DIRECCION X		DIRECCION Y	
Cx	2.50	Cy	2.5
Rx	4.5	Ry	4.5
Cx/R	0.556	Cy/R	0.556

CALCULO DEL PESO DEL EDIFICIO

PISO	DIAFRAGMA	MassX (TON-SEG2/M)	MassY (TON-SEG2/M)
TECHO ASCENSOR	D9	0.5099	0.5099
TECHO ESCALERA	D6	0.6723	0.6723
TECHO ESCALERA	D8	0.8407	0.8407
AZOTEA	D5	26.3215	26.3215
PISO4	D4	31.932	31.932
PISO3	D3	33.861	33.861
PISO2	D2	32.1962	32.1962
PISO1	D1	33.1142	33.1142

CALCULO DEL FACTOR DE ESCALA			
Vx din	257	Vy din.	193.91
Vx est.	347.60	Vy est.	347.60
Vx din/ Vx est	0.74	Vy din/ Vy est	0.56
Cociente min.	0.9	Cociente min.	0.9
Factor (fx)	**1.22**	**Factor (fy)**	**1.61**

DIRECCION X		DIRECCION Y	
Z	0.4	Z	0.4
U	1	U	1
C	2.5	C	2.5
S	1	S	1
P	1564.18	P	1564.18
R	4.5	R	4.5
Vxx est.	**347.60**	**Vyy est.**	**347.60**

PESO (TON)
5.00
6.60
8.25
258.21
313.25
332.18
315.84
324.85

90%Vest 312.836

1564.18 PESO DEL EDIFICIO

ELEMENTO

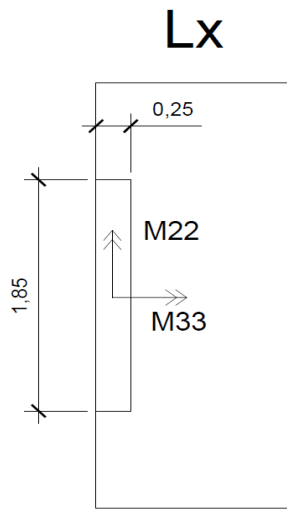
PLACA PL 1

CARGAS

PD	PL	M33: MDy
76.63	17.62	2.87

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-3.29	-1.08	-13.38



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	94.3
Pserv+Pprop+Pterreno (ton)	99.0
h (peralte zapata)	0.6
Area (m2)	2.60
hzapata (m)	0.6
Lx (m)	1.5
Ly(m)	2.9
Area planteada (m2)	4.28
M33: Inercia (CIMENTACION) m4	2.89
M22: Inercia (CIMENTACION) m4	3.15
q adm sim (ton/m2)	52.0

Volado X (m)
Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	94.25	3.99	0.06
2) cargas de gravedad + sismo X	91.62	-6.71	-0.80
3) cargas de gravedad - sismo X	96.88	14.69	0.92
4) cargas de gravedad + sismo Y	97.03	62.31	-0.68
5) cargas de gravedad - sismo Y	91.47	-54.33	0.80

$$\sigma x = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

P

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M22}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M33}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	22.07
2) cg + sx	21.68
3) cg - sx	22.95
4) cg + sy	22.91
5) cg - sy	21.65

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

σu (ton/m2)	51.65		$\emptyset Vc = 0.85 * 1$
A (m2)	4.28		b, d en m
d (m)=h-0.1	0.6		
Ao (m2)	1.35		
bo (m) (perimetro)	3.55		
Vu (ton)	151.19		
øVc (ton)	278.11	OK	

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	111.6		
øVc yy (ton)	58.8		
Cortante en X			
Vu = σu * Ly * x1 (ton)	95.67		OK
Cortante en y			
Vu = σu * Lx * y1 (ton)	-7.75	Cortante en Y	OK

4. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X
Mu = X^2*0.5*Ly*σu (ton-m) 114.99

Cuantia minima (cm2)

Para la dirección Y
Mu = Y^2*0.5*Lx*σu (ton-m) 9.68

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
40.35	100	60	4.34
6.46	100	60	0.67

DE GRAVEDAD

M33: MLy	M22: MD	M22: ML
1.12	0.06	0.00

(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22	M33
3.48	-0.92	72.90

SISMO XX	
PS(+)	M22
-2.63	-0.86

excentricidad (m)	0.625

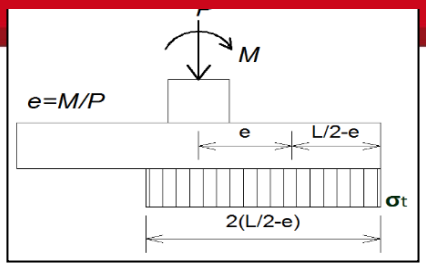
Ly

Nota: Los lados de la zapata variaran en función a las dimensiones de los volados

1.25
0.5

σ max (ton/m2)	σ min (ton/m2)	ey	ex
24.07	20.03	0.04	0.00
17.37	25.49	0.07	0.01
30.76	14.56	0.15	0.01
52.75	-7.35	0.64	0.01
-4.61	47.41	0.59	0.01

σ max yy (ton/m2)
22.72
22.59
25.36
41.32
36.69



51.65

$1.06 * \sqrt{f'c} * b_0 * d * 10\ (tn),$

0.63
0.80

10.8

As	Usar Cuantía min.	As colocado
18.46	NO	3/4" @ 15
2.86	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M33	PS	M22	M33
-10.70	2.78	-0.74	58.32

ELEMENTO

PLACA PL 2

CARGAS

PD	PL	M33: MDx
190.03	42.7	-15.10

CARGAS DE SISMO

SISMO XX		
PS(+)	M33(+x)	M22(+y)
-5.33	-79.20	-8.07

1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	232.7
Pserv+Pprop+Pterreno (ton)	244.4
h (peralte zapata)	0.6
Area (m2)	6.43
hzapata (m)	0.6
Lx (m)	2.6
Ly(m)	6.3
Area planteada (m2)	16.38
M33: Inercia (CIMENTACION) m4	54.18
M22: Inercia (CIMENTACION) m4	9.23
Sismo: qadm (ton/m2)	52.0

Volado X(m)

Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Mxx	Myy
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	232.73	-16.16	0.15
2) cargas de gravedad + sismo X	228.47	-79.52	-6.31
3) cargas de gravedad - sismo X	236.99	47.20	6.61
4) cargas de gravedad + sismo Y	228.07	512.69	-5.91
5) cargas de gravedad - sismo Y	237.39	-545.01	6.21

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{Myy}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{Mxx}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	14.22
2) cg + sx	14.25
3) cg - sx	14.79
4) cg + sy	14.21
5) cg - sy	14.79

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.70
d 0.60

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 1$$

b, d en m

σu (ton/m2)	66.81	
A (m2)	16.38	
d (m)=h-0.1	0.6	
Ao (m2)	6.36	
bo (m) (perimetro)	11.8	
Vu (ton)	669.39	
øVc (ton)	924.42	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	246.8		
øVc yy (ton)	101.8		
Cortante en X			
Vu = σu * Ly * x (ton)	294.61	Cortante en X	NO PASA
Vu = σu * Ly * x1 (ton)	242.00		NO PASA
Cortante en y			
Vu = σu * Lx * y (ton)	121.59	Cortante en Y	NO PASA

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	210.44	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	146.77	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
33.40	100	60	3.57
56.45	100	60	6.17

DE GRAVEDAD

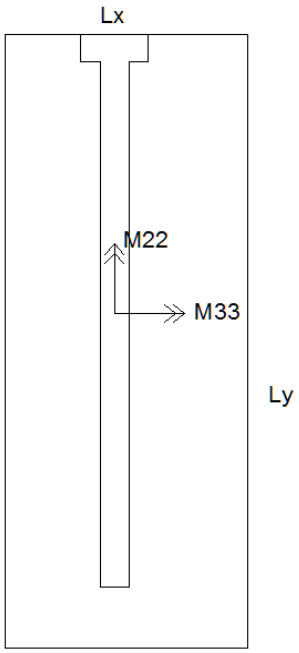
M33: MLx	M22: MDy	M22: MLy
-1.06	0.15	0.00

(AMPLIFICADO POR 1.25)

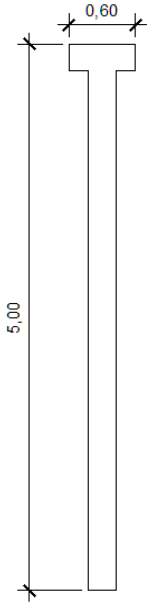
SISMO YY		
PS(+)	M33(+x)	M22(+y)
-5.83	661.06	-7.58

SISMO XX	
PS(+)	M33(+x)
-4.26	-63.36

ZAPATA - PL2



PLACA PL-2

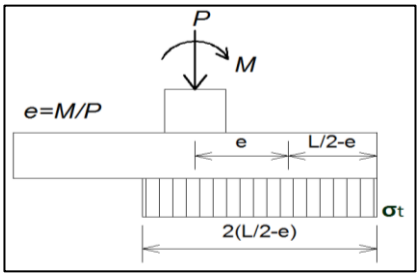


3.15
0.982590164
2.387723725

1
1.3

σ max (ton/m2)	σ min (ton/m2)	ey	ex
13.29	15.13	0.07	0.00
8.44	19.46	0.35	0.03
18.14	10.79	0.20	0.03
42.90	-15.05	2.25	0.03
-16.32	45.31	2.30	0.03

σ max yy (ton/m2)
14.53
15.68
15.45
48.62
53.44



66.81 **AUMENTAR VOLADOS**

10 (tn),

X 0.40
X1 0.575

Y 5.7

1.18 Volado menor en X 1
1.30
10.8

As	Usar Cuantía min.	As colocado	n° FIERROS	As colocado	S
15.18	NO	3/4" @ 15	5.34	12	19.00
26.24	NO	3/4" @ 15	9.24	20	11.00

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22(+y)	PS(+)	M33(+x)	M22(+y)
-6.46	-4.66	528.85	-6.06

2.167409836

S	
20	
20	

ELEMENTO

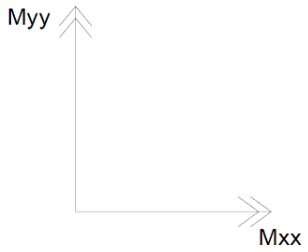
PLACA 3

CARGAS DE

PD	PL	M33Dx
140.07	25.81	-81.14

CARGAS DE SISMO (AM

SISMO XX		
PS(+)	M33	M22
57.97	29.46	-34.47



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2) Suelo	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	165.9
Pserv+Pprop+Pterreno (ton)	174.2
h (peralte zapata)	0.6
Area (m2) minima solicitada	**4.58**
hzapata (m)	0.6
Lx (m)	1.30
Ly(m)	10.65
Area planteada (m2)	**7.43**
M33: Inercia (CIMENTACION) m4	91.80
M22: Inercia (CIMENTACION) m4	0.75
qadm (ton/m2) Sismo	52

Volado Inferior (m)

Volado Superior (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	165.88	-92.32	2.87
2) cargas de gravedad + sismo X	212.26	-68.75	-24.71
3) cargas de gravedad - sismo X	119.50	-115.89	30.45
4) cargas de gravedad + sismo Y	194.43	371.68	-14.90
5) cargas de gravedad - sismo Y	137.33	-556.32	20.64

$$\sigma x = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M22}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M33}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	12.31
2) cg + sx	18.68
3) cg - sx	14.20
4) cg + sy	15.92
5) cg - sy	12.90

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c}$$

b, d en m

σu (ton/m2)	51.82		d
A (m2)	7.43		
d (m)=h-0.1	0.5		
Ao (m2)	3.81	variable	
bo (m) (perimetro)	10.95	variable	
Vu (ton)	187.74		
øVc (ton)	714.86	OK	

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	347.6		
øVc yy (ton)	42.4		
Cortante en X			
Vu = σu * B * x (ton)	55.19	Cortante en X	OK
Cortante en y			
Vu = σu * B * x (ton)	6.74	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X			
Mu = X^2*0.5*Ly*σu (ton-m)	44.15		Cuantia minima (cm2)
Para la dirección Y			

Mu = Y^2*0.5*Lx*σu (ton-m)	12.13		
Mu	b (cm)	d (cm)	a (cm)
4.15	100	50	0.52
9.33	100	50	1.18

N

GRAVEDAD

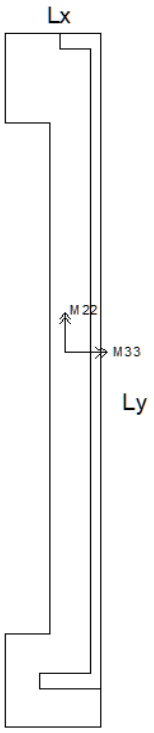
M33Lx	M22Dy	M22Ly
-11.18	2.36	0.51

MPLIFICADO POR 1.25)

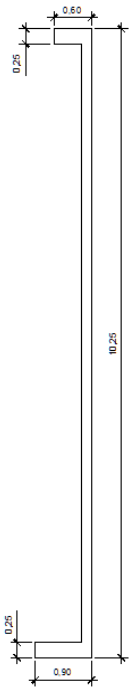
SISMO YY		
PS(+)	M33	M22
35.69	580.00	-22.21

SISMO XX	
PS(+)	M33
46.38	23.57

ZAPATA - 03



PLACA P-3



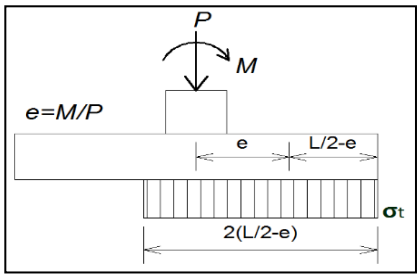
y	1.05
X	1.30
b	8.55
a	0.55
m	1.30

753.97

0.4	c1
0.7	c2

σ max (ton/m2)	σ min (ton/m2)	ey	ex
19.46	25.17	0.56	0.02
3.04	54.08	0.32	0.12
35.89	-3.73	0.97	0.25
34.74	17.58	1.91	0.08
4.19	32.76	4.05	0.15

σ max yy (ton/m2)
13.38
16.32
10.55
21.91
41.46



51.82

$\bar{c} * b_0 * d * 10\ (tn)$,

0.5

10.8

As	As colocado
2.21	5/8" @ 20
4.99	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22	PS(+)	M33	M22
-27.58	28.55	464.00	-17.77

Area	Area (m2)	Y:Centroide (m)	A*Y	d	Para M33 Inercia (m4)	X: Centroide
A1=X*Y	1.365	10.125	13.82	4.80	31.575	0.65
A2=a*b	4.70	5.325	25.04	0.0	28.647	1.025
A3=	1.365	0.53	0.72	4.80	31.575	0.65
A1+A2+A3	7.43		39.58	Total	**91.80**	

Ycg (m)	5.325	Xcg (m)

A*X	d	Para M22 Inercia (m4)
0.89	0.24	0.269
4.82	0.14	0.208
0.89	0.24	0.269
6.59		**0.746**

0.887

ELEMENTO
PLACA PL 4

CARGAS

PD	PL	M33: MDy
190.07	27.81	-101.15

CARGAS DE SISMO

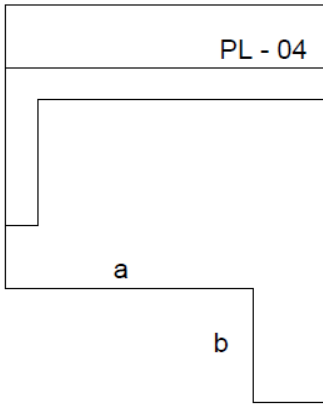
SISMO XX		
PS(+)	M22	M33
-25.97	-183.61	1013.22

1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	217.9
Pserv+Pprop+Pterreno (ton)	228.8
h (peralte zapata)	0.6
Area (m2)	6.02
hzapata (m)	0.6
Lx (m)	5.55
Ly(m)	3.75
Area planteada (m2)	19.10
M33: Inercia (CIMENTACION) m4	46.70
M22: Inercia (CIMENTACION) m4	20.49
q adm sim (ton/m2)	52.0



Volado X (m)
Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	217.88	-122.03	28.55
2) cargas de gravedad + sismo X	197.10	688.55	-118.34
3) cargas de gravedad - sismo X	238.66	-932.60	175.44
4) cargas de gravedad + sismo Y	203.26	-8.44	284.29
5) cargas de gravedad - sismo Y	232.50	-235.61	-227.19

$$\sigma x = \frac{Pg + Psis}{A} \pm \frac{(M33) \cdot Lx/2}{I33} \pm \frac{(M22) \cdot Ly/2}{I22}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M33}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M22}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	13.12
2) cg + sx	-36.59
3) cg - sx	-28.09
4) cg + sy	9.91
5) cg - sy	17.60

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

d 0.5

σu (ton/m2)	48.05
A (m2)	19.10
d (m)=h-0.1	0.5
Ao (m2)	12.19
bo (m) (perimetro)	11.85
Vu (ton)	332.16
øVc (ton)	773.61

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10$$

b, d en m

OK

3. Verificación por cortante

$$Vc = 0.53 \sqrt{f'c}\, b\, d$$

øVc xx (ton)	122.4		
øVc yy (ton)	181.2		
Cortante en X			
Vu = σu * B * x (ton)	126.14	Cortante en X	NO PASA
Cortante en y			
Vu = σu * B * y (ton)	80.01	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X

Mu = X^2*0.5*Ly*σu (ton-m) 129.74

Cuantia minima (cm2)

Para la dirección Y

Mu = Y^2*0.5*Lx*σu (ton-m) 85.34

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
34.60	100	50	4.51
15.38	100	50	1.95

DISEÑO DE CIMENTACIÓN

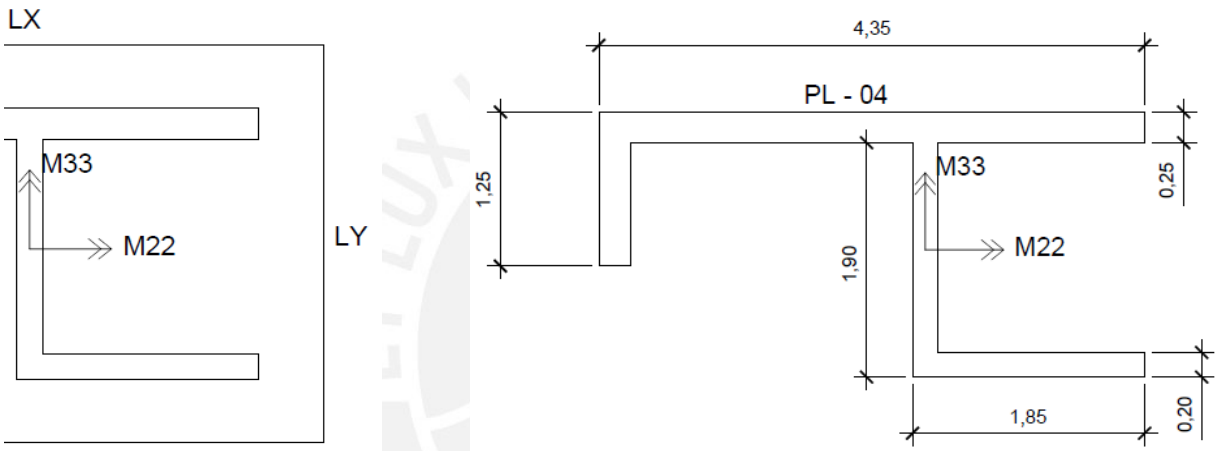
DE GRAVEDAD

M33: MLy	M22: MDx	M22: MLx
-20.88	22.03	6.52

(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22	M33
-18.27	319.68	141.98

SISMO XX	
PS(+)	M22
-20.78	-146.89

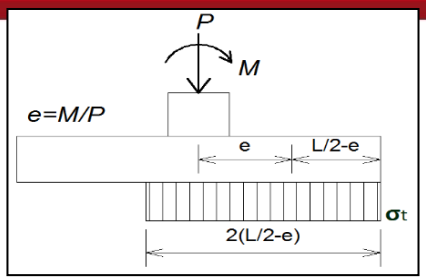


1.2	
0.8	

a (m)	1.9
b (m)	0.9

σ max (ton/m2)	σ min (ton/m2)	ey	ex
6.52	16.29	0.56	0.13
42.07	-21.44	3.49	0.60
-29.04	54.02	3.91	0.74
37.89	-16.61	0.04	1.40
-24.86	49.20	1.01	0.98

σ max yy (ton/m2)
11.26
13.93
18.86
38.44
23.33



48.05

) (tn),

10.8

As	Usar Cuantía min.	As colocado
19.17	NO	3/4" @ 15
8.30	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M33	PS(+)	M22	M33
810.58	-14.62	255.74	113.58

ELEMENTO	X'	Y'	Area	Xcg	Ycg
A1	0.95	2.33	5.42	2.94	2.00
A2	3.73	1.88	13.69		
		Atotal	19.10		

Para A1

Dx	1.9
Dy	2.9
Area-A1	5.42
I33-A1	23.04
I22-A1	4.23

Para A2

Dx	3.7
Dy	3.8
Area-A2	13.69
I33-A2	23.67
I22-A2	16.26

I33	46.70
I22	20.49

ELEMENTO

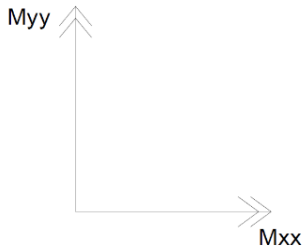
PLACA PL 5

CARGAS

PD	PL	M33: MDy
43.03	6.59	0.00

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-16.65	-0.02	36.68



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	49.6
Pserv+Pprop+Pterreno (ton)	52.1
h (peralte zapata)	0.6
Area (m2)	1.37
hzapata (m)	0.6
Lx (m)	2.4
Ly(m)	1.3
Area planteada (m2)	2.94
M33: Inercia (CIMENTACION) m4	1.35
M22: Inercia (CIMENTACION) m4	0.38
Sismo: qadm (ton/m2)	52.0

Volado X(m)
Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	49.62	0.00	0.00
2) cargas de gravedad + sismo X	36.30	29.34	-0.02
3) cargas de gravedad - sismo X	62.94	-29.34	0.02
4) cargas de gravedad + sismo Y	40.61	6.78	0.39
5) cargas de gravedad - sismo Y	58.63	-6.78	-0.39

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{M33}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{M22}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	16.89
2) cg + sx	39.60
3) cg - sx	35.52
4) cg + sy	16.12
5) cg - sy	22.14

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.60
d 0.50

σu (ton/m2)	49.51	
A (m2)	2.94	
d (m)=h-0.1	0.5	
Ao (m2)	1.39	
bo (m) (perimetro)	5.2	
Vu (ton)	76.73	
øVc (ton)	339.47	OK

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d$$

b, d en m

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	40.8		
øVc yy (ton)	76.7		
Cortante en X			
Vu = σu * Ly * x (ton)	0.00	Cortante en X	OK
Cortante en y			
Vu = σu * Lx * y (ton)	0.00	Cortante en Y	OK

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	7.74	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	14.54	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
6.19	100	50	0.78
6.19	100	50	0.78

DE GRAVEDAD

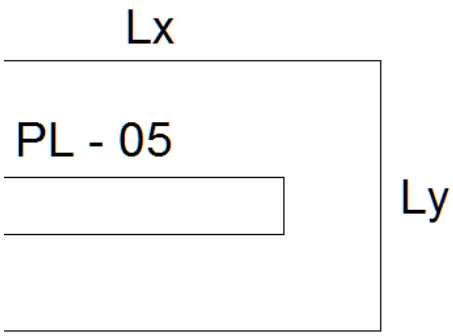
M33: MLy	M22: MDx	M22: MLx
0.00	0.00	0.00

(AMPLIFICADO POR 1.25)

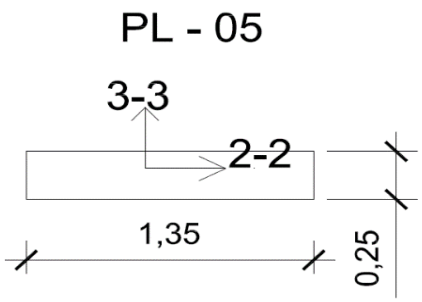
SISMO YY		
PS(+)	M22	M33
-11.26	0.49	8.48

SISMO XX	
PS(+)	M33
-13.32	29.34

ZAPATA - PL5



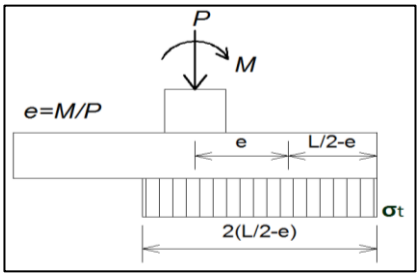
PLACA PL-5



0.5
0.5

σ max (ton/m2)	σ min (ton/m2)	ey	ex
16.89	16.89	0.00	0.00
37.84	-13.12	0.00	0.81
-4.05	46.91	0.00	0.47
20.36	7.29	0.01	0.17
13.42	26.50	0.01	0.12

σ max yy (ton/m2)
16.89
12.37
21.44
14.04
20.17



49.51	OK

$* 10\ (tn),$

X 0.00

Y 0.0

0.50
0.50

10.8

As	Usar Cuantía min.	As colocado
3.30	SI	5/8" @ 20
3.30	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22	PS(+)	M33	M22
-0.02	-9.01	6.78	0.39

ELEMENTO

PLACA PL 6

CARGAS

PD	PL	M33: MD
47.82	5.29	0.00

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-8.90	-0.03	137.79

1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	53.1
Pserv+Pprop+Pterreno (ton)	55.8
h (peralte zapata)	0.6
Area (m2)	1.47
hzapata (m)	0.6
Lx (m)	5.2
Ly(m)	3.2
Area planteada (m2)	16.22
M33: Inercia (CIMENTACION) m4	35.86
M22: Inercia (CIMENTACION) m4	13.41
Sismo: qadm (ton/m2)	52.0

Volado X(m)
Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	53.11	0.00	-0.09
2) cargas de gravedad + sismo X	45.99	110.23	-0.11
3) cargas de gravedad - sismo X	60.23	-110.23	-0.07
4) cargas de gravedad + sismo Y	50.05	17.49	0.18
5) cargas de gravedad - sismo Y	56.17	-17.49	-0.36

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{M33}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{M22}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	3.27
2) cg + sx	40.98
3) cg - sx	12.84
4) cg + sy	3.57
5) cg - sy	3.94

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.60
d 0.50

σu (ton/m2)	51.23	
A (m2)	16.22	
d (m)=h-0.1	0.5	
Ao (m2)	4.11	variable
bo (m) (perimetro)	11.6	variable
Vu (ton)	620.35	
øVc (ton)	757.29	OK

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c}$$

b, d en m

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	102.8		
øVc yy (ton)	168.1		
Cortante en X			
Vu = σu * Ly * x (ton)	96.82	Cortante en X	OK
Cortante en y			
Vu = σu * Lx * y (ton)	263.82	Cortante en Y	NO PASA

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	97.62	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	296.79	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
30.99	100	50	4.02
57.63	100	50	7.78

DE GRAVEDAD

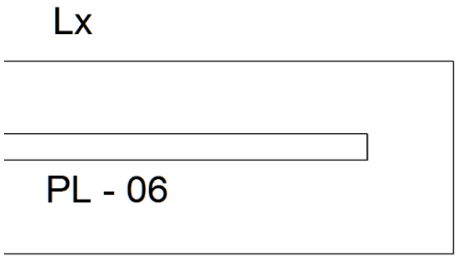
M33: ML	M22: MD	M22: ML
0.00	-0.07	-0.02

(AMPLIFICADO POR 1.25)

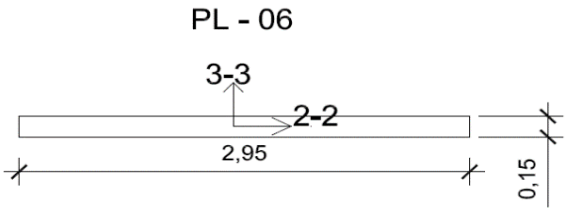
SISMO YY		
PS(+)	M22	M33
-3.82	0.34	21.87

SISMO XX	
PS(+)	M33
-7.12	110.23

ZAPATA - PL6



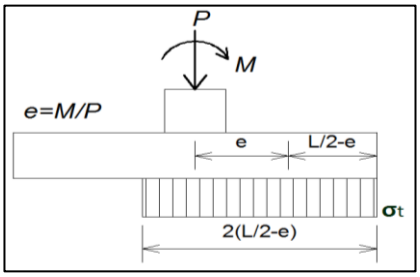
PLACA PL-6



1.1
1.5

σ max (ton/m2)	σ min (ton/m2)	ey	ex
3.26	3.28	0.00	0.00
10.74	-5.07	0.00	2.40
-4.21	11.64	0.00	1.83
4.36	1.81	0.00	0.35
2.16	4.76	0.01	0.31

σ max yy (ton/m2)
3.28
2.84
3.72
3.09
3.48



51.23	OK

$\bar{c} * b_0 * d * 10\ (tn),$

X 0.60

Y 1.00

1.10
1.50

10.8

As	Usar Cuantía min.	As colocado
17.08	NO	5/8" @ 20
33.06	NO	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22	PS(+)	M33	M22
-0.02	-3.06	17.49	0.27

M2	M3
-0.069	-10.816
-0.021	-2.199
-0.031	137.791
0.339	21.868

ELEMENTO

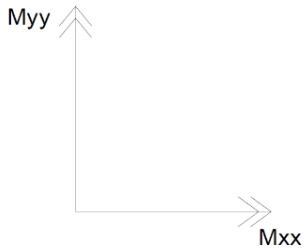
PLACA 8

CARGAS DE

PD	PL	MDx
95.05	13.93	-20.47

CARGAS DE SISMO (AM

SISMO XX		
PS(+)	M(+x)	M(+y)
130.51	27.44	-57.40



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	109.0
Pserv+Pprop+Pterreno (ton)	114.4
h (peralte zapata)	0.6
Area (m2)	3.01
hzapata (m)	0.6
Lx (m)	1.25
Ly(m)	6.9
Area planteada (m2)	5.10
M33: Inercia (CIMENTACION) m4	29.67
M22: Inercia (CIMENTACION) m4	0.71
Sismo: qadm (ton/m2)	48.0

1.4

7.2

Volado X (m)
Volado Y (m)
a (m)
b (m)
c (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Mxx	Myy
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	108.98	-23.99	4.57
2) cargas de gravedad + sismo X	213.39	-2.04	26.52
3) cargas de gravedad - sismo X	4.57	-45.94	-17.38
4) cargas de gravedad + sismo Y	82.64	214.34	13.27
5) cargas de gravedad - sismo Y	135.32	-262.32	-4.13

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{I33} \pm \frac{(M22)\cdot Lx/2}{I22}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{M22}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{M33}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	13.54
2) cg + sx	30.88
3) cg - sx	-0.10
4) cg + sy	12.90
5) cg - sy	16.50

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c}$$

b, d en m

σu (ton/m2)	48.25	
A (m2)	5.10	
d (m)=h-0.1	0.5	
Ao (m2)	4.18	
bo (m) (perimetro)	9	
Vu (ton)	44.39	
øVc (ton)	587.55	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	225.2		
øVc yy (ton)	40.8		
Cortante en X			
Vu = σu * B * x (ton)	-49.93	Cortante en X	OK
Cortante en y			
Vu = σu * B * x (ton)	-9.05	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	20.39	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	10.86	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
2.9551	100	50	0.37
8.68	100	50	1.09

N

GRAVEDAD

MLx	MDy	MLy
-3.52	3.64	0.93

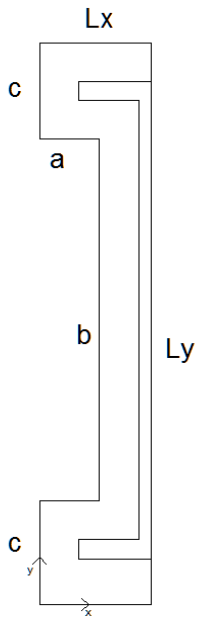
IPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M(+x)	M(+y)
-32.92	297.91	10.88

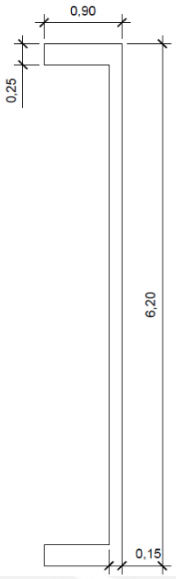
CA

SISMO XX	
PS(+)	M(+x)
104.41	21.95

ZAPATA - 08



PLACA P-8



RESPECTO A LOS EJES X y Y

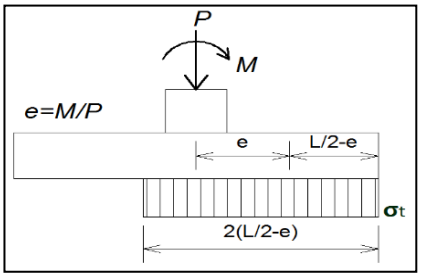
ELEMENTO	X'
A	0.63
B	0.63
C	1.00

	A
DX	1.3
DY	1.25
AREA	1.5625
I33	12.67
I22	0.32

0.35
0.35
0.75
4.7
1.25

σ max (ton/m2)	σ min (ton/m2)	ey	ex
23.31	19.43	0.22	0.04
41.84	14.62	0.01	0.12
0.90	24.23	10.05	3.80
16.20	2.46	2.59	0.16
26.53	30.81	1.94	0.03

σ max yy (ton/m2)
13.50
24.81
-0.28
38.60
35.81



48.25

$* b_0 * d * 10\ (tn)$,

10.8

As	As colocado
1.57	5/8" @ 20
4.65	5/8" @ 20

RGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M(+y)	PS(+)	M(+x)	M(+y)
-45.92	-26.34	238.33	8.70

Y'	Area (m2)	Xcg	Ycg
0.63	1.56	0.73	3.45
3.45	2.35		
6.28	1.56		
	5.48		

B	C	
0.5	1.3	
4.7	1.25	
2.35	1.5625	
4.33	12.67	29.67
0.08	0.32	0.71

ELEMENTO

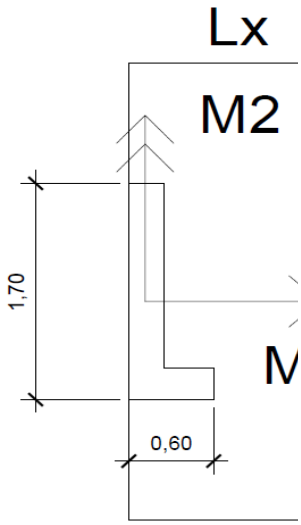
PLACA PL 10

CARGAS

PD	PL	M33: MDy
86.01	19.52	-0.10

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-9.07	-12.15	-24.09



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	105.5
Pserv+Pprop+Pterreno (ton)	110.8
h (peralte zapata)	0.6
Area (m2)	2.92
hzapata (m)	0.6
Lx (m)	1.60
Ly(m)	2.90
Area planteada (m2)	4.64
M33: Inercia (CIMENTACION) m4	3.25
M22: Inercia (CIMENTACION) m4	3.26
q adm sim (ton/m2)	52.0

Volado X (m)
Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	105.53	-0.03	1.83
2) cargas de gravedad + sismo X	98.27	-19.30	-7.89
3) cargas de gravedad - sismo X	112.79	19.25	11.55
4) cargas de gravedad + sismo Y	111.22	65.22	13.86
5) cargas de gravedad - sismo Y	99.84	-65.27	-10.20

$$\sigma x = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

P

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M22}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M33}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	23.25
2) cg + sx	23.54
3) cg - sx	27.88
4) cg + sy	28.39
5) cg - sy	24.67

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

d 0.5

σu (ton/m2)	50.31
A (m2)	4.64
d (m)=h-0.1	0.5
Ao (m2)	1.87
bo (m) (perimetro)	3.9
Vu (ton)	139.35
øVc (ton)	254.61

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10$$

b, d en m

OK

3. Verificación por cortante

$$Vc = 0.53 \sqrt{f'c}\, b\, d$$

øVc xx (ton)	94.7		
øVc yy (ton)	52.2		
Cortante en X			
Vu = σu * B * x (ton)	72.95	Cortante en X	OK
Cortante en y			
Vu = σu * B * y (ton)	8.05	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X

Mu = X^2*0.5*Ly*σu (ton-m) 72.95

Cuantia minima (cm2)

Para la dirección Y

Mu = Y^2*0.5*Lx*σu (ton-m) 14.49

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
25.15	100	50	3.24
9.06	100	50	1.14

DE GRAVEDAD

M33: MLy	M22: MD	M22: ML
0.07	1.87	-0.04

(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22	M33
7.11	15.04	81.56

SISMO XX	
PS(+)	M22
-7.26	-9.72

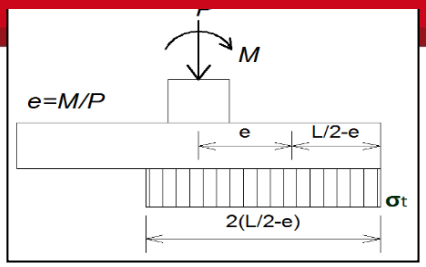
Ly

13

1.00
0.60

σ max (ton/m2)	σ min (ton/m2)	ey	ex
24.21	21.28	0.00	0.02
6.20	36.16	0.20	0.08
42.22	6.39	0.17	0.10
64.25	-16.32	0.59	0.12
-15.83	58.87	0.65	0.10

σ max yy (ton/m2)
22.75
24.50
27.55
40.25
39.19



50.31

OK

) (tn),

10.8

As	Usar Cuantía min.	As colocado
13.75	NO	5/8" @ 15
4.85	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M33	PS	M22	M33
-19.27	5.69	12.03	65.25

ELEMENTO
PLACA PL 11

CARGAS

PD	PL	M33: MDx
158.96	38.91	1.80

CARGAS DE SISMO

SISMO XX		
PS(+)	M(+x)	M(+y)
-2.89	-27.09	-10.70

1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	197.9
Pserv+Pprop+Pterreno (ton)	207.8
h (peralte zapata)	0.6
Area (m2)	5.47
hzapata (m)	0.6
Lx (m)	1.8
Ly(m)	4.55
Area planteada (m2)	8.19
M33: Inercia (CIMENTACION) m4	14.13
M22: Inercia (CIMENTACION) m4	2.21
qadm (ton/m2)	52.0

Volado (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Mxx	Myy
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	197.87	3.54	0.93
2) cargas de gravedad + sismo X	195.56	-18.13	-20.74
3) cargas de gravedad - sismo X	200.18	25.21	22.60
4) cargas de gravedad + sismo Y	195.46	186.64	6.37
5) cargas de gravedad - sismo Y	200.28	-179.56	-4.51

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

CASO	σ max-xx (ton/m2)
1) carg grav	24.29
2) cg + sx	27.07
3) cg - sx	27.95
4) cg + sy	24.76
5) cg - sy	25.08

σu (ton/m2)

2. Verificación por punzonamiento

d 0.5

σu (ton/m2)	51.41	
A (m2)	8.19	
d (m)=h-0.1	0.5	
Ao (m2)	3.00	variable
bo (m) (perimetro)	9.5	variable
Vu (ton)	266.82	
øVc (ton)	620.19	OK

3. Verificación por cortante

øVc xx (ton)	148.5	$Vc = 0.53\sqrt{f'c}\, b\, d$	
øVc yy (ton)	58.8		
Cortante en X			
Vu = σu * B * x (ton)	70.17	Cortante en X	OK
Vu = σu * B * x1 (ton)	100.58		OK
Cortante en y			
Vu = σu * B * y (ton)	27.76	Cortante en Y	OK

4. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	49.41	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	29.61	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
10.86	100	50	1.37
16.45	100	50	2.09

DE GRAVEDAD

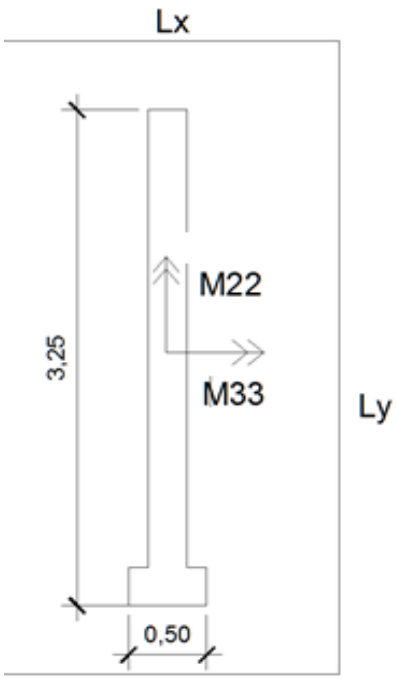
M33: MLx	M22: MDy	M22: MLy
1.74	0.73	0.20

(AMPLIFICADO POR 1.25) **CA**

SISMO YY		
PS(+)	M(+x)	M(+y)
-3.01	228.87	6.80

SISMO XX	
PS(+)	M(+x)
-2.31	-21.67

ZAPATA - 11

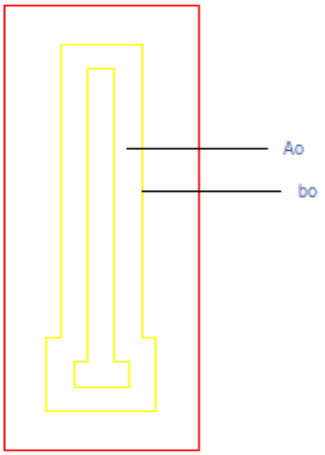


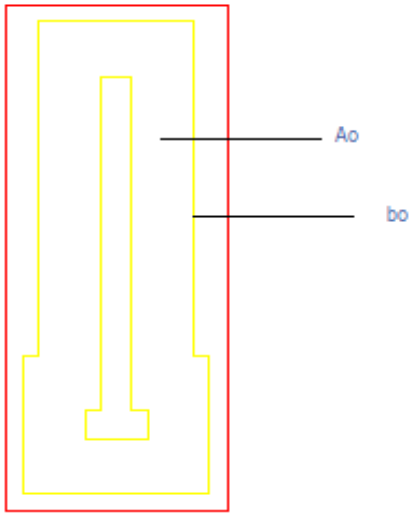
0.65

σ max (ton/m2)	σ min (ton/m2)	ey	ex
25.11	23.21	0.02	0.00
12.52	35.24	0.09	0.11
37.70	11.18	0.13	0.11
56.51	-8.78	0.95	0.03
-6.29	55.20	0.90	0.02

σ max yy (ton/m2)
24.35
24.89
25.87
41.13
40.36

51.41





0.78
0.80

10.8

As	Usar Cuantía min.	As colocado
5.83	SI	5/8" @ 20
8.89	SI	5/8" @ 20

RGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M(+y)	PS(+)	M(+x)	M(+y)
-8.56	-2.41	183.10	5.44

ELEMENTO

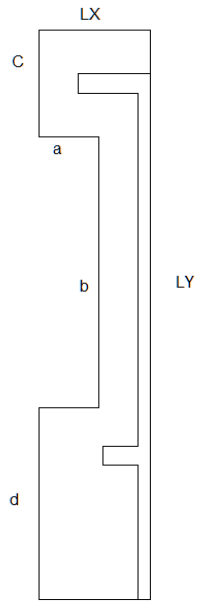
PLACA 12

CARGAS DE G

PD	PL	MD33
103.76	19.49	-12.88

CARGAS DE SISMO (AMF

SISMO XX		
PS(+)	M33	M22
130.51	-29.39	-5.26



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	123.3
Pserv+Pprop+Pterreno (ton)	129.4
h (peralte zapata)	0.6
Area (m2)	3.41
hzapata (m)	0.6
Lx (m)	1.25
Ly(m)	7.15
a (m)	0.75
b (m)	3.53
Area planteada (m2)	6.29
M33: Inercia (CIMENTACION) m4	35.43
M22: Inercia (CIMENTACION) m4	0.85

Volado X (m)
Volado Y (m)
a (m)
b (m)
c (m)
d (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	123.25	-14.51	-0.18
2) cargas de gravedad + sismo X	227.66	-38.02	-23.69
3) cargas de gravedad - sismo X	18.84	9.00	23.33
4) cargas de gravedad + sismo Y	96.91	255.54	23.98

5) cargas de gravedad - sismo Y	149.59	-284.56	-24.34

$$\sigma x = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{M22}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{M33}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	13.82
2) cg + sx	30.56
3) cg - sx	-2.15
4) cg + sy	17.95
5) cg - sy	22.63

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

σu (ton/m2)	51.65	
A (m2)	6.29	
d (m)=h-0.1	0.5	
Ao (m2)	5.52	
bo (m) (perimetro)	8.25	
Vu (ton)	39.90	
øVc (ton)	316.82	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	233.4		
øVc yy (ton)	40.8		
Cortante en X			
Vu = σu * B * x (ton)	-55.39	Cortante en X	OK
Cortante en y			
Vu = σu * B * x (ton)	-12.91	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X

Mu = X^2*0.5*Ly*σu (ton-m)	22.62	Cuantia minima (cm2)
		S

Para la dirección Y

Mu = Y^2*0.5*Lx*σu (ton-m) 11.62

	Mu	b (cm)	d (cm)
M11 INF	0.00	100	50
M11 SUP	10.00	100	50
M22 INF	10	100	50
M22 SUP	10	100	50

RAVEDAD

ML33	MD22	ML22
-1.63	-0.33	0.15

LIFICADO POR 1.25)

SISMO YY		
PS(+)	M33	M22
-32.92	337.56	30.20

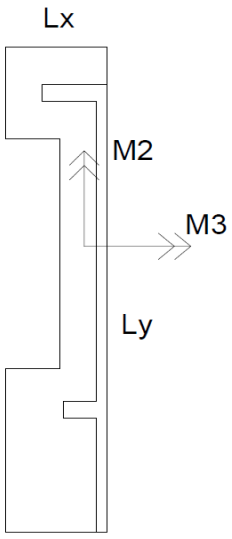
CARGAS DE SISM

SISMO XX		
PS(+)	M33	M22
104.41	-23.51	-4.21

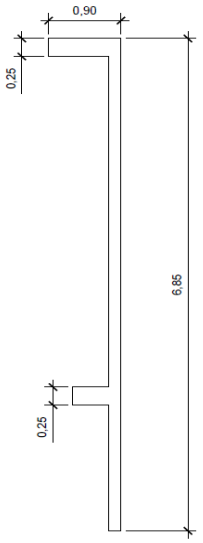
RESPECTO A LOS EJES X y Y

ELEMENTO	X'	Y'
A	0.63	1.25
B	1.00	3.58
C	0.63	6.45

ZAPATA - 12



PLACA P-12



	A	B
DX	1.3	0.5
DY	2.5	3.53
AREA	3.125	1.765
I33	13.98	2.03
I22	0.44	0.17

0.35
0.30
0.75
3.53
1.4
2.5

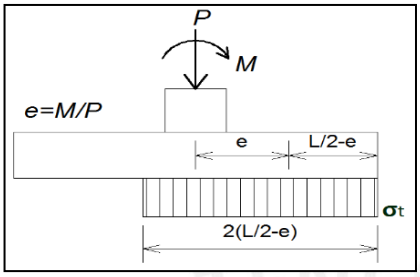
σ max (ton/m2)	σ min (ton/m2)	ey	ex
18.11	21.07	0.12	0.00
12.61	59.78	0.17	0.10
23.62	-17.63	0.48	1.24
59.12	-28.31	2.64	0.25

-22.89	70.46	1.90	0.16

σ max yy (ton/m2)
14.26
26.72
2.43
41.32
35.77

51.65

OK



10.8

16.7 20

hacer modelo en sap para diseñar por flexion

a (cm)	As	As colocado
0.00	0.00	5/8" @ 20
1.26	5.36	5/8" @ 20
1.26	5.36	5/8" @ 20
1.26	5.36	5/8" @ 20

IO (EN SERVICIO)

SISMO YY		
PS(+)	M33	M22
-26.34	270.05	24.16

Area (m2)	Xcg	Ycg
3.13	0.72	3.24
1.77		
1.75		
6.64		

C	
1.3	
1.4	
1.75	
19.41	35.43
0.25	0.85

ELEMENTO

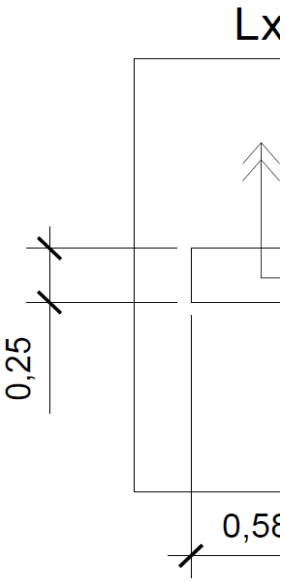
C1

CA

PD	PL	MD33
65.56	11.93	-2.22

CARGAS I

SISMO XX		
PS(+)	M22	M33
-5.89	-0.07	2.62



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
Sismo: qadmsis (ton/m2)	52.0
Cargas de serv. Axiales (ton)	77.5
Pserv+Pprop+Pterreno (ton)	81.4
Area (m2)	**2.03**
hzapata (m)	0.6
Lx (m)	1.13
Ly(m)	2.05
Area planteada (m2)	2.32
excentricidad (m)	0.275
M22: Inercia (m4) = Lx*Ly^3/12	0.81
M33: Inercia (m4) = Ly*Lx^3/12	0.25

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	81.4	-2.36	0.26
2) cargas de gravedad + sismo X	76.65	-0.26	0.20
3) cargas de gravedad - sismo X	86.08	-4.46	0.32
4) cargas de gravedad + sismo Y	81.48	-2.41	0.59
5) cargas de gravedad - sismo Y	81.25	-2.31	-0.07

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M22)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M33)\cdot Lx/2}{(Ly * Lx^3)/12}$$

σ(Max)
σ (Min)

1.3. Empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M33}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M22}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	37.02
2) cg + sx	33.29
3) cg - sx	40.91
4) cg + sy	37.12
5) cg - sy	36.93

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'}$$

b, d en m

h: peralte zapata

σu (ton/m2)	51.13	
A (m2)	2.32	
d (m)=h-0.1	0.5	
Ao (m2)	0.81	
bo (m) (perimetro)	3.66	
Vu (ton)	77.03	
øVc (ton)	238.94	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	66.9		
øVc yy (ton)	36.9		
Cortante en X			
Vu = σu * Ly* x (ton)	-26.21	Cortante en X	OK
Cortante en y			
Vu = σu * Lx * y (ton)	23.11	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X

Mu = X^2*0.5*Ly*σu (ton-m)	3.28	Cuantia minima (cm2)

Para la dirección Y			
Mu = Y^2*0.5*Lx*σu (ton-m)	23.40		
Mu (Para 1m)	b (cm)	d (cm)	a (cm)
1.60	100	50	0.20
20.71	100	50	2.65

ARGAS DE GRAVEDAD

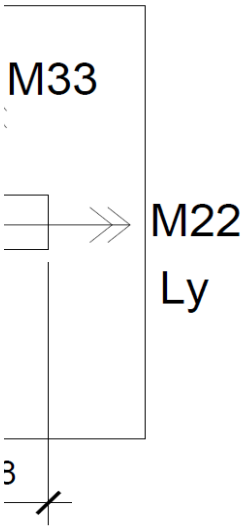
ML33	MD22	ML22
-0.14	0.21	0.05

DE SISMO (Amplificada 1.25)

SISMO YY		
PS(+)	M22	M33
0.14	0.41	-0.07

PS(+)
-4.71

DIMENSIONES DE COLUMNA	Dx (m)	0.58
	Dy (m)	0.25

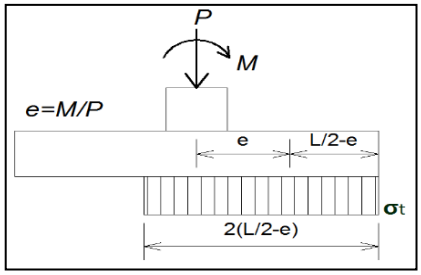


volado en x1 (m)	0.25	
volado en x2 (m)	0.3	(horizontal)
volado en y(m)	0.9	(vertical)

σ max (ton/m2)	σ min (ton/m2)	ex	ey
30.04	40.20	0.029	0.00
32.74	33.44	0.003	0.00
27.35	46.97	0.052	0.00
30.38	39.96	0.030	0.01
29.70	40.45	0.028	0.00

46.97	OK
27.35	OK

σ max yy (ton/m2)
35.23
33.17
37.29
35.42
35.10



51.13

$\overline{c} * b_0 * d * 10\ (tn)$,

0.6

10.8

As	Usar Cuantía Min.	As colocado
0.85	SÍ	5/8" @ 20
11.26	NO	5/8" @ 15

Si uso de 5/8	5.628	10
	S	20

CARGAS DE SISMO (En servicio)

SISMO XX		SISMO YY		
M22	M33	PS(+)	M22	M33
-0.06	2.10	0.11	0.33	-0.05

	Pu	Mu
	135.964	40.7892

ELEMENTO

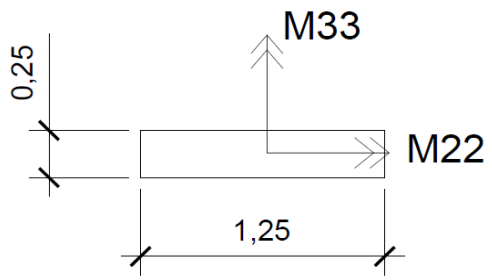
C3

CARGAS

PD	PL	MD33
78.49	15.34	-2.22

CARGAS DE SISI

SISMO XX		
PS(+)	M22	M33
-4.49	-0.16	23.06



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
Sismo: qadmsis (ton/m2)	52.0
Cargas de serv. Axiales (ton)	93.8
Pserv+Pprop+Pterreno (ton)	98.5
Area (m2)	**2.46**
hzapata (m)	0.6
Lx (m)	1.85
Ly(m)	1.85
Area planteada (m2)	3.42
excentricidad (m)	0.3
M22: Inercia (m4) = Lx*Ly^3/12	0.98
M33: Inercia (m4) = Ly*Lx^3/12	0.98

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	98.5	-2.74	0.20
2) cargas de gravedad + sismo X	94.93	15.71	0.07
3) cargas de gravedad - sismo X	102.11	-21.19	0.32
4) cargas de gravedad + sismo Y	101.47	-9.39	0.91
5) cargas de gravedad - sismo Y	95.57	3.91	-0.52

$$\sigma = \frac{P_g + P_{sis}}{A} \pm \frac{(M22) * Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M33) * Lx/2}{(Ly * Lx^3)/12}$$

1.3. Empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{Lx}{2} - \frac{M33}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{Ly}{2} - \frac{M22}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	29.68
2) cg + sx	33.78
3) cg - sx	38.46
4) cg + sy	32.94
5) cg - sy	29.22

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} *$$

b, d en m

h: peralte zapata

σu (ton/m2)	62.01		
A (m2)	3.42		
d (m)=h-0.1	0.5		
Ao (m2)	1.125	variable	
bo (m) (perimetro)	3.75	variable	
Vu (ton)	142.47		
øVc (ton)	244.81	OK	

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	60.4	X: 0.10	
øVc yy (ton)	60.4	Y: 0.30	
Cortante en X			
Vu = σu * Ly* x (ton)	11.47	Cortante en X	OK
Cortante en y			
Vu = σu * Lx * y (ton)	34.42	Cortante en Y	OK

3. Diseño por flexión

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	20.65	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	36.71	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
11.16	100	50	1.41
19.84	100	50	2.53

DE GRAVEDAD

ML33	MD22	ML22
-0.52	0.15	0.04

MO (Amplificada 1.25)

SISMO YY		
PS(+)	M22	M33
3.69	0.89	-8.31

C

SISMO XX	
PS(+)	M22
-3.59	-0.13

DIMENSIONES DE COLUMNA	Dx (m)	1.25
	Dy (m)	0.25

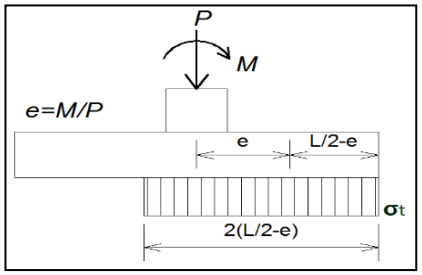
Cx (m)	0.6	(horizontal)	dar valores	0.5
Cy (m)	0.80	(vertical)		1.2

σ max (ton/m2)	σ min (ton/m2)	ex	ey
26.37	31.20	0.028	0.00
42.69	12.79	0.165	0.00
10.06	49.61	0.208	0.00
21.61	37.69	0.093	0.01
31.14	24.71	0.041	0.01

49.61

62.01014254

σ max yy (ton/m2)
28.85
27.76
29.94
29.94
28.09



62.01 **AUMENTAR VOLADOS**

$* b_0 * d * 10\ (tn)$,

0.6

10.8

As	Usar Cuantía Min.	As colocado
5.99	SÍ	5/8" @ 20
10.77	SÍ	5/8" @ 20

Si uso de 5/8	5.386	10
	S	20

ARGAS DE SISMO (En servicio)

	SISMO YY		
M33	PS(+)	M22	M33
18.45	2.95	0.71	-6.65

ELEMENTO

PLACA PL 9

PD	PL	M33: MDy
87.65	16.59	-9.25

CARGAS DE

SISMO XX		
PS(+)	M22(+x)	M33(+y)
-11.77	-0.04	135.82

ELEMENTO

COLUMNA COL 2

PD	PL	M22: MDy
78.36	16.59	-0.21

CARGAS DE

SISMO XX		
PS(+)	M22(+y)	M33(+x)
-56.33	-1.52	-0.31

1. Pre dimensionamiento PL 9

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	104.2
Pserv+Pprop+Pterreno (ton)	109.5
h (peralte zapata)	0.6
Area (m2)	2.74
hzapata (m)	0.6
Lx (m)	1.5
Ly(m)	2.0
Area planteada (m2)	2.83
M33: Inercia (CIMENTACION) m4	0.90
M22: Inercia (CIMENTACION) m4	2.14
qadm (ton/m2)	48.0

q (ton/m2)

Volado (m)

NOTA: COMO VEMOS LA DISTANCIA DE LA CIMENTACION ENTRE LA PLACA Y COLUMNA ES MUY

1. Pre dimensionamiento ZAPATA COMBINADA

Llevamos todas las cargas de gravedad al centro de cargas

Datos para zapata combinada

0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	199.2

Pserv+Pprop+Pterreno (ton)	209.1
h (peralte zapata)	0.6
Area (m2)	5.50
hzapata (m)	0.6
Lx (m)	4.7
Ly(m)	2.15
Area planteada (m2)	10.12
M33: Inercia (CIMENTACION) m4	18.66
M22: Inercia (CIMENTACION) m4	5.70
Sismo: qadm (ton/m2)	48.0

OK

Volado en X: C2

Volado en y: C1

CENTROIDE DE LOS ELEMENTOS REFERENTE A O

Elemento	Xcg	Ycg
C-2	0.83	1.08
PL-9	2.91	0.83
ZAPATA	2.4	1.1

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Myy	Mxx
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	199.19	-99.15	23.32
2) cargas de gravedad + sismo X	144.71	8.29	23.04
3) cargas de gravedad - sismo X	253.67	-206.59	23.60
4) cargas de gravedad + sismo Y	179.56	-137.32	26.68
5) cargas de gravedad - sismo Y	218.82	-60.99	22.23

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

CASO	σ max-xx (ton/m2)
1) carg grav	24.98
2) cg + sx	14.66
3) cg - sx	38.35
4) cg + sy	26.30
5) cg - sy	24.54

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

d 0.5

ZAPATA COMBINADA			h 0.6
σu (ton/m2)	47.94		
A (m2)	10.12		
d (m)=h-0.1	0.50		
Ao (m2)	2.96		
bo (m) (perimetro)	10.90	variable	
Vu (ton)	342.95		
øVc (ton)	711.59	OK	

3. Verificación por cortante

ZAPATA COMBINADA

øVc xx (ton)	70.2	$Vc = 0.53\sqrt{f'c}\, b\, d$
øVc yy (ton)	153.6	
Cortante en X		
Vu = σu * Ly * x (ton)	20.62	OK
Cortante en y		
Vu = σu * Lx * y (ton)	45.11	OK

4. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X			Cuantia minima (cm2)
Mu = X^2*0.5*Ly*σu (ton-m)	25.25		
Para la dirección Y			
Mu = Y^2*0.5*Lx*σu (ton-m)	55.27		

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
11.75	100	50	1.48
11.75	100	50	1.48

ARGAS DE GRAVEDAD

M33: MLy	M22: MDx	M22: MLx
-2.22	0.00	0.00

SISMO (AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22(+x)	M33(+y)
1.93	0.82	-48.25

ARGAS DE GRAVEDAD

M22: MLy	M33: MDx	M33: MLx
-0.03	-2.20	-0.54

SISMO (AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22(+y)	M33(+x)
-26.47	0.54	3.38

1. Pre dimensionamiento COL 2

1.1. Pre dimensionamiento por cargas de gravedad

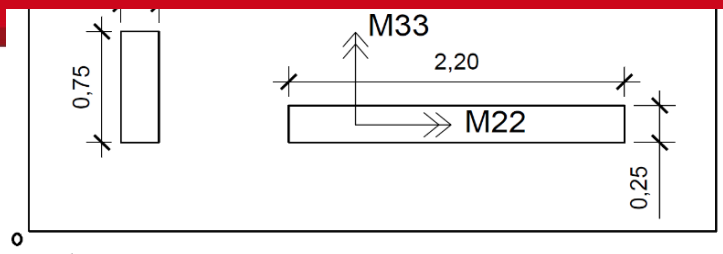
Datos

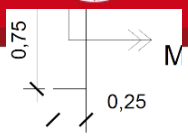
qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	95.0
Pserv+Pprop+Pterreno (ton)	99.7
h (peralte zapata)	0.6
Area (m2)	2.49
hzapata (m)	0.6
Lx (m)	2.9
Ly(m)	1.0
Area planteada (m2)	2.76
M33: Inercia (CIMENTACION) m4	1.93
M22: Inercia (CIMENTACION) m4	2.86
qadm (ton/m2)	52.0

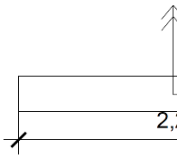
38.71

0.6

PEQUEÑO, POR ELLO RESULTA MEJOR DIMENSIONAR UNA ZAPATA COMBINADA







0.70
0.70

MOMENTOS GENERADOS POR EL DESPLAZAMIENTO DE LAS FUERZAS AXIALES

M33	M22
-145.0	0.00
57.6	26.1

σ max (ton/m2)	σ min (ton/m2)	ex	ey
-3.32	144.22	0.50	0.12
93.92	8.44	0.06	0.16
-100.56	280.00	0.81	0.09
-46.89	173.89	0.76	0.15
43.56	111.22	0.28	0.10

σ max yy (ton/m2)
22.10
16.79
27.45
20.60
23.89

47.94	OK

$$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10\ (tn),$$

b, d en m

0.70
0.70

10.8

As	Usar Cuantía min.	As colocado
6.31	SI	5/8" @ 20
6.31	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

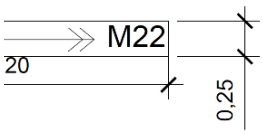
SISMO XX			SISMO YY		
PS(+)	M22(+x)	M33(+y)	PS(+)	M22(+x)	M33(+y)
-9.42	-0.03	108.66	1.54	0.66	-38.60

CARGAS DE SISMO (EN SERVICIO)

SISMO XX			SISMO YY		
PS(+)	M22(+y)	M33(+x)	PS(+)	M22(+y)	M33(+x)
-45.06	-1.22	-0.25	-21.18	0.43	2.70

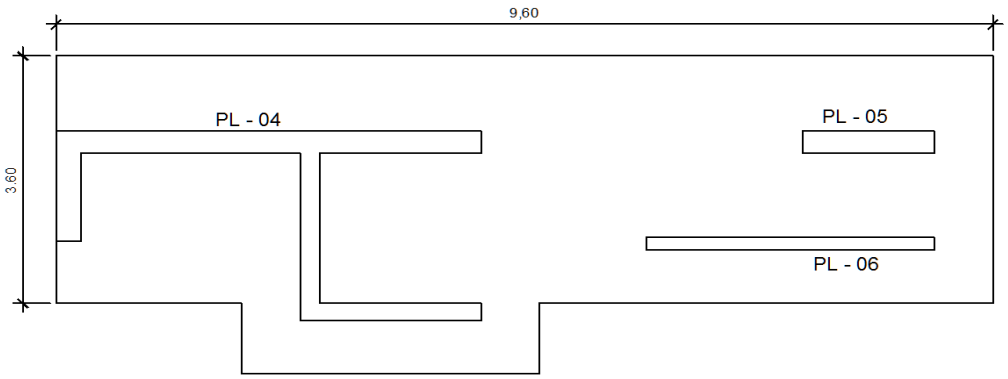
q (ton/m2) 36.19
Volado (m) 0.35

M33



AL CENTRO DE LA ZAPATA

DISEÑO DE ZAPATA COMBINADA



1. CARGAS DEL ANALISIS ESTRUCUTURAL ACTUANTES EN CIMENTACION

PLACA	CARGAS DE GRAVEDAD				
	PD	PL	MDx	MLx	MDy
PL-04	190.06	27.81	-101.21	-20.89	22.04
PL-05	43.03	6.59	0.00	0.00	0.00
PL-06	47.82	5.29	-10.81	-2.20	-0.07

PLACA	SISMO X-X			SISMO Y-Y	
	PS(+x)	**M(+x)**	M(+y)	PS(+y)	M(+x)
PL-04	-24.47	861.87	-199.37	-16.08	133.77
PL-05	-13.54	31.84	-0.04	-9.10	7.77
PL-06	-7.64	116.45	-0.05	-3.26	19.95

nota:según el analisis las tres placas estan en traccion o compresion a la vez.

2.DIMENSIONES PRELIMINARES Y COORDENADAS PARA LA ZAPATA COMBINADA A DISEÑAR

PERALTE DE ZAPATA (m)	0.60
PROFUNDIDAD DE DESPLANTE (m)	0.60
AREA DE LA ZAPATA (m2)	29.32
X CENTRO DE GRAVEDAD DE ZAPATA	4.69
Y CENTRO DE GRAVEDAD DE ZAPATA	2.05
INERCIA X-X (m4)	24.94
INERCIA Y-Y (m4)	212.56
PESO PROPIO DE LA ZAPATA (ton)	42.22
PESO DEL RELLENO SOBRE LA ZAPATA (ton)	0.00
TOTAL DE PESO PROPIO + RELLENO (ton)	42.22

f'c (kg/cm2)
Lx (m)
Ly (m)

Primero se trasladará todas las cargas al C.G. de la zapata.
Consideramos la ubicación del origen de coordenadas en el C.G. de la zapata.

Se tienen las siguientes coordenadas para el C.G. de cada elemento.

PLACA	Xcg	Ycg
PL-04	-2.465	-0.011
PL-05	3.639	0.575
PL-06	2.839	-0.575

Cargas totales reducidas al centro de gravedad de la zapata combinada

CASOS	ELEMENTO	**P (ton)**	Mx-x (ton.m)	My-y (ton.m)	Mx-x trasl. (ton.m)
A) CARGAS DE GRAVEDAD	PL-04	**217.87**	-122.10	28.57	-536.94
	PL-05	**49.62**	0.00	0.00	180.59
	PL-06	**53.11**	-13.01	-0.09	150.80
B) CARGAS DE GRAVEDAD + SISMO X-X	PL-04	**193.40**	739.77	-170.80	-476.63
	PL-05	**36.08**	31.84	-0.04	131.29
	PL-06	**45.47**	103.44	-0.14	129.11
C) CARGAS DE GRAVEDAD - SISMO X-X	PL-04	**242.34**	-983.97	15.51	-597.25
	PL-05	**63.16**	-31.84	0.00	229.88
	PL-06	**60.75**	-129.46	-0.05	172.49
D) CARGAS DE GRAVEDAD + SISMO Y-Y	PL-04	**201.79**	11.67	305.48	-497.31
	PL-05	**40.52**	7.77	0.40	147.48
	PL-06	**49.85**	6.94	0.19	141.53
E) CARGAS DE GRAVEDAD - SISMO Y-Y	PL-04	**233.95**	-255.87	-248.34	-576.57
	PL-05	**58.72**	-7.77	-0.40	213.69
	PL-06	**56.37**	-32.96	-0.37	160.07

Cálculo de la presión máxima sobre el suelo para la zapata combinada

CASOS	R (ton)	Mx-x (ton.m)	My-y (ton.m)	R/A (ton/m2)	$M_{x-x}X/I_{y-y}$ (ton/m2)	$M_{y-y}Y/I_{x-x}$ (ton/m2)
A	362.82	-340.66	24.01	12.375	-7.693	1.733
B	317.16	658.82	-178.56	10.817	14.878	-12.888
C	408.48	-1340.15	14.11	13.932	-30.263	1.018
D	334.38	-181.92	298.43	11.405	-4.108	21.539
E	391.26	-499.41	-250.41	13.345	-11.278	-18.073

Empleando metodo de Meyerhof

$$\sigma_{max.X-X} = \frac{P}{2(\frac{L_x}{2} - \frac{M_{xx}}{P})L_y} \qquad \sigma_{max.Y-Y} = \frac{P}{2(\frac{L_y}{2} - \frac{M_{yy}}{P})L_x}$$

CASOS	R (ton)	Mx-x (ton.m)	My-y (ton.m)	σmax X-X	σmax Y-Y
A	362.82	-340.66	24.01	13.051	10.899
B	317.16	658.82	-178.56	16.179	13.354
C	408.48	-1340.15	14.11	37.345	12.051
D	334.38	-181.92	298.43	10.912	19.191
E	391.26	-499.41	-250.41	15.422	17.567

3. VERIFICACIÓN DEL CORTE POR PUNZONAMIENTO

Se considerará las secciones críticas para cada elemento, según la siguiente tabla:

Perimetro a d/2

ELEMENTO	bo (m)	Ao (m)
PL-04	19.8	6.435
PL-05	5.2	1.3875
PL-06	8.2	2.2425
TOTAL	**33.2**	**10.065**

d=h-10 cm
h=10cm
d=50cm

d (m)	**0.50**

$$V_u = \sigma_u (A - A_o)$$

Vu =	**898.82**

$$\emptyset Vc = \emptyset 1.06 \sqrt{f'c}\, b_o d$$ → **2167.42**

Considerando el menor valor obtenido

Vu =	**898.82**

OK

4. VERIFICACIÓN DEL CORTE

Para analizar las fuerzas cortantes en la zapata se realiza un modelo de elementos finitos.

En la siguiente figura se indica los valores máximos obtenidos para las secciones críticas ubicadas a una distancia ''d'' de la cara de los apoyos.

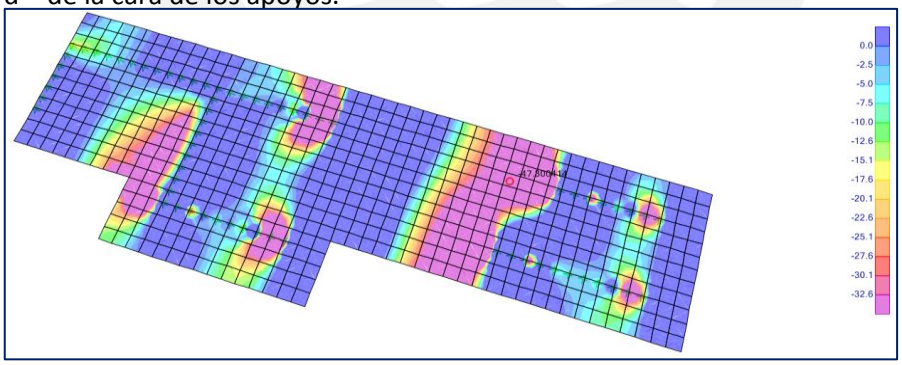


Diagrama de fuerza cortante en direccion X-X (V1-3) para la zapata combinada (ton/m).

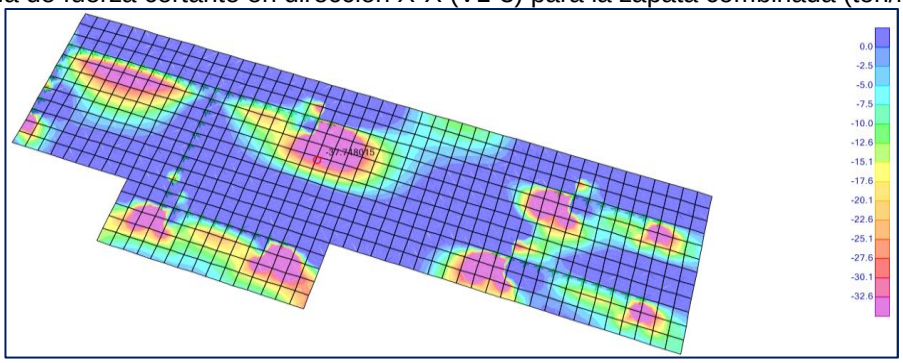


Diagrama de fuerza cortante en direccion Y-Y (V2-3) para la zapata combinada (ton/m).

Calculando la resistencia para un metro de ancho tenemos:

$$\phi V_c = \phi 0.53 \sqrt{f'c} L d$$

øVc (ton)	**32.64**

5. DISEÑO POR FLEXIÓN

Del mismo modelo usado para verificar el corte por flexión, se obtiene los siguientes resultados para los momentos flectores. Los momentos negativos máximos se obtienen en la cara de los apoyos

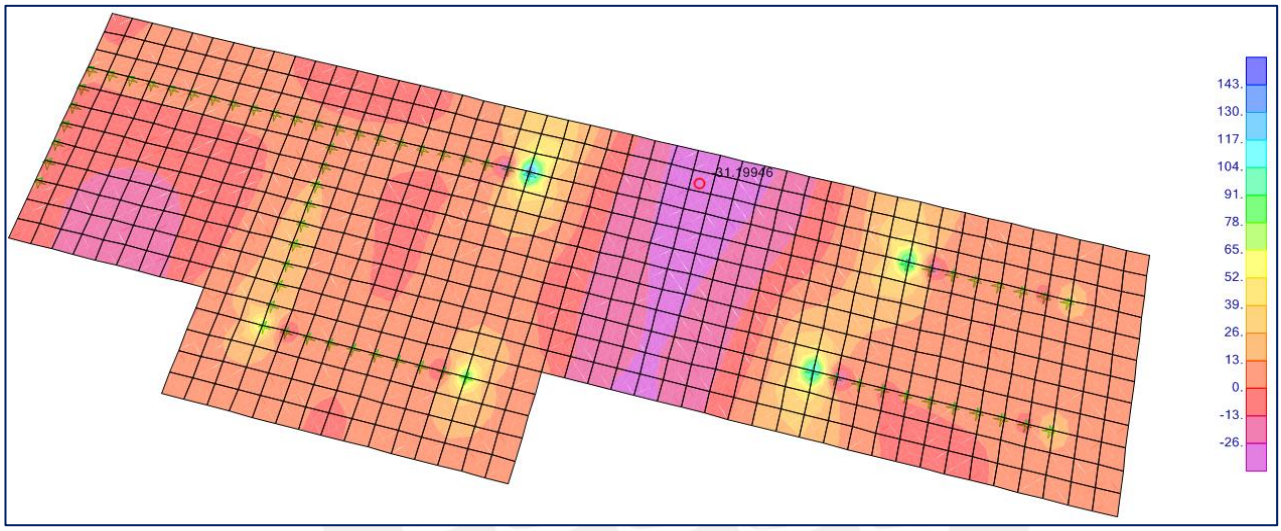


Diagrama de momento flector en direccion X-X (M1-1) para la zapata combinad

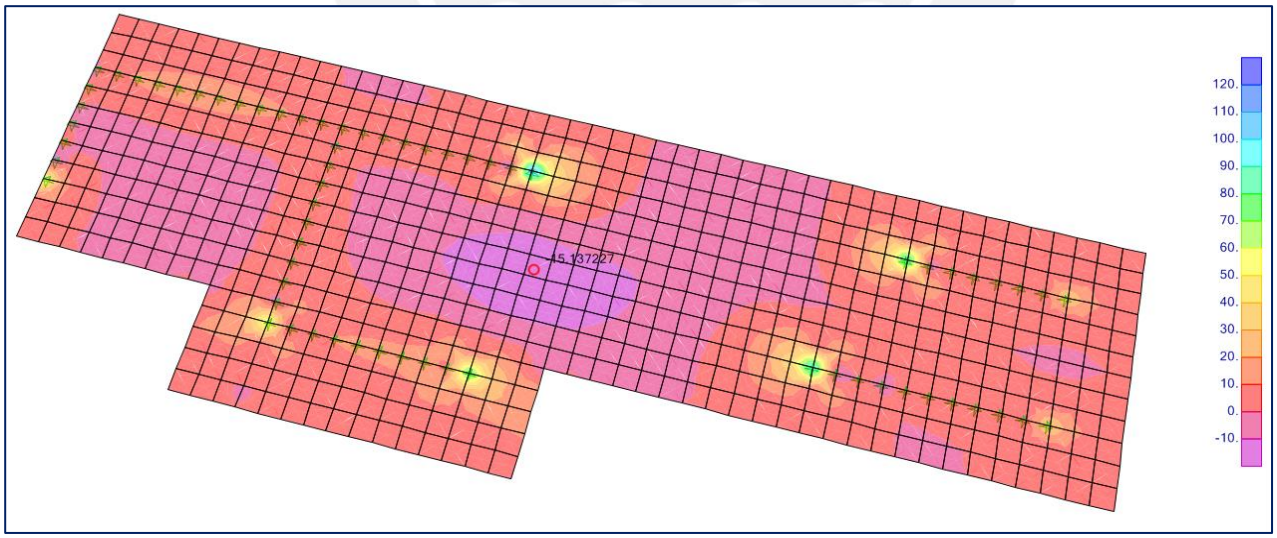
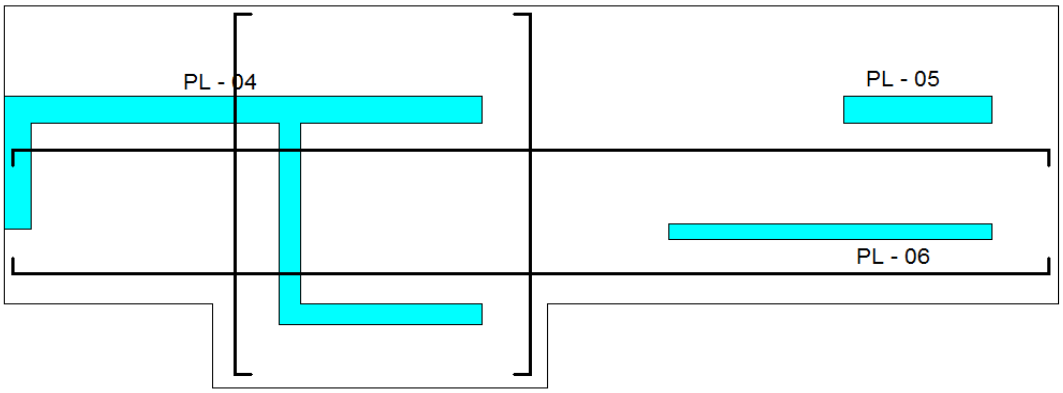


Diagrama de momento flector en direccion Y-Y (M2-2) para la zapata combinad

Asmin sup. (cm2/m)	**3.60**
Asmin inf. (cm2/m)	**7.20**

	DIRECCION X-X		DIRECCION Y-Y	
	As+ (sup.)	As- (inf.)	As+ (sup.)	As- (inf.)
b (cm)	100	100	100	100
h (cm)	60	60	60	60
d (cm)	50	50	50	50
Mu (ton.m)	**20**	**40**	**15**	**33**
Ku (Mu/bd2)	8	16	6	13.2
ρ	0.0022	0.0046	0.0018	0.0037
As calcul.=ρbd(cm2)	11	23	9	18.5
As min (cm2)	3.60	7.20	3.60	7.20
REFUERZO	5/8"	3/4"	5/8"	3/4"
Areabarra (cm2)	1.98	2.85	1.98	2.85
s calcul.=Ab/As (m)	0.18	0.12	0.22	0.15
s elegido	15	15	20	15

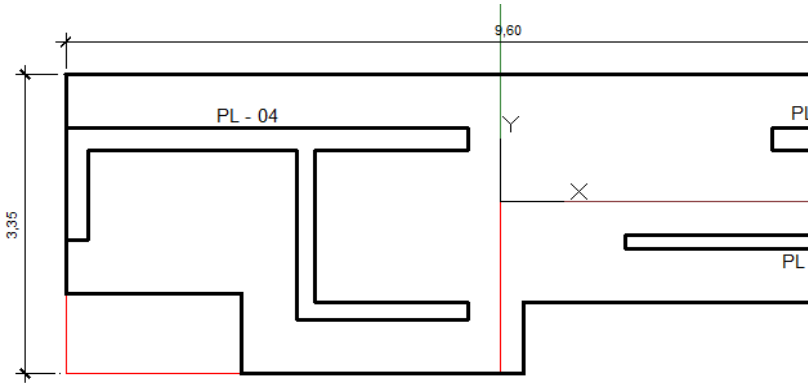
6. EL DISEÑO FINAL DE LA ZAPATA SE MUESTRA A CONTINUACIÓN



MLy
6.53
0.00
-0.02

M(+y)
276.91
0.40
0.28

210
9.6
3.6



My-y trasl. (ton.m)	Mx-x total (ton.m)	My-y total (ton.m)
-2.44	**-659.04**	**26.13**
28.52	**180.59**	**28.52**
-30.55	**137.79**	**-30.64**
-2.17	**263.14**	**-172.96**
20.74	**163.13**	**20.70**
-26.15	**232.55**	**-26.29**
-2.71	**-1581.2**	**12.80**
36.31	**198.04**	**36.31**
-34.94	**43.04**	**-34.99**
-2.26	**-485.64**	**303.22**
23.29	**155.25**	**23.69**
-28.67	**148.47**	**-28.48**
-2.62	**-832.44**	**-250.96**
33.75	**205.92**	**33.35**
-32.43	**127.11**	**-32.80**

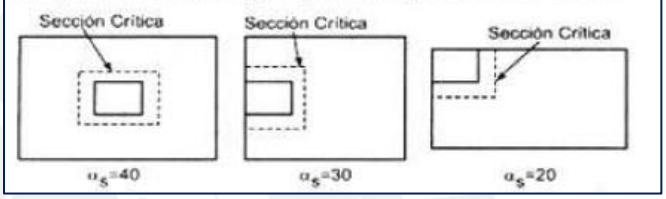
σmax	σmin	σadm
21.80	2.949	**40**
38.58	-16.948	**53.2**
45.21	-17.350	**53.2**
37.05	-14.243	**53.2**
42.70	-16.006	**53.2**

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33) \cdot Ly/2}{I33} \pm \frac{(M22) \cdot Lx/2}{I22}$$

σu	**46.68**

0.9275

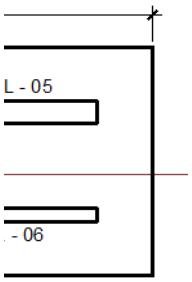
α_s= Parámetro igual a 40 para aquellas columnas en que la sección crítica de punzonamiento tiene 4 lados, 30 para las que tiene 3 lados y 20 para las que tienen 2 lados.



a (ton.m/m).

a (ton.m/m).

ϕ	Diametro	Area
1/4"	0.635	0.32
3/8"	0.953	0.71
1/2"	1.270	1.27
5/8"	1.588	1.98
3/4"	1.905	2.85
1"	2.540	5.07
6 mm	0.600	0.28
8 mm	0.800	0.50
12 mm	1.200	1.13



S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

CM (ton)	
Por area trib	82.2
Por etabs	94.1
Para diseño	94.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

CM (ton)	
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2	total		
14.7		94.7	142.05

CV (ton)	total
16.8	99.1
19.0	
19.0	

CV (ton)	
18.7	127.9

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143
2	-227.0894	7.4635	9.79E-03	-227.0894	4.518	0.6134
3	-227.0894	11.8061	8.92E-03	-227.0894	9.4345	0.7881
4	-210.8245	15.4682	7.90E-03	-218.9677	13.8799	0.8061
5	-189.2643	18.4724	6.65E-03	-195.2421	17.4644	0.8279
6	-167.4668	20.7935	5.33E-03	-170.9462	20.1912	0.8229
7	-143.7389	22.6004	3.39E-03	-145.3818	22.1403	0.8892
8	-118.1657	23.9171	8.53E-04	-117.6229	23.4227	0.934
9	-96.6156	23.5611	-7.76E-04	-93.0412	23.2152	0.8539
10	-73.7133	22.664	-2.84E-03	-67.8196	21.9222	0.8896
11	-52.2389	20.6556	-4.45E-03	-43.5356	19.3254	0.8649
12	-29.5768	17.6678	-6.43E-03	-19.4424	17.0186	1.1546
13	-10.543	16.9616	-9.33E-03	7.9182	13.6572	1.2628
14	15.5135	11.9353	-1.19E-02	41.6394	5.0664	1.5397
15	60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195

DISEÑO POR FLEXOCOMPRESIÓN

Story	Column	Load	Loc	P	V2	V3
PISO1	C1	LIVE	0	-11.93	-0.13	0.05
PISO1	C1	LIVE	1.075	-11.93	-0.13	0.05
PISO1	C1	LIVE	2.15	-11.93	-0.13	0.05
PISO1	C1	DEAD-SQ	0	-65.44	-1.15	0.43
PISO1	C1	DEAD-SQ	1.075	-65.07	-1.15	0.43
PISO1	C1	DEAD-SQ	2.15	-64.7	-1.15	0.43
PISO1	C1	RX MAX	0	6.43	1.11	0.05
PISO1	C1	RX MAX	1.075	6.43	1.11	0.05
PISO1	C1	RX MAX	2.15	6.43	1.11	0.05
PISO1	C1	RX MIN	0	-6.43	-1.11	-0.05
PISO1	C1	RX MIN	1.075	-6.43	-1.11	-0.05
PISO1	C1	RX MIN	2.15	-6.43	-1.11	-0.05
PISO1	C1	RY MAX	0	0.87	0.2	0.12
PISO1	C1	RY MAX	1.075	0.87	0.2	0.12
PISO1	C1	RY MAX	2.15	0.87	0.2	0.12
PISO1	C1	RY MIN	0	-0.87	-0.2	-0.12
PISO1	C1	RY MIN	1.075	-0.87	-0.2	-0.12
PISO1	C1	RY MIN	2.15	-0.87	-0.2	-0.12

1.4CM+1.7CV	111.90	Tn
1.25(CM+CV)	96.71	Tn

RX

CM	M22	0.38	Tn.m
	M33	-1.11	Tn.m
CV	M22	-0.01	Tn.m
	M33	0.00	Tn.m

RY

COMBINACIONES SISMO EN X			
	P	M22	M33
1.4CM+1.7CV	111.90	0.52	-1.56
1.25(CM+CV)+CS	103.14	0.69	1.32
1.25(CM+CV)-CS	90.28	0.25	-4.10
0.9CM+CS	65.33	0.56	1.71
0.9CM-CS	52.47	0.13	-2.71

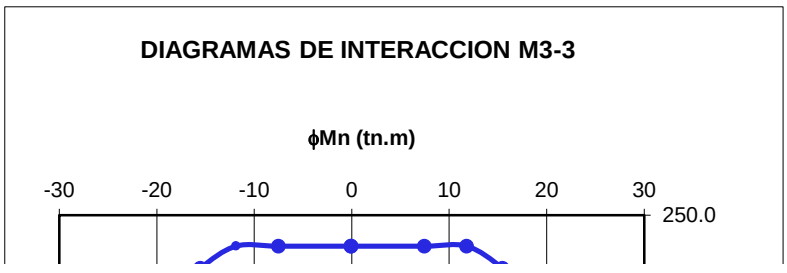
C
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

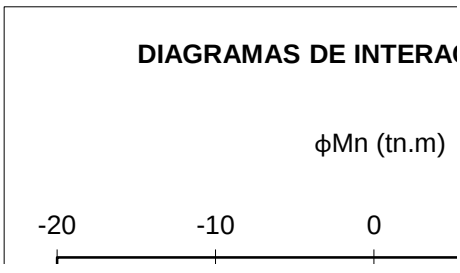
MOMENTO MINIMO DE DISEÑO

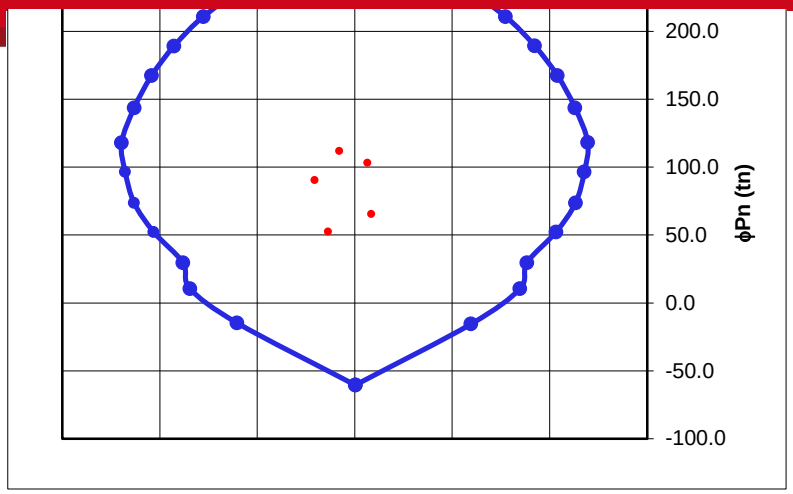
PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	227.1	0.0	227.1	0.0
2	227.1	7.5	227.1	-7.5
3	227.1	11.8	227.1	-11.9
4	210.8	15.5	210.8	-15.5
5	189.3	18.5	189.2	-18.5
6	167.5	20.8	167.3	-20.8
7	143.7	22.6	143.5	-22.6
8	118.2	23.9	117.9	-23.9
9	96.6	23.6	96.4	-23.5
10	73.7	22.7	73.6	-22.6
11	52.2	20.7	52.1	-20.6
12	29.6	17.7	29.6	-17.6
13	10.5	17.0	10.4	-16.9
14	-15.5	11.9	-14.7	-12.1
15	-60.5	0.1	-60.5	0.1

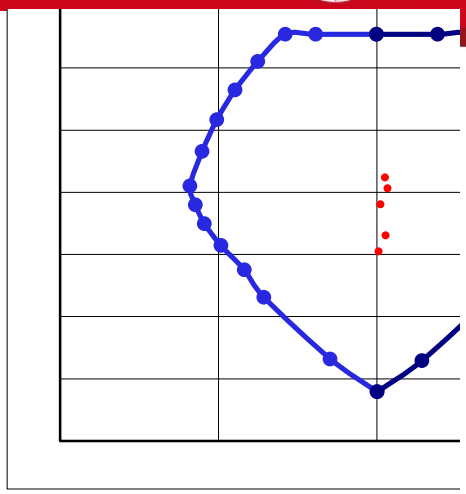
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

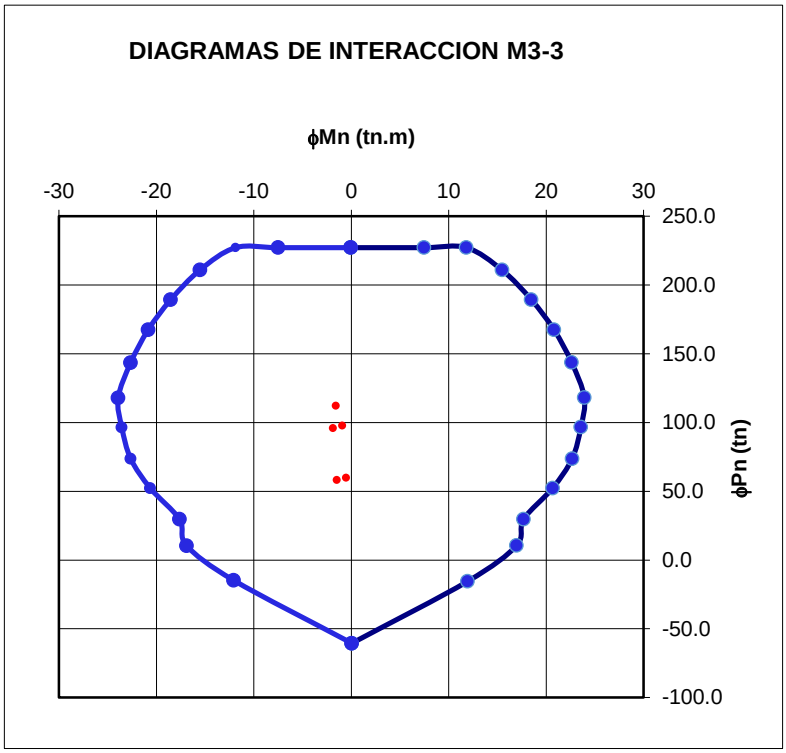


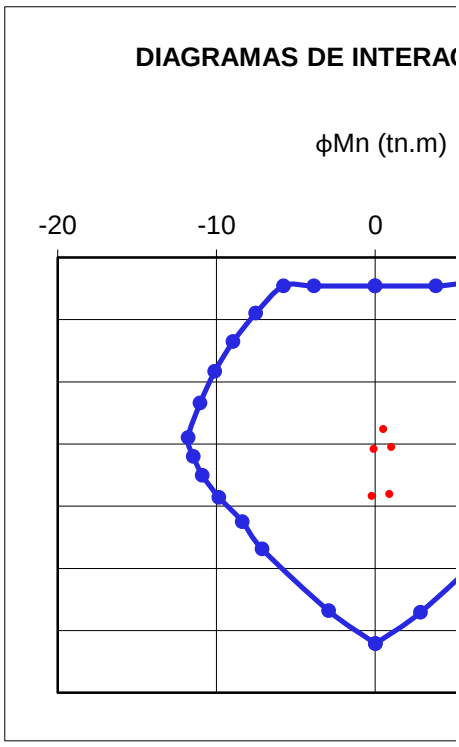






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894
-227.0894	3.4832	0.693	-227.0894	2.9633	0.797	-227.0894
-227.0894	6.9427	1.4026	-227.0894	5.6302	1.6051	-227.0894
-227.0894	11.7553	1.6783	-227.0894	9.3828	2.4412	-227.0894
-201.9466	16.0967	1.7219	-210.7533	13.6957	2.8875	-216.6535
-175.1421	19.3164	1.7439	-179.7979	17.6173	3.0075	-186.1008
-146.5821	21.4836	1.827	-147.4623	20.0573	3.1606	-149.4102
-116.183	22.5815	1.9924	-113.749	21.0809	3.363	-108.787
-88.5106	22.2468	1.8929	-82.8881	20.2606	3.3762	-74.1101
-60.4693	20.3924	1.9816	-50.8695	18.0062	3.3513	-41.3116
-32.5139	17.1647	1.9377	-22.064	15.0492	3.5438	-14.6569
-7.0098	15.3277	2.5008	5.745	12.4926	3.5589	13.8546
24.9914	9.2133	2.1801	33.7823	6.8868	2.443	35.3864
46.1772	3.8359	1.3611	48.333	3.2545	1.1847	49.7252
60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799

T	M2	M3
-0.001	0.049	-0.142
-0.001	-0.008	0.001
-0.001	-0.064	0.144
-0.002	0.382	-1.114
-0.002	-0.081	0.12
-0.002	-0.544	1.353
0.029	0.218	2.711
0.029	0.168	1.521
0.029	0.12	0.343
-0.029	-0.218	-2.711
-0.029	-0.168	-1.521
-0.029	-0.12	-0.343
0.072	0.549	0.477
0.072	0.425	0.262
0.072	0.304	0.058
-0.072	-0.549	-0.477
-0.072	-0.425	-0.262
-0.072	-0.304	-0.058

CARGAS DE SER		
CARGAS	P	V2
VIVA	11.93	0.13
MUERTA	65.44	1.15
SISMO XX	6.43	1.11

P	6.43	Tn
M22	0.22	Tn.m
M33	2.71	Tn.m

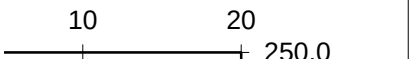
P	0.87	Tn
M22	0.55	Tn.m
M33	0.48	Tn.m

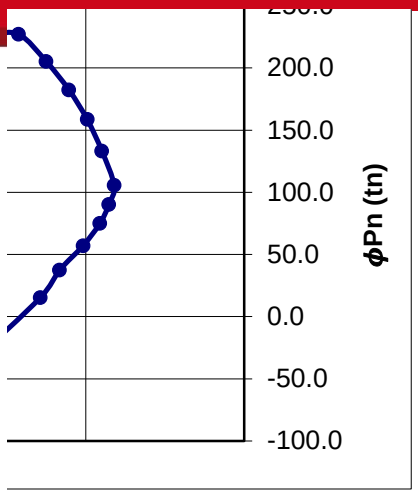
COMBINACIONES SISMO EN Y

P	M22	M33
111.90	0.52	-1.56
97.58	1.02	-0.91
95.84	-0.08	-1.87
59.77	0.89	-0.53
58.03	-0.21	-1.48

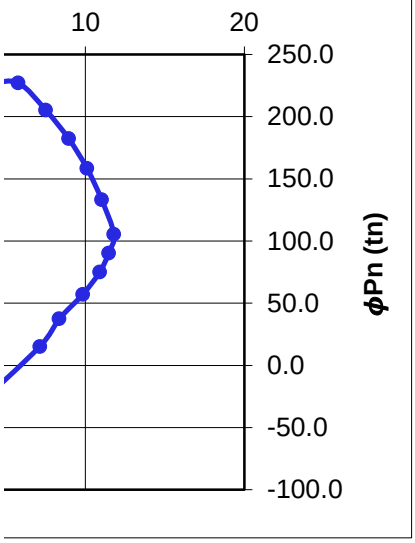
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
227.1	0.0	227.1	0.0
227.1	-3.8	227.1	3.8
227.1	-5.8	227.1	5.8
205.2	-7.5	205.3	7.5
182.3	-8.9	182.4	8.9
158.4	-10.1	158.6	10.1
133.0	-11.0	133.2	11.0
105.2	-11.8	105.5	11.8
90.0	-11.5	90.3	11.5
74.8	-10.9	75.0	10.9
57.2	-9.8	57.1	9.8
37.6	-8.4	37.4	8.3
15.6	-7.1	15.2	7.1
-34.0	-2.9	-35.3	2.9
-60.5	0.0	-60.5	0.0

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426
2.3992	1.0208	-227.0894	1.7183	1.4894	-227.0894	-0.0261
4.586	1.9031	-227.0894	3.5837	2.5392	-227.0894	-2.49E-02
7.5816	3.0133	-227.0894	5.8873	3.9832	-205.2313	-2.18E-02
10.9361	4.0748	-213.1242	7.8926	5.6895	-182.3264	-0.018
14.2746	4.8867	-181.2948	8.9148	7.4192	-158.3925	-0.0133
17.0105	5.2387	-145.3104	9.4156	8.6446	-132.9627	-7.11E-03
17.8688	5.5301	-106.4846	9.9384	9.0524	-105.2375	1.28E-03
16.3829	5.5935	-73.7666	9.7997	8.5756	-90.0132	1.28E-03
14.0675	5.1324	-42.3008	9.181	7.375	-74.7889	1.28E-03
12.8833	4.9629	-17.6728	9.0911	6.5207	-57.1965	3.55E-03
9.9973	4.2198	9.0429	8.9316	4.9917	-37.605	7.75E-03
6.211	2.4301	33.3994	5.9824	2.7137	-15.6355	0.0185
2.8762	1.0609	51.7096	2.3287	0.8814	34.0051	0.0514
0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581

RVICIO (TON)		
V3	**M2**	**M3**
0.05	0.049	0.142
0.43	0.382	1.11
0.05	0.218	2.71

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143
3.8455	-227.0894	-1.7773	1.4875	-227.0894	-2.545	1.0511
5.7788	-227.0894	-3.6408	2.5402	-227.0894	-4.6461	1.9037
7.5157	-227.0894	-5.9412	3.9866	-227.0894	-7.6431	3.016
8.9469	-213.0689	-7.938	5.6953	-216.5792	-10.9973	4.0782
10.1003	-181.1752	-8.9454	7.4263	-185.9509	-14.3312	4.8899
11.0205	-145.1641	-9.4362	8.6487	-149.1639	-17.0477	5.239
11.7841	-106.2909	-9.943	9.0506	-108.466	-17.8637	5.5316
11.4538	-73.6145	-9.7904	8.5694	-73.8847	-16.3506	5.5924
10.8815	-42.2142	-9.1506	7.3703	-41.1958	-14.0204	5.129
9.839	-17.645	-9.0371	6.5219	-14.6087	-12.8244	4.9613
8.3618	8.9723	-8.871	4.9993	13.8103	-9.9306	4.2271
7.1287	33.2781	-5.9186	2.7253	35.2111	-6.1526	2.4475
2.9369	51.5532	-2.2653	0.8964	49.4904	-2.8372	1.0834
-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894
-227.0894	-3.0174	0.7968	-227.0894	-3.5367	0.6929	-227.0894
-227.0894	-5.689	1.6072	-227.0894	-7.0062	1.4034	-227.0894
-227.0894	-9.4535	2.4419	-227.0894	-11.8299	1.6787	-218.9335
-210.6539	-13.775	2.8862	-201.8404	-16.1638	1.7224	-195.1494
-179.6387	-17.68	3.0064	-174.9741	-19.3694	1.7448	-170.7906
-147.2375	-20.0944	3.16	-146.3747	-21.5217	1.8255	-145.1552
-113.4464	-21.0842	3.3632	-115.8952	-22.5901	1.9913	-117.3099
-82.6598	-20.2323	3.3765	-88.2996	-22.227	1.8916	-92.7963
-50.6982	-17.955	3.3515	-60.3186	-20.3533	1.9806	-67.7072
-22.0133	-14.9925	3.543	-32.4249	-17.1129	1.9335	-43.4722
5.7433	-12.4203	3.553	-6.9704	-15.2583	2.5005	-19.4885
33.6973	-6.821	2.4529	24.7758	-9.1904	2.179	7.6959
48.0481	-3.2302	1.2122	45.8564	-3.8231	1.3923	40.947
60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426
-4.5744	0.6128	-227.0894	-7.5233	9.84E-03	-227.0894	-4.5746
-9.504	0.7883	-227.0894	-11.8704	8.97E-03	-227.0894	-9.5026
-13.9486	0.8063	-210.8053	-15.5313	7.95E-03	-218.9366	-13.9468
-17.526	0.8282	-189.1859	-18.5288	6.70E-03	-195.1577	-17.5241
-20.2399	0.8234	-167.3242	-20.8388	5.38E-03	-170.8046	-20.2385
-22.1695	0.8899	-143.5229	-22.6277	3.43E-03	-145.1756	-22.1689
-23.4253	0.9352	-117.859	-23.9207	8.84E-04	-117.3381	-23.4257
-23.1927	0.8548	-96.3825	-23.5425	-7.40E-04	-92.8183	-23.1943
-21.8922	0.8854	-73.5601	-22.6254	-2.80E-03	-67.7173	-21.8932
-19.2886	0.859	-52.1208	-20.6092	-4.41E-03	-43.4779	-19.2892
-16.9645	1.1454	-29.5538	-17.6136	-6.39E-03	-19.4843	-16.9649
-13.649	1.2646	-10.4157	-16.8941	-9.34E-03	7.716	-13.6433
-5.1535	1.5412	14.7212	-12.0741	-0.0116	41.0096	-5.1371
0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143
-0.593	-227.0894	-3.5379	-0.6728	-227.0894	-3.0196	-0.7764
-0.7698	-227.0894	-7.0045	-1.3846	-227.0894	-5.6881	-1.5875
-0.7899	-227.0894	-11.8252	-1.6617	-227.0894	-9.4467	-2.4246
-0.8142	-201.861	-16.1591	-1.7078	-210.6873	-13.7632	-2.8717
-0.8122	-175.0067	-19.3658	-1.7329	-179.6922	-17.6706	-2.9951
-0.8824	-146.4149	-21.5188	-1.818	-147.313	-20.0895	-3.1526
-0.9327	-115.951	-22.5899	-1.9889	-113.5481	-21.0857	-3.3605
-0.8563	-88.3405	-22.2296	-1.894	-82.7365	-20.2394	-3.3788
-0.8919	-60.3478	-20.3568	-1.9879	-50.7557	-17.964	-3.3596
-0.8695	-32.4421	-17.116	-1.9463	-22.0303	-14.9973	-3.5575
-1.1627	-6.978	-15.2602	-2.5204	5.744	-12.4217	-3.5778
-1.2881	24.8178	-9.1789	-2.2066	33.726	-6.8128	-2.4799
-1.5725	45.9188	-3.8067	-1.4187	48.1441	-3.205	-1.2361
-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894
-227.0894	-2.4594	-0.9996	-227.0894	-1.7782	-1.4698	-227.0894
-227.0894	-4.6438	-1.8845	-227.0894	-3.6388	-2.5203	-227.0894
-227.0894	-7.6365	-2.9976	-227.0894	-5.9363	-3.9655	-205.2909
-216.6225	-10.9869	-4.0616	-213.1383	-7.9342	-5.6738	-182.4355
-186.0382	-14.3179	-4.8766	-181.3252	-8.9492	-7.4061	-158.5562
-149.3073	-17.0393	-5.2312	-145.3477	-9.4379	-8.6362	-133.1909
-108.6529	-17.8703	-5.5286	-106.5339	-9.9433	-9.0513	-105.5492
-74.0158	-16.365	-5.5956	-73.8053	-9.7904	-8.5803	-90.2803
-41.2631	-14.0334	-5.1393	-42.323	-9.1591	-7.3841	-75.0115
-14.6367	-12.8303	-4.9786	-17.6799	-9.0527	-6.5343	-57.118
13.8362	-9.9259	-4.248	9.0608	-8.8643	-5.0119	-37.3964
35.3133	-6.1345	-2.4673	33.4303	-5.8911	-2.7396	-15.207
49.6273	-2.8012	-1.1041	51.7493	-2.2135	-0.9128	35.2676
60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0426	0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426
-0.026	-3.8306	-227.0894	1.7194	-1.4718	-227.0894	2.4006
-0.0248	-5.7618	-227.0894	3.5818	-2.5194	-227.0894	4.5838
-0.0217	-7.4994	-227.0894	5.8825	-3.962	-227.0894	7.5751
-0.018	-8.9333	-213.1935	7.8889	-5.668	-216.6967	10.9258
-0.0132	-10.0912	-181.4449	8.9188	-7.3989	-186.188	14.2614
-7.07E-03	-11.0178	-145.4942	9.4174	-8.632	-149.5538	17.0019
1.28E-03	-11.7892	-106.7278	9.9388	-9.053	-108.974	17.8753
1.28E-03	-11.4625	-73.9576	9.7998	-8.5865	-74.2418	16.3973
1.28E-03	-10.8925	-42.4101	9.1897	-7.3889	-41.3795	14.0806
3.80E-03	-9.8277	-17.708	9.1067	-6.5331	-14.6852	12.8892
8.07E-03	-8.3446	9.1307	8.9253	-5.0045	13.88	9.9929
0.0191	-7.1212	33.551	5.9554	-2.7281	35.488	6.1933
0.0527	-2.8514	51.9052	2.2774	-0.898	49.8615	2.8406
0.0581	-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581

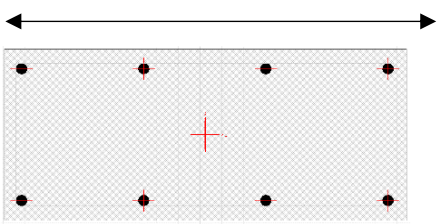
	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0.0143	-227.0894	-0.0426	0.0143	-227.0894	-0.0426	0.0143
-1.0013	-227.0894	2.9656	-0.7767	-227.0894	3.4844	-0.673
-1.8839	-227.0894	5.6294	-1.5856	-227.0894	6.9411	-1.3839
-2.9949	-227.0894	9.3762	-2.424	-227.0894	11.7506	-1.6614
-4.0582	-210.7866	13.684	-2.8731	-201.9673	16.092	-1.7074
-4.8734	-179.8515	17.6079	-2.9962	-175.1748	19.3128	-1.7322
-5.2309	-147.5379	20.0524	-3.1532	-146.6224	21.4806	-1.8197
-5.5272	-113.8509	21.0823	-3.3603	-116.2389	22.5813	-1.9901
-5.5967	-82.965	20.2677	-3.3786	-88.5517	22.2494	-1.8953
-5.1428	-50.9272	18.0152	-3.3594	-60.4986	20.3959	-1.989
-4.9803	-22.0813	15.054	-3.5583	-32.5313	17.1678	-1.9506
-4.2408	5.7453	12.4941	-3.5838	-7.0176	15.3297	-2.5208
-2.4502	33.8106	6.8788	-2.47	25.0331	9.202	-2.2079
-1.0818	48	3.3413	-1.2499	46.2393	3.8197	-1.3877
-0.0195	60.4799	0.0581	-0.0195	60.4799	0.0581	-0.0195

Curve 24	345. degrees	
P	M3	M2
-227.0894	-0.0426	0.0143
-227.0894	4.5183	-0.5938
-227.0894	9.4331	-0.7698
-218.9708	13.8781	-0.7897
-195.2505	17.4625	-0.814
-170.9603	20.1898	-0.8118
-145.4022	22.1396	-0.8817
-117.6512	23.4231	-0.9316
-93.0633	23.2167	-0.8555
-67.8297	21.9233	-0.8962
-43.5414	19.3261	-0.8755
-19.4383	17.0191	-1.1721
7.9381	13.6516	-1.2865
41.7015	5.0502	-1.5715
60.4799	0.0581	-0.0195

DISEÑO DE COLUMNAS (COLUMNA - 1)

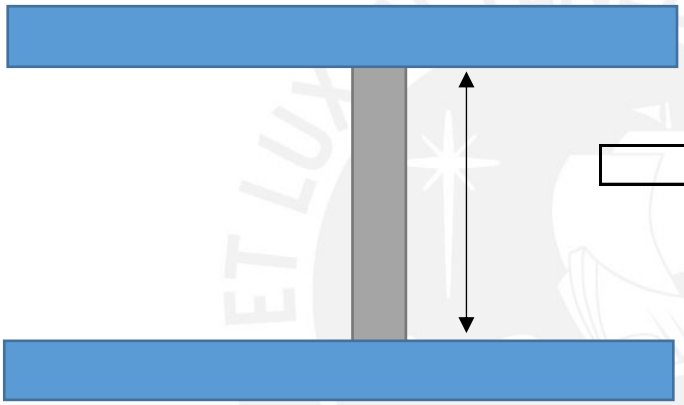
1. INGRESO DE DATOS GENERALES

Lm (m)	0.575



f'c (kg/cm2)	210
fy (kg/cm2)	4200

Area



hm (m)	2.65

d(m)	0.515

2. VERIFICACIÓN POR PANDEO

Pserv (ton)	77.49	(Cargas de servicio del etabs)
Pu	105.00	(Pu de las comb. Diseño por flexocompresió
1.6xPu	168.00	
I (m4)	0.00396	(Momento de inercia de la sección)
Ief = I/5 (m4)	0.000792	Momento de inercia efectivo)
Pcr (ton)	244.90	(Cortante del etabs)
Φ	0.70	
ΦPcr	171.43	
ΦPcr≥1.6xPu	CUMPLE	Condiciones por pandeo

3. DISEÑO POR CORTANTE

ρ min	1%	As	14.38 cm2	
		As colocado	7.19 cm2	8 Φ 5/8"

PARA CORTE EN X-X

COMBINACIONES	Pu (ton)	Mu (ton-m)	Vu (ton)
1.4CM+1.7CV	111.90	-1.56	2.3
1.25(CM+CV)+CS	103.14	1.32	3.3
1.25(CM+CV)-CS	90.28	-4.10	0.6
0.9CM+CS	65.33	1.71	2.6
0.9CM-CS	52.47	-2.71	-0.1

3.1 DISEÑO POR CAPACIDAD

COMBINACIONES	Pu (ton)	Vu	Vc	Vs
1.25(CM+CV)+CS	103.1	3.3	15.1	-11.2
1.25(CM+CV)-CS	90.3	0.6	14.5	-13.7
0.9CM+CS	65.3	2.6	13.2	-10.2
0.9CM-CS	52.5	-0.1	12.6	-12.7

		Espaciamiento So (cm) no debe exceder el minimo		
Diametro	Av (cm2)	8 Φ dmenor	1/2 x 25 cm	100 mm
8 mm	1	4	12.5	10
3/8 "	4	16	12.5	10
1/2"	2.58	10.32	12.5	10

espaciamiento de estribos

2 estribos 3/8" : 1@5, 7@10, resto @25

t (m)	0.25

1437.5 cm2

ɔn)

$$Pcr = \left(\frac{\pi}{kh}\right)^2 E\ Ief, \quad k = 1.0$$

es 16 cm2

$$Vs = \frac{Vu}{}$$

$$Sh = \frac{Ah}{}$$

$$Ah = áre$$

$$= (2$$

Dol

Asumir

S (cm)
-27.9
-22.7
-30.7
-24.5

	Long. De confinamiento (Lo)			
o considerado (cr	1/6xln	Mayor. Dim	500 mm	Lo (cm) considerado
4	35.8	57.5	50	57.5
10	35.8	57.5	50	57.5
10	35.8	57.5	50	57.5

$$\frac{-\phi Vc}{\phi}$$

$$\frac{\times d \times fy}{Vs}$$

'a de acero horizontal

$* A_{barra}$) ó ($1 * A_{barra}$)

ble malla si el espesor del muro ≥ 20cm

$$A_v = A_h \quad y \quad Sv = S_h$$

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

CV (ton)

18.7

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-284.2543	0	0	-284.2543	0	0
2	-284.2543	11.148	0.00E+00	-284.2543	7.0392	0.6988
3	-284.2543	18.2355	0.00E+00	-284.2543	15.2161	0.7583
4	-269.1365	24.0927	0.00E+00	-277.328	22.1187	0.7508
5	-243.2031	28.9317	0.00E+00	-249.5155	27.6561	0.8014
6	-216.5072	32.697	0.00E+00	-220.5944	31.8946	0.8482
7	-189.1469	35.4055	0.00E+00	-190.7941	34.8467	0.8831
8	-159.3691	37.1158	0.00E+00	-159.2554	36.5759	0.9651
9	-130.9729	36.8791	0.00E+00	-128.4665	36.4178	0.9157
10	-102.8107	35.1745	0.00E+00	-97.6014	34.4099	0.9037
11	-73.8757	31.8631	0.00E+00	-66.5027	30.4914	0.8627
12	-44.9955	26.8501	0.00E+00	-35.9259	24.7381	0.891
13	-20.54	23.5019	0.00E+00	-5.9032	20.8805	1.2587
14	11.2034	16.7272	0.00E+00	31.962	9.52	1.3294
15	58.5289	0	0	58.5289	0	0

DISEÑO POR FLEXOCOMPRESIÓN

Story	Column	Load	Loc	P	V2	V3
PISO1	C2	LIVE	0	-18.12	-0.77	-0.1
PISO1	C2	LIVE	1.075	-18.12	-0.77	-0.1
PISO1	C2	LIVE	2.15	-18.12	-0.77	-0.1
PISO1	C2	DEAD-SQ	0	-89.56	-4.91	-0.65
PISO1	C2	DEAD-SQ	1.075	-89.08	-4.91	-0.65
PISO1	C2	DEAD-SQ	2.15	-88.6	-4.91	-0.65
PISO1	C2	RX MAX	0	76.57	0.58	1.59
PISO1	C2	RX MAX	1.075	76.57	0.58	1.59
PISO1	C2	RX MAX	2.15	76.57	0.58	1.59
PISO1	C2	RX MIN	0	-76.57	-0.58	-1.59
PISO1	C2	RX MIN	1.075	-76.57	-0.58	-1.59
PISO1	C2	RX MIN	2.15	-76.57	-0.58	-1.59
PISO1	C2	RY MAX	0	64.48	1.59	1.24
PISO1	C2	RY MAX	1.075	64.48	1.59	1.24
PISO1	C2	RY MAX	2.15	64.48	1.59	1.24
PISO1	C2	RY MIN	0	-64.48	-1.59	-1.24
PISO1	C2	RY MIN	1.075	-64.48	-1.59	-1.24
PISO1	C2	RY MIN	2.15	-64.48	-1.59	-1.24

1.4CM+1.7CV	156.19	Tn
1.25(CM+CV)	134.60	Tn

RX

CM	M22	-0.53	Tn.m
	M33	-3.85	Tn.m
CV	M22	0.03	Tn.m
	M33	0.24	Tn.m

RY

COMBINACIONES SISMO EN X			
	P	M22	M33
1.4CM+1.7CV	156.19	-0.69	-4.99
1.25(CM+CV)+CS	211.17	1.39	-2.90
1.25(CM+CV)-CS	58.03	-2.64	-6.14
0.9CM+CS	157.17	1.54	-1.85
0.9CM-CS	4.03	-2.49	-1.40

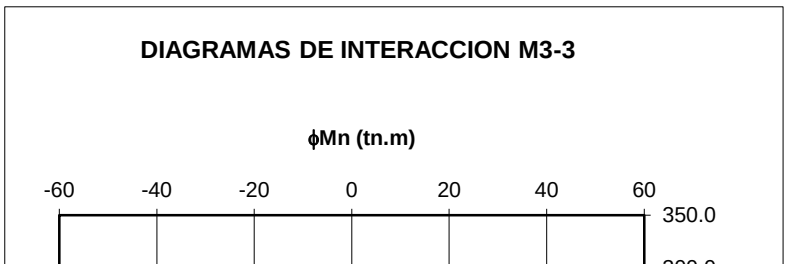
C
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

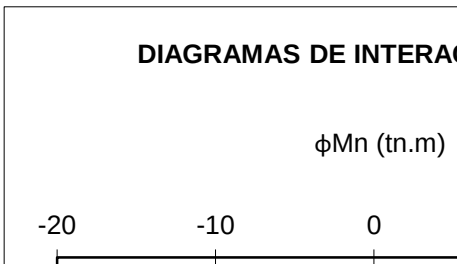
MOMENTO MINIMO DE DISEÑO

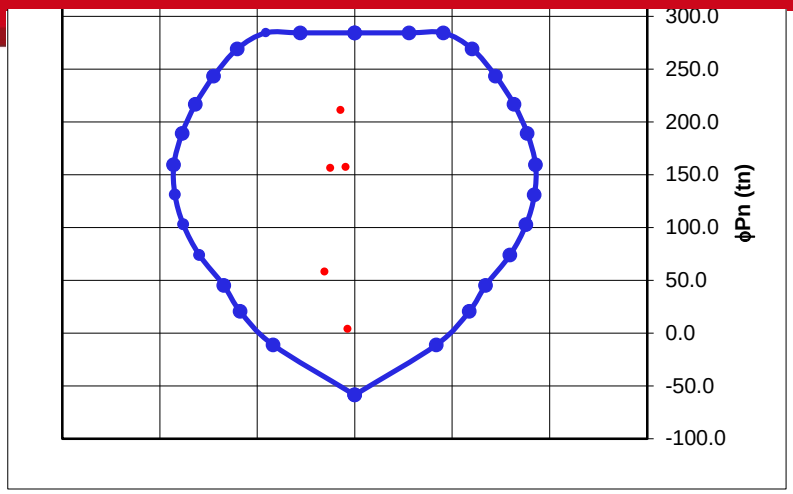
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	284.3	0.0	284.3	0.0
2	284.3	11.1	284.3	-11.1
3	284.3	18.2	284.3	-18.2
4	269.1	24.1	269.1	-24.1
5	243.2	28.9	243.2	-28.9
6	216.5	32.7	216.5	-32.7
7	189.1	35.4	189.1	-35.4
8	159.4	37.1	159.4	-37.1
9	131.0	36.9	131.0	-36.9
10	102.8	35.2	102.8	-35.2
11	73.9	31.9	73.9	-31.9
12	45.0	26.9	45.0	-26.9
13	20.5	23.5	20.5	-23.5
14	-11.2	16.7	-11.2	-16.7
15	-58.5	0.0	-58.5	0.0

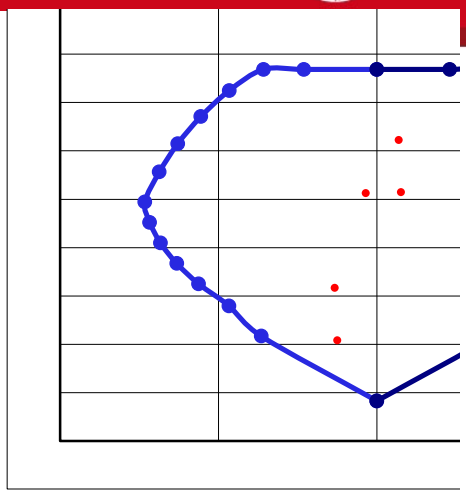
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

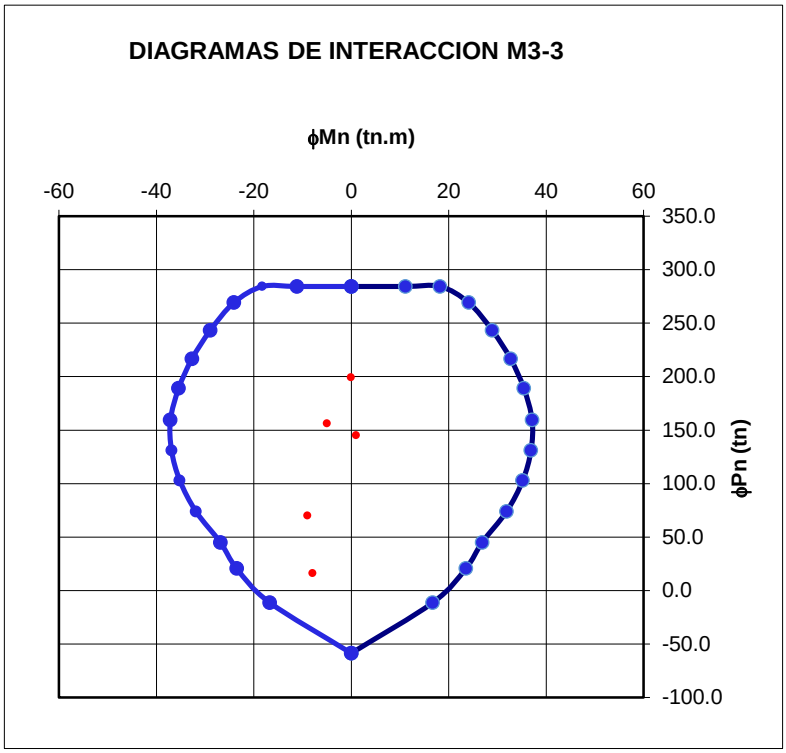


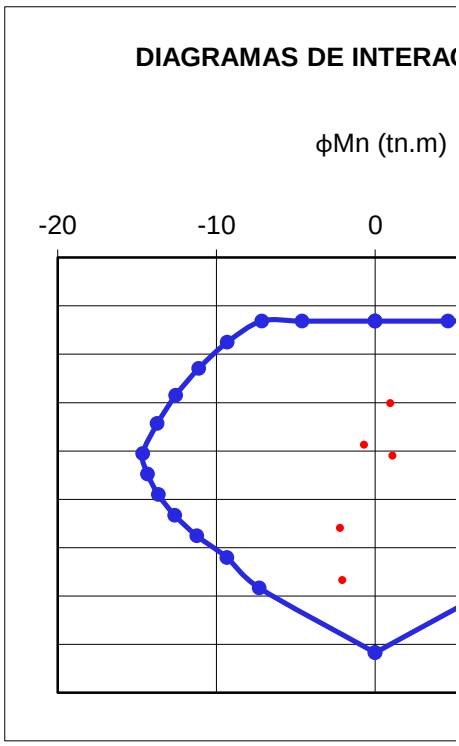






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-284.2543	0	0	-284.2543	0	0	-284.2543
-284.2543	5.1232	0.8305	-284.2543	4.2332	0.9354	-284.2543
-284.2543	11.4657	1.5512	-284.2543	8.8445	1.9178	-284.2543
-284.2543	19.4067	1.637	-284.2543	15.4996	2.6897	-284.2543
-256.13	25.9228	1.6985	-265.3657	23.0782	2.8948	-276.9417
-225.2478	30.7481	1.774	-230.8807	28.9008	2.9918	-240.224
-192.8416	34.0566	1.869	-195.1789	32.6052	3.1782	-198.7398
-159.021	35.8401	2.0104	-157.8236	34.3795	3.3652	-155.5665
-125.2492	35.6306	1.9566	-120.9861	33.682	3.4659	-113.8632
-91.3326	33.0267	1.9611	-83.4173	30.5821	3.4229	-71.2915
-57.8812	28.245	1.9679	-45.9983	24.6588	3.418	-33.6447
-26.4058	23.2296	2.1712	-12.3223	20.0097	3.8535	-2.0303
11.089	15.736	2.499	22.3644	11.7149	3.0633	26.9895
41.7395	6.0088	1.6994	44.0283	5.1844	1.5592	45.4636
58.5289	0	0	58.5289	0	0	58.5289

T	M2	M3
-0.001	-0.081	-0.588
-0.001	0.031	0.239
-0.001	0.144	1.066
-0.002	-0.529	-3.854
-0.002	0.173	1.428
-0.002	0.875	6.71
0.052	2.013	1.62
0.052	0.309	1.012
0.052	1.396	0.461
-0.052	-2.013	-1.62
-0.052	-0.309	-1.012
-0.052	-1.396	-0.461
0.126	1.576	4.48
0.126	0.242	2.792
0.126	1.095	1.167
-0.126	-1.576	-4.48
-0.126	-0.242	-2.792
-0.126	-1.095	-1.167

P	**76.57**	Tn
M22	**2.01**	Tn.m
M33	**1.62**	Tn.m

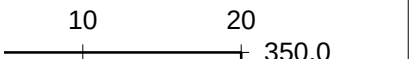
P	64.48	Tn
M22	1.58	Tn.m
M33	4.48	Tn.m

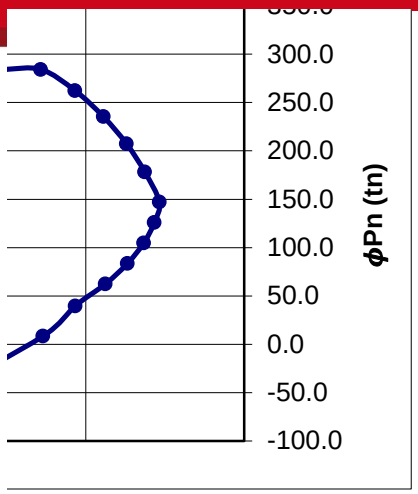
COMBINACIONES SISMO EN Y

P	M22	M33
156.19	-0.69	-4.99
199.08	0.95	-0.04
70.12	-2.20	-9.00
145.08	1.10	1.01
16.12	-2.05	-7.95

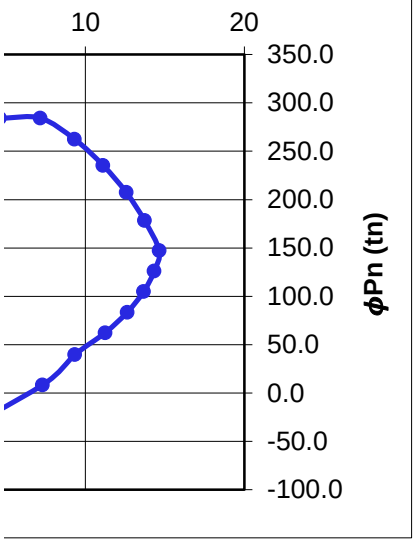
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
284.3	0.0	284.3	0.0
284.3	-4.6	284.3	4.6
284.3	-7.1	284.3	7.1
262.5	-9.3	262.5	9.3
235.4	-11.1	235.4	11.1
207.4	-12.6	207.4	12.6
178.2	-13.7	178.2	13.7
147.2	-14.6	147.2	14.6
126.0	-14.3	126.0	14.3
104.8	-13.7	104.8	13.7
83.6	-12.6	83.6	12.6
62.4	-11.2	62.4	11.2
39.8	-9.3	39.8	9.3
8.4	-7.3	8.4	7.3
-58.5	0.0	-58.5	0.0

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
0	0	-284.2543	0	0	-284.2543	0
3.5006	1.1457	-284.2543	2.4453	1.6361	-284.2543	0
7.1269	2.194	-284.2543	5.4756	2.8106	-284.2543	0.00E+00
12.2183	3.4204	-284.2543	9.4519	4.4138	-262.4763	0.00E+00
18.2368	4.4831	-279.1018	13.5228	6.2441	-235.3967	0
24.4897	5.0787	-244.0114	16.8472	8.0499	-207.4375	0
29.298	5.2837	-200.8422	18.6128	9.6426	-178.2392	0.00E+00
31.1116	5.6052	-152.0319	19.3021	10.4498	-147.2161	0.00E+00
29.6973	5.7681	-106.5955	19.0906	9.9834	-126.001	0.00E+00
25.2769	5.7356	-66.1488	17.0214	8.8507	-104.7858	0.00E+00
19.9604	5.2404	-32.6536	14.4411	7.4194	-83.5707	0.00E+00
16.7263	5.0363	-3.875	13.9386	6.2116	-62.3556	0.00E+00
9.9351	3.2012	24.5421	9.5867	3.6641	-39.7761	0
4.6586	1.441	45.4064	4.4934	1.4691	-8.3913	0
0	0	58.5289	0	0	58.5289	0

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0	-284.2543	0	0	-284.2543	0	0
4.5974	-284.2543	-2.4453	1.6361	-284.2543	-3.5006	1.1457
7.1465	-284.2543	-5.4756	2.8106	-284.2543	-7.1269	2.194
9.3113	-284.2543	-9.4519	4.4138	-284.2543	-12.2183	3.4204
11.1092	-279.1018	-13.5228	6.2441	-276.9417	-18.2368	4.4831
12.566	-244.0114	-16.8472	8.0499	-240.224	-24.4897	5.0787
13.7215	-200.8422	-18.6128	9.6426	-198.7398	-29.298	5.2837
14.6407	-152.0319	-19.3021	10.4498	-155.5665	-31.1116	5.6052
14.3302	-106.5955	-19.0906	9.9834	-113.8632	-29.6973	5.7681
13.6595	-66.1488	-17.0214	8.8507	-71.2915	-25.2769	5.7356
12.6285	-32.6536	-14.4411	7.4194	-33.6447	-19.9604	5.2404
11.2373	-3.875	-13.9386	6.2116	-2.0303	-16.7263	5.0363
9.3348	24.5421	-9.5867	3.6641	26.9895	-9.9351	3.2012
7.2962	45.4064	-4.4934	1.4691	45.4636	-4.6586	1.441
0	58.5289	0	0	58.5289	0	0

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-284.2543	0	0	-284.2543	0	0	-284.2543
-284.2543	-4.2332	0.9354	-284.2543	-5.1232	0.8305	-284.2543
-284.2543	-8.8445	1.9178	-284.2543	-11.4657	1.5512	-284.2543
-284.2543	-15.4996	2.6897	-284.2543	-19.4067	1.637	-277.328
-265.3657	-23.0782	2.8948	-256.13	-25.9228	1.6985	-249.5155
-230.8807	-28.9008	2.9918	-225.2478	-30.7481	1.774	-220.5944
-195.1789	-32.6052	3.1782	-192.8416	-34.0566	1.869	-190.7941
-157.8236	-34.3795	3.3652	-159.021	-35.8401	2.0104	-159.2554
-120.9861	-33.682	3.4659	-125.2492	-35.6306	1.9566	-128.4665
-83.4173	-30.5821	3.4229	-91.3326	-33.0267	1.9611	-97.6014
-45.9983	-24.6588	3.418	-57.8812	-28.245	1.9679	-66.5027
-12.3223	-20.0097	3.8535	-26.4058	-23.2296	2.1712	-35.9259
22.3644	-11.7149	3.0633	11.089	-15.736	2.499	-5.9032
44.0283	-5.1844	1.5592	41.7395	-6.0088	1.6994	31.962
58.5289	0	0	58.5289	0	0	58.5289

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
0	0	-284.2543	0	0	-284.2543	0
-7.0392	0.6988	-284.2543	-11.148	0.00E+00	-284.2543	-7.0392
-15.2161	0.7583	-284.2543	-18.2355	0.00E+00	-284.2543	-15.2161
-22.1187	0.7508	-269.1365	-24.0927	0.00E+00	-277.328	-22.1187
-27.6561	0.8014	-243.2031	-28.9317	0.00E+00	-249.5155	-27.6561
-31.8946	0.8482	-216.5072	-32.697	0.00E+00	-220.5944	-31.8946
-34.8467	0.8831	-189.1469	-35.4055	0.00E+00	-190.7941	-34.8467
-36.5759	0.9651	-159.3691	-37.1158	0.00E+00	-159.2554	-36.5759
-36.4178	0.9157	-130.9729	-36.8791	0.00E+00	-128.4665	-36.4178
-34.4099	0.9037	-102.8107	-35.1745	0.00E+00	-97.6014	-34.4099
-30.4914	0.8627	-73.8757	-31.8631	0.00E+00	-66.5027	-30.4914
-24.7381	0.891	-44.9955	-26.8501	0.00E+00	-35.9259	-24.7381
-20.8805	1.2587	-20.54	-23.5019	0.00E+00	-5.9032	-20.8805
-9.52	1.3294	11.2034	-16.7272	0	31.962	-9.52
0	0	58.5289	0	0	58.5289	0

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0	-284.2543	0	0	-284.2543	0	0
-0.6988	-284.2543	-5.1232	-0.8305	-284.2543	-4.2332	-0.9354
-0.7583	-284.2543	-11.4657	-1.5512	-284.2543	-8.8445	-1.9178
-0.7508	-284.2543	-19.4067	-1.637	-284.2543	-15.4996	-2.6897
-0.8014	-256.13	-25.9228	-1.6985	-265.3657	-23.0782	-2.8948
-0.8482	-225.2478	-30.7481	-1.774	-230.8807	-28.9008	-2.9918
-0.8831	-192.8416	-34.0566	-1.869	-195.1789	-32.6052	-3.1782
-0.9651	-159.021	-35.8401	-2.0104	-157.8236	-34.3795	-3.3652
-0.9157	-125.2492	-35.6306	-1.9566	-120.9861	-33.682	-3.4659
-0.9037	-91.3326	-33.0267	-1.9611	-83.4173	-30.5821	-3.4229
-0.8627	-57.8812	-28.245	-1.9679	-45.9983	-24.6588	-3.418
-0.891	-26.4058	-23.2296	-2.1712	-12.3223	-20.0097	-3.8535
-1.2587	11.089	-15.736	-2.499	22.3644	-11.7149	-3.0633
-1.3294	41.7395	-6.0088	-1.6994	44.0283	-5.1844	-1.5592
0	58.5289	0	0	58.5289	0	0

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-284.2543	0	0	-284.2543	0	0	-284.2543
-284.2543	-3.5006	-1.1457	-284.2543	-2.4453	-1.6361	-284.2543
-284.2543	-7.1269	-2.194	-284.2543	-5.4756	-2.8106	-284.2543
-284.2543	-12.2183	-3.4204	-284.2543	-9.4519	-4.4138	-262.4763
-276.9417	-18.2368	-4.4831	-279.1018	-13.5228	-6.2441	-235.3967
-240.224	-24.4897	-5.0787	-244.0114	-16.8472	-8.0499	-207.4375
-198.7398	-29.298	-5.2837	-200.8422	-18.6128	-9.6426	-178.2392
-155.5665	-31.1116	-5.6052	-152.0319	-19.3021	-10.4498	-147.2161
-113.8632	-29.6973	-5.7681	-106.5955	-19.0906	-9.9834	-126.001
-71.2915	-25.2769	-5.7356	-66.1488	-17.0214	-8.8507	-104.7858
-33.6447	-19.9604	-5.2404	-32.6536	-14.4411	-7.4194	-83.5707
-2.0303	-16.7263	-5.0363	-3.875	-13.9386	-6.2116	-62.3556
26.9895	-9.9351	-3.2012	24.5421	-9.5867	-3.6641	-39.7761
45.4636	-4.6586	-1.441	45.4064	-4.4934	-1.4691	-8.3913
58.5289	0	0	58.5289	0	0	58.5289

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
0	0	-284.2543	0	0	-284.2543	0
0	-4.5974	-284.2543	2.4453	-1.6361	-284.2543	3.5006
0	-7.1465	-284.2543	5.4756	-2.8106	-284.2543	7.1269
0	-9.3113	-284.2543	9.4519	-4.4138	-284.2543	12.2183
0	-11.1092	-279.1018	13.5228	-6.2441	-276.9417	18.2368
0	-12.566	-244.0114	16.8472	-8.0499	-240.224	24.4897
0.00E+00	-13.7215	-200.8422	18.6128	-9.6426	-198.7398	29.298
0.00E+00	-14.6407	-152.0319	19.3021	-10.4498	-155.5665	31.1116
0.00E+00	-14.3302	-106.5955	19.0906	-9.9834	-113.8632	29.6973
0.00E+00	-13.6595	-66.1488	17.0214	-8.8507	-71.2915	25.2769
0.00E+00	-12.6285	-32.6536	14.4411	-7.4194	-33.6447	19.9604
0.00E+00	-11.2373	-3.875	13.9386	-6.2116	-2.0303	16.7263
0	-9.3348	24.5421	9.5867	-3.6641	26.9895	9.9351
0	-7.2962	45.4064	4.4934	-1.4691	45.4636	4.6586
0	0	58.5289	0	0	58.5289	0

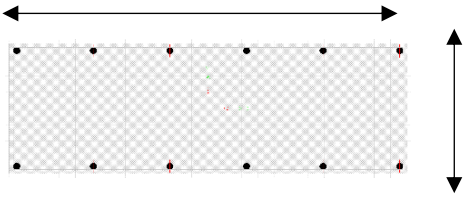
	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0	-284.2543	0	0	-284.2543	0	0
-1.1457	-284.2543	4.2332	-0.9354	-284.2543	5.1232	-0.8305
-2.194	-284.2543	8.8445	-1.9178	-284.2543	11.4657	-1.5512
-3.4204	-284.2543	15.4996	-2.6897	-284.2543	19.4067	-1.637
-4.4831	-265.3657	23.0782	-2.8948	-256.13	25.9228	-1.6985
-5.0787	-230.8807	28.9008	-2.9918	-225.2478	30.7481	-1.774
-5.2837	-195.1789	32.6052	-3.1782	-192.8416	34.0566	-1.869
-5.6052	-157.8236	34.3795	-3.3652	-159.021	35.8401	-2.0104
-5.7681	-120.9861	33.682	-3.4659	-125.2492	35.6306	-1.9566
-5.7356	-83.4173	30.5821	-3.4229	-91.3326	33.0267	-1.9611
-5.2404	-45.9983	24.6588	-3.418	-57.8812	28.245	-1.9679
-5.0363	-12.3223	20.0097	-3.8535	-26.4058	23.2296	-2.1712
-3.2012	22.3644	11.7149	-3.0633	11.089	15.736	-2.499
-1.441	44.0283	5.1844	-1.5592	41.7395	6.0088	-1.6994
0	58.5289	0	0	58.5289	0	0

Curve 24	345. degrees	
P	M3	M2
-284.2543	0	0
-284.2543	7.0392	-0.6988
-284.2543	15.2161	-0.7583
-277.328	22.1187	-0.7508
-249.5155	27.6561	-0.8014
-220.5944	31.8946	-0.8482
-190.7941	34.8467	-0.8831
-159.2554	36.5759	-0.9651
-128.4665	36.4178	-0.9157
-97.6014	34.4099	-0.9037
-66.5027	30.4914	-0.8627
-35.9259	24.7381	-0.891
-5.9032	20.8805	-1.2587
31.962	9.52	-1.3294
58.5289	0	0

DISEÑO DE COLUMNAS (COLUMNA - 2)

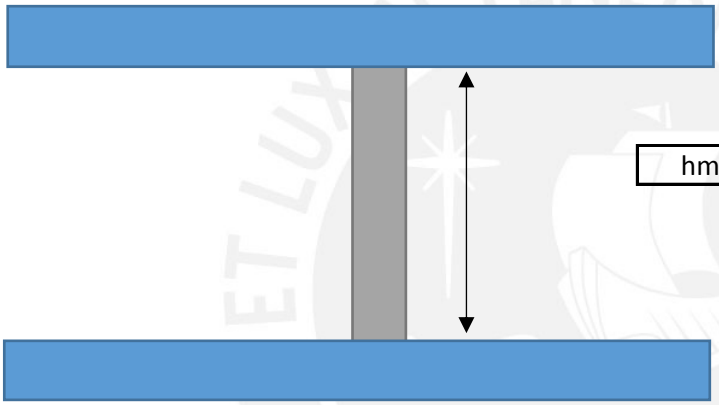
1. INGRESO DE DATOS GENERALES

Lm (m)	0.75



f'c (kg/cm2)	210
fy (kg/cm2)	4200

Area



hm (m)	2.4

d(m)	0.69

2. VERIFICACIÓN POR PANDEO

Pserv (ton)	107.68	(Cargas de servicio del etabs)
Pu	156.19	(Pu de las comb. Diseño por flexocompresi
1.6xPu	249.90	
I (m4)	0.00879	(Momento de inercia de la sección)
Ief = I/5 (m4)	0.001758	Momento de inercia efectivo)
Pcr (ton)	662.59	(Cortante del etabs)
Φ	0.70	
ΦPcr	463.82	
ΦPcr≥1.6xPu	CUMPLE	Condiciones por pandeo

3. DISEÑO POR CORTANTE

ρ min	1%	As	18.75 cm2	
		As colocado	20.00 cm2	10 Φ 5/8"

PARA CORTE EN Y-Y

COMBINACIONES	Pu (ton)	Mu (ton-m)	Vc (ton)	ΦVc (ton)
1.4CM+1.7CV	156.19	-4.99	24.4	20.74
1.25(CM+CV)+CS	211.17	-2.90	27.6	23.46
1.25(CM+CV)-CS	58.03	-6.14	18.7	15.88
0.9CM+CS	157.17	-1.85	24.5	20.79
0.9CM-CS	4.03	-1.40	15.5	13.20

3.1 DISEÑO POR CAPACIDAD

COMBINACIONES	Pu (ton)	ΦMn (ton-m)	Mn (ton-m)	Mpr (ton-m)
1.4CM+1.7CV	156.2	37.1	41.2	51.5
1.25(CM+CV)+CS	199.1	35.4	39.3	49.2
1.25(CM+CV)-CS	70.1	31.9	35.4	44.3
0.9CM+CS	145.1	36.9	41.0	51.3
0.9CM-CS	16.1	23.5	26.1	32.6

		Espaciamiento So (cm) no debe exceder el minimo		
Diametro	Av (cm2)	8 Φ dmenor	1/2 x 25 cm	100 mm
8 mm	1	4	12.5	10
5/8 "	4	16	12.5	10
1/2"	2.58	10.32	12.5	10

espaciamiento de estribos

2 estribos 3/8" : 1@5, 7@10, resto @25

t (m)	0.25

1875.0 cm2

ión)

$$Pcr = \left(\frac{\pi}{kh}\right)^2 E\ Ief, \quad k = 1.0$$

es 20 cm2

Vpr (ton)	Vc (ton)	Vs (ton)	S (cm)
42.9	24.4	26.1	31.3
41.0	27.6	20.6	39.7
36.9	18.7	24.8	33.0
42.7	24.5	25.8	31.7
27.2	15.5	16.5	49.6

$$Vs = \frac{Vu - \phi Vc}{\phi} \qquad Sh = \frac{Ah \times d \times}{Vs}$$

$Ah = \text{área de}$

$= (2 * A_{ba}$

Doble mal

Asumir A

Long. De confinamiento (Lo)

So considerado (cm)	1/6xln	Mayor. Dim	500 mm	Lo (cm) considerado
4	35.8	75	50	75
10	35.8	75	50	75
10	35.8	75	50	75

: *fy*

: *acero horizontal*

ırra) *ó* (1 * *A barra*)

'la si el espesor del muro ≥ 20cm

v = A h y Sv = S h

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

CV (ton)

18.7

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-507.8252	0	0	-507.8252	0	0
2	-507.8252	33.9089	0.00E+00	-507.8252	26.8675	0.8351
3	-507.8252	53.6097	0.00E+00	-507.8252	48.7037	0.8395
4	-476.1936	70.2934	0.00E+00	-484.4244	66.9705	0.8902
5	-429.8892	84.2162	0.00E+00	-436.4226	82.0006	0.9614
6	-382.2434	95.1469	0.00E+00	-386.6646	93.7343	1.0137
7	-331.832	103.5237	0.00E+00	-333.8844	102.421	1.1053
8	-276.7861	109.4049	0.00E+00	-276.4754	108.3347	1.161
9	-219.8295	110.6987	0.00E+00	-217.303	109.8639	1.1256
10	-163.1365	106.7281	0.00E+00	-157.4405	105.1318	1.2169
11	-107.2049	97.0752	0.00E+00	-98.1046	94.2703	1.2035
12	-51.9759	85.3857	0.00E+00	-42.1559	85.0024	1.3083
13	9.4486	77.0276	0.00E+00	27.0377	68.9312	1.3706
14	80.5269	43.3726	0.00E+00	102.7497	31.1163	1.5464
15	155.5894	0	0	155.5894	0	0

DISEÑO POR FLEXOCOMPRESIÓN

Story	Column	Load	Loc	P	V2	V3
PISO1	C3	LIVE	0	-17.15	-0.31	0.02
PISO1	C3	LIVE	1.075	-17.15	-0.31	0.02
PISO1	C3	LIVE	2.15	-17.15	-0.31	0.02
PISO1	C3	DEAD-SQ	0	-79.08	-2.6	0.17
PISO1	C3	DEAD-SQ	1.075	-78.27	-2.6	0.17
PISO1	C3	DEAD-SQ	2.15	-77.47	-2.6	0.17
PISO1	C3	RX MAX	0	6.22	6.97	0.13
PISO1	C3	RX MAX	1.075	6.22	6.97	0.13
PISO1	C3	RX MAX	2.15	6.22	6.97	0.13
PISO1	C3	RX MIN	0	-6.22	-6.97	-0.13
PISO1	C3	RX MIN	1.075	-6.22	-6.97	-0.13
PISO1	C3	RX MIN	2.15	-6.22	-6.97	-0.13
PISO1	C3	RY MAX	0	7.47	5.39	0.33
PISO1	C3	RY MAX	1.075	7.47	5.39	0.33
PISO1	C3	RY MAX	2.15	7.47	5.39	0.33
PISO1	C3	RY MIN	0	-7.47	-5.39	-0.33
PISO1	C3	RY MIN	1.075	-7.47	-5.39	-0.33
PISO1	C3	RY MIN	2.15	-7.47	-5.39	-0.33

1.4CM+1.7CV	139.87	Tn
1.25(CM+CV)	120.29	Tn

RX

CM	M22	0.16	Tn.m
	M33	-3.30	Tn.m
CV	M22	0.00	Tn.m
	M33	-0.27	Tn.m

RY

COMBINACIONES SISMO EN X			
	P	M22	M33
1.4CM+1.7CV	139.87	0.23	-5.09
1.25(CM+CV)+CS	126.51	0.81	26.00
1.25(CM+CV)-CS	114.07	-0.41	-34.93
0.9CM+CS	77.39	0.75	27.50
0.9CM-CS	64.95	-0.47	-30.71

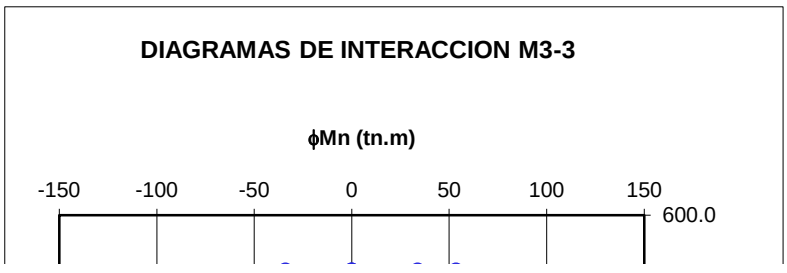
C
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

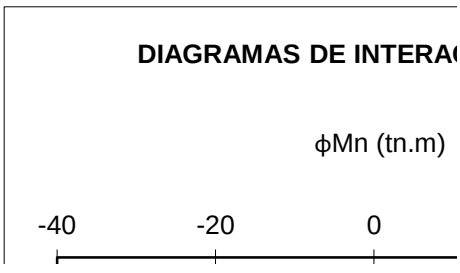
MOMENTO MINIMO DE DISEÑO

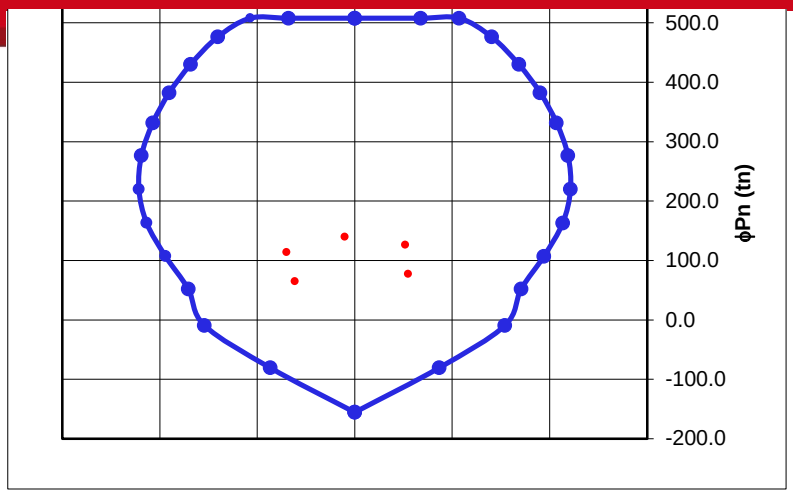
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	507.8	0.0	507.8	0.0
2	507.8	33.9	507.8	-33.9
3	507.8	53.6	507.8	-53.6
4	476.2	70.3	476.2	-70.3
5	429.9	84.2	429.9	-84.2
6	382.2	95.1	382.2	-95.1
7	331.8	103.5	331.8	-103.5
8	276.8	109.4	276.8	-109.4
9	219.8	110.7	219.8	-110.7
10	163.1	106.7	163.1	-106.7
11	107.2	97.1	107.2	-97.1
12	52.0	85.4	52.0	-85.4
13	-9.4	77.0	-9.4	-77.0
14	-80.5	43.4	-80.5	-43.4
15	-155.6	0.0	-155.6	0.0

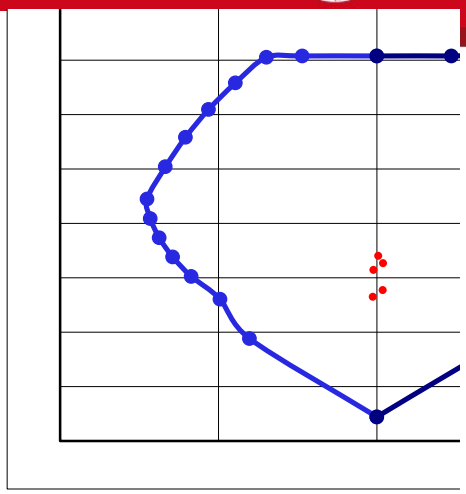
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

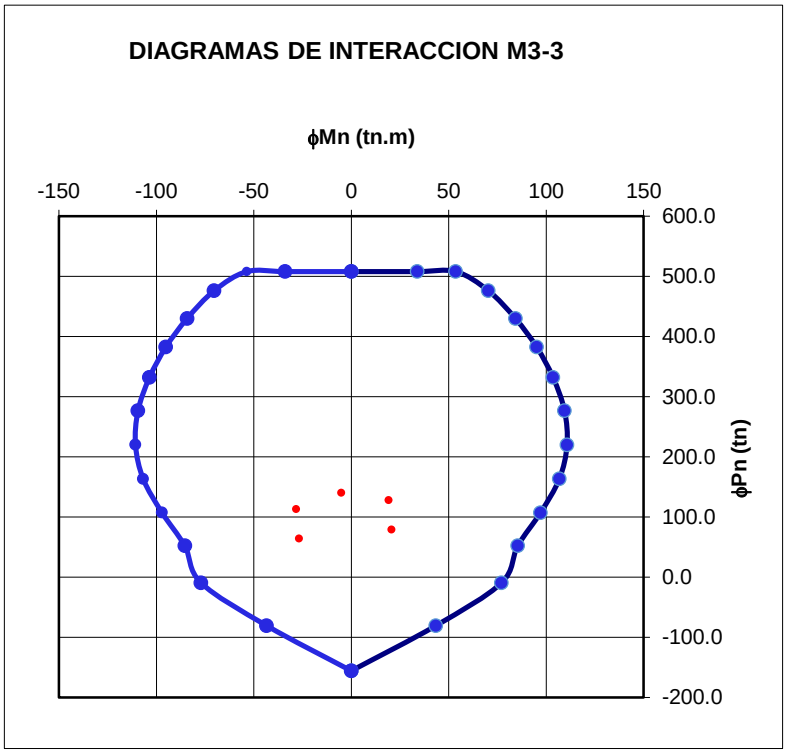


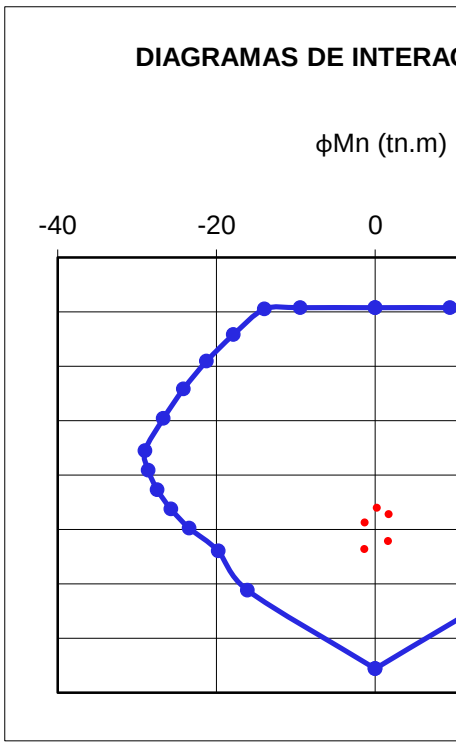






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-507.8252	0	0	-507.8252	0	0	-507.8252
-507.8252	20.0342	1.4918	-507.8252	16.5558	1.7354	-507.8252
-507.8252	42.4097	1.8267	-507.8252	33.7554	3.0059	-507.8252
-494.1206	62.6675	1.9098	-506.4924	56.2679	3.2452	-507.8252
-443.9848	79.071	2.0128	-453.1684	74.8371	3.4191	-468.2953
-390.9785	91.9079	2.1355	-397.4288	88.9379	3.6161	-406.7219
-335.8022	101.0769	2.2892	-338.6185	98.7538	3.8845	-341.8827
-276.2446	106.9315	2.4922	-275.2731	104.5786	4.2668	-272.7216
-214.0345	108.0647	2.5436	-209.5328	105.216	4.4038	-201.8575
-151.0936	102.9093	2.5393	-141.9963	98.9253	4.3686	-128.0537
-88.0273	90.6471	2.547	-74.9812	84.9458	4.3658	-55.946
-29.4364	83.1442	2.9253	-9.937	78.6608	5.2849	19.7293
48.9014	57.8953	3.1343	72.0124	44.7037	4.9558	88.8522
120.4282	20.5527	2.4948	128.951	15.3898	2.69	131.8094
155.5894	0	0	155.5894	0	0	155.5894

T	M2	M3
-0.001	0.028	-0.609
-0.001	0.002	-0.274
-0.001	-0.024	0.061
-0.003	0.159	-3.3
-0.003	-0.023	-0.504
-0.003	-0.205	2.292
0.095	0.609	30.467
0.095	0.467	23.023
0.095	0.327	15.623
-0.095	-0.609	-30.467
-0.095	-0.467	-23.023
-0.095	-0.327	-15.623
0.232	1.502	23.767
0.232	1.155	18.121
0.232	0.815	12.607
-0.232	-1.502	-23.767
-0.232	-1.155	-18.121
-0.232	-0.815	-12.607

P	**6.22**	Tn
M22	**0.61**	Tn.m
M33	**30.47**	Tn.m

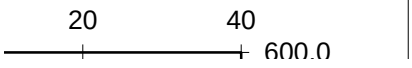
P	7.47	Tn
M22	1.50	Tn.m
M33	23.77	Tn.m

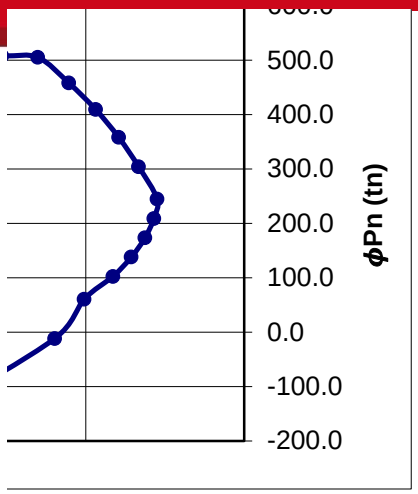
COMBINACIONES SISMO EN Y

P	M22	M33
139.87	0.23	-5.09
127.76	1.70	19.30
112.82	-1.30	-28.23
78.64	1.65	20.80
63.70	-1.36	-26.74

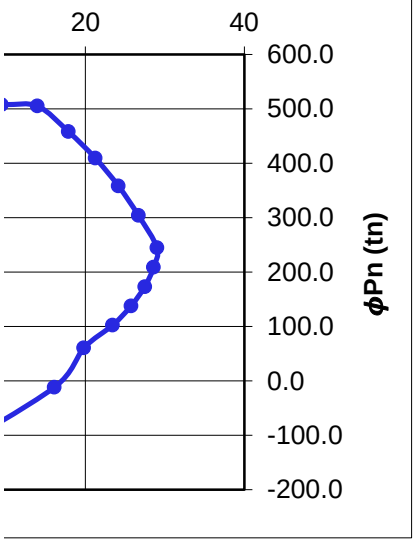
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
507.8	0.0	507.8	0.0
507.8	-9.4	507.8	9.4
505.2	-13.9	505.2	13.9
458.2	-17.9	458.2	17.9
409.4	-21.2	409.4	21.2
358.4	-24.1	358.4	24.1
304.1	-26.7	304.1	26.7
245.0	-29.0	245.0	29.0
208.7	-28.6	208.7	28.6
173.4	-27.5	173.4	27.5
138.0	-25.7	138.0	25.7
102.6	-23.4	102.6	23.4
60.6	-19.8	60.6	19.8
-11.6	-16.1	-11.6	16.1
-155.6	0.0	-155.6	0.0

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
0	0	-507.8252	0	0	-507.8252	0
13.9027	2.1178	-507.8252	10.1763	3.1381	-507.8252	0
26.5074	3.791	-507.8252	19.402	4.9873	-505.1633	0.00E+00
44.745	5.2664	-507.8252	32.4893	7.3631	-458.1588	0.00E+00
66.0206	5.7734	-489.7118	47.5198	9.783	-409.4444	0
82.8134	6.1192	-427.3185	62.7316	11.7622	-358.4055	0
93.9179	6.5363	-351.1753	76.3265	12.8788	-304.0924	0.00E+00
99.6576	7.0763	-266.0168	82.5908	13.7581	-244.9566	0.00E+00
98.8819	7.4553	-182.0784	77.7987	14.5316	-208.723	0.00E+00
90.8832	7.4328	-101.9873	66.2163	14.0909	-173.3644	0.00E+00
76.0432	7.4849	-34.0577	60.189	13.7698	-138.0058	0.00E+00
63.8356	8.5308	37.3687	48.2475	11.3916	-102.6471	0.00E+00
34.4211	6.0079	92.1069	30.3053	6.6451	-60.6002	0
13.6179	2.5521	133.2974	12.5685	2.464	11.648	0
0	0	155.5894	0	0	155.5894	0

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0	-507.8252	0	0	-507.8252	0	0
9.425	-507.8252	-10.1763	3.1381	-507.8252	-13.9027	2.1178
13.9382	-507.8252	-19.402	4.9873	-507.8252	-26.5074	3.791
17.8621	-507.8252	-32.4893	7.3631	-507.8252	-44.745	5.2664
21.2421	-489.7118	-47.5198	9.783	-468.2953	-66.0206	5.7734
24.1456	-427.3185	-62.7316	11.7622	-406.7219	-82.8134	6.1192
26.6765	-351.1753	-76.3265	12.8788	-341.8827	-93.9179	6.5363
29.0042	-266.0168	-82.5908	13.7581	-272.7216	-99.6576	7.0763
28.5822	-182.0784	-77.7987	14.5316	-201.8575	-98.8819	7.4553
27.4643	-101.9873	-66.2163	14.0909	-128.0537	-90.8832	7.4328
25.7461	-34.0577	-60.189	13.7698	-55.946	-76.0432	7.4849
23.4275	37.3687	-48.2475	11.3916	19.7293	-63.8356	8.5308
19.7771	92.1069	-30.3053	6.6451	88.8522	-34.4211	6.0079
16.0768	133.2974	-12.5685	2.464	131.8094	-13.6179	2.5521
0	155.5894	0	0	155.5894	0	0

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-507.8252	0	0	-507.8252	0	0	-507.8252
-507.8252	-16.5558	1.7354	-507.8252	-20.0342	1.4918	-507.8252
-507.8252	-33.7554	3.0059	-507.8252	-42.4097	1.8267	-507.8252
-506.4924	-56.2679	3.2452	-494.1206	-62.6675	1.9098	-484.4244
-453.1684	-74.8371	3.4191	-443.9848	-79.071	2.0128	-436.4226
-397.4288	-88.9379	3.6161	-390.9785	-91.9079	2.1355	-386.6646
-338.6185	-98.7538	3.8845	-335.8022	-101.0769	2.2892	-333.8844
-275.2731	-104.5786	4.2668	-276.2446	-106.9315	2.4922	-276.4754
-209.5328	-105.216	4.4038	-214.0345	-108.0647	2.5436	-217.303
-141.9963	-98.9253	4.3686	-151.0936	-102.9093	2.5393	-157.4405
-74.9812	-84.9458	4.3658	-88.0273	-90.6471	2.547	-98.1046
-9.937	-78.6608	5.2849	-29.4364	-83.1442	2.9253	-42.1559
72.0124	-44.7037	4.9558	48.9014	-57.8953	3.1343	27.0377
128.951	-15.3898	2.69	120.4282	-20.5527	2.4948	102.7497
155.5894	0	0	155.5894	0	0	155.5894

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
0	0	-507.8252	0	0	-507.8252	0
-26.8675	0.8351	-507.8252	-33.9089	0.00E+00	-507.8252	-26.8675
-48.7037	0.8395	-507.8252	-53.6097	0.00E+00	-507.8252	-48.7037
-66.9705	0.8902	-476.1936	-70.2934	0.00E+00	-484.4244	-66.9705
-82.0006	0.9614	-429.8892	-84.2162	0.00E+00	-436.4226	-82.0006
-93.7343	1.0137	-382.2434	-95.1469	0.00E+00	-386.6646	-93.7343
-102.421	1.1053	-331.832	-103.5237	0.00E+00	-333.8844	-102.421
-108.3347	1.161	-276.7861	-109.4049	0.00E+00	-276.4754	-108.3347
-109.8639	1.1256	-219.8295	-110.6987	0.00E+00	-217.303	-109.8639
-105.1318	1.2169	-163.1365	-106.7281	0.00E+00	-157.4405	-105.1318
-94.2703	1.2035	-107.2049	-97.0752	0.00E+00	-98.1046	-94.2703
-85.0024	1.3083	-51.9759	-85.3857	0.00E+00	-42.1559	-85.0024
-68.9312	1.3706	9.4486	-77.0276	0.00E+00	27.0377	-68.9312
-31.1163	1.5464	80.5269	-43.3726	0	102.7497	-31.1163
0	0	155.5894	0	0	155.5894	0

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0	-507.8252	0	0	-507.8252	0	0
-0.8351	-507.8252	-20.0342	-1.4918	-507.8252	-16.5558	-1.7354
-0.8395	-507.8252	-42.4097	-1.8267	-507.8252	-33.7554	-3.0059
-0.8902	-494.1206	-62.6675	-1.9098	-506.4924	-56.2679	-3.2452
-0.9614	-443.9848	-79.071	-2.0128	-453.1684	-74.8371	-3.4191
-1.0137	-390.9785	-91.9079	-2.1355	-397.4288	-88.9379	-3.6161
-1.1053	-335.8022	-101.0769	-2.2892	-338.6185	-98.7538	-3.8845
-1.161	-276.2446	-106.9315	-2.4922	-275.2731	-104.5786	-4.2668
-1.1256	-214.0345	-108.0647	-2.5436	-209.5328	-105.216	-4.4038
-1.2169	-151.0936	-102.9093	-2.5393	-141.9963	-98.9253	-4.3686
-1.2035	-88.0273	-90.6471	-2.547	-74.9812	-84.9458	-4.3658
-1.3083	-29.4364	-83.1442	-2.9253	-9.937	-78.6608	-5.2849
-1.3706	48.9014	-57.8953	-3.1343	72.0124	-44.7037	-4.9558
-1.5464	120.4282	-20.5527	-2.4948	128.951	-15.3898	-2.69
0	155.5894	0	0	155.5894	0	0

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-507.8252	0	0	-507.8252	0	0	-507.8252
-507.8252	-13.9027	-2.1178	-507.8252	-10.1763	-3.1381	-507.8252
-507.8252	-26.5074	-3.791	-507.8252	-19.402	-4.9873	-505.1633
-507.8252	-44.745	-5.2664	-507.8252	-32.4893	-7.3631	-458.1588
-468.2953	-66.0206	-5.7734	-489.7118	-47.5198	-9.783	-409.4444
-406.7219	-82.8134	-6.1192	-427.3185	-62.7316	-11.7622	-358.4055
-341.8827	-93.9179	-6.5363	-351.1753	-76.3265	-12.8788	-304.0924
-272.7216	-99.6576	-7.0763	-266.0168	-82.5908	-13.7581	-244.9566
-201.8575	-98.8819	-7.4553	-182.0784	-77.7987	-14.5316	-208.723
-128.0537	-90.8832	-7.4328	-101.9873	-66.2163	-14.0909	-173.3644
-55.946	-76.0432	-7.4849	-34.0577	-60.189	-13.7698	-138.0058
19.7293	-63.8356	-8.5308	37.3687	-48.2475	-11.3916	-102.6471
88.8522	-34.4211	-6.0079	92.1069	-30.3053	-6.6451	-60.6002
131.8094	-13.6179	-2.5521	133.2974	-12.5685	-2.464	11.648
155.5894	0	0	155.5894	0	0	155.5894

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
0	0	-507.8252	0	0	-507.8252	0
0	-9.425	-507.8252	10.1763	-3.1381	-507.8252	13.9027
0	-13.9382	-507.8252	19.402	-4.9873	-507.8252	26.5074
0	-17.8621	-507.8252	32.4893	-7.3631	-507.8252	44.745
0	-21.2421	-489.7118	47.5198	-9.783	-468.2953	66.0206
0	-24.1456	-427.3185	62.7316	-11.7622	-406.7219	82.8134
0.00E+00	-26.6765	-351.1753	76.3265	-12.8788	-341.8827	93.9179
0.00E+00	-29.0042	-266.0168	82.5908	-13.7581	-272.7216	99.6576
0.00E+00	-28.5822	-182.0784	77.7987	-14.5316	-201.8575	98.8819
0.00E+00	-27.4643	-101.9873	66.2163	-14.0909	-128.0537	90.8832
0.00E+00	-25.7461	-34.0577	60.189	-13.7698	-55.946	76.0432
0.00E+00	-23.4275	37.3687	48.2475	-11.3916	19.7293	63.8356
0	-19.7771	92.1069	30.3053	-6.6451	88.8522	34.4211
0	-16.0768	133.2974	12.5685	-2.464	131.8094	13.6179
0	0	155.5894	0	0	155.5894	0

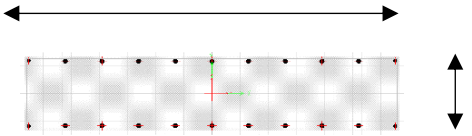
	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0	-507.8252	0	0	-507.8252	0	0
-2.1178	-507.8252	16.5558	-1.7354	-507.8252	20.0342	-1.4918
-3.791	-507.8252	33.7554	-3.0059	-507.8252	42.4097	-1.8267
-5.2664	-506.4924	56.2679	-3.2452	-494.1206	62.6675	-1.9098
-5.7734	-453.1684	74.8371	-3.4191	-443.9848	79.071	-2.0128
-6.1192	-397.4288	88.9379	-3.6161	-390.9785	91.9079	-2.1355
-6.5363	-338.6185	98.7538	-3.8845	-335.8022	101.0769	-2.2892
-7.0763	-275.2731	104.5786	-4.2668	-276.2446	106.9315	-2.4922
-7.4553	-209.5328	105.216	-4.4038	-214.0345	108.0647	-2.5436
-7.4328	-141.9963	98.9253	-4.3686	-151.0936	102.9093	-2.5393
-7.4849	-74.9812	84.9458	-4.3658	-88.0273	90.6471	-2.547
-8.5308	-9.937	78.6608	-5.2849	-29.4364	83.1442	-2.9253
-6.0079	72.0124	44.7037	-4.9558	48.9014	57.8953	-3.1343
-2.5521	128.951	15.3898	-2.69	120.4282	20.5527	-2.4948
0	155.5894	0	0	155.5894	0	0

Curve 24	345. degrees	
P	M3	M2
-507.8252	0	0
-507.8252	26.8675	-0.8351
-507.8252	48.7037	-0.8395
-484.4244	66.9705	-0.8902
-436.4226	82.0006	-0.9614
-386.6646	93.7343	-1.0137
-333.8844	102.421	-1.1053
-276.4754	108.3347	-1.161
-217.303	109.8639	-1.1256
-157.4405	105.1318	-1.2169
-98.1046	94.2703	-1.2035
-42.1559	85.0024	-1.3083
27.0377	68.9312	-1.3706
102.7497	31.1163	-1.5464
155.5894	0	0

DISEÑO DE COLUMNAS (COLUMNA - 3)

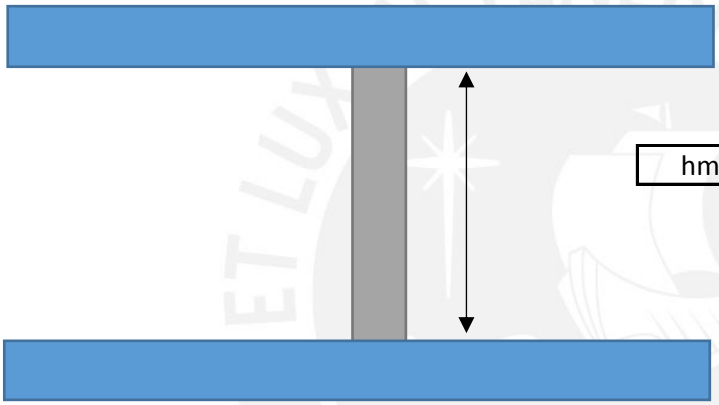
1. INGRESO DE DATOS GENERALES

Lm (m)	1.25



f'c (kg/cm2)	210
fy (kg/cm2)	4200

Area



hm (m)	2.4

d(m)	1.19

2. VERIFICACIÓN POR PANDEO

Pserv (ton)	96.23	(Cargas de servicio del etabs)
Pu	139.87	(Pu de las comb. Diseño por flexocompresi
1.6xPu	223.79	
I (m4)	0.04069	(Momento de inercia de la sección)
Ief = I/5 (m4)	0.008138	Momento de inercia efectivo)
Pcr (ton)	3067.56	(Cortante del etabs)
Φ	0.70	
ΦPcr	2147.29	
ΦPcr≥1.6xPu	CUMPLE	Condiciones por pandeo

3. DISEÑO POR CORTANTE

ρ min	1%	As	31.25 cm2	
		As colocado	32.00 cm2	16 Φ 5/8"

PARA CORTE EN X-X

COMBINACIONES	Pu (ton)	Mu (ton-m)	Vc (ton)	ΦVc (ton)
1.4CM+1.7CV	139.87	-5.09	34.8	29.60
1.25(CM+CV)+CS	126.51	26.00	34.0	28.91
1.25(CM+CV)-CS	114.07	-34.93	33.3	28.27
0.9CM+CS	77.39	27.50	31.1	26.39
0.9CM-CS	64.95	-30.71	30.3	25.76

3.1 DISEÑO POR CAPACIDAD

COMBINACIONES	Pu (ton)	ΦMn (ton-m)	Mn (ton-m)	Mpr (ton-m)
1.4CM+1.7CV	139.9	97.1	107.9	134.9
1.25(CM+CV)+CS	127.8	101	112.2	140.3
1.25(CM+CV)-CS	112.8	96	106.7	133.3
0.9CM+CS	78.6	85.4	94.9	118.6
0.9CM-CS	63.7	70	77.8	97.2

		Espaciamiento So (cm) no debe exceder el minimo		
Diametro	Av (cm2)	8 Φ dmenor	1/2 x 25 cm	100 mm
8 mm	1	4	12.5	10
5/8 "	4	16	12.5	10
1/2"	2.58	10.32	12.5	10

espaciamiento de estribos

2 estribos 3/8" : 1@5, 7@10, resto @25

t (m)	0.25

3125.0 cm2

ión)

$$Pcr = \left(\frac{\pi}{kh}\right)^2 E\ Ief, \quad k = 1.0$$

es 32 cm2

Vpr (ton)	Vc (ton)	Vs (ton)	S (cm)
112.4	34.8	97.4	14.5
116.9	34.0	103.5	13.6
111.1	33.3	97.5	14.5
98.8	31.1	85.2	16.5
81.0	30.3	65.0	21.7

$$Vs = \frac{Vu - \phi Vc}{\phi} \qquad Sh = \frac{Ah \times d \times}{Vs}$$

$$Ah = \text{área de}$$

$$= (2 * A\,ba$$

Doble mal

Asumir A

Long. De confinamiento (Lo)

So considerado (cm)	1/6xln	Mayor. Dim	500 mm	Lo (cm) considerado
4	35.8	125	50	125
10	35.8	125	50	125
10	35.8	125	50	125

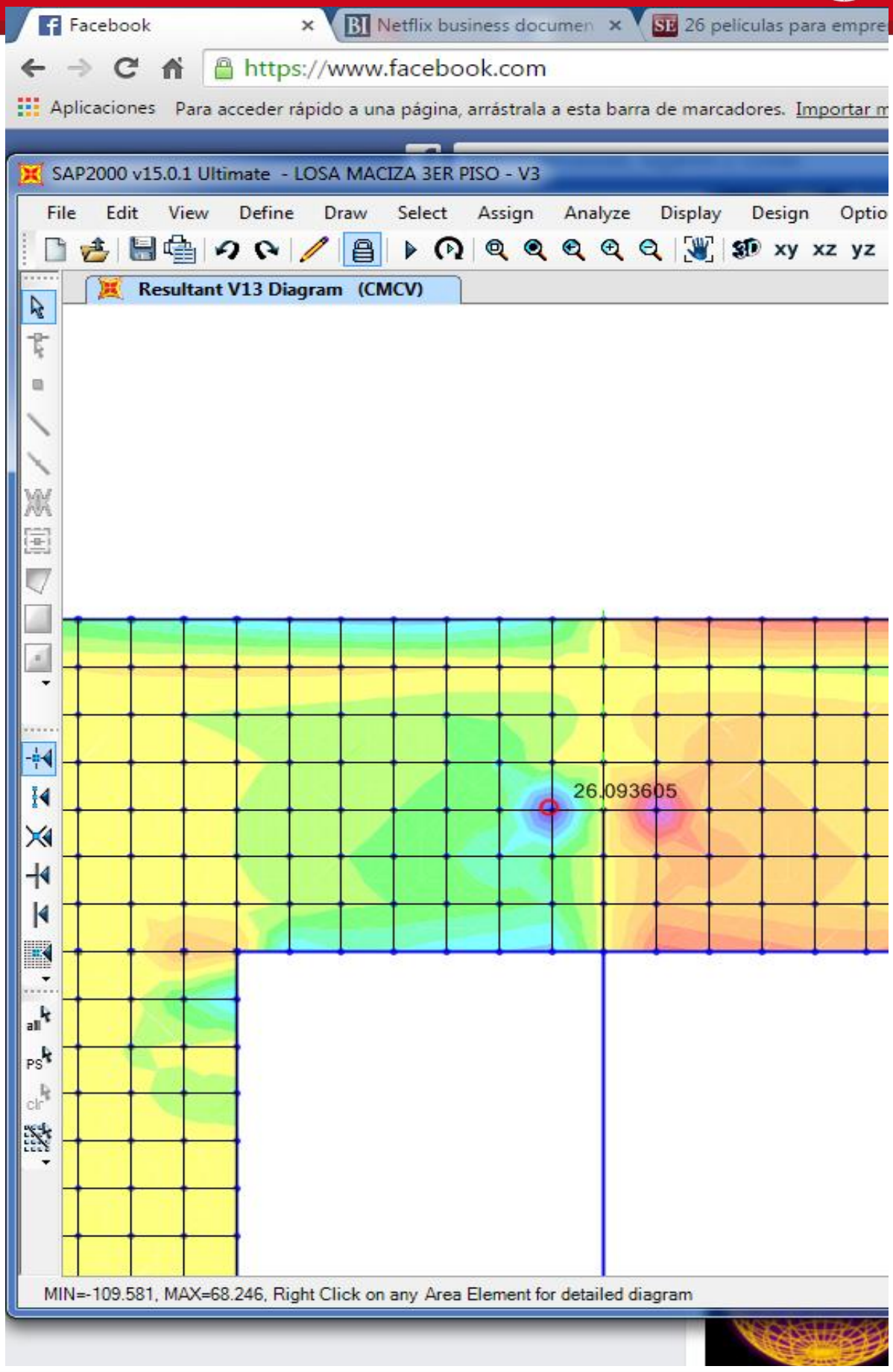
: *fy*

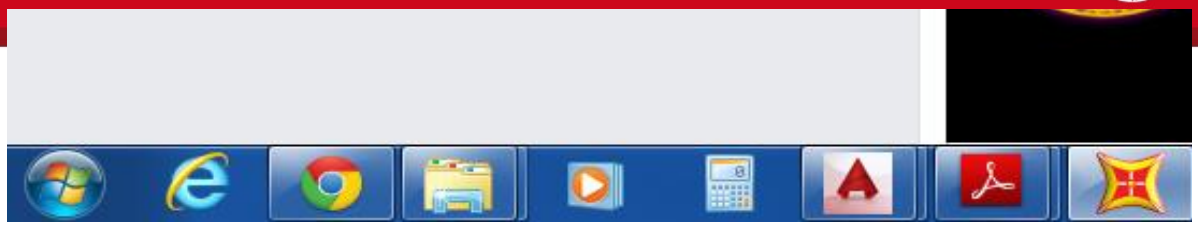
: *acero horizontal*

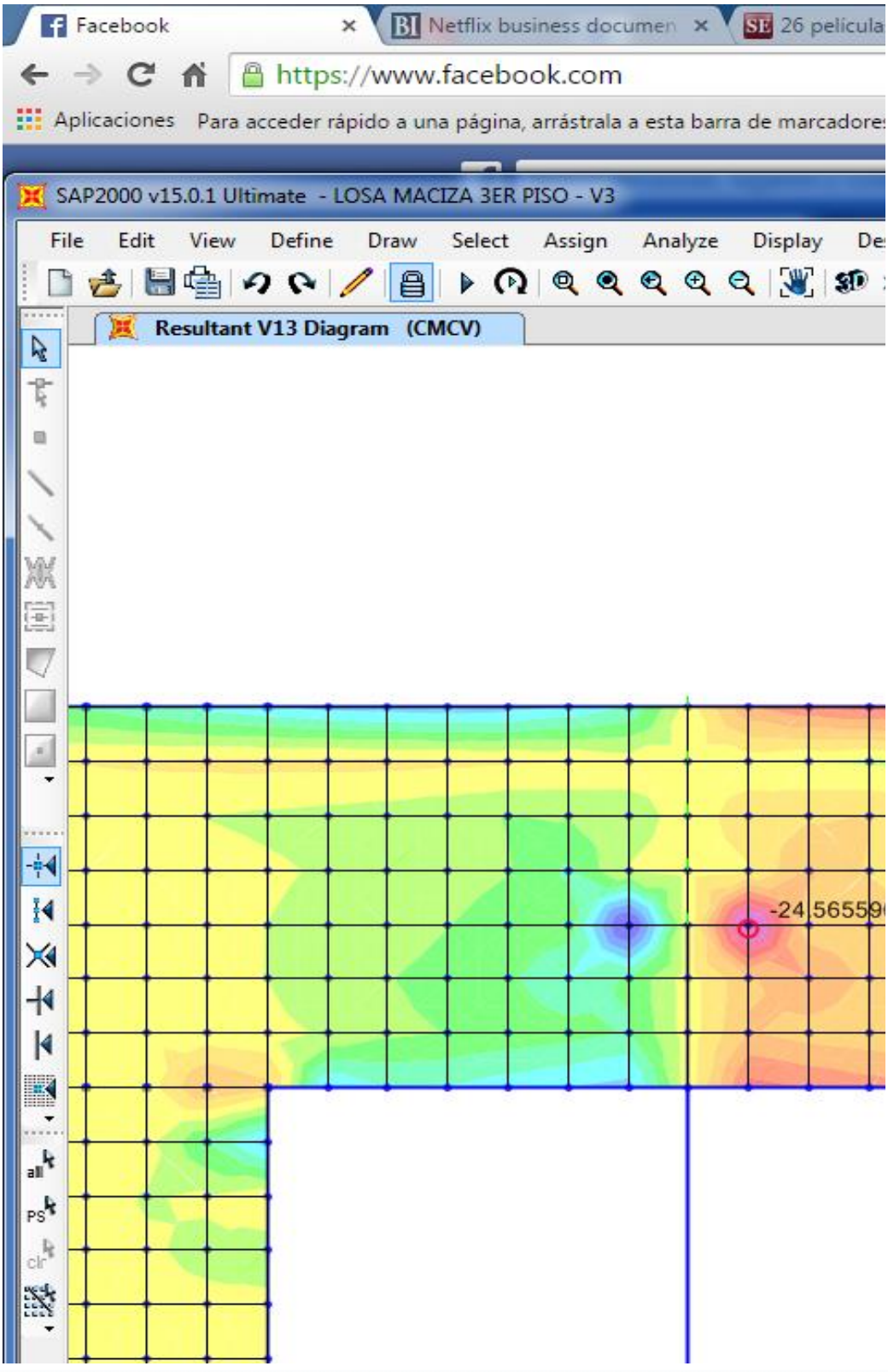
ırra) *ó* (1 * *A barra*)

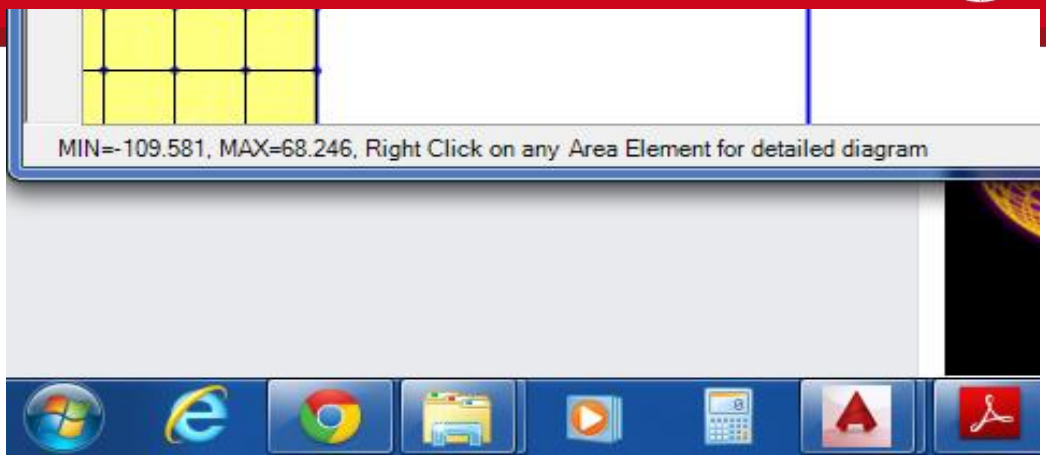
'la si el espesor del muro ≥ 20cm

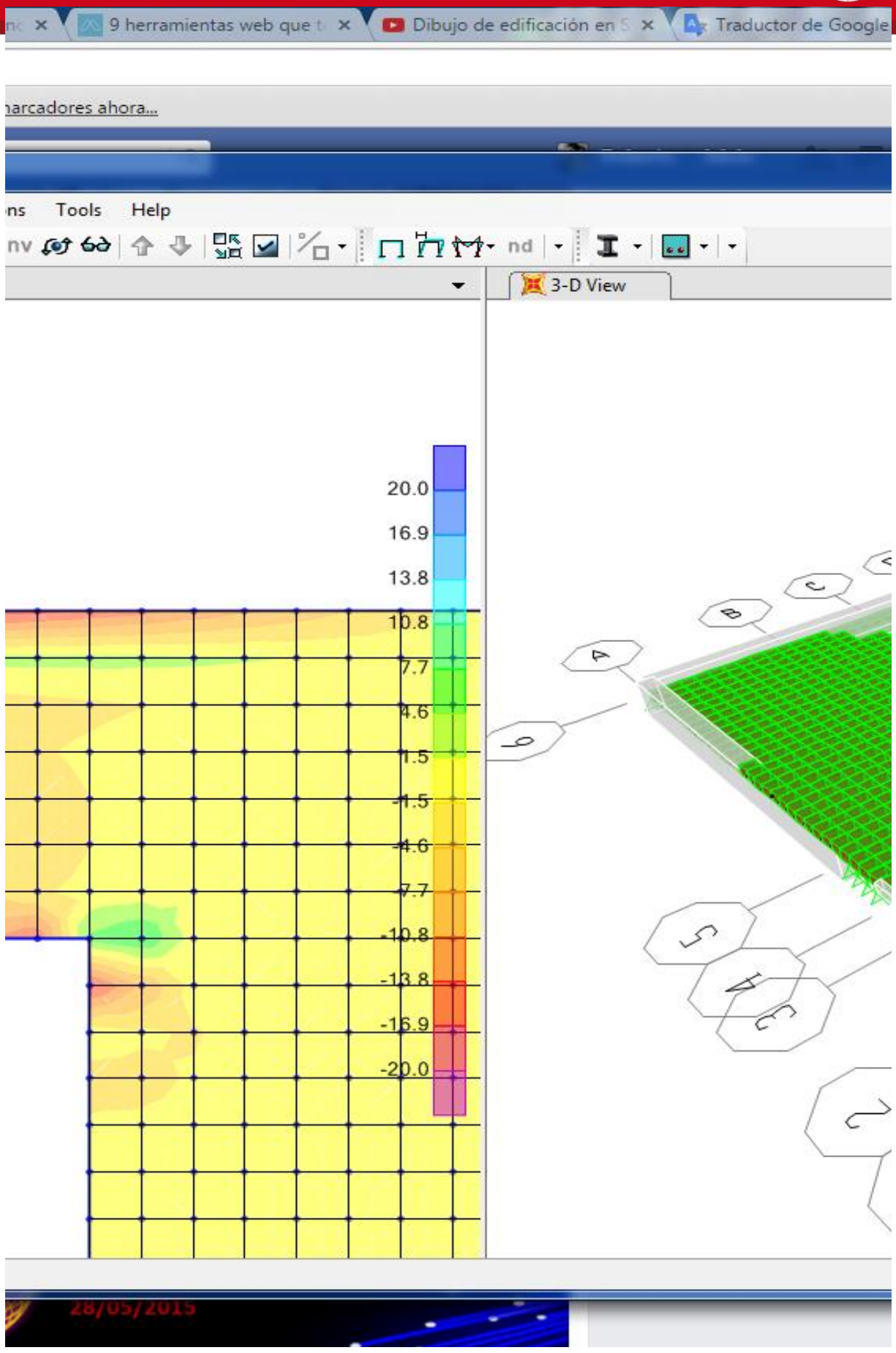
v = A h y Sv = S h

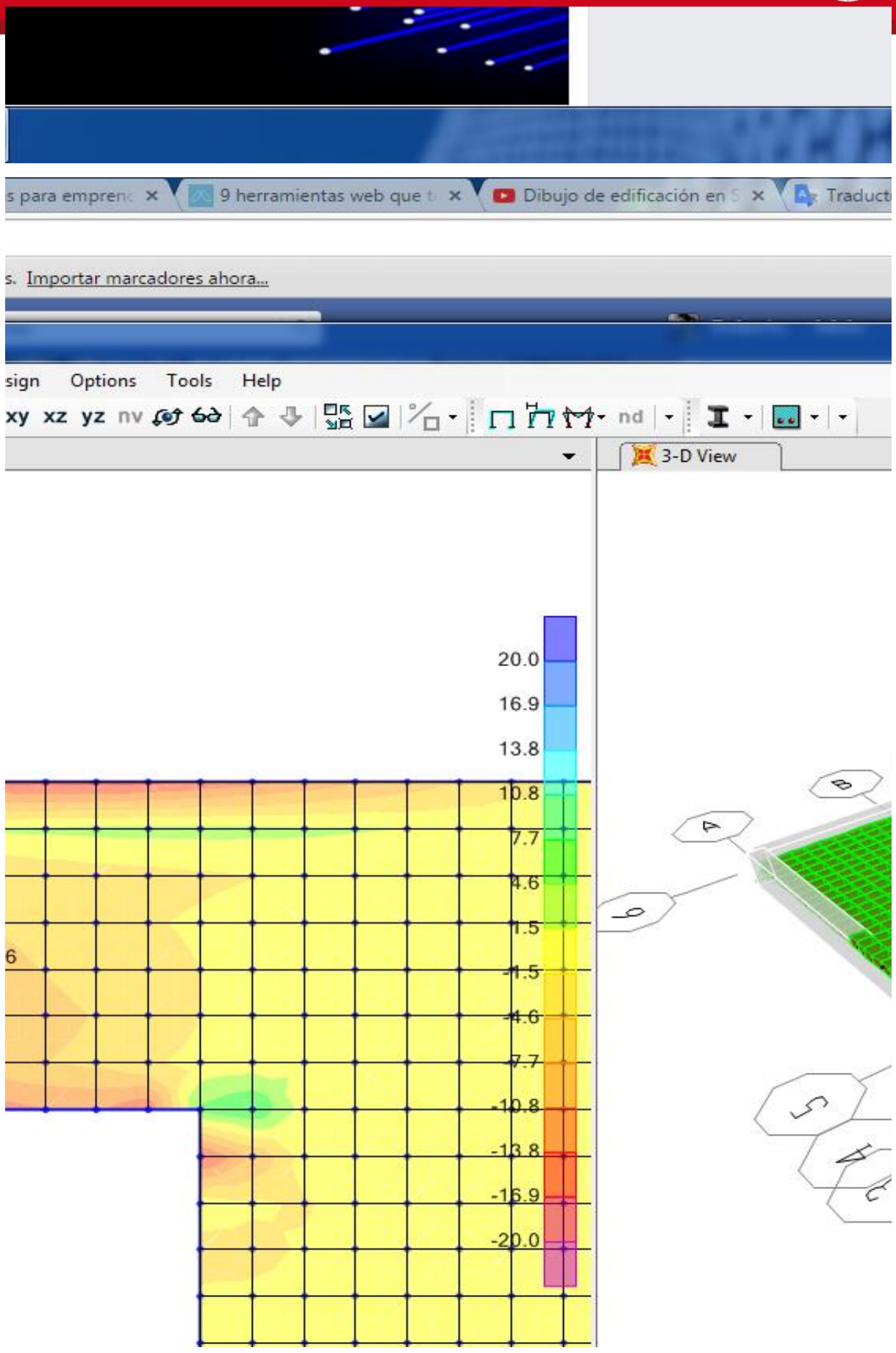


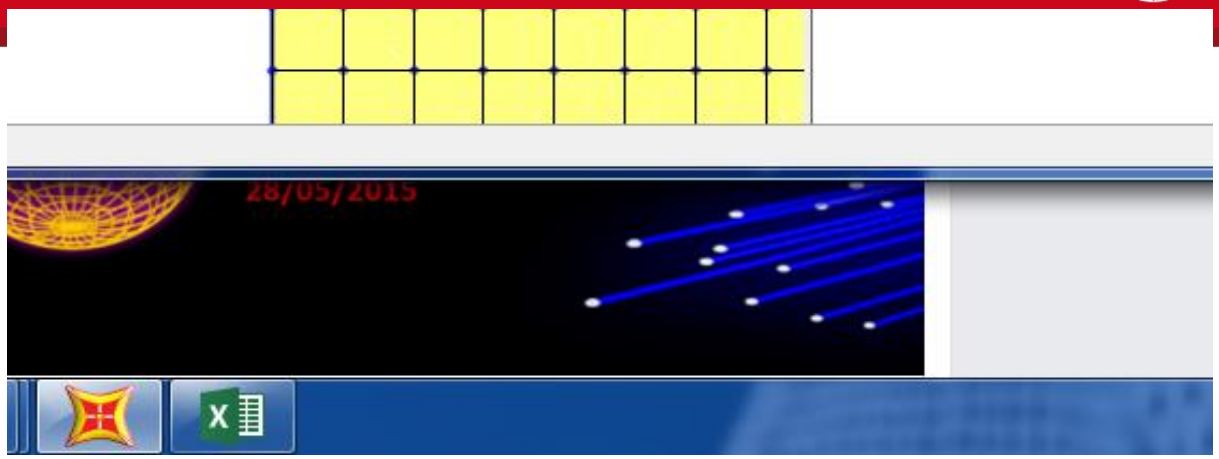


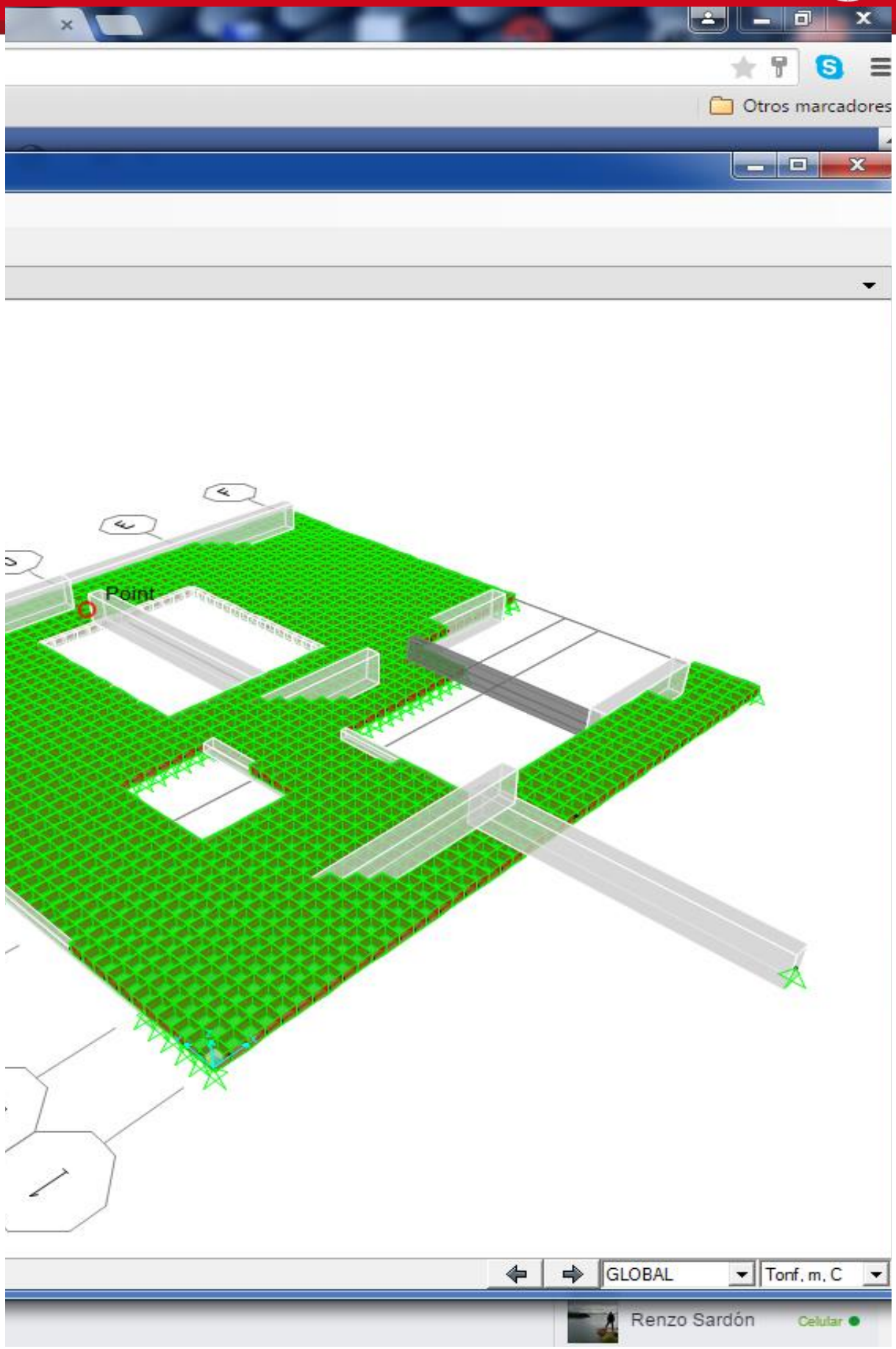


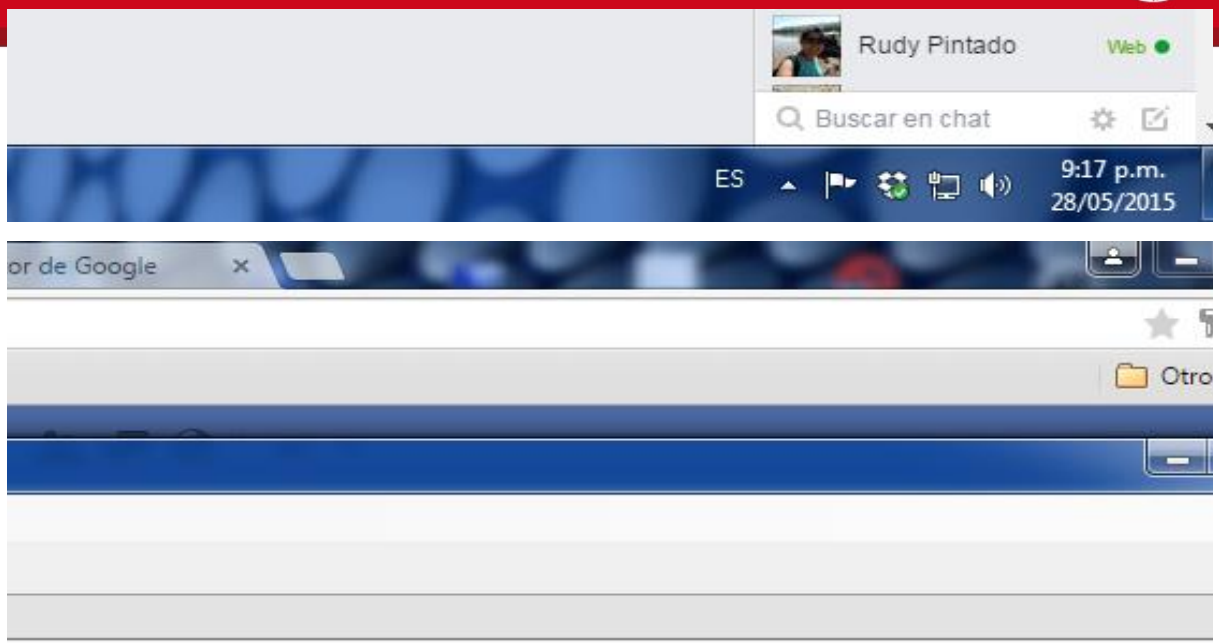


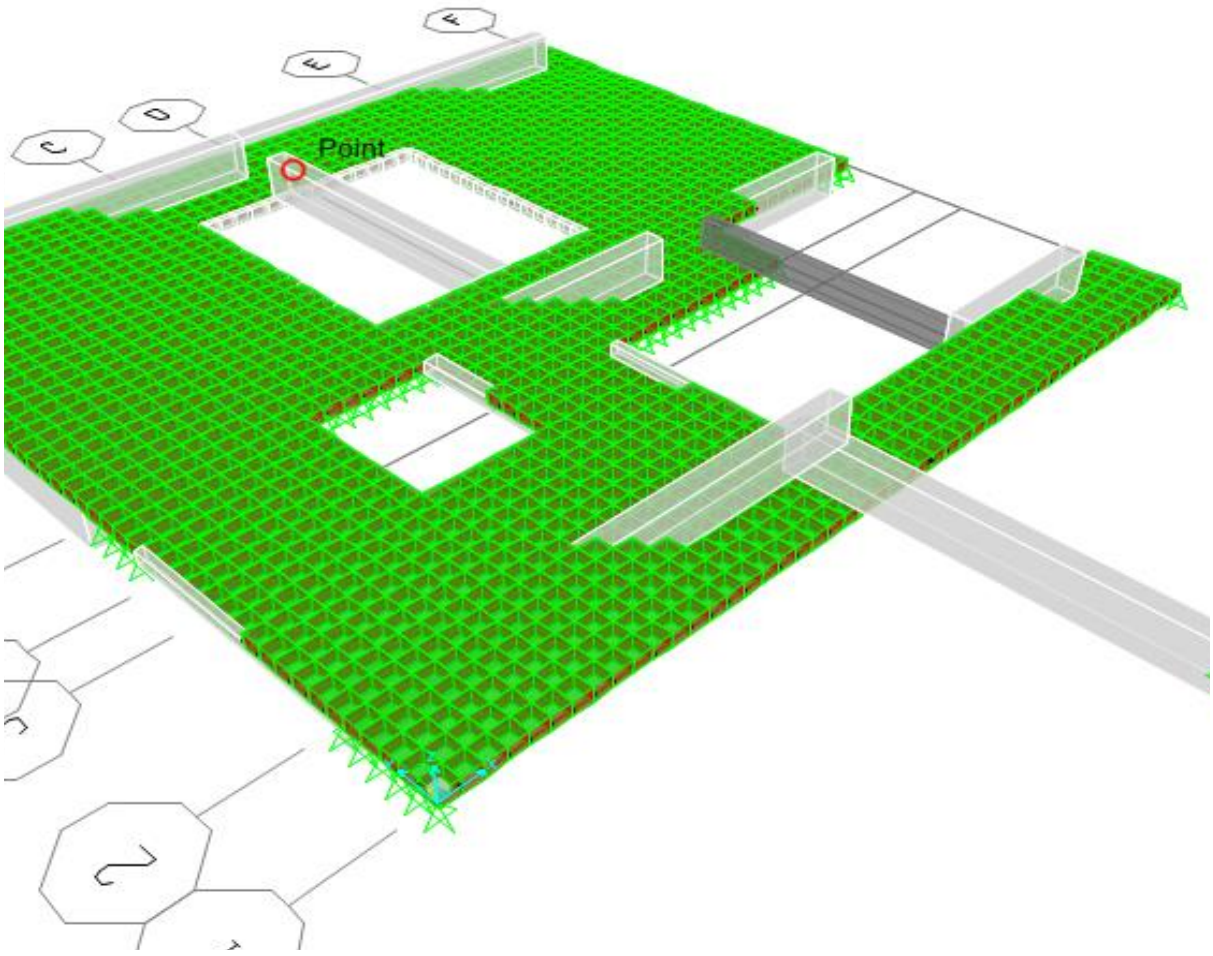


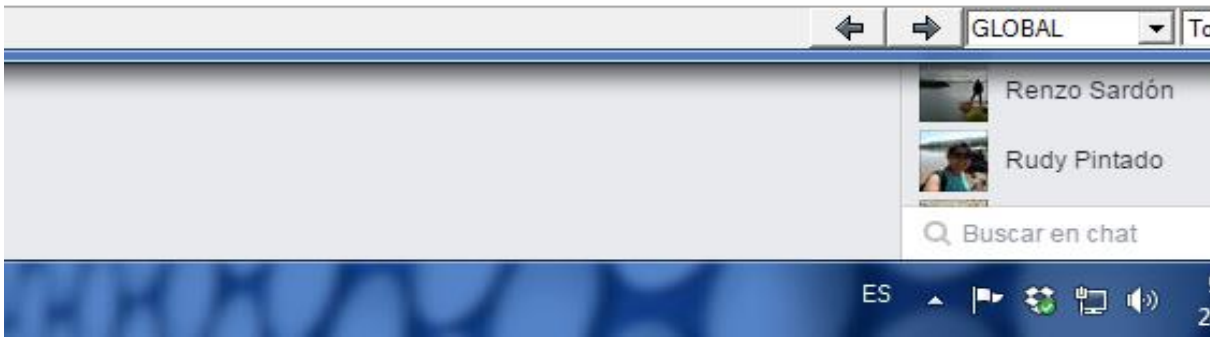


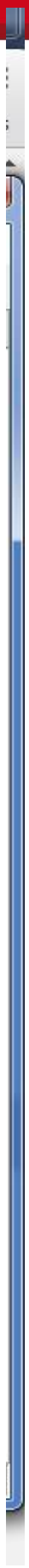


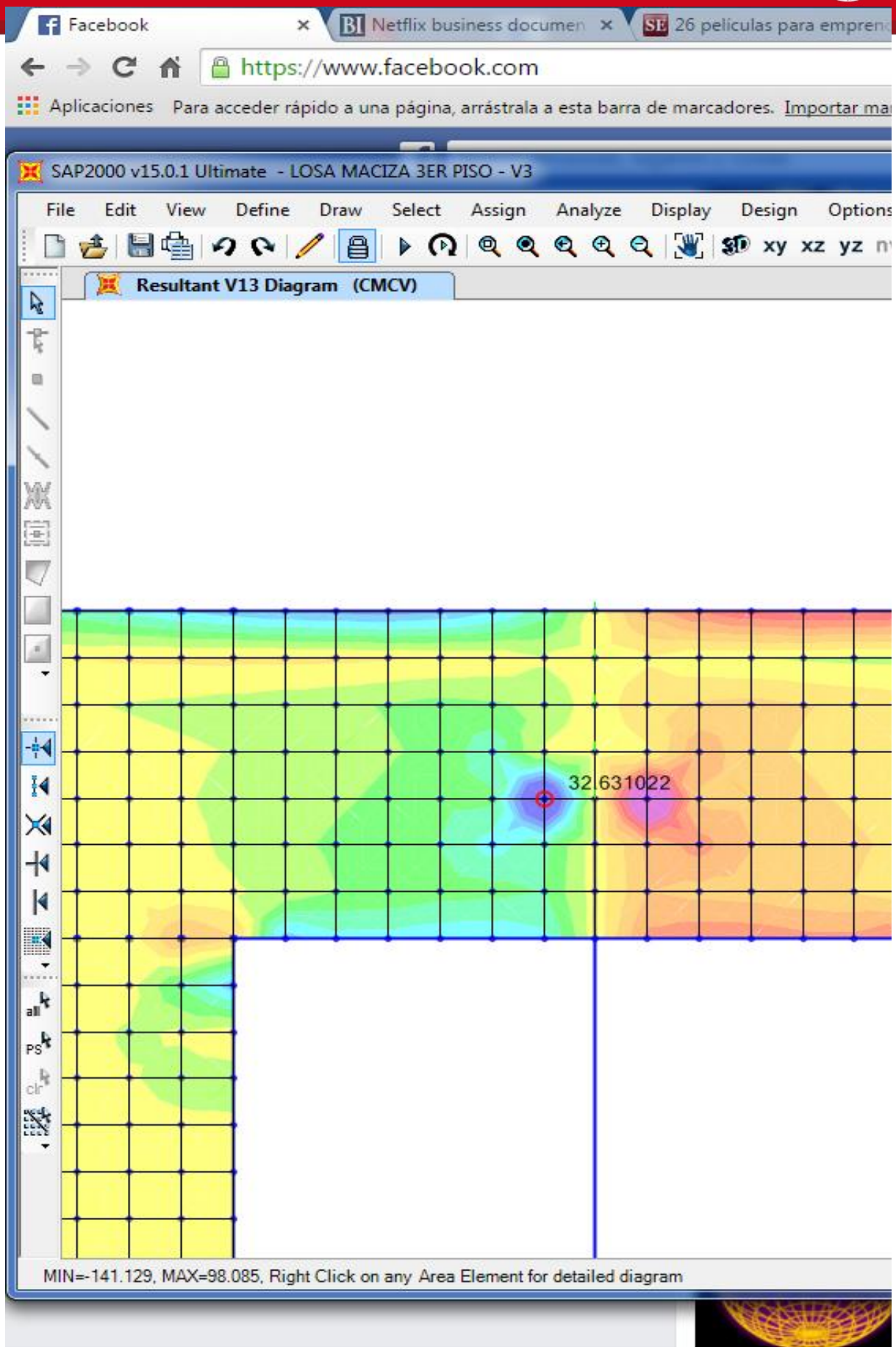


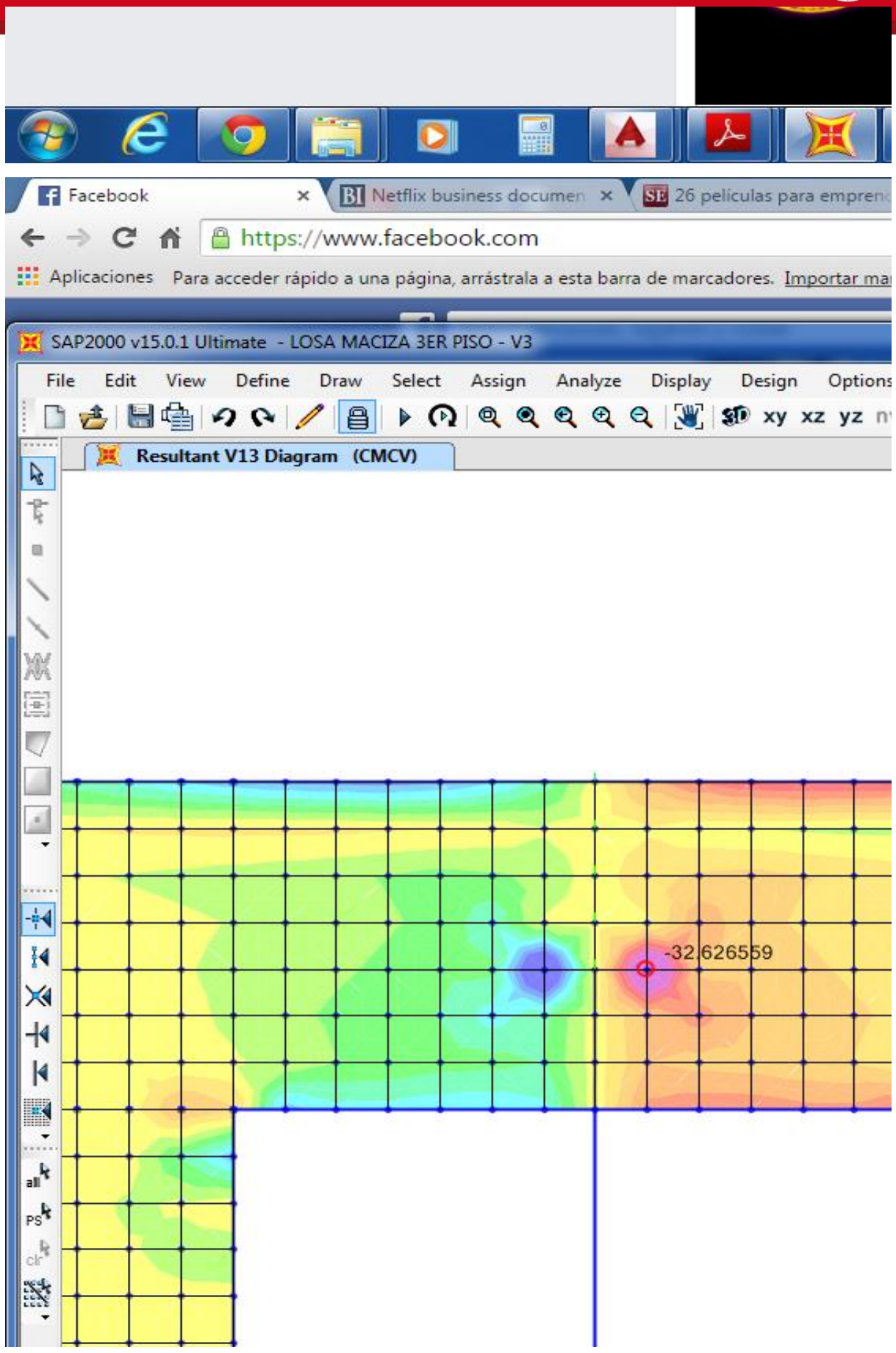


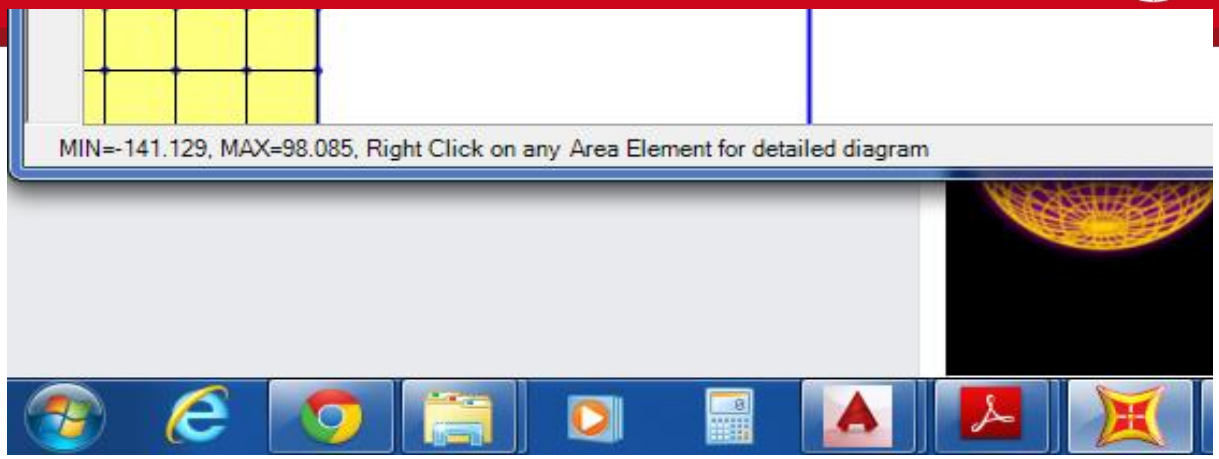


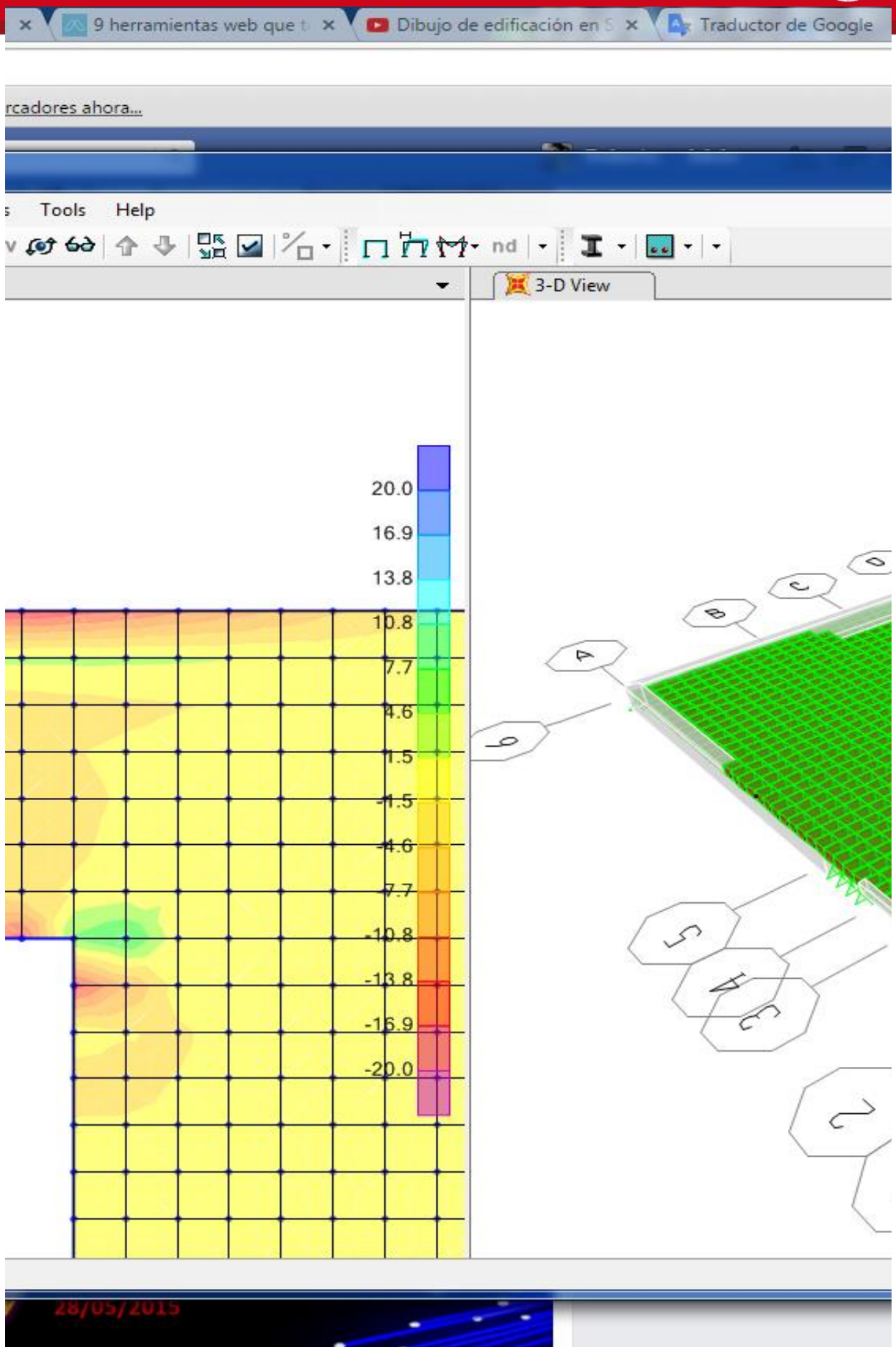


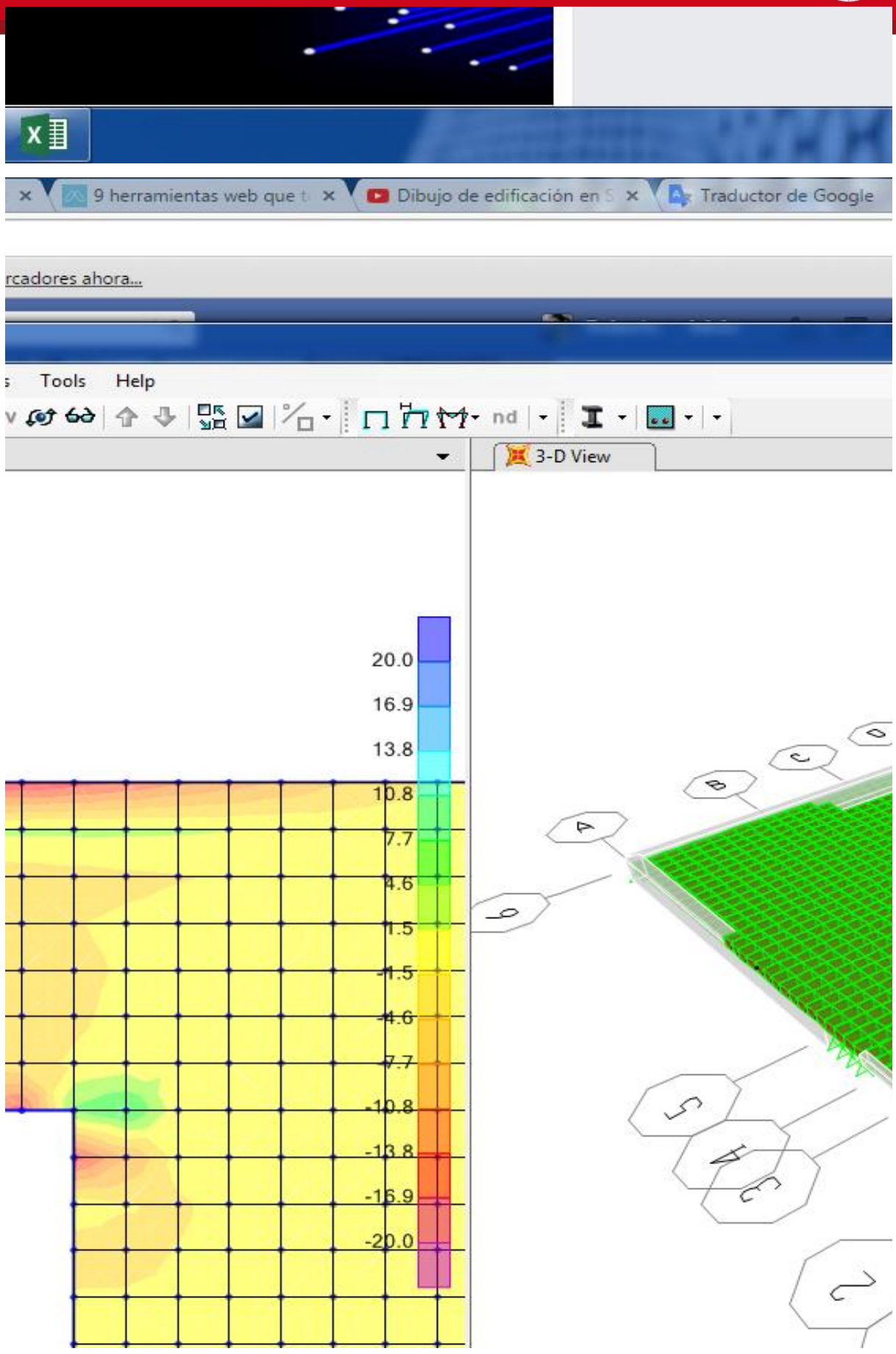


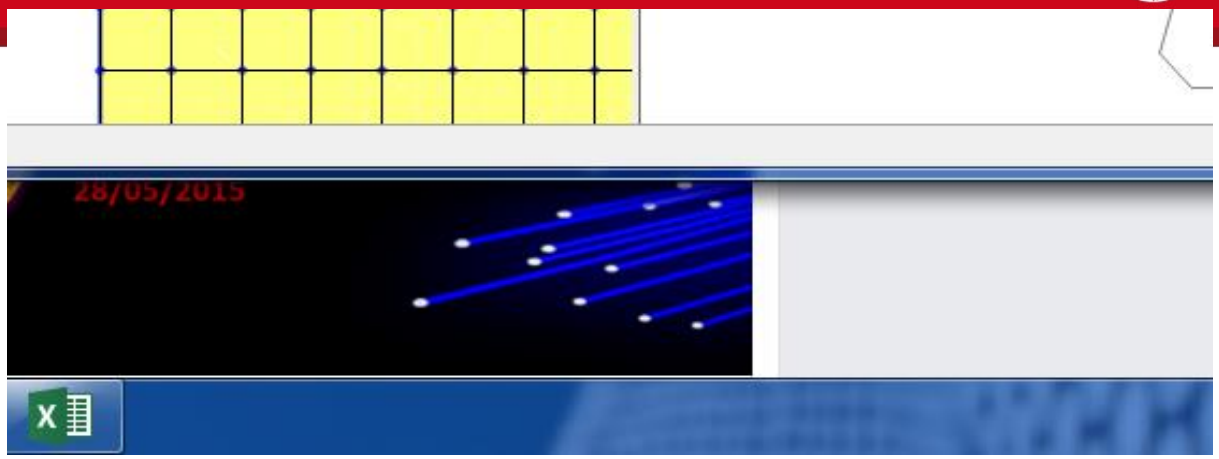


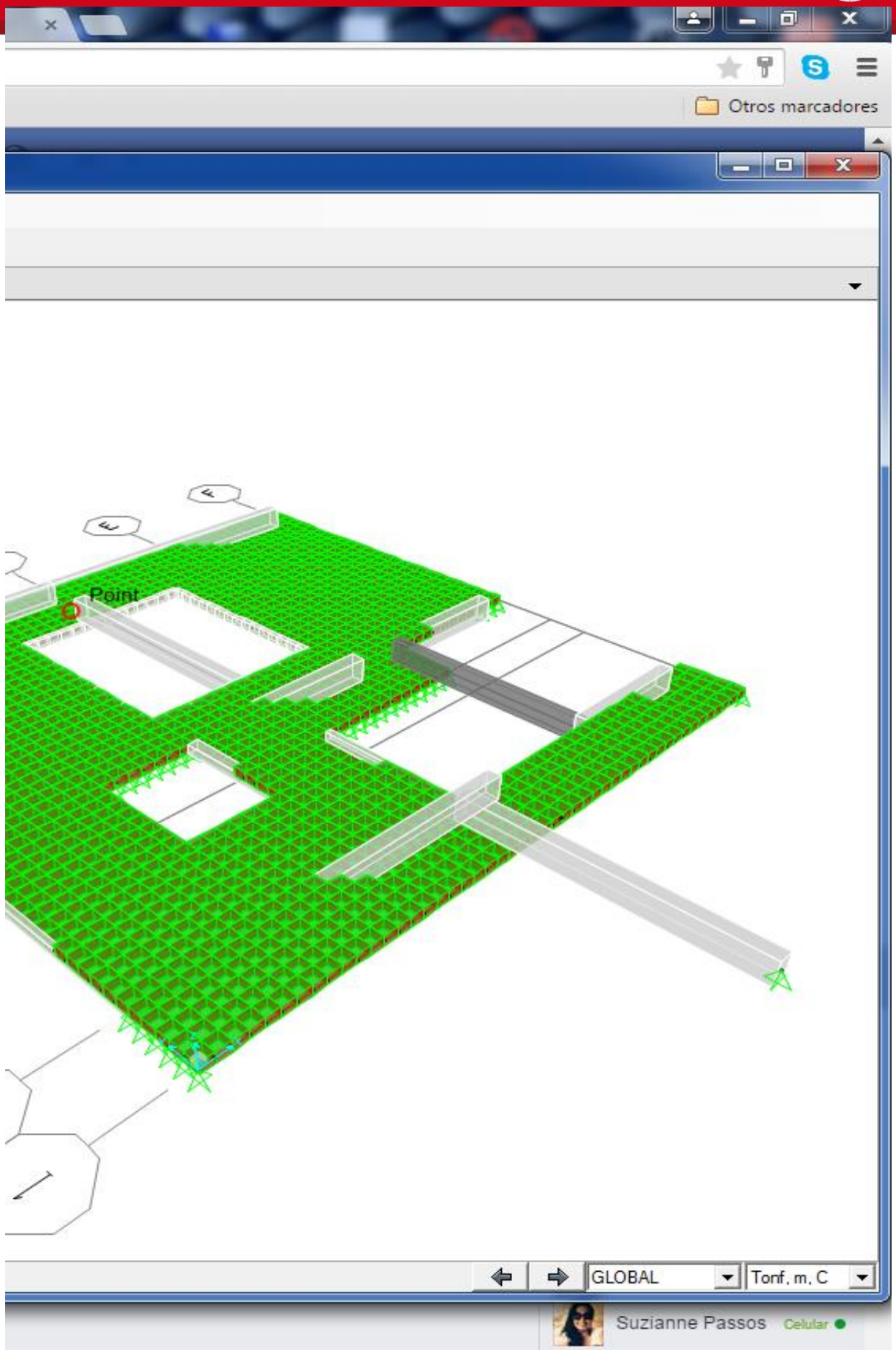


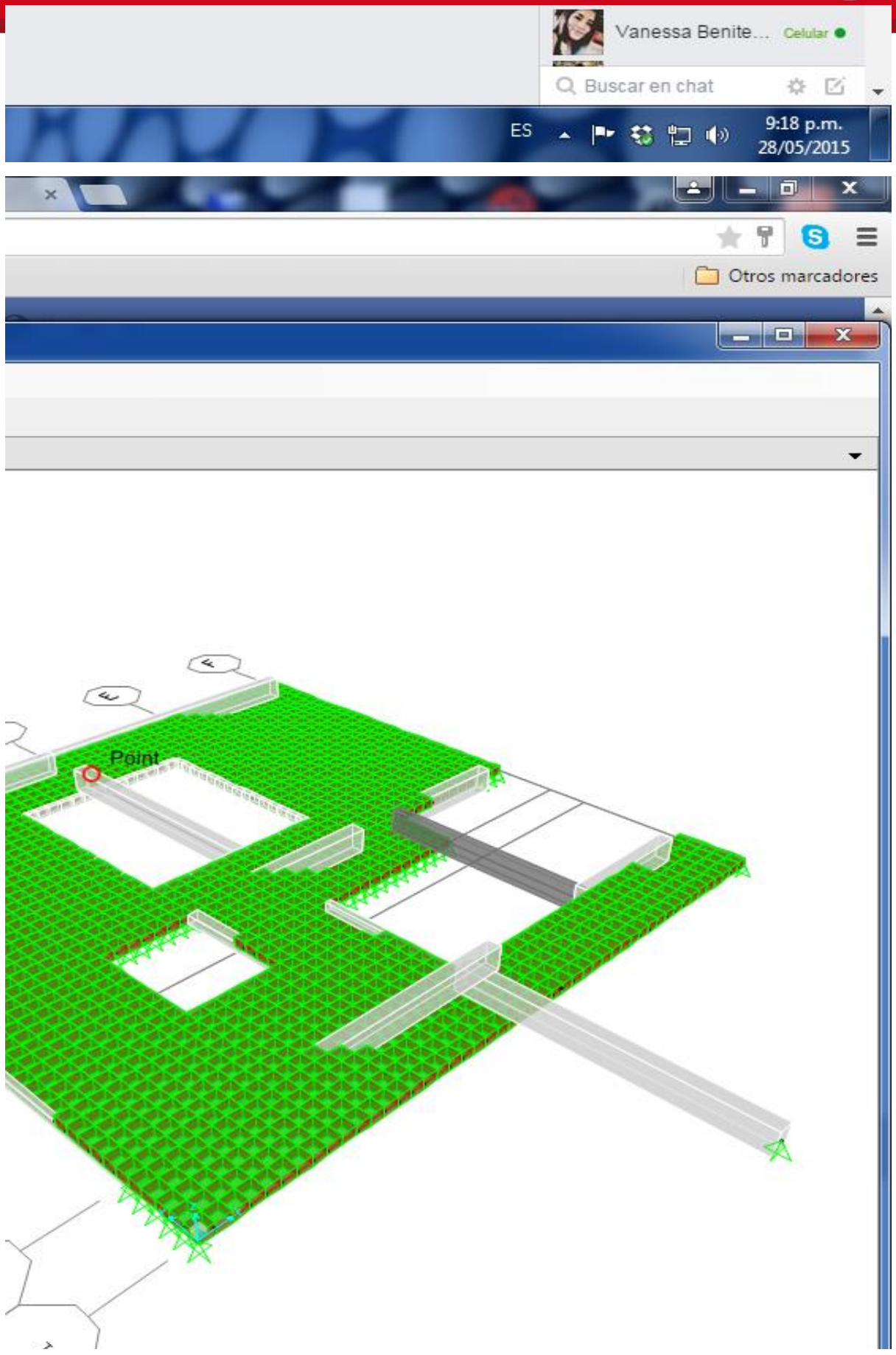


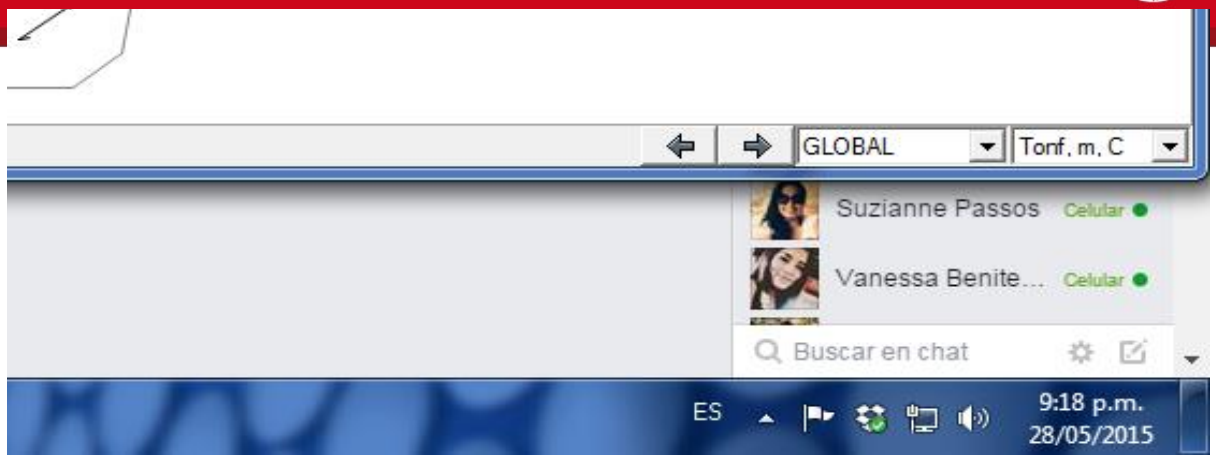












DERIVAS DE ENTREPISO

Story	Item	Load	DriftX	Drift XX x 0.75R	<0.007
AZOTEA	Diaph D5 X	SISXX	0.00072	**0.003**	**CUMPLE**
PISO4	Diaph D4 X	SISXX	0.00074	**0.003**	**CUMPLE**
PISO3	Diaph D3 X	SISXX	0.00070	**0.003**	**CUMPLE**
PISO2	Diaph D2 X	SISXX	0.00057	**0.003**	**CUMPLE**
PISO1	Diaph D1 X	SISXX	0.00028	**0.001**	**CUMPLE**

AZOTEA	Diaph D5 X	SISXX	0.000719
PISO4	Diaph D4 X	SISXX	0.000743
PISO3	Diaph D3 X	SISXX	0.000697
PISO2	Diaph D2 X	SISXX	0.000568
PISO1	Diaph D1 X	SISXX	0.000276

DERIVAS DE ENTREPISO

Story	*Item*	*Load*	DriftY	*Drift YY x 0.75R*	*<0.007*
AZOTEA	Diaph D5 Y	SISYY	0.00055	**0.002**	**CUMPLE**
PISO4	Diaph D4 Y	SISYY	0.00057	**0.003**	**CUMPLE**
PISO3	Diaph D3 Y	SISYY	0.00054	**0.002**	**CUMPLE**
PISO2	Diaph D2 Y	SISYY	0.00044	**0.002**	**CUMPLE**
PISO1	Diaph D1 Y	SISYY	0.00020	**0.001**	**CUMPLE**

AZOTEA	Diaph D5 Y	SISYY	0.000545
PISO4	Diaph D4 Y	SISYY	0.000572
PISO3	Diaph D3 Y	SISYY	0.000543
PISO2	Diaph D2 Y	SISYY	0.000438
PISO1	Diaph D1 Y	SISYY	0.000197

DESPLAZAMIENTOS RELATIVOS DE ENTREPISO SISMO EN XX

PISO	DriftX x 0.75R	ALTURA (cm)
Azotea	0.003	265
4	0.003	265
3	0.003	265
2	0.003	265
1	0.001	265

DESPLAZAMIENTOS RELATIVOS DE ENTREPISO SISMO EN YY

PISO	DriftY x 0.75R	ALTURA (cm)
Azotea	0.002	265
4	0.003	265
3	0.002	265
2	0.002	265
1	0.001	265

DESPLAZAMIENTOS ABSOLUTOS EN XX

PISO	DESPLZ. RELAT. (cm)	DESPLZ. ABS. (cm)
Azotea	0.86	3.58
4	0.89	2.72
3	0.83	1.84
2	0.68	1.01
1	0.33	0.33

DESPLAZAMIENTOS ABSOLUTOS EN YY

PISO	DESPLZ. RELAT. (cm)	DESPLZ. ABS. (cm)
Azotea	0.65	2.74
4	0.68	2.09
3	0.65	1.40
2	0.52	0.76
1	0.23	0.23

VERIFICACION DE IRREGULARI

PISO	Dmax (cm)	Dmax entrepiso (cm)
Azotea	3.58	0.86
4	2.72	0.89
3	1.84	0.83
2	1.01	0.68
1	0.33	0.33

VERIFICACION DE IRREGULARI

PISO	DESPLAZ YY MAX. (cm.)	DESPLAZ. RELATIV. X 0.75R
Azotea	2.74	0.65

4	2.09	0.68
3	1.40	0.65
2	0.76	0.52
1	0.23	0.23

Mode	T (seg)	Masa participante X-X (%)
1	0.382	1.66
2	0.268	70.72
3	0.184	0.00
4	0.131	0.02
5	0.092	0.61
6	0.074	3.77
7	0.067	12.83
8	0.040	1.09
9	0.037	1.11
10	0.035	0.66
11	0.029	3.84
12	0.024	0.00
13	0.024	0.00
14	0.023	0.55
15	0.019	1.66
	Sumatoria	**76.83**

DESPLZ. (cm)
0.86
0.89
0.83
0.68
0.33

DESPLZ. (cm)
0.65
0.68
0.65
0.52
0.23

3.58
2.72

DAD TORSIONAL EN XX

Dmin (cm)	Dmin entrepiso (cm)	Dprom. (cm)
2.48	0.56	0.71
1.92	0.57	0.73
1.35	0.62	0.73
0.73	0.49	0.58
0.24	0.24	0.28

DAD TORSIONAL EN YY

DESPLAZ YY MIN. (cm.)	DESPLAZ. RELATIV. X 0.75R	Dprom.
1.47	0.42	0.53

1.05	0.35	0.52
0.70	0.32	0.48
0.38	0.27	0.40
0.11	0.11	0.17

Masa participante Y-Y (%)
17.95
0.39
2.03
48.03
8.90
0.13
0.08
0.03
2.71
13.34
0.37
0.01
0.14
0.34
0.20
68.09

Condiciónes de Irregularidad Torsional		
Dprom > 0.93	**Drela.max>1.3 Dprom**	**Dmax/Dprom**
NO CUMPLE	NO CUMPLE	1.210
NO CUMPLE	NO CUMPLE	1.217
NO CUMPLE	NO CUMPLE	1.146
NO CUMPLE	NO CUMPLE	1.160
NO CUMPLE	NO CUMPLE	1.157

Condiciónes de Irregularidad Torsional		
Dprom > 0.93	**Drela.max>1.3 Dprom**	**Dmax/Dprom**
NO CUMPLE	NO CUMPLE	1.215

NO CUMPLE	CUMPLE	1.322
NO CUMPLE	CUMPLE	1.339
NO CUMPLE	CUMPLE	1.318
NO CUMPLE	CUMPLE	1.362

0.007
1.9
0.9275

DIAPHRAGM DRIFTS CASE SPECT XX
CASE SPECT YY

Story	Item	Load	DriftX	DriftY
AZOTEA	Diaph D5 X	SISXX	0.000612	
PISO4	Diaph D4 X	SISXX	0.000626	
PISO3	Diaph D3 X	SISXX	0.000579	
PISO2	Diaph D2 X	SISXX	0.000457	
PISO1	Diaph D1 X	SISXX	0.00021	

DISEÑO DE ESCALERA TRAMO 1

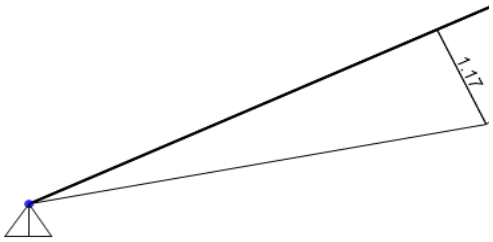
Datos

f'c (kg/cm2)	210
contra paso (m)	0.18
paso (m)	0.25
garganta (t) (m)	0.15
Wpp (kg/m2)	659.60

$$\omega_{PP} = \gamma_{CONCRETO} \times \left[\frac{cp}{2} + t \times \sqrt{1 + \left(\frac{cp}{p} \right)^2} \right] = 653 \text{ kg/m}^2$$

METRADO ESCALERA		
PESO PROPIO	660	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	760	kg/m2
CARGA VIVA	200	kg/m2

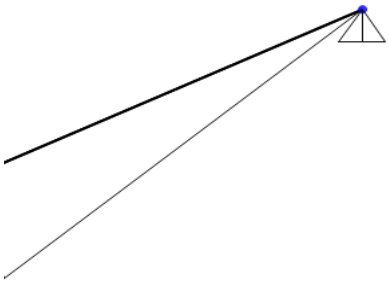
METRADO LOSA MACIZA		
PESO PROPIO	480	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	580	kg/m2
CARGA VIVA	200	kg/m2



DISEÑO POR FLEXIÓN

Mu (ton-m)	b (cm)	d (cm)	a (cm)	As (cm2)	As Colocado (cm2)	
1.17	100	12	0.6	2.6	3.34	3/8" @ .20

1152



3.72973974
26.8115222

4.7
3.337

DISEÑO DE ESCALERA TRAMO 2

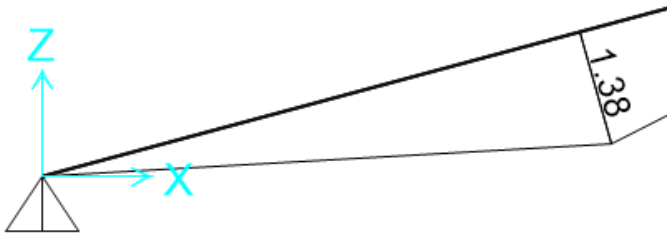
Datos

f'c (kg/cm2)	210
contra paso (m)	0.18
paso (m)	0.65
garganta (t) (m)	0.15
Wpp (kg/m2)	589.55

$$\omega_{PP} = \gamma_{CONCRETO} \times \left[\frac{cp}{2} + t \times \sqrt{1 + \left(\frac{cp}{p} \right)^2} \right] = 653 \text{ kg/m}^2$$

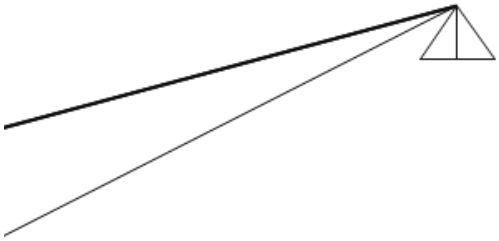
METRADO ESCALERA		
PESO PROPIO	590	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	690	kg/m2
CARGA VIVA	200	kg/m2

METRADO LOSA MACIZA		
PESO PROPIO	480	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	580	kg/m2
CARGA VIVA	200	kg/m2



DISEÑO POR FLEXIÓN

Mu (ton-m)	b (cm)	d (cm)	a (cm)	As (cm2)	As Colocado (cm2)	
1.38	100	12	0.7	3.14	3.55	3/8" @ .20



DISEÑO DE ESCALERA TRAMO 3

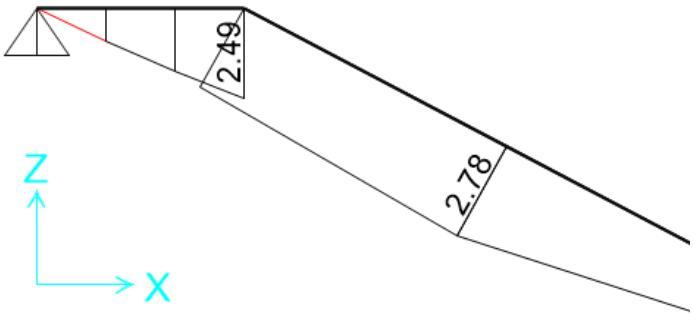
Datos

f'c (kg/cm2)	210
contra paso (m)	0.18
paso (m)	0.25
garganta (t) (m)	0.15
Wpp (kg/m2)	659.60

$$\omega_{PP} = \gamma_{CONCRETO} \times \left[\frac{cp}{2} + t \times \sqrt{1 + \left(\frac{cp}{p} \right)^2} \right] = 653 \text{ kg/m}^2$$

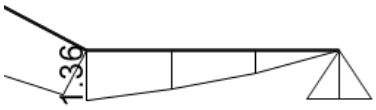
METRADO ESCALERA		
PESO PROPIO	660	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	760	kg/m2
CARGA VIVA	200	kg/m2

METRADO LOSA MACIZA		
PESO PROPIO	480	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	580	kg/m2
CARGA VIVA	200	kg/m2



DISEÑO POR FLEXIÓN

Mu (ton-m)	b (cm)	d (cm)	a (cm)	As (cm2)	As Colocado (cm2)	
2.78	100	12	1.5	6.5	6.45	1/2" @ .20



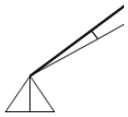
DISEÑO DE ESCALERA TRAMO - DUPLEX

Datos

f'c (kg/cm2)	210
contra paso (m)	0.18
paso (m)	0.25
garganta (t) (m)	0.175
Wpp (kg/m2)	733.54

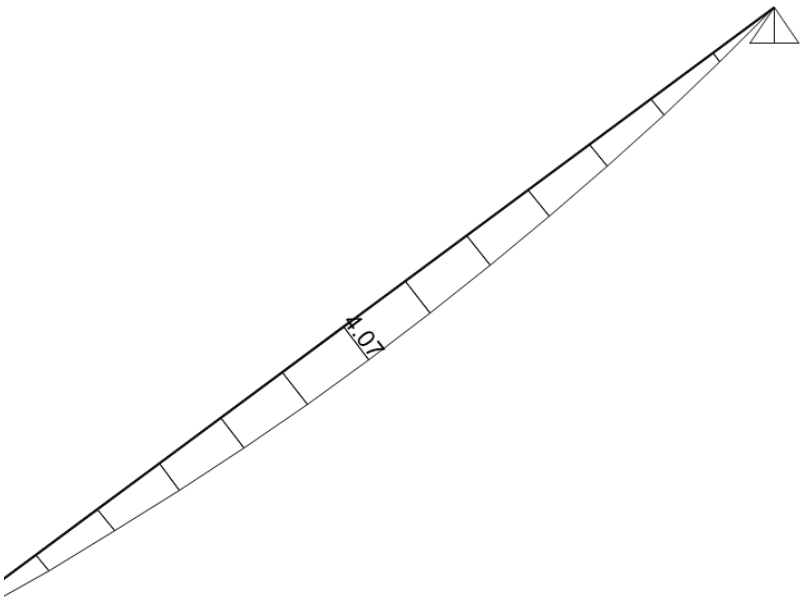
METRADO ESCALERA		
PESO PROPIO	734	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	834	kg/m2
CARGA VIVA	200	kg/m2

METRADO LOSA MACIZA		
PESO PROPIO	480	kg/m2
PISO TERMINADO	100	kg/m2
CARGA MUERTA	580	kg/m2
CARGA VIVA	200	kg/m2



DISEÑO POR FLEXIÓN

Mu (ton-m)	b (cm)	d (cm)	a (cm)	As (cm2)	As Colocado (cm2)	
4.07	100	14.5	1.9	7.9	7.74	1/2" @ .15



Edificio Dual tipo I

DATOS

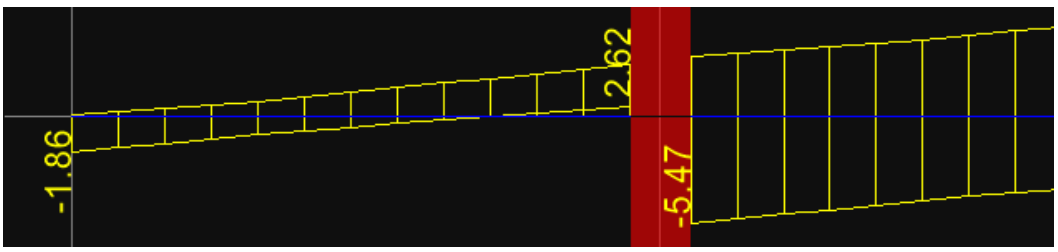
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	41.0 cm
As max.	**16.3 cm2**
As min.	**2.5 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2		5/8"	2	3
3/4"			3/4"		
1"			1"		

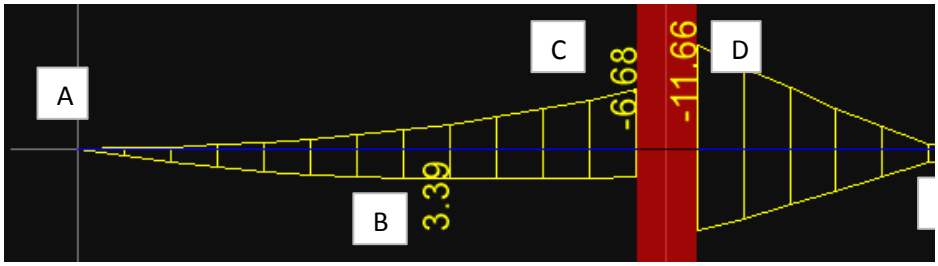
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2	3	5/8"	2	
3/4"			3/4"		
1"			1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 1 (VT-1)

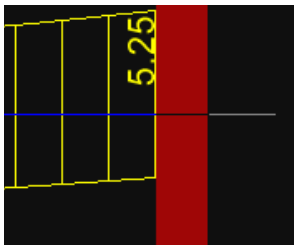


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	2	25.0 cm	41.0 cm	1.2	**1.3**
ESFUERZO B	3.39	25.0 cm	41.0 cm	2.1	**2.2**
ESFUERZO C	6.68	25.0 cm	41.0 cm	4.3	**4.5**
ESFUERZO D	11.66	25.0 cm	41.0 cm	7.8	**8.3**
ESFUERZO E	4.18	25.0 cm	41.0 cm	2.6	**2.8**
ESFUERZO F	9.76	25.0 cm	41.0 cm	6.4	**6.8**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

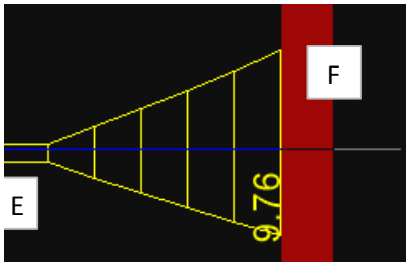
DISEÑO POR CORTANTE



a d de la cara

Vu	ϕVc	Vs	Av	S
1.64 ton	6.69 ton	-5.94 ton	1.42 cm2	-41.14 cm
1.64 ton	6.69 ton	-5.94 ton	1.42 cm2	-41.14 cm
5.24 ton	6.69 ton	-1.71 ton	1.42 cm2	-143.19 cm
5.02 ton	6.69 ton	-1.97 ton	1.42 cm2	-124.34 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.1
4.0	6.0
10.0	14.7
10.0	14.0
4.0	6.0
10.0	14.3

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
10.25 cm	20.00 cm	17.04 cm	30.00 cm
10.25 cm	20.00 cm	17.04 cm	30.00 cm
10.25 cm	20.00 cm	17.04 cm	30.00 cm
10.25 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

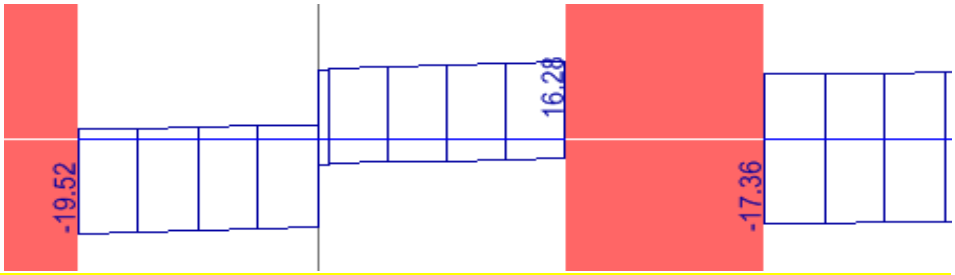
Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**20.7 cm2**
As min.	**3.1 cm2**
ϕ	0.9

REFUERZO A	
Diametro (pulg)	# Corrido
1/4"	
3/8"	
1/2"	
5/8"	
3/4"	
1"	2

REFUERZO B			REFUERZO C	
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido
1/4"			1/4"	
3/8"			3/8"	
1/2"			1/2"	
5/8"			5/8"	
3/4"			3/4"	
1"	2		1"	2

REFUERZO D			REFUERZO E	
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido
1/4"			1/4"	
3/8"			3/8"	
1/2"			1/2"	
5/8"			5/8"	
3/4"			3/4"	
1"	2		1"	2

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	29.2 ton-m	Mn (2)	20.3 ton-m
Mn (3)	21.0 ton-m	Mn (3)	20.3 ton-m

Ln	3.3 m	Ln	2.1 m
Vu = 1.25 (Wm+Wv)	8.9 ton	Vu = 1.25 (Wm+Wv)	1.8 ton
Vu capacidad	24.1 ton	Vu capacidad	21.6 ton

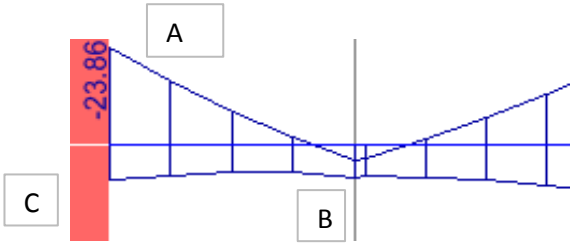
Vu	ϕVc	Vs	Av	S
24.09 ton	8.49 ton	18.36 ton	1.42 cm2	16.89 cm
24.09 ton	8.49 ton	18.36 ton	1.42 cm2	16.89 cm
21.61 ton	8.49 ton	15.44 ton	1.42 cm2	20.08 cm
21.61 ton	8.49 ton	15.44 ton	1.42 cm2	20.08 cm

DISTRIBUCION: 1@5, 10@10, Rto @ 20 c

DISEÑO DE VIGAS

VIGA TIPICA 2 (VT-2)

Bastones
1



ENVOLVENT

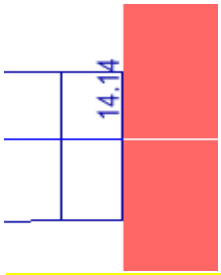
DIS

Bastones

	Mu (ton-m)	b (cm)	d (cm)
ESFUERZO A	23.86	25.0 cm	52.0 cm
ESFUERZO B	7.94	25.0 cm	52.0 cm
ESFUERZO C	11.34	25.0 cm	52.0 cm
ESFUERZO D	17.55	25.0 cm	52.0 cm
ESFUERZO E	3.5	25.0 cm	52.0 cm
ESFUERZO F	17.24	25.0 cm	52.0 cm

	REFUERZO F		
# Bastones	Diametro (pulg)	# Corrido	# Bastones
	1/4"		
	3/8"		
	1/2"		
	5/8"		
	3/4"		
	1"	2	

DISEÑO POR CORTANTE



A "d" de la cara

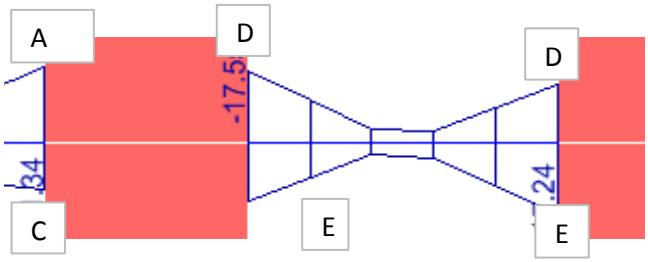
Vu	ϕVc	Vs
19.52 ton	8.49 ton	12.98 ton
16.28 ton	8.49 ton	9.17 ton
17.36 ton	8.49 ton	10.44 ton
14.14 ton	8.49 ton	6.65 ton

D

Vul = (Mn1 + Mn2)/Ln + 1.25 (Wm+ Wv)* Ln /2

d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

:/ext.



E DE MOMENTOS (TON-M)

EÑO POR FLEXIÓN

a (cm)	*As (cm2)*	*As colocado (cm2)*	*φMn (ton-m)*
13.1	**13.9**	**15.3**	26.3
4.0	**4.2**	**10.2**	19.3
5.7	**6.1**	**10.2**	18.9
9.2	**9.8**	**10.2**	18.3
1.7	**1.8**	**10.2**	19.7
9.0	**9.6**	**10.2**	18.3

		Espaciamiento no debe exceder a:			
Av	**S**	**d/4**	**10 db**	**24 de**	**30 cm**
1.42 cm2	23.89 cm	13.00 cm	20.00 cm	17.04 cm	30.00 cm
1.42 cm2	33.83 cm	13.00 cm	20.00 cm	17.04 cm	30.00 cm
1.42 cm2	29.71 cm	13.00 cm	20.00 cm	17.04 cm	30.00 cm
1.42 cm2	46.63 cm	13.00 cm	20.00 cm	17.04 cm	30.00 cm

ISTRIBUCION: 1@5, 10@10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

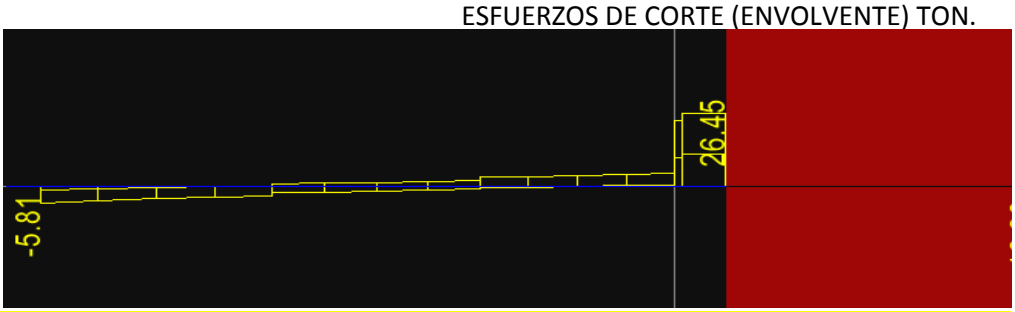
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A	
Diametro (pulg)	# Corrido
1/4"	
3/8"	
1/2"	
5/8"	2
3/4"	
1"	

REFUERZO B			REFUERZO C	
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido
1/4"			1/4"	
3/8"			3/8"	
1/2"			1/2"	
5/8"	2		5/8"	2
3/4"			3/4"	
1"			1"	

REFUERZO D			REFUERZO E	
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido
1/4"			1/4"	
3/8"			3/8"	
1/2"			1/2"	
5/8"			5/8"	
3/4"	2	2	3/4"	2
1"			1"	

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	0.0 ton-m	Mn (2)	16.6 ton-m
Mn (3)	0.0 ton-m	Mn (3)	16.7 ton-m

Ln	0.0 m	Ln	2.1 m
Vu = 1.25 (Wm+Wv) / Ln	0.0 ton	Vu = 1.25 (Wm+Wv) / Ln	1.8 ton
Vu capacidad	0.0 ton	Vu capacidad	18.0 ton

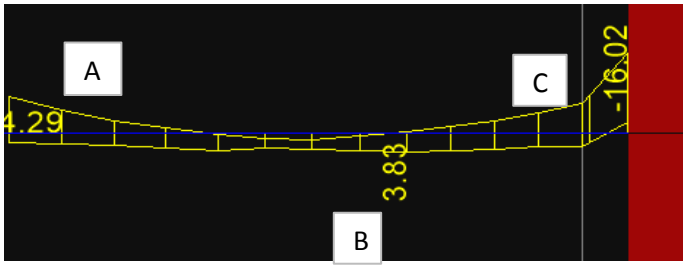
Vu	ϕVc	Vs	Av	S
17.95 ton	7.18 ton	12.67 ton	1.42 cm2	20.71 cm
17.95 ton	7.18 ton	12.67 ton	1.42 cm2	20.71 cm
17.95 ton	7.18 ton	12.67 ton	1.42 cm2	20.71 cm
17.95 ton	7.18 ton	12.67 ton	1.42 cm2	20.71 cm

DISTRIBUCION: 1@5, 10@10, Rto @ 20

DISEÑO DE VIGAS

VIGA TIPICA 3 (VT-3)

Bastones



ENVOLVENTE DE MOM

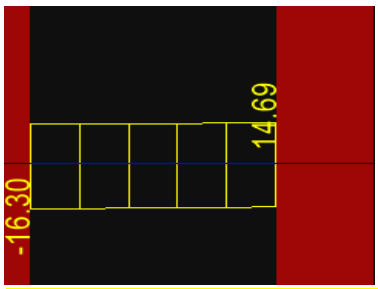
Bastones
3

DISEÑO POR F

	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*
ESFUERZO A	4.29	25.0 cm	44.0 cm	2.5
ESFUERZO B	3.38	25.0 cm	44.0 cm	2.0
ESFUERZO C	16.02	25.0 cm	44.0 cm	10.3
ESFUERZO D	16.61	25.0 cm	44.0 cm	10.7
ESFUERZO E	3.81	25.0 cm	44.0 cm	2.2
ESFUERZO F	16.19	25.0 cm	44.0 cm	10.4

	REFUERZO F		
# Bastones	Diametro (pulg)	# Corrido	# Bastones
	1/4"		
	3/8"		
	1/2"		
	5/8"		
	3/4"	2	2
	1"		

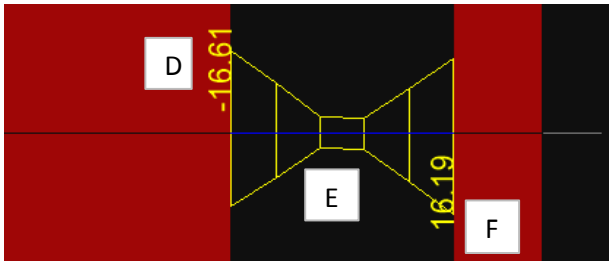
DISEÑO POR CORTANTE



Vu	ϕVc	Vs	Av
5.17 ton	7.18 ton	-2.37 ton	1.42 cm2
25.00 ton	7.18 ton	20.96 ton	1.42 cm2
16.30 ton	7.18 ton	10.73 ton	1.42 cm2
16.30 ton	7.18 ton	10.73 ton	1.42 cm2

DISTRIBUCI

d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
c/ext.			



IENTOS (TON-M)

LEXIÓN

As (cm2)	*As colocado (cm2)*	*φMn (ton-m)*
2.7	**4.0**	6.5
2.1	**4.0**	6.5
10.9	**12.5**	18.4
11.4	**11.4**	16.6
2.3	**5.7**	9.2
11.0	**11.4**	16.7

	Espaciamiento no debe exceder a:			
S	**d/4**	**10 db**	**24 de**	**30 cm**
-110.91 cm	11.00 cm	20.00 cm	17.04 cm	30.00 cm
12.52 cm	11.00 cm	20.00 cm	17.04 cm	30.00 cm
24.46 cm	11.00 cm	20.00 cm	17.04 cm	30.00 cm
24.46 cm	11.00 cm	20.00 cm	17.04 cm	30.00 cm

ON: 1@5, 10@10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

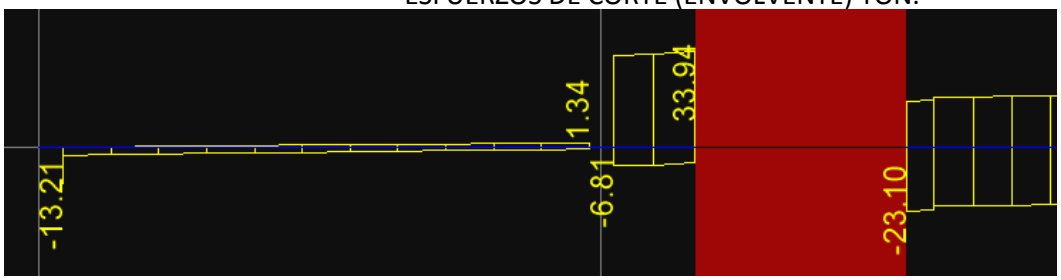
Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	54.0 cm
As max.	**21.5 cm2**
As min.	**3.3 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	1
3/4"		
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2	1	5/8"	3	
3/4"			3/4"		
1"			1"		2

REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"	3		1"	1	

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	13.2 ton-m	Mn (2)	27.0 ton-m
Mn (3)	32.8 ton-m	Mn (3)	27.0 ton-m

Ln	5.7 m	Ln	1.9 m
Vu = 1.25 (Wm+Wv) / Ln	19.5 ton	1.25 (Wm+Wv	4.0 ton
Vu capacidad	27.5 ton	Vu capacidad	32.4 ton

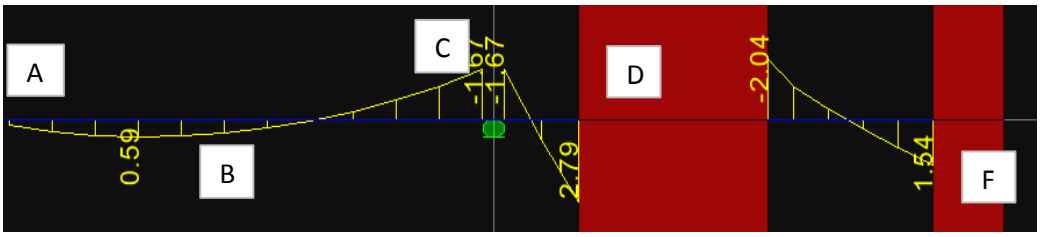
Vu	ϕVc	Vs	Av	S	d/4
32.40 ton	8.81 ton	27.75 ton	1.42 cm2	11.61 cm	13.50 cm
32.40 ton	8.81 ton	27.75 ton	1.42 cm2	11.61 cm	13.50 cm
32.40 ton	8.81 ton	27.75 ton	1.42 cm2	11.61 cm	13.50 cm
32.40 ton	8.81 ton	27.75 ton	1.42 cm2	11.61 cm	13.50 cm

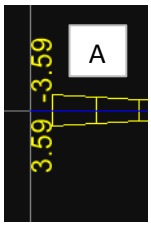
DISTRIBUCION: 1@5, 10@10, Rto @ 20 c/ext.

DISEÑO DE VIGAS

VIGA TIPICA 4 (VT-4)

CARGAS DE SERVICIO CM+CV



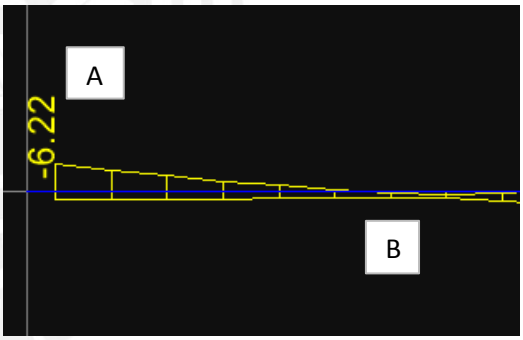


MOMENTOS (TON-M) - 1.25x(cm+cv)-

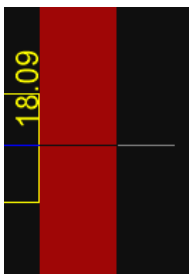
	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	6.22	25.0 cm	54.0 cm	2.9	**3.1**
ESFUERZO B	7.69	25.0 cm	54.0 cm	3.7	**3.9**
ESFUERZO C	22.31	25.0 cm	54.0 cm	11.5	**12.2**
ESFUERZO D	20.43	25.0 cm	54.0 cm	10.4	**11.1**
ESFUERZO E	6.07	25.0 cm	54.0 cm	2.9	**3.1**
ESFUERZO F	19.67	25.0 cm	54.0 cm	10.0	**10.6**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	3	

Momentos - er



DISEÑO POR CORTANTE



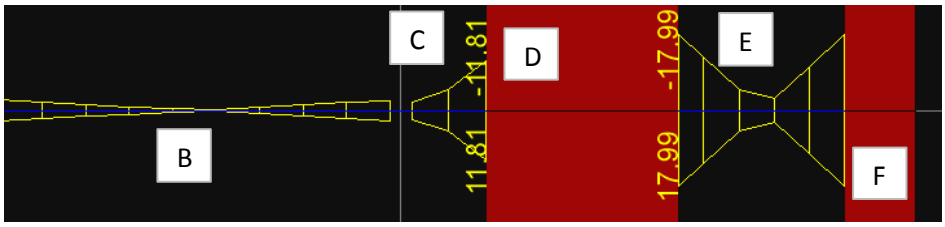
A d de la cara

Vu	ϕVc	Vs	Av	S
13.00 ton	8.81 ton	4.93 ton	1.42 cm2	65.38 cm
38.00 ton	8.81 ton	34.34 ton	1.42 cm2	9.38 cm
25.20 ton	8.81 ton	19.28 ton	1.42 cm2	16.71 cm
21.20 ton	8.81 ton	14.57 ton	1.42 cm2	22.10 cm

DISTRIBUCION: 1@5, 10@

10 db	24 de	30 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm

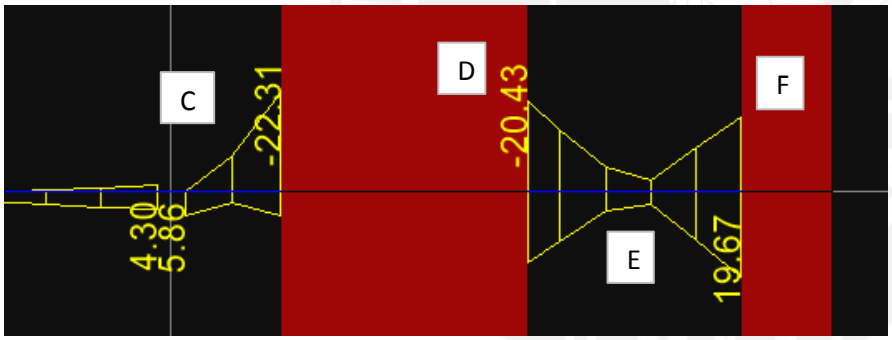
Sismo en X-X



+Sx

As colocado (cm2)	φMn (ton-m)
6.0	11.9
6.0	11.8
16.2	29.5
15.3	28.2
5.1	10.1
15.3	28.3

nvolvente



Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.50 cm	20.00 cm	17.04 cm	30.00 cm
13.50 cm	20.00 cm	17.04 cm	30.00 cm
13.50 cm	20.00 cm	17.04 cm	30.00 cm
13.50 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

E

F

Edificio Dual tipo I

DATOS

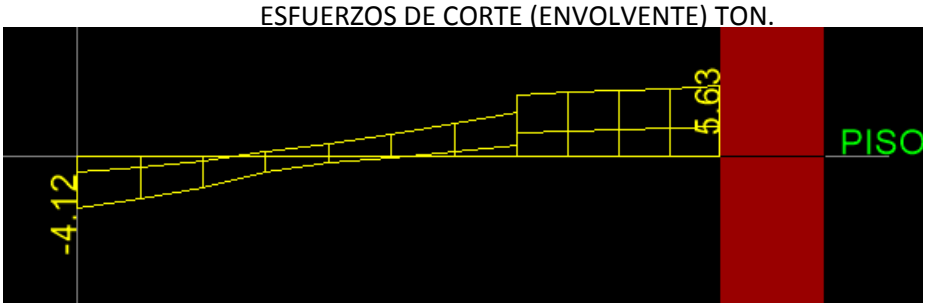
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2	2	5/8"		
3/4"			3/4"		
1"			1"		

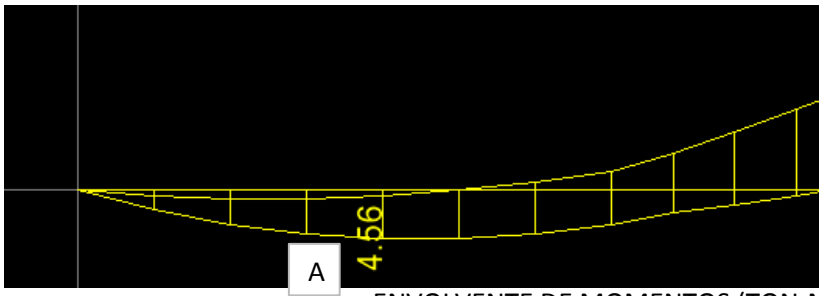
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"			1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 5 (VT-5)

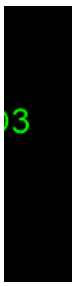


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	4.56	25.0 cm	44.0 cm	2.7	**2.8**
ESFUERZO B	9.83	25.0 cm	44.0 cm	6.0	**6.3**
ESFUERZO C					
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

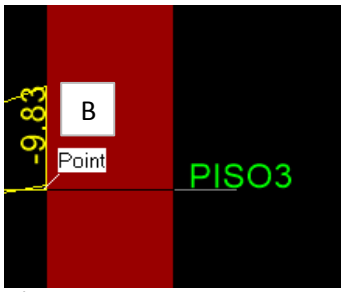
DISEÑO POR CORTANTE



A d de la cara

Vu	ϕVc	Vs	Av	S
4.00 ton	7.18 ton	-3.74 ton	1.42 cm2	-70.12 cm
5.40 ton	7.18 ton	-2.10 ton	1.42 cm2	-125.23 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.5
8.0	12.4

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

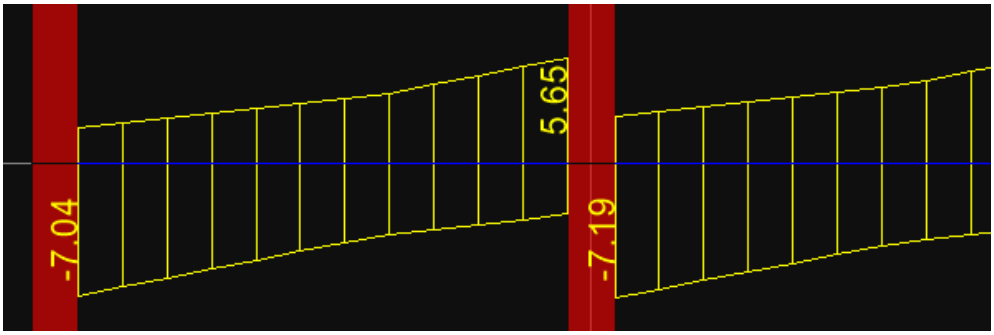
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

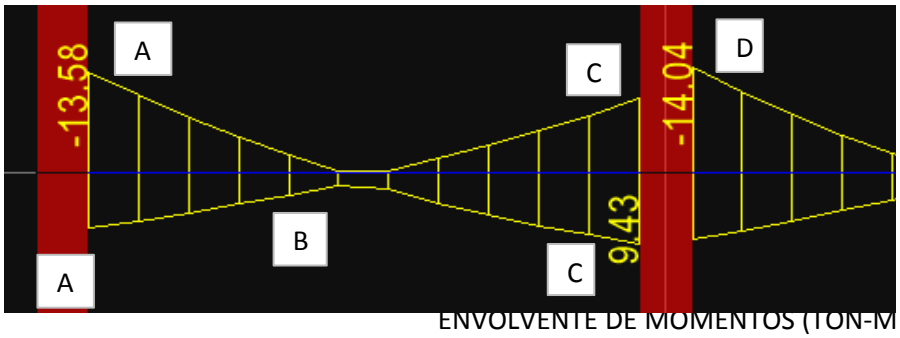
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 6 (VT-6)

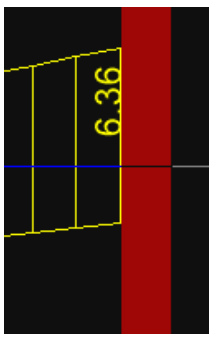


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	13.58	25.0 cm	44.0 cm	8.5	**9.0**
ESFUERZO B	2.25	25.0 cm	44.0 cm	1.3	**1.4**
ESFUERZO C	9.43	25.0 cm	44.0 cm	5.7	**6.1**
ESFUERZO D	14.04	25.0 cm	44.0 cm	8.8	**9.4**
ESFUERZO E	2.3	25.0 cm	44.0 cm	1.3	**1.4**
ESFUERZO F	10.02	25.0 cm	44.0 cm	6.1	**6.5**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

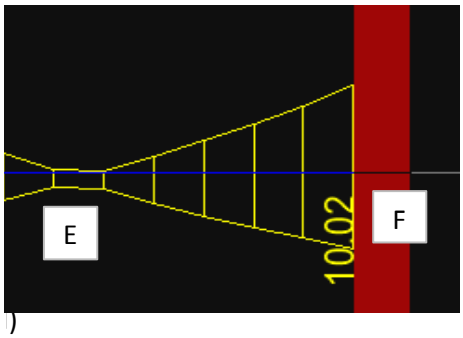
DISEÑO POR CORTANTE



A "d" de la cara — DISEÑO POR CORTE

Vu	ϕVc	Vs	Av	S
6.70 ton	7.18 ton	-0.57 ton	1.42 cm2	-463.53 cm
6.70 ton	7.18 ton	-0.57 ton	1.42 cm2	-463.53 cm
6.90 ton	7.18 ton	-0.33 ton	1.42 cm2	-793.22 cm
6.90 ton	7.18 ton	-0.33 ton	1.42 cm2	-793.22 cm

DISTRIBUCION: 1@5, 10@1



)

As colocado (cm2)	φMn (ton-m)
10.0	15.0
4.0	6.6
10.0	15.6
10.0	15.0
4.0	6.6
10.0	15.5

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

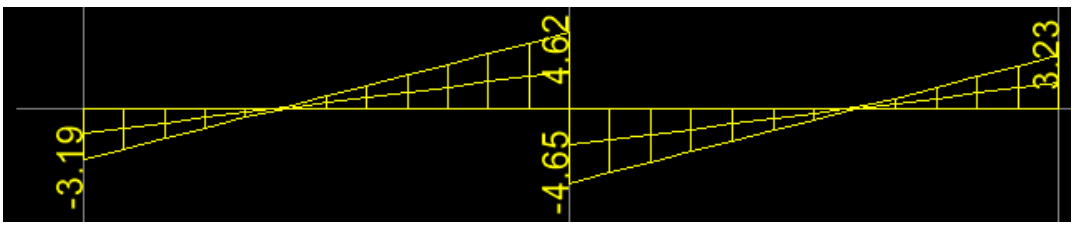
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

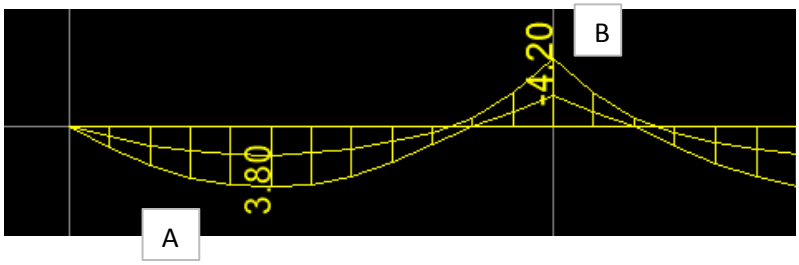
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 7 (VT-7)



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	3.8	25.0 cm	44.0 cm	2.2	**2.3**
ESFUERZO B	4.2	25.0 cm	44.0 cm	2.4	**2.6**
ESFUERZO C	3.9	25.0 cm	44.0 cm	2.3	**2.4**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

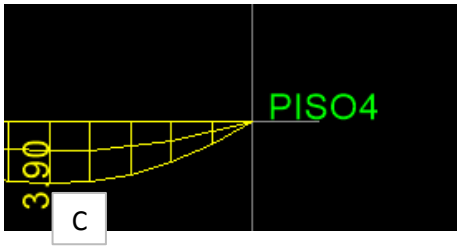
DISEÑO POR CORTANTE

PISO4

a "d" de la cara

Vu	ϕVc	Vs	Av	S
2.60 ton	7.18 ton	-5.39 ton	1.42 cm2	-48.69 cm
2.39 ton	7.18 ton	-5.64 ton	1.42 cm2	-46.55 cm
4.06 ton	7.18 ton	-3.67 ton	1.42 cm2	-71.46 cm
2.79 ton	7.18 ton	-5.17 ton	1.42 cm2	-50.80 cm

DISTRIBUCION: 1@5, 10@1



l)

As colocado (cm2)	φMn (ton-m)
4.0	6.5
4.0	6.5
4.0	6.5

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

l0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

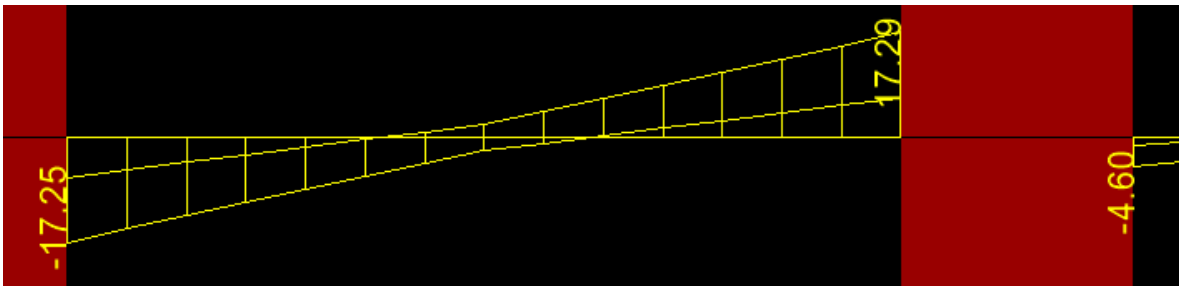
Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**20.7 cm2**
As min.	**3.1 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	3	
3/4"		
1"		2

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2		5/8"	3	
3/4"		1	3/4"		
1"			1"		2

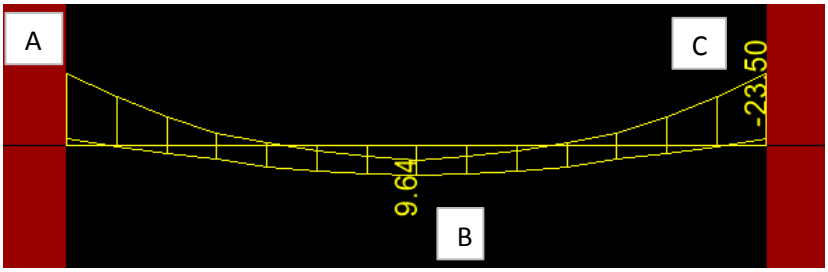
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2		5/8"	2	
3/4"			3/4"		
1"			1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 8 (VT-8)

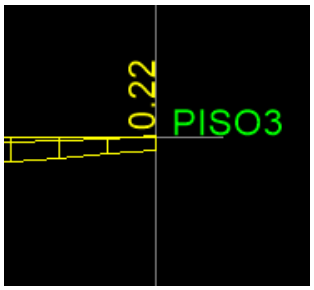


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	23.39	25.0 cm	52.0 cm	12.8	**13.6**
ESFUERZO B	9.64	25.0 cm	52.0 cm	4.8	**5.1**
ESFUERZO C	23.5	25.0 cm	52.0 cm	12.8	**13.6**
ESFUERZO D	5.1	25.0 cm	52.0 cm	2.5	**2.7**
ESFUERZO E	0.02	25.0 cm	52.0 cm	0.0	**0.0**
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

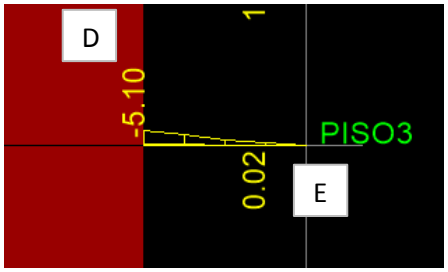
DISEÑO POR CORTANTE



a d de la cara

Vu	ϕVc	Vs	Av	S
17.00 ton	8.49 ton	10.02 ton	1.42 cm2	30.96 cm
16.90 ton	8.49 ton	9.90 ton	1.42 cm2	31.33 cm
4.40 ton	8.49 ton	-4.81 ton	1.42 cm2	-64.50 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
16.2	27.9
6.8	12.8
16.2	27.9
4.0	7.7
4.0	7.9

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

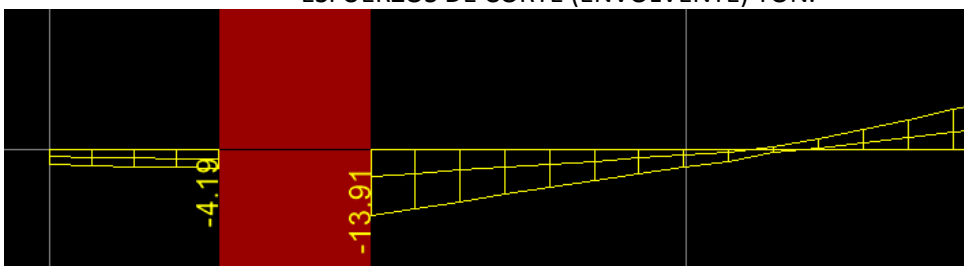
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2		5/8"	2	
3/4"			3/4"		2
1"		2	1"		

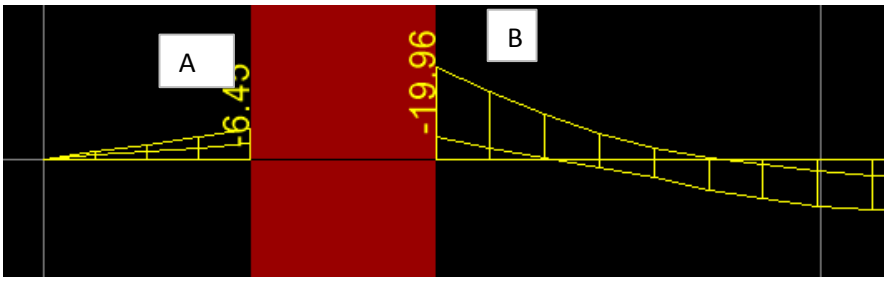
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"			1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 9 (VT-9)

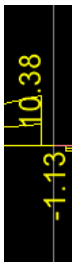


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	6.45	25.0 cm	44.0 cm	3.8	**4.1**
ESFUERZO B	19.96	25.0 cm	44.0 cm	13.3	**14.1**
ESFUERZO C	11.82	25.0 cm	44.0 cm	7.3	**7.7**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

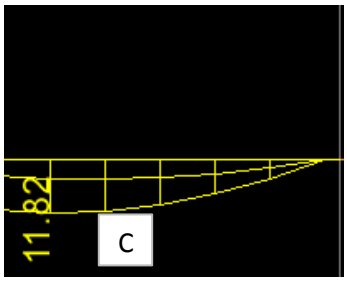
DISEÑO POR CORTANTE



a "d" de la cara

Vu	ϕVc	Vs	Av	S
4.19 ton	7.18 ton	-3.52 ton	1.42 cm2	-74.57 cm
13.91 ton	7.18 ton	7.92 ton	1.42 cm2	33.15 cm
10.38 ton	7.18 ton	3.76 ton	1.42 cm2	69.73 cm

DISTRIBUCION: 1@5, 10@1



l)

As colocado (cm2)	φMn (ton-m)
4.0	6.4
14.2	20.0
9.7	14.8

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

l0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		2
3/4"		
1"	2	

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

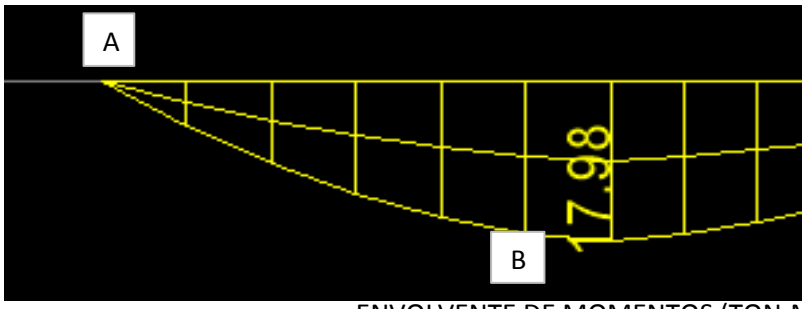
REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.

DISEÑO DE VIGAS

VIGA TIPICA 10 (VT-10)



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO B	17.98	25.0 cm	44.0 cm	11.7	**12.5**
ESFUERZO C	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

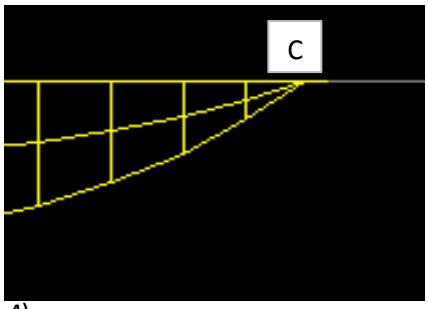
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

a "d" de la cara

Vu	ϕVc	Vs	Av	S
10.80 ton	7.18 ton	4.26 ton	1.42 cm2	61.64 cm
12.80 ton	7.18 ton	6.61 ton	1.42 cm2	39.70 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.6
14.2	20.5
4.0	6.6

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**20.7 cm2**
As min.	**3.1 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

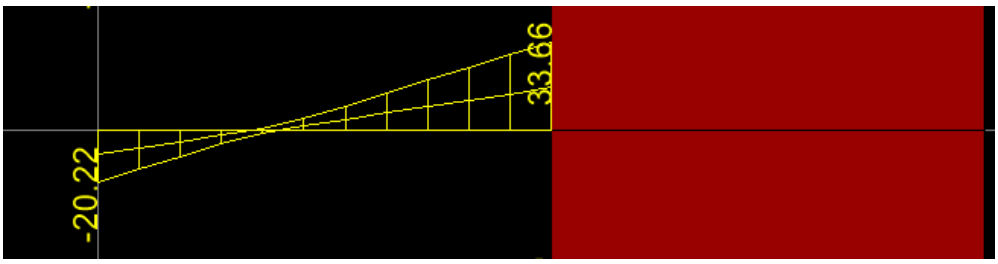
REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		1
1"	3	

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

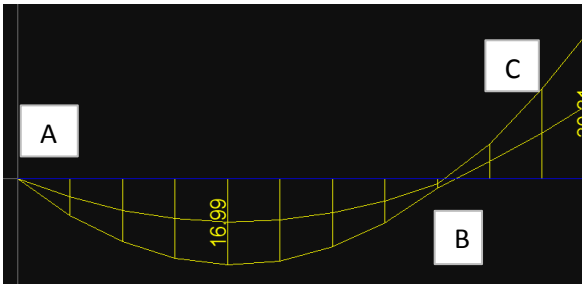
falta corregir grafico

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 11 (VT-11)



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	15	25.0 cm	52.0 cm	7.8	**8.2**
ESFUERZO B	17	25.0 cm	52.0 cm	8.9	**9.5**
ESFUERZO C	30.31	25.0 cm	52.0 cm	17.4	**18.5**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

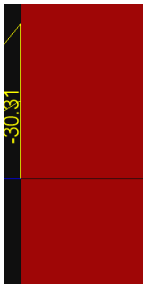
DISEÑO POR CORTANTE

DISEÑO POR

A d de la cara

Vu	ϕVc	Vs	Av	S
13.66 ton	8.49 ton	6.09 ton	1.42 cm2	50.96 cm
25.50 ton	8.49 ton	20.02 ton	1.42 cm2	15.49 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
10.2	18.6
10.2	18.3
18.1	29.7

CORTE

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

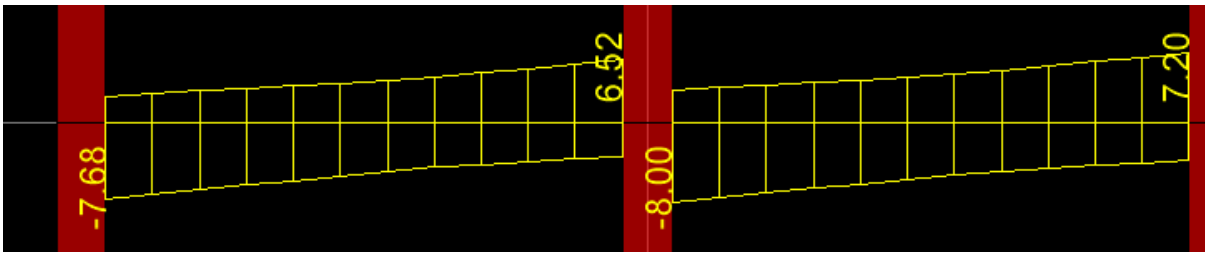
Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**20.7 cm2**
As min.	**3.1 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		1
3/4"	4	
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"		1	5/8"		
3/4"			3/4"		
1"	2		1"	2	

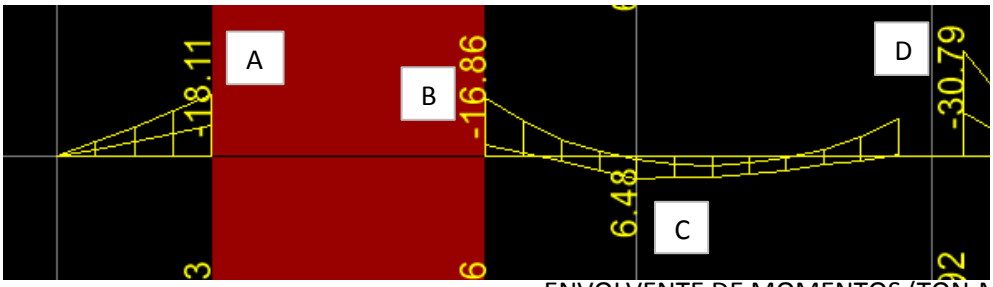
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"	2	2	1"	2	1

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 12 (VT-12)

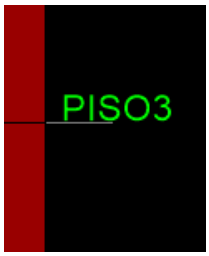


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	18.11	25.0 cm	52.0 cm	9.5	**10.1**
ESFUERZO B	16.86	25.0 cm	52.0 cm	8.8	**9.4**
ESFUERZO C	6.48	25.0 cm	52.0 cm	3.2	**3.4**
ESFUERZO D	30.79	25.0 cm	52.0 cm	17.8	**18.9**
ESFUERZO E	27.35	25.0 cm	52.0 cm	15.4	**16.3**
ESFUERZO F	2	25.0 cm	52.0 cm	1.0	**1.0**

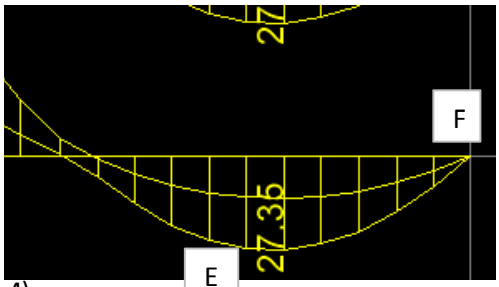
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

DISEÑO POR CORTANTE



Vu	ϕVc	Vs	Av	S
7.00 ton	8.49 ton	-1.75 ton	1.42 cm2	-177.29 cm
6.00 ton	8.49 ton	-2.93 ton	1.42 cm2	-106.00 cm
7.80 ton	8.49 ton	-0.81 ton	1.42 cm2	-383.78 cm
6.80 ton	8.49 ton	-1.98 ton	1.42 cm2	-156.27 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
13.4	23.8
12.2	21.9
10.2	19.4
20.4	33.2
15.3	25.6
10.2	19.9

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	15.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**12.4 cm2**
As min.	**1.9 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"	2	
5/8"		
3/4"		
1"		

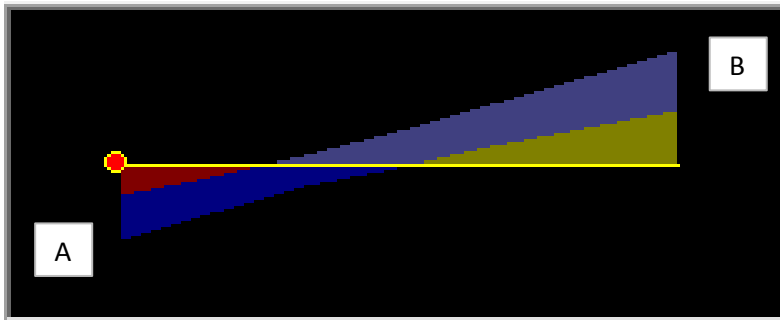
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"	2	
5/8"		
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"	2	
5/8"		
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

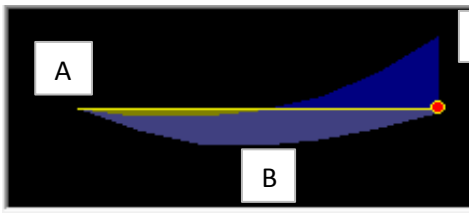
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 13 (VT-12)



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	0	15.0 cm	52.0 cm	0.0	**0.0**
ESFUERZO B	1.57	15.0 cm	52.0 cm	1.3	**0.8**
ESFUERZO C	3.03	15.0 cm	52.0 cm	2.5	**1.6**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

Vu	ϕVc	Vs	Av	S
1.62 ton	5.09 ton	-4.08 ton	1.42 cm2	-75.92 cm
2.98 ton	5.09 ton	-2.48 ton	1.42 cm2	-124.81 cm

DISTRIBUCION: 1@5, 10@

C

M)

As colocado (cm2)	φMn (ton-m)
2.6	5.1
2.6	5.0
2.6	5.0

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

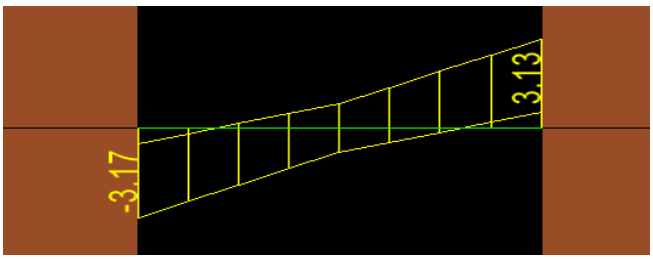
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

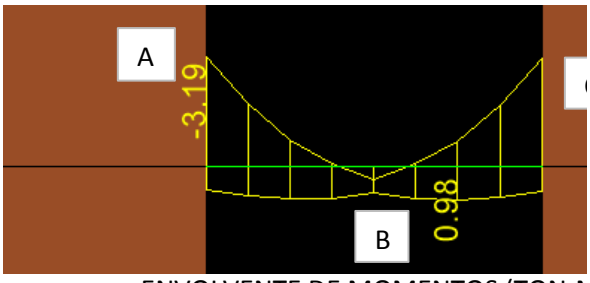
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 14 (VT-14)



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	3.19	25.0 cm	44.0 cm	1.8	**2.0**
ESFUERZO B	0.98	25.0 cm	44.0 cm	0.6	**0.6**
ESFUERZO C	3.19	25.0 cm	44.0 cm	1.8	**2.0**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

Vu	ϕVc	Vs	Av	S
2.65 ton	7.18 ton	-5.33 ton	1.42 cm2	-49.23 cm
2.65 ton	7.18 ton	-5.33 ton	1.42 cm2	-49.23 cm
0.00 ton	7.18 ton	-8.45 ton	1.42 cm2	-31.06 cm
0.00 ton	7.18 ton	-8.45 ton	1.42 cm2	-31.06 cm

DISTRIBUCION: 1@5, 10@

C

M)

As colocado (cm2)	φMn (ton-m)
4.0	6.5
4.0	6.6
4.0	6.5

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	60.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	52.0 cm
As max.	**20.7 cm2**
As min.	**3.1 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

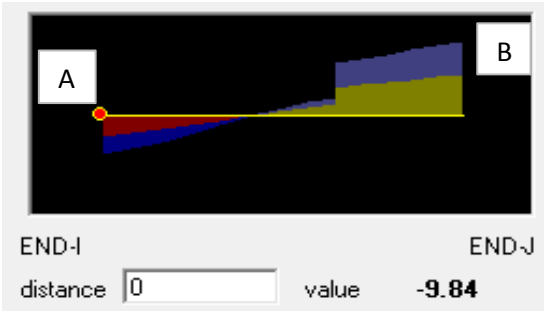
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	1	
1"	1	

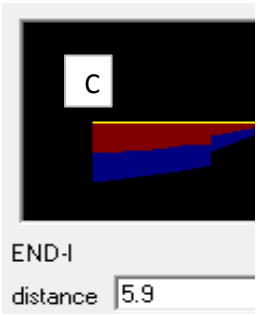
REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		1
1"	2	

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		1
1"	2	

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	1	
1"	1	

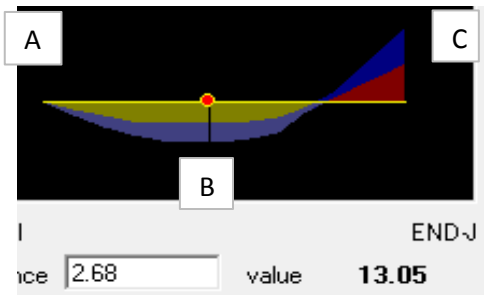
ESFUERZOS DE CORTE (ENVOLVENTE) TON.

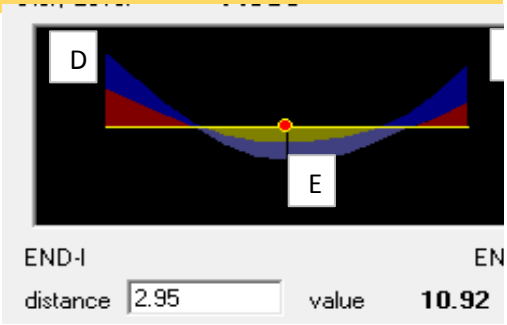




DISEÑO DE VIGAS

VIGA TIPICA 15 (VT-15)



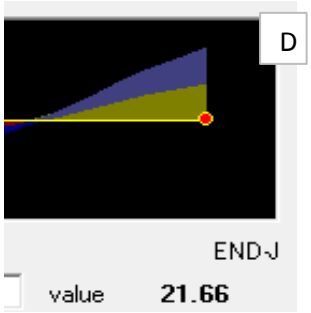


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	7	25.0 cm	52.0 cm	3.5	**3.7**
ESFUERZO B	13.1	25.0 cm	52.0 cm	6.7	**7.1**
ESFUERZO C	23.68	25.0 cm	52.0 cm	13.0	**13.8**
ESFUERZO D	23.68	25.0 cm	52.0 cm	13.0	**13.8**
ESFUERZO E	10.91	25.0 cm	52.0 cm	5.5	**5.9**
ESFUERZO F	20.46	25.0 cm	52.0 cm	10.9	**11.6**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

DISEÑO POR CORTANTE



	Vu	ϕVc	Vs	Av	S
A	8.33 ton	8.49 ton	-0.18 ton	1.42 cm2	-1680.38 cm
B	17.66 ton	8.49 ton	10.79 ton	1.42 cm2	28.74 cm
C	16.47 ton	8.49 ton	9.39 ton	1.42 cm2	33.02 cm
D	18.24 ton	8.49 ton	11.47 ton	1.42 cm2	27.03 cm

DISTRIBUCION: 1@5, 8@

F

ID-J

M)

As colocado (cm2)	φMn (ton-m)
10.2	19.4
7.9	14.6
13.0	22.4
13.0	22.4
7.9	14.8
10.2	17.9

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm
13.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 30 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	42.0 cm
As max.	**16.7 cm2**
As min.	**2.5 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		

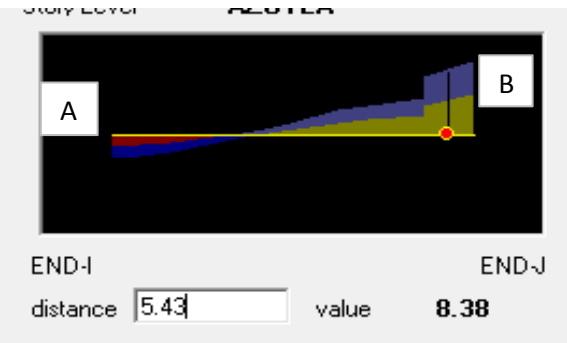
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		

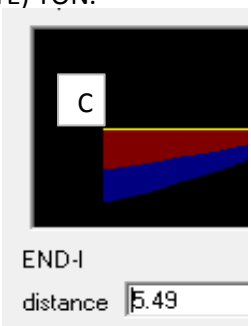
REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		1

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		1

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		1
1"	1	

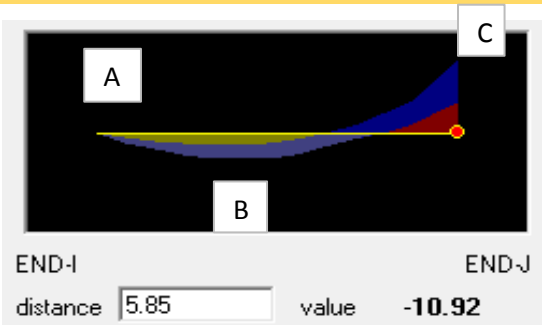
ESFUERZOS DE CORTE (ENVOLVENTE) TON.

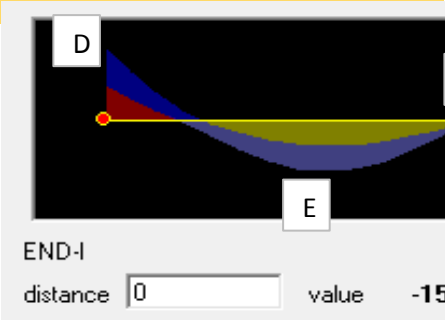




DISEÑO DE VIGAS

VIGA TIPICA 16 (VT-16)



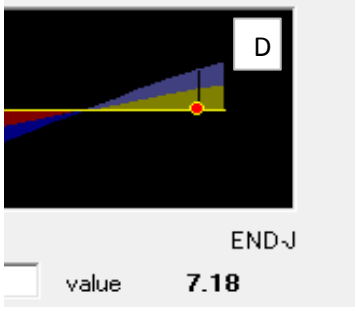


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	5	25.0 cm	42.0 cm	3.1	**3.3**
ESFUERZO B	3.89	25.0 cm	42.0 cm	2.4	**2.5**
ESFUERZO C	15.06	25.0 cm	42.0 cm	10.2	**10.8**
ESFUERZO D	15.06	25.0 cm	42.0 cm	10.2	**10.8**
ESFUERZO E	10.34	25.0 cm	42.0 cm	6.7	**7.1**
ESFUERZO F	5	25.0 cm	42.0 cm	3.1	**3.3**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		

DISEÑO POR CORTANTE



	Vu	ϕVc	Vs	Av	S
A	2.74 ton	6.85 ton	-4.84 ton	1.42 cm2	-51.74 cm
B	8.38 ton	6.85 ton	1.79 ton	1.42 cm2	139.60 cm
C	11.64 ton	6.85 ton	5.63 ton	1.42 cm2	44.49 cm
D	7.15 ton	6.85 ton	0.35 ton	1.42 cm2	721.22 cm

DISTRIBUCION: 1@5, 8@

M)

As colocado (cm2)	φMn (ton-m)
5.7	8.7
5.7	8.8
10.8	15.0
10.8	15.0
7.9	11.6
5.7	8.7

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
10.50 cm	20.00 cm	17.04 cm	30.00 cm
10.50 cm	20.00 cm	17.04 cm	30.00 cm
10.50 cm	20.00 cm	17.04 cm	30.00 cm
10.50 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 30 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

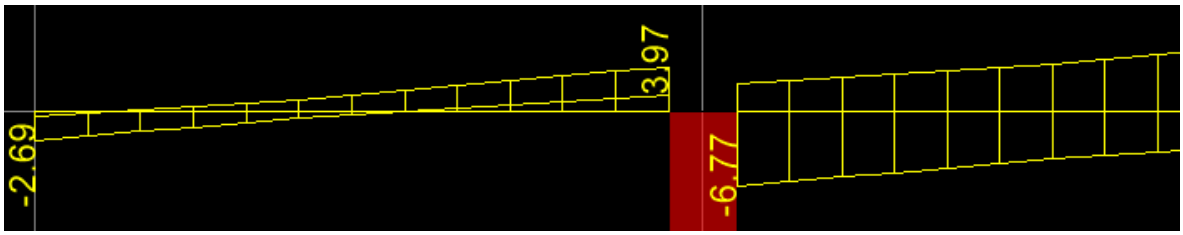
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		2
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		2
1"		

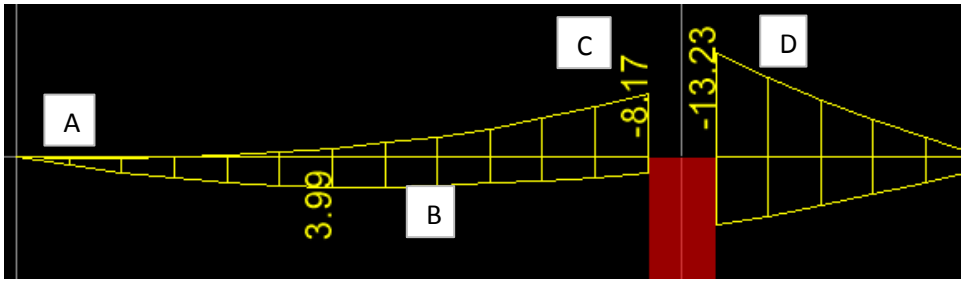
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 1 (VT5-1) - AZOTEA

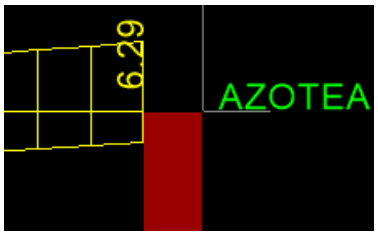


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO B	3.99	25.0 cm	44.0 cm	2.3	**2.5**
ESFUERZO C	8.17	25.0 cm	44.0 cm	4.9	**5.2**
ESFUERZO D	13.23	25.0 cm	44.0 cm	8.3	**8.8**
ESFUERZO E	4.18	25.0 cm	44.0 cm	2.4	**2.6**
ESFUERZO F	9.91	25.0 cm	44.0 cm	6.0	**6.4**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		2
1"		

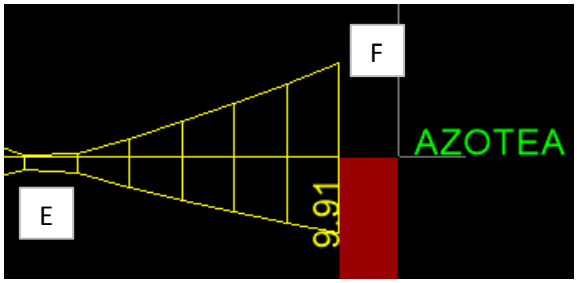
DISEÑO POR CORTANTE



a d de la cara

Vu	ϕVc	Vs	Av	S
2.15 ton	7.18 ton	-5.92 ton	1.42 cm2	-44.33 cm
2.15 ton	7.18 ton	-5.92 ton	1.42 cm2	-44.33 cm
6.38 ton	7.18 ton	-0.94 ton	1.42 cm2	-278.40 cm
6.38 ton	7.18 ton	-0.94 ton	1.42 cm2	-278.40 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.6
4.0	6.5
9.7	15.2
9.7	14.6
4.0	6.5
9.7	15.0

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	2

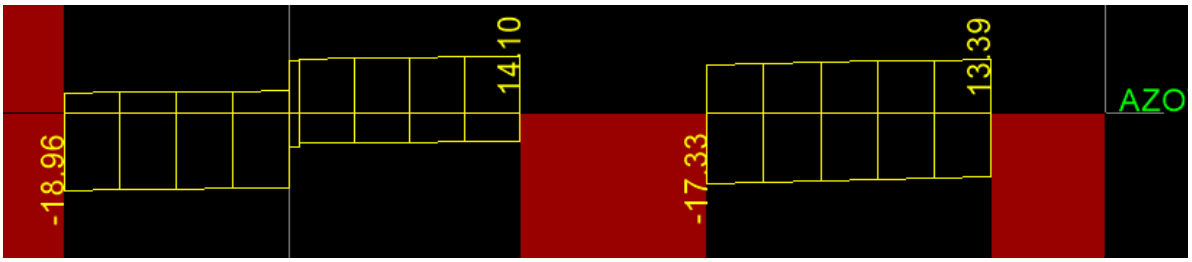
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	1	

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	32.3 ton-m	Mn (2)	26.7 ton-m
Mn (3)	27.1 ton-m	Mn (3)	26.8 ton-m

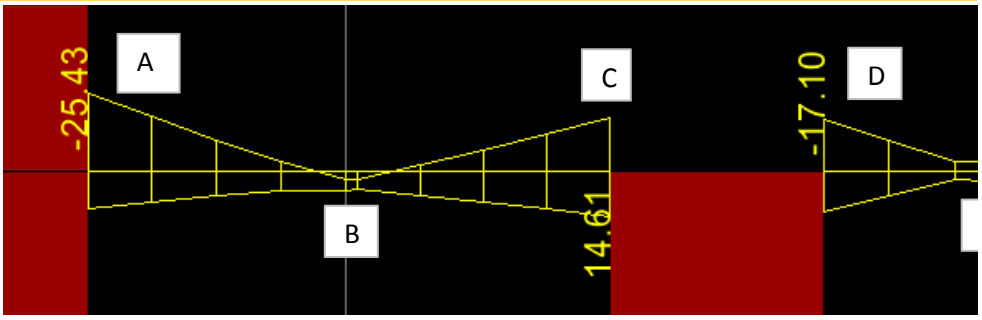
Ln	3.3 m	Ln	2.1 m
Vu = 1.25 (Wm+Wv) / Ln	8.9 ton	Vu = 1.25 (Wm+Wv) / Ln	8.9 ton
Vu capacidad	26.9 ton	Vu capacidad	34.9 ton

Vu	ϕVc	Vs	Av	S	d/4
34.90 ton	7.18 ton	32.61 ton	1.42 cm2	8.05 cm	11.00 cm
34.90 ton	7.18 ton	32.61 ton	1.42 cm2	8.05 cm	11.00 cm
34.90 ton	7.18 ton	32.61 ton	1.42 cm2	8.05 cm	11.00 cm
34.90 ton	7.18 ton	32.61 ton	1.42 cm2	8.05 cm	11.00 cm

DISTRIBUCION: 1@5, 10@10, Rto @ 20 c/ext.

DISEÑO DE VIGAS

VIGA 2 (VT5-2) - AZOTEA



ENVOLVENTE DE MOMENTOS (TON-M

DISEÑO POR FLEXIÓN

	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	25.43	25.0 cm	44.0 cm	18.1	**19.3**
ESFUERZO B	8.88	25.0 cm	44.0 cm	5.4	**5.7**
ESFUERZO C	14.61	25.0 cm	44.0 cm	9.2	**9.8**
ESFUERZO D	17.1	25.0 cm	44.0 cm	11.1	**11.8**
ESFUERZO E	4.18	25.0 cm	44.0 cm	2.4	**2.6**
ESFUERZO F	16.53	25.0 cm	44.0 cm	10.6	**11.3**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

DISEÑO POR CORTANTE

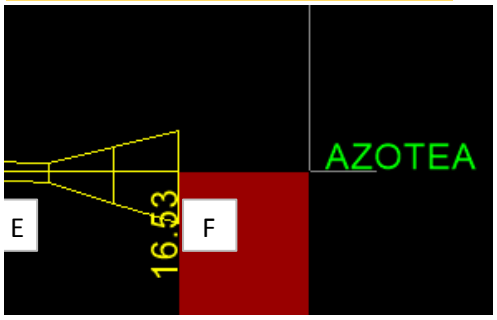
TEA

A "d" de la cara

Vu	ϕVc	Vs	Av	S
18.80 ton	7.18 ton	13.67 ton	1.42 cm2	19.20 cm
18.80 ton	7.18 ton	13.67 ton	1.42 cm2	19.20 cm
16.93 ton	7.18 ton	11.47 ton	1.42 cm2	22.88 cm
16.93 ton	7.18 ton	11.47 ton	1.42 cm2	22.88 cm

DISTRIBUCION: 1@5, 10@1

10 db	24 de	30 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm



)

As colocado (cm2)	φMn (ton-m)
20.4	26.9
5.1	8.0
15.9	23.6
15.9	23.1
4.0	6.5
15.9	23.2

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		

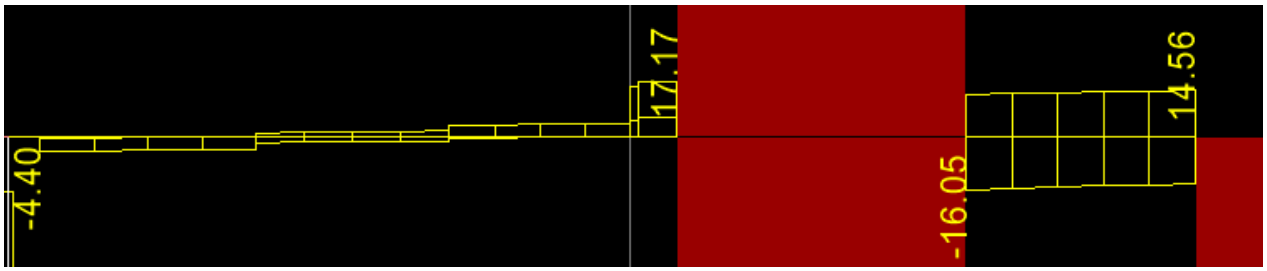
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	2
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		1
3/4"		
1"	2	

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	0.0 ton-m	Mn (2)	20.7 ton-m
Mn (3)	0.0 ton-m	Mn (3)	20.8 ton-m

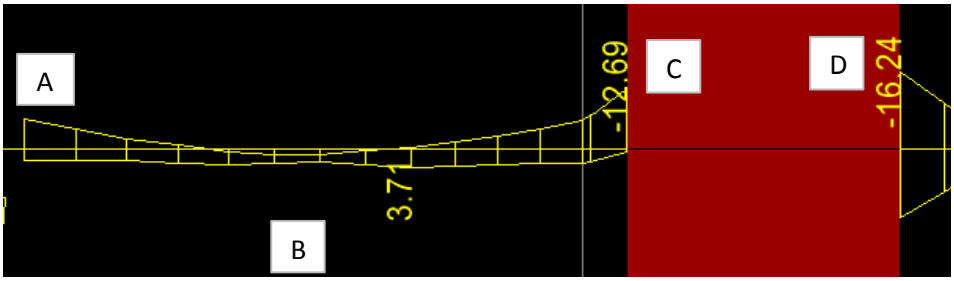
Ln	0.0 m	Ln	2.1 m
Vu = 1.25 (Wm+Wv) / Ln	0.0 ton	Vu = 1.25 (Wm+Wv) / Ln	1.8 ton
Vu capacidad	0.0 ton	Vu capacidad	21.9 ton

Vu	ϕVc	Vs	Av	S	d/4
21.90 ton	7.18 ton	17.32 ton	1.42 cm2	15.15 cm	11.00 cm
21.90 ton	7.18 ton	17.32 ton	1.42 cm2	15.15 cm	11.00 cm
21.90 ton	7.18 ton	17.32 ton	1.42 cm2	15.15 cm	11.00 cm
21.90 ton	7.18 ton	17.32 ton	1.42 cm2	15.15 cm	11.00 cm

DISTRIBUCION: 1@5, 10@10, Rto @ 20 c/ext.

DISEÑO DE VIGAS

VIGA TIPICA 3 (VT5-3) - AZOTEA



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	6.42	25.0 cm	44.0 cm	3.8	**4.0**
ESFUERZO B	3.71	25.0 cm	44.0 cm	2.2	**2.3**
ESFUERZO C	12.69	25.0 cm	44.0 cm	7.9	**8.4**
ESFUERZO D	16.24	25.0 cm	44.0 cm	10.4	**11.1**
ESFUERZO E	3.81	25.0 cm	44.0 cm	2.2	**2.3**
ESFUERZO F	14.9	25.0 cm	44.0 cm	9.4	**10.0**

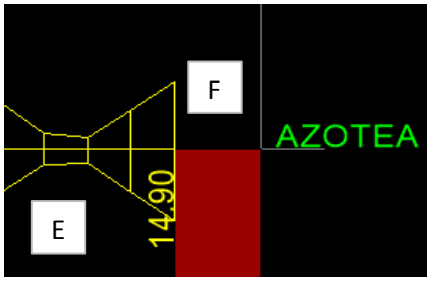
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		1
3/4"		
1"	2	

DISEÑO POR CORTANTE

Vu	ϕVc	Vs	Av	S
4.20 ton	7.18 ton	-3.51 ton	1.42 cm2	-74.82 cm
15.00 ton	7.18 ton	9.20 ton	1.42 cm2	28.53 cm
15.90 ton	7.18 ton	10.26 ton	1.42 cm2	25.58 cm
14.00 ton	7.18 ton	8.02 ton	1.42 cm2	32.71 cm

DISTRIBUCION: 1@5, 10@

10 db	24 de	30 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm



M)

As colocado (cm2)	φMn (ton-m)
5.7	9.0
4.0	6.5
11.4	17.2
12.2	17.9
4.0	6.5
12.2	18.1

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	
1"		

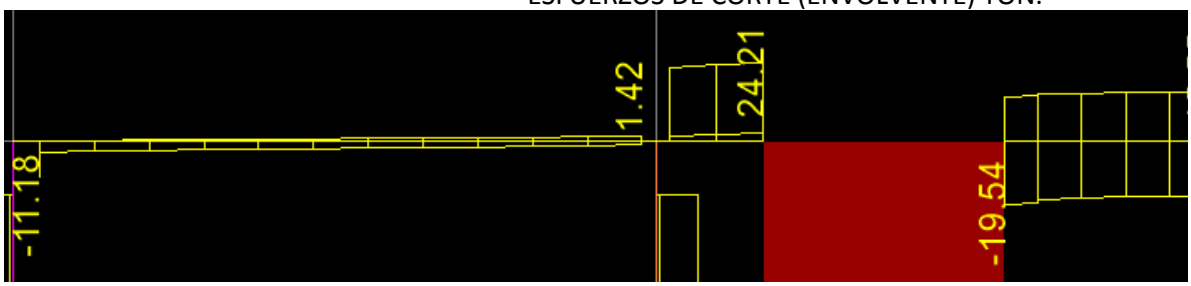
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		2
3/4"		
1"	2	

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		2
3/4"		
1"	2	

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE CORTANTE POR CAPACIDAD

TRAMO 1		TRAMO 2	
Mn (2)	23.8 ton-m	Mn (2)	23.8 ton-m
Mn (3)	9.1 ton-m	Mn (3)	24.0 ton-m

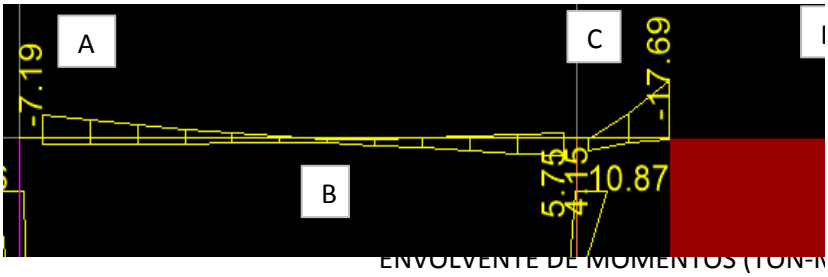
Ln	5.7 m	Ln	1.9 m
Vu = 1.25 (Wm+Wv) / Ln	19.5 ton	1.25 (Wm+Wv	4.0 ton
Vu capacidad	25.2 ton	Vu capacidad	29.1 ton

Vu	ϕVc	Vs	Av	S	d/4
29.10 ton	7.18 ton	25.79 ton	1.42 cm2	10.18 cm	11.00 cm
29.10 ton	7.18 ton	25.79 ton	1.42 cm2	10.18 cm	11.00 cm
29.10 ton	7.18 ton	25.79 ton	1.42 cm2	10.18 cm	11.00 cm
29.10 ton	7.18 ton	25.79 ton	1.42 cm2	10.18 cm	11.00 cm

DISTRIBUCION: 1@5, 10@10, Rto @ 20 c/ext.

DISEÑO DE VIGAS

VIGA 4 (VT5-4) - AZOTEA

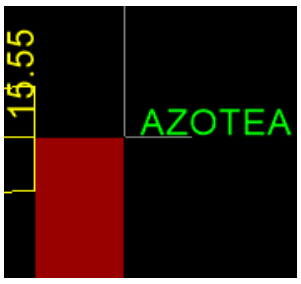


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	7.19	25.0 cm	44.0 cm	4.3	**4.5**
ESFUERZO B	4	25.0 cm	44.0 cm	2.3	**2.5**
ESFUERZO C	17.69	25.0 cm	44.0 cm	11.5	**12.2**
ESFUERZO D	17.51	25.0 cm	44.0 cm	11.4	**12.1**
ESFUERZO E	6.07	25.0 cm	44.0 cm	3.6	**3.8**
ESFUERZO F	16.22	25.0 cm	44.0 cm	10.4	**11.1**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		2
3/4"		
1"	2	

DISEÑO POR CORTANTE

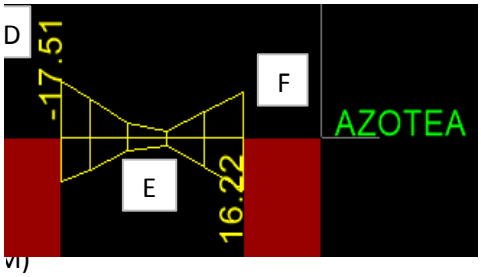


A d de la cara

Vu	ϕVc	Vs	Av	S
11.00 ton	7.18 ton	4.49 ton	1.42 cm2	58.41 cm
1.10 ton	7.18 ton	-7.15 ton	1.42 cm2	-36.68 cm
18.90 ton	7.18 ton	13.79 ton	1.42 cm2	19.03 cm
15.00 ton	7.18 ton	9.20 ton	1.42 cm2	28.53 cm

DISTRIBUCION: 1@5, 10@

10 db	24 de	30 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm
20.00 cm	17.04 cm	30.00 cm



vi)

As colocado (cm2)	φMn (ton-m)
5.7	9.0
4.0	6.5
14.2	20.5
14.2	20.6
4.0	6.4
14.2	20.8

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

)10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

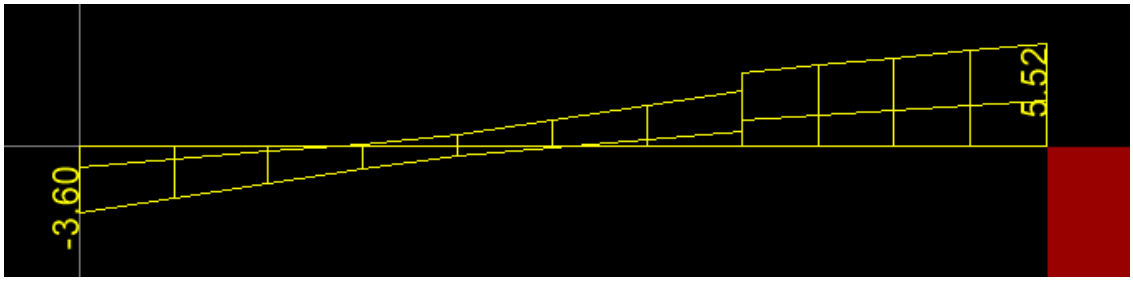
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"	2	1	5/8"		
3/4"			3/4"		
1"			1"		

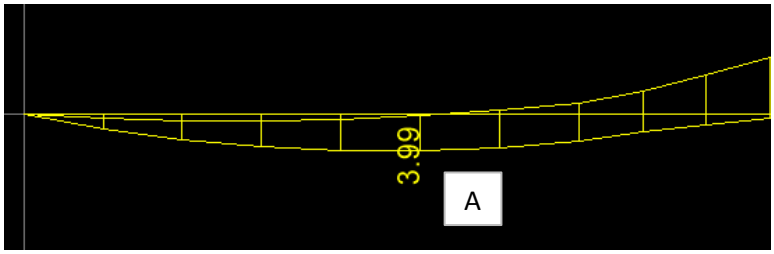
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"			1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 5 (VT5-5) - AZOTEA



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	3.99	25.0 cm	44.0 cm	2.3	**2.5**
ESFUERZO B	8.15	25.0 cm	44.0 cm	4.9	**5.2**
ESFUERZO C					
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

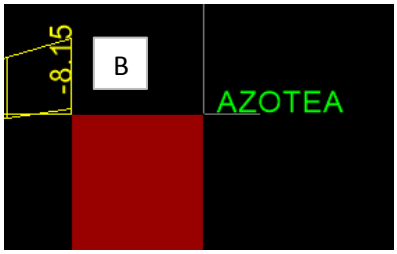
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

A d de la cara

Vu	ϕVc	Vs	Av	S
3.40 ton	7.18 ton	-4.45 ton	1.42 cm2	-58.99 cm
5.00 ton	7.18 ton	-2.57 ton	1.42 cm2	-102.26 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.5
6.0	9.4

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

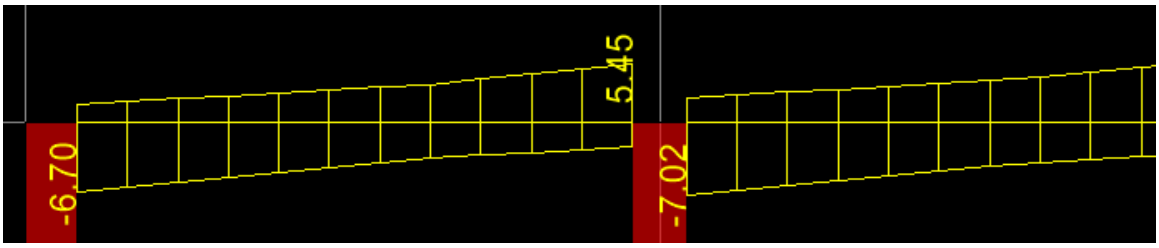
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

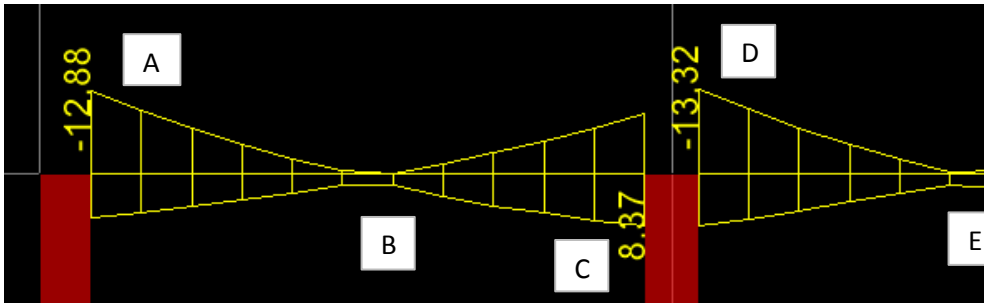
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 6 (VT5-6) - AZOTEA

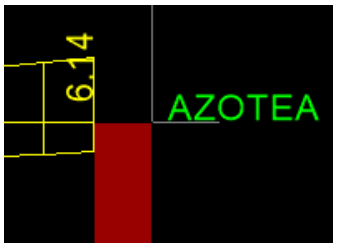


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	12.88	25.0 cm	44.0 cm	8.0	**8.5**
ESFUERZO B	2.25	25.0 cm	44.0 cm	1.3	**1.4**
ESFUERZO C	8.37	25.0 cm	44.0 cm	5.0	**5.3**
ESFUERZO D	13.32	25.0 cm	44.0 cm	8.3	**8.8**
ESFUERZO E	2.3	25.0 cm	44.0 cm	1.3	**1.4**
ESFUERZO F	9.78	25.0 cm	44.0 cm	5.9	**6.3**

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	3
3/4"		
1"		

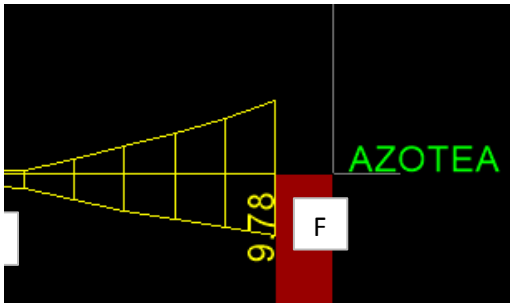
DISEÑO POR CORTANTE



A "d" de la cara

Vu	ϕVc	Vs	Av	S
6.25 ton	7.18 ton	-1.10 ton	1.42 cm2	-239.53 cm
6.25 ton	7.18 ton	-1.10 ton	1.42 cm2	-239.53 cm
6.58 ton	7.18 ton	-0.71 ton	1.42 cm2	-371.01 cm
6.58 ton	7.18 ton	-0.71 ton	1.42 cm2	-371.01 cm

DISTRIBUCION: 1@5, 10@1



)

As colocado (cm2)	φMn (ton-m)
10.0	15.1
4.0	6.6
10.0	15.7
10.0	15.1
4.0	6.6
10.0	15.5

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

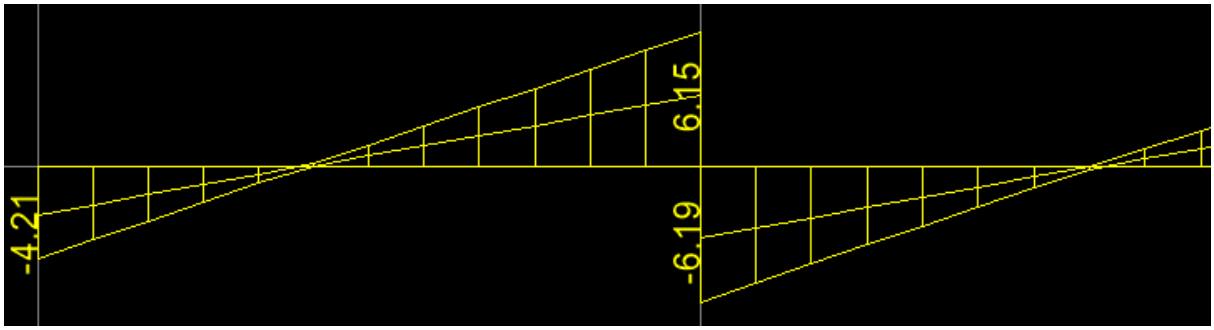
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

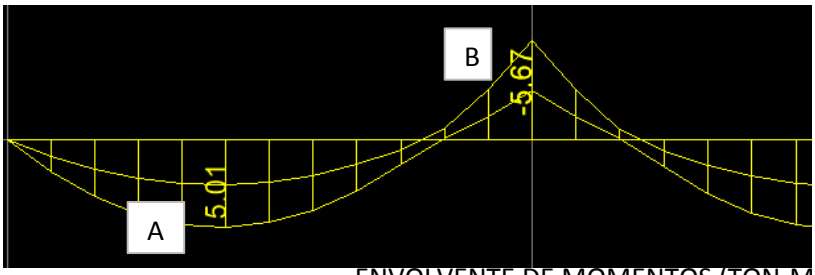
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 7 (VT5-7) - AZOTEA

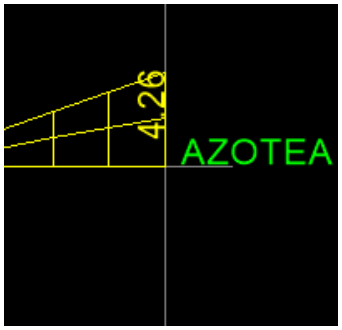


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	5.01	25.0 cm	44.0 cm	2.9	**3.1**
ESFUERZO B	5.67	25.0 cm	44.0 cm	3.3	**3.5**
ESFUERZO C	5.13	25.0 cm	44.0 cm	3.0	**3.2**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

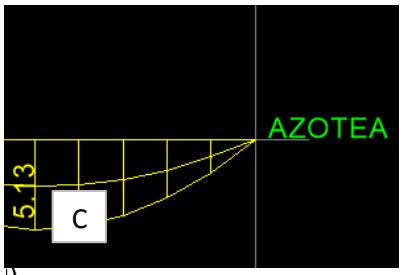
DISEÑO POR CORTANTE



a "d" de la cara

Vu	ϕVc	Vs	Av	S
5.35 ton	7.18 ton	-2.15 ton	1.42 cm2	-121.81 cm
5.35 ton	7.18 ton	-2.15 ton	1.42 cm2	-121.81 cm
5.41 ton	7.18 ton	-2.08 ton	1.42 cm2	-125.93 cm
5.41 ton	7.18 ton	-2.08 ton	1.42 cm2	-125.93 cm

DISTRIBUCION: 1@5, 10@1



l)

As colocado (cm2)	φMn (ton-m)
4.0	6.4
4.0	6.4
4.0	6.4

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

l0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

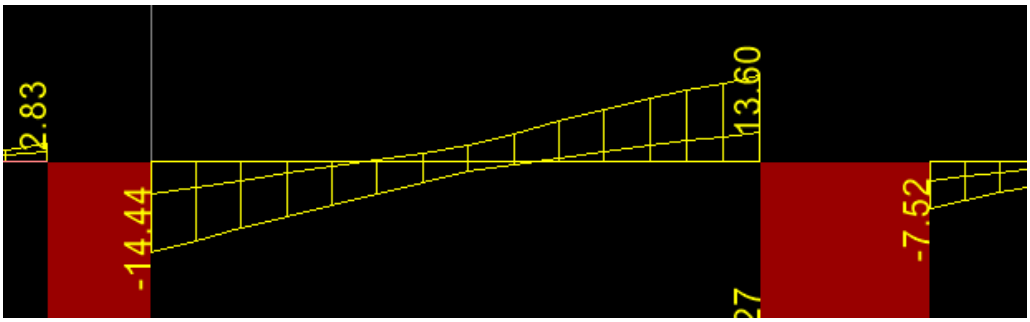
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		1
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

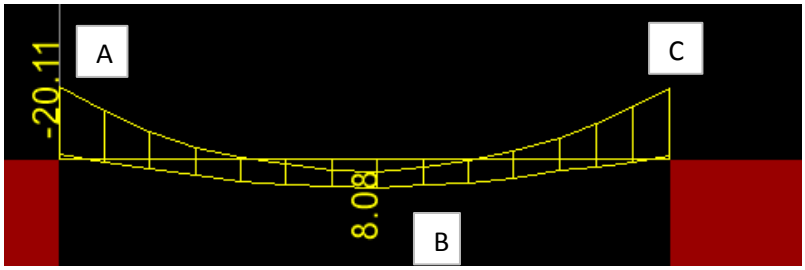
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 8 (VT5-8) - AZOTEA



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	20.11	25.0 cm	44.0 cm	13.4	**14.3**
ESFUERZO B	8.08	25.0 cm	44.0 cm	4.8	**5.1**
ESFUERZO C	19.87	25.0 cm	44.0 cm	13.2	**14.1**
ESFUERZO D	7.65	25.0 cm	44.0 cm	4.6	**4.9**
ESFUERZO E	0.05	25.0 cm	44.0 cm	0.0	**0.0**
ESFUERZO F					

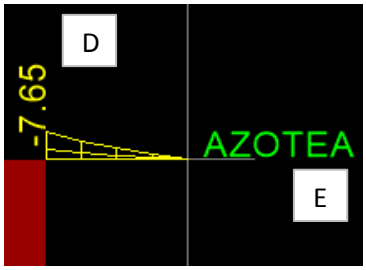
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

a d de la cara

Vu	ϕVc	Vs	Av	S
13.60 ton	7.18 ton	7.55 ton	1.42 cm2	34.75 cm
13.00 ton	7.18 ton	6.85 ton	1.42 cm2	38.33 cm
7.20 ton	7.18 ton	0.02 ton	1.42 cm2	11865.66 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
15.9	22.4
6.8	10.8
15.9	22.4
4.0	6.3
4.0	6.7

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

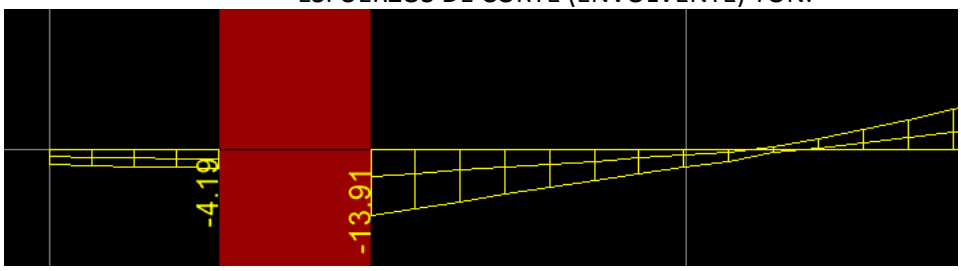
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		2
1"	2	

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		1
3/4"	2	
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

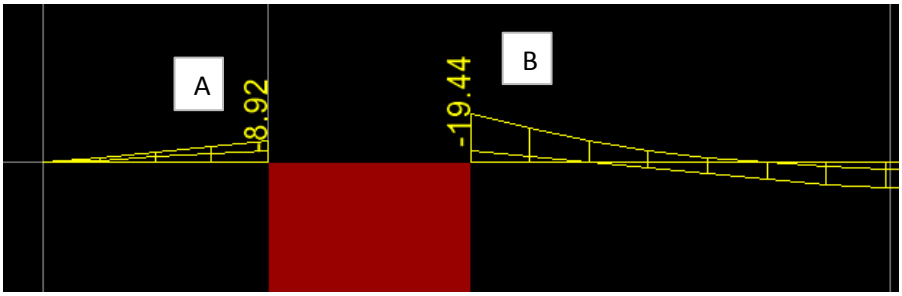
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 9 (VT5-9) - AZOTEA

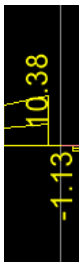


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	8.92	25.0 cm	44.0 cm	5.4	**5.7**
ESFUERZO B	19.44	25.0 cm	44.0 cm	12.9	**13.7**
ESFUERZO C	10.64	25.0 cm	44.0 cm	6.5	**6.9**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

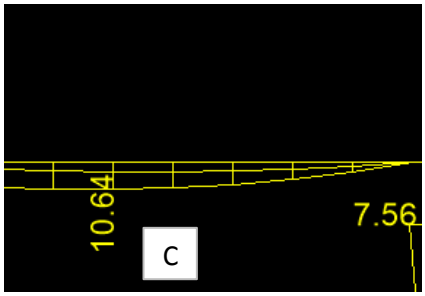
DISEÑO POR CORTANTE



a "d" de la cara

Vu	ϕVc	Vs	Av	S
4.05 ton	7.18 ton	-3.68 ton	1.42 cm2	-71.24 cm
13.00 ton	7.18 ton	6.85 ton	1.42 cm2	38.33 cm
10.00 ton	7.18 ton	3.32 ton	1.42 cm2	79.13 cm

DISTRIBUCION: 1@5, 10@1



l)

As colocado (cm2)	φMn (ton-m)
4.0	6.2
15.9	22.5
7.7	11.8

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

l0, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

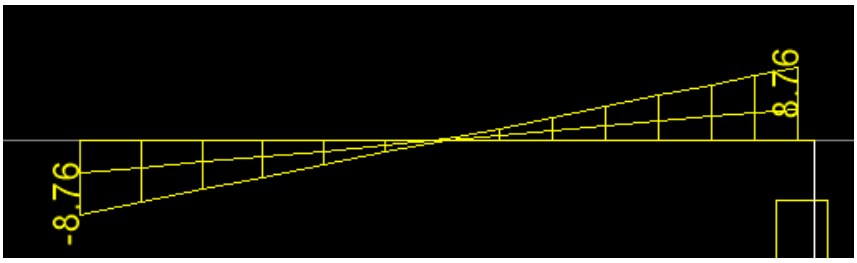
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

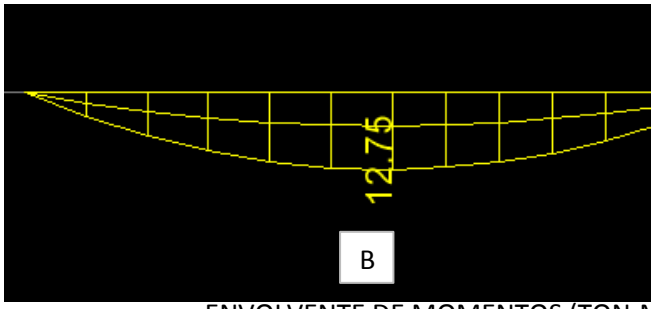
ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA TIPICA 10 (VT5-10) - AZOTEA

A



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO B	12.75	25.0 cm	44.0 cm	7.9	**8.4**
ESFUERZO C	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

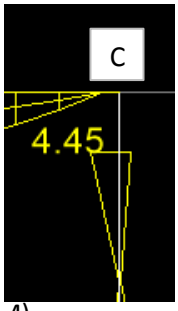
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

a "d" de la cara

Vu	ϕVc	Vs	Av	S
7.40 ton	7.18 ton	0.26 ton	1.42 cm2	1019.45 cm
4.40 ton	7.18 ton	-3.27 ton	1.42 cm2	-80.20 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
4.0	6.6
10.2	15.4
4.0	6.6

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

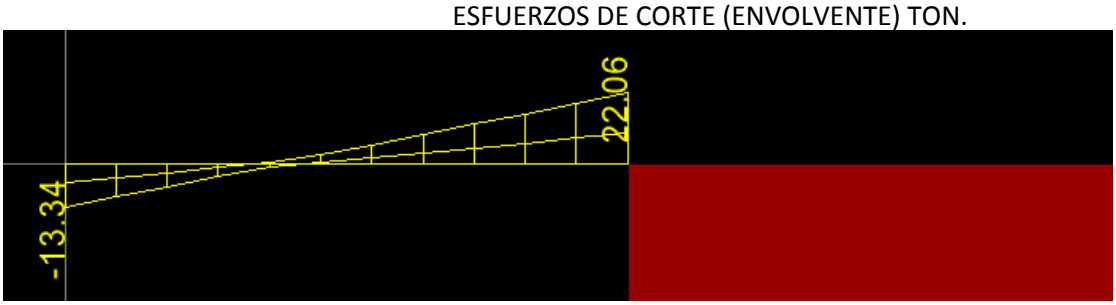
REFUERZO B		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"	2	2
1"		

REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"	2	1

REFUERZO D		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

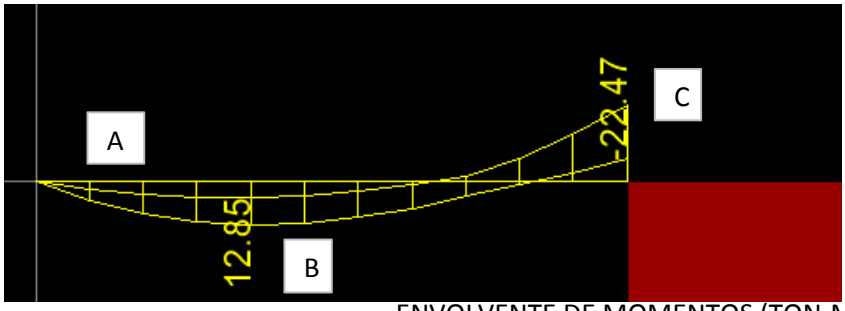
REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 11 (VT5-11) - AZOTEA



ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	2	25.0 cm	44.0 cm	1.1	**1.2**
ESFUERZO B	12.85	25.0 cm	44.0 cm	8.0	**8.5**
ESFUERZO C	22.47	25.0 cm	44.0 cm	15.4	**16.4**
ESFUERZO D					
ESFUERZO E					
ESFUERZO F					

REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		
3/4"		
1"		

DISEÑO POR CORTANTE

A d de la cara

Vu	ϕVc	Vs	Av	S
13.00 ton	7.18 ton	6.85 ton	1.42 cm2	38.33 cm
21.00 ton	7.18 ton	16.26 ton	1.42 cm2	16.14 cm

DISTRIBUCION: 1@5, 10@

M)

As colocado (cm2)	φMn (ton-m)
4.0	6.6
11.4	17.2
15.3	21.0

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

Edificio Dual tipo I

DATOS

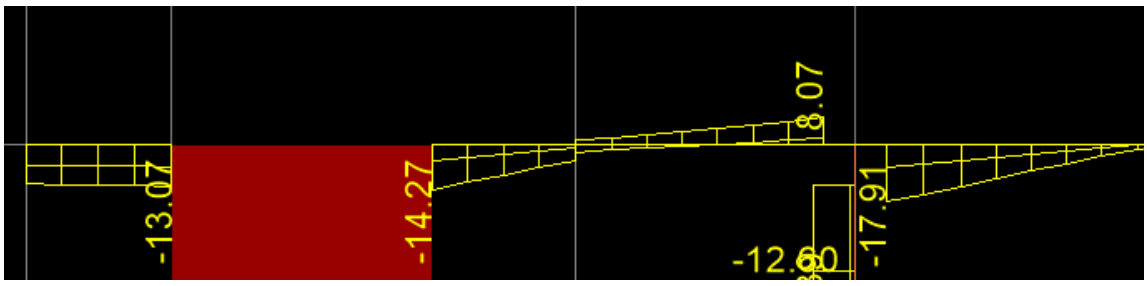
Base	25.0 cm
Peralte	50.0 cm
f'c	210 kg/cm2
fy	4200 kg/cm2
d	44.0 cm
As max.	**17.5 cm2**
As min.	**2.7 cm2**
ϕ	0.9

REFUERZO A		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"		2
3/4"	4	
1"		

REFUERZO B			REFUERZO C		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"	2	
3/4"			3/4"		
1"	2		1"		

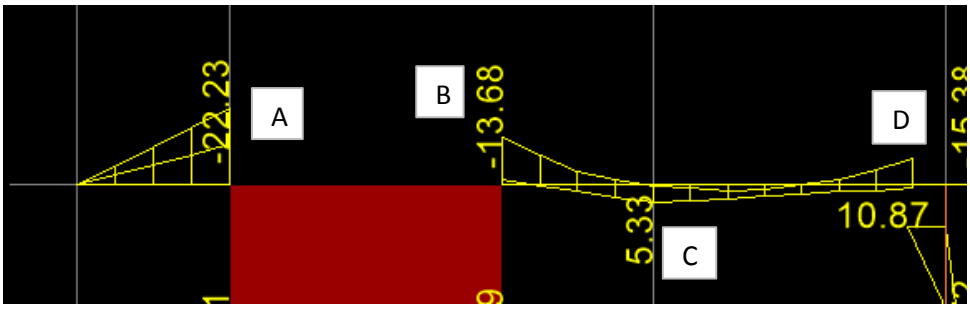
REFUERZO D			REFUERZO E		
Diametro (pulg)	# Corrido	# Bastones	Diametro (pulg)	# Corrido	# Bastones
1/4"			1/4"		
3/8"			3/8"		
1/2"			1/2"		
5/8"			5/8"		
3/4"			3/4"		
1"	2		1"	2	

ESFUERZOS DE CORTE (ENVOLVENTE) TON.



DISEÑO DE VIGAS

VIGA 12 (VT5-12)

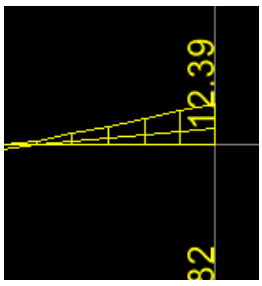


ENVOLVENTE DE MOMENTOS (TON-M

	DISEÑO POR FLEXIÓN				
	Mu (ton-m)	*b (cm)*	*d (cm)*	*a (cm)*	*As (cm2)*
ESFUERZO A	22.23	25.0 cm	44.0 cm	15.2	**16.2**
ESFUERZO B	13.68	25.0 cm	44.0 cm	8.6	**9.1**
ESFUERZO C	5.33	25.0 cm	44.0 cm	3.1	**3.3**
ESFUERZO D	15.38	25.0 cm	44.0 cm	9.8	**10.4**
ESFUERZO E	14.07	25.0 cm	44.0 cm	8.9	**9.4**
ESFUERZO F	2	25.0 cm	44.0 cm	1.1	**1.2**

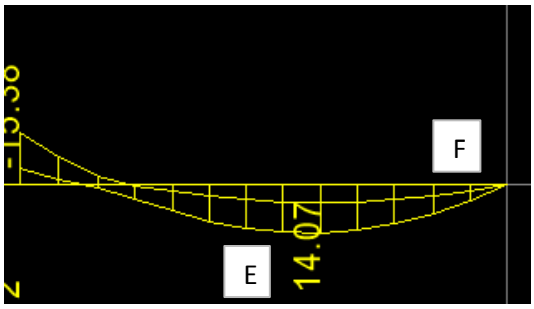
REFUERZO F		
Diametro (pulg)	# Corrido	# Bastones
1/4"		
3/8"		
1/2"		
5/8"	2	
3/4"		
1"		

DISEÑO POR CORTANTE



Vu	ϕVc	Vs	Av	S
13.00 ton	7.18 ton	6.85 ton	1.42 cm2	38.33 cm
14.00 ton	7.18 ton	8.02 ton	1.42 cm2	32.71 cm
17.00 ton	7.18 ton	11.55 ton	1.42 cm2	22.72 cm
12.00 ton	7.18 ton	5.67 ton	1.42 cm2	46.29 cm

DISTRIBUCION: 1@5, 10@



M)

As colocado (cm2)	φMn (ton-m)
15.4	21.1
10.2	15.3
4.0	6.4
10.2	15.1
10.2	15.3
4.0	6.6

Espaciamiento no debe exceder a:			
d/4	10 db	24 de	30 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm
11.00 cm	20.00 cm	17.04 cm	30.00 cm

10, Rto @ 20 c/ext.

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	1.9 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
f'c	210 kg/m2
Peso de tabique (kg/m)	648 kg/m
Peso tabique puntual (kg)	324 kg
As min (cm2)	0.48

PISO TIPICO	EJES 1-2		

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	50	0.06	0

Diagrama de Momentos 3-3 (1.4CM

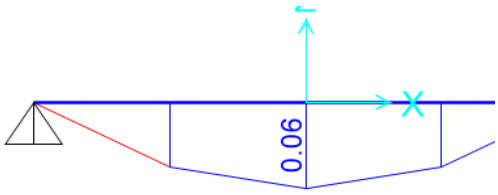
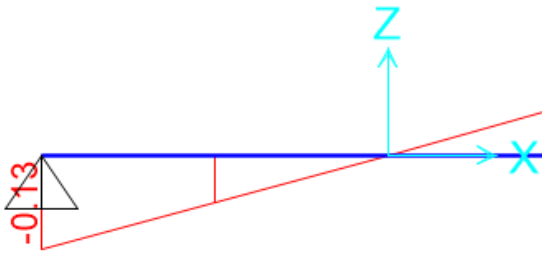
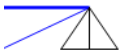


Diagrama de Cortantes 2-2 (1.4CM+



V1 (ton)	V2 (ton)
0.92	0.92

+1.7CV)



+1.7CV)

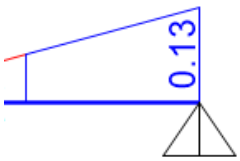


Tabla de momentos admisibles de las vig

Altura (cm)	Peso propio	Momen	
		V101	V102
17	245	0.760	1.030
20	280	**0.940**	1.280
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V101**

Cálculo del acero negativ

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
0	11	18	0.0

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	0.1

Como Vu < ϕ Vc No necesita ensanches

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

vo

As (cm2)	As Colocado (cm2)	
0.00	0.71	**1 Φ 3/8"**

no

d" de la cara
11

DISEÑO DE ALIGERADO FIRTH

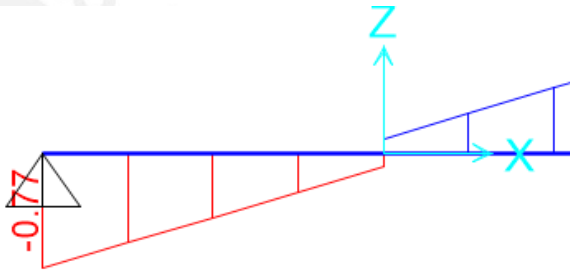
DATOS	
Ln	3.1 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
f'c	210 kg/m2
Peso de tabique (kg/m)	648 kg/m
Peso tabique puntual (kg)	324 kg
As min (cm2)	0.48

PISO TIPICO	EJES 3-4		

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	100	0.67	0

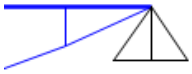
Diagrama de Momentos 3-3 (1.4CM

Diagrama de Cortantes 2-2 (1.4CM+



V1 (ton)	V2 (ton)
0.92	0.92

+1.7CV)



-1.7CV)

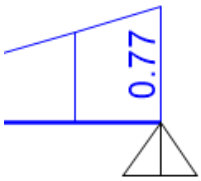


Tabla de momentos admisibles de las vig

Altura (cm)	Peso propio	Momen	
		V101	V102
17	245	0.760	1.030
20	280	**0.940**	1.280
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V101**

Cálculo del acero negativ

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
0	11	18	0.0

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	0.(

Como Vu < ϕ Vc No necesita ensanches

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

vo

As (cm2)	As Colocado (cm2)	
0.00	0.71	**1 Φ 3/8"**

no

d" de la cara
64

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	3.1 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
f'c	210 kg/m2
Peso de tabique (kg/m)	648 kg/m
Peso tabique puntual (kg)	324 kg
As min (cm2)	0.48

PISO TIPICO	EJES 3-4		

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	50	0.57	0

Diagrama de Momentos 3-3 (1.4CM

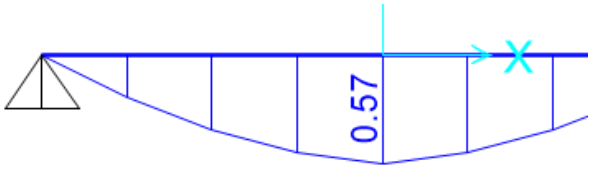
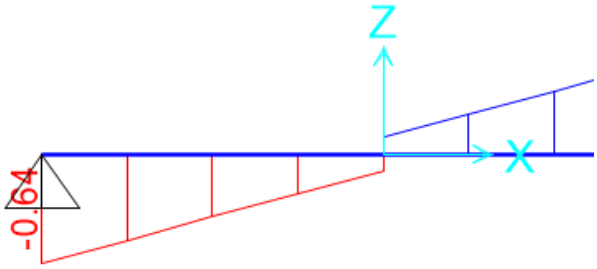
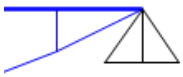


Diagrama de Cortantes 2-2 (1.4CM+



V1 (ton)	V2 (ton)
0.78	0.78

+1.7CV)



+1.7CV)

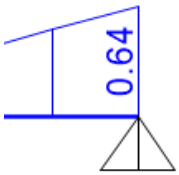


Tabla de momentos admisibles de las vig

Altura (cm)	Peso propio	Momen	
		V101	V102
17	245	0.760	1.030
20	280	**0.940**	1.280
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V101**

Cálculo del acero negativ

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
0	11	18	0.0

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	0.5

Como Vu < ϕ Vc No necesita ensanches

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

vo

As (cm2)	As Colocado (cm2)	
0.00	0.71	**1 Φ 3/8"**

no

d" de la cara
53

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	6.0 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
Peso de tabique (kg/m)	648 kg/m
Peso tabique puntual (kg)	324 kg
As min (cm2)	0.55

PISO TIPICO	EJES 4-5	

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m
190	100	1.18

Modelo estructura

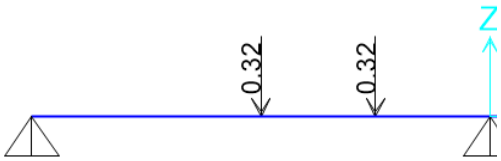


Diagrama de Momen

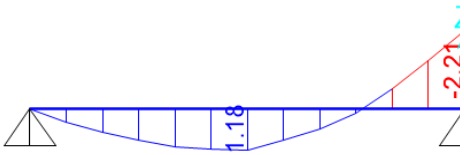
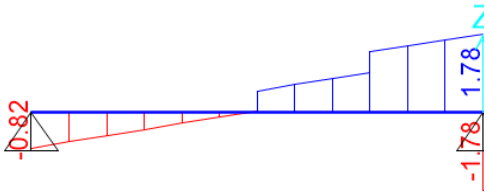
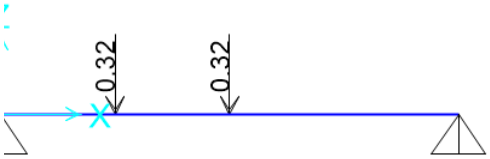


Diagrama de Cortant

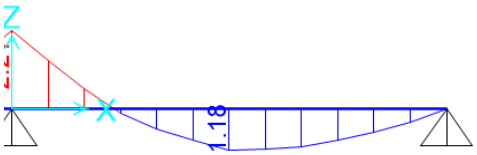


Mu (-) Ton-m	V1 (ton)	V2 (ton)
2.21	1.71	0.92

l (Peso de tabiques)



tos 3-3 (1.4CM+1.7CV)



tes 2-2 (1.4CM+1.7CV)

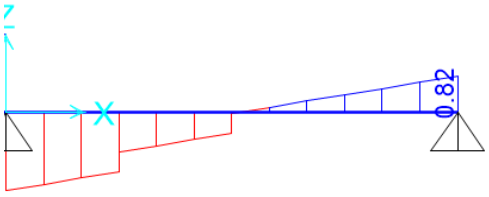


Tabla de momentos admisible

Altura (cm)	Peso propio	V101
17	245	0.760
20	280	0.940
25	335	1.250
30	400	1.560

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V102**

Cálculo del

(-) Mu (ton-m)	bw (cm)	d (cm)
2.21	12	18

Cálculo del

ϕ Vc (ton)	d (cm)	bw (cm)
1.51	17.5	12

Como Vu > ϕ Vc SI Necesita ensanches

Cálculo del

ϕ Vc (ton)	d (cm)	bw (cm)
3.14	17.5	25

es de las viguetas Firth (espaciamiento 0.5 m)

Momentos admisibles ϕMn (ton-m)			
V102	V103	V104	V105
1.030	1.290	1.585	1.965
1.280	1.595	1.965	2.435
1.660	2.100	2.595	3.230
2.020	2.610	3.230	4.020

l acero negativo			
a cm)	As (cm2)	As Colocado (cm2)	
8.3	4.22	4	**2 Φ 5/8"**

cortante último
Vu(ton) a "d" de la cara
1.69

cortante último
Vu(ton) a "d" de la cara
1.69

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	6.0 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
Peso de tabique (kg/m)	648 kg/m
Peso tabique puntual (kg)	324 kg

PISO TIPICO	EJES 4-5	

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	50	0.88	2.07

Modelo estructural (Peso de tabi

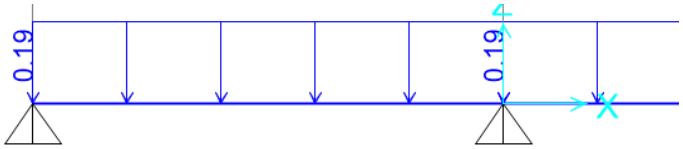


Diagrama de Momentos 3-3 (1.4CM

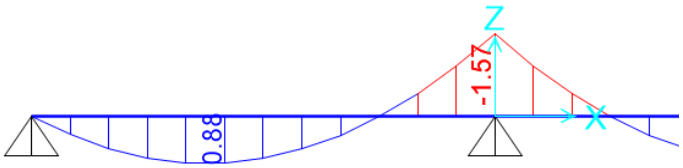
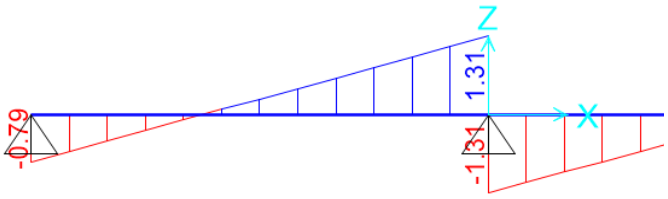
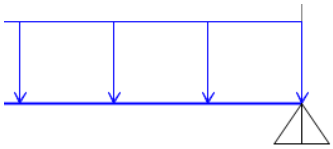


Diagrama de Cortantes 2-2 (1.4CM+

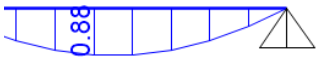


V1 (ton)	V2 (ton)
1.71	0.92

ques)



+1.7CV)



+1.7CV)

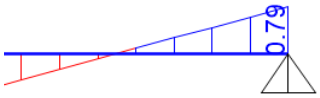


Tabla de momentos admisibles de las vig

Altura (cm)	Peso propio	Momen	
		V101	V102
17	245	0.760	1.030
20	280	**0.940**	1.280
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V101**

Cálculo del acero negativ

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
1.57	11	18	5.9

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	1.7

Como Vu < ϕ Vc No necesita ensanches

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

vo

As (cm2)	As Colocado (cm2)	
2.76	4	**2 Φ 5/8"**

no

d" de la cara
21

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	6.0 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2

PISO TIPICO	EJES 9-10	EJES A-F	EJES 2-3

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	100	1.95	1.95

Diagrama de Momentos 3-3 (1.4CM+

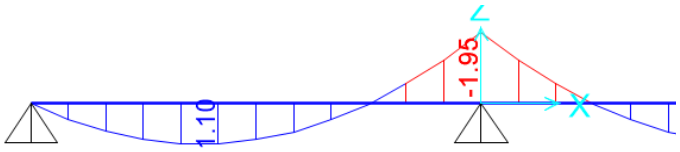
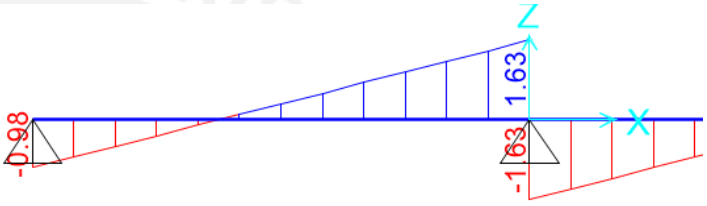
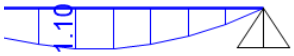


Diagrama de Cortantes 2-2 (1.4CM+



V1 (ton)	V2 (ton)
1.63	0.98

1.7CV)



1.7CV)

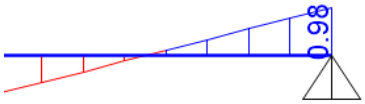


Tabla de momentos admisibles de las vig

Altura (cm)	Peso propio	Momen	
		V101	V102
17	245	0.760	1.030
20	280	0.940	**1.280**
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V102**

Cálculo del acero negativ

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
2.16	11	18	9.1

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	1.4

Como Vu < ϕ Vc No necesita ensanches

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

vo

As (cm2)	As Colocado (cm2)	
4.25	4	**2 Φ 5/8"**

no

d" de la cara
49

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	6.0 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	200 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2

PISO TIPICO	EJES 9-10	EJES A-F	EJES 2-3

CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	100	1.95	1.95

Diagrama de Momentos 3-3 (1.4CM+

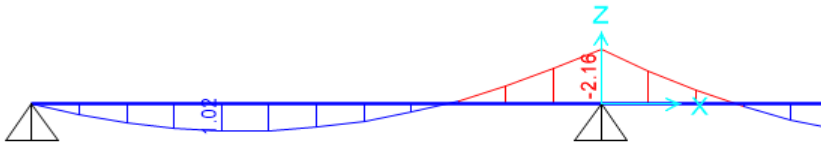
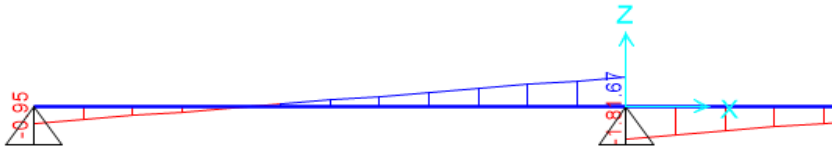
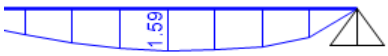


Diagrama de Cortantes 2-2 (1.4CM+



V1 (ton)	V2 (ton)
1.63	0.98

1.7CV)



1.7CV)

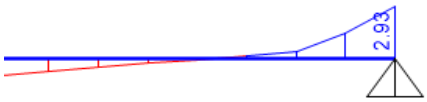


Tabla de momentos admisibles de las vigu

Altura (cm)	Peso propio	Momer	
		V101	V102
17	245	0.760	1.030
20	280	0.940	**1.280**
25	335	1.250	1.660
30	400	1.560	2.020

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V102**

Cálculo del acero negativo

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)
2.16	11	18	9.1

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
1.51	17.5	12	2.

Como Vu > ϕ Vc necesita ensanches

Cálculo del cortante últim

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d
2.26	17.5	18	2.

uetas Firth (espaciamiento 0.5 m)

ntos admisibles ϕMn (ton-m)

V103	V104	V105
1.290	1.585	1.965
1.595	1.965	2.435
2.100	2.595	3.230
2.610	3.230	4.020

o

As (cm2)	As Colocado (cm2)	
4.25	4	**2 Φ 5/8"**

o

d" de la cara

.3

o

d" de la cara

.2

DISEÑO DE ALIGERADO FIRTH

DATOS	
Ln	6.0 m
Espesor	0.2 m
Ancho tributario	0.5 m
Peso	280 kg/m2
Piso terminado	100 kg/m2
Carga viva piso tipico	100 kg/m2
Carga viva azotea	100 kg/m2
f'c	210 kg/m2
As min	0.48 cm2

PISO TIPICO	EJES 9-10	EJES A-F	EJES 2-3
CM (kg/m)	CV (kg/m)	Mu (+) Ton-m	Mu (-) Ton-m
190	50	0.82	1.46

Diagrama de Momentos 3-3 (1.4CM+1.7C

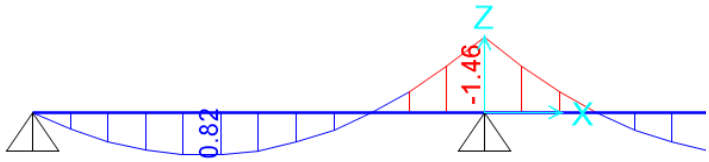
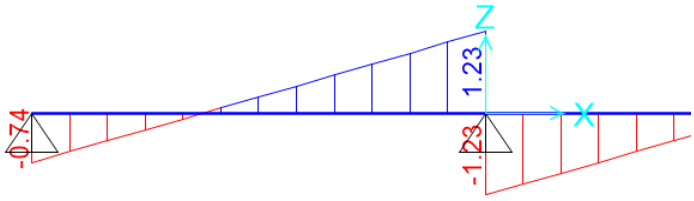
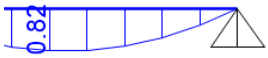


Diagrama de Cortantes 2-2 (1.4CM+1.7CV



V1 (ton)	V2 (ton)
1.23	0.74

V)



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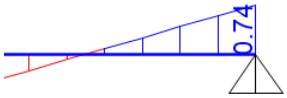


Tabla de momentos admisibles de las viguetas Firth

Altura (cm)	Peso propio	Momentos admisibles		
		V101	V102	V103
17	245	0.760	1.030	1.290
20	280	**0.940**	1.280	1.595
25	335	1.250	1.660	2.100
30	400	1.560	2.020	2.610

Se debe cumplir que **Mu ≤ ϕ Mn**

Se selecciona la vigueta **V101**

Cálculo del acero negativo

(-) Mu (ton-m)	bw (cm)	d (cm)	a cm)	As (cm2)
0.82	11	18	2.8	1.31

Cálculo del cortante último

ϕ Vc (ton)	d (cm)	bw (cm)	Vu(ton) a "d" de la cara
1.51	17.5	12	0.87

Como Vu < ϕ Vc No necesita ensanches

(espaciamiento 0.5 m)

; ϕMn (ton-m)	
V104	V105
1.585	1.965
1.965	2.435
2.595	3.230
3.230	4.020

As Colocado (cm2)	
1.44	**2 Φ 3/8"**

VIGA CIMENTACIÓN VC 08

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 95.23

Para M(+)
Mu = 41.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	95.00	25	90
As(+)	41.00	25	90

Diseño por Corte

$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn)$,
b, d en m

ϕVc (Tn)	14.69
Vu (Tn) a "d" de la cara	24.18
Vu (Tn)	69.00

UTILIZAR ESTRIBOS DE CONFINAMIEN

Distribución Estribos 3/8'': 1@5, 10@10, Rto

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m) 0.9

b (cm) 25

Cuantia minima (cm2)	5.43

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/8'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
31.96	33.95	7.00	35.70
12.16	12.93	3.00	15.30

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	25.4	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

ITO

@ 20

As (+)=As(-)/3	N° Barillas	Diseño
11.90	7	7 ϕ 1''
	3	3 ϕ 1''

VIGA CIMENTACIÓN VC 04

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 5.44

Para M(+)
Mu = 3.10

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	7.91	25	90
As(+)	4.18	25	90

Diseño por Corte

$$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn),$$

b, d en m

ϕVc (Tn)	14.69
Vu (Tn) a "d" de la cara	17.96
Vu (Tn)	21.60

UTILIZAR ESTRIBOS DE CONFINAMIEN

Distribución Estribos 3/8'': 1@5, Rto @ 25

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m) 0.9

b (cm) 25

Cuantia minima (cm2)	5.43

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/4'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
2.22	5.43	3.00	7.44
1.16	5.43	3.00	7.44

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	25.4	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

ITO

As (+)=As(-)/3	N° Barillas	Diseño
2.48	2	2 ϕ 3/4"
	2	2 ϕ 3/4"

VIGA CIMENTACIÓN VC 05

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 22.00

Para M(+)
Mu = 2.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	22.00	25	90
As(+)	2.00	25	90

Diseño por Corte

$$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn),$$

b, d en m

$_{\phi}$Vc (Tn)	14.69
Vu (Tn) a "d" de la cara	14.00
Vu (Tn)	14.00

ESTRIBOS @20

Distribución Estribos 3/8'': 1@5, 10@20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m) 0.9

b (cm) 25

Cuantia minima (cm2)	5.43	2 ϕ 3/4''

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/4'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
6.31	6.70	3.00	10.20
0.56	0.59	1.00	2.48

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	25.4	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

As (+)=As(-)/3	N° Barillas
3.40	2
	0

Diseño

2_{ϕ} 1''

$2\ _{\phi}$ 3/4''

VIGA CIMENTACIÓN VC 01

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 77.00

Para M(+)
Mu = 0.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	77.00	25	90
As(+)	0.00	25	90

Diseño por Corte

$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn)$,
b, d en m

ϕVc (Tn)	14.69
Vu (Tn)	17.70

UTILIZAR ESTRIBOS DE CONFINAMIEN

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m) 0.9

b (cm) 25

Cuantia minima (cm2)	5.43

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/4'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
24.69	26.23	6.00	25.36
0.00	0.00	0.00	0.00

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

ITO

As (+)=As(-)/3	N° Barillas
8.45	6
	3

Diseño

4_{ϕ} 1''+2_{ϕ} 3/4''

$2\ _{\phi}$ 1''

VIGA CIMENTACIÓN VC 03

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 71.70

Para M(+)
Mu = 1.60

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	71.70	25	90
As(+)	0.00	25	90

Diseño por Corte

$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn)$,
b, d en m

ϕVc (Tn)	14.69
Vu (Tn)	7.90

ESTRIBOS @20

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm)	100	d (m)	0.9
b (cm)	25		

Cuantia minima (cm2)	5.43

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/4'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
22.70	24.12	5.00	24.80
0.00	0.00	0.00	0.00

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

As (+)=As(-)/3	N° Barillas
8.27	5
	2

Diseño

5_{ϕ} 1"

2_{ϕ} 1"

VIGA CIMENTACIÓN VC 02

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 76.60

Para M(+)
Mu = 0.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	76.60	25	90
As(+)	0.00	25	90

Diseño por Corte

$$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn),$$

b, d en m

ϕVc (Tn)	14.69
Vu (Tn) a "d" de la cara	40.45
Vu (Tn)	83.05

UTILIZAR ESTRIBOS DE CONFINAMIEN

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m) 0.9

b (cm) 25

Cuantia minima (cm2)	5.43

		Diametero Barra (cm)
As (ϕ1'')	5.10	2.54
As (ϕ3/4'')	2.48	1.91

a (cm)	As	Nº Barillas	As colocado
24.54	26.07	6.00	30.60
0.00	0.00	0.00	0.00

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

ITO

As (+)=As(-)/3	N° Barillas	Diseño
10.20	6	3_{ϕ} 1''+3_{ϕ} 1''
	2	2_{ϕ} 1''

VIGA CIMENTACIÓN VC 07

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 85.60

Para M(+)
Mu = 0.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	42.60	25	90
As(+)	0.00	25	90

Diseño por Corte

$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn)$,
b, d en m

ϕVc (Tn)	14.69
Vu (Tn) a "d" de la cara	8.09
Vu (Tn)	8.09

ESTRIBOS @20

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m)

b (cm) 25

Cuantia minima (cm2)	5.43

As (ϕ1'') 5.10

As (ϕ3/4'') 2.48

a (cm)	As	Nº Barillas	Bastones
12.68	13.47	2.00	2.00
0.00	0.00	0.00	

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

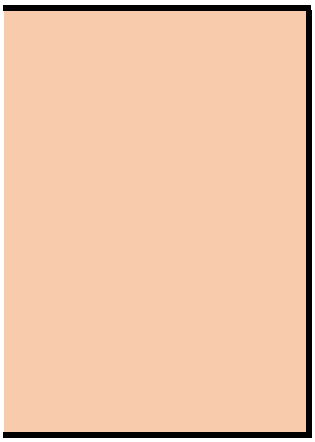
0.9

Diametero Barra (cm)

2.54

1.91

As colocado	As (+)=As(-)/3	N° Barillas	Diseño
15.16	5.05	4	2_ϕ 1"+2_ϕ 3/4"
0.00		2	2_ϕ 3/4"



VIGA CIMENTACIÓN VC 06

Diseño por flexión Pu=135.96

Para M(-)
Mu = Pu*e (ton-m) 40.00

Para M(+)
Mu = 14.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	40.00	25	90
As(+)	14.00	25	90

Diseño por Corte

$$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn),$$

b, d en m

$_{\phi}$Vc (Tn)	14.69
Vu (Tn) a "d" de la cara	11.83
Vu (Tn)	11.83

ESTRIBOS @20

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m)

b (cm) 25

Cuantia minima (cm2)	5.43

As (ϕ1'') 5.10

As (ϕ3/4'') 2.48

a (cm)	As	Nº Barillas	Bastones
11.85	12.59	2.00	2.00
3.96	4.21	2.00	

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

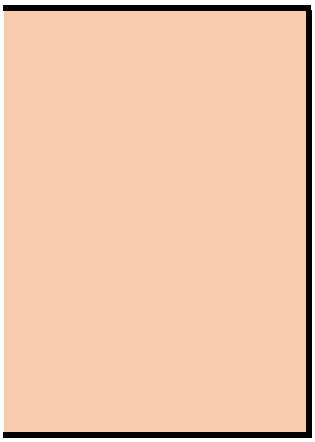
0.9

Diametero Barra (cm)

2.54

1.91

As colocado	As (+)=As(-)/3	N° Barillas	Diseño
15.16	5.05	4	2_ϕ 1"+2_ϕ 3/4"
9.92		2	2_ϕ 3/4"



VIGA CIMENTACIÓN VC 06

Diseño por flexión

Para M(-)
Mu = Pu*e (ton-m) 22.00

Para M(+)
Mu = 5.00

DEL SAP	Mu (Para 1m)	b (cm)	d (cm)
As(-)	22.00	25	90
As(+)	5.00	25	90

Diseño por Corte

$$\emptyset Vc = 0.85 * 0.53 * \sqrt{f'c} * B * d * 10\ (tn),$$

b, d en m

ϕVc (Tn)	14.69
Vu (Tn) a "d" de la cara	14.00
Vu (Tn)	14.00

ESTRIBOS @20

Distribución Estribos 3/8'': 1@5, Rto @20

DISEÑO DE VIGAS DE CIMENTACIÓN

H (cm) 100 d (m)

b (cm) 25

Cuantia minima (cm2)	5.43

As (ϕ1'') 5.10

As (ϕ3/4'') 2.48

a (cm)	As	Nº Barillas	Bastones
6.31	6.70	2.00	0.00
1.39	1.48	1.00	

Estribos de confinamiento S no debe exceder del menor de:

d/4	22.5	cm
10dblong. De menor ϕ	19.1	cm
24db estribo	22.8	cm
30 cm	30	cm
Smax < 0.5d	45	cm

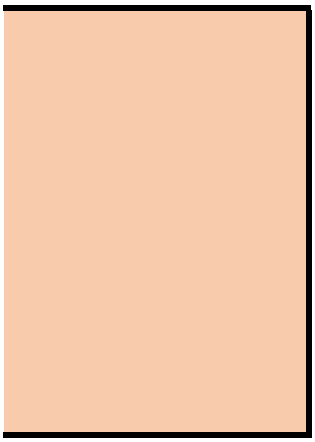
0.9

Diametero Barra (cm)

2.54

1.91

As colocado	As (+)=As(-)/3	N° Barillas	Diseño
10.20	3.40	2	2_{ϕ} 1''
4.96		2	2_{ϕ} 3/4''

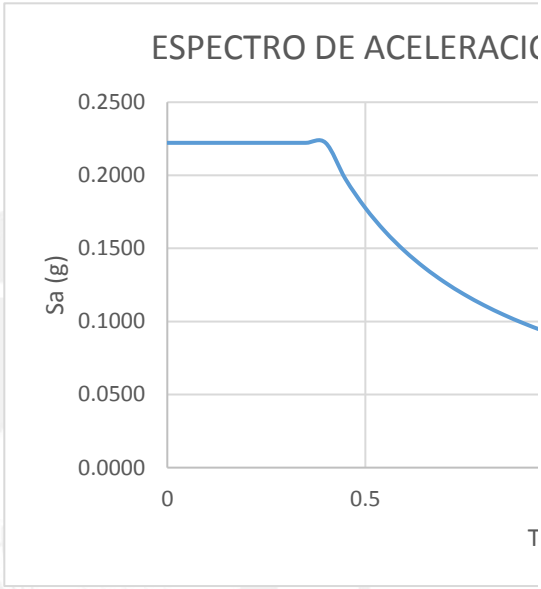


z	0.4
u	1
c	
s	1
R	4.5

tp 0.4

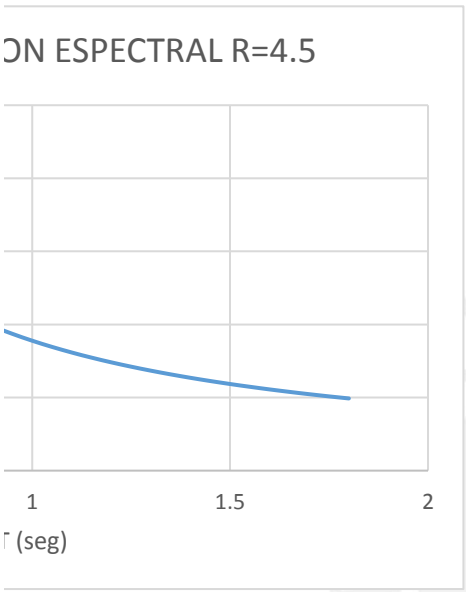
0.5625

C	T	Sa
2.50	0	0.2222
2.50	0.05	0.2222
2.50	0.1	0.2222
2.50	0.15	0.2222
2.50	0.2	0.2222
2.50	0.25	0.2222
2.50	0.3	0.2222
2.50	0.35	0.2222
2.50	0.4	0.2222
2.22	0.45	0.1975
2.00	0.5	0.1778
1.82	0.55	0.1616
1.67	0.6	0.1481
1.54	0.65	0.1368
1.43	0.7	0.1270
1.33	0.75	0.1185
1.25	0.8	0.1111
1.18	0.85	0.1046
1.11	0.9	0.0988
1.05	0.95	0.0936
1.00	1	0.0889
0.95	1.05	0.0847
0.91	1.1	0.0808
0.87	1.15	0.0773
0.83	1.2	0.0741
0.80	1.25	0.0711
0.77	1.3	0.0684
0.74	1.35	0.0658
0.71	1.4	0.0635
0.69	1.45	0.0613
0.67	1.5	0.0593
0.65	1.55	0.0573
0.63	1.6	0.0556
0.61	1.65	0.0539
0.59	1.7	0.0523
0.57	1.75	0.0508
0.56	1.8	0.0494



2.5

3.7037037



ELEMENTO

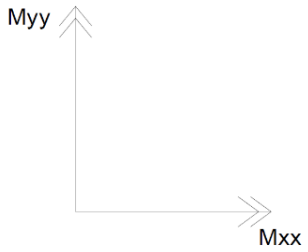
PLACA PL 2

CARGAS

PD	PL	M33: MDx
190.03	42.7	-15.10

CARGAS DE SISMO

SISMO XX		
PS(+)	M33(+x)	M22(+y)
-5.33	-79.20	-8.07



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	232.7
Pserv+Pprop+Pterreno (ton)	244.4
h (peralte zapata)	0.6
Area (m2)	6.43
hzapata (m)	0.6
Lx (m)	3.6
Ly(m)	6.3
Area planteada (m2)	22.68
M33: Inercia (CIMENTACION) m4	75.01
M22: Inercia (CIMENTACION) m4	24.49
Sismo: qadm (ton/m2)	52.0

Volado X(m)

Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Mxx	Myy
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	232.73	-16.16	0.15
2) cargas de gravedad + sismo X	228.47	-79.52	-6.31
3) cargas de gravedad - sismo X	236.99	47.20	6.61
4) cargas de gravedad + sismo Y	228.07	512.69	-5.91
5) cargas de gravedad - sismo Y	237.39	-545.01	6.21

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{Myy}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{Mxx}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	10.27
2) cg + sx	10.23
3) cg - sx	10.61
4) cg + sy	10.20
5) cg - sy	10.62

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.70
d 0.60

σu (ton/m2)	48.25	
A (m2)	22.68	
d (m)=h-0.1	0.6	
Ao (m2)	4.11	variable
bo (m) (perimetro)	11.6	variable
Vu (ton)	895.86	
øVc (ton)	908.75	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	246.8
øVc yy (ton)	141.0

Cortante en X			
Vu = σu * Ly * x (ton)	273.57	Cortante en X	NO PASA
Vu = σu * Ly * x1 (ton)	326.76		NO PASA
Cortante en y			
Vu = σu * Lx * y (ton)	990.06	Cortante en Y	NO PASA

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X		
Mu = X^2*0.5*Ly*σu (ton-m)	341.96	Cuantia minima (cm2)
Para la dirección Y		
Mu = Y^2*0.5*Lx*σu (ton-m)	146.77	

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
54.28	100	60	5.92
40.77	100	60	4.39

DE GRAVEDAD

M33: MLx	M22: MDy	M22: MLy
-1.06	0.15	0.00

(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M33(+x)	M22(+y)
-5.83	661.06	-7.58

SISMO XX	
PS(+)	M33(+x)
-4.26	-63.36

ZAPATA - PL2

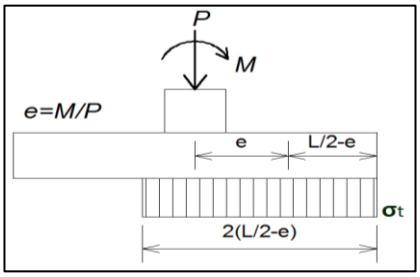
PLACA PL-2

1.5

1.3

σ max (ton/m2)	σ min (ton/m2)	ey	ex
9.59	10.93	0.07	0.00
6.27	13.88	0.35	0.03
12.92	7.98	0.20	0.03
31.15	-11.04	2.25	0.03
-11.96	32.90	2.30	0.03

σ max yy (ton/m2)
10.49
11.32
11.15
35.12
38.60



48.25	OK

$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10\ (tn)$,
b, d en m

X 0.90
X1 1.075

Y 5.7

1.68 Volado menor en X 1.5
1.30

10.8

As	Usar Cuantía min.	As colocado	n° FIERROS	As colocado	S
25.18	NO	5/8" @ 20	8.86	18	12.00
18.66	NO	5/8" @ 20	6.57	14	16.00

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22(+y)	PS(+)	M33(+x)	M22(+y)
-6.46	-4.66	528.85	-6.06

S	
20	
20	

ELEMENTO

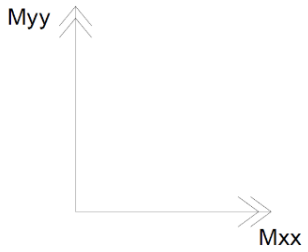
PLACA PL 5

CARGAS

PD	PL	M33: MDy
43.03	6.59	0.00

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-16.65	-0.02	36.68



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	49.6
Pserv+Pprop+Pterreno (ton)	52.1
h (peralte zapata)	0.6
Area (m2)	1.37
hzapata (m)	0.6
Lx (m)	2.8
Ly(m)	2.1
Area planteada (m2)	5.64
M33: Inercia (CIMENTACION) m4	3.55
M22: Inercia (CIMENTACION) m4	1.97
Sismo: qadm (ton/m2)	52.0

Volado X(m)

Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Myy	Mxx
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	49.62	0.00	0.00
2) cargas de gravedad + sismo X	36.30	29.34	-0.02
3) cargas de gravedad - sismo X	62.94	-29.34	0.02
4) cargas de gravedad + sismo Y	40.61	6.78	0.39
5) cargas de gravedad - sismo Y	58.63	-6.78	-0.39

$$\sigma = \frac{Py + Pxs}{A} \pm \frac{(M33) \cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22) \cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{Myy}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{Mxx}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	8.80
2) cg + sx	6.44
3) cg - sx	11.17
4) cg + sy	7.25
5) cg - sy	10.45

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.60
d 0.50

σu (ton/m2)	38.08	
A (m2)	5.64	
d (m)=h-0.1	0.5	
Ao (m2)	1.39	variable
bo (m) (perimetro)	5.2	variable
Vu (ton)	161.86	
øVc (ton)	339.47	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	66.9
øVc yy (ton)	89.8

Cortante en X
Vu = σu * Ly * x (ton) 0.00 Cortante en X **OK**

Cortante en y
Vu = σu * Lx * y (ton) 0.00 Cortante en Y **OK**

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X
Mu = X^2*0.5*Ly*σu (ton-m) 19.13 Cuantia minima (cm2)

Para la dirección Y
Mu = Y^2*0.5*Lx*σu (ton-m) 42.42

Mu (Para 1m)	b (cm)	d (cm)	a (cm)

9.33	100	50	1.18
15.42	100	50	1.96

DE GRAVEDAD

M33: MLy	M22: MDx	M22: MLx
0.00	0.00	0.00

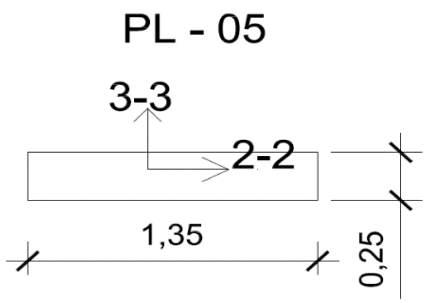
(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22	M33
-11.26	0.49	8.48

SISMO XX	
PS(+)	M33
-13.32	29.34

ZAPATA - PL5

PLACA PL-5

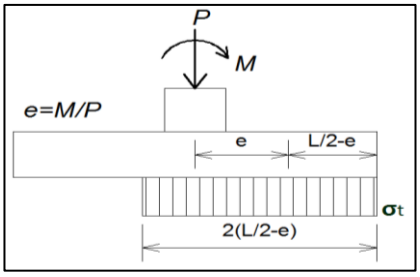


0.7

0.9

σ max (ton/m2)	σ min (ton/m2)	ey	ex
8.80	8.80	0.00	0.00
17.79	-4.91	0.00	0.81
-0.18	22.51	0.00	0.47
10.03	4.37	0.01	0.17
7.57	13.23	0.01	0.12

σ max yy (ton/m2)
8.80
30.47
20.48
8.61
11.72



38.08	OK

$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10\ (tn)$,
b, d en m

X 0.00

Y 0.0

0.70
0.90

10.8

As	Usar Cuantía min.	As colocado

5.00	SI	5/8" @ 20
8.32	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22	PS(+)	M33	M22
-0.02	-9.01	6.78	0.39

ELEMENTO

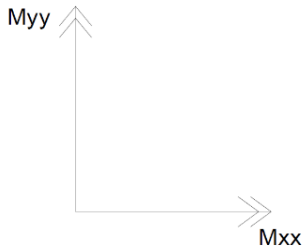
PLACA PL 6

CARGAS

PD	PL	M33: MD
47.82	5.29	0.00

CARGAS DE SISMO

SISMO XX		
PS(+)	M22	M33
-8.90	-0.03	137.79



1. Pre dimensionamiento

1.1. Pre dimensionamiento por cargas de gravedad

Datos

qadm (ton/m2)	40.0
0.95 x qadm (ton/m2)	38.0
Cargas de serv. Axiales (ton)	53.1
Pserv+Pprop+Pterreno (ton)	55.8
h (peralte zapata)	0.6
Area (m2)	1.47
hzapata (m)	0.6
Lx (m)	4.0
Ly(m)	1.4
Area planteada (m2)	5.33
M33: Inercia (CIMENTACION) m4	6.93
M22: Inercia (CIMENTACION) m4	0.81
Sismo: qadm (ton/m2)	52.0

Volado X(m)

Volado Y (m)

1.2. Pre dimensionamiento por cargas de gravedad + cargas de sismo

		Myy	Mxx
CASO	P (TON)	M33 (TON-M)	M22 (TON-M)
1) cargas de gravedad	53.11	0.00	-0.09
2) cargas de gravedad + sismo X	45.99	110.23	-0.11
3) cargas de gravedad - sismo X	60.23	-110.23	-0.07
4) cargas de gravedad + sismo Y	50.05	17.49	0.18
5) cargas de gravedad - sismo Y	56.17	-17.49	-0.36

$$\sigma = \frac{Pg + Psis}{A} \pm \frac{(M33)\cdot Ly/2}{(Lx * Ly^3)/12} \pm \frac{(M22)\cdot Lx/2}{(Ly * Lx^3)/12}$$

1.3. Como existe tracciones en el suelo, empleamos Meyerhoff

$$\sigma \max xx = \frac{P}{2 * \left[\frac{lx}{2} - \frac{Myy}{P}\right] Ly}$$

$$\sigma \max yy = \frac{P}{2 * \left[\frac{ly}{2} - \frac{Mxx}{P}\right] Lx}$$

CASO	σ max-xx (ton/m2)
1) carg grav	9.97
2) cg + sx	8.64
3) cg - sx	11.30
4) cg + sy	9.40
5) cg - sy	10.57

σu (ton/m2)

2. Verificación por punzonamiento

$$V_u = \sigma_u (A - A_o)$$

h 0.60
d 0.50

σu (ton/m2)	24.45	
A (m2)	5.33	
d (m)=h-0.1	0.5	
Ao (m2)	4.11	variable
bo (m) (perimetro)	11.6	variable
Vu (ton)	29.83	
øVc (ton)	757.29	OK

3. Verificación por cortante

$$Vc = 0.53\sqrt{f'c}\, b\, d$$

øVc xx (ton)	44.1
øVc yy (ton)	128.9

Cortante en X
Vu = σu * Ly * x (ton) 0.00 Cortante en X **OK**

Cortante en y
Vu = σu * Lx * y (ton) 9.66 Cortante en Y **OK**

3. Diseño por flexión

volado mayor en X
volado en Y

Para la dirección X
Mu = X^2*0.5*Ly*σu (ton-m) 4.13 Cuantia minima (cm2)

Para la dirección Y
Mu = Y^2*0.5*Lx*σu (ton-m) 17.38

Mu (Para 1m)	b (cm)	d (cm)	a (cm)
3.06	100	50	0.38
4.40	100	50	0.55

DE GRAVEDAD

M33: ML	M22: MD	M22: ML
0.00	-0.07	-0.02

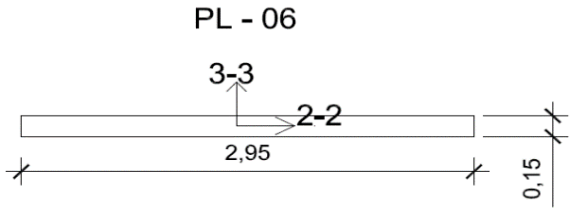
(AMPLIFICADO POR 1.25)

SISMO YY		
PS(+)	M22	M33
-3.82	0.34	21.87

SISMO XX	
PS(+)	M33
-7.12	110.23

ZAPATA - PL6

PLACA PL-6

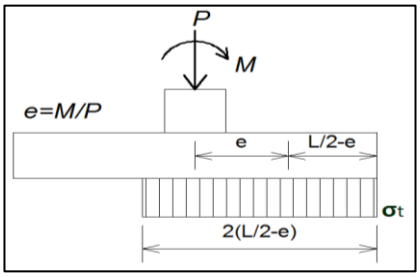


0.5

0.6

σ max (ton/m2)	σ min (ton/m2)	ey	ex
9.88	10.03	0.00	0.00
39.93	-22.68	0.00	2.40
-20.16	42.75	0.00	1.83
14.52	4.25	0.00	0.35
5.25	15.82	0.01	0.31

σ max yy (ton/m2)
9.96
-3.38
-6.60
19.47
19.56



24.45	OK

$\emptyset Vc = 0.85 * 1.06 * \sqrt{f'c} * b_0 * d * 10\ (tn)$,
b, d en m

X 0.00

Y 0.10

0.50
0.60

10.8

As	Usar Cuantía min.	As colocado
1.62	SI	5/8" @ 20
2.34	SI	5/8" @ 20

CARGAS DE SISMO (EN SERVICIO)

	SISMO YY		
M22	PS(+)	M33	M22
-0.02	-3.06	17.49	0.27

M2	M3
-0.069	-10.816
-0.021	-2.199
-0.031	137.791
0.339	21.868

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

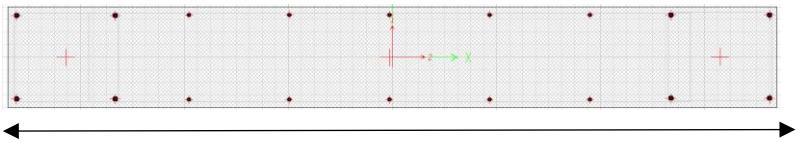
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 1)

1. INGRESO DE DATOS GENERALES

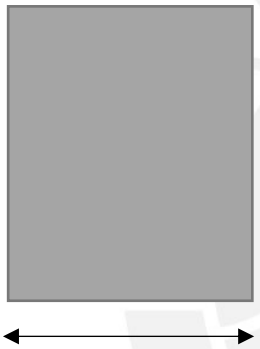
Lm (m)	1.85



t (m)

d (m) = 0.85xLm	1.57

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	1.85

hm/Lm	7.2

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion	1.5 < hm/Lm < 2.	α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**137.21**	(Axial del etabs)
Mua (ton)	**105.47**	(Momento del etabs)
Mn (ton)	**105.47**	(Momento nominal del diagrama de interaccion, al inicio = M
Vua (ton)	**25.83**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**25.83**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	25.66

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	0.19

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	3394.82	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	4820.65	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	8758.65	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

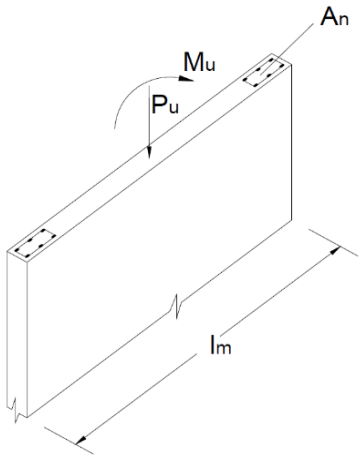
N_u = 137.21 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55\ \phi\ f'c\ Ag\ [1 - (k\ lc\ /\ 32\ h)^2]$$

ϕ Pnw = 332.9 ton > Pu = 137.21 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F

F = Momento máximo de las combinaciones / Longitud de l

As = F / Fy

Mu	105.5 ton-m
Long.	1.85 m
F	57.0 ton
Fy	4200 kg/cm2
As	13.6 cm2

0.25

0.80
0.53
1.205

0.53

u)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28

a placa

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348
2	-670.8143	63.2875	0.0348	-670.8143	53.2814	0.7005
3	-670.8143	105.1621	0.0348	-670.8143	98.3989	0.6783
4	-641.5291	140.5315	0.0348	-649.6923	135.9128	0.7087
5	-581.1739	168.9569	0.0348	-587.0953	166.2397	0.7317
6	-519.6315	190.7851	0.0348	-523.3802	189.2905	0.7502
7	-456.0831	206.2358	0.0348	-457.7927	205.3666	0.7626
8	-390.2673	215.6071	0.0348	-389.7253	214.8109	0.7981
9	-326.7847	215.0055	0.0348	-323.739	214.1584	0.7582
10	-265.5572	204.2404	3.44E-02	-260.0955	202.3961	0.775
11	-203.4085	184.5623	0.0322	-195.8284	181.1874	0.7908
12	-140.9236	156.1552	0.0285	-131.1564	150.7289	0.7832
13	-79.9197	123.406	0.0221	-70.1595	119.2733	0.8345
14	-8.0869	86.5885	3.16E-04	9.7659	73.1912	1.0262
15	92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P1	LIVE	Top	-17.62	0.64	0
PISO1	P1	LIVE	Bottom	-17.62	0.64	0
PISO1	P1	DEAD-SQ	Top	-75.08	3.64	0
PISO1	P1	DEAD-SQ	Bottom	-75.08	3.64	0
PISO1	P1	RX MAX	Top	3.6	9.1	0.45
PISO1	P1	RX MAX	Bottom	3.6	9.1	0.45
PISO1	P1	RX MIN	Top	-3.6	-9.1	-0.45
PISO1	P1	RX MIN	Bottom	-3.6	-9.1	-0.45
PISO1	P1	RY MAX	Top	4.39	22.58	0.44
PISO1	P1	RY MAX	Bottom	4.39	22.58	0.44
PISO1	P1	RY MIN	Top	-4.39	-22.58	-0.44
PISO1	P1	RY MIN	Bottom	-4.39	-22.58	-0.44

1.4CM+1.7CV	135.07	Tn	RX
1.25(CM+CV)	115.88	Tn	

CM	M22	0.07	Tn.m	RY
	M33	4.43	Tn.m	
CV	M22	0.01	Tn.m	
	M33	1.12	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	135.07	0.11	8.10
1.25(CM+CV)+CS	119.48	-1.79	46.93
1.25(CM+CV)-CS	112.28	1.98	-33.07
0.9CM+CS	71.17	-1.82	43.98
0.9CM-CS	63.97	1.95	-38.99

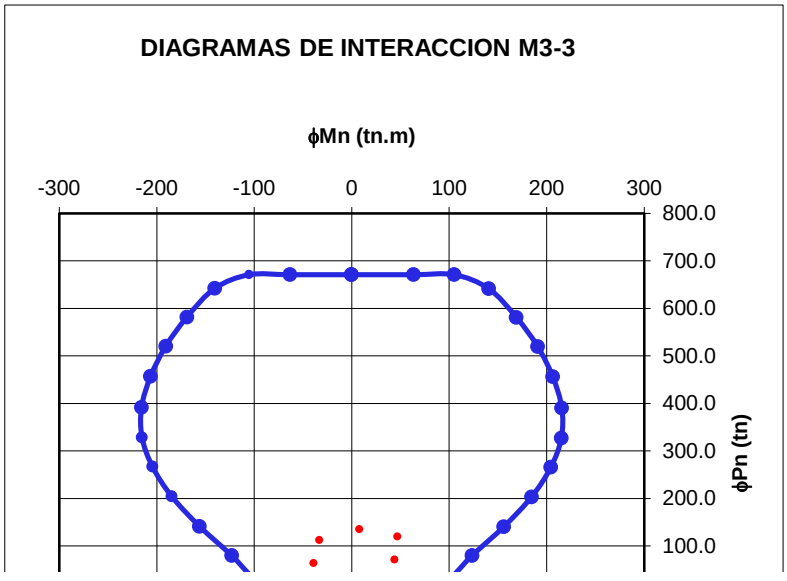
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

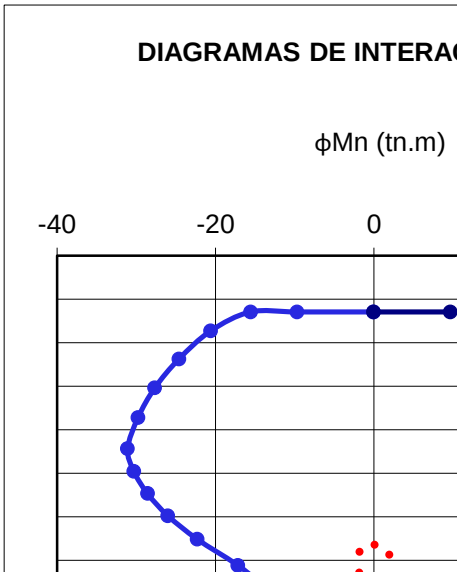
MOMENTO MINIMO DE DISEÑO

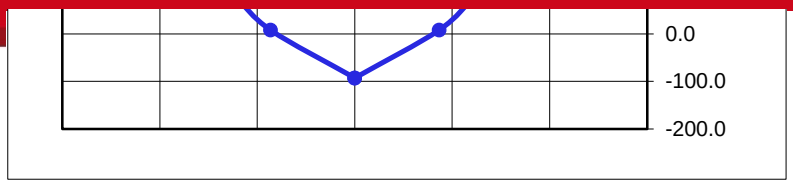
PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	670.8	-0.1	670.8	-0.1
2	670.8	63.3	670.8	-63.4
3	670.8	105.2	670.8	-105.2
4	641.5	140.5	642.0	-140.5
5	581.2	169.0	581.8	-168.9
6	519.6	190.8	520.4	-190.8
7	456.1	206.2	457.1	-206.3
8	390.3	215.6	391.5	-215.7
9	326.8	215.0	328.0	-215.1
10	265.6	204.2	266.6	-204.3
11	203.4	184.6	204.3	-184.6
12	140.9	156.2	141.5	-156.2
13	79.9	123.4	80.2	-123.2
14	8.1	86.6	7.8	-86.1
15	-92.7	0.1	-92.7	0.1

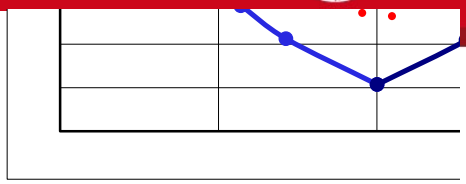
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

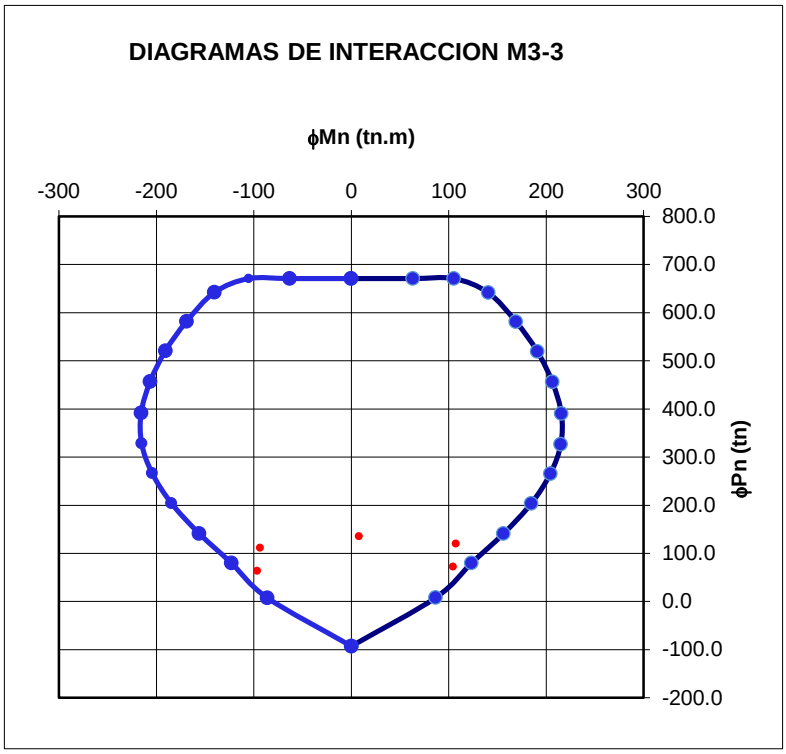


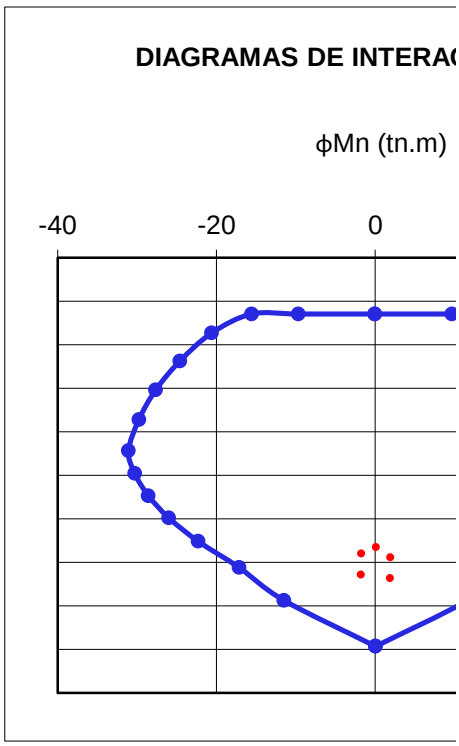






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143
-670.8143	41.4491	1.4299	-670.8143	31.5186	1.7246	-670.8143
-670.8143	89.8988	1.4526	-670.8143	77.52	2.4952	-670.8143
-658.9345	130.3301	1.4925	-670.8143	122.3306	2.5228	-670.8143
-593.8361	162.8424	1.532	-602.7934	157.8177	2.6042	-618.2651
-527.4914	187.3999	1.5585	-533.2003	184.4539	2.6625	-542.3833
-459.5822	204.2328	1.6049	-461.6943	202.2495	2.7611	-464.7568
-388.9032	213.6498	1.6802	-387.4853	211.5908	2.885	-384.6402
-320.0027	212.5472	1.6347	-315.0769	210.0686	2.8249	-306.5495
-253.7104	199.999	1.6312	-245.0952	196.3206	2.7785	-229.8746
-187.1931	177.0051	1.6482	-175.2904	170.5593	2.8197	-153.9662
-119.978	144.114	1.6413	-103.9268	133.4343	2.9005	-79.8635
-56.4362	112.261	2.0084	-35.5948	99.7971	3.7373	-3.3279
31.5511	54.2433	2.31	50.3108	37.5126	3.0613	60.6185
92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708

T	M2	M3
-0.002	0.007	-0.572
-0.002	0.008	1.118
-0.008	0.058	-5.215
-0.008	0.069	4.426
0.137	0.727	16.775
0.137	1.883	40.001
-0.137	-0.727	-16.775
-0.137	-1.883	-40.001
0.337	0.755	42.777
0.337	1.837	100.536
-0.337	-0.755	-42.777
-0.337	-1.837	-100.536

P	3.60	Tn
M22	-1.88	Tn.m
M33	40.00	Tn.m

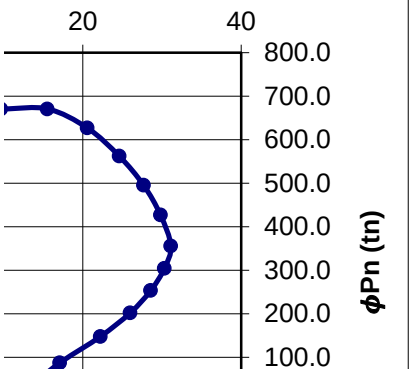
P	4.39	Tn
M22	-1.84	Tn.m
M33	100.54	Tn.m

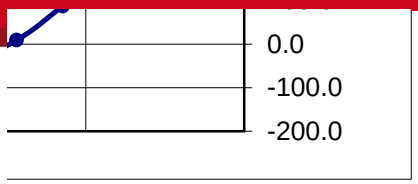
COMBINACIONES SISMO EN Y		
P	M22	M33

135.07	0.11	8.10
120.27	-1.74	107.47
111.49	1.93	-93.61
71.96	-1.77	104.52
63.18	1.90	-96.55

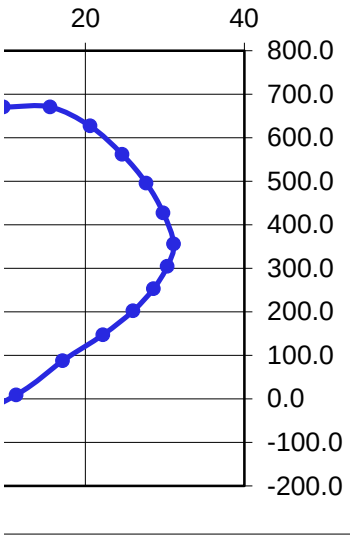
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
670.8	0.0	670.8	0.0
670.8	-9.7	670.8	9.7
670.8	-15.6	670.8	15.5
627.3	-20.6	627.1	20.6
562.5	-24.6	562.2	24.6
496.3	-27.6	496.0	27.7
427.9	-29.8	427.6	29.8
356.6	-31.1	356.2	31.1
304.5	-30.3	304.5	30.3
253.4	-28.6	253.4	28.6
202.3	-26.0	202.3	26.0
148.5	-22.3	147.6	22.2
88.5	-17.2	87.5	17.1
12.7	-11.5	9.3	11.3
-92.7	0.0	-92.7	0.0

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931
25.3473	1.7082	-670.8143	19.6146	1.8983	-670.8143	0.0239
58.8675	3.7393	-670.8143	42.6241	4.3034	-670.8143	3.37E-02
106.4943	4.3414	-670.8143	75.5824	7.0523	-627.3098	4.89E-02
147.672	4.4563	-654.8705	114.7126	9.0932	-562.5039	0.0673
178.1005	4.5901	-565.7027	154.3213	9.682	-496.2546	0.0904
197.9039	4.7303	-471.7739	179.9444	10.0022	-427.9486	1.20E-01
207.3522	4.9193	-374.8954	189.2497	10.3918	-356.5683	1.59E-01
204.3374	4.8893	-283.3646	180.6002	10.5241	-304.4867	2.80E-03
187.7052	4.8289	-190.6848	155.8291	10.35	-253.3986	2.80E-03
157.1576	4.8976	-104.4023	117.5643	9.6556	-202.3104	2.80E-03
118.0186	5.278	-40.1218	91.2453	9.2528	-148.5391	0.3633
78.0518	5.9883	22.4198	55.4633	6.6831	-88.522	0.5589
28.2525	3.1257	66.3397	22.9403	2.7257	-12.7182	1.4124
0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348
9.6721	-670.8143	-19.7233	1.8776	-670.8143	-25.4883	1.6797
15.5508	-670.8143	-42.7535	4.2849	-670.8143	-58.9777	3.7071
20.5913	-670.8143	-75.7129	7.0357	-670.8143	-106.5745	4.3061
24.6108	-654.7459	-114.8671	9.0712	-618.5652	-147.7237	4.4215
27.6497	-565.4957	-154.458	9.6549	-542.7319	-178.1369	4.5495
29.7708	-471.5007	-179.9861	9.9713	-465.1623	-197.9252	4.6825
31.0786	-374.5534	-189.161	10.3552	-385.1255	-207.3528	4.8679
30.2974	-283.1273	-180.3925	10.4912	-307.0527	-204.2821	4.8342
28.5689	-190.5234	-155.5043	10.3199	-230.3226	-187.5996	4.7829
25.9936	-104.2335	-117.1154	9.6284	-154.2844	-156.9726	4.8527
22.2948	-39.8321	-90.7072	9.251	-79.9447	-117.6877	5.2478
17.1582	22.4932	-55.0549	6.6398	-3.167	-77.5801	5.9589
11.4805	67.2786	-21.8963	2.6053	61.173	-27.525	3.0434
-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143
-670.8143	-31.6427	1.6953	-670.8143	-41.5468	1.4011	-670.8143
-670.8143	-77.576	2.4647	-670.8143	-89.9413	1.4216	-670.8143
-670.8143	-122.375	2.4877	-659.3661	-130.3413	1.4592	-650.0519
-603.2693	-157.8423	2.5642	-594.3991	-162.8493	1.4906	-587.6951
-533.769	-184.4748	2.6156	-528.1717	-187.405	1.5102	-524.1432
-462.3396	-202.2573	2.709	-460.4173	-204.2626	1.5504	-458.6241
-388.2877	-211.6251	2.8267	-389.88	-213.6868	1.6193	-390.8577
-315.8972	-210.089	2.7602	-320.9841	-212.5851	1.5676	-324.8409
-245.8397	-196.2854	2.7166	-254.5686	-200.0199	1.5611	-260.9453
-175.7953	-170.475	2.7671	-187.8795	-177.0169	1.5884	-196.607
-104.2948	-133.271	2.8579	-120.4046	-144.0084	1.575	-131.5694
-35.4777	-99.3649	3.7129	-56.548	-111.9175	1.9602	-70.4065
50.8679	-36.7595	3.0339	31.9929	-53.5655	2.2733	10.1394
92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931
-53.3752	0.6713	-670.8143	-63.3733	7.12E-03	-670.8143	-53.3645
-98.4371	0.6481	-670.8143	-105.1929	4.36E-03	-670.8143	-98.4124
-135.9715	0.6869	-642.0473	-140.519	-1.47E-04	-650.1175	-135.9394
-166.2197	0.6922	-581.8291	-168.9268	-5.55E-03	-587.7881	-166.1869
-189.2877	0.7009	-520.4348	-190.7576	-1.22E-02	-524.2651	-189.2604
-205.4084	0.7207	-457.1243	-206.2608	-0.0204	-458.7774	-205.3926
-214.8678	0.7331	-391.512	-215.6646	-0.0311	-391.0458	-214.8684
-214.2087	0.6894	-328.0239	-215.0792	-0.0369	-325.0082	-214.2297
-202.4037	0.7167	-266.6222	-204.3036	-0.0369	-261.0883	-202.4406
-181.2313	0.7304	-204.3479	-184.6256	-0.0369	-196.7215	-181.2773
-150.6515	0.7065	-141.5199	-156.1715	-0.0369	-131.6556	-150.6985
-119.0186	0.7724	-80.189	-123.1626	-0.0384	-70.4597	-119.0416
-72.5507	0.9842	-7.8109	-86.1134	-0.0467	10.0964	-72.585
0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348
-0.6556	-670.8143	-41.5213	-1.3849	-670.8143	-31.6283	-1.6743
-0.6388	-670.8143	-89.8844	-1.4107	-670.8143	-77.469	-2.4517
-0.6856	-659.508	-130.2683	-1.4561	-670.8143	-122.2394	-2.4832
-0.7015	-594.6003	-162.775	-1.4979	-603.6187	-157.7051	-2.5689
-0.7232	-528.4345	-187.3436	-1.5304	-534.2243	-184.3624	-2.6329
-0.7594	-460.7463	-204.2275	-1.5867	-462.9116	-202.197	-2.7417
-0.7929	-390.2865	-213.6918	-1.6762	-388.9892	-211.6386	-2.8797
-0.7623	-321.3436	-212.6339	-1.6386	-316.5174	-210.1814	-2.8285
-0.7903	-254.8762	-200.1035	-1.6346	-246.379	-196.4355	-2.7903
-0.8044	-188.1261	-177.1203	-1.6623	-176.2265	-170.6683	-2.8403
-0.7802	-120.5956	-144.1145	-1.649	-104.6319	-133.47	-2.9309
-0.8517	-56.6794	-111.9824	-2.0417	-35.7316	-99.5087	-3.7971
-1.0796	31.8986	-53.6434	-2.369	50.7452	-36.8602	-3.1327
-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143
-670.8143	-25.4903	-1.6537	-670.8143	-19.7578	-1.8425	-670.8143
-670.8143	-58.8419	-3.6845	-670.8143	-42.6299	-4.2408	-670.8143
-670.8143	-106.3118	-4.2979	-670.8143	-75.3847	-6.9903	-627.0728
-619.1757	-147.4624	-4.4219	-655.9077	-114.3301	-9.0447	-562.2407
-543.5254	-177.9269	-4.5618	-567.2194	-153.9064	-9.6563	-495.9587
-466.1512	-197.8154	-4.7096	-473.6372	-179.7248	-9.9835	-427.6108
-386.3405	-207.3953	-4.9136	-377.1446	-189.322	-10.3822	-356.1749
-308.1216	-204.4779	-4.8954	-285.3938	-180.9563	-10.5308	-304.4867
-231.129	-187.838	-4.8684	-192.4536	-156.3318	-10.3777	-253.3986
-155.0453	-157.3361	-4.9255	-105.6164	-117.8197	-9.7254	-202.2967
-80.4035	-117.8702	-5.314	-40.7314	-91.1138	-9.3501	-147.6211
-3.5338	-77.8062	-6.0591	22.0404	-55.3698	-6.7702	-87.5124
61.0443	-27.6268	-3.1496	67.0897	-22.0429	-2.7191	-9.3301
92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0931	0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931
-0.132	-9.6508	-670.8143	19.5924	-1.8334	-670.8143	25.3473
-0.1363	-15.5332	-670.8143	42.6	-4.2397	-670.8143	58.8675
-0.1381	-20.5808	-670.8143	75.5204	-6.9946	-670.8143	106.4943
-0.1402	-24.609	-654.7837	114.6442	-9.0385	-618.2407	147.6555
-0.1429	-27.6586	-565.6057	154.2449	-9.631	-542.356	178.0822
-1.46E-01	-29.7935	-471.6642	179.8579	-9.9559	-464.7261	197.8833
-1.51E-01	-31.1196	-374.769	189.15	-10.3516	-384.586	207.3113
2.80E-03	-30.2995	-283.2171	180.4839	-10.4916	-306.4671	204.2724
2.80E-03	-28.571	-190.5079	155.6895	-10.3273	-229.7635	187.619
-8.04E-03	-25.9943	-104.0704	117.3156	-9.6384	-153.7807	157.0185
-0.3606	-22.2075	-39.6479	90.9629	-9.2748	-79.6653	117.9137
-0.5371	-17.1074	22.7042	55.2723	-6.6717	-3.0138	77.8504
-1.3191	-11.2641	67.4774	22.0433	-2.657	61.1091	27.8826
0.1269	-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0.0348	-670.8143	-0.0931	0.0348	-670.8143	-0.0931	0.0348
-1.6386	-670.8143	31.5186	-1.6551	-670.8143	41.4491	-1.3604
-3.6697	-670.8143	77.52	-2.4256	-670.8143	89.8988	-1.383
-4.2718	-670.8143	122.3306	-2.4532	-658.9345	130.3301	-1.4229
-4.3899	-602.7934	157.8177	-2.5346	-593.8361	162.8424	-1.4624
-4.525	-533.2003	184.4539	-2.5929	-527.4914	187.3999	-1.4889
-4.6669	-461.6751	202.2366	-2.6943	-459.5822	204.2328	-1.5353
-4.8601	-387.4633	211.576	-2.8198	-388.8898	213.6408	-1.6125
-4.8365	-315.0512	210.0513	-2.7619	-319.9872	212.5367	-1.5686
-4.7816	-245.0335	196.2791	-2.7154	-253.6731	199.9739	-1.5658
-4.8563	-175.1746	170.4726	-2.7675	-187.1464	176.9737	-1.5882
-5.2578	-103.7725	133.3186	-2.8615	-119.9157	144.0722	-1.59
-5.9905	-35.3408	99.6518	-3.727	-56.3004	112.1868	-1.9797
-3.1203	50.7077	37.1996	-3.0974	31.7915	54.0538	-2.3292
-0.0474	92.6708	0.1269	-0.0474	92.6708	0.1269	-0.0474

Curve 24	345. degrees	
P	M3	M2
-670.8143	-0.0931	0.0348
-670.8143	53.2814	-0.6309
-670.8143	98.3989	-0.6087
-649.6923	135.9128	-0.6391
-587.0953	166.2397	-0.6621
-523.3802	189.2905	-0.6806
-457.7927	205.3666	-0.693
-389.7253	214.8109	-0.7285
-323.7315	214.1534	-0.6897
-260.0775	202.384	-0.7078
-195.8059	181.1723	-0.7285
-131.1264	150.7087	-0.729
-70.1202	119.2564	-0.7922
9.8816	73.1	-1.0333
92.6708	0.1269	-0.0474

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

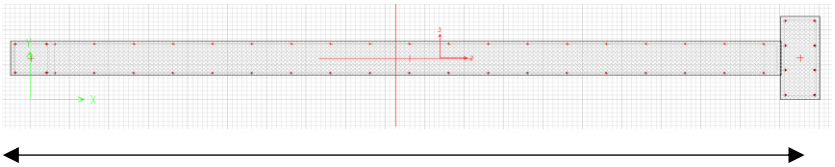
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 2)

1. INGRESO DE DATOS GENERALES

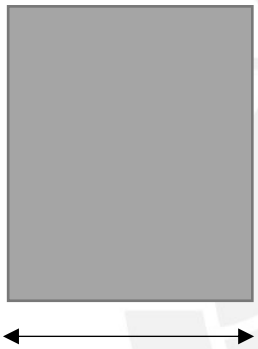
Lm (m)	4.5



t (m)

d (m) = 0.85xLm	3.83

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	4.5

hm/Lm	2.9

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**338.63**	(Axial del etabs)
Mua (ton)	**775.93**	(Momento del etabs)
Mn (ton)	**775.93**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**106.45**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**106.45**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	62.43

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	51.79

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	31.02	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	44.05	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	80.03	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

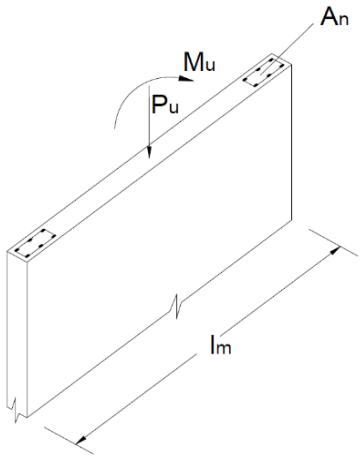
N_u = 334.55 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55\ \phi\ f'c\ Ag\ [1 - (k\ lc\ /\ 32\ h)^2]$$

ϕ Pnw = 809.8 ton > Pu = 334.55 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F

F = Momento máximo de las combinaciones / Longitud de

As = F / Fy

Mu	775.9 ton-m
Long.	4.50 m
F	172.4 ton
Fy	4200 kg/cm2
As	41.1 cm2

0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28

e la placa

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562
2	-1960	490.2218	-0.0776	-1960	465.4051	0.5423
3	-1960	834.8322	-2.77E-02	-1960	820.0536	0.6358
4	-1919	1127.7547	0.0279	-1922	1121.1858	0.7028
5	-1754	1369.1556	0.0899	-1754	1368.0131	0.7631
6	-1587	1559.6094	0.159	-1583	1561.4948	0.862
7	-1415	1701.184	0.2389	-1408	1703.3831	0.9595
8	-1238	1796.7897	0.3346	-1227	1796.5343	1.067
9	-1065	1817.9068	0.4178	-1050	1813.9605	1.1203
10	-895.9397	1764.3059	0.4893	-877.2939	1753.0348	1.1847
11	-727.0426	1646.4624	0.5609	-704.9274	1625.0843	1.2625
12	-558.2591	1464.6192	0.6322	-532.3246	1430.1823	1.3443
13	-389.3064	1218.4969	0.704	-358.5912	1165.5333	1.6754
14	-226.4597	945.4518	0.8078	-188.9501	886.958	3.8701
15	228.2628	14.3929	0.3492	228.2628	14.3929	0.3492

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P2	LIVE	Top	-42.7	2.46	-0.02
PISO1	P2	LIVE	Bottom	-42.7	2.46	-0.02
PISO1	P2	DEAD-SQ	Top	-185.7	15.32	-0.39
PISO1	P2	DEAD-SQ	Bottom	-185.7	15.32	-0.39
PISO1	P2	RX MAX	Top	11.08	25.5	6.93
PISO1	P2	RX MAX	Bottom	11.08	25.5	6.93
PISO1	P2	RX MIN	Top	-11.08	-25.5	-6.93
PISO1	P2	RX MIN	Bottom	-11.08	-25.5	-6.93
PISO1	P2	RY MAX	Top	12.16	77.25	7.65
PISO1	P2	RY MAX	Bottom	12.16	77.25	7.65
PISO1	P2	RY MIN	Top	-12.16	-77.25	-7.65
PISO1	P2	RY MIN	Bottom	-12.16	-77.25	-7.65

1.4CM+1.7CV	332.57	Tn	
1.25(CM+CV)	285.50	Tn	

CM	M22	-0.23	Tn.m
	M33	-33.89	Tn.m
CV	M22	0.00	Tn.m
	M33	-1.07	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	332.57	-0.31	-49.26
1.25(CM+CV)+CS	296.58	-15.53	229.02
1.25(CM+CV)-CS	274.42	14.97	-316.42
0.9CM+CS	178.21	-15.45	242.22
0.9CM-CS	156.05	15.05	-273.68

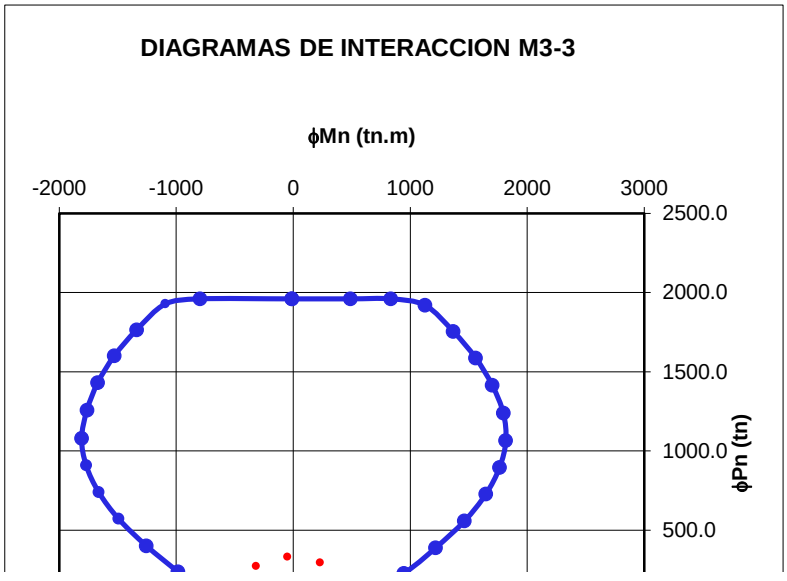
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

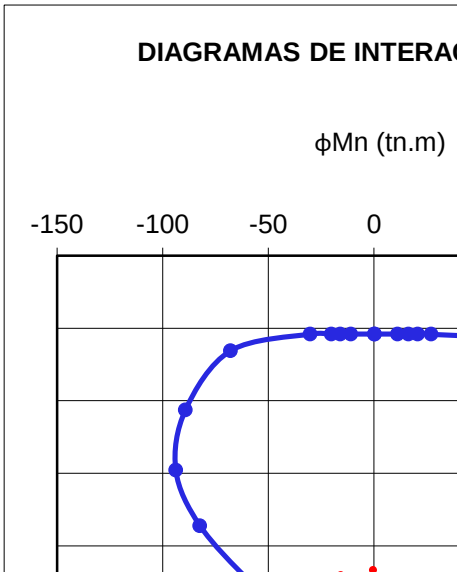
MOMENTO MINIMO DE DISEÑO

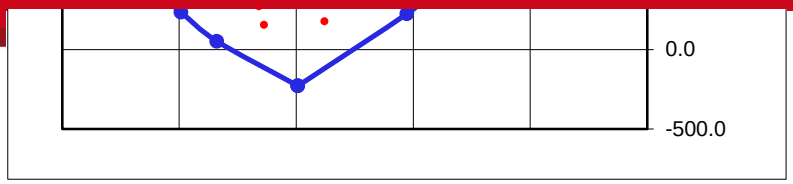
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	1960.0	-10.6	1960.0	-10.6
2	1960.0	490.2	1960.0	-795.4
3	1960.0	834.8	1928.0	-1093.0
4	1919.0	1127.8	1765.0	-1338.0
5	1754.0	1369.2	1600.0	-1530.0
6	1587.0	1559.6	1431.0	-1671.0
7	1415.0	1701.2	1258.0	-1763.0
8	1238.0	1796.8	1079.0	-1809.0
9	1065.0	1817.9	908.6	-1770.0
10	895.9	1764.3	739.9	-1663.0
11	727.0	1646.5	571.3	-1493.0
12	558.3	1464.6	401.0	-1255.0
13	389.3	1218.5	237.5	-985.7
14	226.5	945.5	53.8	-677.7
15	-228.3	14.4	-228.3	14.4

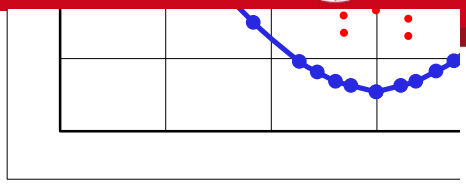
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

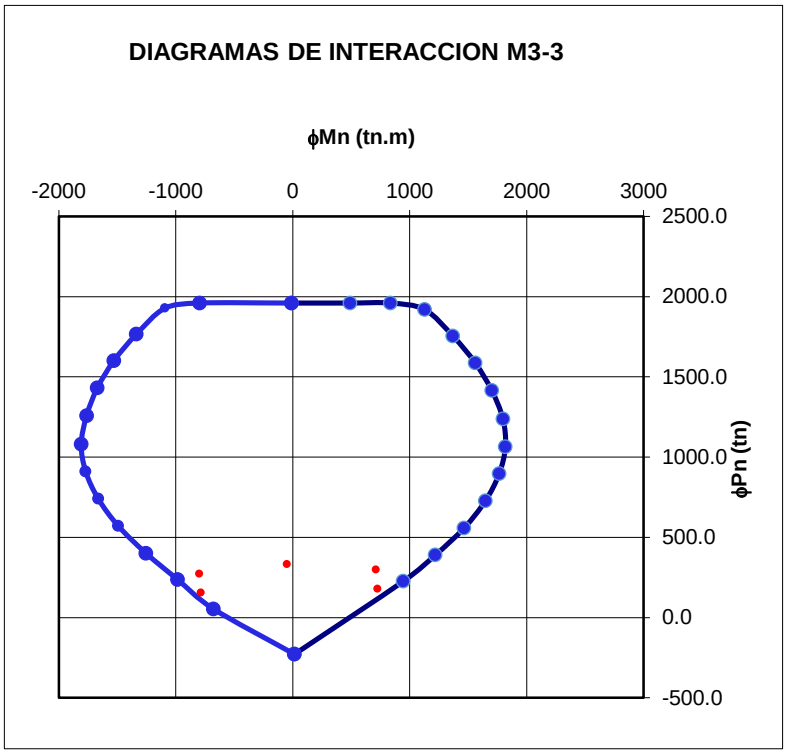


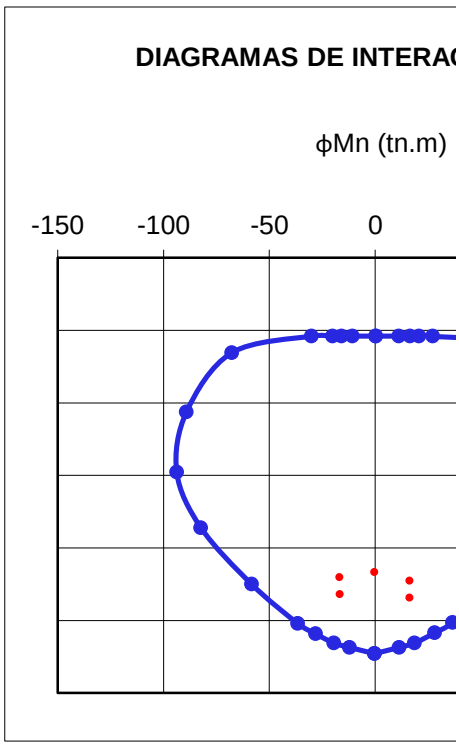






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960
-1960	435.3396	1.2966	-1960	394.2879	2.288	-1960
-1960	802.7052	1.3976	-1960	778.7042	2.4254	-1960
-1926	1113.6012	1.4666	-1931	1102.6327	2.5199	-1941
-1754	1366.6879	1.5537	-1754	1364.6055	2.6282	-1753
-1579	1563.5069	1.6675	-1573	1565.7553	2.7535	-1562
-1400	1705.5564	1.7916	-1388	1707.9058	2.903	-1367
-1214	1795.7446	1.9235	-1197	1793.7431	3.0886	-1166
-1032	1808.6159	1.9128	-1009	1799.7362	3.0144	-966.4774
-855.7176	1738.6867	1.9996	-826.1675	1716.7308	3.1424	-772.6703
-679.1657	1598.6776	2.0718	-643.0166	1557.5195	3.4401	-577.7536
-501.6521	1386.4808	2.3461	-457.9068	1319.0659	4.1347	-379.5789
-321.0006	1097.0783	3.1182	-265.7133	991.1227	6.2116	-128.1002
-95.0999	721.162	18.5195	15.6278	503.2349	30.0635	92.5643
228.2628	14.3929	0.3492	228.2628	14.3929	0.3492	228.2628

T	M2	M3
-0.056	0.059	-7.588
-0.056	0.002	-1.066
-0.914	0.818	-74.492
-0.914	-0.225	-33.894
12.509	3.223	207.614
12.509	15.251	272.724
-12.509	-3.223	-207.614
-12.509	-15.251	-272.724
15	4.045	562.341
15	16.489	755.588
-15	-4.045	-562.341
-15	-16.489	-755.588

P	**11.08**	Tn
M22	**-15.25**	Tn.m
M33	**272.72**	Tn.m

P	**12.16**	Tn
M22	**-16.49**	Tn.m
M33	**755.59**	Tn.m

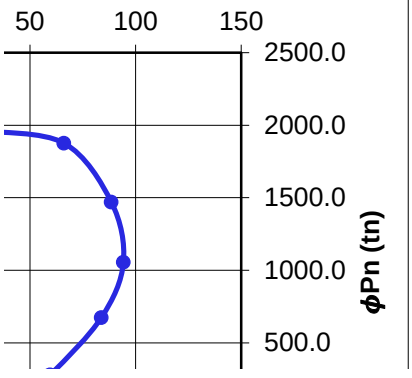
COMBINACIONES SISMO EN Y

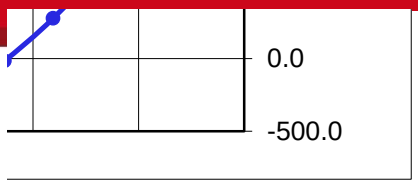
P	M22	M33

332.57	-0.31	-49.26
297.66	-16.77	711.89
273.34	16.21	-799.29
179.29	-16.69	725.08
154.97	16.29	-786.09

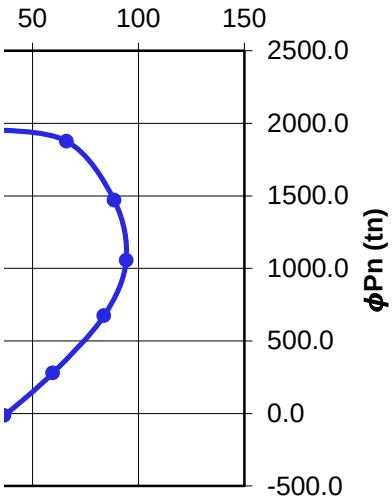
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1960.0	0.3	1960.0	0.3
1960.0	-10.8	1960.0	11.2
1960.0	-15.9	1960.0	16.4
1960.0	-20.2	1960.0	20.7
1960.0	-30.1	1960.0	27.1
1845.0	-67.8	1877.0	66.1
1437.0	-89.2	1470.0	88.5
1022.0	-93.8	1055.0	94.2
639.5	-82.3	673.5	83.8
251.1	-58.5	279.1	59.6
-19.7	-36.6	-14.3	36.5
-92.0	-28.1	-84.9	28.1
-155.8	-19.5	-155.8	18.5
-185.2	-12.2	-185.2	11.4
-228.3	-0.3	-228.3	-0.3

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602
319.5966	4.0445	-1960	229.5703	4.989	-1960	-58.1439
735.7691	4.1685	-1960	608.2983	9.0155	-1960	-100.2198
1082.672	4.335	-1960	1019.8188	9.4344	-1960	-141.7732
1360.1532	4.4764	-1749	1339.1472	9.8257	-1960	-168.7075
1568.828	4.6424	-1531	1564.9029	10.2895	-1845	-109.1492
1710.4917	4.8273	-1307	1698.351	10.8968	-1437	-47.3002
1787.0154	5.1538	-1077	1741.8377	11.6778	-1022	15.2151
1777.7826	5.199	-848.578	1680.6839	11.9384	-639.5099	83.9439
1668.1102	5.6464	-622.5498	1489.4448	13.3072	-251.07	163.2445
1472.6377	6.3052	-350.1903	1080.4528	25.3978	19.6625	240.0916
1186.854	7.4889	-126.0605	740.3625	34.4672	92.0037	210.7156
765.1252	27.598	48.147	423.5843	32.677	155.8061	179.7307
326.2542	27.8995	149.2693	195.9172	20.321	185.2184	112.6152
14.3929	0.3492	228.2628	14.3929	0.3492	228.2628	14.3929

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562
10.8215	-1960	-189.3767	11.4384	-1960	-274.17	15.3531
15.8895	-1960	-328.3501	19.1702	-1960	-604.6864	18.8581
20.1822	-1960	-603.875	24.8381	-1920	-1101	4.4243
30.0648	-1928	-1043	21.2234	-1732	-1374	4.5198
67.8309	-1665	-1437	10.5958	-1541	-1578	4.7274
89.1595	-1444	-1636	10.844	-1346	-1713	4.9812
93.7536	-1217	-1742	11.4765	-1145	-1783	5.3037
82.3485	-992.6608	-1749	11.0736	-945.7563	-1774	4.3937
58.456	-767.9314	-1651	9.954	-753.0742	-1666	4.2186
36.6431	-546.9966	-1432	9.9608	-560.735	-1471	4.4368
28.1412	-325.2414	-1100	10.4574	-366.4805	-1190	4.7322
19.4676	-116.5091	-768.1186	13.1243	-185.2909	-902.8031	5.7691
12.1856	118.3091	-263.9106	10.0161	61.2333	-413.2305	7.8801
0.3492	228.2628	14.3929	0.3492	228.2628	14.3929	0.3492

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960
-1960	-377.9916	17.4734	-1960	-547.8735	11.423	-1960
-1960	-902.3765	2.8877	-1960	-988.9779	1.0277	-1956
-1855	-1208	2.3076	-1817	-1265	1.1007	-1790
-1676	-1445	2.4267	-1644	-1482	1.1974	-1620
-1495	-1620	2.5668	-1468	-1643	1.2967	-1448
-1309	-1736	2.734	-1288	-1748	1.3959	-1272
-1118	-1795	2.9411	-1102	-1801	1.5358	-1090
-929.4047	-1775	2.2267	-920.5676	-1773	1.1357	-914.1573
-747.5624	-1666	2.2964	-744.4587	-1666	1.2116	-741.9967
-565.435	-1482	2.4415	-567.8409	-1487	1.3117	-569.6894
-381.3992	-1220	2.6358	-389.8094	-1235	1.4574	-395.9168
-208.6851	-942.6001	3.1812	-221.2659	-962.3148	1.7732	-230.1539
13.2375	-535.551	4.7455	-16.3054	-602.3849	2.6916	-37.0045
228.2628	14.3929	0.3492	228.2628	14.3929	0.3492	228.2628

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602
-722.4844	1.1712	-1960	-795.3523	-0.6306	-1960	-721.7318
-1046	0.1663	-1928	-1093	-0.5986	-1956	-1045
-1304	0.2173	-1765	-1338	-0.5664	-1790	-1304
-1508	0.2759	-1600	-1530	-0.5329	-1621	-1508
-1659	0.3418	-1431	-1671	-0.4973	-1449	-1658
-1757	0.4123	-1258	-1763	-0.4602	-1272	-1756
-1805	0.489	-1079	-1809	-0.4199	-1090	-1805
-1772	0.3408	-908.5714	-1770	-0.3519	-914.3939	-1772
-1665	0.4109	-739.8742	-1663	-0.2806	-742.201	-1665
-1490	0.4843	-571.3076	-1493	-0.2096	-569.8703	-1490
-1246	0.595	-400.9952	-1255	-0.1339	-396.077	-1246
-975.5079	0.7677	-237.4663	-985.7258	-0.053	-230.2823	-975.6861
-644.3885	1.2369	-53.8245	-677.6545	0.0769	-37.2602	-644.8888
14.3929	0.3492	228.2628	14.3929	0.3492	228.2628	14.3929

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562
-2.4266	-1960	-547.6157	-12.4734	-1960	-378.1684	-18.3366
-1.3739	-1960	-987.6327	-2.2465	-1960	-900.0204	-4.1025
-1.3462	-1818	-1264	-2.2518	-1856	-1206	-3.471
-1.3481	-1645	-1482	-2.2782	-1678	-1444	-3.518
-1.3426	-1469	-1642	-2.3042	-1496	-1620	-3.5826
-1.3373	-1288	-1748	-2.3252	-1310	-1736	-3.6699
-1.3313	-1102	-1801	-2.3816	-1119	-1795	-3.7908
-1.0504	-921.0738	-1774	-1.8516	-930.1637	-1775	-2.9397
-0.9753	-744.8999	-1666	-1.7793	-748.3582	-1667	-2.8653
-0.9013	-568.2342	-1487	-1.727	-566.1083	-1483	-2.8544
-0.8585	-390.1701	-1236	-1.7126	-382.0015	-1221	-2.8818
-0.8647	-221.5701	-962.7605	-1.8545	-209.222	-943.4055	-3.2417
-1.0557	-16.9318	-603.645	-2.4661	12.198	-538.0505	-4.4691
0.3492	228.2628	14.3929	0.3492	228.2628	14.3929	0.3492

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960
-1960	-274.3115	-16.0938	-1960	-189.4688	-12.086	-1960
-1960	-602.1125	-19.7944	-1960	-327.894	-19.9309	-1960
-1922	-1097	-5.6009	-1960	-599.6097	-25.6136	-1960
-1734	-1372	-5.6289	-1932	-1038	-22.1583	-1960
-1543	-1576	-5.757	-1669	-1433	-11.6248	-1877
-1348	-1712	-5.9275	-1447	-1634	-11.8117	-1470
-1147	-1783	-6.1584	-1220	-1742	-12.3238	-1055
-947.2735	-1774	-5.1299	-995.9261	-1750	-11.7988	-673.4883
-754.4282	-1667	-4.7924	-770.9711	-1653	-10.5135	-279.0915
-561.9388	-1473	-4.8408	-549.5349	-1435	-10.338	14.3206
-367.5767	-1192	-4.9561	-327.6184	-1104	-10.6168	84.8812
-186.3156	-904.46	-5.7789	-118.8368	-772.2094	-13.0237	155.8061
59.7199	-416.9267	-7.5522	116.2385	-268.8736	-9.7116	185.2184
228.2628	14.3929	0.3492	228.2628	14.3929	0.3492	228.2628

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-10.5602	-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602
-59.2541	-11.1546	-1960	229.2372	-5.1877	-1960	320.3795
-102.6355	-16.3826	-1960	608.4779	-9.1092	-1960	736.023
-144.422	-20.6951	-1960	1020.4207	-9.3896	-1941	1082.7863
-179.6177	-27.1498	-1749	1339.516	-9.6498	-1753	1360.2932
-120.4099	-66.0708	-1530	1565.1738	-9.9711	-1562	1568.9501
-59.0065	-88.521	-1307	1698.3157	-10.3915	-1367	1710.5748
2.9233	-94.2136	-1076	1741.4815	-10.9688	-1166	1787.0145
70.9333	-83.7618	-848.709	1680.5053	-11.0127	-966.6369	1777.8045
145.9396	-59.5598	-623.1465	1489.1497	-12.3966	-773.286	1668.5466
235.2395	-36.5271	-351.2638	1081.085	-24.5037	-578.8272	1473.8702
204.2461	-28.0844	-127.1132	741.1895	-33.3859	-380.9602	1188.9543
179.7307	-18.5436	48.3614	422.8543	-31.4879	-128.8986	766.094
112.6152	-11.3531	149.7018	194.9263	-19.2952	92.8966	325.4713
14.3929	0.3492	228.2628	14.3929	0.3492	228.2628	14.3929

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.2562	-1960	-10.5602	-0.2562	-1960	-10.5602	-0.2562
-4.192	-1960	394.2085	-2.4577	-1960	435.2898	-1.4606
-4.2541	-1960	778.7044	-2.4924	-1960	802.6991	-1.4604
-4.2885	-1931	1102.6839	-2.47	-1926	1113.6246	-1.4143
-4.2974	-1754	1364.6704	-2.4495	-1754	1366.7235	-1.3749
-4.3132	-1573	1565.8209	-2.43	-1579	1563.5415	-1.3464
-4.3258	-1388	1707.9581	-2.413	-1399	1705.5813	-1.3065
-4.4531	-1197	1793.7598	-2.3996	-1214	1795.7639	-1.2431
-4.3045	-1009	1799.7778	-2.1396	-1032	1808.634	-1.0551
-4.5974	-826.5516	1716.9955	-2.1159	-855.9359	1738.8196	-0.9919
-5.1089	-643.6512	1558.1869	-2.2641	-679.5497	1599.0657	-0.9145
-6.1934	-458.8166	1320.3835	-2.818	-502.1893	1387.2259	-1.0444
-26.3146	-266.4289	991.888	-4.8058	-321.6699	1098.2617	-1.6828
-26.7508	15.8872	502.59	-28.7323	-95.103	721.1141	-17.008
0.3492	228.2628	14.3929	0.3492	228.2628	14.3929	0.3492

Curve 24	345. degrees	
P	M3	M2
-1960	-10.5602	-0.2562
-1960	465.3798	-0.7009
-1960	820.0493	-0.6947
-1922	1121.1944	-0.6489
-1754	1368.0275	-0.5842
-1583	1561.5111	-0.5425
-1408	1703.3962	-0.4784
-1227	1796.5438	-0.3932
-1050	1813.9702	-0.2741
-877.3944	1753.0902	-0.1929
-705.1043	1625.2526	-0.1251
-532.5773	1430.5159	-0.0596
-358.9082	1166.0762	-0.2502
-189.254	887.4296	-2.2082
228.2628	14.3929	0.3492

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

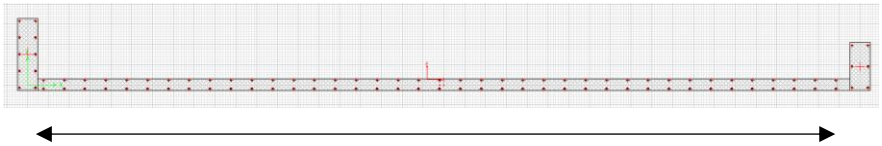
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 3)

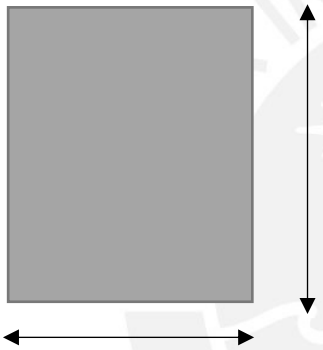
1. INGRESO DE DATOS GENERALES

Lm (m)	9.5



d (m) = 0.85xLm	8.08

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	9.5

hm/Lm	1.4

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**287.65**	(Axial del etabs)
Mua (ton)	**1425.84**	(Momento del etabs)
Mn (ton)	**1425.84**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**150.95**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**150.95**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	79.07

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	84.56

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	40.11	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	56.95	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	103.48	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

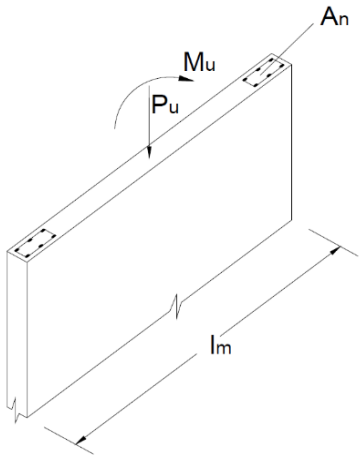
N_u = 287.00 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 801.0 ton > Pu = 287 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	1425
Long. (m)	9.5
F (ton)	150
Fy (kg/cm2)	4200
As (cm2)	35.7

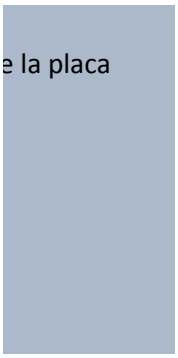
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-2614	-18.6093	17.5337	-2614	-18.6093	17.5337
2	-2614	2616.8355	-103.884	-2614	2604.0428	-103.4063
3	-2501	3353.4713	-93.8516	-2500	3352.1481	-93.1385
4	-2305	3965.3405	-84.1068	-2301	3970.9779	-83.1508
5	-2106	4454.4194	-74.731	-2100	4462.6501	-73.5266
6	-1903	4823.9137	-65.8508	-1894	4830.061	-64.3825
7	-1695	5078.4452	-57.6503	-1683	5077.8722	-55.9002
8	-1480	5225.1511	-50.4157	-1464	5213.2508	-48.3619
9	-1275	5155.5816	-37.7966	-1255	5136.221	-36.3538
10	-1072	4924.4322	-2.47E+01	-1048	4885.3142	-23.0927
11	-868.4648	4538.562	-11.6681	-842.1994	4474.9351	-9.8322
12	-665.2392	3997.7337	1.3964	-635.9735	3905.2268	3.4257
13	-461.9212	3301.5791	14.4668	-429.8188	3176.3737	16.6774
14	-279.2205	2645.8536	29.7327	-246.0518	2527.2654	33.2562
15	280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P3	LIVE	Top	-25.81	-0.41	0.11
PISO1	P3	LIVE	Bottom	-25.81	-0.41	0.11
PISO1	P3	DEAD-SQ	Top	-135.37	-2.86	-0.01
PISO1	P3	DEAD-SQ	Bottom	-135.37	-2.86	-0.01
PISO1	P3	RX MAX	Top	80.34	32.77	17.59
PISO1	P3	RX MAX	Bottom	80.34	32.77	17.59
PISO1	P3	RX MIN	Top	-80.34	-32.77	-17.59
PISO1	P3	RX MIN	Bottom	-80.34	-32.77	-17.59
PISO1	P3	RY MAX	Top	41.45	121.1	9.8
PISO1	P3	RY MAX	Bottom	41.45	121.1	9.8
PISO1	P3	RY MIN	Top	-41.45	-121.1	-9.8
PISO1	P3	RY MIN	Bottom	-41.45	-121.1	-9.8

1.4CM+1.7CV	233.40	Tn	RX
1.25(CM+CV)	201.48	Tn	

CM	M22	2.56	Tn.m	RY
	M33	-83.05	Tn.m	
CV	M22	0.51	Tn.m	
	M33	-11.11	Tn.m	

COMBINACIONES SISMO EN X				C
	P	M22	M33	

1.4CM+1.7CV	233.40	4.46	-135.17
1.25(CM+CV)+CS	281.82	-41.33	97.50
1.25(CM+CV)-CS	121.14	49.02	-332.92
0.9CM+CS	202.17	-42.87	140.46
0.9CM-CS	41.49	47.48	-225.21

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	2614.0	-18.6	2614.0	-18.6
2	2614.0	2616.8	2614.0	-2185.0
3	2501.0	3353.5	2614.0	-2993.0
4	2305.0	3965.3	2443.0	-3676.0
5	2106.0	4454.4	2246.0	-4236.0
6	1903.0	4823.9	2046.0	-4675.0
7	1695.0	5078.4	1841.0	-4999.0
8	1480.0	5225.2	1629.0	-5213.0
9	1275.0	5155.6	1425.0	-5226.0
10	1072.0	4924.4	1221.0	-5077.0
11	868.5	4538.6	1018.0	-4774.0
12	665.2	3997.7	815.0	-4316.0
13	461.9	3301.6	611.7	-3703.0
14	279.2	2645.9	408.6	-2936.0
15	-280.9	25.4	-280.9	25.4

PUNTO
1
2
3
4
5
6
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10
11
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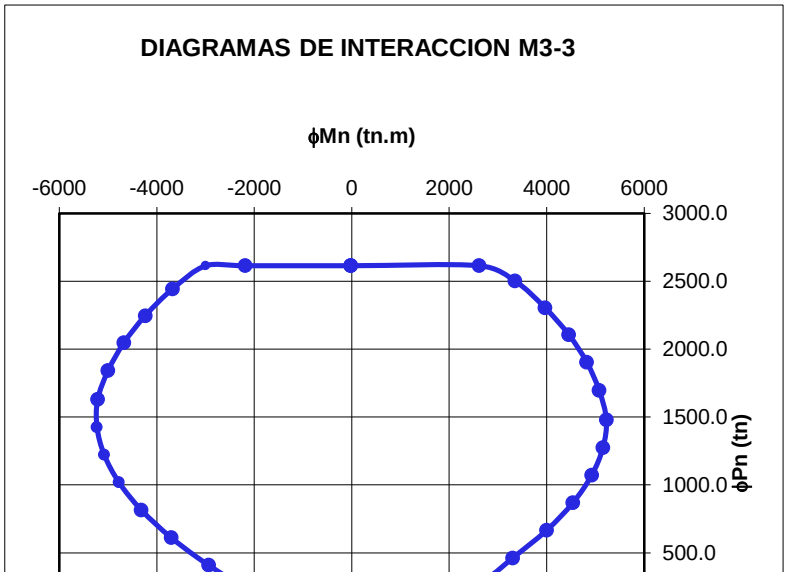
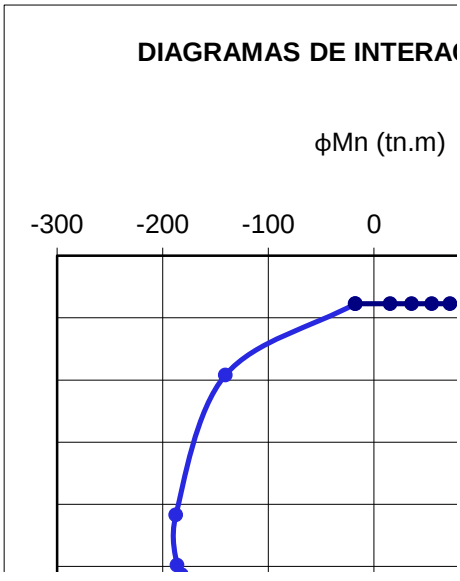
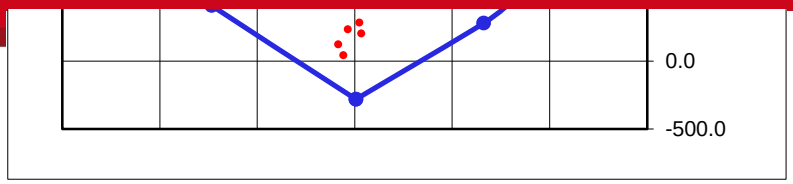
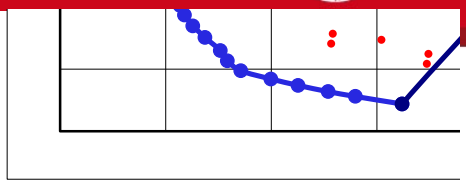
15

SISMO EN XX

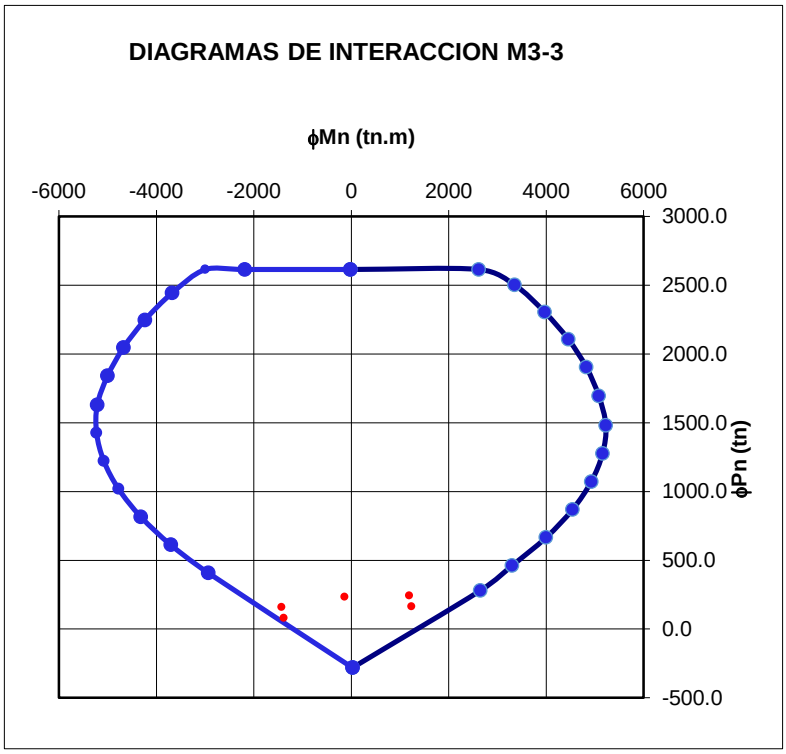


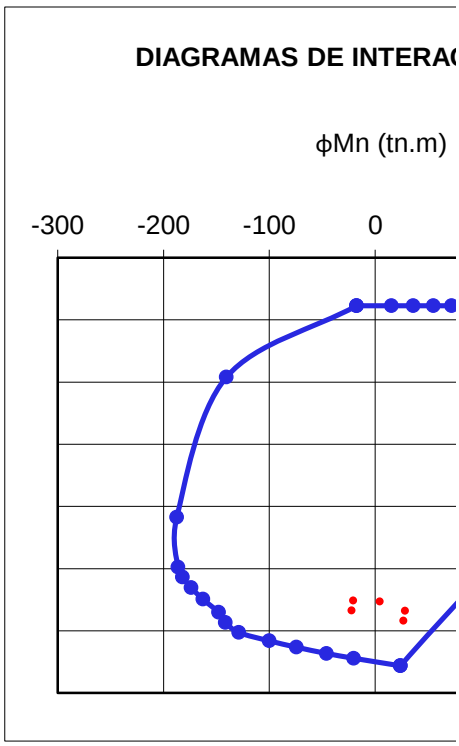






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-2614	-18.6093	17.5337	-2614	-18.6093	17.5337	-2614
-2614	2587.6822	-102.6039	-2614	2073.1679	-37.2667	-2614
-2500	3350.7507	-92.3347	-2499	3348.9622	-91.2644	-2515
-2297	3977.5601	-82.0682	-2292	3986.6235	-80.6225	-2282
-2092	4471.8994	-72.1543	-2082	4484.3753	-70.3179	-2064
-1883	4836.7853	-62.7098	-1868	4845.158	-60.4621	-1841
-1668	5076.5948	-53.9081	-1648	5073.4514	-51.2249	-1614
-1446	5198.3892	-46.0206	-1421	5176.1576	-42.8701	-1378
-1231	5111.6188	-34.6816	-1200	5074.9476	-32.404	-1145
-1022	4837.6707	-21.1991	-985.1453	4768.199	-18.6256	-921.8097
-811.9441	4398.6714	-7.7178	-770.6026	4288.82	-4.8311	-699.1089
-602.1516	3794.4903	5.77	-556.2086	3637.4153	8.9603	-475.1932
-392.3738	3025.4108	19.2581	-345.3879	2847.4752	23.1703	-270.1789
-203.0845	2363.2666	37.5063	-138.5227	2098.9224	43.5485	-16.1904
280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388

T	M2	M3
-0.238	0.221	-10.019
-0.238	0.514	-11.113
-4.511	2.594	-75.474
-4.511	2.564	-83.053
36.754	4.055	181.977
36.754	45.177	215.209
-36.754	-4.055	-181.977
-36.754	-45.177	-215.209
35.659	12.847	999.431
35.659	24.582	1310.649
-35.659	-12.847	-999.431
-35.659	-24.582	-1310.649

P	80.34	Tn
M22	-45.18	Tn.m
M33	215.21	Tn.m

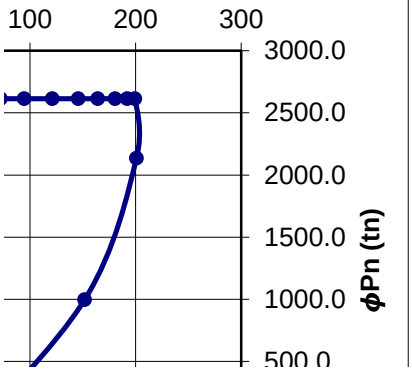
P	41.45	Tn
M22	-24.58	Tn.m
M33	1310.65	Tn.m

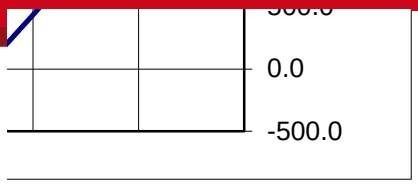
COMBINACIONES SISMO EN Y		
P	M22	M33

233.40	4.46	-135.17
242.93	-20.73	1192.94
160.03	28.43	-1428.36
163.28	-22.27	1235.90
80.38	26.89	-1385.40

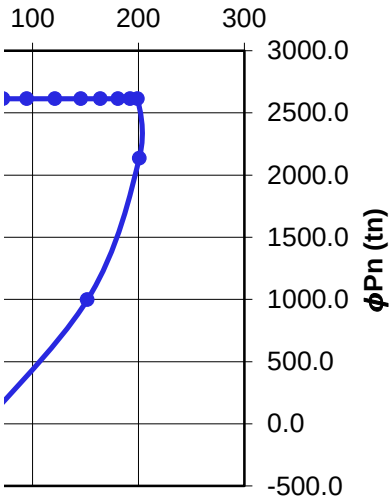
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
2614.0	-17.5	2614.0	-17.5
2040.0	-140.6	2614.0	15.4
914.4	-187.4	2614.0	35.8
512.2	-186.4	2614.0	54.8
433.7	-182.1	2614.0	72.2
347.7	-174.1	2614.0	94.6
254.1	-162.7	2614.0	121.2
148.9	-148.0	2614.0	145.7
67.4	-141.5	2614.0	164.2
-13.4	-128.7	2614.0	180.5
-79.7	-100.3	2614.0	192.2
-131.1	-74.5	2614.0	199.2
-181.6	-45.9	2136.0	200.8
-220.2	-20.3	998.0	151.8
-280.9	23.9	-280.9	23.9

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-18.6093	17.5337	-2614	-18.6093	17.5337	-2614	-18.6093
1532.0121	4.7885	-2614	1070.5975	20.1226	-2040	-275.2546
3259.4384	-76.1921	-2614	2443.0573	14.8107	-914.3841	-5.07E+02
4002.2709	-78.1987	-2343	3621.0619	-14.4173	-512.1516	-5.93E+02
4505.1865	-67.2228	-2014	4555.3665	-59.1485	-433.707	-611.7307
4857.7321	-56.6814	-1768	4878.6454	-46.8612	-347.6562	-630.6416
5064.4239	-46.702	-1518	5015.6562	-34.9098	-254.1403	-6.48E+02
5131.8862	-37.5465	-1259	4973.1785	-23.643	-148.9476	-6.75E+02
5002.071	-28.4163	-999.3702	4713.582	-13.7983	-67.4321	-7.82E+02
4636.0001	-14.1416	-747.3064	4189.7174	-1.7781	13.4013	-9.11E+02
4083.6774	0.169	-500.3696	3408.5646	14.0109	79.6914	-8.13E+02
3339.4156	14.6031	-273.4344	2599.1103	32.2728	131.1215	-647.6758
2604.3424	31.6153	-53.4218	1721.7668	50.1637	181.6165	-450.9783
1561.5043	49.6498	120.7949	859.9319	32.3933	220.2003	-265.9334
25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
17.5337	-2614	-18.6093	17.5337	-2614	-18.6093	17.5337
140.6091	-2614	-1319	26.347	-2614	-1757	10.3527
187.4367	-2614	-2923	18.085	-2611	-3072	-4.2207
186.3576	-2322	-3971	15.065	-2387	-3820	8.8738
182.096	-2062	-4554	30.3684	-2161	-4400	21.882
174.0526	-1797	-4908	45.6401	-1931	-4814	34.8091
162.7225	-1527	-5038	60.8836	-1696	-5066	47.6039
148.0013	-1248	-4950	75.9812	-1454	-5163	60.211
141.5247	-970.7258	-4594	90.5532	-1215	-5035	73.6116
128.7234	-701.2661	-3926	107.4311	-981.7509	-4674	88.6333
100.2734	-430.9238	-2982	124.1022	-747.3041	-4104	103.7156
74.5408	-225.4647	-2224	152.7244	-510.9689	-3322	118.6347
45.9342	-70.3514	-1613	147.0065	-289.1182	-2478	142.1602
20.3431	111.2252	-789.6748	85.3235	-22.4549	-1418	137.0289
-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-2614	-18.6093	17.5337	-2614	-18.6093	17.5337	-2614
-2614	-2153	-16.8975	-2614	-2174	-18.4391	-2614
-2614	-3039	-5.7217	-2614	-3019	-6.608	-2614
-2411	-3760	6.538	-2425	-3725	5.1698	-2434
-2197	-4334	18.7142	-2218	-4293	16.8561	-2233
-1980	-4762	30.7786	-2008	-4727	28.4217	-2028
-1757	-5047	42.6925	-1793	-5030	39.8211	-1819
-1528	-5198	54.3742	-1571	-5209	50.988	-1602
-1304	-5136	67.5165	-1355	-5181	64.0033	-1392
-1083	-4872	81.69	-1142	-4967	77.7077	-1185
-862.876	-4425	95.866	-928.5548	-4583	91.4108	-976.6934
-641.6767	-3793	110.109	-715.3403	-4029	105.1163	-768.8844
-416.588	-2960	124.2522	-501.2545	-3300	118.8759	-561.0991
-177.5674	-2051	154.3562	-294.5809	-2505	140.3548	-351.9749
280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-18.6093	17.5337	-2614	-18.6093	17.5337	-2614	-18.6093
-2180	-18.7458	-2614	-2185	-1.90E+01	-2614	-2030
-3006	-7.2496	-2614	-2993	-7.83E+00	-2614	-2874
-3699	4.172	-2443	-3676	3.29E+00	-2471	-3587
-4263	15.4832	-2246	-4236	1.43E+01	-2271	-4173
-4700	26.6839	-2046	-4675	2.52E+01	-2068	-4634
-5014	37.709	-1841	-4999	35.8805	-1860	-4975
-5213	48.4837	-1629	-5213	46.3199	-1645	-5202
-5207	61.4186	-1425	-5226	59.1988	-1437	-5229
-5029	74.7825	-1221	-5077	72.2619	-1231	-5087
-4690	88.145	-1018	-4774	85.3265	-1025	-4786
-4188	101.5047	-814.9643	-4316	98.3947	-818.6016	-4325
-3524	114.8601	-611.7165	-3703	111.4606	-612.3133	-3705
-2700	128.9571	-408.6093	-2936	124.5175	-402.2166	-2907
25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
17.5337	-2614	-18.6093	17.5337	-2614	-18.6093	17.5337
-21.2613	-2614	-1847	-23.8487	-2614	-1591	-27.3275
-9.882	-2614	-2732	-12.2519	-2614	-2532	-15.4707
1.4199	-2502	-3482	-0.7352	-2546	-3332	-3.6601
12.6193	-2300	-4099	10.6776	-2338	-3992	8.0442
23.6822	-2093	-4585	21.9519	-2128	-4515	19.6102
34.5611	-1882	-4947	33.0409	-1912	-4905	30.9846
45.1767	-1664	-5189	43.8607	-1690	-5169	42.0694
58.2333	-1452	-5233	57.1223	-1472	-5236	55.6023
71.4906	-1242	-5099	70.6031	-1258	-5113	69.3927
84.7506	-1033	-4800	84.0881	-1043	-4818	83.1874
98.0129	-822.7852	-4336	97.5739	-827.5635	-4346	96.3323
111.2732	-611.9701	-3702	110.3574	-607.5372	-3679	106.7335
122.339	-389.3462	-2847	116.6673	-286.9955	-2432	47.4506
-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-2614	-18.6093	17.5337	-2614	-18.6093	17.5337	-2614
-2614	-1139	-29.6542	-2614	-712.0677	-17.8058	-2614
-2614	-2165	-21.0489	-2614	-1263	-31.6386	-2614
-2614	-3057	-8.7279	-2614	-2206	-22.5206	-2614
-2405	-3797	3.4865	-2587	-3183	-9.0211	-2614
-2187	-4385	15.5415	-2346	-3968	3.9832	-2614
-1964	-4828	27.412	-2101	-4568	16.6296	-2614
-1734	-5130	38.9979	-1849	-4985	28.507	-2614
-1507	-5237	52.9855	-1596	-5187	42.0927	-2614
-1283	-5133	66.9451	-1346	-5138	55.7087	-2614
-1059	-4837	79.9759	-1094	-4844	67.4095	-2614
-831.3129	-4341	91.4577	-748.1555	-3876	19.0046	-2614
-579.3225	-3542	86.4981	-380.7317	-2578	-19.003	-2136
-151.5051	-1894	-12.6598	-8.0105	-1308	-40.2369	-998.0201
280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-18.6093	17.5337	-2614	-18.6093	17.5337	-2614	-18.6093
167.5175	-15.3908	-2614	682.5212	-56.6464	-2614	1088.147
306.4162	-35.8003	-2614	1235.9421	-101.7161	-2614	2095.6403
446.5912	-54.7995	-2614	1797.3472	-118.9729	-2590	3031.3093
586.0387	-72.1878	-2614	2763.9668	-110.053	-2365	3799.9238
666.4528	-94.5815	-2398	3704.0891	-97.2965	-2135	4403.393
6.74E+02	-121.1838	-2132	4422.0818	-85.2439	-1901	4846.1329
6.80E+02	-145.7383	-1860	4925.0588	-74.1828	-1659	5134.4835
6.75E+02	-164.2102	-1587	5182.8263	-59.927	-1419	5221.0795
6.58E+02	-180.548	-1316	5165.9613	-43.1373	-1185	5069.187
6.35E+02	-192.1516	-1046	4861.2733	-26.7894	-952.3286	4713.3305
604.7369	-199.2498	-773.5302	4275.3673	-11.2901	-718.296	4148.8898
509.6689	-200.819	-448.0141	3145.025	-16.3888	-480.5843	3361.7336
262.6339	-151.7919	-53.7679	1666.2708	-38.861	-177.0862	2212.4505
25.3635	-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
17.5337	-2614	-18.6093	17.5337	-2614	-18.6093	17.5337
-90.2972	-2614	1610.6949	-112.694	-2614	2120.5528	-111.1582
-113.8403	-2614	2668.8429	-105.4183	-2605	2972.6724	-100.5187
-102.3124	-2470	3460.4477	-94.6241	-2400	3685.1401	-90.1816
-91.1416	-2256	4103.8599	-84.2059	-2193	4260.9119	-80.2044
-80.4601	-2038	4602.0237	-74.2874	-1981	4702.5551	-70.7258
-70.4702	-1815	4959.2256	-65.0542	-1764	5014.5516	-61.9303
-61.4828	-1584	5182.6846	-56.8	-1540	5203.8329	-54.1063
-47.9838	-1358	5203.1088	-43.6796	-1323	5186.2353	-41.185
-32.9974	-1137	5014.1569	-29.507	-1110	4978.12	-27.4815
-18.0059	-916.8568	4642.9205	-15.331	-896.3447	4599.7606	-13.78
-3.4605	-696.3813	4089.3133	-1.1539	-683.2641	4051.256	-0.0725
9.7941	-474.9127	3348.2907	12.5866	-469.9483	3331.5562	13.6384
-10.3091	-263.2474	2580.9366	24.108	-272.8869	2620.6853	27.7363
-23.8976	280.9388	25.3635	-23.8976	280.9388	25.3635	-23.8976

Curve 24	345. degrees	
P	M3	M2
-2614	-18.6093	17.5337
-2614	2392.5989	-107.2586
-2549	3181.7867	-96.9455
-2349	3839.5297	-86.9181
-2146	4367.9206	-77.2633
-1940	4770.0647	-68.1056
-1727	5050.5345	-59.6298
-1508	5216.318	-52.1213
-1297	5170.7531	-39.3622
-1089	4949.8521	-25.9996
-881.2533	4567.0712	-12.6391
-673.4942	4022.5123	0.725
-465.6548	3315.6442	14.08
-277.0732	2637.5371	29.093
280.9388	25.3635	-23.8976

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

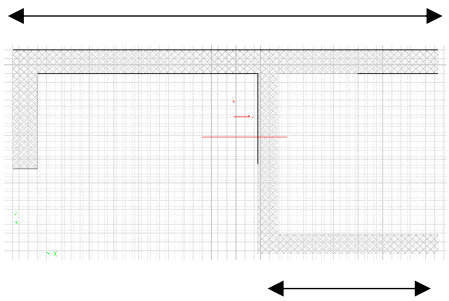
16.8
19.0
19.0

CV (ton)

18.7

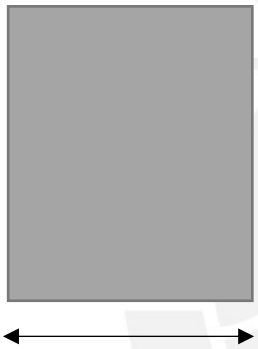
DISEÑO DE MUROS DE CORTE (PLACA - 4) SENTIDO XX

1. INGRESO DE DATOS GENERALES



Lm (m)	6.2
d (m) = 0.85xLm	5.27

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25
Lm (m)	4.35

hm/Lm	**3.0**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**313.74**	(Axial del etabs)
Mua (ton)	**1351.08**	(Momento del etabs)
Mn (ton)	**1351.08**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**162.75**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**162.75**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	86.01

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	90.28

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	24.52	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	34.81	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	63.25	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

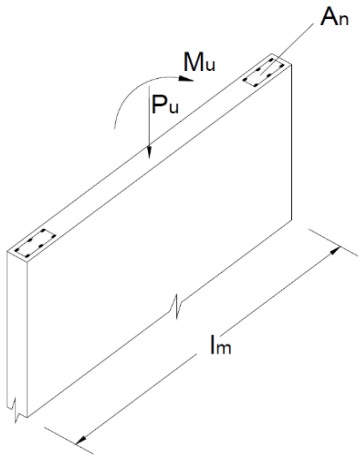
N_u = 174.17 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 1115.7 ton > Pu =313.74 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	443
Long. (m)	4.35
F (ton)	101.8
Fy (kg/cm2)	4200
As (cm2)	24.2

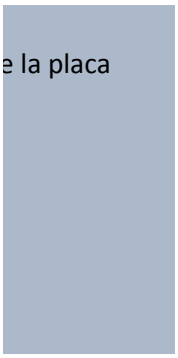
0.25

0.80
0.53
1.205

0.53

Mu)

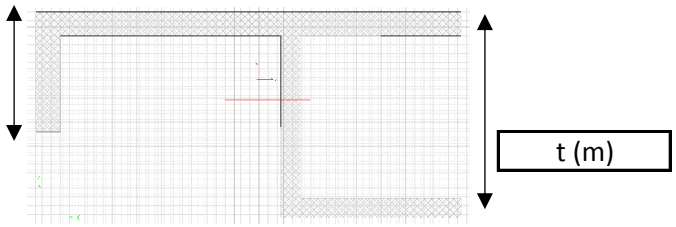
Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



DISEÑO DE MUROS DE CORTE (PLACA - 4)

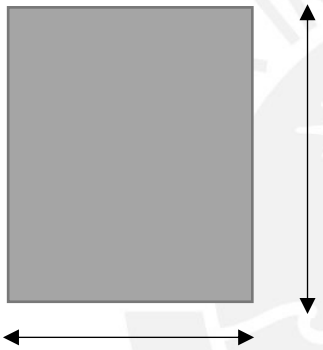
1. INGRESO DE DATOS GENERALES

Lm (m)	3.4



d (m) = 0.85xLm	2.89

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	3.4

hm/Lm	**3.9**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**313.74**	(Axial del etabs)
Mua (ton)	**1351.00**	(Momento del etabs)
Mn (ton)	**1351.00**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**67.84**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**67.84**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	37.73

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	35.42

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	34.27	3t=60.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	48.66	3t=60.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	88.42	3t=60.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	20.00 cm	3t=60.0 cm	40.0 cm
0.0025	0.0025	28.40 cm	3t=60.0 cm	40.0 cm
0.0025	0.0025	51.60 cm	3t=60.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	20.00 cm	5.00 cm2/m	2 ϕ 8 mm =	20.00 cm	5.00 cm2/m
2 ϕ 3/8" =	28.40 cm	5.00 cm2/m	2 ϕ 3/8" =	28.40 cm	5.00 cm2/m

2 ϕ 1/2" =	51.60 cm	5.00 cm2/m	2 ϕ 1/2" =	51.60 cm	5.00 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

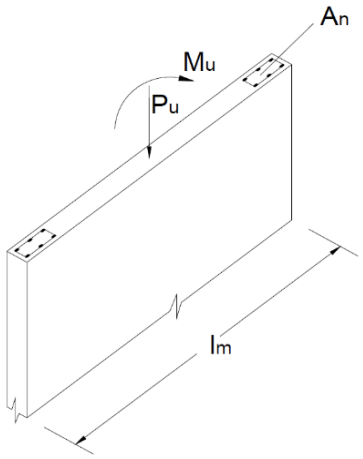
N_u = 313.92 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 455.5 ton > Pu = 140.64 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	1351
Long. (m)	4.35
F (ton)	310.6
Fy (kg/cm2)	4200
As (cm2)	73.9

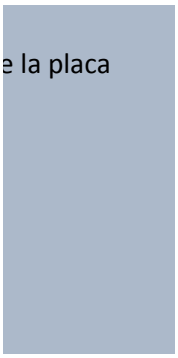
0.2

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	5.00 cm2/m	20.00
0.0009	0.0025	5.00 cm2/m	28.40
0.0016	0.0025	5.00 cm2/m	51.60



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-3149	123.7299	-129.8285	-3149	123.7299	-129.8285
2	-3149	1530.7124	-188.1259	-3149	1066.329	-83.291
3	-3091	1791.3373	-262.2457	-3149	1592.4996	-185.3371
4	-2933	2018.2031	-335.9809	-3028	1865.7071	-262.8907
5	-2770	2212.9711	-409.0126	-2853	2099.856	-339.4462
6	-2598	2378.6744	-481.5364	-2670	2297.4581	-414.7048
7	-2415	2518.9668	-552.9308	-2475	2462.215	-488.1274
8	-2216	2640.0621	-623.1557	-2247	2594.3897	-535.8516
9	-2044	2644.2853	-695.0062	-1622	2450.1846	-225.9632
10	-1212	2322.3996	-4.17E+02	-1070	2190.0323	-149.5182
11	-920.6107	2128.5984	-337.1948	-741.5372	1916.9602	-39.9473
12	-600.0101	1841.5285	-240.107	-390.2886	1535.366	84.5517
13	-325.1333	1562.7555	-153.7748	-62.2258	1260.4434	262.8815
14	13.2766	1208.9928	-51.4203	341.7979	564.5166	373.2612
15	711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P4	LIVE	Top	-27.86	-1.01	-0.29
PISO1	P4	LIVE	Bottom	-27.86	-1.01	-0.29
PISO1	P4	DEAD-SQ	Top	-182.33	-9.15	-2.88
PISO1	P4	DEAD-SQ	Bottom	-182.33	-9.15	-2.88
PISO1	P4	RX MAX	Top	39.56	137.42	20.26
PISO1	P4	RX MAX	Bottom	39.56	137.42	20.26
PISO1	P4	RX MIN	Top	-39.56	-137.42	-20.26
PISO1	P4	RX MIN	Bottom	-39.56	-137.42	-20.26
PISO1	P4	RY MAX	Top	25.23	35.4	48.71
PISO1	P4	RY MAX	Bottom	25.23	35.4	48.71
PISO1	P4	RY MIN	Top	-25.23	-35.4	-48.71
PISO1	P4	RY MIN	Bottom	-25.23	-35.4	-48.71

1.4CM+1.7CV	302.62	Tn	RX
1.25(CM+CV)	262.74	Tn	

CM	M22	20.51	Tn.m	RY
	M33	-100.92	Tn.m	
CV	M22	6.50	Tn.m	
	M33	-20.50	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	302.62	39.77	-176.12
1.25(CM+CV)+CS	302.30	-182.66	1049.30
1.25(CM+CV)-CS	223.18	250.20	-1352.83
0.9CM+CS	203.66	-197.97	1110.24
0.9CM-CS	124.54	234.89	-1219.51

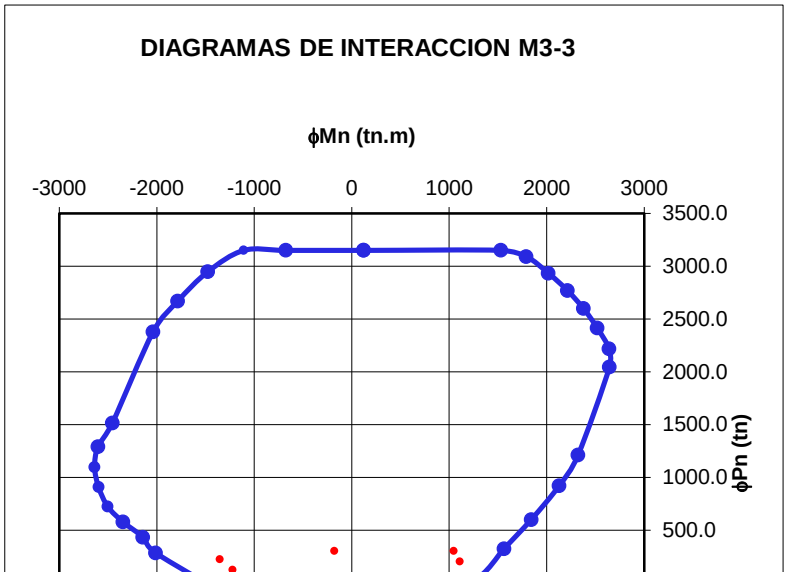
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

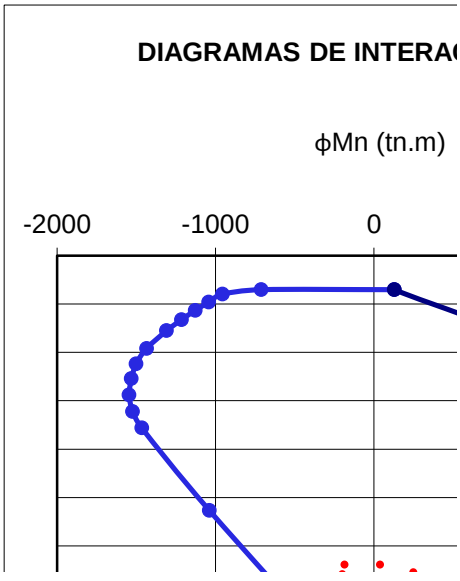
MOMENTO MINIMO DE DISEÑO

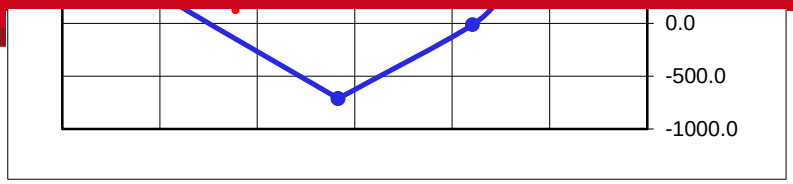
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	3149.0	123.7	3149.0	123.7
2	3149.0	1530.7	3149.0	-674.7
3	3091.0	1791.3	3149.0	-1106.0
4	2933.0	2018.2	2947.0	-1476.0
5	2770.0	2213.0	2668.0	-1785.0
6	2598.0	2378.7	2377.0	-2038.0
7	2415.0	2519.0	1513.0	-2456.0
8	2216.0	2640.1	1291.0	-2603.0
9	2044.0	2644.3	1094.0	-2637.0
10	1212.0	2322.4	906.1	-2596.0
11	920.6	2128.6	721.1	-2501.0
12	600.0	1841.5	577.4	-2345.0
13	325.1	1562.8	433.7	-2142.0
14	-13.3	1209.0	283.5	-2012.0
15	-711.6	-168.6	-711.6	-168.6

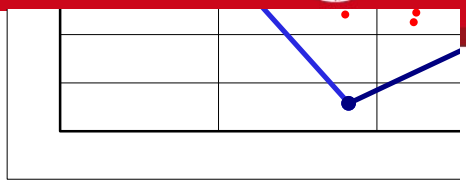
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

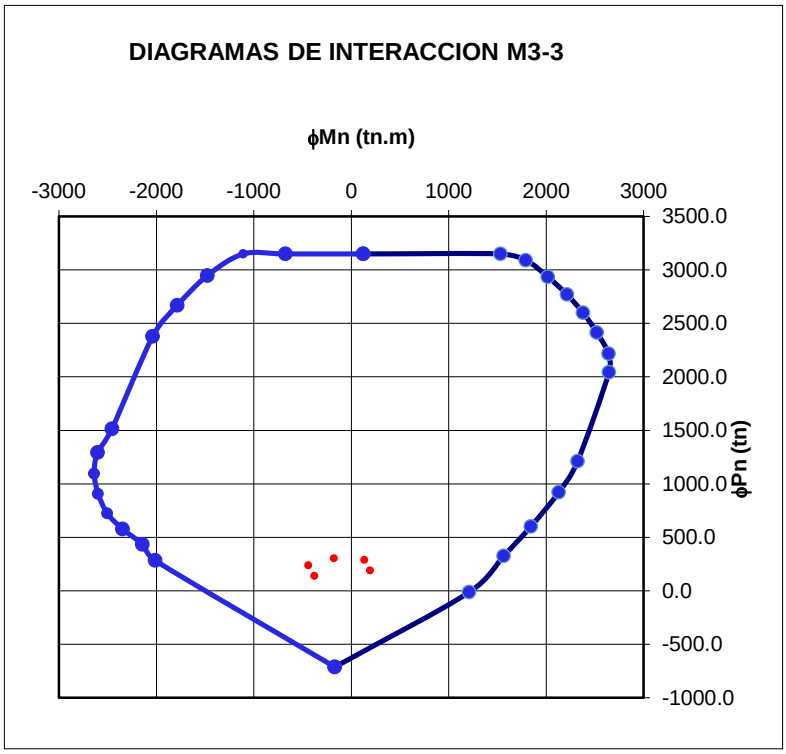


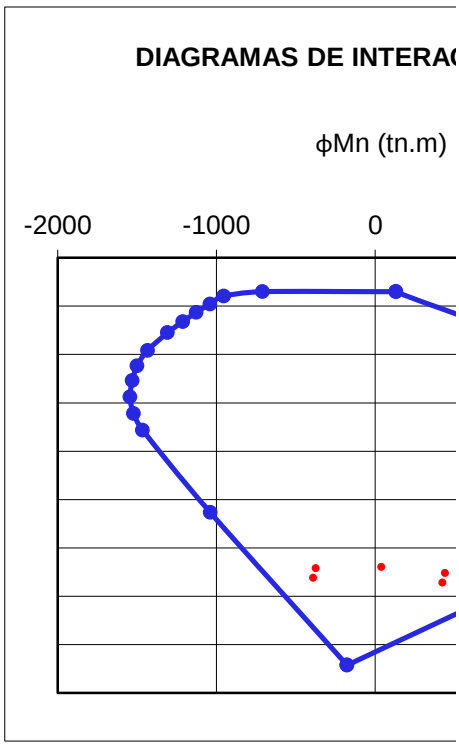






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-3149	123.7299	-129.8285	-3149	123.7299	-129.8285	-3149
-3149	725.4816	-47.9606	-3149	568.9647	-27.3552	-3149
-3149	1299.5668	-89.9794	-3149	936.9254	-3.2411	-3149
-3135	1660.1574	-176.8894	-3149	1309.1845	-43.4374	-3149
-2946	1941.5943	-255.0819	-3056	1659.2146	-121.6344	-2876
-2746	2174.4157	-329.1368	-2705	1897.3128	-25.3782	-2419
-2482	2343.4382	-329.9916	-2206	1976.6765	208.5665	-1911
-1946	2349.0247	-59.4225	-1687	1948.4586	396.969	-1485
-1391	2200.616	108.6899	-1171	1762.2373	531.1108	-1106
-887.0361	1906.79	188.2551	-683.0236	1455.103	598.9389	-727.793
-522.581	1545.9612	321.6513	-413.7804	1284.2135	558.6076	-421.7128
-215.8584	1298.85	459.1364	-169.3269	1195.7193	615.1412	-208.7714
95.8896	974.5599	502.9673	105.2456	946.08	536.7778	85.5805
365.14	517.6771	383.4584	383.4763	481.064	375.3339	409.9473
711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141

T	M2	M3
1.429	7.281	-17.817
1.429	6.501	-20.495
11.989	28.158	-76.675
11.989	20.514	-100.916
69.681	167.317	843.939
69.681	216.431	1201.064
-69.681	-167.317	-843.939
-69.681	-216.431	-1201.064
52.985	283.911	196.404
52.985	407.237	287.005
-52.985	-283.911	-196.404
-52.985	-407.237	-287.005

P	39.56	Tn
M22	-216.43	Tn.m
M33	1201.06	Tn.m

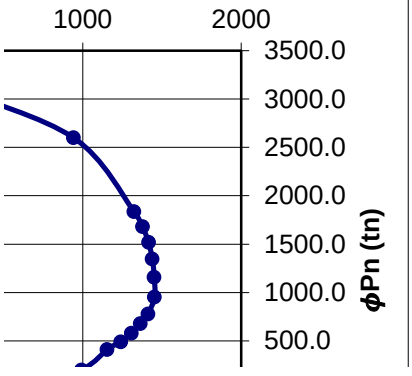
P	25.23	Tn
M22	-407.24	Tn.m
M33	287.01	Tn.m

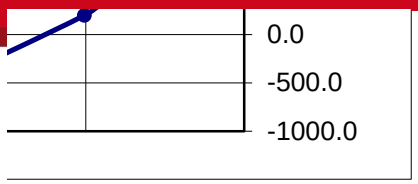
COMBINACIONES SISMO EN Y		
P	M22	M33

302.62	39.77	-176.12
287.97	-373.47	135.24
237.51	441.01	-438.77
189.33	-388.77	196.18
138.87	425.70	-377.83

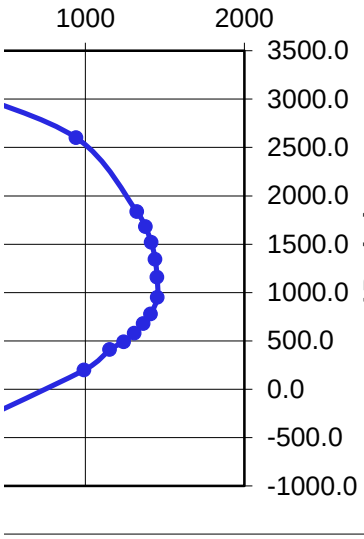
90 GRADOS	M_{2-2}	270 GRADOS	M_{2-2}
ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
3149.0	129.8	3149.0	129.8
3149.0	-710.6	2601.0	940.7
3103.0	-954.5	1835.0	1324.0
3022.0	-1041.1	1680.0	1377.0
2935.0	-1126.6	1518.0	1415.0
2840.0	-1212.8	1345.0	1439.0
2725.0	-1307.7	1158.0	1451.0
2542.0	-1433.8	951.3	1453.0
2383.0	-1500.2	778.5	1411.0
2230.0	-1529.6	679.1	1364.0
2062.0	-1544.4	579.7	1307.0
1889.0	-1522.9	489.8	1240.0
1719.0	-1464.9	410.9	1153.0
865.7	-1038.1	198.4	991.5
-711.6	-176.9	-711.6	-176.9

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
123.7299	-129.8285	-3149	123.7299	-129.8285	-3149	123.7299
428.6219	20.2735	-3149	71.3532	203.4203	-3149	-595.4426
673.2394	61.4167	-3149	-72.082	621.1962	-3103	-7.89E+02
882.0624	209.9622	-2870	-282.0389	1024.6892	-3022	-8.26E+02
979.4083	500.4442	-2638	-230.1257	1180.7268	-2935	-866.409
1084.8726	726.35	-2441	-83.6168	1257.3833	-2840	-911.4371
1130.1518	904.7282	-2229	64.3372	1317.4064	-2725	-9.44E+02
1256.8355	930.6583	-1995	216.3599	1364.5577	-2542	-8.77E+02
1352.2528	874.5664	-1615	596.0757	1313.5421	-2383	-7.47E+02
1318.8855	788.2564	-1195	971.4428	1143.184	-2230	-5.73E+02
1183.4307	704.7904	-787.9258	1164.24	928.1523	-2062	-3.67E+02
1181.5012	662.2306	-416.8913	1149.7867	716.3858	-1889	-194.9898
964.6587	551.5752	-66.8559	1081.3027	631.1964	-1719	-76.0537
426.6041	363.7333	403.1403	423.713	374.48	-865.715	-34.7405
-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-129.8285	-3149	123.7299	-129.8285	-3149	123.7299	-129.8285
710.5803	-3149	-380.1947	277.6997	-3149	-372.6687	204.6454
954.5247	-3149	-751.1851	693.3561	-3149	-684.004	479.603
1041.1411	-3115	-872.2553	930.2466	-3149	-893.4221	758.1404
1126.6447	-2997	-941.6165	1047.8645	-3026	-1005	957.1723
1212.759	-2869	-1020	1153.8697	-2865	-1111	1095.8944
1307.65	-2728	-1110	1250.6892	-2677	-1253	1200.613
1433.7911	-2567	-1216	1342.0574	-2279	-1758	1171.0236
1500.1559	-2413	-1285	1388.1674	-1844	-2179	1053.6301
1529.6161	-2066	-1534	1309.8249	-1439	-2432	883.1431
1544.3514	-1438	-1844	1083.3148	-1092	-2514	715.3271
1522.9413	-830.0597	-1798	844.3659	-630.1694	-2107	602.4375
1464.8949	-242.9762	-1538	649.9478	-162.341	-1681	555.7804
1038.0877	393.7991	-784.1762	375.4762	411.086	-779.6661	354.9133
176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-3149	123.7299	-129.8285	-3149	123.7299	-129.8285	-3149
-3149	-383.1022	168.5418	-3149	-396.836	142.5979	-3149
-3149	-658.2774	391.2693	-3149	-648.6851	335.1031	-3149
-3149	-871.2763	618.2812	-3149	-884.1662	524.7898	-3109
-3072	-1022	847.4686	-2950	-1351	631.8868	-2800
-2749	-1384	978.5521	-2550	-1753	781.6734	-2468
-2337	-1841	1000.0944	-2086	-2119	868.5176	-1836
-1903	-2233	960.1252	-1606	-2445	808.0073	-1424
-1493	-2494	836.203	-1325	-2606	716.8675	-1191
-1204	-2607	722.512	-1076	-2656	624.5422	-984.5658
-937.0102	-2570	591.268	-852.4697	-2571	520.601	-784.4792
-662.6642	-2361	468.4722	-634.773	-2381	411.8809	-610.7923
-244.7769	-1850	465.295	-374.9139	-2022	343.5598	-427.2373
377.9088	-858.4297	360.509	275.5958	-1081	366.8673	-17.2646
711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
123.7299	-129.8285	-3149	123.7299	-129.8285	-3149	123.7299
-411.5363	118.9833	-3149	-674.7068	2.24E+01	-3149	-438.7896
-776.7582	253.0197	-3149	-1106	9.74E+01	-3149	-789.0035
-1236	342.2486	-2947	-1476	1.75E+02	-3117	-1224
-1620	433.1277	-2668	-1785	2.55E+02	-2822	-1592
-1930	542.0324	-2377	-2038	3.39E+02	-2516	-1891
-2299	768.3003	-1513	-2456	642.7962	-1957	-2222
-2545	696.5301	-1291	-2603	603.2344	-1296	-2521
-2652	625.3897	-1094	-2637	553.3415	-1048	-2582
-2635	556.5174	-906.1292	-2596	496.2071	-842.2172	-2523
-2549	468.8762	-721.1211	-2501	430.7859	-638.0959	-2395
-2379	373.5978	-577.3812	-2345	346.4342	-468.7434	-2191
-2118	285.4497	-433.7414	-2142	262.1484	-322.6128	-2042
-1690	322.4473	-283.4917	-2012	198.0977	17.6452	-1638
-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-129.8285	-3149	123.7299	-129.8285	-3149	123.7299	-129.8285
-142.6468	-3149	-393.3529	-175.4096	-3149	-339.1073	-211.1786
-164.1269	-3149	-682.7317	-256.232	-3149	-649.9527	-305.7829
-89.4967	-3149	-926.9529	-336.3095	-3149	-903.1609	-399.7843
-8.7681	-2993	-1291	-304.9146	-3067	-1099	-492.7691
75.1189	-2670	-1649	-221.5935	-2839	-1246	-586.341
148.3675	-2171	-1993	-166.573	-2375	-1594	-561.3247
476.5921	-1608	-2280	-2.4489	-1862	-1895	-453.5052
473.5839	-1066	-2439	284.9322	-1349	-2055	-272.3917
418.4586	-768.9292	-2407	322.9649	-822.0037	-2090	-16.0766
360.339	-546.3629	-2230	262.9605	-424.5576	-1951	123.9673
282.1841	-352.1029	-2052	210.2096	-212.605	-1852	75.6208
200.0445	-156.3023	-1869	111.5905	73.241	-1510	36.6346
83.3494	278.7055	-1085	35.8737	383.4266	-862.2953	48.8047
176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-3149	123.7299	-129.8285	-3149	123.7299	-129.8285	-3149
-3149	-265.0757	-248.0323	-3149	-225.0442	-284.1407	-2601
-3149	-611.0697	-364.8264	-3149	-661.8449	-462.8463	-1835
-3149	-875.0247	-483.2339	-3056	-922.8018	-650.2569	-1680
-3030	-1055	-602.0212	-2714	-983.4478	-847.1435	-1518
-2760	-1165	-733.9509	-2316	-858.6681	-1061	-1345
-2419	-1219	-874.9565	-1906	-534.4752	-1266	-1158
-2061	-1201	-992.3709	-1565	-220.2615	-1407	-951.2991
-1650	-1176	-999.6575	-1354	-92.6947	-1442	-778.5083
-1134	-1199	-830.7336	-1147	74.088	-1434	-679.0806
-643.8632	-1165	-578.5985	-934.4372	256.0867	-1381	-579.7214
-196.1327	-1334	-255.1816	-663.3838	314.3542	-1204	-489.8405
184.9191	-1153	-45.9441	-205.2913	88.0325	-821.6146	-410.9372
451.337	-718.1119	66.6876	450.1675	-86.5764	-165.4927	-198.3577
711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
123.7299	-129.8285	-3149	123.7299	-129.8285	-3149	123.7299
147.9593	-940.6664	-3149	567.9537	-303.1267	-3149	628.7725
224.7015	-1324	-3097	1248.1825	-558.2553	-3149	1304.9717
340.7848	-1377	-2593	1640.7956	-800.3006	-2800	1854.7625
457.3289	-1415	-2080	1706.4072	-1022	-2393	2242.8615
573.9215	-1439	-1485	1419.0552	-1247	-2100	2244.0975
6.92E+02	-1451	-1153	1220.5915	-1335	-1711	2072.0748
8.07E+02	-1453	-987.6612	1227.0677	-1348	-1274	1759.6672
9.52E+02	-1411	-811.0624	1215.288	-1339	-873.8212	1395.6436
1.02E+03	-1364	-626.3277	1178.0676	-1303	-658.0757	1320.3739
1.08E+03	-1307	-488.0777	1114.6385	-1231	-468.7463	1179.0827
1114.9154	-1240	-389.142	1081.4284	-1130	-280.7651	1116.5356
1063.6508	-1153	-206.6748	1098.1178	-985.9269	-13.9404	1035.1511
927.2395	-991.5146	272.3373	642.2596	-423.717	329.549	565.6267
-168.6375	176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-129.8285	-3149	123.7299	-129.8285	-3149	123.7299	-129.8285
-264.1237	-3149	721.7847	-251.5104	-3149	849.3715	-254.5641
-448.8586	-3149	1469.054	-396.1003	-3094	1740.2294	-327.933
-591.1339	-2800	2086.0213	-463.2176	-2857	2078.1375	-408.1354
-694.9811	-2559	2275.0795	-578.3753	-2656	2270.5164	-506.7553
-844.1721	-2317	2363.5054	-698.3471	-2445	2403.6643	-606.1826
-1026	-2062	2371.8327	-819.094	-2221	2479.3059	-706.7179
-1188	-1654	2252.9384	-975.9909	-1946	2491.7918	-820.1327
-1277	-1216	2022.9507	-1065	-1472	2336.7302	-921.45
-1222	-796.6135	1620.7736	-1088	-1017	2025.2199	-872.8904
-1129	-446.2463	1252.6344	-993.7119	-594.6456	1632.0587	-753.9049
-1045	-228.2312	1185.3357	-892.7041	-236.1584	1277.6469	-743.6112
-797.6836	75.6754	949.8315	-680.4611	77.6387	984.9025	-587.0101
-342.0283	349.3287	535.7046	-313.376	361.276	516.4261	-295.9697
176.9495	711.6141	-168.6375	176.9495	711.6141	-168.6375	176.9495

Curve 24	345. degrees	
P	M3	M2
-3149	123.7299	-129.8285
-3149	1179.5819	-241.418
-3073	1807.3197	-285.6351
-2898	2047.2884	-371.0016
-2717	2243.584	-456.1341
-2528	2398.4719	-540.9431
-2327	2515.8279	-625.1501
-2110	2601.552	-708.7205
-1729	2523.1653	-815.7397
-1119	2232.0719	-618.1107
-775.3793	1954.328	-527.8946
-413.8963	1553.1295	-436.4294
-71.5323	1266.9576	-416.7326
352.188	539.6093	-268.4802
711.6141	-168.6375	176.9495

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

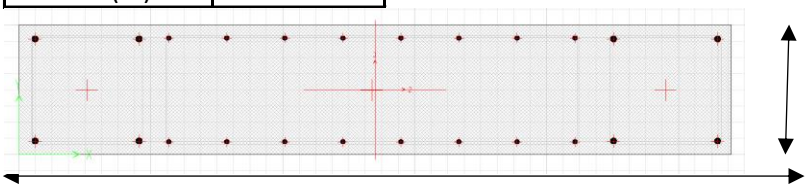
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 5)

1. INGRESO DE DATOS GENERALES

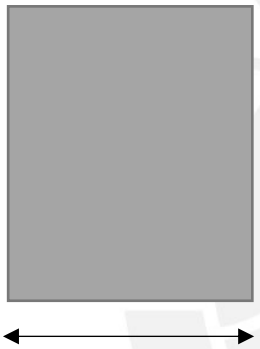
Lm (m)	1.35



t (m)

d (m) = 0.85xLm	1.15

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	1.35

hm/Lm	9.8

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**80.97**	(Axial del etabs)
Mua (ton)	**44.06**	(Momento del etabs)
Mn (ton)	**44.06**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**21.68**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**21.68**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	18.73

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	3.47

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	138.78	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	197.07	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	358.06	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

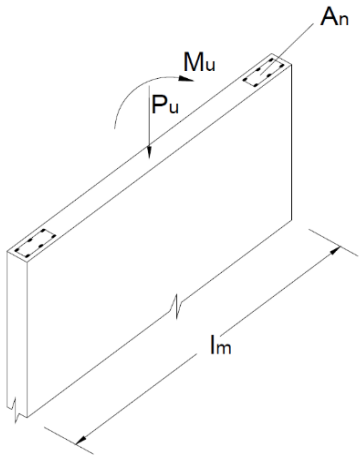
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	83.93	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 242.9 ton > Pu = 140.64 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	80.97
Long. (m)	1.35
F (ton)	59.98
Fy (kg/cm2)	4200
As (cm2)	14.3

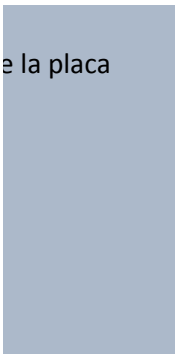
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
2	-501.0651	36.2559	-0.0251	-501.0651	28.8557	0.654
3	-501.0651	59.3144	-0.023	-501.0651	54.1495	0.6645
4	-474.9604	78.2633	-0.0211	-482.9472	74.9347	0.6646
5	-429.1549	93.9718	-0.0181	-435.1115	91.9411	0.6913
6	-382.4474	106.1264	-0.0145	-386.0709	104.9906	0.7049
7	-333.8233	114.9718	-9.84E-03	-335.3641	114.2418	0.7503
8	-282.9662	120.7264	-3.81E-03	-281.9572	119.8742	0.7971
9	-234.6303	120.6369	1.48E-03	-231.1677	119.5959	0.8201
10	-189.2455	114.3604	5.00E-03	-183.1296	112.7975	0.7614
11	-143.3014	103.3921	8.86E-03	-135.1898	100.7304	0.7887
12	-96.6485	87.7295	0.0131	-86.3577	83.5179	0.8124
13	-51.7485	72.0157	0.02	-39.5902	68.4036	1.0281
14	7.1151	50.9337	0.0348	27.5199	38.4464	1.2478
15	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P5	LIVE	Top	-6.55	0.33	0
PISO1	P5	LIVE	Bottom	-6.55	0.33	0
PISO1	P5	DEAD-SQ	Top	-42.82	2.51	0
PISO1	P5	DEAD-SQ	Bottom	-42.82	2.51	0
PISO1	P5	RX MAX	Top	19.18	17.27	0.02
PISO1	P5	RX MAX	Bottom	19.18	17.27	0.02
PISO1	P5	RX MIN	Top	-19.18	-17.27	-0.02
PISO1	P5	RX MIN	Bottom	-19.18	-17.27	-0.02
PISO1	P5	RY MAX	Top	11.4	5.36	0.13
PISO1	P5	RY MAX	Bottom	11.4	5.36	0.13
PISO1	P5	RY MIN	Top	-11.4	-5.36	-0.13
PISO1	P5	RY MIN	Bottom	-11.4	-5.36	-0.13

1.4CM+1.7CV	71.08	Tn	RX
1.25(CM+CV)	61.71	Tn	

CM	M22	-0.01	Tn.m	RY
	M33	0.85	Tn.m	
CV	M22	0.00	Tn.m	
	M33	0.03	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	71.08	-0.01	1.24
1.25(CM+CV)+CS	80.89	-0.12	45.19
1.25(CM+CV)-CS	42.53	0.10	-42.98
0.9CM+CS	57.72	-0.12	44.85
0.9CM-CS	19.36	0.10	-44.06

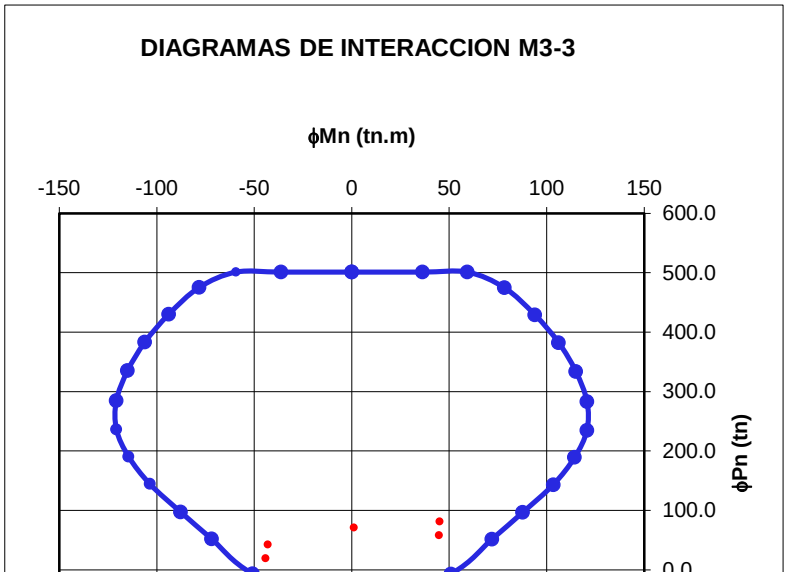
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

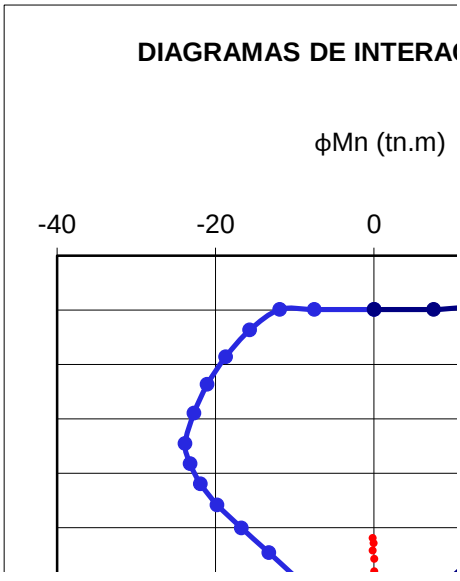
MOMENTO MINIMO DE DISEÑO

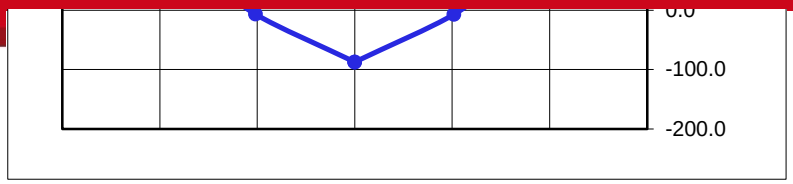
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	501.1	0.0	501.1	0.0
2	501.1	36.3	501.1	-36.3
3	501.1	59.3	501.1	-59.3
4	475.0	78.3	475.3	-78.3
5	429.2	94.0	429.9	-93.9
6	382.4	106.1	383.2	-106.1
7	333.8	115.0	335.1	-115.0
8	283.0	120.7	284.5	-120.8
9	234.6	120.6	236.0	-120.7
10	189.2	114.4	190.5	-114.4
11	143.3	103.4	144.3	-103.5
12	96.6	87.7	97.1	-87.7
13	51.7	72.0	52.0	-71.9
14	-7.1	50.9	-6.9	-50.9
15	-87.3	0.0	-87.3	0.0

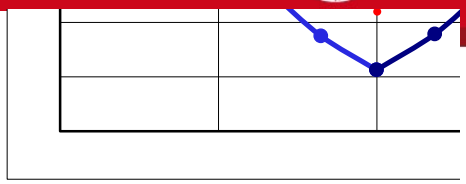
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

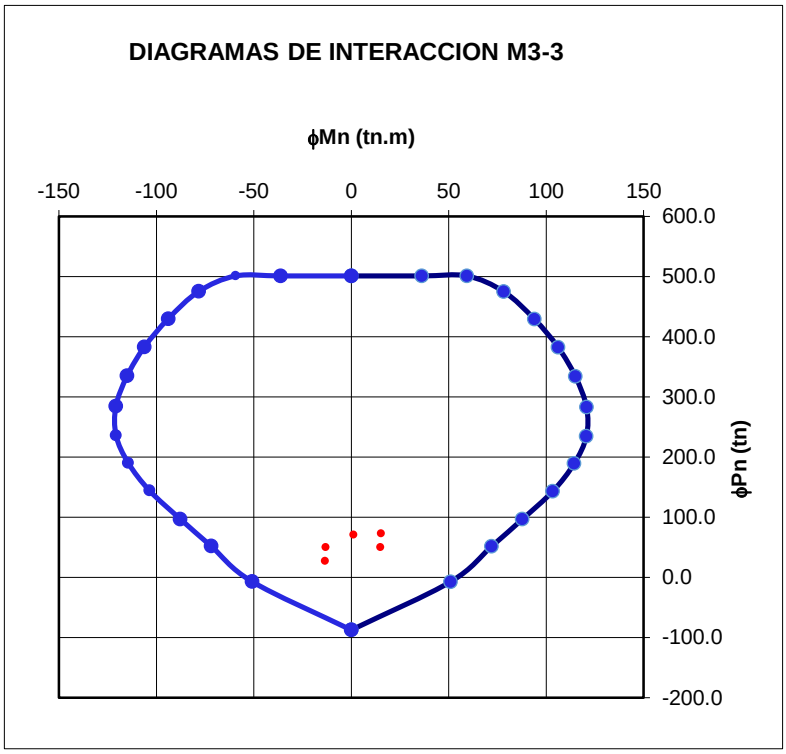


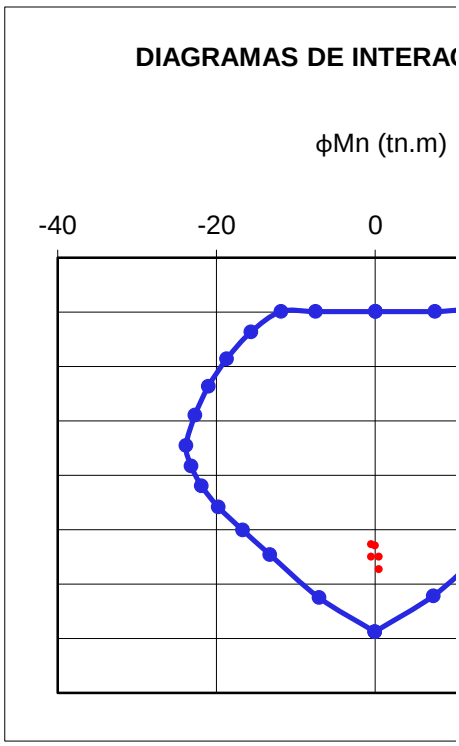






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	21.1708	1.2087	-501.0651	17.0066	1.2501	-501.0651
-501.0651	47.763	1.4467	-501.0651	38.6179	2.4479	-501.0651
-491.8915	70.8783	1.4251	-501.0651	64.5368	2.5022	-501.0651
-441.814	89.3385	1.5057	-450.5171	85.3365	2.6065	-464.999
-390.2367	103.4599	1.5405	-395.3169	100.8473	2.706	-403.8894
-336.7056	113.1029	1.6441	-338.4241	111.2489	2.8319	-340.615
-280.6052	118.6455	1.738	-278.7156	116.7536	2.9843	-274.6473
-227.2736	118.1966	1.7333	-222.0463	115.9821	2.9389	-212.3826
-176.3059	110.7938	1.6292	-166.5774	107.2523	2.8488	-150.6532
-126.0342	97.3961	1.6611	-112.7351	91.5806	2.9195	-90.3168
-73.9138	77.8027	1.7616	-58.9698	71.649	3.2158	-35.089
-22.2618	61.8682	2.4732	2.1036	50.7106	4.3278	22.3846
48.444	25.0405	2.2823	60.7131	17.1163	2.5065	65.7286
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

T	M2	M3
-0.002	0.001	-0.836
-0.002	0.001	0.03
-0.006	0	-5.795
-0.006	-0.006	0.852
0.098	0.068	2.938
0.098	0.11	44.087
-0.098	-0.068	-2.938
-0.098	-0.11	-44.087
0.241	0.181	1.29
0.241	0.47	14.169
-0.241	-0.181	-1.29
-0.241	-0.47	-14.169

P	19.18	Tn
M22	-0.11	Tn.m
M33	44.09	Tn.m

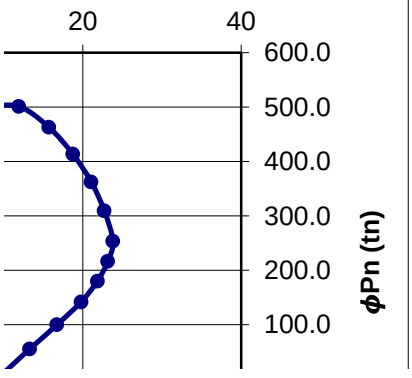
P	11.40	Tn
M22	-0.47	Tn.m
M33	14.17	Tn.m

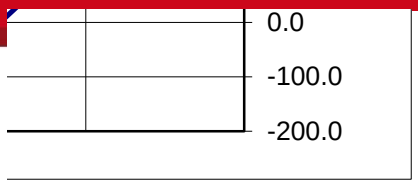
COMBINACIONES SISMO EN Y		
P	M22	M33

71.08	-0.01	1.24
73.11	-0.48	15.27
50.31	0.46	-13.07
49.94	-0.48	14.94
27.14	0.46	-13.40

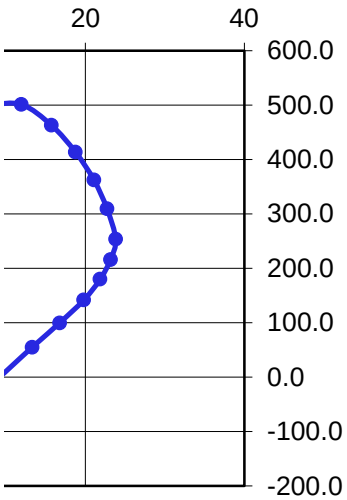
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
501.1	0.0	501.1	0.0
501.1	-7.5	501.1	7.5
501.1	-11.9	501.1	11.9
463.4	-15.7	463.0	15.7
414.1	-18.7	413.5	18.7
363.4	-21.0	362.6	21.1
310.7	-22.7	309.6	22.7
254.9	-23.8	253.5	23.8
217.5	-23.2	216.3	23.2
180.9	-21.9	179.9	21.8
142.0	-19.8	141.9	19.8
99.5	-16.7	99.9	16.7
54.3	-13.3	55.2	13.3
-24.7	-7.1	-21.4	7.3
-87.3	-0.1	-87.3	-0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
14.2218	1.2822	-501.0651	10.9132	1.6502	-501.0651	-8.51E-03
29.8791	3.0202	-501.0651	22.3597	3.5276	-501.0651	-7.96E-03
52.4622	4.2652	-501.0651	38.4485	5.8895	-463.4303	-6.74E-03
77.1743	4.4747	-489.4628	56.9082	8.1225	-414.1311	-5.23E-03
95.577	4.6459	-423.6377	75.5563	9.6274	-363.4199	-3.34E-03
107.1772	4.8563	-345.1685	90.7624	10.1347	-310.6783	-8.95E-04
112.316	5.125	-262.7488	95.3367	10.6082	-254.8649	2.38E-03
109.8546	5.1702	-187.9878	88.039	10.7715	-217.4846	4.74E-04
99.2547	5.0067	-117.3827	74.0722	10.0189	-180.9165	4.74E-04
80.0262	5.0732	-57.7408	60.0566	8.7251	-142.0308	-2.65E-03
62.1378	5.8106	-8.8672	48.3794	8.1308	-99.5254	-2.41E-03
37.9094	5.0813	34.3692	29.7472	5.1922	-54.3294	-2.07E-03
13.869	2.1797	70.3982	10.8044	1.7844	24.6668	-1.32E-03
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
7.4991	-501.0651	-10.9369	1.6459	-501.0651	-14.2586	1.2758
11.8727	-501.0651	-22.3422	3.5189	-501.0651	-29.8422	3.0093
15.66	-501.0651	-38.3833	5.8754	-501.0651	-52.333	4.2603
18.6968	-489.9539	-56.7987	8.107	-465.5931	-77.0381	4.4855
21.0215	-424.7488	-75.206	9.6524	-404.7647	-95.4333	4.6461
22.6953	-346.1947	-90.6786	10.1329	-341.6875	-107.0948	4.8561
23.8208	-263.9925	-95.3878	10.6044	-275.9938	-112.3404	5.1272
23.1937	-189.1241	-88.2142	10.7752	-213.6173	-109.9326	5.1688
21.8928	-118.1117	-74.2103	10.0254	-151.6983	-99.3861	5.0192
19.7729	-58.236	-59.9603	8.7443	-91.1681	-80.157	5.091
16.7048	-9.269	-48.3418	8.164	-35.6367	-62.0666	5.834
13.2562	34.2179	-29.637	5.2061	22.2875	-37.798	5.1089
7.0766	70.6341	-10.5612	1.7619	66.0187	-13.5802	2.1513
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	-17.0357	1.2435	-501.0651	-21.1793	1.2031	-501.0651
-501.0651	-38.5487	2.443	-501.0651	-47.6871	1.4465	-501.0651
-501.0651	-64.4184	2.4992	-492.4542	-70.7673	1.4248	-483.5181
-451.2466	-85.1992	2.6055	-442.5845	-89.2312	1.5021	-435.8613
-396.2356	-100.7363	2.7045	-391.1707	-103.3592	1.5393	-387.051
-339.3171	-111.2122	2.8297	-337.86	-113.049	1.6428	-336.5946
-280.135	-116.7834	2.985	-282.0538	-118.6698	1.7398	-283.4299
-223.3239	-116.0251	2.9398	-228.6243	-118.2518	1.7307	-232.543
-167.7411	-107.3164	2.8589	-177.4733	-110.9008	1.6276	-184.3165
-113.5185	-91.6795	2.9323	-126.7962	-97.4247	1.6786	-136.1578
-59.3595	-71.5432	3.227	-74.5173	-77.8328	1.7695	-86.948
1.9161	-50.6227	4.3521	-22.3097	-61.6838	2.5078	-39.7733
61.0136	-16.8151	2.4753	49.0969	-24.487	2.2841	28.0442
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
-28.8514	0.6537	-501.0651	-36.2596	-2.52E-02	-501.0651	-28.8531
-54.0846	0.6644	-501.0651	-59.2594	-2.31E-02	-501.0651	-54.0903
-74.8341	0.6644	-475.3027	-78.2645	-2.10E-02	-483.5006	-74.8417
-91.8339	0.691	-429.9148	-93.8744	-1.82E-02	-435.8338	-91.8417
-104.9145	0.7008	-383.1671	-106.0896	-1.45E-02	-387.0138	-104.9211
-114.2162	0.7483	-335.0874	-114.9573	-0.0101	-336.546	-114.2195
-119.8942	0.7999	-284.5045	-120.7641	-4.14E-03	-283.3721	-119.8947
-119.6407	0.8182	-236.02	-120.6757	1.16E-03	-232.499	-119.6376
-112.8939	0.7604	-190.4506	-114.4488	4.70E-03	-184.2834	-112.8884
-100.8417	0.7878	-144.283	-103.4956	8.61E-03	-136.1367	-100.8358
-83.5545	0.7997	-97.1275	-87.7124	0.0131	-86.9396	-83.5507
-68.223	1.0441	-52.0452	-71.8872	0.0199	-39.7901	-68.228
-37.9445	1.2602	6.9339	-50.8576	0.0348	27.9989	-37.974
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
-0.7048	-501.0651	-21.1805	-1.255	-501.0651	-17.0322	-1.2969
-0.7114	-501.0651	-47.7008	-1.4944	-501.0651	-38.5733	-2.4917
-0.7075	-492.4154	-70.7854	-1.4684	-501.0651	-64.4545	-2.5437
-0.7284	-442.5257	-89.2501	-1.5402	-451.1491	-85.2384	-2.6436
-0.7309	-391.0941	-103.3763	-1.5698	-396.1002	-100.768	-2.7353
-0.7693	-337.7596	-113.0587	-1.6638	-339.1408	-111.2292	-2.8508
-0.8084	-281.9285	-118.6697	-1.7486	-279.916	-116.7807	-2.9942
-0.8157	-228.5281	-118.2433	-1.7282	-223.1651	-116.0134	-2.9364
-0.7497	-177.4	-110.8868	-1.6158	-167.6247	-107.295	-2.8441
-0.769	-126.759	-97.4164	-1.6571	-113.444	-91.6583	-2.9079
-0.7717	-74.5105	-77.8313	-1.7372	-59.3392	-71.539	-3.1894
-0.9969	-22.3448	-61.6934	-2.4497	1.8997	-50.6279	-4.2865
-1.1842	49.001	-24.5491	-2.2008	60.9371	-16.8648	-2.3943
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	-14.2536	-1.3298	-501.0651	-10.9329	-1.6986	-501.0651
-501.0651	-29.8671	-3.0611	-501.0651	-22.3739	-3.5733	-501.0651
-501.0651	-52.3996	-4.3061	-501.0651	-38.4591	-5.9292	-463.0445
-465.4165	-77.1152	-4.5236	-489.6943	-56.9146	-8.1552	-413.5376
-404.5345	-95.5019	-4.6761	-423.9369	-75.5633	-9.6548	-362.605
-341.3885	-107.1333	-4.8763	-345.5153	-90.7656	-10.1519	-309.6169
-275.6231	-112.3377	-5.1353	-263.153	-95.3393	-10.6116	-253.5091
-213.3347	-109.8965	-5.1652	-188.4446	-88.0577	-10.7712	-216.3187
-151.4878	-99.3297	-5.0029	-117.7345	-74.0812	-9.9995	-179.9449
-91.0276	-80.1004	-5.0628	-58.0882	-59.9324	-8.7019	-141.9381
-35.6081	-62.0493	-5.7836	-9.2149	-48.32	-8.0971	-99.8551
22.2296	-37.8249	-5.0353	34.0164	-29.7328	-5.1535	-55.1501
65.8906	-13.6632	-2.0736	70.4093	-10.707	-1.6906	21.3964
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
-8.56E-03	-7.5463	-501.0651	10.9093	-1.7028	-501.0651	14.2128
-8.01E-03	-11.9307	-501.0651	22.3914	-3.5819	-501.0651	29.904
-6.78E-03	-15.7184	-501.0651	38.5242	-5.9433	-501.0651	52.5287
-5.27E-03	-18.7476	-489.2024	57.024	-8.1706	-464.8225	77.251
-3.37E-03	-21.0569	-423.1578	75.6974	-9.6616	-403.6475	95.6375
-9.14E-04	-22.7076	-344.489	90.8475	-10.1535	-340.316	107.2149
2.39E-03	-23.8034	-261.909	95.2858	-10.6152	-274.2763	112.3121
4.74E-04	-23.1591	-187.3097	87.8817	-10.7669	-212.0824	109.8098
4.74E-04	-21.8478	-116.8883	73.9436	-9.9809	-150.4425	99.1977
-2.83E-03	-19.7886	-57.5926	60.0282	-8.6821	-90.1762	79.9692
-2.66E-03	-16.7381	-8.8137	48.3575	-8.0636	-35.0608	62.1206
-2.46E-03	-13.28	34.1668	29.8437	-5.1396	22.3259	37.9371
-2.29E-03	-7.3106	70.1722	10.9522	-1.7136	65.5996	13.9532
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
-1.3369	-501.0651	17.003	-1.3035	-501.0651	21.1719	-1.2605
-3.0719	-501.0651	38.6429	-2.4966	-501.0651	47.7766	-1.4944
-4.3107	-501.0651	64.5727	-2.5465	-491.8527	70.8964	-1.4685
-4.5128	-450.4196	85.3754	-2.6444	-441.7551	89.3572	-1.5436
-4.6768	-395.1814	100.8786	-2.7365	-390.1601	103.4767	-1.5707
-4.8762	-338.2478	111.2653	-2.8529	-336.607	113.113	-1.6649
-5.1326	-278.4964	116.7502	-2.993	-280.4797	118.645	-1.7462
-5.1645	-221.8872	115.97	-2.935	-227.1773	118.1878	-1.7302
-4.9899	-166.4609	107.2306	-2.8334	-176.2324	110.7795	-1.6168
-5.0446	-112.3273	91.4082	-2.9269	-125.997	97.3877	-1.6394
-5.7598	-58.9496	71.6448	-3.178	-73.9072	77.8011	-1.729
-5.0079	2.0866	50.7165	-4.2623	-22.2904	61.8766	-2.4162
-2.1024	60.6359	17.1668	-2.4259	48.3473	25.1036	-2.1999
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 24	345. degrees	
P	M3	M2
-501.0651	-0.0158	-0.0384
-501.0651	28.8574	-0.7051
-501.0651	54.1551	-0.7114
-482.9297	74.9423	-0.7075
-435.084	91.9489	-0.7284
-386.0337	104.997	-0.7347
-335.3164	114.2453	-0.771
-281.8993	119.8745	-0.805
-231.1237	119.5927	-0.817
-183.0964	112.7919	-0.7501
-135.1686	100.7244	-0.7695
-86.3493	83.5141	-0.7842
-39.6072	68.4086	-0.981
27.5039	38.4572	-1.1699
87.3056	0.0215	0.0524

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

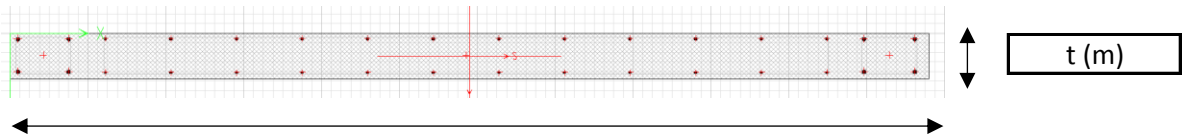
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 6)

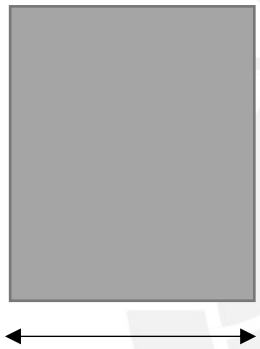
1. INGRESO DE DATOS GENERALES

Lm (m)	2.95



d (m) = 0.85xLm	2.51

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	2.95

hm/Lm	4.5

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**77.77**	(Axial del etabs)
Mua (ton)	**175.15**	(Momento del etabs)
Mn (ton)	**175.15**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**29.15**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**29.15**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	28.35

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	0.94

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	1123.83	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	1595.84	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	2899.48	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

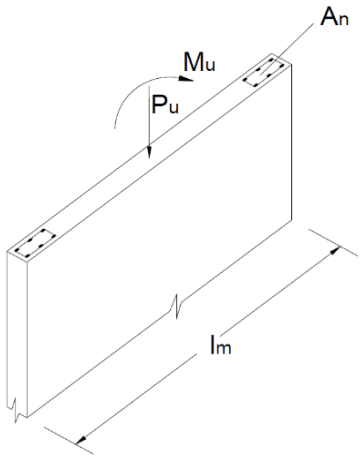
N_u = 75.95 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 248.7 ton > Pu = 140.64 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	175.15
Long. (m)	2.95
F (ton)	59.4
Fy (kg/cm2)	4200
As (cm2)	14.1

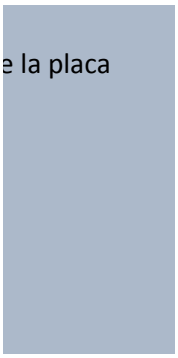
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894
2	-661.914	104.3017	-0.124	-661.914	98.6026	2.11E-02
3	-661.914	169.0382	-0.1151	-661.914	165.0619	3.32E-02
4	-628.4662	224.0186	-0.1033	-631.3315	221.4293	0.0471
5	-569.0305	269.0136	-0.0891	-571.1009	267.4681	0.0639
6	-507.9002	304.2777	-0.0713	-509.1438	303.4115	0.0871
7	-444.5034	330.3481	-0.0487	-444.9416	329.8379	0.1138
8	-377.969	348.0889	-1.95E-02	-377.5518	347.5575	0.1507
9	-313.63	348.8288	5.01E-03	-312.2736	348.3723	0.1638
10	-251.3845	333.294	2.51E-02	-249.3047	332.3324	0.1828
11	-189.2201	303.9751	0.0451	-186.3301	302.0745	0.2061
12	-126.3204	259.9139	0.0666	-122.4608	256.5438	0.238
13	-67.1253	216.425	0.0978	-62.6664	213.8081	0.3096
14	10.1313	154.0618	0.1635	18.3533	143.6518	0.4432
15	122.9107	1.0131	0.2582	122.9107	1.0131	0.2582

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P6	LIVE	Top	-5.29	0.02	-0.02
PISO1	P6	LIVE	Bottom	-5.29	0.02	-0.02
PISO1	P6	DEAD-SQ	Top	-45.27	-1.09	-0.14
PISO1	P6	DEAD-SQ	Bottom	-45.27	-1.09	-0.14
PISO1	P6	RX MAX	Top	11.41	28.39	0.03
PISO1	P6	RX MAX	Bottom	11.41	28.39	0.03
PISO1	P6	RX MIN	Top	-11.41	-28.39	-0.03
PISO1	P6	RX MIN	Bottom	-11.41	-28.39	-0.03
PISO1	P6	RY MAX	Top	4.09	5.61	0.16
PISO1	P6	RY MAX	Bottom	4.09	5.61	0.16
PISO1	P6	RY MIN	Top	-4.09	-5.61	-0.16
PISO1	P6	RY MIN	Bottom	-4.09	-5.61	-0.16

1.4CM+1.7CV	72.37	Tn	RX
1.25(CM+CV)	63.20	Tn	

CM	M22	-0.13	Tn.m	RY
	M33	-12.53	Tn.m	
CV	M22	-0.02	Tn.m	
	M33	-2.22	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	72.37	-0.21	-21.31
1.25(CM+CV)+CS	74.61	-0.27	140.35
1.25(CM+CV)-CS	51.79	-0.10	-177.21
0.9CM+CS	52.15	-0.20	147.50
0.9CM-CS	29.33	-0.03	-160.77

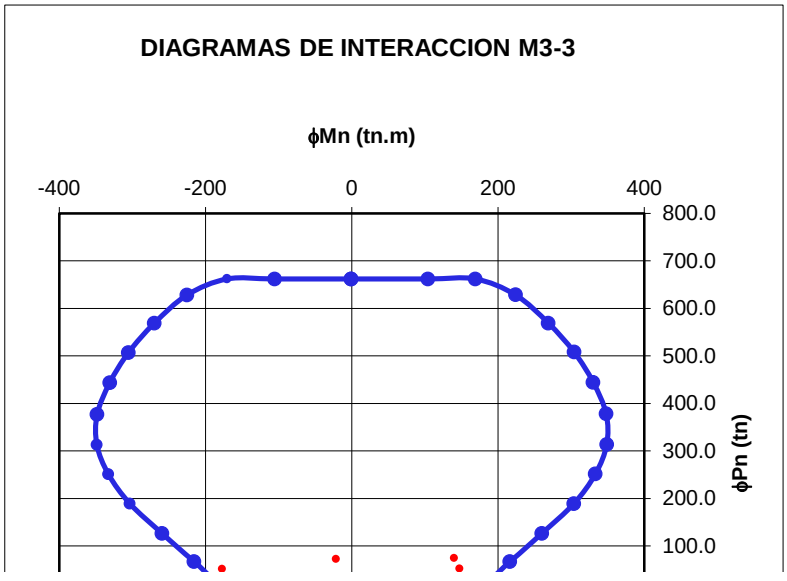
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

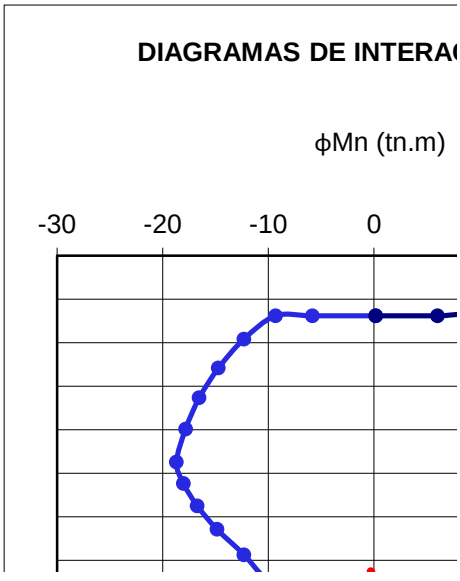
MOMENTO MINIMO DE DISEÑO

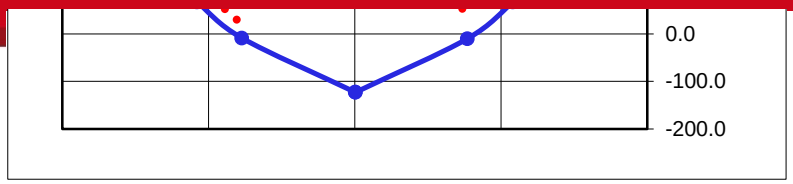
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	661.9	-0.7	661.9	-0.7
2	661.9	104.3	661.9	-105.3
3	661.9	169.0	661.9	-170.2
4	628.5	224.0	628.2	-225.2
5	569.0	269.0	568.5	-270.1
6	507.9	304.3	507.2	-305.2
7	444.5	330.3	443.5	-331.0
8	378.0	348.1	376.7	-348.3
9	313.6	348.8	312.7	-348.6
10	251.4	333.3	250.8	-332.7
11	189.2	304.0	188.9	-303.3
12	126.3	259.9	126.4	-259.3
13	67.1	216.4	67.4	-215.6
14	-10.1	154.1	-8.8	-154.3
15	-122.9	1.0	-122.9	1.0

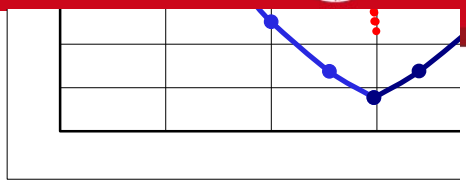
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

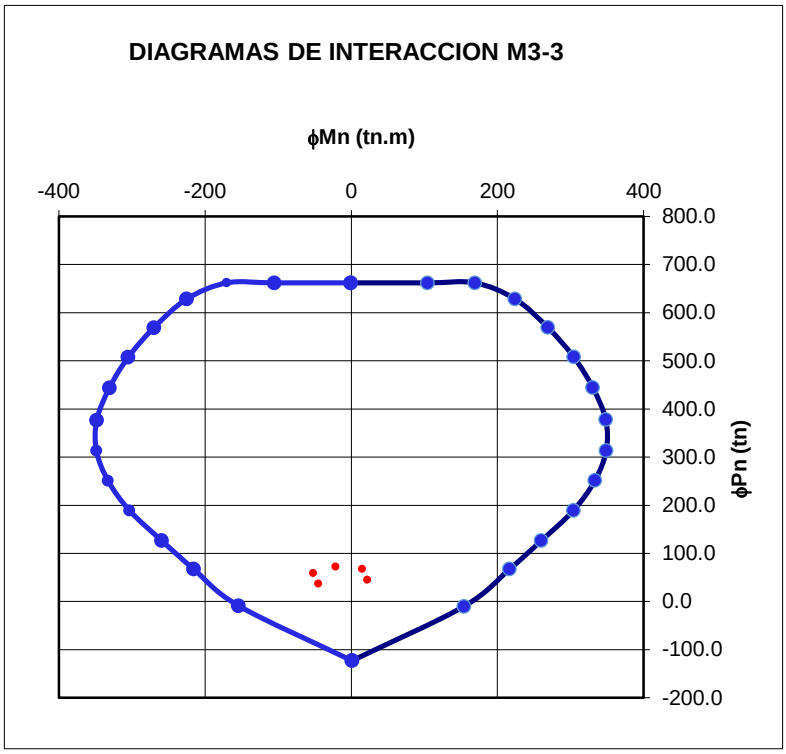


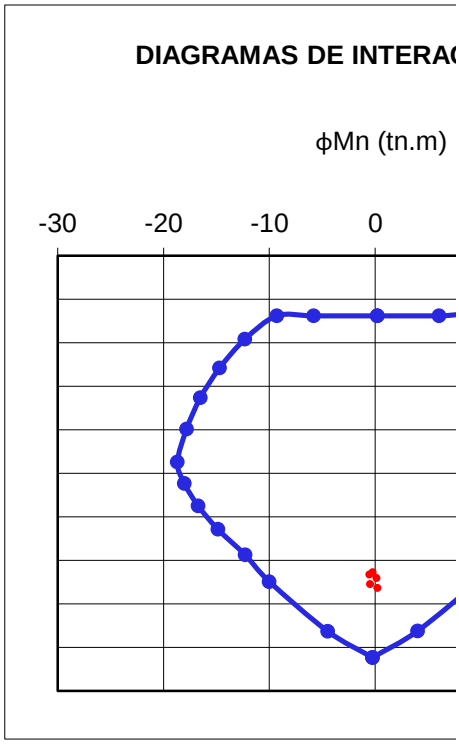






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914
-661.914	91.9017	0.1879	-661.914	82.8118	0.4052	-661.914
-661.914	160.3816	0.2038	-661.914	153.8335	0.4355	-661.914
-634.6319	218.3752	0.22	-639.1267	214.091	0.455	-646.7077
-573.4519	265.6148	0.2415	-576.6461	262.9998	0.4828	-582.0293
-510.5723	302.3775	0.2689	-512.5112	300.9057	0.5156	-515.7065
-445.4403	329.2203	0.3004	-446.0804	328.299	0.555	-447.1016
-377.0523	346.9037	0.3466	-376.3613	345.9602	0.612	-375.2601
-310.7107	347.8008	0.3462	-308.5813	346.9428	0.5938	-304.9638
-246.8973	331.1534	0.3646	-243.5213	329.3356	0.617	-237.5102
-182.8662	299.6487	0.3987	-178.1992	296.2214	0.6574	-169.8032
-118.0253	252.5818	0.4346	-111.8369	246.7832	0.7099	-100.9933
-57.276	210.398	0.5601	-49.7207	205.2024	0.9048	-35.2991
28.3908	130.6252	0.7971	42.2524	112.2282	1.2896	63.0783
122.9107	1.0131	0.2582	122.9107	1.0131	0.2582	122.9107

T	M2	M3
0.007	0.043	-2.258
0.007	-0.02	-2.215
0.086	0.251	-9.652
0.086	-0.127	-12.53
0.164	0.027	84.881
0.164	0.084	158.779
-0.164	-0.027	-84.881
-0.164	-0.084	-158.779
0.117	0.138	19.837
0.117	0.336	33.51
-0.117	-0.138	-19.837
-0.117	-0.336	-33.51

P	11.41	Tn
M22	-0.08	Tn.m
M33	158.78	Tn.m

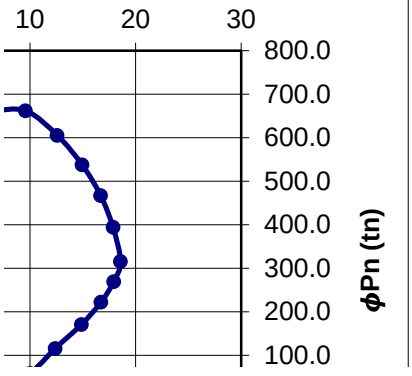
P	4.09	Tn
M22	-0.34	Tn.m
M33	33.51	Tn.m

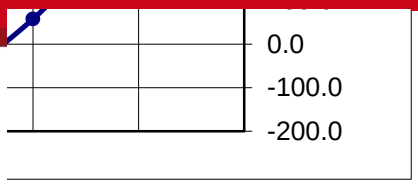
COMBINACIONES SISMO EN Y		
P	M22	M33

72.37	-0.21	-21.31
67.29	-0.52	15.08
59.11	0.15	-51.94
44.83	-0.45	22.23
36.65	0.22	-44.79

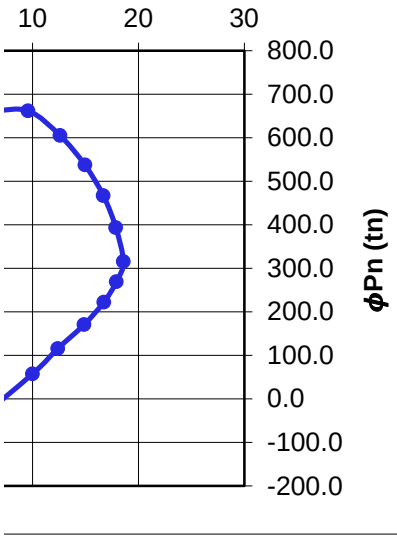
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
661.9	0.2	661.9	0.2
661.9	-5.8	661.9	6.0
661.9	-9.3	661.9	9.6
608.3	-12.3	605.5	12.6
541.9	-14.7	537.5	14.9
473.4	-16.5	467.3	16.7
401.9	-17.8	393.9	17.9
325.7	-18.7	315.4	18.6
276.6	-18.0	269.3	17.9
225.1	-16.7	222.2	16.7
171.3	-14.8	170.9	14.9
112.8	-12.3	115.7	12.4
51.4	-10.0	57.9	10.0
-62.7	-4.5	-61.8	4.0
-122.9	-0.3	-122.9	-0.3

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433
66.8805	0.7604	-661.914	49.1824	0.859	-661.914	-0.4576
142.4572	0.8158	-661.914	108.4836	1.8427	-661.914	-4.36E-01
206.4364	0.8552	-661.914	183.2715	1.9433	-608.3244	-3.83E-01
258.3376	0.8907	-596.8836	243.7093	2.0006	-541.9167	-0.3176
298.2416	0.9331	-524.5052	289.4506	2.0712	-473.4267	-0.235
326.5091	0.9947	-449.5608	320.4944	2.1649	-401.9084	-1.27E-01
344.1952	1.0594	-371.0535	337.6424	2.2976	-325.7405	1.85E-02
345.1151	1.0197	-294.4117	336.3315	2.2736	-276.6446	3.35E-02
325.6143	1.0606	-220.5454	312.127	2.3194	-225.1365	7.17E-02
289.5454	1.1213	-146.4723	267.721	2.4202	-171.2871	1.29E-01
235.9998	1.1931	-74.6493	213.0954	2.6498	-112.7551	0.2244
193.7654	1.5629	7.4733	151.1287	3.36	-51.3589	0.4464
83.6178	1.9588	86.7818	50.4623	2.1482	62.7065	1.0131
1.0131	0.2582	122.9107	1.0131	0.2582	122.9107	1.0131

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894
5.8053	-661.914	-50.161	0.8611	-661.914	-67.9566	0.7604
9.2956	-661.914	-109.7883	1.843	-661.914	-143.7288	0.8139
12.3057	-661.914	-184.7006	1.9406	-646.427	-207.7609	0.8533
14.7042	-596.3453	-245.0343	1.9979	-581.5065	-259.5608	0.8888
16.5244	-523.7269	-290.5301	2.0692	-514.9693	-299.2649	0.9319
17.8198	-448.575	-321.2321	2.1617	-446.1105	-327.1853	0.9929
18.6823	-369.7937	-337.8545	2.294	-373.9701	-344.3834	1.058
18.0245	-293.516	-335.9821	2.2703	-304.0784	-344.7877	1.0184
16.7211	-219.8386	-311.3866	2.3216	-236.9082	-324.9952	1.0567
14.8491	-146.212	-266.9011	2.4175	-169.5224	-288.8553	1.1183
12.2857	-74.7126	-212.1562	2.6484	-101.1035	-235.3999	1.1878
9.9995	6.9845	-150.2618	3.3615	-35.8693	-193.0399	1.5581
4.4868	85.8909	-49.8306	2.1958	61.9922	-83.3549	1.9632
0.2582	122.9107	1.0131	0.2582	122.9107	1.0131	0.2582

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914
-661.914	-83.9031	0.4034	-661.914	-93.2532	0.176	-661.914
-661.914	-155.2124	0.4275	-661.914	-161.6101	0.2024	-661.914
-638.8396	-215.3675	0.4541	-634.3535	-219.6304	0.2191	-631.0597
-576.1379	-264.1942	0.4807	-572.9526	-266.7908	0.2393	-570.5843
-511.7755	-301.8963	0.5149	-509.8454	-303.3546	0.268	-508.4235
-445.1034	-328.9692	0.5529	-444.4433	-329.8588	0.2997	-443.9505
-375.0829	-346.1604	0.6101	-375.781	-347.1125	0.3443	-376.2857
-307.6602	-346.6234	0.5931	-309.8007	-347.4992	0.3453	-311.372
-242.905	-328.7379	0.6138	-246.2598	-330.5447	0.363	-248.6644
-177.816	-295.4441	0.6611	-182.6185	-298.9992	0.3953	-186.0501
-111.8434	-246.0663	0.7117	-118.0979	-251.9333	0.4333	-122.5484
-50.146	-204.4166	0.9096	-57.7681	-209.6726	0.555	-63.1061
40.9442	-112.3186	1.2849	26.7329	-131.2008	0.7742	17.03
122.9107	1.0131	0.2582	122.9107	1.0131	0.2582	122.9107

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433
-99.6571	2.02E-02	-661.914	-105.3449	-1.25E-01	-661.914	-99.6626
-166.2795	3.22E-02	-661.914	-170.2428	-1.16E-01	-661.914	-166.303
-222.6687	0.0462	-628.2002	-225.2441	-1.04E-01	-631.0275	-222.702
-268.6126	0.063	-568.5195	-270.1452	-9.01E-02	-570.5311	-268.6472
-304.3786	0.0861	-507.1858	-305.2361	-7.23E-02	-508.3507	-304.4089
-330.4724	0.1129	-443.5175	-330.979	-0.0497	-443.8537	-330.4897
-347.7727	0.1481	-376.6748	-348.278	-0.0204	-376.1631	-347.7732
-348.0839	0.1628	-312.7359	-348.5519	3.78E-03	-311.2731	-348.0628
-331.7287	0.1817	-250.7523	-332.7067	2.39E-02	-248.588	-331.6937
-301.4009	0.2046	-188.9333	-303.306	0.0436	-185.9984	-301.3653
-255.9327	0.2364	-126.4214	-259.336	0.0648	-122.5368	-255.9257
-213.0769	0.3013	-67.4463	-215.6234	0.0958	-63.1308	-213.0946
-143.7856	0.4402	8.7762	-154.2727	0.16	16.9062	-143.94
1.0131	0.2582	122.9107	1.0131	0.2582	122.9107	1.0131

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894
-0.271	-661.914	-93.2665	-0.427	-661.914	-83.9315	-0.6558
-0.2655	-661.914	-161.6628	-0.4368	-661.914	-155.3081	-0.6628
-0.256	-634.2834	-219.7043	-0.4302	-638.7163	-215.5004	-0.6669
-0.2443	-572.8397	-266.8692	-0.4217	-575.9406	-264.334	-0.6647
-0.2319	-509.6878	-303.421	-0.415	-511.5008	-302.0138	-0.6635
-0.2134	-444.2342	-329.8962	-0.4014	-444.7412	-329.0353	-0.6562
-0.1898	-375.5164	-347.1122	-0.3868	-374.6238	-346.1564	-0.6538
-0.1547	-309.5869	-347.452	-0.3368	-307.2882	-346.5372	-0.584
-0.1331	-246.0944	-330.467	-0.3135	-242.6248	-328.6078	-0.5623
-0.1156	-182.5212	-298.938	-0.3037	-177.649	-295.3365	-0.5658
-0.1038	-118.0708	-251.9143	-0.2974	-111.819	-246.061	-0.5692
-0.1012	-57.8206	-209.7095	-0.344	-50.2676	-204.5075	-0.6856
-0.1096	26.6833	-131.2511	-0.4415	40.4489	-112.958	-0.9169
0.2582	122.9107	1.0131	0.2582	122.9107	1.0131	0.2582

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914
-661.914	-67.9957	-1.0152	-661.914	-50.1067	-1.125	-661.914
-661.914	-143.9082	-1.0508	-661.914	-110.5016	-2.075	-661.914
-646.2147	-208.0105	-1.0678	-661.914	-185.3173	-2.1601	-605.5118
-581.1593	-259.8155	-1.0747	-595.3468	-245.8411	-2.1887	-537.5179
-514.4886	-299.4764	-1.0828	-522.6643	-291.0355	-2.2249	-467.3251
-445.3676	-327.3429	-1.0914	-447.2546	-321.5554	-2.2698	-393.8849
-373.1723	-344.3664	-1.1043	-368.1123	-337.8244	-2.3409	-315.3561
-303.4429	-344.6362	-1.0084	-292.216	-335.6549	-2.2529	-269.3246
-236.4466	-324.7802	-1.0006	-218.7757	-310.9206	-2.2411	-222.1719
-169.2474	-288.6919	-1.0154	-145.6426	-266.4966	-2.2923	-170.9262
-101.0297	-235.356	-1.0367	-74.6166	-212.1025	-2.4603	-115.7427
-36.1381	-193.2795	-1.3067	6.4417	-150.9222	-3.043	-57.8876
61.332	-84.2159	-1.5759	84.7732	-51.2904	-1.8274	61.841
122.9107	1.0131	0.2582	122.9107	1.0131	0.2582	122.9107

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.7433	-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433
-0.4714	-6.0446	-661.914	49.1217	-1.1214	-661.914	66.9162
-0.4499	-9.5815	-661.914	108.88	-2.0851	-661.914	142.6343
-0.3965	-12.5884	-661.914	183.9	-2.1605	-646.495	206.6842
-0.3303	-14.9449	-596.1202	244.3427	-2.19	-581.6815	258.5916
-0.246	-16.6846	-523.4489	289.9632	-2.2255	-515.2328	298.4609
-1.35E-01	-17.8626	-448.2376	320.8212	-2.2709	-446.4756	326.6324
1.84E-02	-18.5751	-369.3851	337.6414	-2.3417	-374.4608	344.182
2.23E-02	-17.9291	-293.1074	336.0058	-2.2538	-304.3263	344.9647
3.48E-02	-16.7272	-219.5958	311.6954	-2.2436	-237.0416	325.4014
8.28E-02	-14.8749	-145.8973	267.3067	-2.292	-169.5255	289.3775
0.1629	-12.3817	-74.5479	213.0301	-2.4581	-100.9624	236.0152
0.3516	-10.0019	6.9426	151.7589	-3.0372	-35.5638	193.9934
0.9837	-4.0041	85.6746	51.8922	-1.7748	62.4255	84.4593
1.0131	0.2582	122.9107	1.0131	0.2582	122.9107	1.0131

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.1894	-661.914	-0.7433	-0.1894	-661.914	-0.7433	-0.1894
-1.0135	-661.914	82.8387	-0.6559	-661.914	91.9141	-0.4382
-1.0509	-661.914	153.929	-0.6697	-661.914	160.4347	-0.4364
-1.0678	-639.0031	214.2229	-0.6658	-634.5616	218.4486	-0.4292
-1.0746	-576.4484	263.1391	-0.6647	-573.3388	265.6928	-0.4219
-1.0815	-512.2359	301.0234	-0.6622	-510.4143	302.4439	-0.4138
-1.0979	-445.7214	328.37	-0.656	-445.2308	329.2583	-0.4001
-1.1039	-375.9012	345.9584	-0.6539	-376.7872	346.9047	-0.3872
-1.0072	-308.2082	346.8574	-0.5823	-310.4963	347.754	-0.3353
-1.0016	-243.2398	329.2048	-0.563	-246.7361	331.0812	-0.3123
-1.0155	-177.9123	296.0254	-0.5658	-182.7709	299.5895	-0.3041
-1.036	-111.8105	246.7734	-0.5642	-117.997	252.5605	-0.2952
-1.3061	-49.8746	205.3366	-0.6753	-57.351	210.453	-0.3456
-1.5658	41.7662	112.8496	-0.915	28.0681	131.0351	-0.4419
0.2582	122.9107	1.0131	0.2582	122.9107	1.0131	0.2582

Curve 24	345. degrees	
P	M3	M2
-661.914	-0.7433	-0.1894
-661.914	98.6077	-0.2701
-661.914	165.0856	-0.2646
-631.2993	221.4624	-0.2549
-571.0475	267.5026	-0.2432
-509.0709	303.4418	-0.2307
-444.8446	329.8555	-0.2123
-377.4289	347.5586	-0.1905
-312.1744	348.3515	-0.1534
-249.228	332.2973	-0.1317
-186.2811	302.0418	-0.1144
-122.4486	256.5356	-0.1019
-62.7012	213.8337	-0.1054
18.2308	143.8027	-0.1056
122.9107	1.0131	0.2582

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

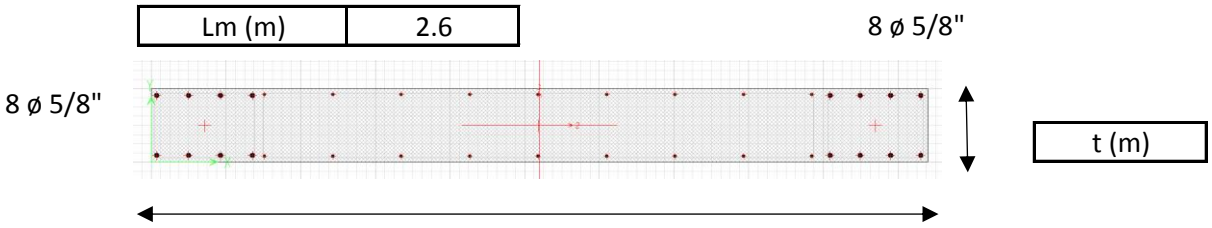
16.8
19.0
19.0

CV (ton)

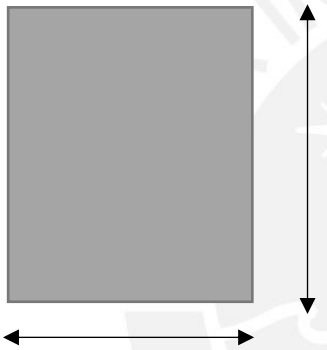
18.7

DISEÑO DE MUROS DE CORTE (PLACA - 7)

1. INGRESO DE DATOS GENERALES



Lm (m)	2.6
d (m) = 0.85xLm	2.21
f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25
Lm (m)	2.6

hm/Lm	5.1

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**215.18**	(Axial del etabs)
Mua (ton)	**201.97**	(Momento del etabs)
Mn (ton)	**201.97**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**47.70**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**47.70**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	36.07

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	13.68

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	67.83	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	96.33	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	175.01	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

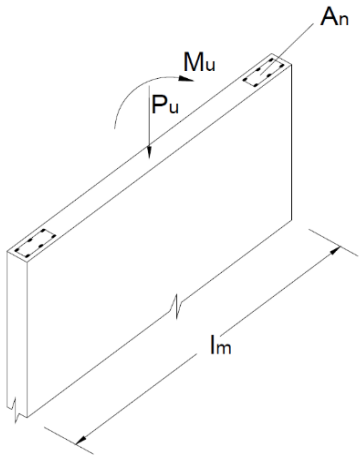
N_u = 134.19 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 467.9 ton > Pu = 134.19 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	201.97
Long. (m)	2.6
F (ton)	77.68
Fy (kg/cm2)	4200
As (cm2)	18.5

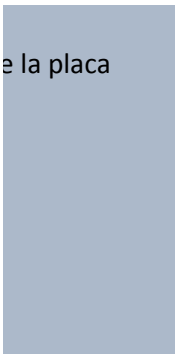
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621
2	-965.6612	138.7503	-0.0394	-965.6612	124.521	0.6442
3	-965.6612	222.5968	-0.0368	-965.6612	212.8681	0.6283
4	-916.7467	294.3142	-0.0329	-925.0707	287.6378	0.6768
5	-830.0821	353.2017	-0.0282	-836.3053	349.0776	0.6943
6	-741.283	399.7442	-0.0224	-745.342	397.3036	0.7234
7	-649.3176	434.512	-0.0151	-651.2921	432.9833	0.753
8	-553.0995	458.7653	-5.64E-03	-552.8568	457.3159	0.7769
9	-461.0515	461.3604	1.69E-03	-458.0041	460.423	0.6932
10	-375.9922	440.5051	5.51E-03	-370.579	438.0738	0.7297
11	-289.713	402.3682	9.95E-03	-282.0519	397.6965	0.7526
12	-201.8927	346.3445	0.0152	-191.4759	338.0919	0.845
13	-114.2104	279.7978	0.0232	-103.1569	274.0707	1.0193
14	-1.7834	204.3706	0.0487	22.3026	177.7995	1.6405
15	169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P7	LIVE	Top	-17.82	1.03	-0.07
PISO1	P7	LIVE	Bottom	-17.82	1.03	-0.07
PISO1	P7	DEAD-SQ	Top	-108.76	8.58	-0.52
PISO1	P7	DEAD-SQ	Bottom	-108.76	8.58	-0.52
PISO1	P7	RX MAX	Top	55.49	40.95	0.05
PISO1	P7	RX MAX	Bottom	55.49	40.95	0.05
PISO1	P7	RX MIN	Top	-55.49	-40.95	-0.05
PISO1	P7	RX MIN	Bottom	-55.49	-40.95	-0.05
PISO1	P7	RY MAX	Top	14.18	7.81	0.28
PISO1	P7	RY MAX	Bottom	14.18	7.81	0.28
PISO1	P7	RY MIN	Top	-14.18	-7.81	-0.28
PISO1	P7	RY MIN	Bottom	-14.18	-7.81	-0.28

1.4CM+1.7CV	182.56	Tn	
1.25(CM+CV)	158.23	Tn	

CM	M22	-0.47	Tn.m
	M33	-11.54	Tn.m
CV	M22	-0.06	Tn.m
	M33	-2.49	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	182.56	-0.75	-20.39
1.25(CM+CV)+CS	213.72	-0.93	167.07
1.25(CM+CV)-CS	102.74	-0.38	-202.14
0.9CM+CS	153.37	-0.69	174.21
0.9CM-CS	42.39	-0.15	-186.84

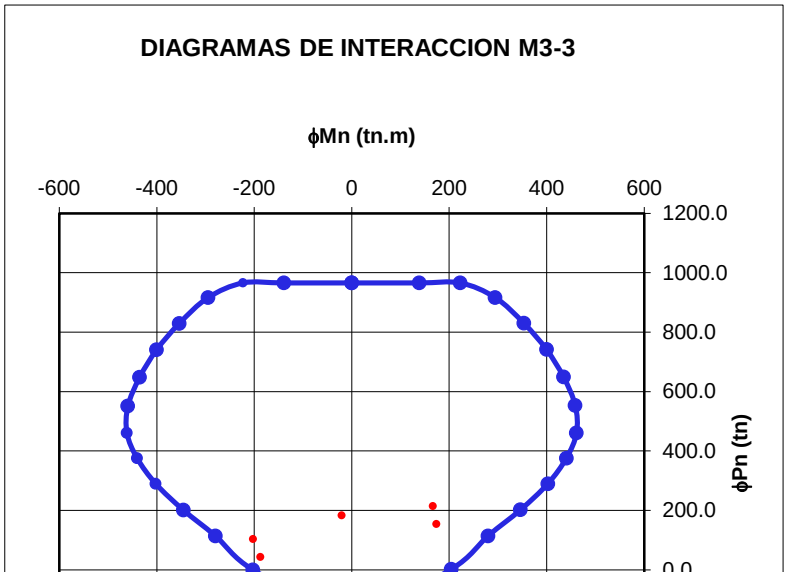
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

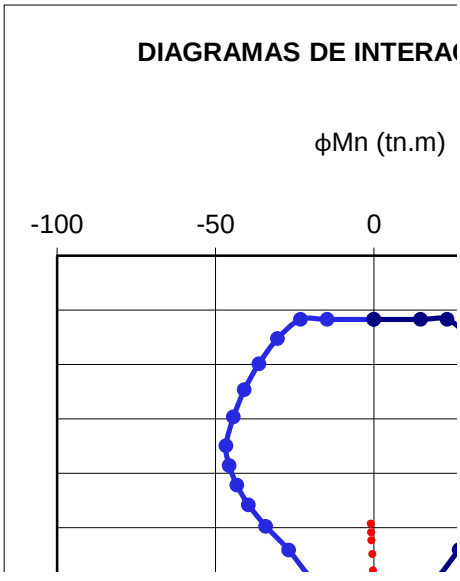
MOMENTO MINIMO DE DISEÑO

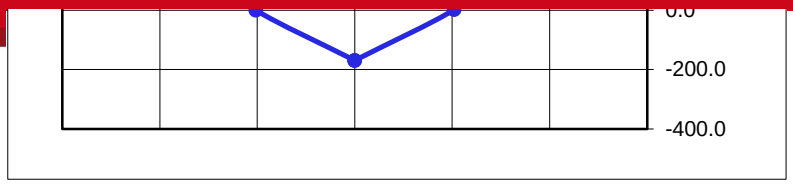
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	965.7	0.0	965.7	0.0
2	965.7	138.8	965.7	-139.0
3	965.7	222.6	965.7	-223.0
4	916.7	294.3	916.3	-294.8
5	830.1	353.2	829.5	-353.7
6	741.3	399.7	740.5	-400.2
7	649.3	434.5	648.3	-435.0
8	553.1	458.8	551.6	-459.1
9	461.1	461.4	460.3	-461.2
10	376.0	440.5	375.5	-440.2
11	289.7	402.4	289.1	-401.8
12	201.9	346.3	201.2	-345.5
13	114.2	279.8	113.6	-279.3
14	1.8	204.4	-0.3	-202.7
15	-169.2	0.0	-169.2	0.0

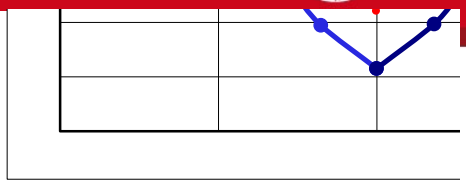
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

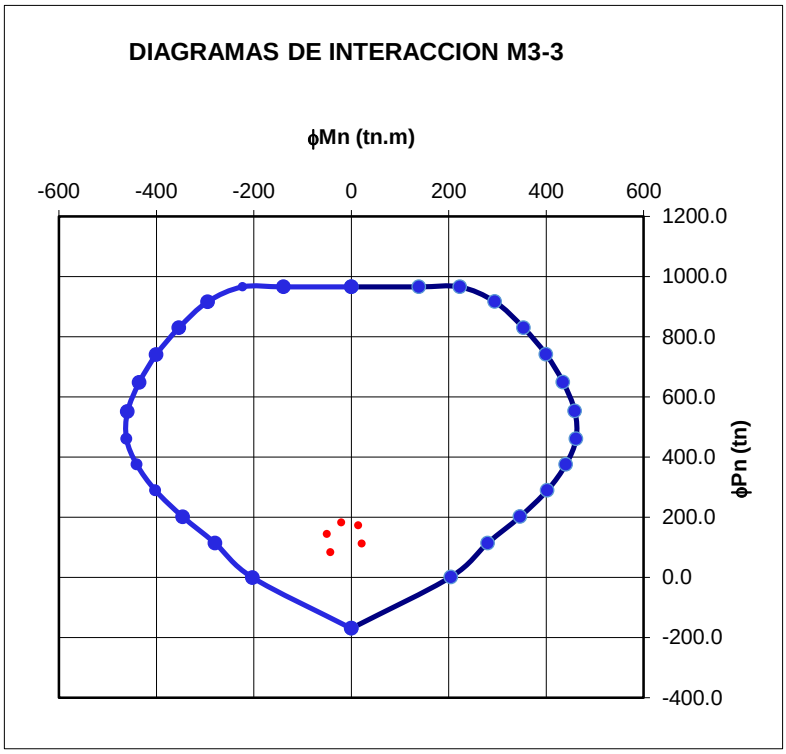


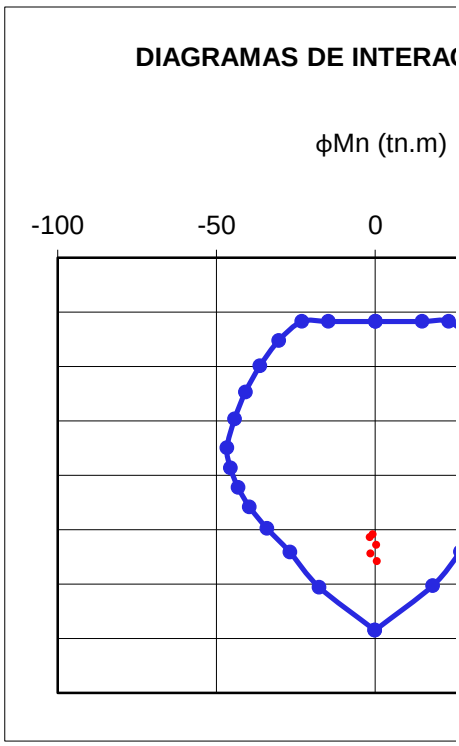






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612
-965.6612	107.905	1.3979	-965.6612	86.35	2.2442	-965.6612
-965.6612	200.735	1.4148	-965.6612	183.93	2.46	-965.6612
-934.6321	279.6257	1.4886	-947.5861	268.1288	2.5884	-965.6612
-843.4002	344.0727	1.5244	-852.8531	336.908	2.6365	-869.3603
-749.9757	394.3289	1.5749	-756.1047	390.0411	2.7106	-766.5993
-653.3984	431.121	1.6168	-656.315	428.2819	2.8005	-660.6412
-552.6228	455.4906	1.6863	-551.9398	452.5185	2.9377	-549.8781
-454.7148	458.6247	1.5306	-449.8736	455.3982	2.7202	-441.2759
-364.354	434.9647	1.5584	-355.1678	429.6191	2.7538	-338.8018
-272.7677	391.471	1.6554	-259.9711	381.9989	2.9208	-236.6577
-179.2112	327.7	1.8242	-162.0473	312.2202	3.1993	-131.8539
-88.7703	265.4446	2.3155	-66.7942	249.951	4.2676	-24.2375
49.4298	145.7929	3.4092	80.982	107.2728	5.2472	105.5589
169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461

T	M2	M3
0.07	0.124	-5.206
0.07	-0.057	-2.487
0.577	0.92	-34.282
0.577	-0.467	-11.541
0.199	0.16	77.669
0.199	0.271	184.601
-0.199	-0.16	-77.669
-0.199	-0.271	-184.601
0.49	0.423	12.736
0.49	0.999	32.23
-0.49	-0.423	-12.736
-0.49	-0.999	-32.23

CARGA	P (ton)	V2 (ton)
VIVA	17.82	1.03
MUERTA	108.76	8.58
SISMO XX	55.49	40.95

CARGA	P (ton)	V2 (ton)
VIVA	17.82	1.03
MUERTA	108.76	8.58
SISMO YY	14.18	7.81

P	55.49	Tn
M22	-0.27	Tn.m
M33	184.60	Tn.m

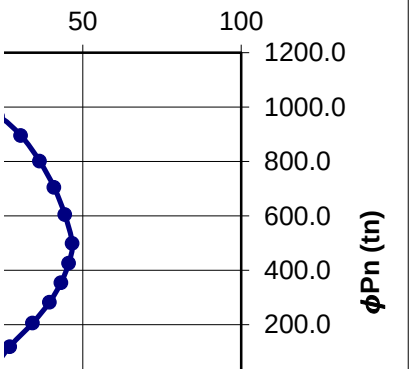
P	14.18	Tn
M22	-1.00	Tn.m
M33	32.23	Tn.m

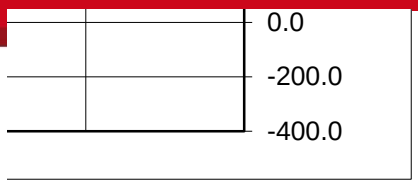
COMBINACIONES SISMO EN Y		
P	M22	M33

182.56	-0.75	-20.39
172.41	-1.65	14.70
144.05	0.34	-49.77
112.06	-1.42	21.84
83.70	0.58	-42.62

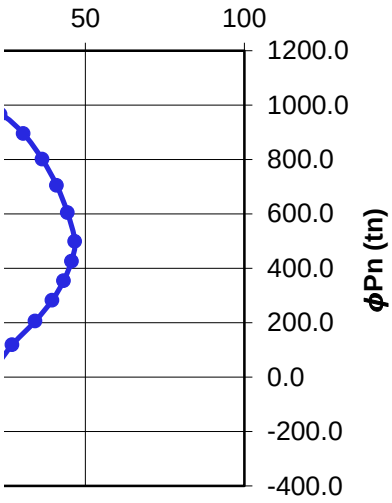
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
965.7	0.1	965.7	0.1
965.7	-14.7	965.7	14.8
965.7	-23.1	965.7	23.2
896.0	-30.4	895.4	30.4
802.6	-36.3	801.7	36.3
706.6	-40.9	705.3	40.9
606.9	-44.3	605.2	44.3
501.5	-46.7	499.4	46.7
428.0	-45.6	426.1	45.6
356.0	-43.2	354.5	43.1
284.1	-39.6	282.8	39.5
205.3	-34.1	205.9	34.2
118.0	-26.9	119.2	26.9
-11.0	-17.6	-5.6	18.1
-169.2	-0.1	-169.2	-0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02
69.6959	2.4076	-965.6612	55.0199	2.5462	-965.6612	-1.21E-02
152.5376	4.2749	-965.6612	108.4626	5.7839	-965.6612	-1.14E-02
247.0232	4.4137	-965.6612	186.6108	8.7469	-896.0057	-9.63E-03
323.2298	4.5385	-910.7204	277.8337	9.6936	-802.6306	-7.50E-03
381.6053	4.6758	-791.6851	350.3761	10.0991	-706.6265	-4.85E-03
422.2202	4.8625	-668.5343	397.8859	10.5432	-606.8805	-1.45E-03
446.058	5.1264	-540.5175	420.7475	11.111	-501.5487	3.07E-03
447.097	4.916	-417.6854	413.203	11.1428	-428.0033	6.83E-04
417.9288	4.9024	-294.5567	376.2264	10.7817	-356.0478	6.83E-04
362.6475	5.2142	-176.0712	301.9895	11.1148	-284.0923	6.83E-04
282.727	5.6189	-71.4364	235.2665	12.4027	-205.3361	-4.32E-03
215.041	7.8504	40.1668	145.1855	11.327	-117.9631	-4.17E-03
76.6929	5.9841	117.8653	61.2147	5.3282	10.9541	-5.13E-03
3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02

V3 (ton)	M2 (ton-m)	M3 (ton-m)
-0.07	-0.057	-2.487
-0.52	-0.467	-11.541
40.95	0.271	184.601

V3 (ton)	M2 (ton-m)	M3 (ton-m)
-0.07	-0.057	-2.487
-0.52	-0.467	-11.541
0.28	0.999	32.23

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621
14.7251	-965.6612	-55.1512	2.5472	-965.6612	-69.8733	2.4116
23.0637	-965.6612	-108.7004	5.7941	-965.6612	-152.9661	4.2733
30.3568	-965.6612	-187.0147	8.7579	-965.6612	-247.5326	4.4127
36.2677	-910.0623	-278.3535	9.6975	-868.6381	-323.8108	4.5505
40.87	-790.8646	-350.8483	10.1038	-765.7795	-382.0609	4.679
44.2789	-667.5129	-398.2257	10.5496	-659.6292	-422.5921	4.8679
46.6851	-539.2786	-420.9009	11.1212	-548.6005	-446.2621	5.1367
45.6232	-416.7185	-412.9979	11.1396	-440.2754	-446.955	4.9111
43.203	-293.8029	-375.8104	10.7891	-338.1521	-417.5028	4.9172
39.5874	-175.4368	-301.2935	11.1262	-236.0286	-362.0208	5.2219
34.0831	-70.8694	-234.7216	12.4188	-131.2174	-281.9526	5.6204
26.875	40.53	-144.6622	11.2916	-23.3412	-214.2264	7.8618
17.6336	118.3229	-60.7289	5.2826	106.1473	-76.0717	5.8893
0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612
-965.6612	-86.5902	2.2462	-965.6612	-108.1794	1.397	-965.6612
-965.6612	-184.3399	2.4591	-965.6612	-201.2435	1.4264	-965.6612
-947.037	-268.7308	2.5752	-934.1917	-280.1056	1.4887	-924.6303
-852.2483	-337.4251	2.6358	-842.7947	-344.5863	1.5234	-835.6881
-755.3151	-390.5299	2.71	-749.1839	-394.8199	1.5741	-744.5485
-655.3487	-428.7163	2.8	-652.4153	-431.5542	1.6174	-650.3056
-550.6822	-452.7861	2.944	-551.4206	-455.8413	1.6856	-551.6337
-448.9037	-455.2618	2.716	-453.8466	-458.4806	1.528	-457.3121
-354.506	-429.1806	2.7682	-363.5964	-434.4971	1.5837	-369.9772
-259.3214	-381.3411	2.9307	-272.1291	-390.8275	1.6641	-281.3956
-161.4138	-311.4666	3.1993	-178.5204	-326.875	1.8293	-190.8013
-65.9046	-249.2216	4.2606	-88.121	-264.8827	2.3119	-102.4783
81.8099	-106.4409	5.1405	50.625	-144.587	3.3307	23.506
169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02
-124.7885	0.6442	-965.6612	-139.0151	-3.94E-02	-965.6612	-124.79
-213.2672	0.6284	-965.6612	-222.9879	-3.68E-02	-965.6612	-213.2752
-288.1122	0.6768	-916.3063	-294.784	-3.29E-02	-924.6157	-288.1235
-349.5804	0.6945	-829.4641	-353.7016	-2.82E-02	-835.6651	-349.5922
-397.7959	0.7223	-740.4776	-400.2312	-2.24E-02	-744.5168	-397.8058
-433.4258	0.7533	-648.3281	-434.9622	-0.0151	-650.2648	-433.4314
-457.6712	0.7774	-551.6343	-459.137	-5.44E-03	-551.5821	-457.6705
-460.2679	0.6924	-460.3361	-461.2058	1.58E-03	-457.2687	-460.2596
-437.7031	0.7391	-375.4879	-440.2322	5.38E-03	-369.9447	-437.6915
-397.0622	0.7591	-289.1189	-401.805	9.94E-03	-281.3763	-397.0536
-337.2781	0.8478	-201.2388	-345.5351	0.0153	-190.7962	-337.2762
-273.4876	1.0233	-113.5857	-279.271	0.0235	-102.489	-273.4946
-176.5955	1.5581	0.27	-202.7386	0.0498	23.4435	-176.6656
3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621
-0.7239	-965.6612	-108.184	-1.4771	-965.6612	-86.5933	-2.3275
-0.7024	-965.6612	-201.2618	-1.5012	-965.6612	-184.3747	-2.5348
-0.7434	-934.1596	-280.1314	-1.5563	-946.9814	-268.7796	-2.6437
-0.7517	-842.7452	-344.6135	-1.5816	-852.1614	-337.4752	-2.695
-0.768	-749.1154	-394.8422	-1.6208	-755.1956	-390.5706	-2.7579
-0.7844	-652.3271	-431.5667	-1.6495	-655.1967	-428.7397	-2.8335
-0.7894	-551.3102	-455.84	-1.6988	-550.4948	-452.7862	-2.958
-0.6892	-453.7563	-458.464	-1.5245	-448.7524	-455.2347	-2.7118
-0.7275	-363.5296	-434.4746	-1.5707	-354.3884	-429.1377	-2.7533
-0.7379	-272.0872	-390.8067	-1.6412	-259.2543	-381.3093	-2.9045
-0.8154	-178.513	-326.8756	-1.794	-161.4079	-311.475	-3.1589
-0.971	-88.1532	-264.9063	-2.2514	-65.9556	-249.2603	-4.1891
-1.4509	50.4964	-144.7304	-3.2145	81.6177	-106.6538	-5.0203
0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612
-965.6612	-69.8617	-2.4955	-965.6612	-55.1116	-2.6347	-965.6612
-965.6612	-153.0365	-4.3501	-965.6612	-108.7626	-5.8794	-965.6612
-965.6612	-247.626	-4.4826	-965.6612	-187.2139	-8.8335	-895.3851
-868.4847	-323.9065	-4.6117	-909.7459	-278.6429	-9.7571	-801.6751
-765.5777	-382.1449	-4.728	-790.4452	-351.0998	-10.1511	-705.3144
-659.37	-422.6402	-4.9025	-666.9699	-398.3741	-10.5814	-605.1731
-548.2812	-446.264	-5.1512	-538.6029	-420.9029	-11.1335	-499.3727
-440.0199	-446.9064	-4.9055	-416.1688	-412.8487	-11.132	-426.1322
-337.964	-417.441	-4.897	-293.3703	-375.5862	-10.7596	-354.4885
-235.9175	-361.9663	-5.1889	-175.1572	-301.0821	-11.0823	-282.8449
-131.1947	-281.9458	-5.5725	-70.83	-234.7035	-12.3429	-205.8822
-23.4588	-214.3164	-7.7737	40.3251	-144.8783	-11.1879	-119.1828
105.8851	-76.3586	-5.7698	117.7943	-61.3131	-5.2016	5.64
169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02
-1.22E-02	-14.7981	-965.6612	54.9801	-2.6336	-965.6612	69.6841
-1.14E-02	-23.1545	-965.6612	108.5246	-5.8692	-965.6612	152.608
-9.68E-03	-30.4491	-965.6612	186.8098	-8.8226	-965.6612	247.1174
-7.55E-03	-36.3489	-910.4039	278.1238	-9.7532	-869.2069	323.3258
-4.89E-03	-40.9278	-791.2656	350.6285	-10.1466	-766.3975	381.6896
-1.47E-03	-44.3016	-667.9913	398.0354	-10.5752	-660.382	422.2688
3.08E-03	-46.6627	-539.8419	420.751	-11.1235	-549.5588	446.0606
6.83E-04	-45.5717	-417.1355	413.0549	-11.1353	-441.0204	447.0489
6.83E-04	-43.1336	-294.1298	376.0083	-10.7528	-338.6135	417.8673
6.83E-04	-39.5105	-175.7914	301.7785	-11.0709	-236.5442	362.5932
-4.61E-03	-34.1554	-71.3942	235.2481	-12.3275	-131.831	282.7204
-4.61E-03	-26.9274	39.9626	145.4014	-11.2235	-24.3544	215.131
-6.28E-03	-18.078	117.3371	61.7993	-5.2476	105.297	76.9801
3.10E-02	0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.0621	-965.6612	-2.28E-02	-0.0621	-965.6612	-2.28E-02	-0.0621
-2.4915	-965.6612	86.353	-2.3255	-965.6612	107.9095	-1.478
-4.3517	-965.6612	183.9648	-2.5356	-965.6612	200.7533	-1.4897
-4.4837	-947.5304	268.1776	-2.657	-934.6	279.6516	-1.5561
-4.5997	-852.7662	336.9582	-2.6958	-843.3506	344.0999	-1.5826
-4.7249	-755.9851	390.0819	-2.7585	-749.9071	394.3513	-1.6217
-4.8972	-656.163	428.3055	-2.8339	-653.3102	431.1336	-1.649
-5.1411	-551.7525	452.519	-2.9518	-552.5123	455.4895	-1.6995
-4.9105	-449.7222	455.3714	-2.7159	-454.6245	458.6083	-1.527
-4.8821	-355.0502	429.5764	-2.7388	-364.2833	434.9383	-1.5458
-5.1814	-259.904	381.9674	-2.8947	-272.7258	391.4503	-1.6325
-5.5711	-162.0413	312.2287	-3.1591	-179.2037	327.7007	-1.7891
-7.7629	-66.8446	249.9896	-4.1968	-88.8024	265.4682	-2.2556
-5.8651	80.804	107.473	-5.1263	49.3012	145.9366	-3.2939
0.0846	169.2461	3.10E-02	0.0846	169.2461	3.10E-02	0.0846

Curve 24	345. degrees	
P	M3	M2
-965.6612	-2.28E-02	-0.0621
-965.6612	124.5225	-0.7239
-965.6612	212.8761	-0.7023
-925.056	287.6492	-0.7434
-836.2822	349.0894	-0.7516
-745.3104	397.3135	-0.7692
-651.2512	432.989	-0.7842
-552.8051	457.3153	-0.7891
-457.9607	460.4148	-0.6897
-370.5465	438.0623	-0.7179
-282.0325	397.688	-0.7315
-191.4701	338.0899	-0.8128
-103.1676	274.0778	-0.9677
22.2401	177.8698	-1.5342
169.2461	3.10E-02	0.0846

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

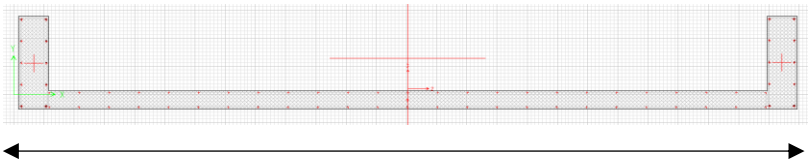
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 8)

1. INGRESO DE DATOS GENERALES

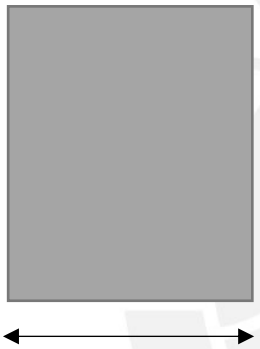
Lm (m)	5.7



t (m)

d (m) = 0.85xLm	4.85

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	5.7

hm/Lm	2.3

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	279.25	(Axial del etabs)
Mua (ton)	552.35	(Momento del etabs)
Mn (ton)	552.35	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	69.64	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	69.64

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	47.44

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	26.11

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	77.93	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	110.66	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	201.06	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

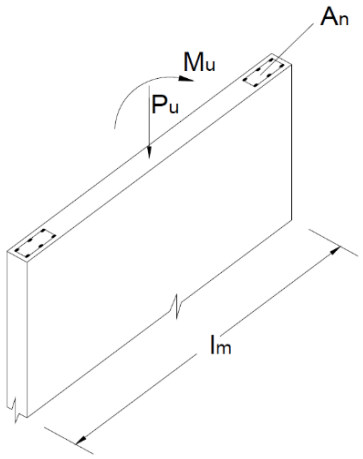
N_u = 156.17 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55\ \phi\ f'c\ Ag\ [1 - (k\ lc\ /\ 32\ h)^2]$$

ϕ Pnw = 480.6 ton > Pu = 156.17 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	552.35
Long. (m)	5.7
F (ton)	96.9
Fy (kg/cm2)	4200
As (cm2)	23.1

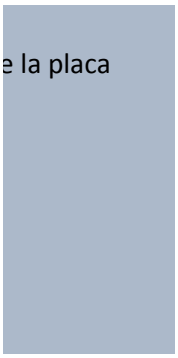
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-2002	-0.2172	20.97	-2002	-0.2172	20.97
2	-2002	1440.9531	-62.1258	-2002	1432.3721	-61.4295
3	-1885	1780.7618	-51.2545	-1883	1782.2501	-50.0705
4	-1748	2070.0081	-40.5944	-1742	2077.5258	-38.9131
5	-1608	2310.3239	-30.2116	-1597	2319.6806	-28.0124
6	-1463	2503.9495	-20.1938	-1448	2511.0128	-17.4572
7	-1313	2654.2687	-10.6759	-1294	2654.9297	-7.3789
8	-1154	2766.7472	-1.8538	-1131	2756.6295	2.0227
9	-1010	2764.0051	11.5274	-979.143	2747.9078	14.8
10	-868.8664	2684.5328	2.55E+01	-833.0979	2649.9431	29.2785
11	-727.5016	2536.8394	39.5556	-687.0817	2479.0951	43.7529
12	-586.198	2320.9182	53.5636	-540.8398	2234.7474	58.2414
13	-444.8333	2036.2075	67.5777	-393.5788	1914.1646	72.8256
14	-297.8757	1666.5357	80.2868	-240.9542	1531.9603	88.5905
15	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P8	LIVE	Top	-13.92	-0.27	0.24
PISO1	P8	LIVE	Bottom	-13.92	-0.27	0.24
PISO1	P8	DEAD-SQ	Top	-91.58	-2.74	1.39
PISO1	P8	DEAD-SQ	Bottom	-91.58	-2.74	1.39
PISO1	P8	RX MAX	Top	143.06	17.61	23.51
PISO1	P8	RX MAX	Bottom	143.06	17.61	23.51
PISO1	P8	RX MIN	Top	-143.06	-17.61	-23.51
PISO1	P8	RX MIN	Bottom	-143.06	-17.61	-23.51
PISO1	P8	RY MAX	Top	70.31	67.61	11.71
PISO1	P8	RY MAX	Bottom	70.31	67.61	11.71
PISO1	P8	RY MIN	Top	-70.31	-67.61	-11.71
PISO1	P8	RY MIN	Bottom	-70.31	-67.61	-11.71

1.4CM+1.7CV	151.88	Tn	
1.25(CM+CV)	131.88	Tn	

CM	M22	4.82	Tn.m
	M33	-19.71	Tn.m
CV	M22	0.93	Tn.m
	M33	-3.50	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	151.88	8.32	-33.54
1.25(CM+CV)+CS	274.94	-53.08	58.49
1.25(CM+CV)-CS	-11.19	67.44	-116.51
0.9CM+CS	225.48	-55.93	69.76
0.9CM-CS	-60.64	64.60	-90.65

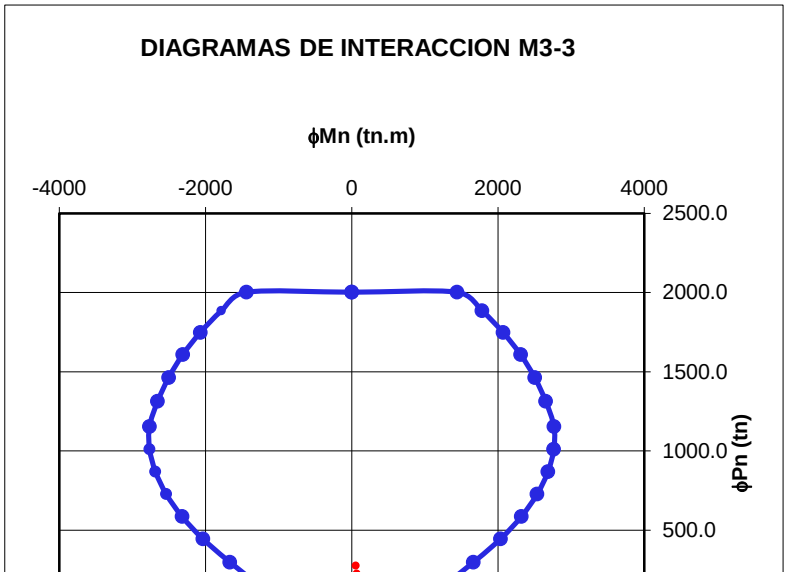
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

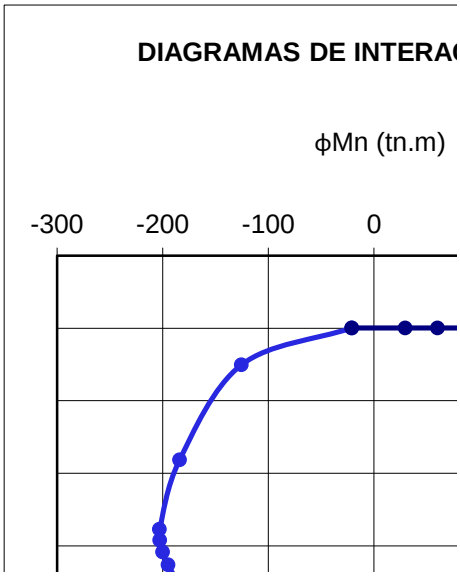
MOMENTO MINIMO DE DISEÑO

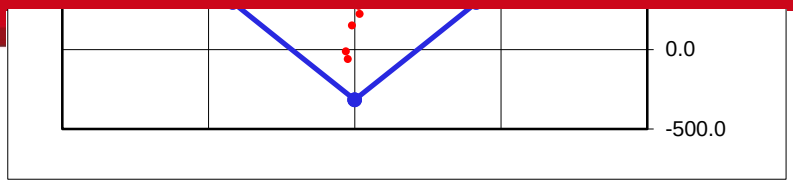
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	2002.0	-0.2	2002.0	-0.2
2	2002.0	1441.0	2002.0	-1441.0
3	1885.0	1780.8	1885.0	-1781.0
4	1748.0	2070.0	1748.0	-2070.0
5	1608.0	2310.3	1608.0	-2311.0
6	1463.0	2503.9	1463.0	-2504.0
7	1313.0	2654.3	1313.0	-2654.0
8	1154.0	2766.7	1154.0	-2767.0
9	1010.0	2764.0	1010.0	-2764.0
10	868.9	2684.5	868.9	-2684.0
11	727.5	2536.8	727.6	-2537.0
12	586.2	2320.9	586.3	-2321.0
13	444.8	2036.2	444.9	-2036.0
14	297.9	1666.5	298.0	-1666.0
15	-315.6	0.3	-315.6	0.3

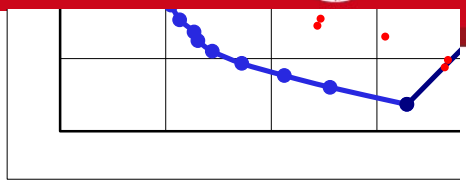
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

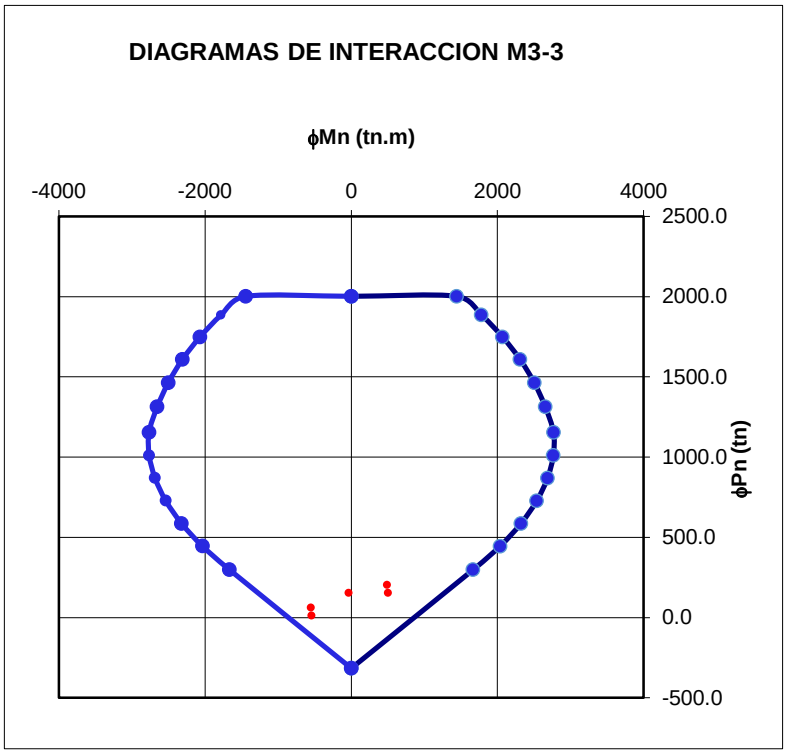


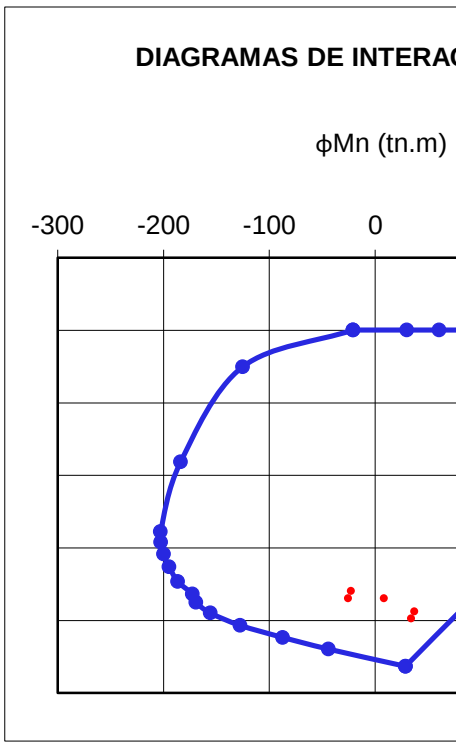






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	1192.124	-22.2543	-2002	867.4595	14.2769	-2002
-1881	1784.1973	-48.7564	-1878	1784.0516	-46.4672	-1970
-1734	2086.1567	-37.0233	-1724	2097.7176	-34.5469	-1705
-1585	2330.1375	-25.5327	-1567	2343.6141	-22.2585	-1537
-1431	2518.3655	-14.3669	-1406	2526.6284	-10.2644	-1364
-1271	2654.0754	-3.6458	-1240	2649.9948	1.3244	-1185
-1103	2742.4068	6.4467	-1065	2718.7314	12.3342	-997.1932
-943.0311	2725.0826	18.6004	-893.9519	2686.7626	23.765	-809.3797
-791.517	2604.3015	33.6214	-734.7773	2532.0268	39.5537	-633.968
-639.9821	2404.8769	48.6414	-574.5833	2287.6649	55.4414	-458.8043
-487.4732	2123.925	63.7746	-411.9138	1949.2247	71.3639	-280.4355
-330.6388	1751.2782	78.8484	-248.9183	1542.004	88.8102	-121.0734
-147.0773	1333.437	103.0853	1.4863	977.5662	101.0542	111.4085
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

T	M2	M3
-0.308	0.292	-2.778
-0.308	0.93	-3.497
-1.8	1.125	-12.443
-1.8	4.815	-19.712
15.041	3.697	49.11
15.041	60.263	87.502
-15.041	-3.697	-49.11
-15.041	-60.263	-87.502
41.771	3.286	350.192
41.771	29.822	522.494
-41.771	-3.286	-350.192
-41.771	-29.822	-522.494

CARGA	P (ton)	V2 (ton)
VIVA	13.92	-0.27
MUERTA	91.58	-2.74
SISMO XX	143.06	17.61

CARGA	P (ton)	V2 (ton)
VIVA	13.92	-0.27
MUERTA	91.58	-2.74
SISMO YY	70.31	67.61

P	143.06	Tn
M22	-60.26	Tn.m
M33	87.50	Tn.m

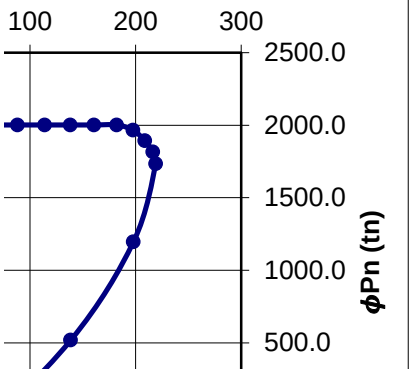
P	70.31	Tn
M22	-29.82	Tn.m
M33	522.49	Tn.m

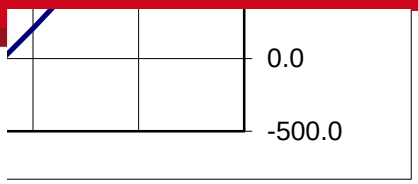
COMBINACIONES SISMO EN Y		
P	M22	M33

151.88	8.32	-33.54
202.19	-22.64	493.48
61.57	37.00	-551.51
152.73	-25.49	504.75
12.11	34.16	-540.23

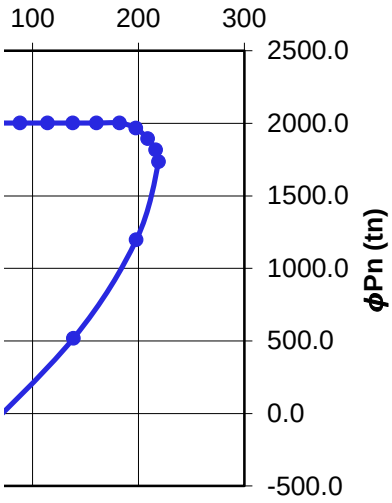
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
2002.0	-21.0	2002.0	-21.0
1748.0	-125.3	2002.0	29.8
1093.0	-183.8	2002.0	60.4
613.6	-202.8	2002.0	88.3
539.2	-202.7	2002.0	114.1
458.3	-200.0	2002.0	138.2
370.3	-194.8	2002.0	160.4
268.1	-186.5	2002.0	182.2
183.5	-172.8	1966.0	197.6
125.1	-169.3	1893.0	208.8
51.9	-155.8	1816.0	216.3
-33.1	-127.7	1734.0	219.0
-116.6	-87.4	1197.0	198.0
-197.0	-44.2	518.2	138.6
-315.6	28.6	-315.6	28.6

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
664.721	24.7432	-2002	493.4654	29.4552	-1748	1.2663
1483.7788	7.2634	-2002	1185.1035	42.1373	-1093	1.44E+00
2117.6395	-30.4199	-1777	1774.561	41.3337	-613.5737	-4.40E-01
2364.8263	-16.7723	-1500	2246.2665	26.5862	-539.1823	1.7983
2536.2433	-3.3875	-1243	2523.4762	14.5029	-458.3146	2.0159
2634.8819	9.676	-1030	2529.7178	31.4736	-370.2589	2.92E+00
2664.4333	22.3005	-807.0399	2424.4672	48.1013	-268.1214	3.38E+00
2591.6767	33.8745	-581.6412	2186.3686	63.0905	-183.4745	3.34E+00
2373.5181	50.0357	-361.9874	1780.6244	78.1035	-125.1016	3.47E+00
2044.422	67.1195	-194.836	1413.8522	101.5055	-51.9396	3.32E+00
1604.9278	83.8303	-84.7804	1180.411	109.8199	33.0996	4.5273
1268.2255	109.1912	53.7324	812.442	92.5003	116.6256	3.5779
635.2936	73.326	191.0966	386.9929	41.5001	196.9921	6.7196
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.24	0.93	-3.497
1.39	4.815	-19.712
17.61	60.263	87.502

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.24	0.93	-3.497
1.39	4.815	-19.712
11.71	29.822	522.494

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
125.3292	-2002	-495.2501	29.2862	-2002	-665.4769	24.4825
183.8442	-2002	-1187	41.9314	-1970	-1485	6.88
202.7865	-1776	-1778	40.9258	-1705	-2118	-30.7271
202.7159	-1498	-2248	26.1183	-1536	-2365	-17.1208
200.0107	-1241	-2523	14.3041	-1363	-2537	-3.7904
194.7714	-1028	-2528	31.2366	-1184	-2635	9.201
186.4557	-804.4562	-2421	47.7874	-996.0638	-2664	21.7312
172.8146	-579.2691	-2181	62.6825	-808.3487	-2590	33.1954
169.3387	-359.7766	-1774	77.5632	-633.0131	-2372	49.3165
155.7704	-193.741	-1411	100.8702	-457.9524	-2042	66.4012
127.7078	-83.3207	-1177	109.0344	-279.6334	-1602	83.1261
87.3654	55.5042	-806.4068	91.5034	-120.1038	-1266	108.4181
44.2286	192.7164	-381.4081	40.4393	112.9386	-630.018	72.3203
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	-868.1714	13.9622	-2002	-1193	-22.6158	-2002
-1878	-1785	-46.8107	-1881	-1785	-49.1079	-1883
-1724	-2098	-34.9096	-1734	-2087	-37.4207	-1742
-1567	-2344	-22.6722	-1584	-2331	-25.9866	-1597
-1406	-2527	-10.7425	-1430	-2519	-14.8911	-1448
-1239	-2650	0.7631	-1271	-2654	-4.2595	-1293
-1064	-2718	11.6629	-1102	-2742	5.7165	-1130
-893.4135	-2686	22.9964	-942.7565	-2725	17.8057	-979.062
-734.3257	-2531	38.7781	-791.3	-2604	32.8208	-833.0459
-574.1893	-2287	54.6657	-639.8217	-2404	47.8355	-687.0542
-411.5394	-1948	70.5979	-487.3484	-2123	62.9688	-540.8344
-248.544	-1541	88.0845	-330.4476	-1750	78.0597	-393.5671
2.8881	-972.6964	100.0987	-146.4789	-1332	102.29	-240.8238
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
-1433	-61.7617	-2002	-1441	-6.25E+01	-2002	-1296
-1783	-50.4447	-1885	-1781	-5.16E+01	-1933	-1668
-2078	-39.3375	-1748	-2070	-4.10E+01	-1792	-1985
-2320	-28.4972	-1608	-2311	-3.07E+01	-1648	-2250
-2511	-18.0167	-1463	-2504	-2.08E+01	-1499	-2463
-2655	-8.0324	-1313	-2654	-11.3646	-1345	-2629
-2757	1.2482	-1154	-2767	-2.6681	-1183	-2753
-2748	13.986	-1010	-2764	10.6971	-1032	-2770
-2650	28.4616	-868.9496	-2684	24.7112	-886.0854	-2697
-2479	42.9332	-727.5844	-2537	38.7253	-740.0473	-2552
-2234	57.4199	-586.2802	-2321	52.7334	-594.0532	-2334
-1914	72.0067	-444.915	-2036	66.7476	-446.8174	-2039
-1531	87.8071	-297.9547	-1666	79.4888	-285.6582	-1630
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
-67.5416	-2002	-1037	-71.7376	-2002	-715.7079	-61.2363
-56.3052	-1988	-1528	-61.6901	-2002	-1323	-68.9923
-45.2886	-1842	-1880	-50.2068	-1911	-1725	-56.8612
-34.5657	-1694	-2174	-39.0126	-1756	-2061	-45.0456
-24.2232	-1541	-2412	-28.2073	-1597	-2335	-33.6057
-14.4099	-1383	-2598	-17.9376	-1433	-2550	-22.7066
-5.3517	-1216	-2736	-8.429	-1261	-2710	-12.5785
8.3391	-1058	-2774	5.6099	-1092	-2776	1.9093
22.8224	-905.9712	-2711	20.6339	-932.7897	-2726	17.5556
37.299	-754.4439	-2569	35.6543	-772.5464	-2587	32.6017
51.7734	-601.9954	-2346	50.1469	-609.3026	-2352	46.1997
65.6562	-444.7546	-2030	62.4648	-437.7514	-2004	56.2436
74.9509	-206.3939	-1448	31.4221	-75.9177	-1147	-21.4294
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	-520.5279	-43.6364	-2002	-357.3104	-25.5269	-2002
-2002	-962.6291	-75.2564	-2002	-615.5638	-57.2283	-2002
-2002	-1421	-68.3998	-2002	-876.3445	-75.5476	-2002
-1862	-1840	-55.4476	-2002	-1143	-80.6434	-2002
-1692	-2183	-42.8983	-1945	-1626	-69.5793	-2002
-1518	-2453	-30.9028	-1739	-2081	-55.5063	-2002
-1335	-2655	-19.8942	-1526	-2424	-42.6672	-2002
-1152	-2762	-5.4855	-1310	-2639	-27.6773	-1966
-976.2126	-2738	10.5439	-1092	-2711	-10.0416	-1893
-799.9819	-2602	25.4063	-821.7037	-2454	-23.717	-1816
-619.4522	-2351	38.4856	-523.5646	-1956	-41.53	-1734
-327.7366	-1656	-4.1063	-223.8713	-1342	-53.0507	-1197
35.1447	-852.0782	-45.3731	121.6994	-581.3158	-50.8104	-518.2183
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
-1.7132	-29.8332	-2002	358.0717	-25.4541	-2002	520.5192
-1.8508	-60.4194	-2002	615.8234	-57.0075	-2002	963.2469
0.0508	-88.3342	-2002	878.2077	-75.3015	-2002	1422.4727
-2.2035	-114.0757	-2002	1144.9703	-80.1923	-1861	1841.2227
-2.4362	-138.213	-1942	1631.8053	-68.9009	-1691	2184.0902
-3.23E+00	-160.4361	-1736	2085.4216	-54.7381	-1516	2454.0693
-3.67E+00	-182.2096	-1522	2427.2678	-41.8075	-1334	2655.4705
-3.34E+00	-197.57	-1306	2639.9925	-26.815	-1150	2761.478
-2.92E+00	-208.8322	-1089	2709.4737	-9.2561	-974.6287	2736.6248
-2.39E+00	-216.2559	-817.8401	2447.4235	-23.5214	-798.5922	2599.7067
-3.0742	-218.9775	-520.2939	1949.1724	-41.3677	-618.1829	2348.2357
-2.199	-197.9934	-221.527	1338.6489	-53.0719	-325.9766	1651.5547
-3.7193	-138.6017	123.8681	575.3891	-50.5106	37.1426	846.5811
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
-43.3771	-2002	715.8305	-60.9429	-2002	1037.0989	-71.3943
-74.9001	-2002	1323.1595	-68.5821	-1988	1528.0814	-61.2865
-67.905	-1910	1724.7793	-56.4059	-1842	1880.0804	-49.7439
-54.8713	-1755	2061.7149	-44.4972	-1693	2174.0521	-38.4799
-42.2285	-1596	2335.7759	-32.9705	-1541	2412.1899	-27.5914
-30.1424	-1432	2550.2179	-21.9676	-1382	2597.8609	-17.2202
-19.0011	-1259	2710.1163	-11.7106	-1216	2736.2677	-7.5848
-4.5673	-1091	2776.3026	2.8262	-1057	2773.941	6.4926
11.3943	-931.9159	2725.9614	18.4469	-905.4467	2710.638	21.5079
26.1668	-771.7622	2585.9801	33.4378	-754.0062	2568.8995	36.5197
39.1166	-608.5914	2350.3004	46.9512	-601.6093	2345.7954	50.9737
-3.8932	-436.9177	2002.2076	56.8063	-444.3308	2029.3555	63.1884
-45.1443	-74.1941	1143.5456	-21.3165	-205.5827	1447.1918	31.8274
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 24	345. degrees	
P	M3	M2
-2002	-0.2172	20.97
-2002	1294.9643	-67.2103
-1933	1667.511	-55.9064
-1792	1985.307	-44.8333
-1648	2249.7489	-34.044
-1499	2463.297	-23.6209
-1345	2629.3804	-13.7081
-1183	2753.3341	-4.5236
-1032	2769.6293	9.1934
-885.7967	2697.3201	23.6734
-739.7925	2552.0515	38.1463
-593.8444	2333.9783	52.6157
-446.6163	2039.1833	66.4667
-285.3354	1629.094	75.6136
315.5684	0.2961	-28.581

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

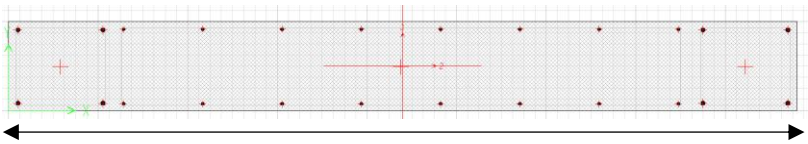
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 9)

1. INGRESO DE DATOS GENERALES

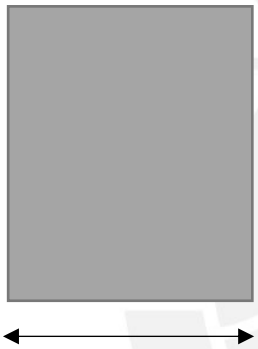
Lm (m)	2.2



t (m)

d (m) = 0.85xLm	1.87

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	2.2

hm/Lm	6.0

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**156.53**	(Axial del etabs)
Mua (ton)	**150.51**	(Momento del etabs)
Mn (ton)	**150.51**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**43.19**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**43.19**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	30.52

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	14.91

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	52.69	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	74.82	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	135.94	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

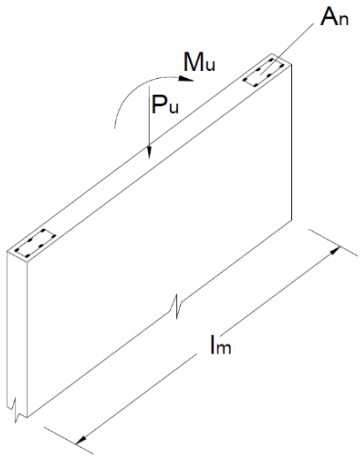
N_u = 153.83 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 395.9 ton > Pu = 153.83 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	160.58
Long. (m)	2.2
F (ton)	73.0
Fy (kg/cm2)	4200
As (cm2)	17.4

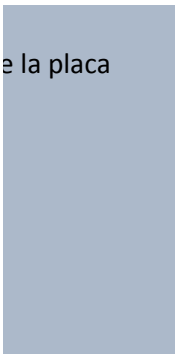
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373
2	-811.4823	96.3868	-0.0882	-811.4823	84.6969	0.5602
3	-811.4823	156.6715	-0.0816	-811.4823	148.4092	0.5627
4	-771.1627	207.6751	-0.0731	-779.4305	202.0955	0.6274
5	-698.0058	249.3099	-0.0627	-704.1471	245.881	0.6531
6	-623.0247	281.8357	-0.0499	-626.926	279.8977	0.6759
7	-545.3202	305.7591	-0.0332	-547.2477	304.5453	0.7248
8	-464.4103	321.7786	-1.20E-02	-464.2477	320.6263	0.7716
9	-387.9737	322.4133	3.86E-03	-384.9275	321.5821	0.6995
10	-315.9698	307.1485	1.35E-02	-310.7313	305.133	0.7218
11	-243.2181	279.7824	0.0242	-235.5329	275.7436	0.7886
12	-169.4963	239.7941	0.0362	-159.1874	232.8265	0.8485
13	-96.0409	192.5599	0.055	-85.1324	187.5062	1.0232
14	-3.8119	138.5484	0.1112	19.7797	116.8163	1.6733
15	133.641	0.0312	0.1871	133.641	0.0312	0.1871

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P9	LIVE	Top	-16.59	0.17	0
PISO1	P9	LIVE	Bottom	-16.59	0.17	0
PISO1	P9	DEAD-SQ	Top	-75.21	0.53	0
PISO1	P9	DEAD-SQ	Bottom	-75.21	0.53	0
PISO1	P9	RX MAX	Top	14.39	42.42	0.03
PISO1	P9	RX MAX	Bottom	14.39	42.42	0.03
PISO1	P9	RX MIN	Top	-14.39	-42.42	-0.03
PISO1	P9	RX MIN	Bottom	-14.39	-42.42	-0.03
PISO1	P9	RY MAX	Top	19.6	33.17	0.22
PISO1	P9	RY MAX	Bottom	19.6	33.17	0.22
PISO1	P9	RY MIN	Top	-19.6	-33.17	-0.22
PISO1	P9	RY MIN	Bottom	-19.6	-33.17	-0.22

1.4CM+1.7CV	133.50	Tn	
1.25(CM+CV)	114.75	Tn	

CM	M22	-0.01	Tn.m
	M33	-10.70	Tn.m
CV	M22	0.00	Tn.m
	M33	-2.23	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	133.50	-0.01	-18.77
1.25(CM+CV)+CS	129.14	-0.21	130.06
1.25(CM+CV)-CS	100.36	0.19	-162.38
0.9CM+CS	82.08	-0.21	136.59
0.9CM-CS	53.30	0.19	-148.23

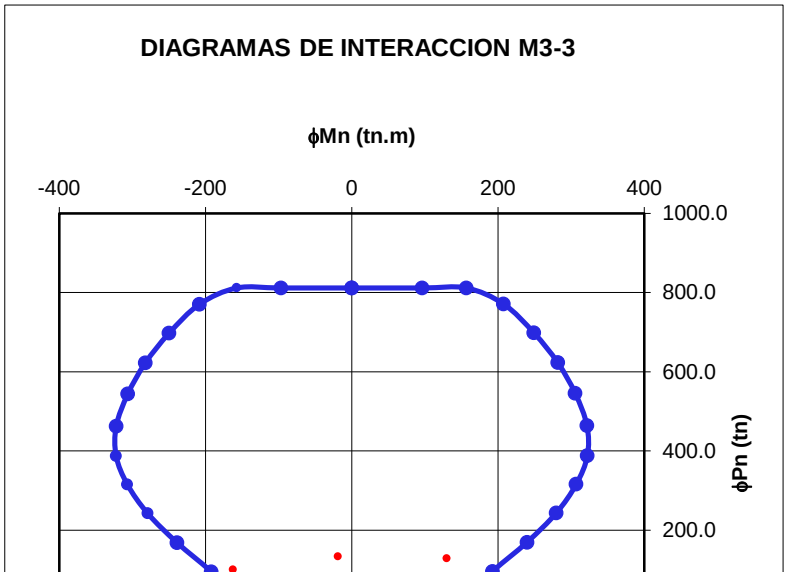
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

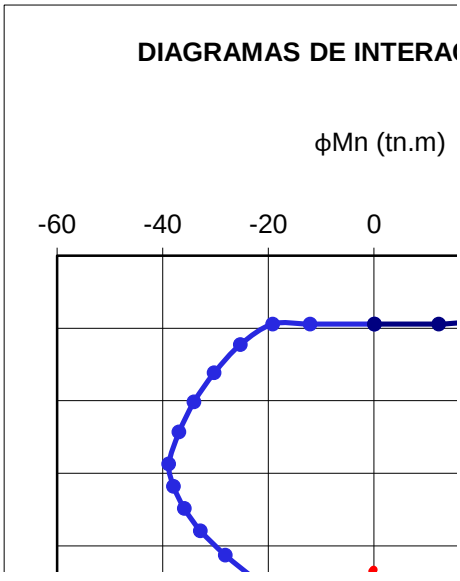
MOMENTO MINIMO DE DISEÑO

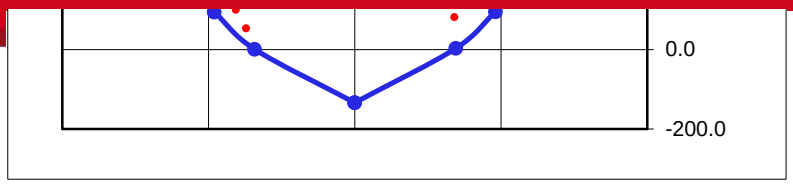
PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	811.5	0.0	811.5	0.0
2	811.5	96.4	811.5	-96.7
3	811.5	156.7	811.5	-157.1
4	771.2	207.7	770.6	-208.2
5	698.0	249.3	697.2	-249.8
6	623.0	281.8	622.0	-282.4
7	545.3	305.8	544.0	-306.2
8	464.4	321.8	462.8	-322.1
9	388.0	322.4	387.0	-322.2
10	316.0	307.1	315.3	-306.8
11	243.2	279.8	242.4	-279.1
12	169.5	239.8	168.7	-239.0
13	96.0	192.6	95.2	-191.9
14	3.8	138.5	1.1	-136.8
15	-133.6	0.0	-133.6	0.0

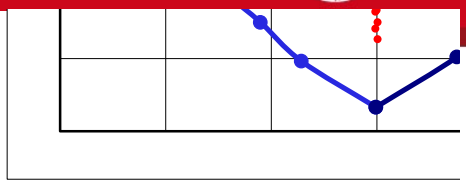
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

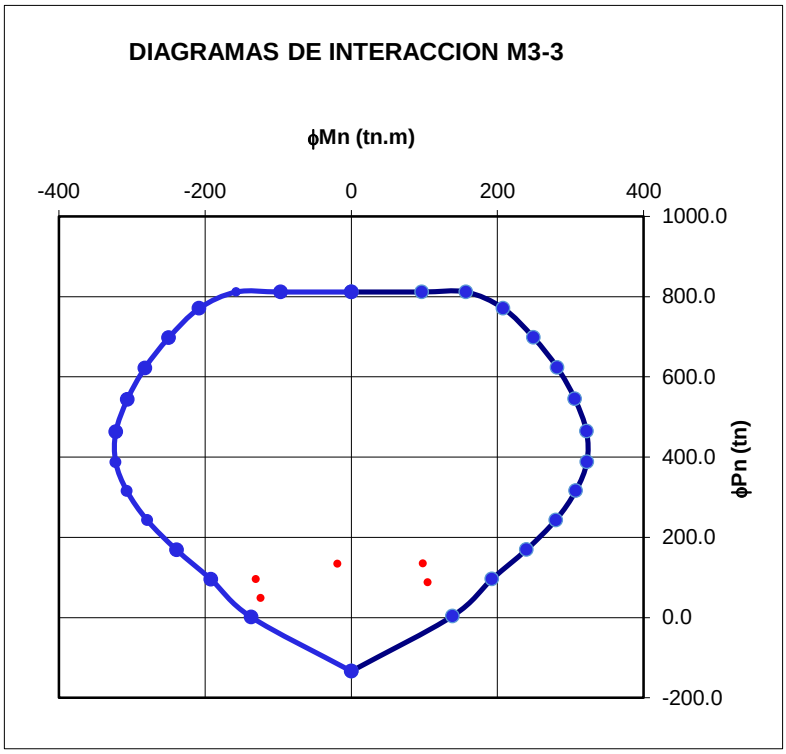


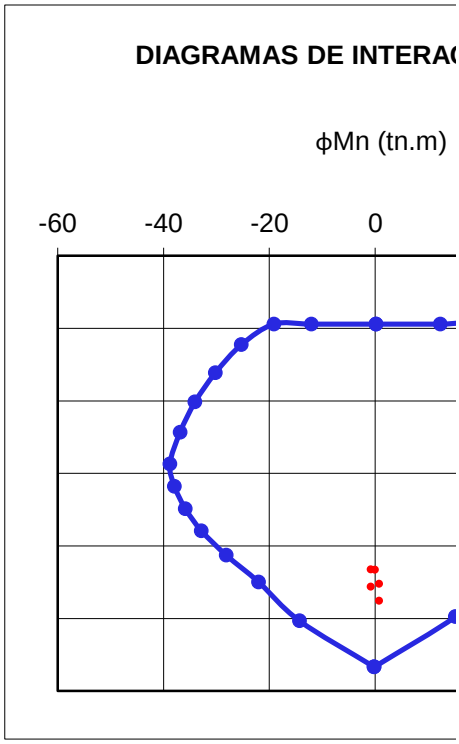






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823
-811.4823	70.2636	1.3386	-811.4823	54.882	1.9121	-811.4823
-811.4823	138.2348	1.3523	-811.4823	123.9023	2.3869	-811.4823
-788.9113	195.3356	1.4293	-801.5866	185.6067	2.5073	-811.4823
-711.1376	241.6732	1.4753	-720.4878	235.5977	2.5711	-736.6361
-631.5112	277.4508	1.5173	-637.6822	273.8124	2.6496	-647.7861
-549.5325	302.9986	1.5754	-552.3034	300.5921	2.7463	-556.1684
-463.9156	319.1057	1.6719	-463.1627	316.5448	2.9014	-460.6686
-381.5021	319.9599	1.5528	-376.5468	317.0325	2.7367	-368.0221
-304.3145	302.3013	1.573	-295.2511	297.5203	2.7803	-279.0178
-226.5718	270.4868	1.6748	-213.8199	262.2988	2.9313	-190.822
-146.9901	224.0753	1.8142	-129.7293	210.6241	3.2045	-102.5033
-70.5023	179.3749	2.3302	-48.6282	165.3128	4.2261	-8.0658
44.8627	91.5093	3.2512	70.7814	64.5601	4.572	86.1516
133.641	0.0312	0.1871	133.641	0.0312	0.1871	133.641

T	M2	M3
-0.003	0.002	-2.677
-0.003	0.002	-2.227
-0.009	0	-12.105
-0.009	-0.008	-10.702
0.165	0.12	35.129
0.165	0.201	146.223
-0.165	-0.12	-35.129
-0.165	-0.201	-146.223
0.407	0.317	30.974
0.407	0.795	114.286
-0.407	-0.317	-30.974
-0.407	-0.795	-114.286

CARGA	P (ton)	V2 (ton)
VIVA	16.59	0.17
MUERTA	75.21	0.53
SISMO XX	14.39	42.42

CARGA	P (ton)	V2 (ton)
VIVA	16.59	0.17
MUERTA	75.21	0.53
SISMO YY	19.6	33.17

P	14.39	Tn
M22	-0.20	Tn.m
M33	146.22	Tn.m

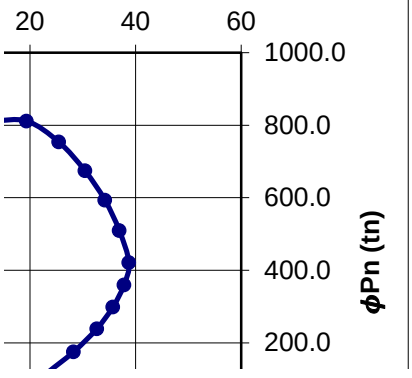
P	19.60	Tn
M22	-0.80	Tn.m
M33	114.29	Tn.m

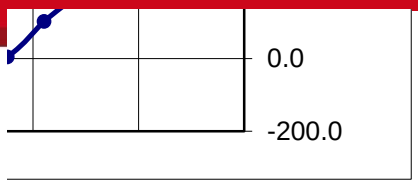
COMBINACIONES SISMO EN Y		
P	M22	M33

133.50	-0.01	-18.77
134.35	-0.80	98.12
95.15	0.79	-130.45
87.29	-0.80	104.65
48.09	0.79	-123.92

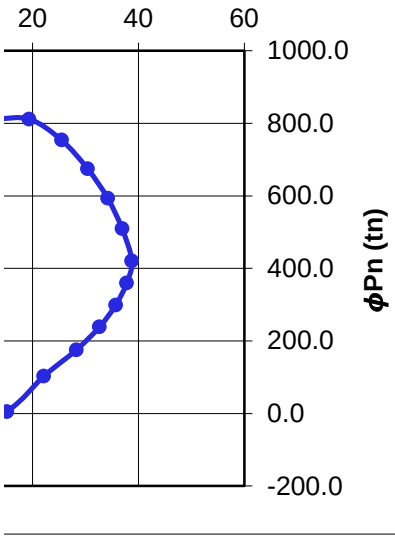
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
811.5	0.1	811.5	0.1
811.5	-12.0	811.5	12.3
811.5	-19.1	811.5	19.4
755.1	-25.3	753.6	25.5
677.0	-30.2	674.7	30.4
596.8	-34.0	593.6	34.2
513.6	-36.9	509.5	36.9
426.1	-38.8	420.9	38.7
363.8	-37.9	359.4	37.8
302.7	-35.9	299.0	35.7
241.5	-32.8	238.6	32.6
174.2	-28.1	175.2	28.3
100.4	-22.0	103.0	22.1
-6.6	-14.3	5.1	15.1
-133.6	-0.2	-133.6	-0.2

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229
44.4855	1.9539	-811.4823	35.3667	2.1635	-811.4823	-0.017
98.1331	4.0431	-811.4823	70.5253	4.9615	-811.4823	-1.14E-02
167.3572	4.3298	-811.4823	121.8154	7.9216	-755.1424	-9.61E-03
223.8049	4.4616	-777.0773	182.9524	9.5682	-676.9834	-7.47E-03
266.3796	4.6042	-672.006	238.316	9.9519	-596.7629	-4.80E-03
295.2784	4.7799	-563.6791	273.5757	10.3606	-513.6138	-1.38E-03
310.8521	5.0564	-451.363	288.7492	10.8803	-426.1031	3.15E-03
309.5372	4.9261	-344.9256	280.2615	10.9742	-363.7923	6.89E-04
287.1598	4.9276	-237.4399	250.4253	10.682	-302.6694	6.89E-04
245.5324	5.1844	-133.656	194.1825	10.7579	-241.5465	6.89E-04
189.0185	5.6248	-50.4982	152.4905	11.2875	-174.1557	-4.23E-03
135.3399	7.4795	35.7818	92.4259	9.262	-100.4113	-4.01E-03
48.3116	4.7301	95.2474	38.5965	4.1195	6.578	-4.70E-03
0.0312	0.1871	133.641	0.0312	0.1871	133.641	0.0312

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0	0.002	-2.227
0	-0.008	-10.702
42.42	0.201	146.223

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0	0.002	-2.227
0	-0.008	-10.702
0.22	0.795	114.286

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373
12.0212	-811.4823	-35.1465	2.1343	-811.4823	-44.6603	1.9579
19.1439	-811.4823	-70.7361	4.977	-811.4823	-98.5475	4.046
25.2636	-811.4823	-122.1999	7.9399	-811.4823	-167.9142	4.329
30.2121	-776.2542	-183.5459	9.5736	-735.8516	-224.3839	4.4596
34.0477	-670.9341	-238.8325	9.9575	-646.6974	-266.8539	4.6097
36.861	-562.3495	-273.928	10.3684	-554.8223	-295.6365	4.7893
38.8015	-449.7566	-288.8686	10.8932	-458.9981	-311.0209	5.0708
37.9096	-343.6543	-279.9936	10.9718	-366.7353	-309.3837	4.9181
35.8755	-236.342	-250.009	10.6827	-278.1353	-286.6819	4.9455
32.8221	-132.824	-193.4446	10.7631	-189.9464	-244.8137	5.1894
28.1149	-49.8141	-151.9144	11.3031	-101.9058	-188.5899	5.6469
22.0197	36.2597	-91.8303	9.2227	-6.9502	-134.4709	7.4859
14.2952	95.7683	-38.1353	4.0678	86.8209	-47.7343	4.6664
0.1871	133.641	0.0312	0.1871	133.641	0.0312	0.1871

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823
-811.4823	-55.1114	1.9161	-811.4823	-70.5558	1.3373	-811.4823
-811.4823	-124.358	2.3857	-811.4823	-138.763	1.3649	-811.4823
-801.0139	-186.1398	2.5062	-788.3379	-195.8592	1.4281	-778.8445
-719.6888	-236.1527	2.5702	-710.2193	-242.287	1.4618	-703.3461
-636.6437	-274.3287	2.6488	-630.4854	-277.9755	1.5179	-625.8979
-551.0376	-301.0358	2.7459	-548.2439	-303.4413	1.5763	-545.9541
-461.5043	-316.775	2.9118	-462.3458	-319.4418	1.6713	-462.6491
-375.3224	-316.8459	2.7338	-380.2774	-319.7942	1.5489	-383.9801
-294.3493	-297.0116	2.8016	-303.4488	-301.8539	1.588	-309.8726
-212.9526	-261.6097	2.9348	-225.6428	-269.7365	1.6842	-234.6779
-128.973	-209.854	3.2092	-146.1106	-223.2168	1.8231	-158.3064
-47.4752	-164.4824	4.2193	-69.581	-178.7153	2.3308	-84.2232
71.3141	-64.1719	4.4634	46.2022	-90.3291	3.2153	21.131
133.641	0.0312	0.1871	133.641	0.0312	0.1871	133.641

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229
-84.9866	0.5594	-811.4823	-96.6745	-8.83E-02	-811.4823	-84.9921
-148.6507	0.6088	-811.4823	-157.0891	-8.17E-02	-811.4823	-148.6712
-202.6043	0.6275	-770.5766	-208.1773	-7.31E-02	-778.8018	-202.6324
-246.4253	0.6517	-697.1882	-249.8414	-6.27E-02	-703.2809	-246.4549
-280.423	0.6762	-621.9945	-282.3633	-4.98E-02	-625.8092	-280.4477
-304.9958	0.7253	-544.0219	-306.2183	-0.033	-545.8391	-305.0092
-320.9693	0.7725	-462.8033	-322.1412	-0.0117	-462.5042	-320.9668
-321.401	0.6982	-386.9963	-322.2331	3.54E-03	-383.859	-321.3804
-304.6956	0.7367	-315.265	-306.8435	1.31E-02	-309.7831	-304.6687
-275.0462	0.7899	-242.3721	-279.0903	0.0242	-234.622	-275.0218
-231.9681	0.8567	-168.6859	-239.0046	0.0365	-158.2867	-231.9602
-186.83	1.0279	-95.1988	-191.9453	0.0561	-84.2533	-186.8463
-115.701	1.5437	-1.1314	-136.806	0.1151	20.9993	-115.8255
0.0312	0.1871	133.641	0.0312	0.1871	133.641	0.0312

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373
-0.7368	-811.4823	-70.5704	-1.5166	-811.4823	-55.1154	-2.0991
-0.7742	-811.4823	-138.8108	-1.5316	-811.4823	-124.4502	-2.5545
-0.7759	-788.2442	-195.9237	-1.5789	-800.8515	-186.2627	-2.6591
-0.7793	-710.0773	-242.3543	-1.5914	-719.4395	-236.2776	-2.7027
-0.7779	-630.2931	-278.0312	-1.6222	-636.3038	-274.4287	-2.7561
-0.7939	-547.9952	-303.4709	-1.6482	-550.6093	-301.0922	-2.8208
-0.7987	-462.0363	-319.4367	-1.7001	-460.9809	-316.7728	-2.9421
-0.6908	-380.027	-319.7536	-1.5398	-374.8858	-316.7674	-2.7235
-0.7083	-303.2537	-301.7916	-1.5566	-294.0294	-296.911	-2.7637
-0.7385	-225.5322	-269.6936	-1.6278	-212.7791	-261.5491	-2.8691
-0.7774	-146.0632	-223.1927	-1.7361	-128.9239	-209.8347	-3.1082
-0.9033	-69.6681	-178.7729	-2.1856	-47.6232	-164.5776	-4.0467
-1.2944	46.3626	-90.174	-2.9023	70.9378	-64.5171	-4.1908
0.1871	133.641	0.0312	0.1871	133.641	0.0312	0.1871

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823
-811.4823	-44.6366	-2.1463	-811.4823	-35.4059	-2.361	-811.4823
-811.4823	-98.6938	-4.2206	-811.4823	-70.8992	-5.1671	-811.4823
-811.4823	-168.1537	-4.4852	-811.4823	-122.6247	-8.1149	-753.622
-735.4169	-224.6293	-4.596	-775.3759	-184.283	-9.7046	-674.6733
-646.1257	-267.0647	-4.7185	-669.7181	-239.445	-10.0609	-593.615
-554.1014	-295.7626	-4.8648	-560.7911	-274.2692	-10.4375	-509.542
-458.108	-311.0226	-5.1008	-447.8345	-288.8251	-10.9193	-420.9457
-366.0286	-309.2715	-4.9018	-342.0822	-279.5751	-10.9544	-359.3593
-277.597	-286.5081	-4.8945	-235.1169	-249.3731	-10.6167	-298.9752
-189.6256	-244.6588	-5.1095	-132.0961	-192.9621	-10.6522	-238.5912
-101.8061	-188.5626	-5.5286	-49.6969	-151.8447	-11.1095	-175.217
-7.2408	-134.6579	-7.2614	36.0374	-91.9687	-9.0068	-103.0026
86.2581	-48.2385	-4.4254	94.477	-39.3359	-3.8964	-5.0729
133.641	0.0312	0.1871	133.641	0.0312	0.1871	133.641

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0229	-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229
-0.0123	-12.2886	-811.4823	35.3091	-2.356	-811.4823	44.7772
-0.0115	-19.3531	-811.4823	70.688	-5.1516	-811.4823	98.2787
-9.76E-03	-25.4775	-811.4823	122.2395	-8.0969	-811.4823	167.597
-7.61E-03	-30.4011	-776.2013	183.6886	-9.6997	-736.2013	224.051
-4.91E-03	-34.1826	-670.7897	238.9318	-10.0555	-647.2143	266.592
-1.45E-03	-36.914	-562.1204	273.9216	-10.43	-555.4394	295.399
3.18E-03	-38.7488	-449.441	288.7117	-10.9069	-459.7786	310.8566
6.89E-04	-37.7882	-343.3531	279.8475	-10.957	-367.3151	309.4267
6.89E-04	-35.7117	-236.2356	249.8082	-10.6186	-278.4749	286.9883
6.89E-04	-32.6404	-132.9181	193.703	-10.6469	-190.4934	245.381
-5.07E-03	-28.2647	-50.3448	152.3968	-11.0918	-102.4038	188.9927
-5.26E-03	-22.1374	35.5608	92.5655	-9.0467	-8.3542	135.5273
-7.89E-03	-15.1488	93.9578	39.7987	-3.9493	85.4936	48.9259
0.0312	0.1871	133.641	0.0312	0.1871	133.641	0.0312

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.1373	-811.4823	-0.0229	-0.1373	-811.4823	-0.0229	-0.1373
-2.1757	-811.4823	54.8857	-2.095	-811.4823	70.2782	-1.5178
-4.2176	-811.4823	123.9953	-2.5554	-811.4823	138.2826	-1.5192
-4.486	-801.4242	185.7298	-2.6602	-788.8196	195.4015	-1.5798
-4.5979	-720.2385	235.723	-2.7036	-710.9955	241.7408	-1.6052
-4.7133	-637.3423	273.9131	-2.7569	-631.3189	277.5068	-1.6217
-4.8565	-551.875	300.6494	-2.8214	-549.2838	303.0288	-1.6475
-5.0871	-462.6395	316.5441	-2.9324	-463.6062	319.1013	-1.7011
-4.91	-376.11	316.9552	-2.7265	-381.2516	319.9199	-1.5438
-4.8767	-294.9307	297.4204	-2.7421	-304.1193	302.2394	-1.5412
-5.1039	-213.6461	262.2387	-2.8659	-226.4611	270.4444	-1.6187
-5.5073	-129.6798	210.6052	-3.1039	-146.9426	224.0517	-1.728
-7.2574	-48.7752	165.4086	-4.0562	-70.5888	179.4328	-2.1871
-4.5005	70.4462	64.8747	-4.2962	45.0233	91.305	-3.0288
0.1871	133.641	0.0312	0.1871	133.641	0.0312	0.1871

Curve 24	345. degrees	
P	M3	M2
-811.4823	-0.0229	-0.1373
-811.4823	84.7027	-0.7376
-811.4823	148.5218	-0.7396
-779.3877	202.1237	-0.7758
-704.0819	245.9107	-0.7807
-626.8373	279.9226	-0.7776
-547.1327	304.5589	-0.7936
-464.1028	320.6241	-0.7983
-384.8063	321.5618	-0.6914
-310.6417	305.1063	-0.693
-235.4756	275.7195	-0.7375
-159.1676	232.8189	-0.7699
-85.1623	187.5229	-0.9008
19.6482	116.9413	-1.427
133.641	0.0312	0.1871

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

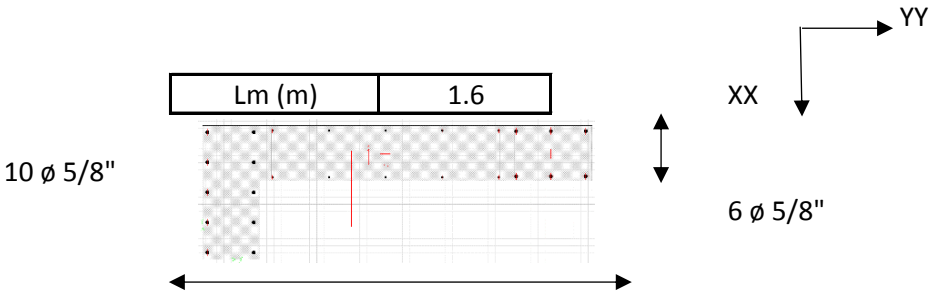
16.8
19.0
19.0

CV (ton)

18.7

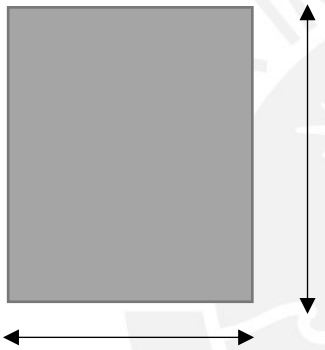
DISEÑO DE MUROS DE CORTE (PLACA - 10)

1. INGRESO DE DATOS GENERALES



Lm (m)	1.6
d (m) = 0.85xLm	1.36

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25
Lm (m)	1.6

hm/Lm	**8.3**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**153.60**	(Axial del etabs)
Mua (ton)	**130.00**	(Momento del etabs)
Mn (ton)	**233.00**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**27.98**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**50.15**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	22.20

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	32.89

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	17.37	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	24.66	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	44.81	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

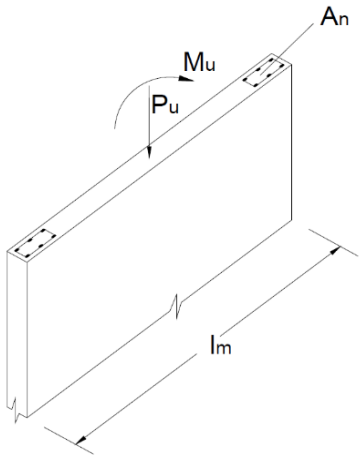
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	153.60	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 287.9 ton > Pu = 116 ton **OK!**

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	118.16
Long. (m)	1.6
F (ton)	73.85
Fy (kg/cm2)	4200
As (cm2)	17.6

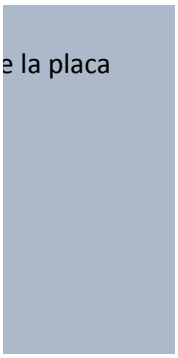
0.25

0.80
0.53
1.205

0.53

Mu)

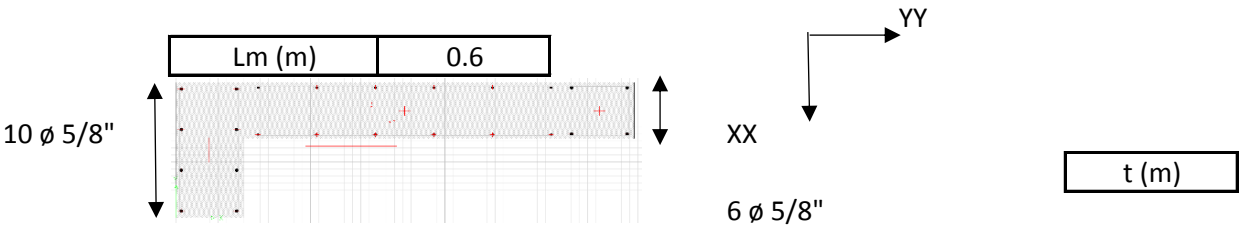
Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



6.25

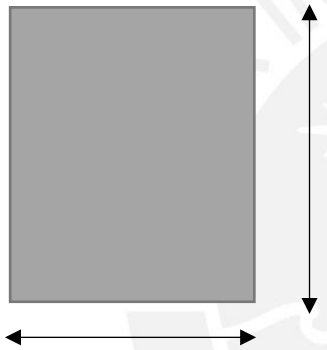
DISEÑO DE MUROS DE CORTE (PLACA - 10)

1. INGRESO DE DATOS GENERALES



d (m) = 0.85xLm	0.51

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	0.6

hm/Lm	**22.1**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**153.60**	(Axial del etabs)
Mua (ton)	**30.69**	(Momento del etabs)
Mn (ton)	**30.69**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**9.76**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**9.76**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	8.32

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	1.69

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	126.76	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	180.00	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	327.04	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

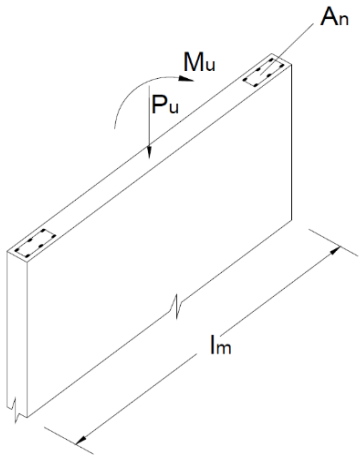
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	153.60	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 108.0 ton > Pu = 41.02 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	30.69
Long. (m)	0.6
F (ton)	51.15
Fy (kg/cm2)	4200
As (cm2)	12.2

0.25

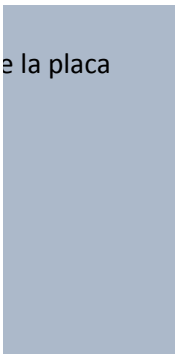
0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28

3.125



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469
2	-773.1366	104.9562	16.4358	-773.1366	59.7246	15.6939
3	-664.1745	175.0155	32.3899	-725.519	142.5513	33.1246
4	-601.7613	202.4707	31.3677	-644.2321	184.6339	34.0971
5	-540.5495	223.1987	29.7107	-578.5958	211.3997	32.2098
6	-477.2562	238.8701	28.288	-510.5541	231.8726	30.5372
7	-410.3417	249.9182	27.1507	-439.3049	246.3824	29.2023
8	-338.7264	256.9219	26.446	-363.1485	255.4412	28.3044
9	-274.0029	251.3842	24.6206	-290.5378	253.5322	26.2427
10	-217.6723	234.5847	2.17E+01	-227.8168	237.7378	22.9595
11	-160.5103	210.4209	18.7339	-165.0323	212.114	19.7788
12	-100.721	177.3974	15.6363	-100.1815	176.7674	16.4717
13	-43.4508	158.9658	14.5582	-37.0658	155.8761	15.5341
14	44.1604	102.4442	11.1284	61.5183	87.2186	11.6669
15	147.7855	7.551	5.7883	147.7855	7.551	5.7883

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P10	LIVE	Top	-19.52	-0.92	0.22
PISO1	P10	LIVE	Bottom	-19.52	-0.92	0.22
PISO1	P10	DEAD-SQ	Top	-83.59	-4.45	0.89
PISO1	P10	DEAD-SQ	Bottom	-83.59	-4.45	0.89
PISO1	P10	RX MAX	Top	10.5	9.72	5.57
PISO1	P10	RX MAX	Bottom	10.5	9.72	5.57
PISO1	P10	RX MIN	Top	-10.5	-9.72	-5.57
PISO1	P10	RX MIN	Bottom	-10.5	-9.72	-5.57
PISO1	P10	RY MAX	Top	14.22	23.63	8.42
PISO1	P10	RY MAX	Bottom	14.22	23.63	8.42
PISO1	P10	RY MIN	Top	-14.22	-23.63	-8.42
PISO1	P10	RY MIN	Bottom	-14.22	-23.63	-8.42

1.4CM+1.7CV	150.21	Tn
1.25(CM+CV)	128.89	Tn

RX

CM	M22	2.13	Tn.m
	M33	10.16	Tn.m
CV	M22	0.54	Tn.m
	M33	0.06	Tn.m

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	150.21	3.90	14.33
1.25(CM+CV)+CS	139.39	-11.83	60.00
1.25(CM+CV)-CS	118.39	18.50	-34.44
0.9CM+CS	85.73	-13.24	56.37
0.9CM-CS	64.73	17.08	-47.16

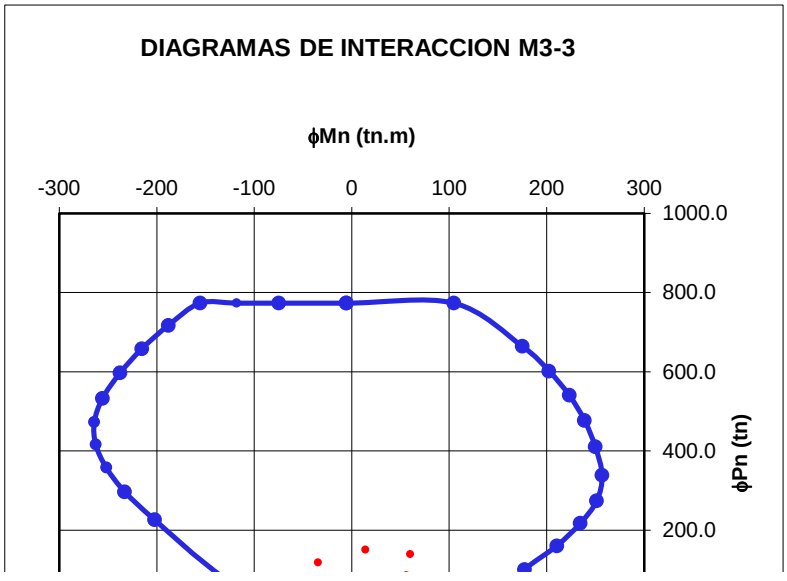
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

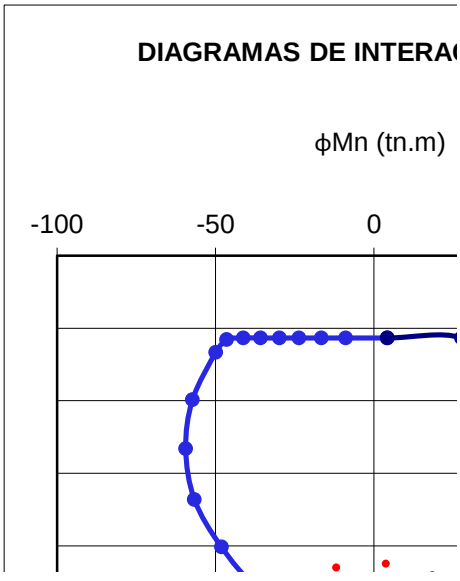
MOMENTO MINIMO DE DISEÑO

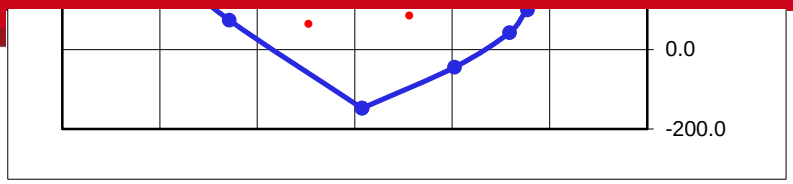
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	773.1	-5.5	773.1	-5.5
2	773.1	105.0	773.1	-74.8
3	664.2	175.0	773.1	-118.1
4	601.8	202.5	773.1	-155.7
5	540.5	223.2	717.1	-188.1
6	477.3	238.9	658.0	-215.3
7	410.3	249.9	597.1	-237.6
8	338.7	256.9	533.1	-255.6
9	274.0	251.4	472.4	-264.1
10	217.7	234.6	415.9	-262.5
11	160.5	210.4	357.6	-251.7
12	100.7	177.4	297.0	-232.9
13	43.5	159.0	226.1	-202.2
14	-44.2	102.4	74.8	-128.6
15	-147.8	7.6	-147.8	7.6

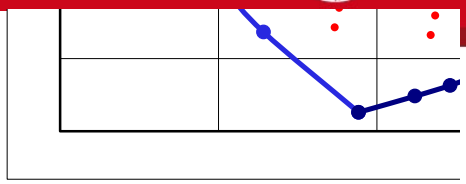
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

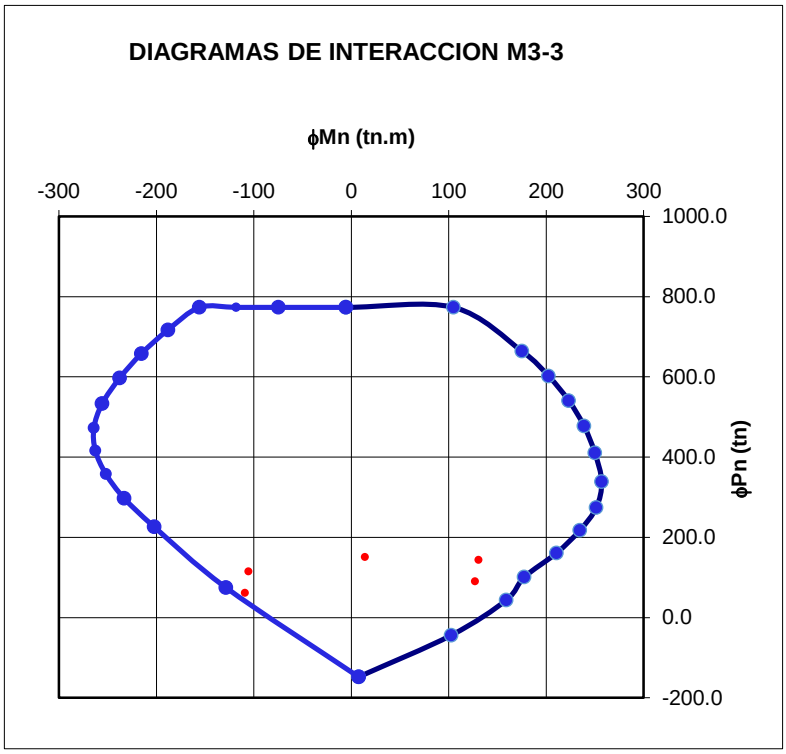


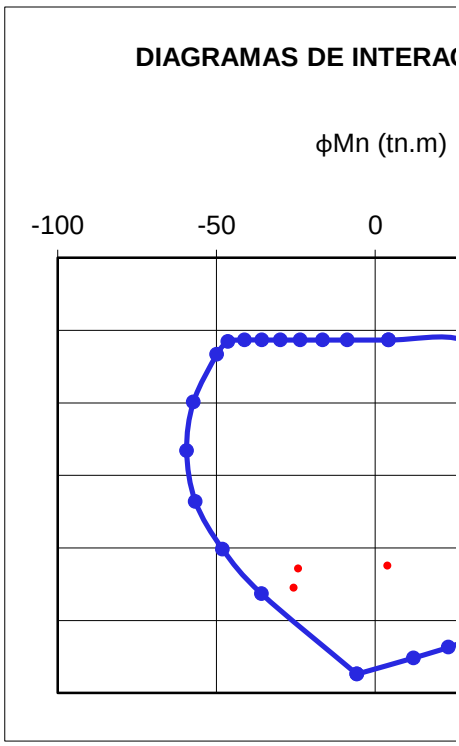






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366
-773.1366	41.3002	12.0796	-773.1366	33.6234	10.1067	-773.1366
-773.1366	101.1144	33.1097	-773.1366	75.577	29.062	-773.1366
-692.1872	160.0197	37.1686	-756.553	121.26	39.2277	-773.1366
-621.5041	194.7671	35.0434	-678.6323	166.6706	38.8551	-748.3741
-548.0377	221.7068	33.1205	-597.9452	203.9568	36.5756	-680.5197
-471.466	240.9188	31.5291	-513.8805	231.0557	34.6154	-584.597
-390.1366	253.0813	30.3818	-425.392	248.633	33.1484	-483.2192
-310.4	254.7411	28.0975	-337.9389	253.8415	30.6891	-384.0642
-238.8536	240.51	24.3961	-255.1976	243.0508	26.5202	-285.4768
-170.2226	213.8763	20.9385	-177.573	215.6872	22.5478	-189.6753
-99.9421	176.2451	17.3673	-98.8042	174.5911	18.7315	-97.5274
-28.5424	151.0684	16.7098	-16.256	143.4484	18.3003	2.4004
79.7872	70.4274	12.1704	94.2497	56.6307	12.3467	102.0163
147.7855	7.551	5.7883	147.7855	7.551	5.7883	147.7855

T	M2	M3
-0.08	-0.039	2.498
-0.08	0.537	0.064
-0.284	-0.226	10.402
-0.284	2.131	-1.382
3.612	2.897	22.315
3.612	15.16	47.222
-3.612	-2.897	-22.315
-3.612	-15.16	-47.222
6.304	6.895	57.595
6.304	27.589	118.039
-6.304	-6.895	-57.595
-6.304	-27.589	-118.039

CARGA	P (ton)	V2 (ton)
VIVA	19.52	-0.92
MUERTA	83.59	-4.45
SISMO XX	10.5	9.72

CARGA	P (ton)	V2 (ton)
VIVA	19.52	-0.92
MUERTA	83.59	-4.45
SISMO YY	14.22	23.63

P	10.50	Tn
M22	-15.16	Tn.m
M33	47.22	Tn.m

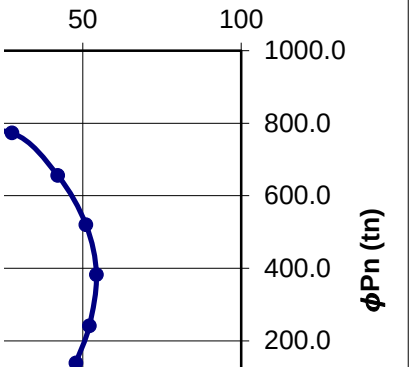
P	14.22	Tn
M22	-27.59	Tn.m
M33	118.04	Tn.m

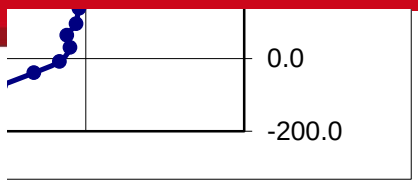
COMBINACIONES SISMO EN Y		
P	M22	M33

150.21	3.90	14.33
143.11	-24.25	130.82
114.67	30.92	-105.26
89.45	-25.67	127.18
61.01	29.51	-108.90

90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
773.1	4.2	773.1	4.2
773.1	-8.8	773.1	27.6
773.1	-16.5	656.1	42.1
773.1	-23.6	520.2	51.0
773.1	-29.8	382.6	54.3
773.1	-35.7	241.3	52.1
773.1	-41.2	138.6	47.8
768.8	-46.4	96.2	47.0
733.5	-49.9	64.4	44.1
602.7	-57.2	31.1	45.1
468.3	-59.4	-7.7	41.7
327.7	-56.6	-38.8	33.6
196.8	-48.1	-73.7	23.1
73.5	-35.8	-103.3	12.1
-147.8	-5.8	-147.8	-5.8

CCION M2-2





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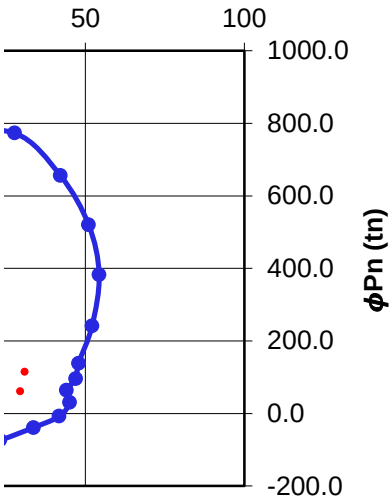


60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402
28.0362	9.0975	-773.1366	22.7276	9.1929	-773.1366	15.5424
59.3309	24.8766	-773.1366	44.9858	21.0659	-773.1366	2.80E+01
91.7968	35.8204	-773.1366	67.4569	30.5184	-773.1366	4.07E+01
124.9852	41.4642	-773.1366	90.6836	37.7813	-773.1366	53.5096
163.1523	42.2393	-761.8871	114.6362	42.7938	-773.1366	67.3102
206.9753	39.8102	-710.3137	142.1976	46.0754	-773.1366	8.18E+01
236.5199	37.772	-620.0448	181.2788	48.1434	-768.8078	9.68E+01
249.141	34.8468	-498.9354	218.1464	45.3814	-733.4549	1.08E+02
243.3577	30.3159	-366.0338	231.0885	39.793	-602.7225	9.58E+01
216.9826	25.2756	-231.3317	210.5546	33.2374	-468.2536	8.06E+01
170.9767	20.9659	-98.7938	156.6003	26.1347	-327.7401	61.7837
129.3443	20.619	10.879	115.3287	23.6164	-196.8491	50.2842
48.9026	12.4842	98.2612	50.3368	13.3458	-73.5377	37.9162
7.551	5.7883	147.7855	7.551	5.7883	147.7855	7.551

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.22	0.537	0.064
0.89	2.131	-1.382
9.72	15.16	47.222

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.22	0.537	0.064
0.89	2.131	-1.382
8.42	27.589	118.039

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469
8.8389	-773.1366	-20.6689	1.2027	-773.1366	-33.6213	-3.1253
16.5438	-773.1366	-34.6343	8.2219	-773.1366	-65.5466	-2.7484
23.5778	-773.1366	-53.6013	17.1028	-773.1366	-112.536	-4.6796
29.821	-709.2749	-79.4843	23.7521	-746.2878	-157.3143	-7.6
35.7042	-599.8022	-108.5073	27.22	-671.0455	-192.4153	-10.4093
41.186	-481.2109	-127.5997	28.9926	-588.2561	-216.0693	-11.3841
46.3938	-357.8354	-131.4255	30.1429	-479.1204	-217.9487	-4.0324
49.8853	-242.4718	-119.7707	29.9269	-362.4475	-201.9155	4.6056
57.2226	-140.2155	-101.2325	26.8344	-245.4341	-171.2039	10.882
59.3738	-61.3121	-88.086	25.0532	-130.1274	-126.3066	15.3284
56.6258	15.233	-65.3327	22.1404	-39.8913	-95.9851	18.8107
48.0769	79.5239	-33.6137	15.4721	52.7489	-52.0057	16.3047
35.771	125.651	-7.4347	9.1748	119.175	-11.9973	10.0143
5.7883	147.7855	7.551	5.7883	147.7855	7.551	5.7883

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366
-773.1366	-41.5976	-4.6878	-773.1366	-51.1687	-5.6257	-773.1366
-773.1366	-86.6204	-6.3898	-773.1366	-100.8823	-8.6677	-773.1366
-773.1366	-133.4957	-9.408	-773.1366	-143.8824	-11.7396	-773.1366
-737.0464	-172.7935	-12.3483	-729.9123	-180.2524	-14.7838	-723.3165
-668.713	-204.496	-15.2754	-665.9237	-210.1528	-17.8344	-662.1169
-597.3805	-228.782	-18.0875	-599.4044	-233.8239	-20.8865	-599.0909
-522.4159	-246.0327	-20.809	-529.2764	-251.6439	-23.9245	-532.3064
-447.5149	-252.5956	-23.0415	-460.3573	-259.6514	-26.7672	-467.7528
-352.9232	-234.0566	-16.6745	-394.7158	-255.031	-29.0121	-406.5778
-228.9644	-184.4729	-2.2132	-319.6465	-235.1608	-27.2455	-345.322
-99.033	-121.7304	8.3046	-194.3061	-178.9314	-11.8208	-276.4539
12.0553	-78.7174	15.0579	-52.4711	-111.6961	5.7227	-139.6089
105.8792	-21.2869	10.8441	86.0746	-35.0675	10.8837	31.72
147.7855	7.551	5.7883	147.7855	7.551	5.7883	147.7855

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402
-63.8902	-7.0824	-773.1366	-74.8243	-8.42E+00	-773.1366	-66.6373
-110.1597	-10.0341	-773.1366	-118.0611	-1.13E+01	-773.1366	-114.661
-150.4821	-13.0882	-773.1366	-155.6761	-1.42E+01	-773.1366	-155.7938
-184.5935	-16.1149	-717.0991	-188.0561	-1.72E+01	-710.9933	-190.4051
-213.2323	-19.2743	-657.983	-215.2953	-2.02E+01	-646.9265	-218.5313
-236.3293	-22.4985	-597.0848	-237.567	-23.3883	-580.7064	-240.4305
-254.3638	-25.69	-533.0513	-255.6313	-26.7028	-511.1119	-256.5775
-262.7123	-28.6712	-472.3975	-264.0915	-29.8441	-443.6804	-262.2374
-259.6111	-31.2477	-415.8787	-262.5396	-32.7632	-380.247	-255.5812
-247.172	-33.5092	-357.6371	-251.6945	-35.1919	-316.2985	-239.0223
-223.5443	-33.573	-296.9931	-232.8729	-37.3485	-249.2493	-212.6678
-155.4039	-16.2941	-226.1218	-202.1698	-37.52	-154.0062	-163.5604
-72.8599	3.9846	-74.8363	-128.6265	-20.1185	22.186	-79.1169
7.551	5.7883	147.7855	7.551	5.7883	147.7855	7.551

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469
-8.6367	-773.1366	-57.1174	-8.8548	-773.1366	-48.6579	-8.9143
-11.7689	-773.1366	-110.8346	-12.2962	-773.1366	-104.7041	-13.0809
-14.9452	-771.884	-155.9277	-15.7773	-769.4219	-155.3402	-17.0279
-18.2009	-703.6981	-192.7814	-19.411	-692.7236	-195.1026	-21.1231
-21.5342	-633.3714	-221.5291	-23.116	-613.7306	-224.1436	-25.3139
-25.0092	-560.5148	-242.2336	-26.974	-532.1495	-242.5412	-29.6336
-28.6553	-484.3055	-255.506	-30.9749	-446.537	-250.7577	-34.1667
-32.1009	-409.7105	-257.3193	-34.6768	-362.5227	-245.5114	-38.2366
-35.1782	-339.1906	-244.3443	-38.0641	-282.3957	-222.9617	-41.9793
-37.9529	-267.4036	-219.3299	-41.3196	-201.7429	-185.6945	-45.6177
-40.4663	-190.9984	-181.8596	-44.1248	-115.2236	-135.9187	-46.0242
-38.964	-76.6416	-121.4835	-42.4114	-22.7792	-96.7394	-42.6567
-23.062	73.9761	-42.9133	-18.0525	93.248	-29.2413	-14.1298
5.7883	147.7855	7.551	5.7883	147.7855	7.551	5.7883

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366
-773.1366	-43.4628	-9.0842	-773.1366	-38.59	-9.8794	-773.1366
-773.1366	-93.0279	-14.3935	-773.1366	-82.4876	-16.7651	-656.1249
-763.7777	-152.7143	-19.2256	-747.9665	-141.8956	-24.5969	-520.1819
-672.5077	-197.0142	-24.0847	-619.5276	-194.9723	-31.5015	-382.5601
-578.8804	-225.4512	-29.0285	-487.728	-215.0201	-38.4573	-241.2644
-482.5451	-238.3005	-34.1294	-352.9839	-201.5677	-45.4569	-138.6289
-381.8362	-235.7483	-39.4214	-236.0256	-173.1953	-49.3114	-96.1882
-283.4573	-215.5586	-43.9997	-157.9874	-146.9386	-49.2494	-64.3571
-191.3729	-176.2884	-47.7837	-104.8054	-125.1952	-47.3964	-31.1065
-124.202	-139.2036	-47.799	-62.9889	-110.036	-48.7263	7.6956
-62.7854	-111.7054	-47.5239	-10.8317	-87.743	-44.7072	38.8236
18.497	-73.3251	-37.5983	47.4462	-54.3029	-30.6679	73.7064
101.7522	-22.9314	-11.8451	105.6445	-19.2766	-11.0494	103.292
147.7855	7.551	5.7883	147.7855	7.551	5.7883	147.7855

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-5.5402	-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402
-27.8017	-27.6481	-773.1366	10.8783	-7.3516	-773.1366	20.5252
-44.5635	-42.0848	-773.1366	27.0343	-11.0594	-773.1366	44.427
-61.4989	-50.9918	-773.1366	49.4049	-16.1129	-773.1366	78.9502
-78.8539	-54.2995	-773.1366	74.3378	-21.4875	-723.4912	119.8107
-95.9223	-52.0737	-698.8969	98.8563	-26.3541	-611.6207	161.571
-1.02E+02	-47.8263	-592.2744	119.6117	-29.8883	-494.6533	195.5366
-9.35E+01	-46.9652	-472.5232	130.3482	-31.9055	-375.0235	219.5183
-8.36E+01	-44.0565	-360.7857	125.7129	-32.1268	-274.8785	221.729
-8.42E+01	-45.0661	-246.9371	106.1663	-30.9665	-190.8977	203.6306
-7.69E+01	-41.7321	-140.3362	81.0774	-26.7867	-109.362	172.2904
-58.1693	-33.6104	-51.5371	64.9424	-22.3283	-35.8669	149.3256
-37.1321	-23.0927	41.8392	50.649	-10.6068	52.4721	89.624
-19.2987	-12.0745	115.8245	29.5903	2.354	115.1707	37.4901
7.551	5.7883	147.7855	7.551	5.7883	147.7855	7.551

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-4.2469	-773.1366	-5.5402	-4.2469	-773.1366	-5.5402	-4.2469
-5.266	-773.1366	28.1909	-3.95	-773.1366	36.8826	-3.1718
-8.7326	-773.1366	62.2605	-6.8045	-773.1366	88.3084	-2.3662
-12.093	-762.4468	111.7814	-6.0401	-681.4006	160.8544	11.291
-13.2046	-639.8198	170.2747	2.7088	-565.9095	211.8044	24.4715
-10.4626	-519.8903	217.1575	15.8247	-492.7098	231.5744	24.6941
-3.9525	-429.3069	237.1491	20.0988	-421.7985	242.4997	22.9277
5.3586	-350.575	241.5349	18.1586	-346.4041	248.1092	21.5216
10.2879	-272.3242	237.5165	17.1541	-271.4783	245.1794	20.9103
9.8301	-197.4283	221.6589	16.6001	-204.4617	228.4332	19.3442
8.9901	-128.9787	191.5566	14.0639	-142.2723	200.1429	16.0235
7.6191	-66.5895	165.7379	11.4021	-82.5606	172.3991	13.3945
4.0561	19.8166	119.0316	7.5784	-8.3399	140.9079	10.8913
4.207	106.8991	45.2992	4.4291	89.5955	61.6126	5.9631
5.7883	147.7855	7.551	5.7883	147.7855	7.551	5.7883

Curve 24	345. degrees	
P	M3	M2
-773.1366	-5.5402	-4.2469
-773.1366	55.9146	-0.6178
-737.4871	135.6125	14.5554
-615.6749	195.9985	29.0927
-549.9419	219.2466	28.2529
-484.7502	235.5136	26.5783
-415.9461	246.4979	25.1492
-342.4905	252.7804	24.0973
-272.0232	249.1187	23.1165
-211.7705	232.0425	20.6372
-151.9268	205.7314	17.4547
-92.7292	175.4599	14.6514
-28.3008	151.8364	13.0005
66.9622	82.5243	8.4663
147.7855	7.551	5.7883

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

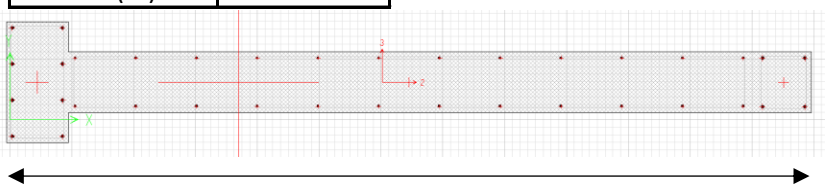
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 11)

1. INGRESO DE DATOS GENERALES

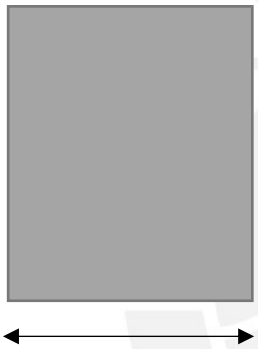
Lm (m)	3.25



t (m)

d (m) = 0.85xLm	2.76

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	3.25

hm/Lm	4.1

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**288.69**	(Axial del etabs)
Mua (ton)	**260.95**	(Momento del etabs)
Mn (ton)	**260.95**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**36.73**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**36.73**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	45.09

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-9.83

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-118.02	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-167.58	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-304.48	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

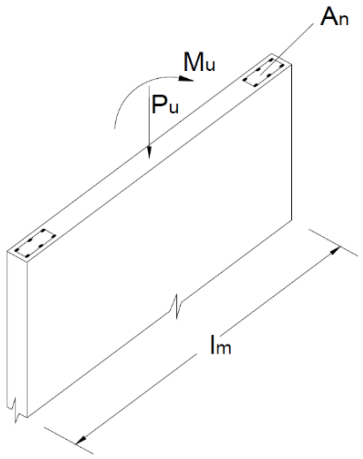
N_u = 288.69 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 584.8 ton > Pu = 288.69 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	260.95
Long. (m)	3.25
F (ton)	80.29
Fy (kg/cm2)	4200
As (cm2)	19.1

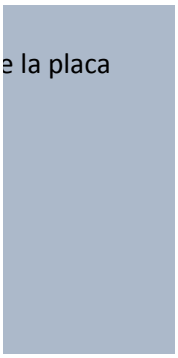
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
2	-1259	311.3199	0.0359	-1259	244.937	4.7862
3	-1219	442.1211	0.0293	-1242	416.6834	0.802
4	-1113	542.5388	0.0214	-1133	524.7209	0.8155
5	-1006	622.4262	1.19E-02	-1023	610.6887	0.8273
6	-896.2039	682.4513	1.99E-04	-910.3025	675.215	0.8455
7	-782.9732	723.3658	-0.0147	-794.1091	719.1265	0.8665
8	-664.9728	746.8342	-0.0339	-673.1739	744.0129	0.8902
9	-555.6276	732.9118	-0.0452	-558.9074	733.3054	0.6326
10	-449.6528	688.7918	-5.35E-02	-449.8809	688.4796	0.6205
11	-343.7909	619.4535	-0.0617	-340.9852	616.9483	0.6063
12	-238.0202	524.8677	-0.0698	-232.0399	518.4533	0.6075
13	-139.867	430.0563	-0.0833	-131.3963	422.756	0.7254
14	-23.9718	311.3512	-0.1075	-7.7144	291.4051	0.8689
15	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P11	LIVE	Top	-38.91	-0.38	0.09
PISO1	P11	LIVE	Bottom	-38.91	-0.38	0.09
PISO1	P11	DEAD-SQ	Top	-154.98	0.11	0.34
PISO1	P11	DEAD-SQ	Bottom	-154.98	0.11	0.34
PISO1	P11	RX MAX	Top	3.75	11.46	6.47
PISO1	P11	RX MAX	Bottom	3.75	11.46	6.47
PISO1	P11	RX MIN	Top	-3.75	-11.46	-6.47
PISO1	P11	RX MIN	Bottom	-3.75	-11.46	-6.47
PISO1	P11	RY MAX	Top	2.89	36.18	8.7
PISO1	P11	RY MAX	Bottom	2.89	36.18	8.7
PISO1	P11	RY MIN	Top	-2.89	-36.18	-8.7
PISO1	P11	RY MIN	Bottom	-2.89	-36.18	-8.7

1.4CM+1.7CV	283.12	Tn
1.25(CM+CV)	242.36	Tn

CM	M22	0.83	Tn.m
	M33	1.45	Tn.m
CV	M22	0.20	Tn.m
	M33	1.73	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	283.12	1.50	4.97
1.25(CM+CV)+CS	246.11	-11.01	95.63
1.25(CM+CV)-CS	238.61	13.57	-87.67
0.9CM+CS	143.23	-11.55	92.95
0.9CM-CS	135.73	13.03	-90.09

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	1259.0	-20.8	1259.0	-20.8
2	1259.0	311.3	1259.0	-219.8
3	1219.0	442.1	1259.0	-359.7
4	1113.0	542.5	1240.0	-478.1
5	1006.0	622.4	1137.0	-575.3
6	896.2	682.5	1031.0	-651.9
7	783.0	723.4	923.1	-708.4
8	665.0	746.8	812.0	-745.9
9	555.6	732.9	704.8	-752.2
10	449.7	688.8	598.9	-730.7
11	343.8	619.5	493.2	-683.9
12	238.0	524.9	387.5	-612.0
13	139.9	430.1	278.1	-510.0
14	24.0	311.4	156.0	-371.7
15	-155.1	28.4	-155.1	28.4

PUNTO
1
2
3
4
5
6
7
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11
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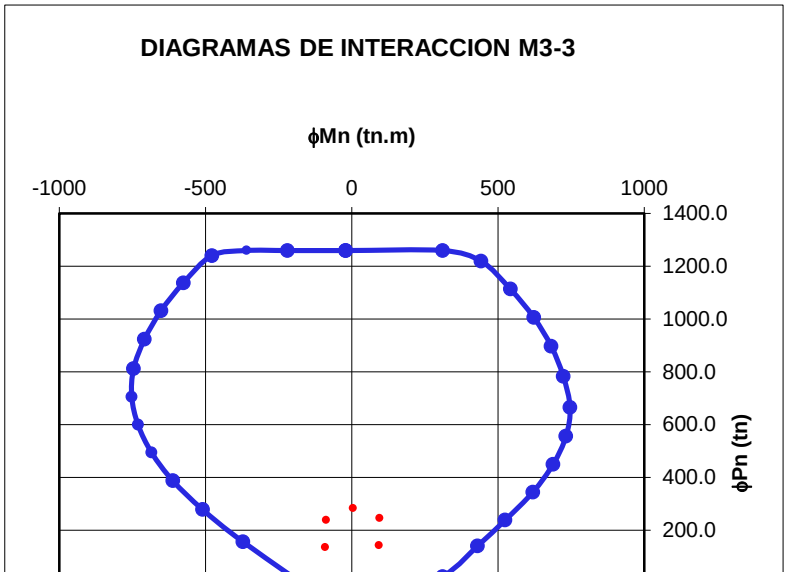
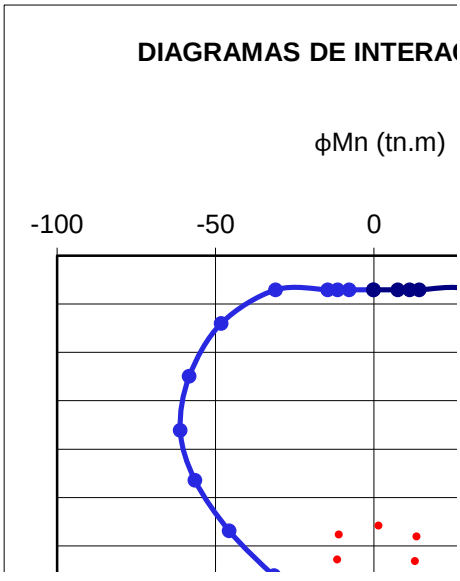
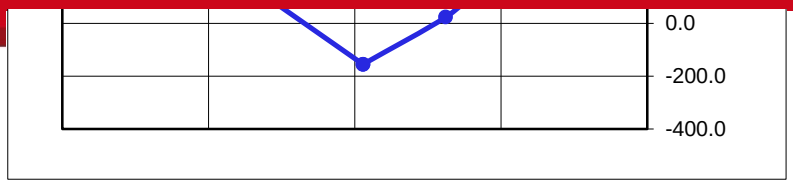
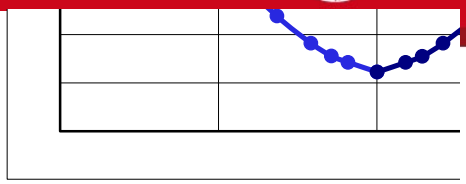
14
15

SISMO EN XX

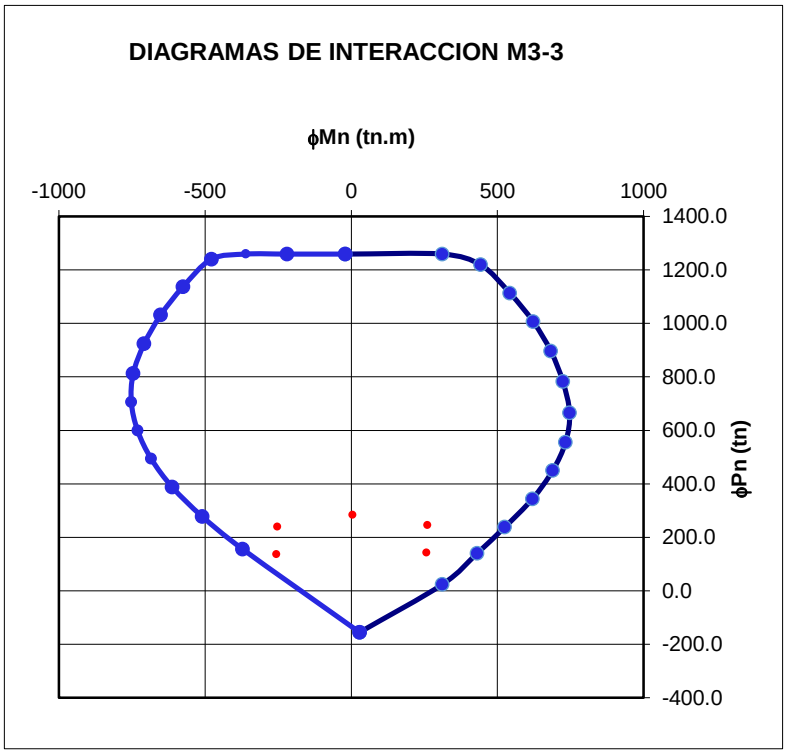


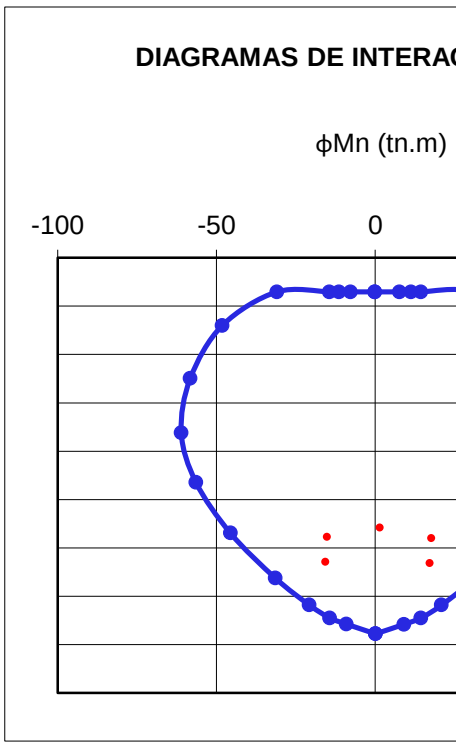






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	165.7197	9.7542	-1259	116.2615	9.6927	-1259
-1259	383.2227	2.1505	-1259	295.5348	9.4826	-1259
-1157	503.1076	1.7174	-1188	471.8656	2.9128	-1259
-1043	596.4275	1.7524	-1069	575.7432	2.9823	-1115
-926.4273	666.4201	1.8038	-948.1046	653.6842	3.0723	-985.3101
-806.8055	714.0116	1.8635	-823.7775	706.6395	3.1813	-852.6622
-682.4474	740.6674	1.9362	-694.6516	735.8671	3.3236	-715.3574
-562.6482	733.5579	1.4073	-568.3342	732.5919	2.5973	-580.1693
-450.1291	687.9412	1.3925	-450.3654	686.6994	2.4393	-450.6281
-337.6406	613.6957	1.3823	-332.7953	608.3595	2.4732	-324.1807
-224.6412	509.9939	1.4348	-214.5425	497.9212	2.5617	-196.5737
-121.3043	413.4505	1.6771	-106.1245	398.0091	3.1118	-78.7325
14.4484	258.698	2.2948	44.2578	210.4852	4.1793	76.2022
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

T	M2	M3
-0.112	-0.027	2.731
-0.112	0.201	1.731
-0.411	-0.067	1.152
-0.411	0.825	1.451
7.659	4.877	62.34
7.659	12.289	91.648
-7.659	-4.877	-62.34
-7.659	-12.289	-91.648
10.885	6.673	167.196
10.885	16.438	256.604
-10.885	-6.673	-167.196
-10.885	-16.438	-256.604

CARGA	P (ton)	V2 (ton)
VIVA	38.91	-0.38
MUERTA	154.98	0.11
SISMO XX	3.75	11.46

CARGA	P (ton)	V2 (ton)
VIVA	38.91	-0.38
MUERTA	154.98	0.11
SISMO YY	2.89	36.18

P	3.75	Tn
M22	-12.29	Tn.m
M33	91.65	Tn.m

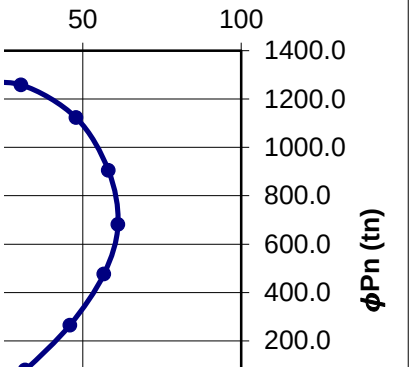
P	2.89	Tn
M22	-16.44	Tn.m
M33	256.60	Tn.m

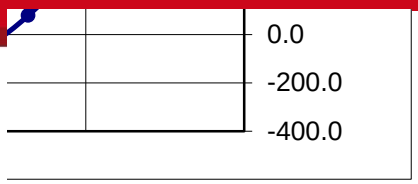
COMBINACIONES SISMO EN Y		
P	M22	M33

283.12	1.50	4.97
245.25	-15.16	260.58
239.47	17.72	-252.63
142.37	-15.70	257.91
136.59	17.18	-255.30

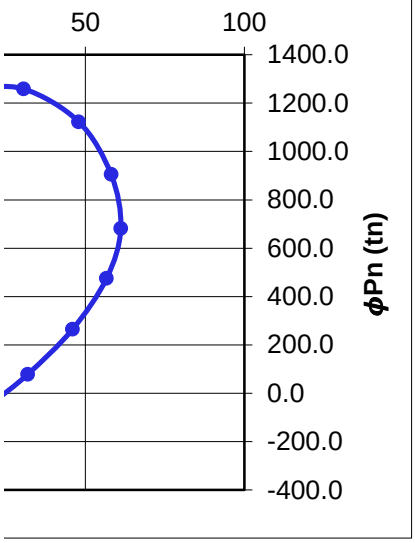
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1259.0	-0.1	1259.0	-0.1
1259.0	-7.7	1259.0	7.6
1259.0	-11.4	1259.0	11.3
1259.0	-14.5	1259.0	14.4
1259.0	-31.0	1259.0	30.5
1120.0	-48.2	1123.0	47.9
901.0	-58.2	905.0	58.1
677.0	-61.1	681.8	61.1
471.7	-56.5	475.7	56.7
261.7	-45.6	265.0	45.9
75.9	-31.5	78.6	31.8
-35.7	-20.8	-36.0	20.9
-89.5	-14.3	-89.9	14.4
-114.9	-9.1	-115.7	9.1
-155.1	0.1	-155.1	0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
85.3204	8.227	-1259	56.4782	6.8621	-1259	9.7203
191.951	14.0256	-1259	116.0122	12.6008	-1259	3.34E+01
367.8131	11.5319	-1259	199.3255	16.8537	-1259	5.70E+01
536.3307	5.0629	-1259	333.8455	20.0089	-1259	51.7441
629.2761	5.2224	-1116	502.3398	17.483	-1120	32.4277
692.4243	5.4184	-929.5151	641.9718	11.5197	-901.0353	1.34E+01
727.0395	5.66	-767.8013	696.8246	11.6903	-677.0486	-4.81E+00
727.1758	4.9834	-611.1483	701.5303	11.4658	-471.6663	-2.69E+01
682.9138	4.3085	-454.2	657.4492	10.4955	-261.724	-4.90E+01
597.4634	4.3775	-299.9197	558.897	9.6842	-75.9389	-7.85E+01
474.4103	4.5741	-154.8355	418.1415	10.2458	35.7005	-78.31
366.7836	5.6806	-16.9907	285.8744	10.7284	89.5238	-63.1166
157.665	5.5591	97.0954	122.3963	5.5494	114.8553	-27.7705
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.09	0.201	1.731
0.34	0.825	1.451
11.46	12.289	91.648

V3 (ton)	M2 (ton-m)	M3 (ton-m)
0.09	0.201	1.731
0.34	0.825	1.451
8.7	16.438	256.604

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
7.7385	-1259	-97.9897	3.3437	-1259	-123.5256	3.0654
11.3809	-1259	-215.1502	7.7023	-1259	-288.2167	4.181
14.4808	-1259	-384.0313	9.4652	-1259	-440.2113	4.2456
30.9766	-1151	-532.3757	9.802	-1145	-560.9951	4.3181
48.1586	-999.5286	-634.2815	10.1937	-1019	-650.0079	4.4633
58.2401	-844.6451	-690.2895	10.6751	-889.6025	-708.1886	4.6579
61.0779	-685.7074	-700.9274	11.2896	-756.0866	-735.6567	4.9897
56.4683	-525.5878	-654.1105	12.8086	-625.5294	-725.5737	5.0722
45.6182	-336.7394	-512.6643	19.9053	-497.162	-673.1836	5.4858
31.5031	-171.2689	-349.9339	22.2861	-366.8613	-582.2806	6.0823
20.7701	-58.9589	-250.917	24.6248	-197.3411	-402.1554	14.2213
14.2909	32.0197	-143.8011	21.086	-53.9106	-252.7075	21.5566
9.0711	102.6626	-46.1042	11.5109	76.4885	-84.1407	14.9901
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	-154.9102	2.4235	-1259	-183.2761	1.4172	-1259
-1259	-319.4386	2.4795	-1259	-336.9065	1.4668	-1259
-1258	-457.1127	2.5054	-1250	-466.2821	1.4779	-1245
-1142	-567.6982	2.5277	-1140	-571.1993	1.497	-1138
-1024	-651.8014	2.5641	-1027	-652.0939	1.5204	-1029
-904.441	-709.908	2.6153	-912.3602	-709.642	1.5421	-918.1361
-780.9905	-743.0085	2.7097	-794.1385	-744.8339	1.5827	-803.7506
-660.5295	-741.395	2.6716	-679.4843	-747.2009	1.4941	-693.0132
-542.0619	-703.5221	2.8709	-566.8132	-717.1947	1.5381	-584.1217
-422.264	-632.676	3.2765	-453.3144	-657.4773	1.7313	-475.3408
-299.5571	-526.7436	3.9335	-337.8397	-566.5311	2.0739	-364.9658
-143.1681	-352.8149	12.7156	-214.2483	-436.1736	3.3639	-250.5179
38.0307	-139.4791	17.5371	-22.9055	-222.6288	16.0213	-102.6611
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
-203.3869	0.6787	-1259	-219.848	7.03E-02	-1259	-203.3923
-349.2777	0.7193	-1259	-359.7047	6.85E-02	-1259	-349.2848
-472.695	0.7239	-1240	-478.0715	6.63E-02	-1245	-472.7031
-573.4936	0.7288	-1137	-575.3138	6.35E-02	-1138	-573.5024
-652.0634	0.7411	-1031	-651.9063	6.01E-02	-1029	-652.0714
-709.0553	0.749	-923.1335	-708.3679	0.0556	-918.114	-709.0628
-745.6204	0.7592	-811.9599	-745.904	0.0496	-803.7247	-745.6271
-750.1168	0.7188	-704.771	-752.1843	0.0417	-692.9862	-750.1178
-724.9321	0.7065	-598.9053	-730.6592	0.0334	-584.097	-724.927
-673.0343	0.6971	-493.1537	-683.9448	0.0253	-475.3174	-673.0229
-592.2376	0.9196	-387.4828	-612.0023	0.0172	-364.9286	-592.201
-479.3447	1.1207	-278.1423	-510.0021	5.75E-03	-250.4691	-479.2868
-316.6999	6.8033	-155.9789	-371.712	-1.57E-02	-102.5599	-316.5903
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
-0.5381	-1259	-183.2872	-1.2769	-1259	-154.9292	-2.2834
-0.5824	-1259	-336.9211	-1.3301	-1259	-319.4638	-2.3431
-0.5916	-1250	-466.2993	-1.3458	-1258	-457.141	-2.374
-0.602	-1140	-571.217	-1.3708	-1142	-567.7284	-2.4019
-0.6214	-1027	-652.1106	-1.4013	-1024	-651.8275	-2.4458
-0.6386	-912.3135	-709.6575	-1.4323	-904.3598	-709.9312	-2.5067
-0.6607	-794.0822	-744.8457	-1.4855	-780.8852	-743.0147	-2.6154
-0.6367	-679.4273	-747.2022	-1.4134	-660.425	-741.3763	-2.5956
-0.6413	-566.7526	-717.1725	-1.477	-541.9431	-703.4512	-2.8188
-0.6488	-453.2495	-657.4322	-1.6906	-422.1294	-632.556	-3.2472
-0.8919	-337.7512	-566.4384	-2.0582	-299.3983	-526.5633	-3.9354
-1.1189	-214.1131	-436.003	-3.3811	-142.9643	-352.6108	-12.761
-6.865	-22.643	-222.3211	-16.1258	38.3942	-138.9688	-17.6669
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	-123.5503	-2.9264	-1259	-97.9922	-3.2143	-1259
-1259	-288.1146	-4.0338	-1259	-215.1742	-7.5794	-1259
-1259	-440.2575	-4.1153	-1259	-384.0675	-9.3502	-1259
-1145	-561.0301	-4.1958	-1151	-532.3232	-9.6855	-1259
-1019	-650.0391	-4.3494	-999.2298	-634.2626	-10.1015	-1123
-889.4428	-708.1911	-4.558	-844.2902	-690.2264	-10.5985	-904.9906
-755.8835	-735.6239	-4.9067	-685.2704	-700.7825	-11.2325	-681.82
-625.323	-725.5068	-5.01	-525.1112	-653.8448	-12.7803	-475.6978
-496.9268	-673.0084	-5.4494	-336.2372	-512.233	-19.9061	-264.9593
-366.6184	-582.047	-6.0761	-170.8276	-349.5273	-22.3264	-78.6157
-197.0421	-401.7991	-14.2507	-58.4868	-250.4395	-24.7232	36.0444
-53.4903	-252.242	-21.6543	32.4992	-143.1513	-21.184	89.8541
76.8568	-83.6434	-15.1086	102.6316	-46.1046	-11.6964	115.726
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
9.8731	-7.633	-1259	56.5409	-6.7561	-1259	85.3227
33.5181	-11.2757	-1259	115.5011	-12.4804	-1259	191.8241
57.0182	-14.3699	-1259	199.008	-16.763	-1259	366.8919
52.4791	-30.4717	-1259	333.1368	-19.9473	-1115	536.0851
33.1068	-47.868	-1117	501.2899	-17.4915	-985.7008	629.0769
1.42E+01	-58.0793	-930.6989	641.4021	-11.5309	-853.1557	692.3139
-3.93E+00	-61.1022	-769.1153	696.758	-11.7059	-715.9636	727.0593
-2.61E+01	-56.6544	-612.2455	701.8797	-11.5161	-580.6741	727.3371
-4.83E+01	-45.9271	-455.0799	658.0549	-10.5787	-451.0418	683.1567
-7.75E+01	-31.8109	-300.6265	559.5893	-9.8013	-324.5006	597.752
-78.1385	-20.8742	-155.2263	418.4958	-10.3771	-196.7959	474.676
-62.6556	-14.3801	-17.2795	286.2473	-10.9283	-78.8838	366.9667
-26.5556	-9.0583	97.0709	122.4654	-5.7699	76.1203	157.8019
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
-8.1347	-1259	116.2343	-9.6078	-1259	165.6734	-9.677
-13.9489	-1259	295.368	-9.4251	-1259	382.7232	-2.164
-11.5698	-1188	471.75	-2.8587	-1157	503.0477	-1.6675
-5.0194	-1069	575.6248	-2.9463	-1043	596.368	-1.721
-5.2003	-948.3281	653.5914	-3.0587	-926.5555	666.3739	-1.7954
-5.4239	-824.0612	706.5943	-3.1957	-806.969	713.9914	-1.8838
-5.7007	-695.0022	735.8893	-3.375	-682.6501	740.6835	-1.994
-5.0609	-568.6303	732.6884	-2.6834	-562.8198	733.6137	-1.4961
-4.4125	-450.5995	686.8341	-2.5451	-450.266	688.0207	-1.4986
-4.5003	-332.9745	608.5152	-2.5969	-337.7425	613.7806	-1.5062
-4.7138	-214.6605	498.0573	-2.7027	-224.7098	510.0694	-1.5756
-5.8627	-106.2003	398.0913	-3.2903	-121.342	413.4881	-1.8511
-5.78	44.1934	210.5939	-4.4003	14.4136	258.7555	-2.516
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 24	345. degrees	
P	M3	M2
-1259	-20.8277	0.0811
-1259	244.9118	-4.7134
-1242	416.6647	-0.7403
-1133	524.6956	-0.7693
-1023	610.6637	-0.7999
-910.3618	675.196	-0.8413
-794.1849	719.1191	-0.8916
-673.2687	744.0222	-0.9533
-558.9869	733.3318	-0.7222
-449.9442	688.5162	-0.7271
-341.0333	616.9887	-0.7297
-232.0704	518.4857	-0.7478
-131.4126	422.7713	-0.8955
-7.7294	291.425	-1.0883
155.1016	28.3871	-0.1106

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

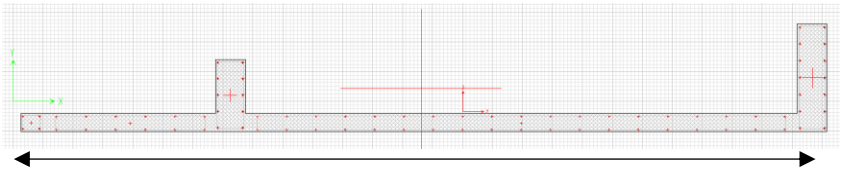
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 12)

1. INGRESO DE DATOS GENERALES

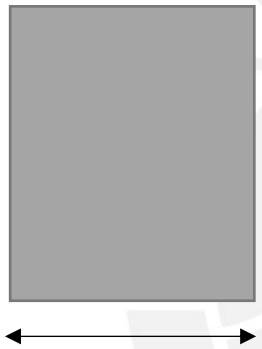
Lm (m)	6.85



t (m)

d (m) = 0.85xLm	5.82

f'c (kg/cm2)	210
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	6.85

hm/Lm	1.9

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**178.40**	(Axial del etabs)
Mua (ton)	**531.61**	(Momento del etabs)
Mn (ton)	**531.61**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**65.03**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**65.03**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	57.02

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	9.43

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	259.41	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	368.36	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	669.28	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

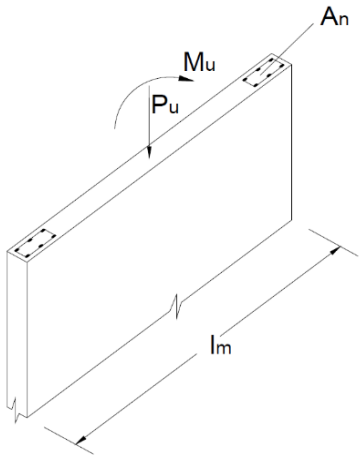
N_u = 178.40 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 577.5 ton > Pu = 178.40 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	531.61
Long. (m)	9.5
F (ton)	55.96
Fy (kg/cm2)	4200
As (cm2)	13.3

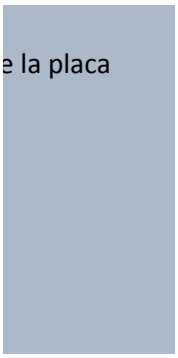
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1959	-28.6335	17.1684	-1959	-28.6335	17.1684
2	-1959	602.4893	29.1092	-1959	600.1129	29.4162
3	-1959	987.3048	40.155	-1959	997.1469	40.8914
4	-1959	1320.8364	51.2436	-1959	1338.598	52.415
5	-1650	1966.1023	22.8629	-1645	1970.5098	27.8212
6	-1507	2202.6561	34.0834	-1488	2223.0134	36.1396
7	-1358	2395.3586	45.4111	-1334	2410.6817	47.9335
8	-1200	2549.7841	56.885	-1172	2555.7077	59.8935
9	-1042	2623.7655	67.303	-1009	2615.8613	70.8104
10	-884.0286	2624.3594	7.74E+01	-845.7222	2598.1732	81.0544
11	-744.4473	2518.9483	90.2436	-701.2211	2468.5989	94.3741
12	-604.9159	2342.9043	103.1046	-556.7753	2263.321	107.6887
13	-465.4737	2096.3698	115.9569	-411.1105	1978.7819	121.0823
14	-320.9753	1764.9031	127.4494	-252.3342	1585.1547	132.4056
15	360.9283	39.026	-23.3997	360.9283	39.026	-23.3997

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO1	P12	LIVE	Top	-21.66	-0.08	-0.38
PISO1	P12	LIVE	Bottom	-21.66	-0.08	-0.38
PISO1	P12	DEAD-SQ	Top	-100.93	-1.15	-3.32
PISO1	P12	DEAD-SQ	Bottom	-100.93	-1.15	-3.32
PISO1	P12	RX MAX	Top	16.92	16.06	17.35
PISO1	P12	RX MAX	Bottom	16.92	16.06	17.35
PISO1	P12	RX MIN	Top	-16.92	-16.06	-17.35
PISO1	P12	RX MIN	Bottom	-16.92	-16.06	-17.35
PISO1	P12	RY MAX	Top	25.58	78.92	19.18
PISO1	P12	RY MAX	Bottom	25.58	78.92	19.18
PISO1	P12	RY MIN	Top	-25.58	-78.92	-19.18
PISO1	P12	RY MIN	Bottom	-25.58	-78.92	-19.18

1.4CM+1.7CV	178.12	Tn	
1.25(CM+CV)	153.24	Tn	

CM	M22	-1.64	Tn.m
	M33	-5.60	Tn.m
CV	M22	0.13	Tn.m
	M33	-0.19	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	178.12	-2.07	-8.16
1.25(CM+CV)+CS	170.16	-53.92	95.82
1.25(CM+CV)-CS	136.32	50.15	-110.28
0.9CM+CS	107.76	-53.51	98.01
0.9CM-CS	73.92	50.56	-103.22

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	1959.0	-28.6	1959.0	-28.6
2	1959.0	602.5	1920.0	-1511.0
3	1959.0	987.3	1787.0	-1818.0
4	1959.0	1320.8	1652.0	-2074.0
5	1650.0	1966.1	1512.0	-2279.0
6	1507.0	2202.7	1366.0	-2434.0
7	1358.0	2395.4	1212.0	-2542.0
8	1200.0	2549.8	1049.0	-2610.0
9	1042.0	2623.8	900.2	-2552.0
10	884.0	2624.4	752.3	-2410.0
11	744.4	2518.9	600.4	-2190.0
12	604.9	2342.9	254.2	-1524.0
13	465.5	2096.4	87.7	-1329.0
14	321.0	1764.9	-104.0	-852.3
15	-360.9	39.0	-360.9	39.0

PUNTO
1
2
3
4
5
6
7
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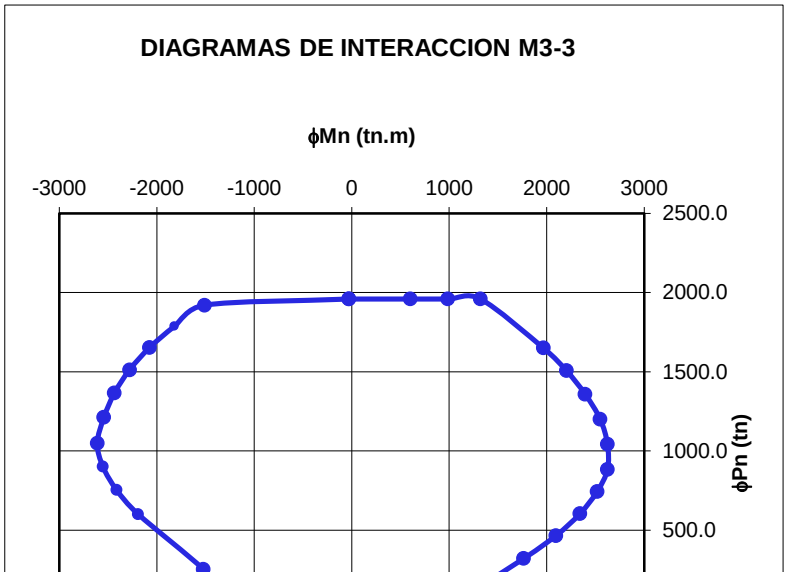
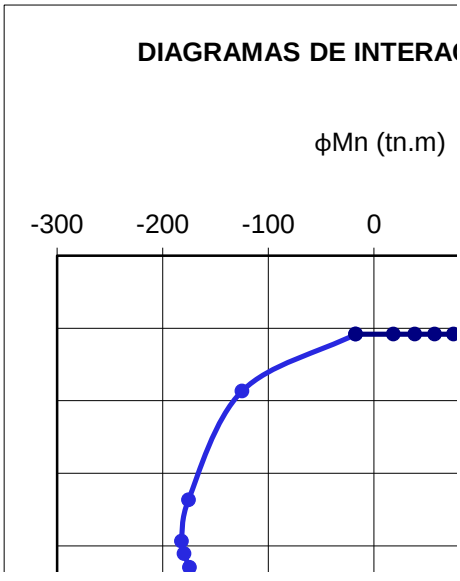
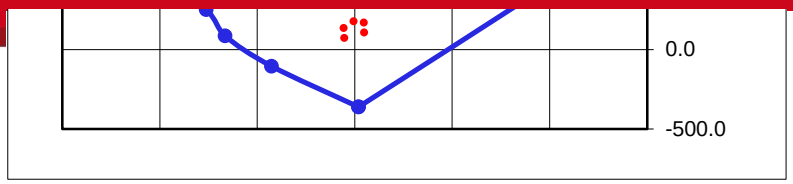
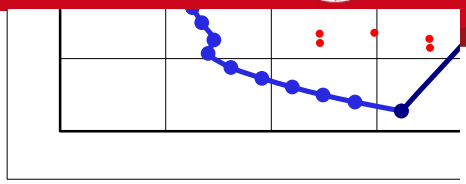
10
11
12
13
14
15

SISMO EN XX

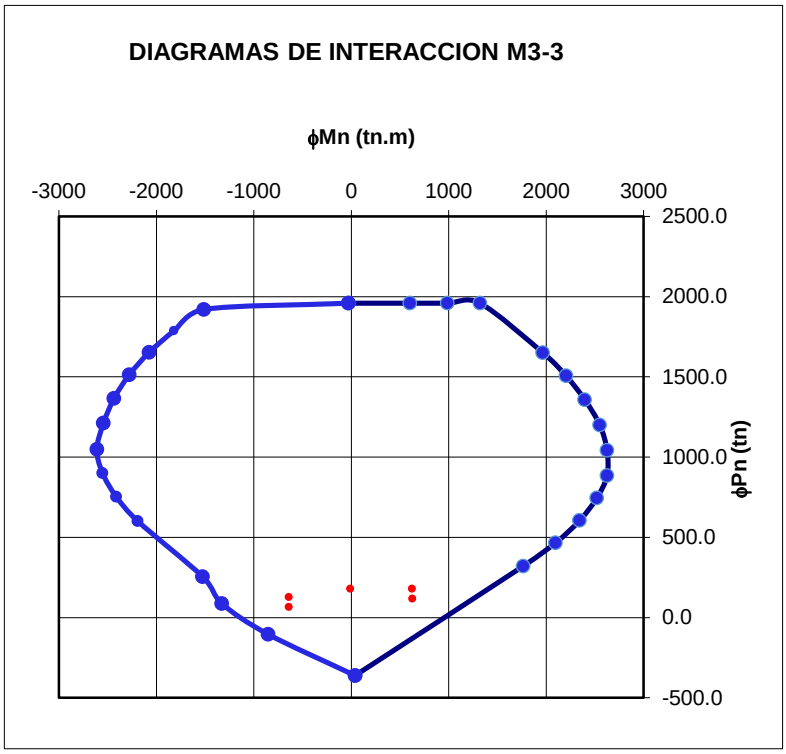


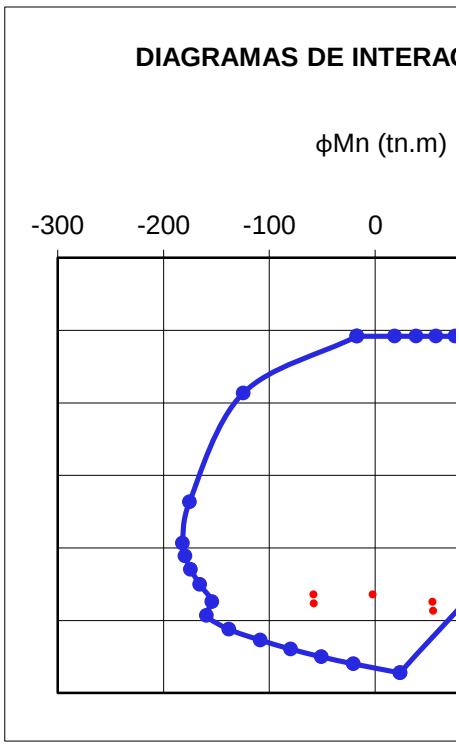






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1959	-28.6335	17.1684	-1959	-28.6335	17.1684	-1959
-1959	597.3082	29.7569	-1959	593.3116	30.2056	-1959
-1959	1008.3529	41.7284	-1959	1022.9996	42.8372	-1959
-1955	1358.3501	53.7385	-1941	1384.8643	55.5511	-1916
-1657	1941.9943	39.0144	-1673	1899.4328	53.5807	-1663
-1467	2244.9279	38.5117	-1438	2272.1751	41.7346	-1388
-1308	2425.8568	50.8437	-1271	2442.1381	54.7832	-1208
-1139	2558.7911	63.3659	-1095	2556.6379	68.0702	-1018
-970.6554	2601.6396	74.8618	-918.5465	2573.605	80.3325	-826.7406
-801.5885	2560.5384	85.4343	-741.4088	2497.0179	91.4825	-634.7742
-651.2216	2401.8844	99.1475	-581.3647	2292.0576	105.8096	-457.5168
-500.0057	2157.8515	113.0844	-419.152	1986.3506	120.3411	-278.6553
-343.9976	1818.123	126.75	-251.5356	1579.4079	134.5217	-112.8656
-144.5214	1396.7979	152.3309	18.7322	1040.5759	144.7642	138.2962
360.9283	39.026	-23.3997	360.9283	39.026	-23.3997	360.9283

T	M2	M3
-0.556	1.149	0.023
-0.556	0.131	-0.186
-6.683	7.167	-2.55
-6.683	-1.639	-5.601
14.309	6.83	79.798
14.309	52.031	103.051
-14.309	-6.83	-79.798
-14.309	-52.031	-103.051
10.511	19.711	432.287
10.511	56.27	633.289
-10.511	-19.711	-432.287
-10.511	-56.27	-633.289

CARGA	P (ton)	V2 (ton)
VIVA	21.66	-0.08
MUERTA	100.93	-1.15
SISMO XX	16.92	16.06

CARGA	P (ton)	V2 (ton)
VIVA	21.66	-0.08
MUERTA	100.93	-1.15
SISMO YY	25.58	78.92

P	16.92	Tn
M22	-52.03	Tn.m
M33	103.05	Tn.m

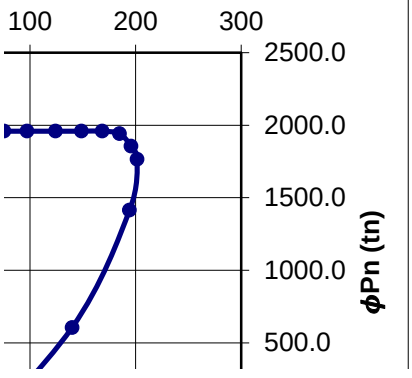
P	25.58	Tn
M22	-56.27	Tn.m
M33	633.29	Tn.m

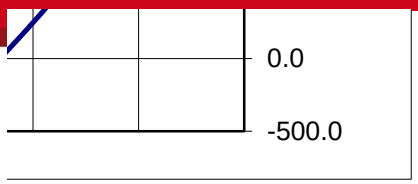
COMBINACIONES SISMO EN Y		
P	M22	M33

178.12	-2.07	-8.16
178.82	-58.16	626.06
127.66	54.39	-640.52
116.42	-57.75	628.25
65.26	54.79	-638.33

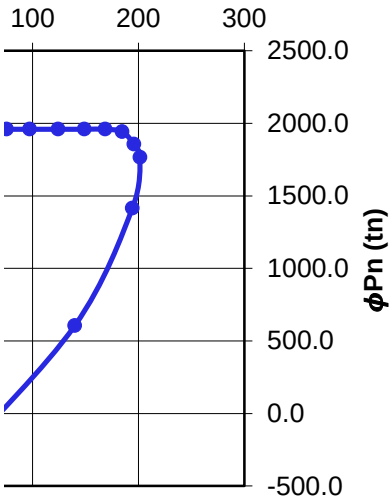
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1959.0	-17.2	1959.0	-17.2
1567.0	-124.7	1959.0	18.4
818.1	-175.4	1959.0	38.8
533.0	-181.9	1959.0	57.5
445.9	-179.7	1959.0	75.4
352.6	-174.4	1959.0	97.4
247.8	-165.7	1959.0	124.2
129.5	-154.2	1959.0	148.9
35.3	-159.5	1959.0	168.6
-60.8	-138.2	1942.0	184.7
-135.1	-108.6	1857.0	195.8
-196.5	-80.0	1766.0	201.4
-250.5	-50.8	1415.0	194.3
-298.7	-20.7	605.7	139.9
-360.9	23.4	-360.9	23.4

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-28.6335	17.1684	-1959	-28.6335	17.1684	-1959	-28.6335
585.5193	30.9254	-1959	563.0786	32.785	-1567	302.6222
1048.0065	44.7452	-1959	1108.7225	49.7857	-818.06	5.48E+02
1427.5491	58.5954	-1846	1528.6403	66.8553	-533.0383	6.17E+02
1892.8997	64.8111	-1579	1949.7754	80.1057	-445.851	607.2924
2311.2006	47.2389	-1290	2278.1656	78.7106	-352.5917	602.3838
2458.1193	61.5523	-1030	2415.1555	79.8002	-247.7811	6.02E+02
2534.5034	76.1981	-802.8596	2353.9139	97.7491	-129.4839	6.10E+02
2497.5368	89.8677	-574.1469	2135.9327	114.4723	-35.34	7.10E+02
2347.237	102.1944	-346.5565	1752.1712	129.4015	60.7616	7.12E+02
2054.2147	116.9441	-191.7312	1461.7094	150.3939	135.0903	6.16E+02
1640.2357	131.873	-73.8428	1246.3403	158.6637	196.526	491.4894
1328.4975	158.6779	75.9543	870.3408	131.7109	250.5428	360.5301
690.28	106.2982	226.2532	432.6022	64.2839	298.6785	220.3461
39.026	-23.3997	360.9283	39.026	-23.3997	360.9283	39.026

V3 (ton)	M2 (ton-m)	M3 (ton-m)
-0.38	0.131	-0.186
-3.32	-1.639	-5.601
16.06	52.031	103.051

V3 (ton)	M2 (ton-m)	M3 (ton-m)
-0.38	0.131	-0.186
-3.32	-1.639	-5.601
19.18	56.27	633.289

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
17.1684	-1959	-28.6335	17.1684	-1959	-28.6335	17.1684
124.7195	-1959	-377.4758	19.0901	-1959	-580.046	14.0704
175.4492	-1959	-855.4725	28.5867	-1959	-1255	0.7155
181.9364	-1922	-1318	30.3401	-1728	-1872	-47.006
179.7006	-1713	-1715	23.57	-1538	-2220	-68.7198
174.3677	-1500	-2050	8.204	-1390	-2381	-59.958
165.6561	-1280	-2325	-15.8892	-1234	-2490	-51.8628
154.1886	-1075	-2476	-31.0633	-1069	-2553	-44.7677
159.5216	-902.4316	-2453	-23.6781	-902.1501	-2541	-39.5421
138.1838	-731.4297	-2336	-17.6748	-746.9094	-2408	-29.9891
108.6231	-564.3981	-2114	-10.2528	-593.2906	-2178	-17.8474
80.0163	-370.6814	-1715	2.2075	-372.3938	-1744	-10.302
50.7867	-153.4692	-1293	9.9036	-96.0224	-1308	-37.5851
20.6754	145.1248	-574.3907	4.6943	152.7719	-688.5906	-40.1486
-23.3997	360.9283	39.026	-23.3997	360.9283	39.026	-23.3997

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1959	-28.6335	17.1684	-1959	-28.6335	17.1684	-1959
-1959	-804.2468	4.092	-1959	-1142	-33.9271	-1927
-1833	-1698	-72.588	-1799	-1789	-90.7274	-1793
-1669	-2033	-80.4213	-1662	-2050	-81.8995	-1656
-1527	-2245	-71.7105	-1521	-2259	-73.4744	-1516
-1380	-2404	-63.5184	-1375	-2417	-65.6552	-1370
-1226	-2514	-56.1331	-1221	-2526	-58.8404	-1216
-1061	-2578	-50.067	-1056	-2591	-53.4433	-1052
-898.9736	-2554	-44.3047	-899.3987	-2553	-45.5714	-899.8346
-749.3294	-2409	-32.3003	-750.6305	-2410	-33.6585	-751.5475
-596.5368	-2184	-20.6793	-597.9951	-2186	-22.2861	-599.2833
-323.2615	-1653	-24.7818	-265.7478	-1543	-46.041	-253.3577
-85.141	-1310	-49.6282	-86.409	-1318	-53.0057	-87.1659
132.4841	-758.9778	-43.553	120.1603	-799.6961	-45.0908	111.2193
360.9283	39.026	-23.3997	360.9283	39.026	-23.3997	360.9283

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-28.6335	17.1684	-1959	-28.6335	17.1684	-1959	-28.6335
-1493	-100.3429	-1920	-1511	-1.01E+02	-1959	-1368
-1805	-91.6395	-1787	-1818	-9.24E+01	-1838	-1709
-2063	-83.0001	-1652	-2074	-8.40E+01	-1698	-1994
-2270	-74.7907	-1512	-2279	-7.60E+01	-1554	-2224
-2427	-67.3516	-1366	-2434	-6.89E+01	-1404	-2399
-2535	-60.9792	-1212	-2542	-62.8775	-1247	-2523
-2601	-55.9785	-1049	-2610	-58.1951	-1079	-2602
-2553	-46.4056	-900.1749	-2552	-47.129	-923.1103	-2564
-2410	-34.6587	-752.3282	-2410	-35.5307	-770.2442	-2429
-2188	-23.5059	-600.3826	-2190	-24.5696	-609.0472	-2202
-1522	-53.2138	-254.1985	-1524	-54.4868	-261.6874	-1538
-1324	-55.4865	-87.7429	-1329	-57.6468	-90.6196	-1335
-828.9844	-46.2047	104.0059	-852.3088	-47.0924	105.411	-847.6328
39.026	-23.3997	360.9283	39.026	-23.3997	360.9283	39.026

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
17.1684	-1959	-28.6335	17.1684	-1959	-28.6335	17.1684
-106.0615	-1959	-1075	-108.1699	-1959	-753.315	-90.0157
-96.8329	-1896	-1573	-101.9014	-1959	-1369	-108.7902
-87.9598	-1751	-1894	-92.6203	-1824	-1742	-99.0209
-79.7179	-1603	-2154	-84.007	-1668	-2047	-89.8971
-72.3227	-1448	-2354	-76.2552	-1507	-2285	-81.5735
-65.9293	-1286	-2499	-69.4551	-1339	-2459	-74.2055
-60.902	-1115	-2592	-64.0201	-1162	-2575	-68.2121
-49.7541	-949.9373	-2576	-52.7891	-986.5552	-2588	-56.8826
-37.7651	-791.3116	-2450	-40.3447	-820.0554	-2475	-43.8074
-28.1147	-597.6995	-2176	-39.4913	-578.8675	-2129	-55.2745
-56.0022	-270.87	-1557	-57.7881	-283.6061	-1583	-60.1641
-59.1667	-95.1643	-1343	-60.4223	-101.7775	-1354	-61.739
-47.1848	107.3582	-841.0241	-47.2751	110.0265	-831.7033	-47.4136
-23.3997	360.9283	39.026	-23.3997	360.9283	39.026	-23.3997

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1959	-28.6335	17.1684	-1959	-28.6335	17.1684	-1959
-1959	-558.1613	-66.5028	-1959	-393.8449	-43.5771	-1959
-1959	-997.1707	-110.712	-1959	-651.1435	-84.4172	-1959
-1947	-1439	-110.1623	-1959	-913.3213	-110.2943	-1959
-1780	-1831	-100.0342	-1959	-1179	-121.1532	-1959
-1608	-2141	-90.7021	-1877	-1592	-115.2642	-1959
-1430	-2374	-82.3352	-1668	-2028	-104.1133	-1959
-1242	-2534	-75.3919	-1451	-2347	-94.4542	-1959
-1052	-2592	-64.0491	-1231	-2529	-81.9799	-1959
-870.0982	-2512	-49.7257	-962.913	-2471	-82.9794	-1942
-583.9441	-2116	-67.9919	-660.927	-2175	-84.7254	-1857
-305.608	-1626	-64.064	-368.0396	-1734	-73.9782	-1766
-114.5334	-1372	-63.2073	-148.0611	-1415	-66.2691	-1415
114.6988	-815.0257	-47.6368	126.9669	-768.8161	-48.2722	-605.6828
360.9283	39.026	-23.3997	360.9283	39.026	-23.3997	360.9283

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-28.6335	17.1684	-1959	-28.6335	17.1684	-1959	-28.6335
-165.2004	-18.3669	-1959	440.3789	-0.8117	-1959	516.4285
-254.6448	-38.7634	-1959	998.5071	-5.2615	-1959	954.3533
-343.6945	-57.4869	-1852	1503.0077	-1.1526	-1861	1534.5608
-436.903	-75.4463	-1672	1878.8644	9.0539	-1657	1950.5842
-507.4116	-97.4035	-1513	2142.7668	19.2917	-1508	2199.4197
-5.54E+02	-124.2351	-1345	2348.5349	29.0906	-1352	2399.0873
-6.07E+02	-148.8955	-1166	2500.1251	38.2278	-1186	2553.6443
-6.53E+02	-168.5532	-950.0956	2434.6336	19.4898	-1020	2623.6521
-6.89E+02	-184.6881	-724.2757	2202.8496	-4.1889	-861.7836	2588.6812
-7.15E+02	-195.7573	-499.2153	1859.8285	-22.9153	-710.4393	2451.349
-735.6531	-201.447	-265.1984	1406.7858	-37.0675	-506.6632	2086.9642
-642.3085	-194.3102	-37.9684	1087.0934	-49.2789	-224.6754	1452.6831
-328.7856	-139.8911	237.0531	393.6025	-37.6635	131.1011	699.4358
39.026	-23.3997	360.9283	39.026	-23.3997	360.9283	39.026

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
17.1684	-1959	-28.6335	17.1684	-1959	-28.6335	17.1684
24.3464	-1959	553.1259	26.3353	-1959	574.1749	27.503
30.7654	-1959	954.3169	37.5897	-1959	968.4062	38.6688
11.4586	-1910	1443.4428	24.6435	-1959	1334.2448	45.2219
19.1474	-1654	1957.6709	20.7201	-1652	1960.9706	21.594
30.5028	-1508	2201.258	32.0556	-1507	2201.9361	32.9062
41.6908	-1355	2398.8741	43.5107	-1356	2397.4652	44.3072
52.4754	-1193	2555.4755	55.0719	-1196	2553.1537	55.8309
61.6841	-1031	2631.666	65.5581	-1036	2628.4865	66.3001
72.4297	-875.3215	2616.3567	77.0421	-879.4414	2621.0486	77.4679
81.8565	-730.5379	2497.118	88.5143	-738.2963	2511.8268	90.4474
57.1429	-581.7523	2292.8453	97.913	-595.6355	2326.0157	102.4441
-0.3044	-398.8694	1917.6326	86.3084	-446.6698	2049.7748	111.0813
-36.5515	-5.9864	1092.418	-14.2312	-173.4541	1436.9804	47.7983
-23.3997	360.9283	39.026	-23.3997	360.9283	39.026	-23.3997

Curve 24	345. degrees	
P	M3	M2
-1959	-28.6335	17.1684
-1959	589.412	28.3621
-1959	978.5829	39.4635
-1959	1315.6862	50.6046
-1651	1963.7513	22.272
-1507	2202.3592	33.5346
-1357	2396.3621	44.8964
-1198	2551.3765	56.3933
-1039	2625.9944	66.8349
-881.9042	2622.8617	77.4193
-741.6087	2515.7255	90.3506
-601.3563	2337.2141	103.2774
-459.7824	2083.5147	115.3094
-301.614	1711.3715	120.659
360.9283	39.026	-23.3997

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

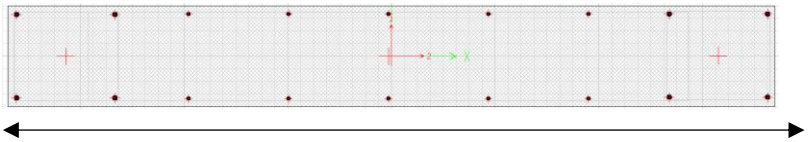
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 1) 3ER - 5TO PISO

1. INGRESO DE DATOS GENERALES

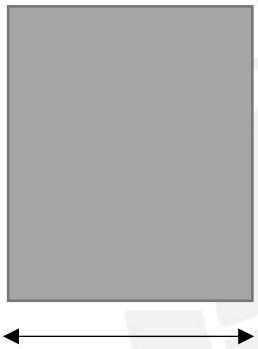
Lm (m)	1.85



t (m)

d (m) = 0.85xLm	1.57

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	1.85

hm/Lm	7.2

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**54.11**	(Axial del etabs)
Mua (ton)	**23.95**	(Momento del etabs)
Mn (ton)	**23.95**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**14.52**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**14.52**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	29.63

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-17.78

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-37.14	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-52.74	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-95.82	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	54.11	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 443.9 ton > Pu = 54.11 ton OK!

entonces h está bien

0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28

	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372
2	-661.3664	59.8006	0.0223	-661.3664	50.0297	0.657
3	-661.3664	101.5526	0.0208	-661.3664	95.0439	0.6412
4	-634.5169	136.3147	0.0184	-642.0016	132.1344	0.6636
5	-574.6469	164.0581	0.0154	-579.7927	161.708	0.6748
6	-513.3941	184.9259	0.0118	-516.243	183.7977	0.68
7	-450.9636	199.0231	7.25E-03	-451.504	198.4894	0.6867
8	-386.4978	206.7724	1.38E-03	-384.5884	206.2094	0.6845
9	-324.4541	205.2764	-1.12E-03	-320.414	204.3924	0.6725
10	-264.3104	194.2422	-1.12E-03	-258.0548	192.2162	0.6901
11	-203.1533	174.5417	-2.11E-03	-195.0517	170.9897	0.687
12	-141.5865	146.4153	-3.94E-03	-131.4029	140.7541	0.7073
13	-81.5086	113.3143	-7.88E-03	-71.6375	108.6969	0.7479
14	-14.0963	76.2806	-2.25E-02	5.3513	62.2519	0.9832
15	76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P1	LIVE	Top	-5.88	0.99	0
PISO4	P1	LIVE	Bottom	-5.88	0.99	0
PISO4	P1	DEAD-SQ	Top	-29.99	2.97	0
PISO4	P1	DEAD-SQ	Bottom	-29.99	2.97	0
PISO4	P1	RX MAX	Top	1.48	3.81	0.12
PISO4	P1	RX MAX	Bottom	1.48	3.81	0.12
PISO4	P1	RX MIN	Top	-1.48	-3.81	-0.12
PISO4	P1	RX MIN	Bottom	-1.48	-3.81	-0.12
PISO4	P1	RY MAX	Top	1.95	9.39	0.12
PISO4	P1	RY MAX	Bottom	1.95	9.39	0.12
PISO4	P1	RY MIN	Top	-1.95	-9.39	-0.12
PISO4	P1	RY MIN	Bottom	-1.95	-9.39	-0.12

1.4CM+1.7CV	51.98	Tn
1.25(CM+CV)	44.84	Tn

CM	M22	0.03	Tn.m
	M33	2.01	Tn.m
CV	M22	0.00	Tn.m
	M33	1.44	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	51.98	0.04	5.25
1.25(CM+CV)+CS	46.32	-0.15	10.98
1.25(CM+CV)-CS	43.36	0.23	-2.37
0.9CM+CS	28.47	-0.17	8.48
0.9CM-CS	25.51	0.21	-5.38

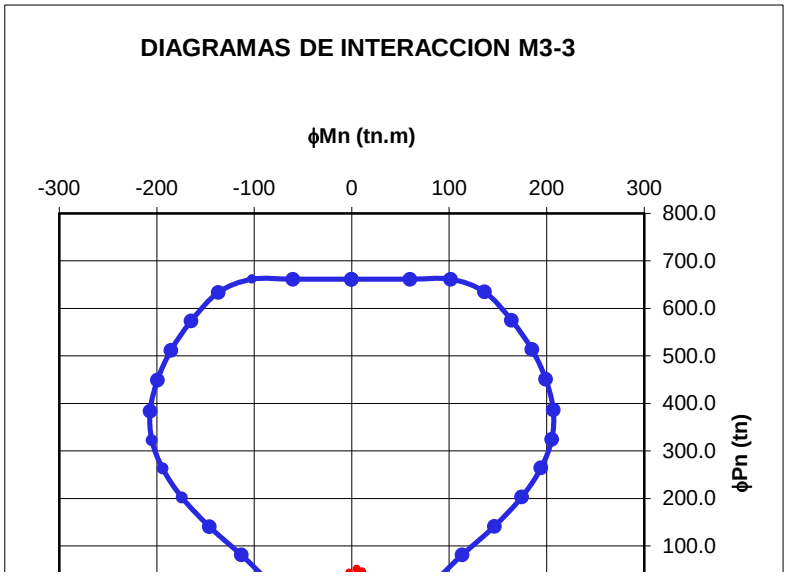
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

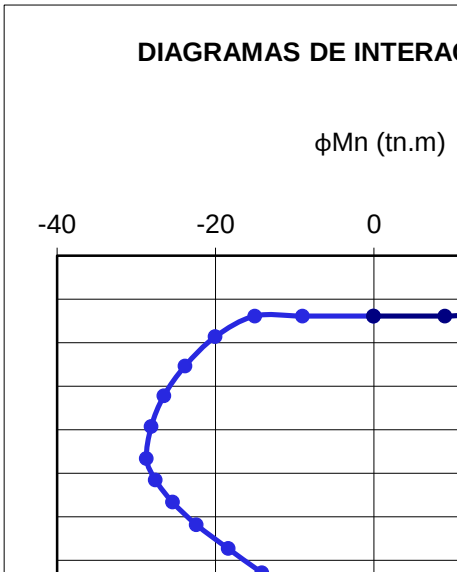
MOMENTO MINIMO DE DISEÑO

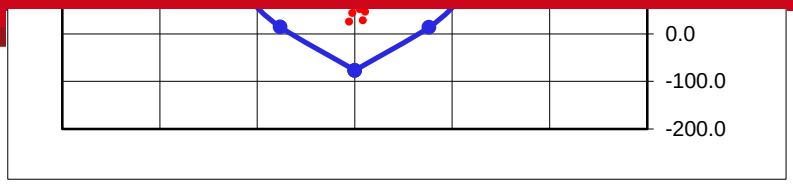
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	661.4	-0.2	661.4	-0.2
2	661.4	59.8	661.4	-60.2
3	661.4	101.6	661.4	-102.1
4	634.5	136.3	633.6	-136.9
5	574.6	164.1	573.4	-164.6
6	513.4	184.9	511.7	-185.4
7	451.0	199.0	448.9	-199.3
8	386.5	206.8	384.0	-206.8
9	324.5	205.3	322.3	-205.0
10	264.3	194.2	262.5	-193.8
11	203.2	174.5	201.9	-174.1
12	141.6	146.4	140.7	-146.0
13	81.5	113.3	81.2	-113.1
14	14.1	76.3	14.5	-76.3
15	-76.6	0.2	-76.6	0.2

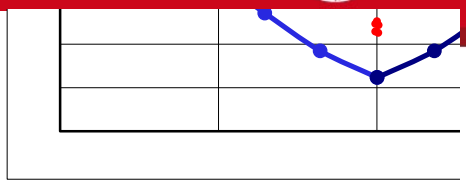
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

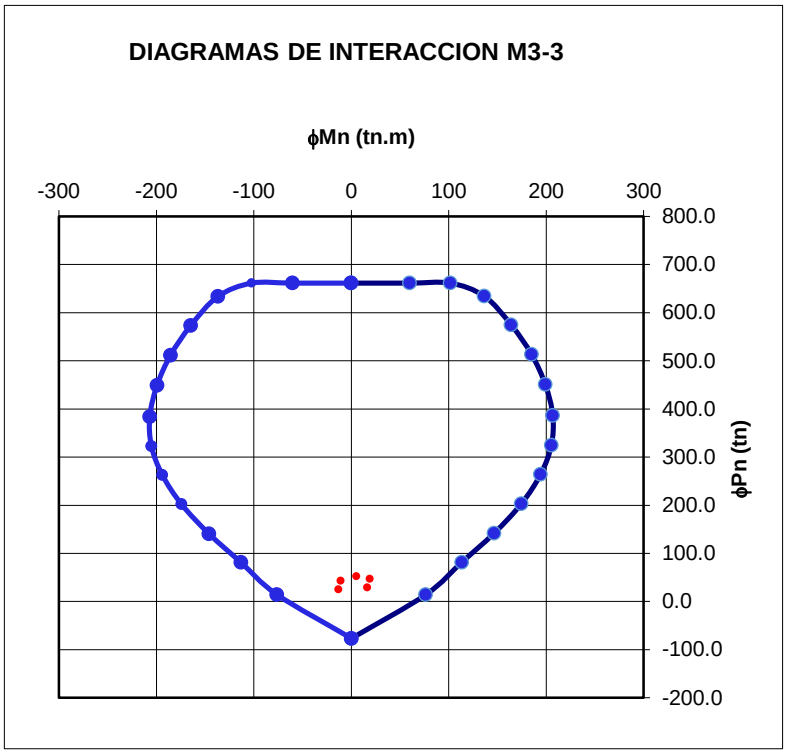


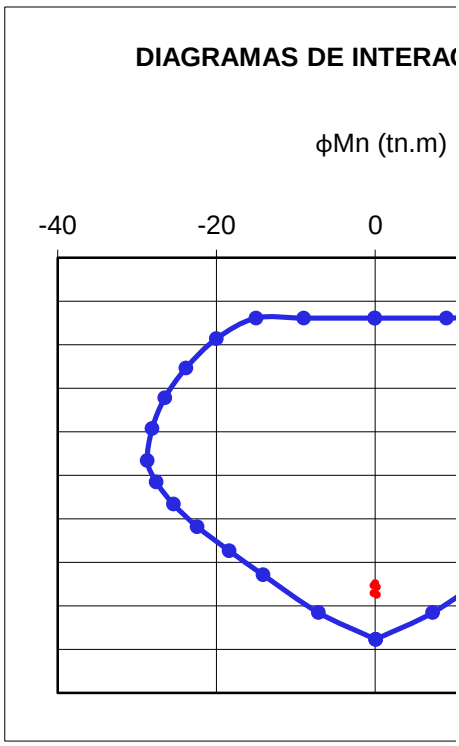






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664
-661.3664	38.3647	1.3666	-661.3664	28.459	1.6455	-661.3664
-661.3664	86.926	1.3745	-661.3664	75.0565	2.3761	-661.3664
-650.5427	126.9649	1.4095	-661.3664	119.4322	2.4091	-661.3664
-585.5828	158.8135	1.419	-593.5892	154.3788	2.4393	-607.2215
-519.502	182.3154	1.4449	-524.0009	179.9326	2.4709	-530.9659
-452.0989	197.7123	1.4638	-452.548	196.2604	2.5211	-453.2105
-382.358	205.2974	1.49	-378.9576	203.5264	2.6042	-373.0147
-315.6945	202.9244	1.4645	-309.3317	200.3172	2.5735	-298.047
-250.88	189.5735	1.4877	-241.2583	185.4526	2.5729	-224.031
-185.6336	166.5218	1.4866	-172.5329	159.5708	2.5951	-150.2449
-119.6124	133.6997	1.5295	-103.5974	123.1231	2.6406	-79.2115
-58.2858	101.3286	1.7718	-38.121	88.7353	3.2749	-7.5317
26.4418	44.0755	1.9944	43.7426	28.8657	2.3508	53.6209
76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753

T	M2	M3
-0.01	-0.001	-1.183
-0.01	0.003	1.435
-0.009	0.021	-5.863
-0.009	0.026	2.009
0.36	0.175	7.134
0.36	0.191	6.673
-0.36	-0.175	-7.134
-0.36	-0.191	-6.673
0.854	0.229	15.142
0.854	0.213	14.863
-0.854	-0.229	-15.142
-0.854	-0.213	-14.863

P	1.48	Tn
M22	-0.19	Tn.m
M33	6.67	Tn.m

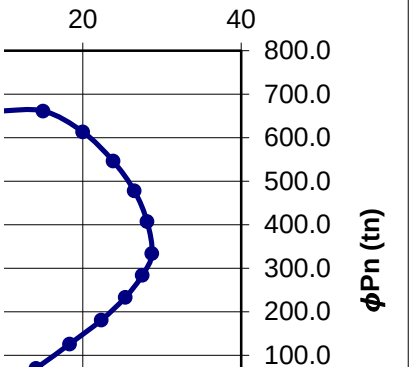
P	1.95	Tn
M22	-0.21	Tn.m
M33	14.86	Tn.m

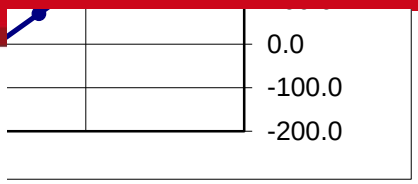
COMBINACIONES SISMO EN Y		
P	M22	M33

51.98	0.04	5.25
46.79	-0.18	19.17
42.89	0.25	-10.56
28.94	-0.19	16.67
25.04	0.24	-13.05

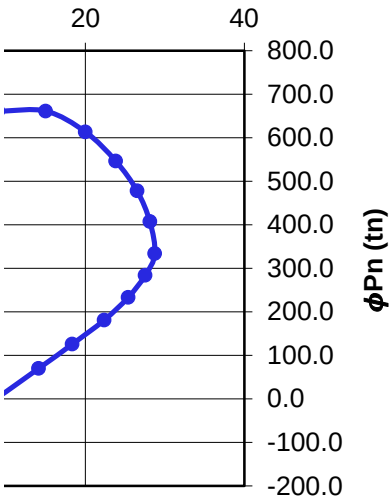
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
661.4	0.0	661.4	0.0
661.4	-9.0	661.4	9.0
661.4	-15.0	661.4	15.0
613.9	-20.0	613.6	20.0
546.7	-23.8	546.4	23.8
478.2	-26.5	477.9	26.5
407.7	-28.1	407.4	28.1
334.2	-28.7	333.7	28.7
284.7	-27.6	284.2	27.5
234.0	-25.4	233.4	25.4
181.9	-22.4	181.1	22.3
126.9	-18.4	125.9	18.3
71.5	-14.1	70.2	14.1
-15.1	-7.2	-15.1	7.3
-76.6	0.1	-76.6	0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574
22.4297	1.5792	-661.3664	17.2926	1.6156	-661.3664	-0.1012
56.7058	3.6196	-661.3664	40.9963	4.0805	-661.3664	-9.68E-02
104.8874	4.1212	-661.3664	75.025	6.822	-613.8916	-8.58E-02
145.4902	4.1964	-640.895	114.9231	8.7304	-546.7192	-0.0721
174.7484	4.2661	-549.0839	154.0759	9.1228	-478.2086	-0.0548
192.6717	4.362	-453.6635	177.1016	9.3174	-407.7307	-3.20E-02
199.6171	4.5008	-355.6745	182.5451	9.5728	-334.1885	-6.96E-04
194.5581	4.485	-268.1159	170.9231	9.6523	-284.7106	8.24E-03
176.478	4.461	-179.5916	143.6612	9.5243	-234.0212	1.66E-02
145.7133	4.5039	-99.203	106.1359	8.6716	-181.9077	2.90E-02
107.4353	4.7824	-40.1163	80.5847	7.9276	-126.9462	0.0498
67.4516	5.0933	17.962	46.2873	5.255	-71.5455	0.0932
20.1997	2.0693	60.6472	14.0389	1.5516	15.065	0.2146
0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372
8.9898	-661.3664	-17.5262	1.6215	-661.3664	-22.6728	1.5894
15.0244	-661.3664	-41.3685	4.0999	-661.3664	-57.2192	3.634
20.0119	-661.3664	-75.5935	6.8463	-661.3664	-105.6217	4.1221
23.8263	-639.7793	-115.6651	8.7424	-605.9579	-146.2085	4.1961
26.5014	-547.6037	-154.7511	9.1105	-529.3441	-175.3273	4.2652
28.0926	-451.8034	-177.4682	9.306	-451.1999	-192.9943	4.3617
28.6959	-353.4004	-182.4633	9.5634	-370.6063	-199.6038	4.4991
27.5695	-266.0552	-170.3986	9.6517	-295.9711	-194.2162	4.4794
25.4204	-177.9276	-142.9122	9.522	-222.3618	-175.9591	4.4576
22.4019	-98.1847	-105.547	8.639	-148.9887	-145.0946	4.497
18.3875	-39.6083	-80.2012	7.8951	-78.553	-107.0746	4.7874
14.1338	18.2988	-45.8083	5.2297	-7.3859	-67.1607	5.0579
7.1607	60.4972	-13.779	1.5636	53.0028	-20.3425	2.1246
-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664
-661.3664	-28.7542	1.6554	-661.3664	-38.7592	1.3667	-661.3664
-661.3664	-75.6576	2.3765	-661.3664	-87.4962	1.3747	-661.3664
-661.1217	-120.1122	2.4097	-649.6209	-127.6109	1.41	-641.0818
-592.3099	-155.0331	2.4401	-584.3044	-159.4371	1.4197	-578.5126
-522.3464	-180.4568	2.4721	-517.9668	-182.7951	1.4349	-514.588
-450.6527	-196.5573	2.5306	-450.0474	-198.0066	1.4647	-449.448
-376.5076	-203.5253	2.6036	-379.8583	-205.2899	1.4919	-382.0862
-307.2049	-200.0015	2.5701	-313.5639	-202.6462	1.46	-318.2174
-239.5007	-184.9473	2.5695	-249.0964	-189.096	1.4809	-256.3016
-171.2965	-159.0508	2.591	-184.3276	-165.987	1.4882	-193.7526
-102.6012	-122.4893	2.65	-118.8542	-133.2848	1.519	-130.513
-37.8218	-88.4259	3.2618	-58.0551	-101.1347	1.756	-71.3756
42.753	-29.3611	2.3771	25.5336	-44.544	2.0322	4.4875
76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574
-50.4094	0.6571	-661.3664	-60.165	2.25E-02	-661.3664	-50.3975
-95.5905	0.6414	-661.3664	-102.0809	2.09E-02	-661.3664	-95.5672
-132.755	0.6639	-633.6004	-136.9137	1.85E-02	-641.14	-132.7259
-162.3079	0.6751	-573.3672	-164.6378	1.55E-02	-578.5937	-162.2785
-184.2868	0.6804	-511.7376	-185.4011	1.19E-02	-514.6929	-184.2626
-198.7798	0.6872	-448.9034	-199.31	7.32E-03	-449.5782	-198.7659
-206.2189	0.6852	-383.9873	-206.7933	1.39E-03	-382.2448	-206.2196
-204.1112	0.6708	-322.2891	-204.9996	-1.12E-03	-318.3566	-204.1287
-191.7593	0.685	-262.4894	-193.7655	-1.12E-03	-256.4127	-191.7876
-170.4929	0.688	-201.8611	-174.0787	-1.88E-03	-193.8349	-170.523
-140.274	0.7084	-140.7075	-145.9709	-3.64E-03	-130.5693	-140.3019
-108.5243	0.7386	-81.1866	-113.1362	-7.42E-03	-71.3972	-108.5339
-62.7241	1.0151	-14.5446	-76.3051	-0.0214	4.518	-62.7005
0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372
-0.6114	-661.3664	-38.7318	-1.3208	-661.3664	-28.7311	-1.6062
-0.5992	-661.3664	-87.4431	-1.3317	-661.3664	-75.5595	-2.3323
-0.6261	-649.7467	-127.5451	-1.3712	-661.3402	-119.9914	-2.3697
-0.6431	-584.4789	-159.3712	-1.3867	-592.6123	-154.9128	-2.4058
-0.6556	-518.0743	-182.7665	-1.4197	-522.7375	-180.3604	-2.4448
-0.6715	-450.3274	-197.9766	-1.4479	-451.1287	-196.4999	-2.5128
-0.6813	-380.1996	-205.2945	-1.4867	-377.0869	-203.5322	-2.5981
-0.6731	-313.8549	-202.6831	-1.4632	-307.7087	-200.0746	-2.5739
-0.6882	-249.34	-189.1592	-1.4857	-239.9223	-185.0662	-2.5759
-0.6929	-184.5059	-166.0564	-1.4943	-171.5887	-159.1648	-2.6007
-0.7172	-118.9575	-133.3348	-1.5313	-103.0007	-122.7388	-2.6487
-0.756	-58.0863	-101.1466	-1.7821	-37.8921	-88.4646	-3.2983
-1.069	25.6586	-44.4419	-2.0887	42.9883	-29.1677	-2.4435
-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664
-661.3664	-22.6569	-1.5368	-661.3664	-17.5114	-1.565	-661.3664
-661.3664	-57.0867	-3.583	-661.3664	-41.2181	-4.0351	-661.3664
-661.3664	-105.3922	-4.0807	-661.3664	-75.2507	-6.7823	-613.6338
-606.4809	-145.9808	-4.1598	-640.7638	-115.147	-8.6952	-546.4306
-530.0081	-175.1401	-4.2371	-549.0139	-154.2641	-9.0828	-477.8809
-452.0231	-192.8959	-4.3429	-453.4306	-177.212	-9.2986	-407.3516
-371.5964	-199.6251	-4.493	-355.3928	-182.5489	-9.5679	-333.7315
-296.8219	-194.3506	-4.4857	-267.8733	-170.8416	-9.6576	-284.1862
-223.0453	-176.1564	-4.4679	-179.3955	-143.5131	-9.5401	-233.3919
-149.503	-145.3236	-4.5138	-99.0821	-105.9774	-8.6916	-181.1211
-78.823	-107.1826	-4.8082	-40.0563	-80.381	-7.9662	-125.8974
-7.4447	-67.1945	-5.1207	18.2457	-45.8228	-5.2948	-70.1779
53.2569	-20.1425	-2.1819	60.6184	-13.7009	-1.64	15.065
76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.1574	0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574
-0.1	-8.9606	-661.3664	17.2789	-1.5593	-661.3664	22.4143
-0.0955	-14.999	-661.3664	40.8473	-4.016	-661.3664	56.5742
-0.0844	-19.9939	-661.3664	74.684	-6.7581	-661.3664	104.6572
-0.0705	-23.8174	-641.7575	114.4317	-8.6939	-607.7351	145.2547
-0.053	-26.5042	-550.4943	153.5842	-9.0953	-531.6299	174.5589
-2.99E-02	-28.1106	-455.409	176.8633	-9.2995	-454.0336	192.5698
1.82E-03	-28.7343	-357.7845	182.6708	-9.5668	-373.9978	199.6281
1.11E-02	-27.5289	-269.9328	171.3587	-9.6585	-298.8955	194.6882
2.00E-02	-25.3748	-181.0607	144.2595	-9.5427	-224.7144	176.6737
3.34E-02	-22.3489	-100.1111	106.5664	-8.7249	-150.7594	145.9421
0.0556	-18.322	-40.5663	80.7672	-7.999	-79.4803	107.5428
0.103	-14.0993	17.9057	46.3073	-5.3205	-7.5582	67.4628
0.2146	-7.2621	60.8618	13.8474	-1.6206	53.8715	20.0059
0.2146	-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0.0372	-661.3664	-0.1574	0.0372	-661.3664	-0.1574	0.0372
-1.5269	-661.3664	28.4363	-1.5965	-661.3664	38.3373	-1.3209
-3.5688	-661.3664	74.9583	-2.3322	-661.3664	86.873	-1.3317
-4.0801	-661.3664	119.311	-2.3694	-650.6685	126.8989	-1.371
-4.1612	-593.8917	154.2576	-2.4052	-585.7573	158.7471	-1.3862
-4.2383	-524.392	179.8348	-2.4437	-519.7276	182.2608	-1.4193
-4.3433	-453.024	196.2009	-2.5036	-452.3788	197.681	-1.4471
-4.4955	-379.5365	203.5306	-2.5988	-382.699	205.3003	-1.4848
-4.4914	-309.8339	200.3875	-2.5773	-315.9851	202.9601	-1.4679
-4.4717	-241.665	185.5602	-2.5782	-251.1159	189.6309	-1.492
-4.5211	-172.8253	159.6847	-2.6054	-185.8119	166.591	-1.4931
-4.8037	-103.7824	123.2227	-2.6583	-119.7161	133.7501	-1.5426
-5.1545	-38.1923	88.7756	-3.3127	-58.3176	101.3415	-1.7993
-2.1289	43.9744	28.6784	-2.4205	26.5644	43.9773	-2.0544
-0.0507	76.5753	0.2146	-0.0507	76.5753	0.2146	-0.0507

Curve 24	345. degrees	
P	M3	M2
-661.3664	-0.1574	0.0372
-661.3664	50.0179	-0.6116
-661.3664	95.0205	-0.5993
-642.0598	132.1051	-0.626
-579.7556	161.7288	-0.6323
-516.3478	183.7731	-0.6555
-451.6342	198.4749	-0.6711
-384.7469	206.2094	-0.6807
-320.553	204.4093	-0.6748
-258.1658	192.2442	-0.6934
-195.134	171.0198	-0.6924
-131.4593	140.7821	-0.7167
-71.6492	108.6997	-0.7676
5.4113	62.2029	-1.0379
76.5753	0.2146	-0.0507

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

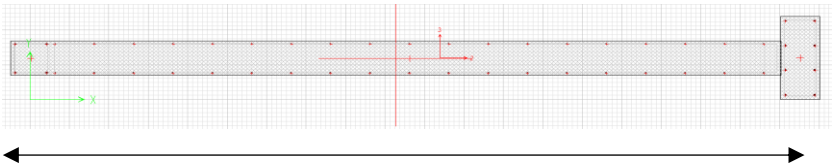
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 2) 3ER - 5TO PISO

1. INGRESO DE DATOS GENERALES

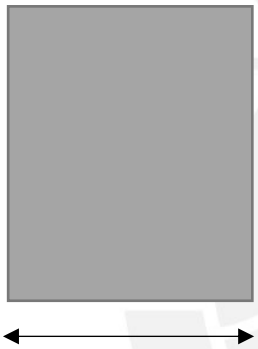
Lm (m)	4.5



t (m)

d (m) = 0.85xLm	3.83

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	4.5

hm/Lm	2.9

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**128.87**	(Axial del etabs)
Mua (ton)	**204.55**	(Momento del etabs)
Mn (ton)	**204.55**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**85.10**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**85.10**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	72.09

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	15.31

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	104.92	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	148.99	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	270.69	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

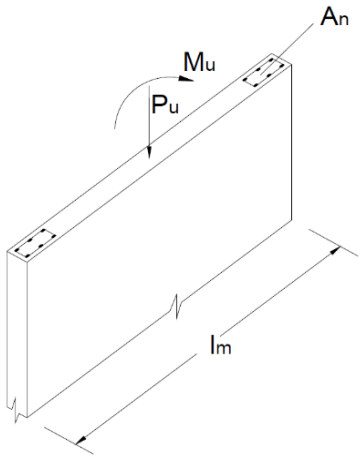
N_u = 128.87 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 1079.7 ton > Pu =128.87 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	204.55
Long. (m)	4.5
F (ton)	45.46
Fy (kg/cm2)	4200
As (cm2)	10.8

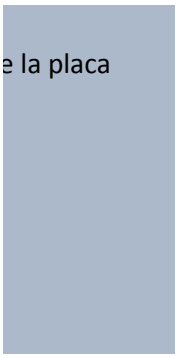
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1900	12.6747	-0.3385	-1900	12.6747	-0.3385
2	-1900	447.0119	-0.1458	-1900	422.2218	0.4882
3	-1900	772.5226	-4.90E-02	-1900	758.2919	0.5988
4	-1880	1046.473	0.033	-1883	1040.2869	0.6954
5	-1722	1269.66	0.1021	-1722	1268.9905	0.7763
6	-1562	1442.8673	0.1599	-1558	1445.1028	0.8514
7	-1399	1566.3193	0.2072	-1391	1568.9646	0.9153
8	-1232	1641.7743	0.2478	-1220	1642.1475	0.9773
9	-1064	1654.2559	0.2701	-1049	1650.4466	0.9888
10	-897.6912	1603.1978	0.2727	-879.0751	1592.3116	0.9854
11	-730.6375	1490.29	0.2582	-708.4919	1469.4997	0.9771
12	-563.4449	1315.3113	0.2259	-537.5756	1281.9027	0.9346
13	-395.9634	1078.0375	0.176	-365.2266	1026.5467	1.0981
14	-233.3363	801.7767	0.1272	-197.3825	742.7166	3.1337
15	171.1971	-17.275	0.4613	171.1971	-17.275	0.4613

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P2	LIVE	Top	-14.21	6.11	-0.01
PISO4	P2	LIVE	Bottom	-14.21	6.11	-0.01
PISO4	P2	DEAD-SQ	Top	-70.42	18.47	0.08
PISO4	P2	DEAD-SQ	Bottom	-70.42	18.47	0.08
PISO4	P2	RX MAX	Top	4.79	19.72	3.73
PISO4	P2	RX MAX	Bottom	4.79	19.72	3.73
PISO4	P2	RX MIN	Top	-4.79	-19.72	-3.73
PISO4	P2	RX MIN	Bottom	-4.79	-19.72	-3.73
PISO4	P2	RY MAX	Top	5.13	49.57	4.74
PISO4	P2	RY MAX	Bottom	5.13	49.57	4.74
PISO4	P2	RY MIN	Top	-5.13	-49.57	-4.74
PISO4	P2	RY MIN	Bottom	-5.13	-49.57	-4.74

1.4CM+1.7CV	122.75	Tn
1.25(CM+CV)	105.79	Tn

CM	M22	0.21	Tn.m
	M33	-18.21	Tn.m
CV	M22	-0.02	Tn.m
	M33	9.12	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	122.75	0.27	-10.00
1.25(CM+CV)+CS	110.58	-5.18	52.49
1.25(CM+CV)-CS	101.00	5.67	-75.23
0.9CM+CS	68.17	-5.24	47.47
0.9CM-CS	58.59	5.62	-55.66

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	1900.0	12.7	1900.0	12.7
2	1900.0	447.0	1900.0	-711.1
3	1900.0	772.5	1875.0	-994.8
4	1880.0	1046.5	1716.0	-1226.0
5	1722.0	1269.7	1555.0	-1406.0
6	1562.0	1442.9	1391.0	-1535.0
7	1399.0	1566.3	1225.0	-1615.0
8	1232.0	1641.8	1053.0	-1647.0
9	1064.0	1654.3	885.0	-1609.0
10	897.7	1603.2	718.5	-1506.0
11	730.6	1490.3	552.2	-1341.0
12	563.4	1315.3	386.1	-1115.0
13	396.0	1078.0	230.7	-867.2
14	233.3	801.8	64.0	-581.7
15	-171.2	-17.3	-171.2	-17.3

PUNTO
1
2
3
4
5
6
7
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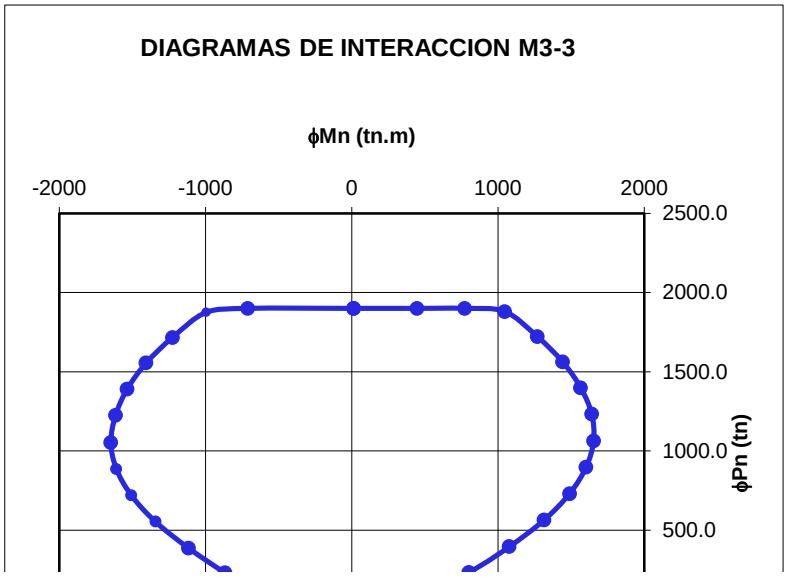
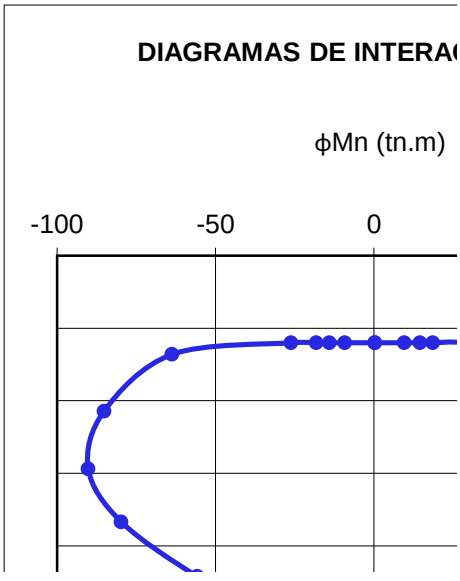
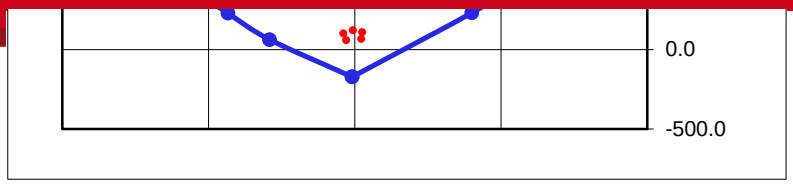
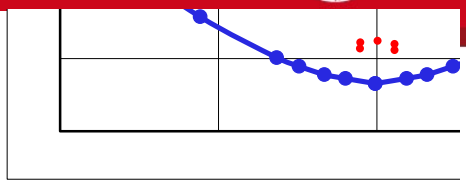
11
12
13
14
15

SISMO EN XX

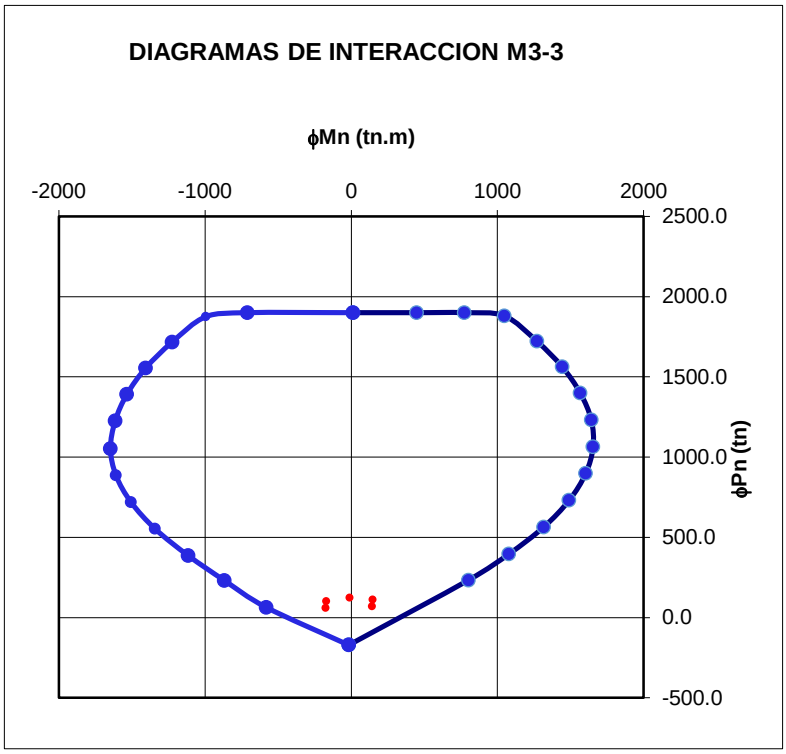


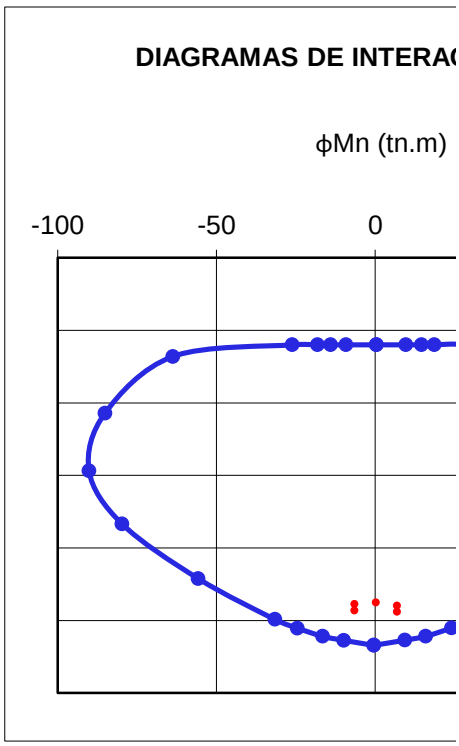






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1900	12.6747	-0.3385	-1900	12.6747	-0.3385	-1900
-1900	393.3668	1.2087	-1900	353.2608	2.1812	-1900
-1900	741.3289	1.3303	-1900	717.8871	2.347	-1900
-1887	1032.9234	1.4563	-1892	1022.6971	2.4793	-1900
-1722	1268.1615	1.5427	-1721	1266.5185	2.6014	-1721
-1554	1447.3946	1.632	-1548	1450.2106	2.7164	-1537
-1383	1571.6308	1.7341	-1371	1574.6065	2.8297	-1350
-1208	1642.0385	1.8174	-1190	1640.9279	2.9629	-1159
-1032	1645.2392	1.8011	-1009	1636.5953	2.9311	-966.9301
-857.6279	1578.5416	1.8045	-828.0226	1557.1582	2.9892	-775.4697
-682.7017	1443.8021	1.806	-646.7805	1404.1392	3.1318	-583.0472
-506.8208	1239.3638	1.9278	-463.9762	1175.7975	3.5021	-386.7538
-328.7555	962.4372	2.3276	-273.381	858.3319	5.476	-141.0709
-110.1235	582.6213	17.0676	-12.5891	390.827	26.7923	54.6713
171.1971	-17.275	0.4613	171.1971	-17.275	0.4613	171.1971

T	M2	M3
-0.072	0.021	-7.08
-0.072	-0.017	9.116
0.12	0.002	-67.148
0.12	0.214	-18.213
8.257	4.519	20.002
8.257	5.428	63.86
-8.257	-4.519	-20.002
-8.257	-5.428	-63.86
11.999	5.951	50.157
11.999	6.709	158.973
-11.999	-5.951	-50.157
-11.999	-6.709	-158.973

P	4.79	Tn
M22	-5.43	Tn.m
M33	63.86	Tn.m

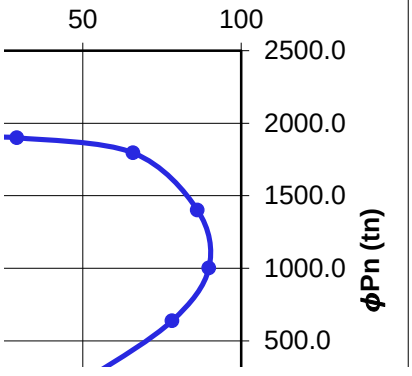
P	5.13	Tn
M22	-6.71	Tn.m
M33	158.97	Tn.m

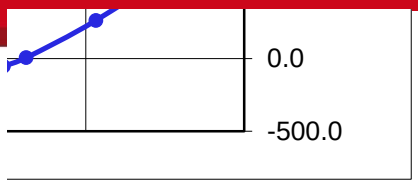
COMBINACIONES SISMO EN Y		
P	M22	M33

122.75	0.27	-10.00
110.92	-6.46	147.60
100.66	6.96	-170.34
68.51	-6.52	142.58
58.25	6.90	-175.36

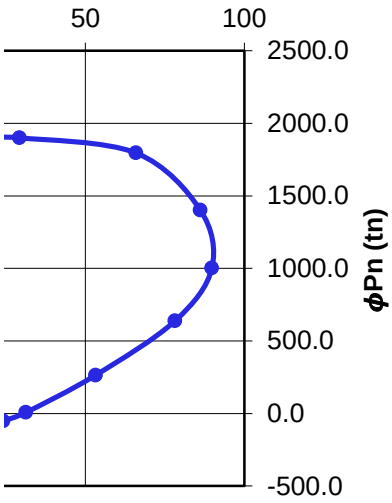
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1900.0	0.3	1900.0	0.3
1900.0	-9.2	1900.0	9.6
1900.0	-14.1	1900.0	14.6
1900.0	-18.1	1900.0	18.6
1900.0	-26.1	1900.0	29.2
1820.0	-63.7	1796.0	65.9
1429.0	-85.1	1402.0	86.2
1032.0	-90.1	1002.0	89.8
665.1	-79.7	638.0	78.2
288.8	-55.7	264.2	53.2
7.4	-31.6	7.6	31.2
-52.5	-24.5	-51.4	24.0
-109.3	-16.5	-109.2	15.8
-136.5	-9.9	-135.5	9.4
-171.2	-0.5	-171.2	-0.5

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
12.6747	-0.3385	-1900	12.6747	-0.3385	-1900	12.6747
281.6789	3.8466	-1900	198.5848	4.6283	-1900	-36.5689
676.0428	4.0846	-1900	551.3009	8.851	-1900	-78.8495
1003.4165	4.2521	-1900	943.2008	9.239	-1900	-120.7013
1262.5988	4.4134	-1717	1243.9558	9.6073	-1900	-155.2205
1454.0015	4.5849	-1506	1453.1774	10.0239	-1820	-97.4383
1578.1056	4.7463	-1291	1571.0487	10.5015	-1429	-39.4113
1635.7681	4.9898	-1071	1598.4756	11.071	-1032	18.1319
1615.9995	5.087	-851.2952	1528.5212	11.3777	-665.1465	76.9345
1511.4708	5.3473	-626.4781	1338.8664	13.2326	-288.8299	138.3912
1324.8185	5.7176	-356.0134	943.0456	24.9882	-7.4131	202.9837
1049.521	6.8218	-143.1187	609.4374	31.6569	52.4959	161.0709
625.6575	25.5935	13.9305	329.9383	28.9014	109.2993	120.0712
243.3226	24.2505	104.1752	132.5842	17.2692	136.5121	59.6955
-17.275	0.4613	171.1971	-17.275	0.4613	171.1971	-17.275

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.3385	-1900	12.6747	-0.3385	-1900	12.6747	-0.3385
9.1559	-1900	-135.4906	10.8935	-1900	-211.6417	15.0266
14.0724	-1900	-262.552	18.6311	-1900	-511.0381	19.2913
18.1482	-1900	-509.5705	24.4778	-1875	-989.3481	5.0099
26.1337	-1892	-914.8939	22.127	-1689	-1254	4.6297
63.6874	-1630	-1303	11.0122	-1502	-1446	4.6921
85.0963	-1411	-1497	10.5324	-1312	-1570	4.8256
90.1191	-1190	-1595	10.9032	-1118	-1629	5.0388
79.7172	-971.5934	-1597	10.6725	-923.947	-1613	4.5009
55.7465	-751.7735	-1501	9.9093	-733.5932	-1510	4.3307
31.5884	-534.5664	-1294	9.7569	-544.4489	-1325	4.4015
24.5184	-318.5482	-981.1536	9.9182	-354.9929	-1060	4.5298
16.5423	-120.6051	-663.986	11.9157	-182.723	-788.7162	5.2974
9.9334	84.7228	-232.9078	8.0041	35.5343	-358.8517	6.578
0.4613	171.1971	-17.275	0.4613	171.1971	-17.275	0.4613

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1900	12.6747	-0.3385	-1900	12.6747	-0.3385	-1900
-1900	-306.8552	17.4951	-1900	-464.6952	12.3133	-1900
-1900	-801.673	3.7776	-1900	-891.6476	1.4098	-1900
-1807	-1098	2.563	-1769	-1154	1.3531	-1740
-1632	-1323	2.5536	-1600	-1360	1.3451	-1576
-1456	-1487	2.5858	-1428	-1508	1.3432	-1409
-1276	-1591	2.6679	-1254	-1602	1.3933	-1238
-1091	-1638	2.8133	-1075	-1642	1.5115	-1063
-906.8706	-1614	2.3522	-897.6891	-1612	1.2405	-890.932
-727.1762	-1510	2.3975	-723.4852	-1508	1.2846	-720.8709
-547.8019	-1333	2.4655	-549.6616	-1337	1.3533	-550.934
-368.427	-1085	2.5627	-375.9499	-1098	1.4473	-381.4165
-204.0016	-825.8018	2.9821	-215.5232	-844.3757	1.7152	-223.859
-7.1291	-463.7371	3.9264	-32.0978	-516.8183	2.2706	-49.4676
171.1971	-17.275	0.4613	171.1971	-17.275	0.4613	171.1971

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
12.6747	-0.3385	-1900	12.6747	-0.3385	-1900	12.6747
-634.1972	2.1551	-1900	-711.1188	-0.1443	-1900	-635.8459
-947.8665	0.5382	-1875	-994.7758	-0.2335	-1900	-948.502
-1193	0.4626	-1716	-1226	-0.3016	-1740	-1194
-1385	0.4421	-1555	-1406	-0.3465	-1575	-1385
-1523	0.4354	-1391	-1535	-0.3676	-1408	-1523
-1609	0.4511	-1225	-1615	-0.3617	-1238	-1609
-1645	0.5334	-1053	-1647	-0.3244	-1063	-1645
-1611	0.4236	-885.0142	-1609	-0.2833	-890.5816	-1611
-1507	0.4815	-718.5254	-1506	-0.2287	-720.587	-1507
-1339	0.5479	-552.187	-1341	-0.1564	-550.7152	-1339
-1108	0.6364	-386.1271	-1115	-0.0668	-381.2631	-1107
-857.1927	0.8115	-230.7355	-867.1673	0.0418	-223.7938	-857.0973
-552.5829	1.146	-64.0065	-581.7363	0.2099	-49.4556	-552.5593
-17.275	0.4613	171.1971	-17.275	0.4613	171.1971	-17.275

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.3385	-1900	12.6747	-0.3385	-1900	12.6747	-0.3385
-2.3276	-1900	-466.1199	-12.5645	-1900	-307.6452	-17.8299
-0.976	-1900	-893.1004	-1.8113	-1900	-804.7106	-4.0926
-1.0472	-1768	-1155	-1.9149	-1805	-1100	-3.0892
-1.1262	-1599	-1360	-2.0176	-1631	-1325	-3.2066
-1.1694	-1428	-1509	-2.0738	-1454	-1488	-3.3103
-1.1787	-1253	-1602	-2.1254	-1274	-1592	-3.4039
-1.1913	-1074	-1642	-2.1789	-1090	-1638	-3.4926
-0.9946	-896.9337	-1612	-1.8154	-905.5559	-1613	-2.9317
-0.9416	-722.8726	-1508	-1.7469	-726.117	-1509	-2.8624
-0.8598	-549.1909	-1336	-1.6649	-546.9854	-1332	-2.7753
-0.7652	-375.6243	-1098	-1.5695	-367.881	-1084	-2.6744
-0.7142	-215.3753	-844.1554	-1.6009	-203.739	-825.393	-2.8446
-0.696	-32.1022	-516.8333	-1.7804	-7.1675	-463.8044	-3.3812
0.4613	171.1971	-17.275	0.4613	171.1971	-17.275	0.4613

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1900	12.6747	-0.3385	-1900	12.6747	-0.3385	-1900
-1900	-212.0426	-15.4185	-1900	-135.591	-11.3514	-1900
-1900	-515.633	-19.6476	-1900	-264.5426	-19.0853	-1900
-1872	-993.8314	-5.4428	-1900	-517.3683	-25.0121	-1900
-1686	-1257	-5.2421	-1885	-926.3564	-22.4935	-1900
-1500	-1448	-5.3996	-1624	-1310	-11.5599	-1796
-1310	-1572	-5.5628	-1405	-1501	-11.2397	-1402
-1116	-1629	-5.7321	-1184	-1596	-11.6083	-1002
-921.5471	-1612	-5.1062	-966.605	-1596	-11.2935	-637.9646
-731.7472	-1509	-4.7989	-747.8076	-1497	-10.3789	-264.2087
-543.0594	-1323	-4.7039	-531.5931	-1290	-10.0275	-7.6299
-354.0412	-1058	-4.6215	-316.5734	-977.7503	-9.9417	51.4331
-182.2786	-787.9964	-5.1106	-119.5753	-662.061	-11.5967	109.1557
35.4877	-358.9347	-5.9535	84.6061	-233.1529	-7.2874	135.5089
171.1971	-17.275	0.4613	171.1971	-17.275	0.4613	171.1971

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
12.6747	-0.3385	-1900	12.6747	-0.3385	-1900	12.6747
-36.6567	-9.6128	-1900	199.1627	-5.0587	-1900	282.1897
-79.6174	-14.555	-1900	553.8187	-9.0609	-1900	677.2325
-122.0662	-18.5946	-1900	946.6252	-9.2153	-1900	1004.9654
-160.6431	-29.177	-1714	1247.5685	-9.4121	-1719	1264.3261
-102.4564	-65.8698	-1502	1455.9986	-9.68	-1535	1455.36
-44.0312	-86.1521	-1287	1572.3787	-10.0639	-1348	1578.9412
13.8984	-89.7948	-1066	1597.4792	-10.5773	-1156	1635.8017
72.2878	-78.1776	-845.934	1524.9212	-10.8729	-964.5606	1615.0413
133.3699	-53.1772	-620.7279	1331.9227	-12.8658	-773.1173	1509.5611
200.3508	-31.2415	-349.7677	932.4743	-24.7018	-580.7234	1321.9843
159.2442	-24.0247	-139.745	604.011	-31.1304	-384.3667	1045.5657
120.4071	-15.8451	14.4123	328.8793	-28.2564	-139.1943	622.4716
61.9282	-9.3872	103.984	133.0161	-16.5473	54.502	243.7085
-17.275	0.4613	171.1971	-17.275	0.4613	171.1971	-17.275

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.3385	-1900	12.6747	-0.3385	-1900	12.6747	-0.3385
-4.2266	-1900	353.598	-2.5212	-1900	393.571	-1.5278
-4.2315	-1900	718.5785	-2.4725	-1900	741.7296	-1.4439
-4.2044	-1892	1023.5848	-2.4221	-1887	1033.4326	-1.3954
-4.2208	-1721	1267.4389	-2.3951	-1721	1268.6925	-1.3365
-4.256	-1547	1451.0112	-2.3904	-1553	1447.8609	-1.3086
-4.3228	-1370	1575.1328	-2.4097	-1382	1571.9475	-1.3155
-4.4822	-1188	1641.0192	-2.4674	-1207	1642.1255	-1.321
-4.554	-1007	1636.1548	-2.398	-1031	1645.0288	-1.2644
-4.8269	-826.6889	1556.2152	-2.4616	-856.8591	1578.0405	-1.2701
-5.2502	-645.4711	1402.725	-2.6457	-681.9459	1443.0279	-1.3112
-6.4709	-462.7034	1173.9268	-3.0961	-506.0863	1238.3452	-1.5063
-25.1993	-272.0014	855.7341	-5.1991	-328.0568	961.2146	-2.0042
-23.6081	-12.5634	390.797	-26.2522	-109.6601	581.7986	-16.7311
0.4613	171.1971	-17.275	0.4613	171.1971	-17.275	0.4613

Curve 24	345. degrees	
P	M3	M2
-1900	12.6747	-0.3385
-1900	422.3196	-0.7926
-1900	758.4777	-0.7036
-1883	1040.5219	-0.6315
-1722	1269.236	-0.5714
-1558	1445.3212	-0.5294
-1391	1569.1174	-0.4988
-1220	1642.198	-0.4812
-1049	1650.3649	-0.4496
-878.7215	1592.0977	-0.4446
-708.1433	1469.1608	-0.4712
-537.2297	1281.4398	-0.4998
-364.9032	1026.0053	-0.7628
-196.7765	741.6833	-2.9583
171.1971	-17.275	0.4613

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

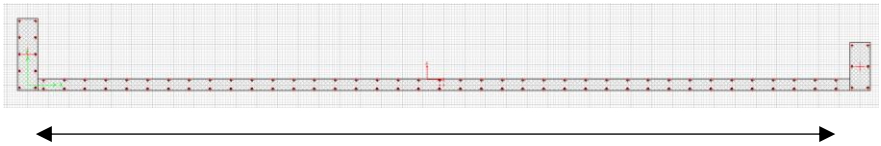
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 3) 4TO-5TO PISO

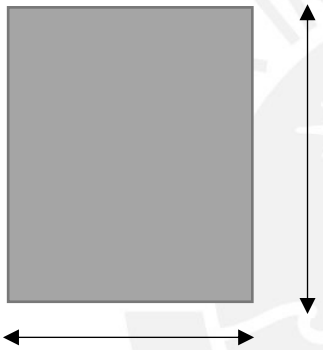
1. INGRESO DE DATOS GENERALES

Lm (m)	9.5



d (m) = 0.85xLm	8.08

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	9.5

hm/Lm	1.4

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**109.79**	(Axial del etabs)
Mua (ton)	**410.76**	(Momento del etabs)
Mn (ton)	**410.76**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**130.73**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**130.73**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	91.31

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	46.38

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	73.13	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	103.84	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	188.66	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

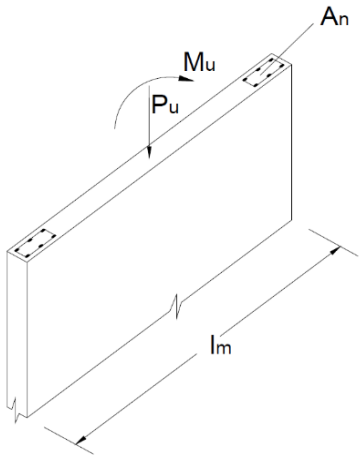
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	88.58	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 1067.9 ton > Pu = 88.58 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	410.66
Long. (m)	9.5
F (ton)	43.2
Fy (kg/cm2)	4200
As (cm2)	10.3

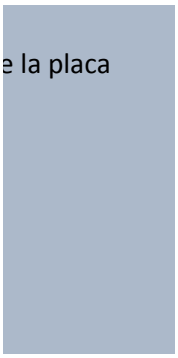
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-2616	0.3934	6.6517	-2616	0.3934	6.6517
2	-2616	2601.8321	-108.8662	-2616	2590.4958	-108.5386
3	-2507	3333.7092	-98.0175	-2506	3333.5861	-97.4801
4	-2312	3939.1529	-87.3216	-2308	3946.5564	-86.5397
5	-2113	4421.512	-76.7897	-2106	4431.5106	-75.7707
6	-1911	4782.3307	-66.5106	-1901	4790.3719	-65.2452
7	-1703	5026.3742	-56.5427	-1690	5027.8811	-55.0184
8	-1488	5159.4033	-47.0525	-1472	5149.8208	-45.2533
9	-1279	5094.8107	-34.0044	-1259	5074.8879	-32.5312
10	-1072	4864.3095	-2.07E+01	-1048	4824.9781	-19.0341
11	-864.2411	4475.0578	-7.3904	-837.5154	4410.7362	-5.5222
12	-656.6872	3926.1805	5.9235	-627.1199	3833.1593	7.9735
13	-449.3697	3218.9618	19.2225	-416.4761	3090.8899	21.4856
14	-263.335	2566.7638	35.6695	-227.4019	2436.3342	39.6028
15	284.353	-0.5362	-9.066	284.353	-0.5362	-9.066

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P3	LIVE	Top	-8.28	-1.91	0.36
PISO4	P3	LIVE	Bottom	-8.28	-1.91	0.36
PISO4	P3	DEAD-SQ	Top	-48.8	-7.67	1
PISO4	P3	DEAD-SQ	Bottom	-48.8	-7.67	1
PISO4	P3	RX MAX	Top	32.91	23.43	13.67
PISO4	P3	RX MAX	Bottom	32.91	23.43	13.67
PISO4	P3	RX MIN	Top	-32.91	-23.43	-13.67
PISO4	P3	RX MIN	Bottom	-32.91	-23.43	-13.67
PISO4	P3	RY MAX	Top	18.44	92.39	8.17
PISO4	P3	RY MAX	Bottom	18.44	92.39	8.17
PISO4	P3	RY MIN	Top	-18.44	-92.39	-8.17
PISO4	P3	RY MIN	Bottom	-18.44	-92.39	-8.17

1.4CM+1.7CV	82.40	Tn	
1.25(CM+CV)	71.35	Tn	

CM	M22	1.83	Tn.m
	M33	-23.58	Tn.m
CV	M22	0.58	Tn.m
	M33	-5.79	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	82.40	3.55	-42.85
1.25(CM+CV)+CS	104.26	-15.04	28.95
1.25(CM+CV)-CS	38.44	21.07	-102.37
0.9CM+CS	76.83	-16.41	44.44
0.9CM-CS	11.01	19.70	-70.87

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	2616.0	0.4	2616.0	0.4
2	2616.0	2601.8	2616.0	-2145.0
3	2507.0	3333.7	2616.0	-2951.0
4	2312.0	3939.2	2446.0	-3630.0
5	2113.0	4421.5	2249.0	-4186.0
6	1911.0	4782.3	2049.0	-4621.0
7	1703.0	5026.4	1843.0	-4938.0
8	1488.0	5159.4	1630.0	-5145.0
9	1279.0	5094.8	1422.0	-5166.0
10	1072.0	4864.3	1214.0	-5021.0
11	864.2	4475.1	1007.0	-4716.0
12	656.7	3926.2	799.1	-4252.0
13	449.4	3219.0	591.5	-3629.0
14	263.3	2566.8	384.1	-2847.0
15	-284.4	-0.5	-284.4	-0.5

PUNTO
1
2
3
4
5
6
7
8
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10
11
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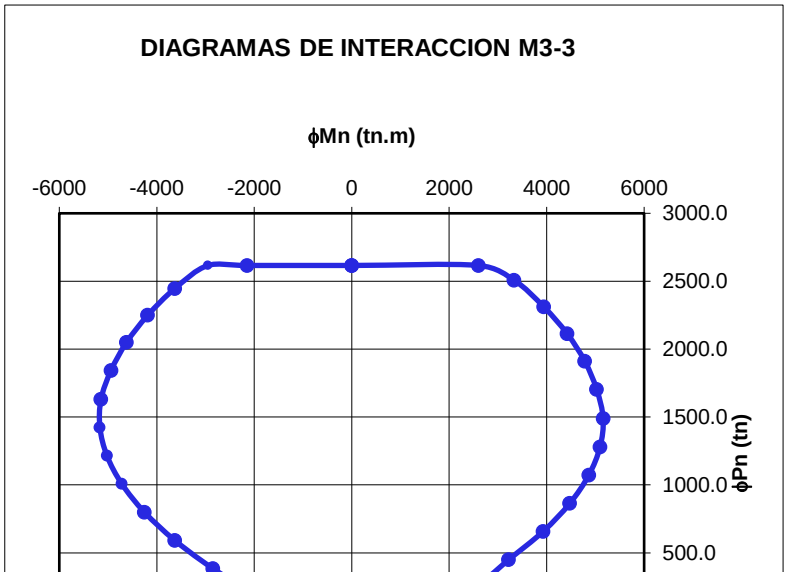
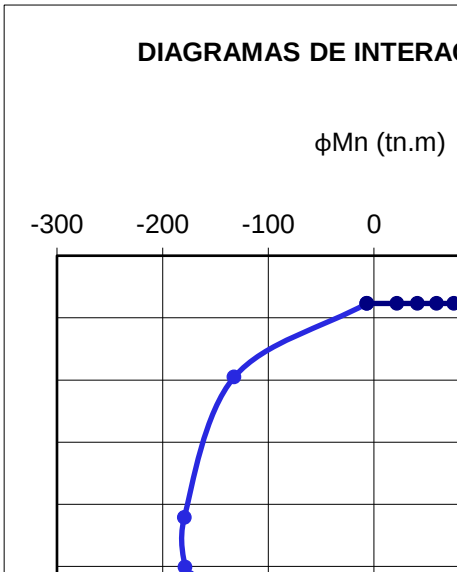
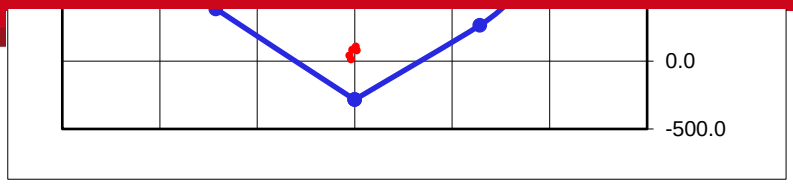
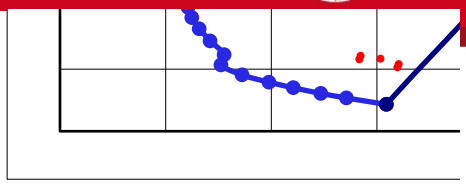
14
15

SISMO EN XX

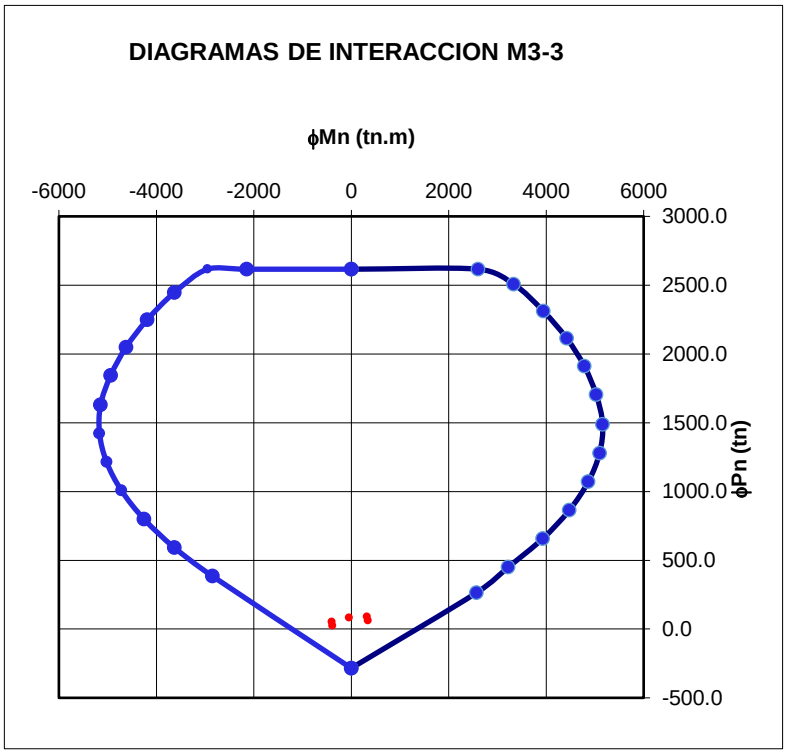


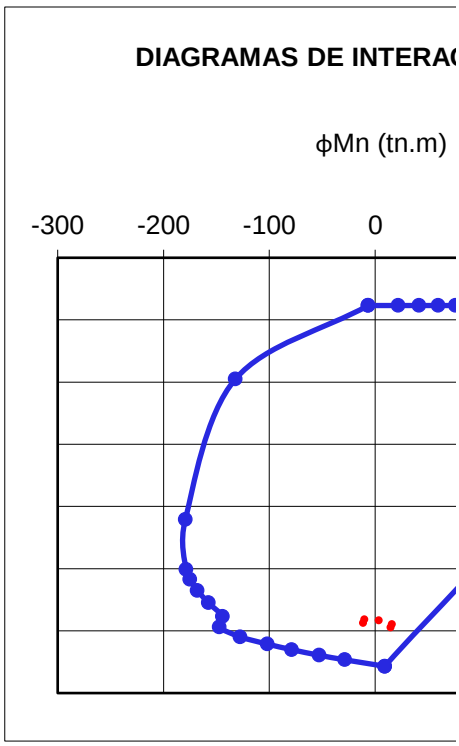






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-2616	0.3934	6.6517	-2616	0.3934	6.6517	-2616
-2616	2575.7691	-107.9061	-2616	2061.5215	-42.5916	-2616
-2505	3333.9551	-96.8544	-2504	3334.4535	-96.0185	-2519
-2303	3955.093	-85.6505	-2297	3966.5918	-84.4549	-2286
-2098	4442.6805	-74.6247	-2087	4457.7679	-73.0588	-2068
-1889	4799.2802	-63.8021	-1873	4810.52	-61.8525	-1845
-1675	5028.8493	-53.2928	-1654	5028.6862	-50.941	-1617
-1452	5137.4946	-43.1958	-1426	5118.4891	-40.429	-1381
-1235	5049.9399	-30.8441	-1203	5012.5146	-28.5195	-1146
-1021	4776.1979	-17.1043	-983.624	4705.599	-14.4833	-919.1873
-806.7206	4333.01	-3.3787	-764.7027	4221.4451	-0.4326	-691.5669
-592.6401	3720.3405	10.3611	-545.6209	3559.3244	13.6229	-462.324
-378.0582	2935.6248	24.1364	-333.0714	2782.5133	28.6284	-254.0486
-181.8376	2260.5755	44.3255	-114.7609	1984.3272	51.0133	11.4758
284.353	-0.5362	-9.066	284.353	-0.5362	-9.066	284.353

T	M2	M3
-1.559	-0.387	-0.72
-1.559	0.58	-5.792
-5.481	-0.819	-3.243
-5.481	1.83	-23.576
36.34	18.373	79.625
36.34	18.054	65.658
-36.34	-18.373	-79.625
-36.34	-18.054	-65.658
28.149	9.685	129.458
28.149	12.978	361.776
-28.149	-9.685	-129.458
-28.149	-12.978	-361.776

P	**32.91**	Tn
M22	**-18.05**	Tn.m
M33	**65.66**	Tn.m

P	**18.44**	Tn
M22	**-12.98**	Tn.m
M33	**361.78**	Tn.m

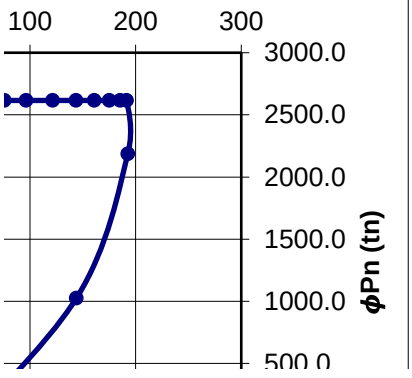
COMBINACIONES SISMO EN Y

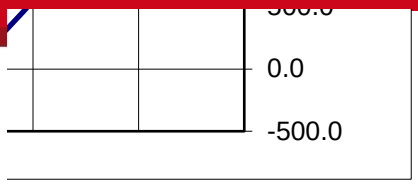
P	M22	M33

82.40	3.55	-42.85
89.79	-9.97	325.07
52.91	15.99	-398.49
62.36	-11.33	340.56
25.48	14.63	-382.99

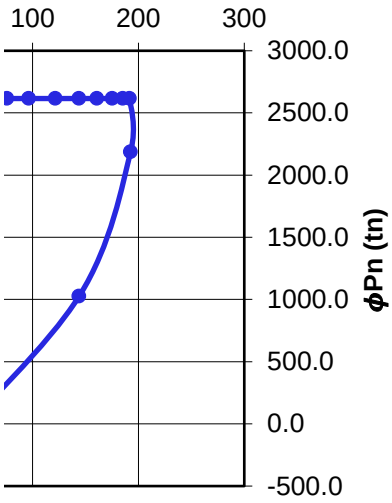
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
2616.0	-6.7	2616.0	-6.7
2024.0	-132.2	2616.0	21.8
895.8	-179.4	2616.0	41.4
495.3	-178.8	2616.0	59.4
413.7	-175.2	2616.0	75.8
324.5	-168.0	2616.0	96.3
226.8	-157.7	2616.0	121.4
116.2	-144.3	2616.0	143.7
32.2	-147.5	2616.0	160.8
-47.7	-127.6	2616.0	175.2
-105.7	-102.0	2616.0	185.4
-150.9	-78.9	2616.0	191.5
-195.8	-53.0	2187.0	192.6
-232.4	-28.9	1026.0	144.0
-284.4	9.1	-284.4	9.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
0.3934	6.6517	-2616	0.3934	6.6517	-2616	0.3934
1523.7426	-0.8439	-2616	1068.0944	13.7952	-2024	-256.5115
3248.296	-81.3232	-2616	2438.499	9.066	-895.7929	-4.88E+02
3985.9739	-82.4529	-2343	3615.2568	-19.6845	-495.2633	-5.72E+02
4482.6387	-70.4067	-2014	4542.6015	-63.3933	-413.68	-590.3839
4827.5616	-58.5554	-1768	4858.2673	-49.8687	-324.4761	-609.0837
5024.4295	-46.9529	-1516	4985.8173	-36.4145	-226.7678	-6.27E+02
5079.2567	-35.6906	-1256	4929.9595	-23.1716	-116.2188	-6.53E+02
4937.8918	-24.4691	-995.9253	4651.2089	-10.9159	-32.1642	-8.00E+02
4571.066	-9.9296	-740.7668	4112.9978	2.7202	47.7186	-8.77E+02
4011.1586	4.6952	-488.6978	3322.146	18.8446	105.7201	-7.73E+02
3252.1907	19.4278	-258.8615	2521.0954	38.3619	150.949	-607.4061
2522.8531	37.7446	-29.2939	1603.094	58.1169	195.8412	-425.0035
1419.6022	57.8912	142.3883	739.3416	41.2721	232.3763	-249.7877
-0.5362	-9.066	284.353	-0.5362	-9.066	284.353	-0.5362

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
6.6517	-2616	0.3934	6.6517	-2616	0.3934	6.6517
132.2064	-2616	-1279	18.2424	-2616	-1717	2.4887
179.404	-2616	-2877	10.4924	-2613	-3032	-11.9627
178.8194	-2323	-3927	7.5061	-2389	-3776	1.5791
175.1863	-2063	-4506	23.3351	-2163	-4352	15.1638
168.0171	-1798	-4858	39.2745	-1933	-4762	28.7715
157.7233	-1527	-4985	55.3429	-1697	-5010	42.4311
144.3476	-1248	-4894	71.5308	-1454	-5101	56.164
147.4545	-966.3266	-4535	87.4413	-1212	-4975	70.44
127.6007	-690.6944	-3868	104.785	-972.6197	-4615	85.798
102.0331	-414.668	-2920	122.0249	-732.4928	-4039	101.1979
78.909	-203.7486	-2170	153.763	-490.8033	-3246	116.5197
53.046	-41.5187	-1535	149.706	-268.0216	-2428	143.1406
28.8689	130.9457	-737.207	89.7648	7.8306	-1329	139.6677
-9.066	284.353	-0.5362	-9.066	284.353	-0.5362	-9.066

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-2616	0.3934	6.6517	-2616	0.3934	6.6517	-2616
-2616	-2117	-24.9665	-2616	-2136	-26.4189	-2616
-2616	-2998	-13.3609	-2616	-2978	-14.1646	-2616
-2413	-3716	-0.6245	-2427	-3680	-1.9173	-2437
-2200	-4285	12.1146	-2220	-4245	10.3552	-2236
-1982	-4709	24.8906	-2010	-4673	22.6266	-2031
-1759	-4989	37.6832	-1795	-4971	34.9172	-1821
-1529	-5134	50.5207	-1572	-5144	47.2496	-1603
-1300	-5076	64.3352	-1352	-5121	60.7956	-1389
-1075	-4814	78.7858	-1134	-4910	74.777	-1177
-849.6433	-4364	93.2384	-916.0417	-4524	88.7435	-964.5854
-622.9814	-3721	107.8143	-698.0712	-3962	102.7248	-752.3855
-392.8865	-2873	122.3524	-478.6985	-3218	116.806	-539.9493
-149.7925	-1977	156.5281	-271.3501	-2448	141.749	-331.8998
284.353	-0.5362	-9.066	284.353	-0.5362	-9.066	284.353

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
0.3934	6.6517	-2616	0.3934	6.6517	-2616	0.3934
-2141	-26.6807	-2616	-2145	-2.69E+01	-2616	-1991
-2963	-14.7702	-2616	-2951	-1.53E+01	-2616	-2831
-3653	-2.8704	-2446	-3630	-3.70E+00	-2474	-3541
-4213	9.0497	-2249	-4186	7.91E+00	-2274	-4122
-4646	20.962	-2049	-4621	1.95E+01	-2071	-4579
-4955	32.899	-1843	-4938	31.1306	-1863	-4914
-5146	44.835	-1630	-5145	42.7511	-1647	-5134
-5147	58.2167	-1422	-5166	55.9723	-1435	-5169
-4972	71.8275	-1214	-5021	69.2908	-1224	-5031
-4631	85.4531	-1007	-4716	82.5945	-1014	-4728
-4123	99.0653	-799.1317	-4252	95.9131	-802.8806	-4262
-3447	112.6924	-591.5049	-3629	109.2317	-592.2349	-3631
-2656	129.9486	-384.0853	-2847	122.5373	-378.8272	-2824
-0.5362	-9.066	284.353	-0.5362	-9.066	284.353	-0.5362

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
6.6517	-2616	0.3934	6.6517	-2616	0.3934	6.6517
-29.1703	-2616	-1807	-31.791	-2616	-1552	-35.2979
-17.39	-2616	-2689	-19.7836	-2616	-2487	-23.0684
-5.5948	-2506	-3435	-7.7931	-2550	-3284	-10.7753
6.1849	-2303	-4048	4.2098	-2342	-3940	1.4979
17.9786	-2097	-4529	16.1943	-2131	-4458	13.7788
29.7562	-1885	-4885	28.1891	-1916	-4842	26.0363
41.547	-1667	-5119	40.1624	-1693	-5098	38.2949
54.9903	-1450	-5172	53.8409	-1471	-5174	52.2692
68.4956	-1236	-5042	67.577	-1252	-5056	66.3202
82.0151	-1021	-4742	81.3274	-1032	-4760	80.386
95.5203	-807.2362	-4273	95.0633	-812.6049	-4284	93.9996
109.0398	-592.3038	-3630	108.3402	-589.8626	-3617	105.8467
121.0858	-369.2359	-2779	117.3519	-273.9588	-2412	51.8403
-9.066	284.353	-0.5362	-9.066	284.353	-0.5362	-9.066

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-2616	0.3934	6.6517	-2616	0.3934	6.6517	-2616
-2616	-1098	-37.6649	-2616	-668.5292	-25.8989	-2616
-2616	-2120	-28.7151	-2616	-1217	-39.4309	-2616
-2616	-3007	-15.9371	-2616	-2152	-29.9448	-2616
-2410	-3742	-3.168	-2593	-3123	-15.8876	-2616
-2192	-4326	9.6031	-2354	-3905	-2.0659	-2616
-1968	-4763	22.3429	-2109	-4499	11.6176	-2616
-1738	-5058	35.0591	-1858	-4912	24.962	-2616
-1506	-5175	49.562	-1602	-5125	39.6291	-2616
-1279	-5077	63.9116	-1347	-5095	54.3876	-2616
-1050	-4784	77.6748	-1092	-4815	67.7948	-2616
-818.8656	-4290	90.4315	-744.3868	-3862	21.7765	-2616
-566.2143	-3501	88.1211	-378.8372	-2590	-11.9814	-2187
-144.3405	-1899	-3.1988	-9.4348	-1351	-26.4377	-1026
284.353	-0.5362	-9.066	284.353	-0.5362	-9.066	284.353

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
0.3934	6.6517	-2616	0.3934	6.6517	-2616	0.3934
166.9892	-21.7707	-2616	664.083	-62.122	-2616	1071.311
302.9201	-41.3502	-2616	1213.9375	-106.5634	-2616	2074.8063
439.6684	-59.3891	-2616	1770.3068	-123.0023	-2599	3003.2281
576.1171	-75.7605	-2616	2726.0639	-113.0846	-2374	3765.0572
656.0121	-96.3129	-2409	3657.5545	-99.0154	-2145	4359.9706
6.55E+02	-121.4125	-2145	4365.2608	-85.3129	-1911	4792.2662
6.55E+02	-143.7428	-1875	4855.1254	-72.133	-1671	5067.3061
6.48E+02	-160.7628	-1600	5109.8744	-56.713	-1427	5156.3528
6.33E+02	-175.2144	-1323	5106.0015	-39.3796	-1189	5009.4508
6.15E+02	-185.3656	-1048	4808.5478	-22.3997	-950.6334	4652.9519
589.7374	-191.4503	-771.5169	4226.3359	-5.9685	-711.8602	4083.1629
495.445	-192.6079	-443.8961	3102.3237	-9.5346	-470.789	3291.8661
256.7315	-143.9509	-51.8529	1643.5327	-26.1273	-166.8	2154.3742
-0.5362	-9.066	284.353	-0.5362	-9.066	284.353	-0.5362

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
6.6517	-2616	0.3934	6.6517	-2616	0.3934	6.6517
-95.5612	-2616	1595.1739	-117.8874	-2616	2106.2268	-116.2584
-118.4225	-2616	2648.3026	-109.8468	-2612	2952.017	-104.8564
-105.9994	-2478	3433.3116	-98.1275	-2408	3658.4767	-93.57
-93.7178	-2264	4069.6359	-86.579	-2201	4227.4906	-82.4514
-81.6892	-2047	4559.3079	-75.2916	-1990	4660.3648	-71.5907
-69.9932	-1824	4906.0529	-64.3432	-1773	4961.9163	-61.0488
-58.8066	-1594	5116.1675	-53.8634	-1550	5137.6721	-50.9973
-44.4593	-1364	5140.551	-40.0403	-1328	5124.5638	-37.4837
-29.1875	-1139	4954.5963	-25.5881	-1111	4918.6912	-23.527
-13.9163	-914.1418	4581.4285	-11.1522	-892.977	4537.5839	-9.5556
1.0718	-688.9778	4020.6271	3.2824	-675.2895	3981.2251	4.4025
15.2059	-463.0859	3268.7293	17.442	-457.7154	3250.0823	18.3607
-1.2602	-250.7348	2515.5546	31.6492	-258.224	2546.4702	34.3072
-9.066	284.353	-0.5362	-9.066	284.353	-0.5362	-9.066

Curve 24	345. degrees	
P	M3	M2
-2616	0.3934	6.6517
-2616	2377.4617	-112.3094
-2556	3160.9647	-101.2008
-2356	3813.1555	-90.2165
-2154	4334.3069	-79.4279
-1948	4728.2379	-68.8637
-1736	4998.0386	-58.6441
-1517	5150.3867	-48.879
-1302	5109.7228	-35.6269
-1090	4890.2214	-22.0075
-877.6543	4504.599	-8.4029
-665.3368	3951.9269	5.2165
-453.2558	3233.4896	18.8211
-261.5071	2559.6565	35.2209
284.353	-0.5362	-9.066

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

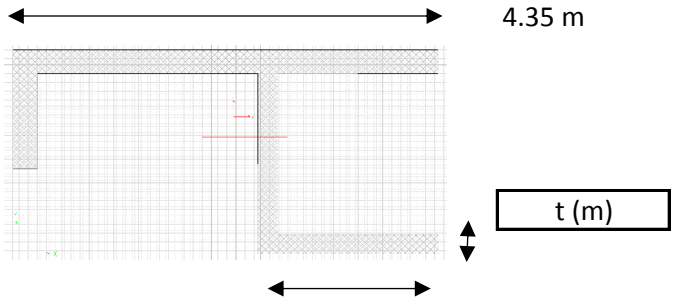
16.8
19.0
19.0

CV (ton)

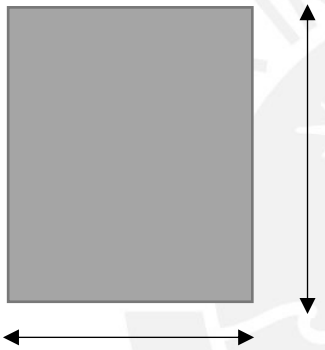
18.7

DISEÑO DE MUROS DE CORTE (PLACA - 4) SENTIDO XX

1. INGRESO DE DATOS GENERALES



Lm (m)	6.2
d (m) = 0.85xLm	5.27
f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25
Lm (m)	4.35

hm/Lm	**3.0**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**135.24**	(Axial del etabs)
Mua (ton)	**87.76**	(Momento del etabs)
Mn (ton)	**87.76**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**55.00**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**55.00**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	99.32

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-52.14

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-42.45	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-60.28	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-109.53	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

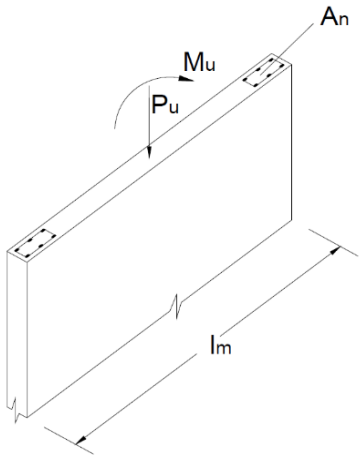
N_u = 313.92 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 1487.6 ton > Pu =313.92 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	87.76
Long. (m)	9.5
F (ton)	9.2
Fy (kg/cm2)	4200
As (cm2)	2.20

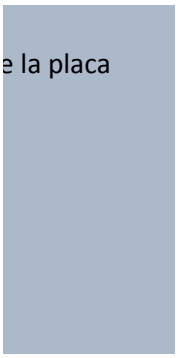
0.25

0.80
0.53
1.205

0.53

Mu)

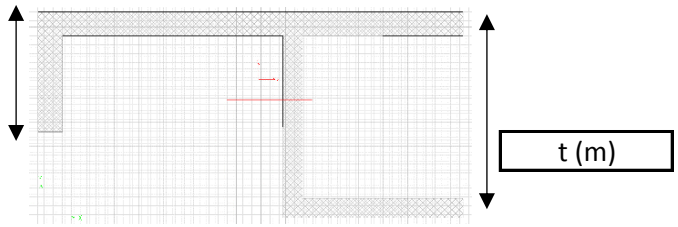
Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



DISEÑO DE MUROS DE CORTE (PLACA - 4)

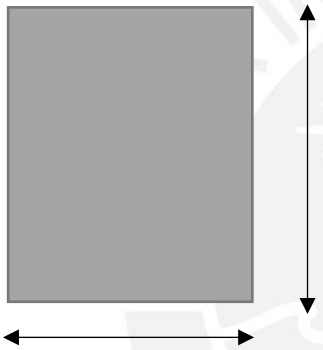
1. INGRESO DE DATOS GENERALES

Lm (m)	3.4



d (m) = 0.85xLm	2.89

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	3.4

hm/Lm	**3.9**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**135.24**	(Axial del etabs)
Mua (ton)	**278.73**	(Momento del etabs)
Mn (ton)	**278.73**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**137.04**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**137.04**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	43.57

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	109.96

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	11.04	3t=60.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	15.67	3t=60.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	28.48	3t=60.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	20.00 cm	3t=60.0 cm	40.0 cm
0.0025	0.0025	28.40 cm	3t=60.0 cm	40.0 cm
0.0025	0.0025	51.60 cm	3t=60.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	20.00 cm	5.00 cm2/m	2 ϕ 8 mm =	20.00 cm	5.00 cm2/m
2 ϕ 3/8" =	28.40 cm	5.00 cm2/m	2 ϕ 3/8" =	28.40 cm	5.00 cm2/m

2 ϕ 1/2" =	51.60 cm	5.00 cm2/m	2 ϕ 1/2" =	51.60 cm	5.00 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

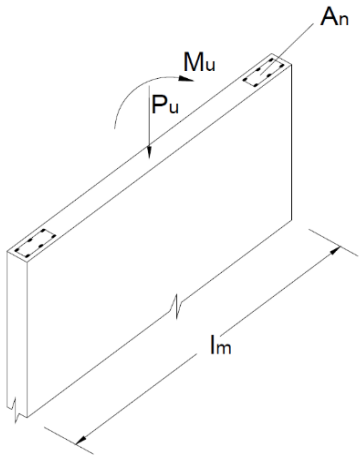
N_u = 135.13 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 607.4 ton > Pu = 140.64 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	278.73
Long. (m)	3.4
F (ton)	82.0
Fy (kg/cm2)	4200
As (cm2)	19.52

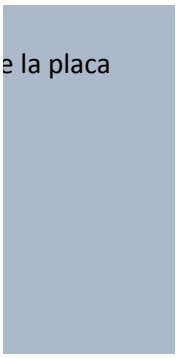
0.2

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	5.00 cm2/m	20.00
0.0009	0.0025	5.00 cm2/m	28.40
0.0016	0.0025	5.00 cm2/m	51.60



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-3012	63.1072	-62.7787	-3012	63.1072	-62.7787
2	-3012	1364.9626	-133.5701	-3012	901.3805	-30.4004
3	-2979	1611.4023	-209.6588	-3012	1415.1466	-134.801
4	-2831	1821.5149	-285.7192	-2925	1671.6384	-214.7916
5	-2678	1996.1952	-361.539	-2762	1885.8738	-294.2941
6	-2520	2137.3705	-437.4672	-2592	2059.2574	-373.1791
7	-2354	2247.0396	-513.1121	-2415	2193.8259	-451.1634
8	-2177	2328.8216	-588.7935	-2210	2287.6171	-506.1557
9	-2011	2326.4701	-662.7565	-1598	2137.2246	-199.9939
10	-1183	2005.9024	-3.86E+02	-1050	1884.1773	-129.7903
11	-898.4215	1814.7319	-308.8081	-735.3669	1627.494	-33.1517
12	-589.1605	1532.0464	-216.006	-401.5563	1261.2025	73.2622
13	-321.857	1245.3525	-132.5216	-109.7578	968.0272	210.5101
14	-12.2227	874.4061	-42.8933	205.8736	452.1583	237.0572
15	477.9861	-86.0118	85.564	477.9861	-86.0118	85.564

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P4	LIVE	Top	-11.64	-2.44	-0.39
PISO4	P4	LIVE	Bottom	-11.64	-2.44	-0.39
PISO4	P4	DEAD-SQ	Top	-74.49	-9.81	-1.19
PISO4	P4	DEAD-SQ	Bottom	-74.49	-9.81	-1.19
PISO4	P4	RX MAX	Top	17.71	82.62	12.59
PISO4	P4	RX MAX	Bottom	17.71	82.62	12.59
PISO4	P4	RX MIN	Top	-17.71	-82.62	-12.59
PISO4	P4	RX MIN	Bottom	-17.71	-82.62	-12.59
PISO4	P4	RY MAX	Top	11.75	23.28	29.32
PISO4	P4	RY MAX	Bottom	11.75	23.28	29.32
PISO4	P4	RY MIN	Top	-11.75	-23.28	-29.32
PISO4	P4	RY MIN	Bottom	-11.75	-23.28	-29.32

1.4CM+1.7CV	124.07	Tn
1.25(CM+CV)	107.66	Tn

CM	M22	4.28	Tn.m
	M33	-31.58	Tn.m
CV	M22	1.01	Tn.m
	M33	-7.63	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	124.07	7.72	-57.19
1.25(CM+CV)+CS	125.37	-31.45	164.68
1.25(CM+CV)-CS	89.95	44.70	-262.71
0.9CM+CS	84.75	-34.22	185.27
0.9CM-CS	49.33	41.93	-220.56

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	3012.0	63.1	3012.0	63.1
2	3012.0	1365.0	3012.0	-584.1
3	2979.0	1611.4	3012.0	-994.6
4	2831.0	1821.5	2884.0	-1339.0
5	2678.0	1996.2	2622.0	-1619.0
6	2520.0	2137.4	2352.0	-1836.0
7	2354.0	2247.0	1511.0	-2209.0
8	2177.0	2328.8	1322.0	-2298.0
9	2011.0	2326.5	1138.0	-2316.0
10	1183.0	2005.9	956.0	-2272.0
11	898.4	1814.7	778.1	-2175.0
12	589.2	1532.0	634.2	-2019.0
13	321.9	1245.4	490.4	-1815.0
14	12.2	874.4	344.4	-1606.0
15	-478.0	-86.0	-478.0	-86.0

PUNTO
1
2
3
4
5
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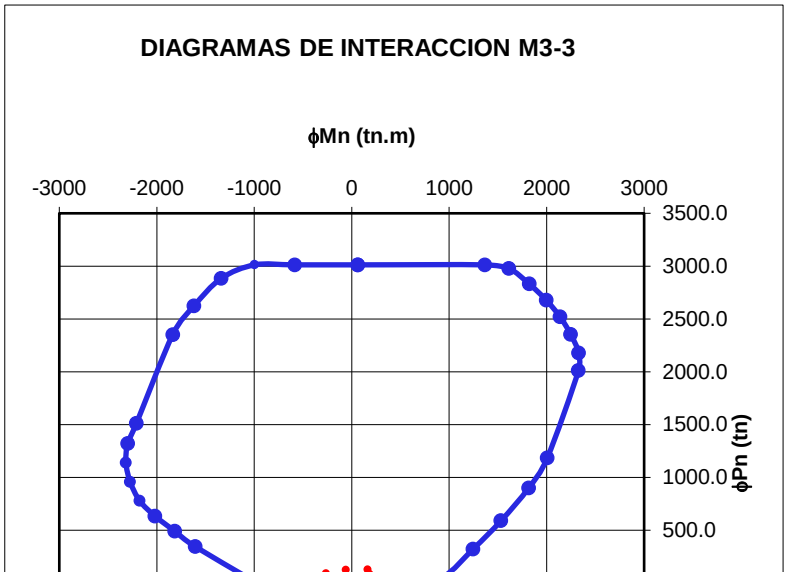
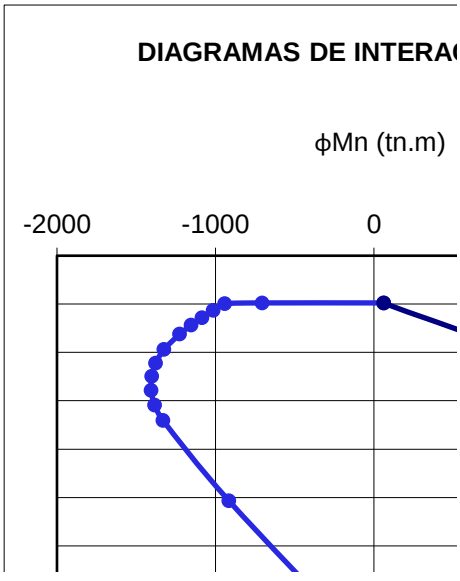
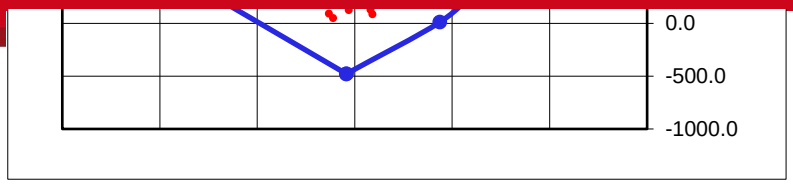
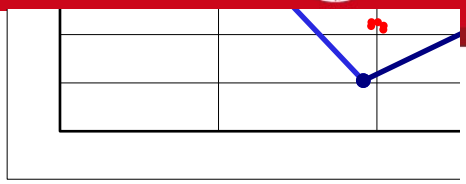
7
8
9
10
11
12
13
14
15

SISMO EN XX

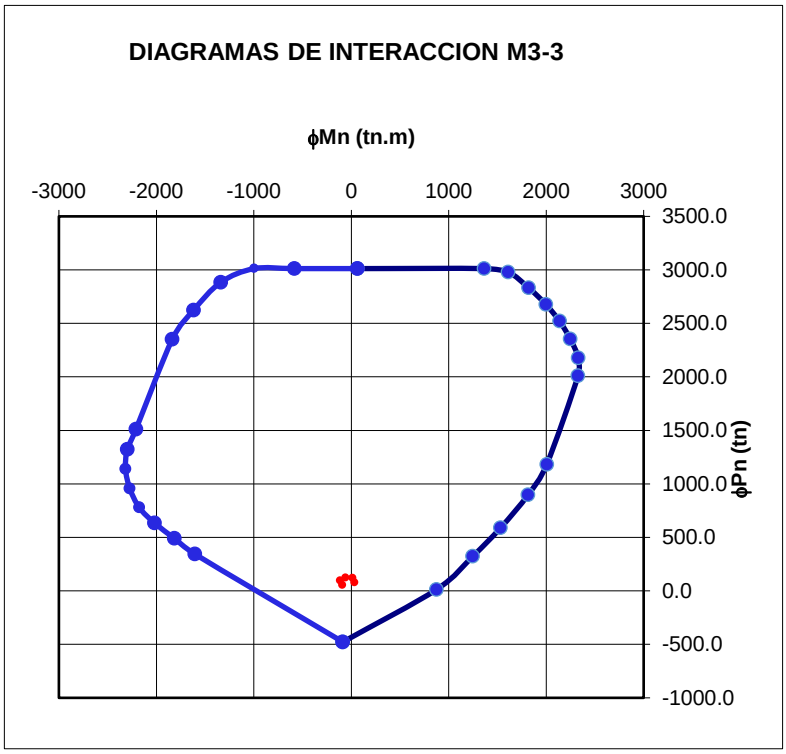


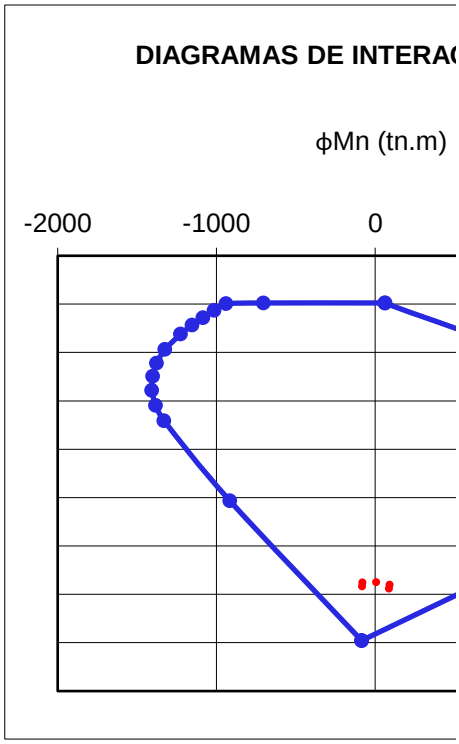






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-3012	63.1072	-62.7787	-3012	63.1072	-62.7787	-3012
-3012	562.8992	2.6132	-3012	417.8762	15.5057	-3012
-3012	1123.7192	-41.2513	-3012	777.4368	34.0067	-3012
-3012	1469.6259	-131.4059	-3012	1139.006	-12.7634	-3012
-2855	1733.224	-214.0998	-2977	1477.2288	-99.243	-2815
-2672	1946.2678	-294.9579	-2646	1701.0258	-14.986	-2378
-2430	2092.9239	-307.2915	-2170	1762.3582	206.4683	-1894
-1922	2070.2681	-49.7483	-1680	1711.007	378.9362	-1498
-1384	1920.18	109.7291	-1185	1526.529	499.5675	-1145
-891.4339	1644.3073	174.8803	-712.0676	1235.5251	552.4079	-790.0789
-545.6009	1310.2446	287.7932	-463.8518	1102.5363	486.7615	-509.2265
-261.0428	1040.0121	384.5744	-256.9054	1001.2619	459.4388	-299.1884
-21.9118	819.5051	362.4043	-25.9439	816.9259	380.6421	-47.8879
218.8537	426.466	240.0234	231.2749	401.7789	234.6364	251.5698
477.9861	-86.0118	85.564	477.9861	-86.0118	85.564	477.9861

T	M2	M3
2.965	2.05	-1.169
2.965	1.013	-7.632
10.465	7.445	-5.591
10.465	4.284	-31.582
52.973	15.804	60.139
52.973	38.074	213.693
-52.973	-15.804	-60.139
-52.973	-38.074	-213.693
33.482	31.385	19.828
33.482	85.285	63.533
-33.482	-31.385	-19.828
-33.482	-85.285	-63.533

P	17.71	Tn
M22	-38.07	Tn.m
M33	213.69	Tn.m

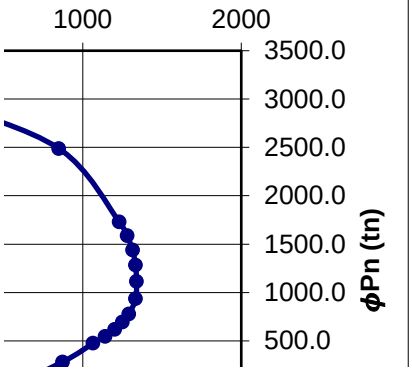
P	11.75	Tn
M22	-85.29	Tn.m
M33	63.53	Tn.m

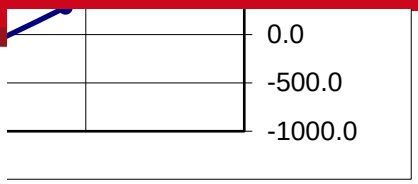
COMBINACIONES SISMO EN Y		
P	M22	M33

124.07	7.72	-57.19
119.41	-78.66	14.52
95.91	91.91	-112.55
78.79	-81.43	35.11
55.29	89.14	-91.96

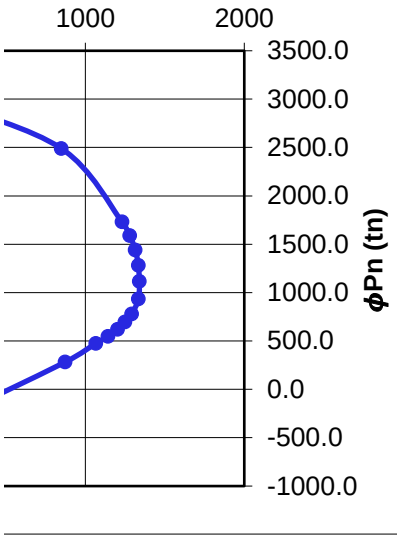
90 GRADOS	M_{2-2}	270 GRADOS	M_{2-2}
ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
3012.0	62.8	3012.0	62.8
3012.0	-704.2	2489.0	848.8
3003.0	-940.1	1731.0	1230.0
2934.0	-1014.4	1587.0	1280.0
2860.0	-1085.2	1438.0	1314.0
2782.0	-1153.3	1282.0	1333.0
2689.0	-1225.7	1116.0	1339.0
2531.0	-1323.8	934.5	1334.0
2388.0	-1377.9	778.4	1291.0
2252.0	-1401.0	694.5	1250.0
2108.0	-1406.3	618.4	1202.0
1954.0	-1383.0	546.5	1142.0
1795.0	-1330.0	475.1	1065.0
965.8	-914.8	281.6	872.3
-478.0	-85.6	-478.0	-85.6

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
63.1072	-62.7787	-3012	63.1072	-62.7787	-3012	63.1072
305.4348	42.6559	-3012	-1.6319	202.2046	-3012	-594.0381
546.3749	76.6196	-3012	-144.8117	610.8585	-3003	-7.85E+02
747.6881	215.2533	-2799	-356.7539	1005.7685	-2934	-8.16E+02
836.7336	494.5748	-2581	-310.3557	1150.7822	-2860	-849.145
932.1784	707.2585	-2403	-167.257	1210.9807	-2782	-885.0341
960.6634	872.3863	-2217	-23.5155	1250.4783	-2689	-9.06E+02
1064.8622	881.2874	-2016	123.1783	1271.2752	-2531	-8.20E+02
1169.5965	803.5416	-1675	498.7598	1190.551	-2388	-7.01E+02
1166.0402	694.8953	-1271	880.5279	1009.7479	-2252	-5.61E+02
1076.2692	581.4576	-869.7686	1066.8556	798.1699	-2108	-4.05E+02
1005.084	490.1856	-507.8459	1051.3304	591.6041	-1954	-256.6024
833.2602	392.6618	-184.1043	920.05	454.9118	-1795	-125.3482
359.7038	225.7306	240.8765	364.8126	237.578	-965.7547	-58.1412
-86.0118	85.564	477.9861	-86.0118	85.564	477.9861	-86.0118

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-62.7787	-3012	63.1072	-62.7787	-3012	63.1072	-62.7787
704.2079	-3012	-352.6538	279.0006	-3012	-324.5234	213.6023
940.068	-3012	-712.3007	686.079	-3012	-619.5836	481.4862
1014.3929	-3012	-820.3654	914.0556	-3012	-809.0453	751.2343
1085.1544	-2914	-873.9844	1019.102	-2950	-897.9415	940.7444
1153.2619	-2805	-932.8189	1109.8583	-2807	-976.5268	1066.2921
1225.6618	-2687	-998.6029	1187.7233	-2643	-1087	1154.4882
1323.8354	-2557	-1074	1254.8678	-2276	-1554	1103.2743
1377.865	-2426	-1135	1292.6422	-1865	-1960	980.4875
1401.0277	-2103	-1386	1216.7874	-1484	-2204	812.3072
1406.2683	-1503	-1701	993.5068	-1171	-2271	652.7817
1383.0207	-947.1314	-1666	759.0072	-735.9721	-1892	538.5765
1330.0336	-383.2259	-1280	499.429	-308.4104	-1385	423.7085
914.8462	178.1937	-663.5057	273.2032	196.7917	-656.3688	251.9885
85.564	477.9861	-86.0118	85.564	477.9861	-86.0118	85.564

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-3012	63.1072	-62.7787	-3012	63.1072	-62.7787	-3012
-3012	-321.4691	182.873	-3012	-323.8922	161.4332	-3012
-3012	-579.1941	399.1479	-3012	-557.3611	347.9256	-3012
-3012	-770.6943	617.8113	-3012	-769.6152	529.9611	-3012
-3004	-896.0285	837.6257	-2888	-1213	626.6113	-2746
-2699	-1228	956.8732	-2508	-1582	765.5303	-2435
-2309	-1647	963.9881	-2068	-1907	839.5397	-1828
-1906	-1991	905.2623	-1617	-2180	762.1567	-1444
-1518	-2227	778.0363	-1357	-2306	669.8629	-1234
-1257	-2318	667.8837	-1127	-2337	579.5575	-1034
-1008	-2287	538.9942	-913.3789	-2261	474.5546	-840.6821
-753.7407	-2107	413.6076	-709.7723	-2092	363.6836	-671.7536
-350.7758	-1505	362.3869	-462.5762	-1732	279.6477	-499.461
164.2285	-733.8303	257.2642	76.9468	-923.2977	268.1281	-150.9152
477.9861	-86.0118	85.564	477.9861	-86.0118	85.564	477.9861

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
63.1072	-62.7787	-3012	63.1072	-62.7787	-3012	63.1072
-329.1913	143.2341	-3012	-584.1415	4.97E+01	-3012	-358.6219
-675.3653	270.1386	-3012	-994.5516	1.19E+02	-3012	-691.5672
-1113	351.349	-2884	-1339	1.90E+02	-3012	-1107
-1468	433.5351	-2622	-1619	2.62E+02	-2763	-1448
-1744	531.2512	-2352	-1836	3.36E+02	-2477	-1713
-2069	746.5866	-1511	-2209	628.8871	-1945	-2001
-2261	657.8482	-1322	-2298	573.7609	-1312	-2247
-2332	586.7907	-1138	-2316	517.7162	-1088	-2266
-2312	515.1242	-955.972	-2272	457.9581	-890.1035	-2201
-2224	427.0535	-778.1433	-2175	389.7153	-693.176	-2071
-2061	330.8952	-634.2427	-2019	305.2692	-526.7077	-1867
-1823	238.1611	-490.4411	-1815	220.887	-372.4221	-1635
-1332	229.2722	-344.4007	-1606	142.5056	-84.3679	-1236
-86.0118	85.564	477.9861	-86.0118	85.564	477.9861	-86.0118

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-62.7787	-3012	63.1072	-62.7787	-3012	63.1072	-62.7787
-106.1387	-3012	-330.8155	-126.2837	-3012	-295.8928	-147.807
-131.3403	-3012	-602.0887	-210.5465	-3012	-590.2496	-244.3201
-59.4241	-3012	-824.7182	-294.6444	-3012	-823.785	-340.7561
14.7345	-2923	-1167	-265.2137	-2985	-996.0322	-436.8335
90.6139	-2618	-1495	-187.8692	-2775	-1115	-534.4858
152.7084	-2143	-1799	-140.8749	-2331	-1431	-512.4438
468.6418	-1609	-2036	12.0638	-1845	-1688	-410.7191
444.571	-1090	-2156	279.6538	-1353	-1815	-245.6309
384.7884	-815.4039	-2088	294.8224	-851.9041	-1815	-14.5757
322.5699	-599.9174	-1911	231.3935	-477.2113	-1641	99.9919
241.6702	-398.6032	-1651	163.771	-271.5946	-1445	40.8292
151.441	-227.6692	-1447	64.8729	-23.7343	-1129	-7.381
30.7619	158.8499	-762.0316	-11.5288	253.7872	-560.2045	-0.7911
85.564	477.9861	-86.0118	85.564	477.9861	-86.0118	85.564

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-3012	63.1072	-62.7787	-3012	63.1072	-62.7787	-3012
-3012	-246.3793	-166.9813	-3012	-222.6332	-192.5812	-2489
-3012	-579.2902	-284.1404	-3012	-653.1778	-367.8523	-1731
-3012	-826.891	-402.5689	-2939	-905.3963	-550.8807	-1587
-2932	-987.8377	-521.5688	-2606	-956.1463	-742.255	-1438
-2678	-1074	-653.3679	-2220	-819.5059	-949.8143	-1282
-2356	-1100	-794.8187	-1826	-479.0202	-1148	-1116
-2021	-1045	-913.1033	-1501	-135.5467	-1285	-934.4876
-1628	-995.9242	-928.6502	-1306	4.272	-1321	-778.3808
-1131	-996.8167	-775.7085	-1114	170.9181	-1320	-694.4873
-664.2991	-926.3434	-551.8307	-921.7697	349.8438	-1280	-618.4295
-254.1637	-967.279	-262.3307	-680.0481	410.9801	-1128	-546.4991
86.3727	-812.5365	-74.1854	-276.2128	204.5392	-758.3291	-475.0905
310.3127	-440.0993	13.7653	246.6417	14.3162	-225.8527	-281.6135
477.9861	-86.0118	85.564	477.9861	-86.0118	85.564	477.9861

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
63.1072	-62.7787	-3012	63.1072	-62.7787	-3012	63.1072
117.6158	-848.7923	-3012	476.4098	-227.3515	-3012	503.6878
192.6356	-1230	-2987	1152.204	-481.0291	-3012	1172.6155
309.7324	-1280	-2494	1539.7934	-721.4654	-2695	1714.8739
427.4933	-1314	-1993	1599.6375	-941.2665	-2299	2097.4345
545.5735	-1333	-1411	1306.6686	-1164	-2019	2087.6652
6.65E+02	-1339	-1095	1097.8737	-1250	-1649	1900.5609
7.85E+02	-1334	-955.2929	1091.91	-1259	-1237	1568.7783
9.19E+02	-1291	-809.0454	1070.3283	-1248	-864.0851	1180.3258
9.50E+02	-1250	-664.1501	1021.332	-1210	-679.1425	1095.8723
9.65E+02	-1202	-547.5281	964.6071	-1137	-510.5883	989.5049
964.0068	-1142	-447.5991	922.9103	-1030	-337.8296	913.2249
925.5396	-1065	-274.9759	894.5791	-854.9969	-103.9702	819.306
765.6997	-872.3392	150.794	504.6992	-362.6029	210.6778	422.1646
-86.0118	85.564	477.9861	-86.0118	85.564	477.9861	-86.0118

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-62.7787	-3012	63.1072	-62.7787	-3012	63.1072	-62.7787
-197.4704	-3012	574.9726	-190.9226	-3012	693.5199	-196.1668
-381.6151	-3012	1311.6911	-335.7152	-2976	1575.6284	-270.107
-523.0557	-2689	1923.0346	-402.0129	-2746	1900.6724	-351.439
-625.2281	-2459	2100.5127	-517.0943	-2555	2074.9883	-452.1158
-773.3883	-2232	2173.3417	-637.6034	-2358	2186.9942	-553.7639
-954.8963	-1996	2162.0789	-759.3038	-2151	2238.4283	-656.4311
-1116	-1612	2018.2501	-917.2369	-1900	2221.0572	-772.3553
-1208	-1203	1761.6321	-1010	-1451	2039.8612	-878.3173
-1152	-801.8055	1366.1469	-1031	-1007	1741.075	-827.5628
-1051	-467.6707	1019.8579	-931.3985	-599.6318	1367.8078	-703.5289
-910.6984	-272.6969	940.5884	-789.7416	-259.2914	993.1982	-673.8714
-673.7688	-22.7059	760.9409	-584.0765	0.1289	760.1338	-510.1247
-277.8449	231.7635	389.2922	-247.8397	244.1851	368.8171	-230.104
85.564	477.9861	-86.0118	85.564	477.9861	-86.0118	85.564

Curve 24	345. degrees	
P	M3	M2
-3012	63.1072	-62.7787
-3012	1017.8219	-184.9176
-2958	1636.6119	-229.9326
-2792	1860.5534	-317.3236
-2621	2037.6589	-404.8929
-2445	2169.1232	-492.6887
-2261	2257.2158	-580.6389
-2065	2305.3072	-669.0339
-1699	2206.6521	-780.772
-1094	1920.6413	-583.5238
-761.531	1654.2947	-491.6437
-418.202	1273.9856	-399.2822
-102.735	951.4527	-362.761
241.7003	377.7595	-209.6324
477.9861	-86.0118	85.564

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

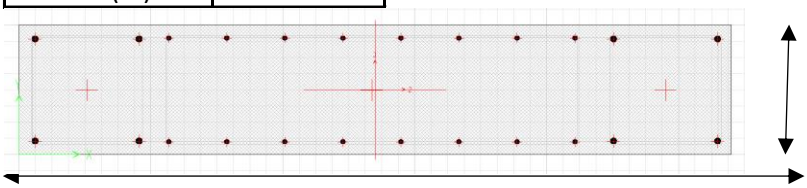
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 5) PISO 4-5

1. INGRESO DE DATOS GENERALES

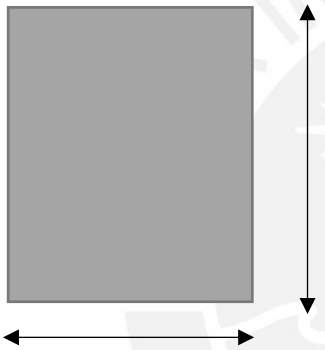
Lm (m)	1.35



t (m)

d (m) = 0.85xLm	1.15

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	1.35

hm/Lm	**9.8**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**28.07**	(Axial del etabs)
Mua (ton)	**23.60**	(Momento del etabs)
Mn (ton)	**23.60**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**17.86**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**17.86**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	21.63

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-4.43

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-108.79	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-154.48	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-280.68	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

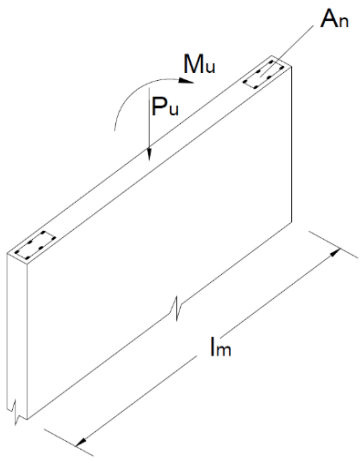
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	25.44	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 323.9 ton > Pu = 140.64 ton **OK!**

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	23.6
Long. (m)	1.35
F (ton)	17.5
Fy (kg/cm2)	4200
As (cm2)	4.16

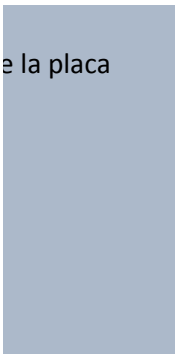
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
2	-501.0651	36.2559	-0.0251	-501.0651	28.8557	0.654
3	-501.0651	59.3144	-0.023	-501.0651	54.1495	0.6645
4	-474.9604	78.2633	-0.0211	-482.9472	74.9347	0.6646
5	-429.1549	93.9718	-0.0181	-435.1115	91.9411	0.6913
6	-382.4474	106.1264	-0.0145	-386.0709	104.9906	0.7049
7	-333.8233	114.9718	-9.84E-03	-335.3641	114.2418	0.7503
8	-282.9662	120.7264	-3.81E-03	-281.9572	119.8742	0.7971
9	-234.6303	120.6369	1.48E-03	-231.1677	119.5959	0.8201
10	-189.2455	114.3604	5.00E-03	-183.1296	112.7975	0.7614
11	-143.3014	103.3921	8.86E-03	-135.1898	100.7304	0.7887
12	-96.6485	87.7295	0.0131	-86.3577	83.5179	0.8124
13	-51.7485	72.0157	0.02	-39.5902	68.4036	1.0281
14	7.1151	50.9337	0.0348	27.5199	38.4464	1.2478
15	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P5	LIVE	Top	-2.14	0.4	0
PISO4	P5	LIVE	Bottom	-2.14	0.4	0
PISO4	P5	DEAD-SQ	Top	-15.08	0.94	0
PISO4	P5	DEAD-SQ	Bottom	-15.08	0.94	0
PISO4	P5	RX MAX	Top	5.93	15.71	0.01
PISO4	P5	RX MAX	Bottom	5.93	15.71	0.01
PISO4	P5	RX MIN	Top	-5.93	-15.71	-0.01
PISO4	P5	RX MIN	Bottom	-5.93	-15.71	-0.01
PISO4	P5	RY MAX	Top	5.78	6.11	0.02
PISO4	P5	RY MAX	Bottom	5.78	6.11	0.02
PISO4	P5	RY MIN	Top	-5.78	-6.11	-0.02
PISO4	P5	RY MIN	Bottom	-5.78	-6.11	-0.02

1.4CM+1.7CV	24.75	Tn	
1.25(CM+CV)	21.53	Tn	

CM	M22	0.00	Tn.m
	M33	-0.36	Tn.m
CV	M22	0.00	Tn.m
	M33	0.44	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	24.75	0.00	0.25
1.25(CM+CV)+CS	27.46	-0.02	21.75
1.25(CM+CV)-CS	15.60	0.01	-21.54
0.9CM+CS	19.50	-0.02	21.32
0.9CM-CS	7.64	0.02	-21.25

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	501.1	0.0	501.1	0.0
2	501.1	36.3	501.1	-36.3
3	501.1	59.3	501.1	-59.3
4	475.0	78.3	475.3	-78.3
5	429.2	94.0	429.9	-93.9
6	382.4	106.1	383.2	-106.1
7	333.8	115.0	335.1	-115.0
8	283.0	120.7	284.5	-120.8
9	234.6	120.6	236.0	-120.7
10	189.2	114.4	190.5	-114.4
11	143.3	103.4	144.3	-103.5
12	96.6	87.7	97.1	-87.7
13	51.7	72.0	52.0	-71.9
14	-7.1	50.9	-6.9	-50.9
15	-87.3	0.0	-87.3	0.0

PUNTO
1
2
3
4
5
6
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11
12
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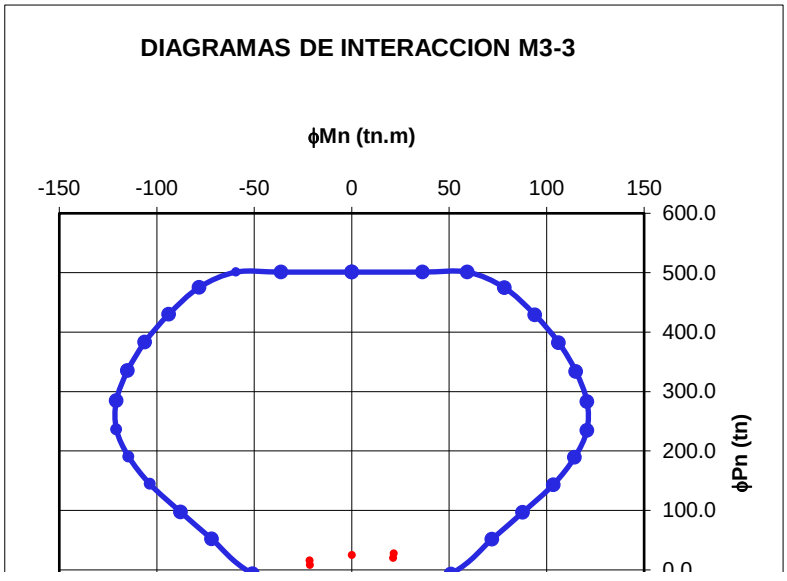
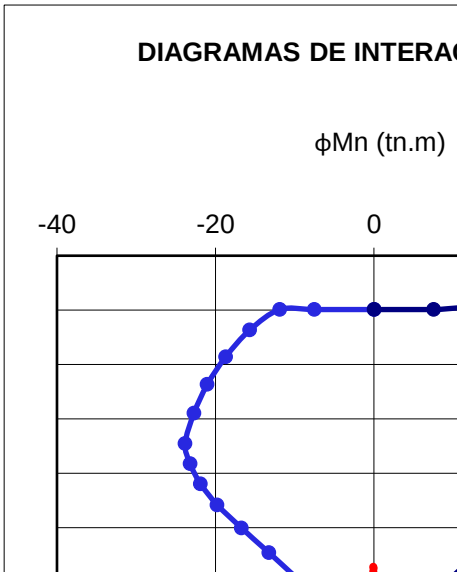
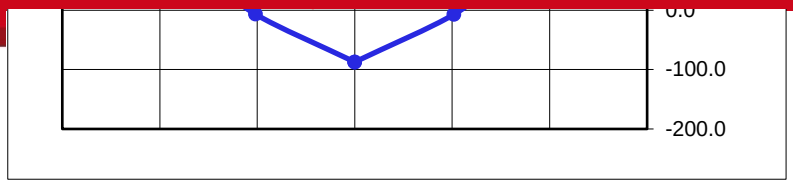
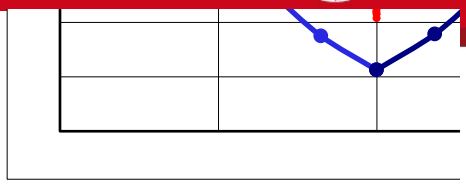
14
15

SISMO EN XX

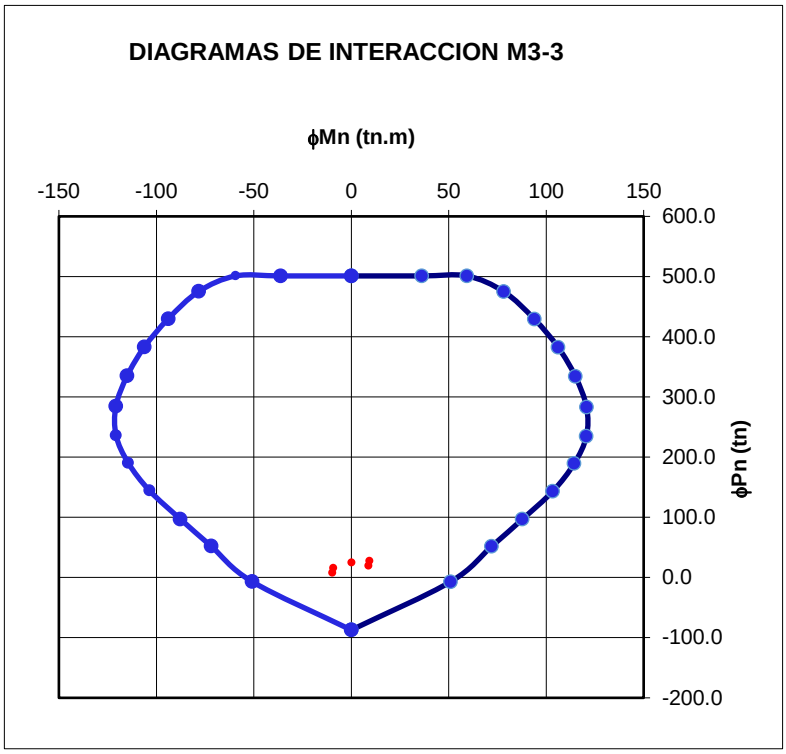


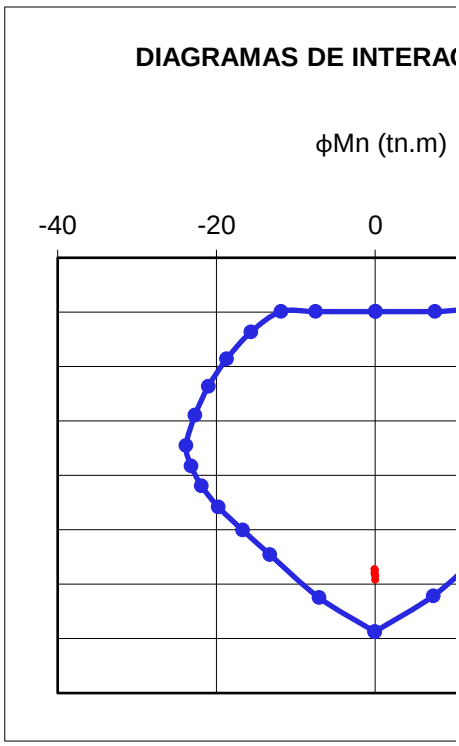






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	21.1708	1.2087	-501.0651	17.0066	1.2501	-501.0651
-501.0651	47.763	1.4467	-501.0651	38.6179	2.4479	-501.0651
-491.8915	70.8783	1.4251	-501.0651	64.5368	2.5022	-501.0651
-441.814	89.3385	1.5057	-450.5171	85.3365	2.6065	-464.999
-390.2367	103.4599	1.5405	-395.3169	100.8473	2.706	-403.8894
-336.7056	113.1029	1.6441	-338.4241	111.2489	2.8319	-340.615
-280.6052	118.6455	1.738	-278.7156	116.7536	2.9843	-274.6473
-227.2736	118.1966	1.7333	-222.0463	115.9821	2.9389	-212.3826
-176.3059	110.7938	1.6292	-166.5774	107.2523	2.8488	-150.6532
-126.0342	97.3961	1.6611	-112.7351	91.5806	2.9195	-90.3168
-73.9138	77.8027	1.7616	-58.9698	71.649	3.2158	-35.089
-22.2618	61.8682	2.4732	2.1036	50.7106	4.3278	22.3846
48.444	25.0405	2.2823	60.7131	17.1163	2.5065	65.7286
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

T	M2	M3
-0.007	0	-0.624
-0.007	0	0.442
-0.007	-0.004	-2.854
-0.007	-0.001	-0.359
0.262	0.008	20.144
0.262	0.016	21.648
-0.262	-0.008	-20.144
-0.262	-0.016	-21.648
0.622	0.028	7.034
0.622	0.049	9.247
-0.622	-0.028	-7.034
-0.622	-0.049	-9.247

P	5.93	Tn
M22	-0.02	Tn.m
M33	21.65	Tn.m

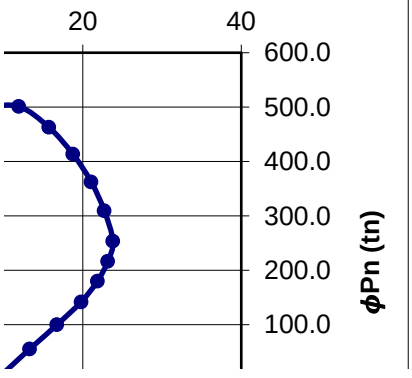
P	5.78	Tn
M22	-0.05	Tn.m
M33	9.25	Tn.m

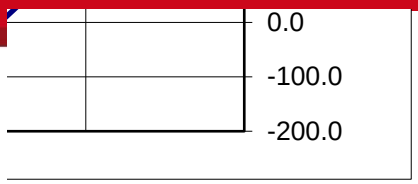
COMBINACIONES SISMO EN Y		
P	M22	M33

24.75	0.00	0.25
27.31	-0.05	9.35
15.75	0.05	-9.14
19.35	-0.05	8.92
7.79	0.05	-9.57

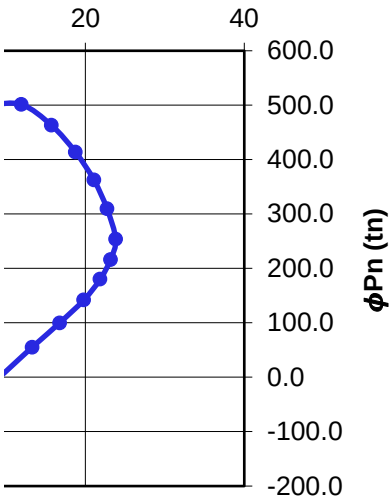
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
501.1	0.0	501.1	0.0
501.1	-7.5	501.1	7.5
501.1	-11.9	501.1	11.9
463.4	-15.7	463.0	15.7
414.1	-18.7	413.5	18.7
363.4	-21.0	362.6	21.1
310.7	-22.7	309.6	22.7
254.9	-23.8	253.5	23.8
217.5	-23.2	216.3	23.2
180.9	-21.9	179.9	21.8
142.0	-19.8	141.9	19.8
99.5	-16.7	99.9	16.7
54.3	-13.3	55.2	13.3
-24.7	-7.1	-21.4	7.3
-87.3	-0.1	-87.3	-0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
14.2218	1.2822	-501.0651	10.9132	1.6502	-501.0651	-8.51E-03
29.8791	3.0202	-501.0651	22.3597	3.5276	-501.0651	-7.96E-03
52.4622	4.2652	-501.0651	38.4485	5.8895	-463.4303	-6.74E-03
77.1743	4.4747	-489.4628	56.9082	8.1225	-414.1311	-5.23E-03
95.577	4.6459	-423.6377	75.5563	9.6274	-363.4199	-3.34E-03
107.1772	4.8563	-345.1685	90.7624	10.1347	-310.6783	-8.95E-04
112.316	5.125	-262.7488	95.3367	10.6082	-254.8649	2.38E-03
109.8546	5.1702	-187.9878	88.039	10.7715	-217.4846	4.74E-04
99.2547	5.0067	-117.3827	74.0722	10.0189	-180.9165	4.74E-04
80.0262	5.0732	-57.7408	60.0566	8.7251	-142.0308	-2.65E-03
62.1378	5.8106	-8.8672	48.3794	8.1308	-99.5254	-2.41E-03
37.9094	5.0813	34.3692	29.7472	5.1922	-54.3294	-2.07E-03
13.869	2.1797	70.3982	10.8044	1.7844	24.6668	-1.32E-03
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
7.4991	-501.0651	-10.9369	1.6459	-501.0651	-14.2586	1.2758
11.8727	-501.0651	-22.3422	3.5189	-501.0651	-29.8422	3.0093
15.66	-501.0651	-38.3833	5.8754	-501.0651	-52.333	4.2603
18.6968	-489.9539	-56.7987	8.107	-465.5931	-77.0381	4.4855
21.0215	-424.7488	-75.206	9.6524	-404.7647	-95.4333	4.6461
22.6953	-346.1947	-90.6786	10.1329	-341.6875	-107.0948	4.8561
23.8208	-263.9925	-95.3878	10.6044	-275.9938	-112.3404	5.1272
23.1937	-189.1241	-88.2142	10.7752	-213.6173	-109.9326	5.1688
21.8928	-118.1117	-74.2103	10.0254	-151.6983	-99.3861	5.0192
19.7729	-58.236	-59.9603	8.7443	-91.1681	-80.157	5.091
16.7048	-9.269	-48.3418	8.164	-35.6367	-62.0666	5.834
13.2562	34.2179	-29.637	5.2061	22.2875	-37.798	5.1089
7.0766	70.6341	-10.5612	1.7619	66.0187	-13.5802	2.1513
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	-17.0357	1.2435	-501.0651	-21.1793	1.2031	-501.0651
-501.0651	-38.5487	2.443	-501.0651	-47.6871	1.4465	-501.0651
-501.0651	-64.4184	2.4992	-492.4542	-70.7673	1.4248	-483.5181
-451.2466	-85.1992	2.6055	-442.5845	-89.2312	1.5021	-435.8613
-396.2356	-100.7363	2.7045	-391.1707	-103.3592	1.5393	-387.051
-339.3171	-111.2122	2.8297	-337.86	-113.049	1.6428	-336.5946
-280.135	-116.7834	2.985	-282.0538	-118.6698	1.7398	-283.4299
-223.3239	-116.0251	2.9398	-228.6243	-118.2518	1.7307	-232.543
-167.7411	-107.3164	2.8589	-177.4733	-110.9008	1.6276	-184.3165
-113.5185	-91.6795	2.9323	-126.7962	-97.4247	1.6786	-136.1578
-59.3595	-71.5432	3.227	-74.5173	-77.8328	1.7695	-86.948
1.9161	-50.6227	4.3521	-22.3097	-61.6838	2.5078	-39.7733
61.0136	-16.8151	2.4753	49.0969	-24.487	2.2841	28.0442
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
-28.8514	0.6537	-501.0651	-36.2596	-2.52E-02	-501.0651	-28.8531
-54.0846	0.6644	-501.0651	-59.2594	-2.31E-02	-501.0651	-54.0903
-74.8341	0.6644	-475.3027	-78.2645	-2.10E-02	-483.5006	-74.8417
-91.8339	0.691	-429.9148	-93.8744	-1.82E-02	-435.8338	-91.8417
-104.9145	0.7008	-383.1671	-106.0896	-1.45E-02	-387.0138	-104.9211
-114.2162	0.7483	-335.0874	-114.9573	-0.0101	-336.546	-114.2195
-119.8942	0.7999	-284.5045	-120.7641	-4.14E-03	-283.3721	-119.8947
-119.6407	0.8182	-236.02	-120.6757	1.16E-03	-232.499	-119.6376
-112.8939	0.7604	-190.4506	-114.4488	4.70E-03	-184.2834	-112.8884
-100.8417	0.7878	-144.283	-103.4956	8.61E-03	-136.1367	-100.8358
-83.5545	0.7997	-97.1275	-87.7124	0.0131	-86.9396	-83.5507
-68.223	1.0441	-52.0452	-71.8872	0.0199	-39.7901	-68.228
-37.9445	1.2602	6.9339	-50.8576	0.0348	27.9989	-37.974
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
-0.7048	-501.0651	-21.1805	-1.255	-501.0651	-17.0322	-1.2969
-0.7114	-501.0651	-47.7008	-1.4944	-501.0651	-38.5733	-2.4917
-0.7075	-492.4154	-70.7854	-1.4684	-501.0651	-64.4545	-2.5437
-0.7284	-442.5257	-89.2501	-1.5402	-451.1491	-85.2384	-2.6436
-0.7309	-391.0941	-103.3763	-1.5698	-396.1002	-100.768	-2.7353
-0.7693	-337.7596	-113.0587	-1.6638	-339.1408	-111.2292	-2.8508
-0.8084	-281.9285	-118.6697	-1.7486	-279.916	-116.7807	-2.9942
-0.8157	-228.5281	-118.2433	-1.7282	-223.1651	-116.0134	-2.9364
-0.7497	-177.4	-110.8868	-1.6158	-167.6247	-107.295	-2.8441
-0.769	-126.759	-97.4164	-1.6571	-113.444	-91.6583	-2.9079
-0.7717	-74.5105	-77.8313	-1.7372	-59.3392	-71.539	-3.1894
-0.9969	-22.3448	-61.6934	-2.4497	1.8997	-50.6279	-4.2865
-1.1842	49.001	-24.5491	-2.2008	60.9371	-16.8648	-2.3943
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651
-501.0651	-14.2536	-1.3298	-501.0651	-10.9329	-1.6986	-501.0651
-501.0651	-29.8671	-3.0611	-501.0651	-22.3739	-3.5733	-501.0651
-501.0651	-52.3996	-4.3061	-501.0651	-38.4591	-5.9292	-463.0445
-465.4165	-77.1152	-4.5236	-489.6943	-56.9146	-8.1552	-413.5376
-404.5345	-95.5019	-4.6761	-423.9369	-75.5633	-9.6548	-362.605
-341.3885	-107.1333	-4.8763	-345.5153	-90.7656	-10.1519	-309.6169
-275.6231	-112.3377	-5.1353	-263.153	-95.3393	-10.6116	-253.5091
-213.3347	-109.8965	-5.1652	-188.4446	-88.0577	-10.7712	-216.3187
-151.4878	-99.3297	-5.0029	-117.7345	-74.0812	-9.9995	-179.9449
-91.0276	-80.1004	-5.0628	-58.0882	-59.9324	-8.7019	-141.9381
-35.6081	-62.0493	-5.7836	-9.2149	-48.32	-8.0971	-99.8551
22.2296	-37.8249	-5.0353	34.0164	-29.7328	-5.1535	-55.1501
65.8906	-13.6632	-2.0736	70.4093	-10.707	-1.6906	21.3964
87.3056	0.0215	0.0524	87.3056	0.0215	0.0524	87.3056

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0158	-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158
-8.56E-03	-7.5463	-501.0651	10.9093	-1.7028	-501.0651	14.2128
-8.01E-03	-11.9307	-501.0651	22.3914	-3.5819	-501.0651	29.904
-6.78E-03	-15.7184	-501.0651	38.5242	-5.9433	-501.0651	52.5287
-5.27E-03	-18.7476	-489.2024	57.024	-8.1706	-464.8225	77.251
-3.37E-03	-21.0569	-423.1578	75.6974	-9.6616	-403.6475	95.6375
-9.14E-04	-22.7076	-344.489	90.8475	-10.1535	-340.316	107.2149
2.39E-03	-23.8034	-261.909	95.2858	-10.6152	-274.2763	112.3121
4.74E-04	-23.1591	-187.3097	87.8817	-10.7669	-212.0824	109.8098
4.74E-04	-21.8478	-116.8883	73.9436	-9.9809	-150.4425	99.1977
-2.83E-03	-19.7886	-57.5926	60.0282	-8.6821	-90.1762	79.9692
-2.66E-03	-16.7381	-8.8137	48.3575	-8.0636	-35.0608	62.1206
-2.46E-03	-13.28	34.1668	29.8437	-5.1396	22.3259	37.9371
-2.29E-03	-7.3106	70.1722	10.9522	-1.7136	65.5996	13.9532
0.0215	0.0524	87.3056	0.0215	0.0524	87.3056	0.0215

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.0384	-501.0651	-0.0158	-0.0384	-501.0651	-0.0158	-0.0384
-1.3369	-501.0651	17.003	-1.3035	-501.0651	21.1719	-1.2605
-3.0719	-501.0651	38.6429	-2.4966	-501.0651	47.7766	-1.4944
-4.3107	-501.0651	64.5727	-2.5465	-491.8527	70.8964	-1.4685
-4.5128	-450.4196	85.3754	-2.6444	-441.7551	89.3572	-1.5436
-4.6768	-395.1814	100.8786	-2.7365	-390.1601	103.4767	-1.5707
-4.8762	-338.2478	111.2653	-2.8529	-336.607	113.113	-1.6649
-5.1326	-278.4964	116.7502	-2.993	-280.4797	118.645	-1.7462
-5.1645	-221.8872	115.97	-2.935	-227.1773	118.1878	-1.7302
-4.9899	-166.4609	107.2306	-2.8334	-176.2324	110.7795	-1.6168
-5.0446	-112.3273	91.4082	-2.9269	-125.997	97.3877	-1.6394
-5.7598	-58.9496	71.6448	-3.178	-73.9072	77.8011	-1.729
-5.0079	2.0866	50.7165	-4.2623	-22.2904	61.8766	-2.4162
-2.1024	60.6359	17.1668	-2.4259	48.3473	25.1036	-2.1999
0.0524	87.3056	0.0215	0.0524	87.3056	0.0215	0.0524

Curve 24	345. degrees	
P	M3	M2
-501.0651	-0.0158	-0.0384
-501.0651	28.8574	-0.7051
-501.0651	54.1551	-0.7114
-482.9297	74.9423	-0.7075
-435.084	91.9489	-0.7284
-386.0337	104.997	-0.7347
-335.3164	114.2453	-0.771
-281.8993	119.8745	-0.805
-231.1237	119.5927	-0.817
-183.0964	112.7919	-0.7501
-135.1686	100.7244	-0.7695
-86.3493	83.5141	-0.7842
-39.6072	68.4086	-0.981
27.5039	38.4572	-1.1699
87.3056	0.0215	0.0524

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

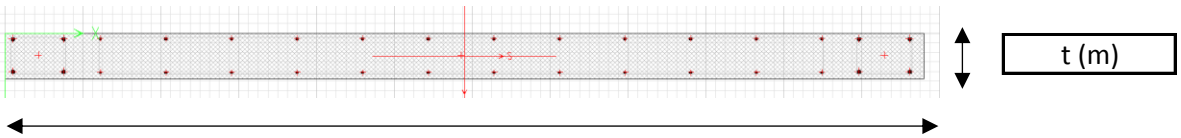
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 6)

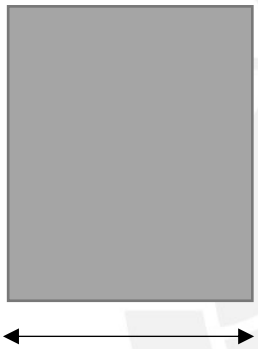
1. INGRESO DE DATOS GENERALES

Lm (m)	2.95



d (m) = 0.85xLm	2.51

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	2.95

hm/Lm	4.5

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**33.90**	(Axial del etabs)
Mua (ton)	**21.64**	(Momento del etabs)
Mn (ton)	**21.64**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**15.02**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**15.02**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	28.35

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-15.69

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-67.14	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-95.34	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-173.22	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

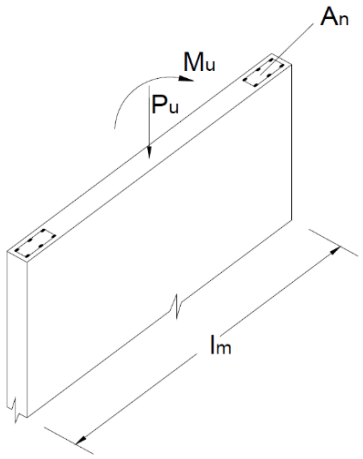
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	32.76	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 331.6 ton > Pu = 32.76 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	21.64
Long. (m)	2.95
F (ton)	7.3
Fy (kg/cm2)	4200
As (cm2)	1.75

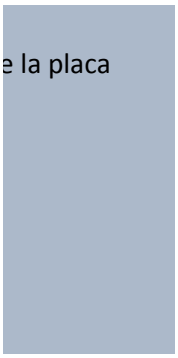
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676
2	-653.6117	103.6362	-0.1079	-653.6117	98.3739	0.0173
3	-653.6117	168.9307	-0.0993	-653.6117	164.9777	0.0439
4	-621.3031	223.9254	-0.0887	-624.1366	221.3533	0.0579
5	-562.2333	269.0229	-0.0754	-564.264	267.4947	0.0734
6	-501.9859	304.2544	-0.0596	-503.2117	303.424	0.0918
7	-439.7928	330.3516	-0.0397	-440.1738	329.8432	0.1171
8	-374.5603	347.9168	-0.0134	-374.1132	347.4104	0.1486
9	-313.3202	346.918	4.78E-03	-311.9472	346.5136	0.1537
10	-253.7566	331.1534	1.94E-02	-251.7085	330.2197	0.1691
11	-194.4797	302.2624	0.0334	-191.6472	300.3988	0.1844
12	-134.515	259.8522	0.0489	-131.0316	256.8574	0.1988
13	-76.3416	211.1351	0.0701	-72.453	208.8402	0.2536
14	-8.7999	158.7451	0.121	-1.9014	152.1146	0.3822
15	108.7662	1.1308	0.2285	108.7662	1.1308	0.2285

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P6	LIVE	Top	-2.06	0.04	-0.02
PISO4	P6	LIVE	Bottom	-2.06	0.04	-0.02
PISO4	P6	DEAD-SQ	Top	-18.61	-0.74	-0.03
PISO4	P6	DEAD-SQ	Bottom	-18.61	-0.74	-0.03
PISO4	P6	RX MAX	Top	5.2	9.82	0.31
PISO4	P6	RX MAX	Bottom	5.2	9.82	0.31
PISO4	P6	RX MIN	Top	-5.2	-9.82	-0.31
PISO4	P6	RX MIN	Bottom	-5.2	-9.82	-0.31
PISO4	P6	RY MAX	Top	2.14	2.81	0.29
PISO4	P6	RY MAX	Bottom	2.14	2.81	0.29
PISO4	P6	RY MIN	Top	-2.14	-2.81	-0.29
PISO4	P6	RY MIN	Bottom	-2.14	-2.81	-0.29

1.4CM+1.7CV	29.56	Tn	
1.25(CM+CV)	25.84	Tn	

CM	M22	-0.03	Tn.m
	M33	-4.52	Tn.m
CV	M22	-0.02	Tn.m
	M33	-0.35	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	29.56	-0.07	-6.93
1.25(CM+CV)+CS	31.04	-0.44	10.01
1.25(CM+CV)-CS	20.64	0.33	-22.20
0.9CM+CS	21.95	-0.41	12.03
0.9CM-CS	11.55	0.36	-16.42

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	653.6	-0.8	653.6	-0.8
2	653.6	103.6	653.6	-104.8
3	653.6	168.9	653.6	-170.3
4	621.3	223.9	620.7	-225.4
5	562.2	269.0	561.2	-270.4
6	502.0	304.3	500.6	-305.4
7	439.8	330.4	437.9	-331.0
8	374.6	347.9	372.3	-348.1
9	313.3	346.9	311.4	-346.5
10	253.8	331.2	252.3	-330.3
11	194.5	302.3	193.5	-301.3
12	134.5	259.9	133.9	-258.8
13	76.3	211.1	76.6	-210.7
14	8.8	158.7	10.6	-159.2
15	-108.8	1.1	-108.8	1.1

PUNTO
1
2
3
4
5
6
7
8
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11
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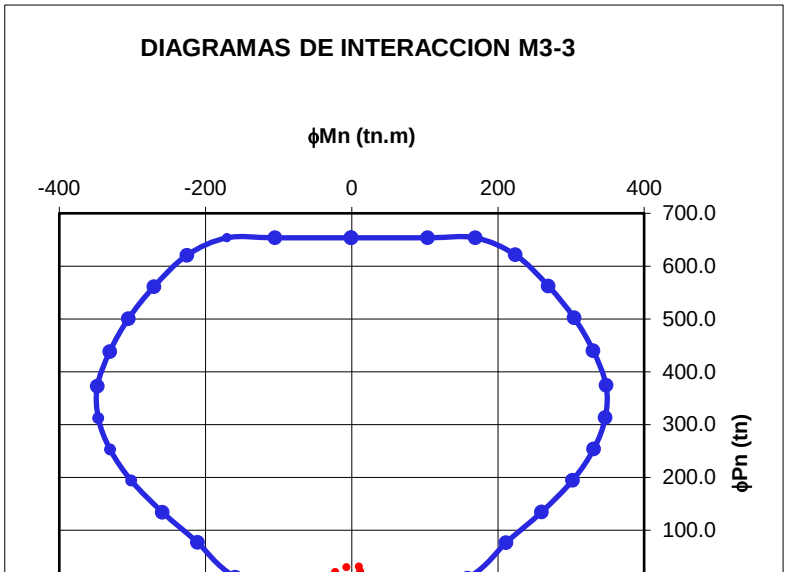
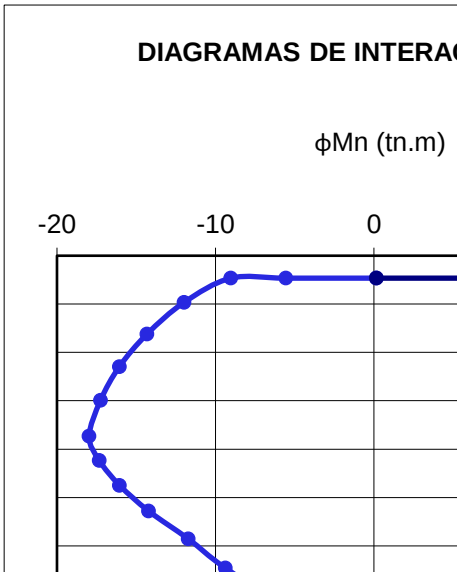
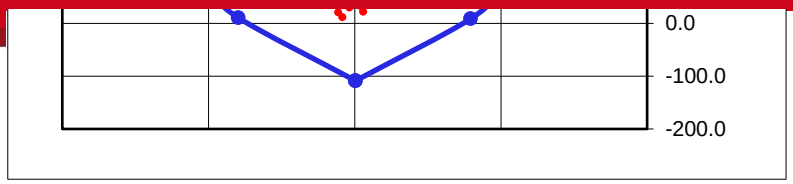
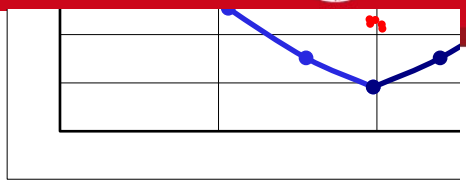
14
15

SISMO EN XX

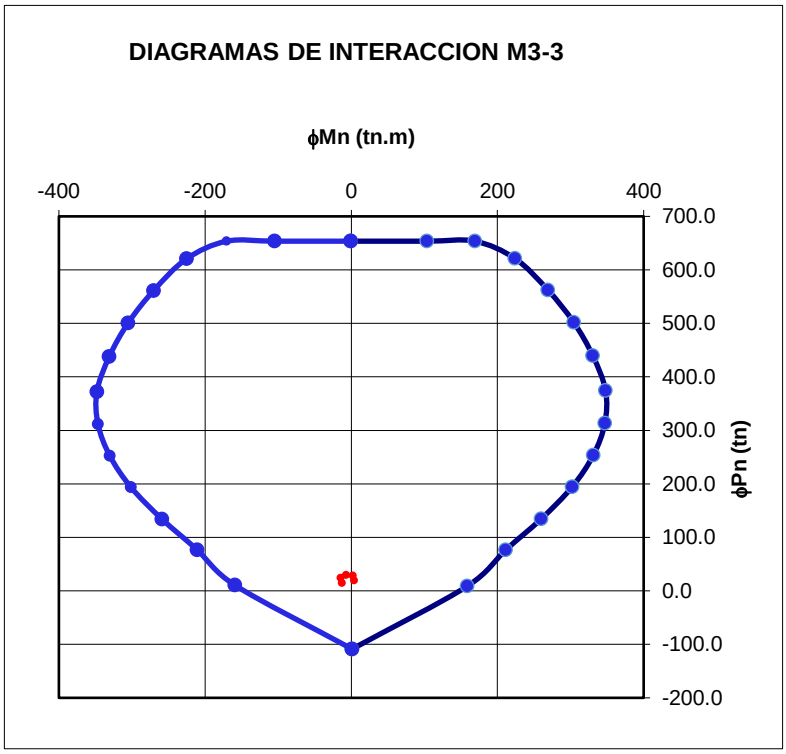


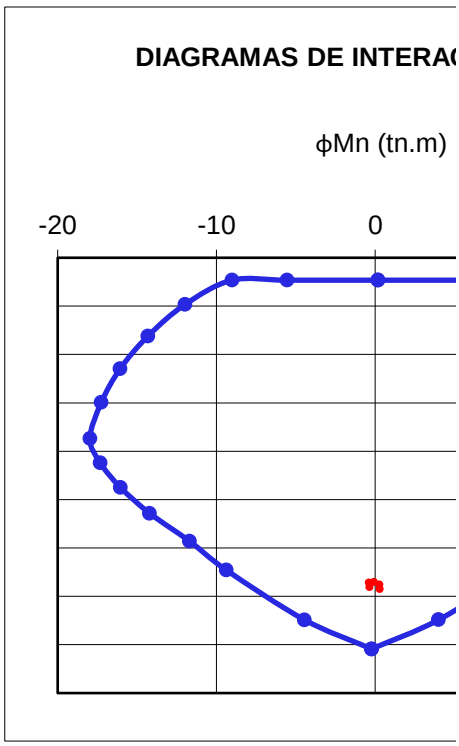






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117
-653.6117	91.6822	0.1805	-653.6117	82.3329	0.4025	-653.6117
-653.6117	160.311	0.21	-653.6117	153.7807	0.4361	-653.6117
-627.2825	218.4236	0.2203	-631.7282	214.1686	0.4495	-639.3953
-566.6007	265.6847	0.2445	-569.7794	263.1324	0.477	-575.364
-504.6191	302.4311	0.2659	-506.5054	300.9955	0.5037	-509.6868
-440.5997	329.2217	0.2977	-441.1704	328.3231	0.5427	-442.0121
-373.4724	346.7969	0.3283	-372.7483	345.904	0.5805	-371.4677
-310.3643	345.9997	0.3249	-308.3243	345.2493	0.5509	-304.5218
-249.3339	329.0688	0.3419	-246.0406	327.2648	0.5802	-240.3937
-188.3852	298.1797	0.358	-183.8422	294.9033	0.5994	-175.5102
-126.553	252.7807	0.3967	-120.5492	247.1122	0.6605	-110.103
-67.8003	205.8827	0.4708	-61.0631	201.1579	0.783	-47.3768
8.6989	138.8125	0.7669	22.6631	120.1683	1.2619	44.9729
108.7662	1.1308	0.2285	108.7662	1.1308	0.2285	108.7662

T	M2	M3
-0.017	0.024	-0.465
-0.017	-0.019	-0.352
0.013	0.056	-2.566
0.013	-0.026	-4.524
0.336	0.432	16.898
0.336	0.386	16.102
-0.336	-0.432	-16.898
-0.336	-0.386	-16.102
0.344	0.503	3.908
0.344	0.326	8.255
-0.344	-0.503	-3.908
-0.344	-0.326	-8.255

P	5.20	Tn
M22	-0.39	Tn.m
M33	16.10	Tn.m

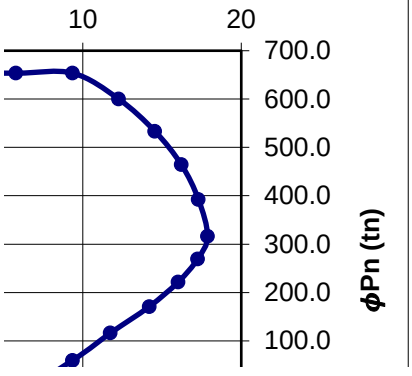
P	2.14	Tn
M22	-0.33	Tn.m
M33	8.26	Tn.m

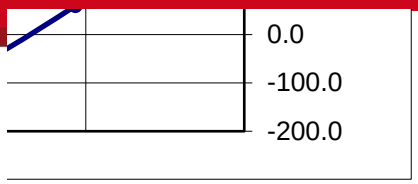
COMBINACIONES SISMO EN Y		
P	M22	M33

29.56	-0.07	-6.93
27.98	-0.38	2.16
23.70	0.27	-14.35
18.89	-0.35	4.18
14.61	0.30	-12.33

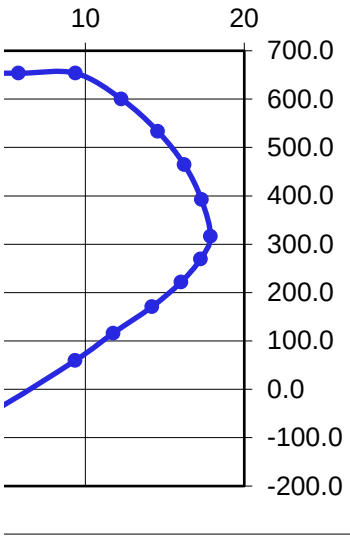
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
653.6	0.2	653.6	0.2
653.6	-5.6	653.6	5.8
653.6	-9.0	653.6	9.4
603.4	-12.0	600.4	12.3
538.0	-14.3	533.4	14.6
470.7	-16.1	464.5	16.2
400.8	-17.3	392.7	17.3
326.6	-18.0	316.4	17.9
276.2	-17.3	269.4	17.3
225.1	-16.0	221.5	16.0
171.7	-14.2	170.7	14.2
114.1	-11.7	116.2	11.7
54.1	-9.4	59.6	9.3
-48.6	-4.5	-48.4	4.0
-108.8	-0.2	-108.8	-0.2

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297
66.5853	0.7442	-653.6117	49.2759	0.8426	-653.6117	-0.5155
142.1853	0.8189	-653.6117	108.5273	1.8156	-653.6117	-4.92E-01
206.492	0.8438	-653.6117	183.5406	1.9032	-603.4261	-4.33E-01
258.4162	0.8701	-589.8068	244.1969	1.9497	-537.9832	-0.3609
298.2977	0.9151	-518.2123	289.8621	2.0056	-470.7118	-0.2696
326.6625	0.9569	-444.4682	320.9361	2.0832	-400.7812	-1.51E-01
344.2088	1.0131	-367.2955	337.9406	2.1986	-326.5702	1.28E-02
343.5139	0.9589	-293.906	335.6196	2.1298	-276.2157	4.89E-02
323.8406	0.9873	-223.2263	310.5741	2.1832	-225.0616	9.39E-02
288.2734	1.0416	-152.3468	266.5644	2.2894	-171.7431	1.61E-01
236.6723	1.1187	-81.7077	207.2294	2.4634	-114.0959	0.2736
190.161	1.4316	-7.6655	151.896	3.1675	-54.0978	0.5333
89.5374	1.9796	70.5787	53.634	2.1939	48.562	1.1308
1.1308	0.2285	108.7662	1.1308	0.2285	108.7662	1.1308

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676
5.5506	-653.6117	-50.308	0.8478	-653.6117	-68.2128	0.763
9.0196	-653.6117	-110.0865	1.8179	-653.6117	-143.7096	0.8171
11.9798	-653.6117	-185.284	1.9007	-638.7266	-208.0972	0.843
14.3168	-588.7501	-245.8283	1.9484	-574.206	-259.9826	0.8761
16.0593	-516.7657	-291.1675	2.0047	-508.2693	-299.514	0.9135
17.2535	-442.5098	-321.7364	2.0883	-440.1711	-327.401	0.9556
17.9687	-365.0859	-338.1163	2.1956	-369.1773	-344.3201	1.0139
17.3237	-292.1026	-335.0659	2.1261	-302.6498	-342.9985	0.9576
16.0436	-221.9134	-309.7179	2.1726	-238.8741	-322.9398	0.9883
14.2064	-151.3871	-265.4557	2.2734	-174.6016	-287.3118	1.034
11.7011	-81.5582	-206.5223	2.4594	-109.8203	-235.9636	1.1002
9.3701	-8.184	-151.1662	3.1463	-47.9366	-189.7707	1.4103
4.4571	69.0628	-53.8298	2.2721	42.5407	-91.1689	1.9615
0.2285	108.7662	1.1308	0.2285	108.7662	1.1308	0.2285

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117
-653.6117	-83.9738	0.4197	-653.6117	-92.8765	0.1796	-653.6117
-653.6117	-155.3941	0.4279	-653.6117	-161.7596	0.208	-653.6117
-631.0756	-215.7229	0.4487	-626.6382	-219.9471	0.2194	-623.3805
-568.7469	-264.5762	0.4763	-565.5758	-267.1001	0.2437	-563.2448
-505.0982	-302.1767	0.5019	-503.1955	-303.5712	0.2653	-501.793
-439.3383	-329.0505	0.541	-438.7729	-329.941	0.2957	-438.3509
-370.463	-346.0316	0.5808	-371.1901	-346.934	0.3282	-371.7148
-306.3033	-344.7083	0.5576	-308.4678	-345.5147	0.3246	-310.0556
-244.5683	-326.3799	0.5785	-247.8554	-328.1716	0.3408	-250.222
-182.9106	-293.9716	0.5936	-187.3633	-297.1603	0.3574	-190.6333
-120.0956	-246.2197	0.6519	-126.1688	-251.966	0.3847	-130.4008
-61.5495	-200.8243	0.7668	-68.0853	-205.3932	0.4686	-72.7445
20.8649	-121.1096	1.2094	6.5321	-140.315	0.6959	-3.3736
108.7662	1.1308	0.2285	108.7662	1.1308	0.2285	108.7662

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297
-99.5501	0.0164	-653.6117	-104.8032	-1.09E-01	-653.6117	-99.5563
-166.3926	0.043	-653.6117	-170.3261	-1.00E-01	-653.6117	-166.4163
-222.9579	0.0507	-620.6708	-225.4086	-8.97E-02	-623.3446	-222.992
-268.8891	0.0725	-561.2193	-270.3989	-7.63E-02	-563.1878	-268.9244
-304.548	0.0911	-500.5714	-305.3644	-6.05E-02	-501.7139	-304.5769
-330.5565	0.115	-437.9456	-331.0351	-0.0404	-438.2493	-330.5734
-347.5559	0.1419	-372.2821	-348.0697	-0.014	-371.5878	-347.5557
-346.0455	0.1532	-311.4329	-346.4647	4.12E-03	-309.9499	-346.0219
-329.3286	0.1685	-252.2753	-330.2813	0.0187	-250.1387	-329.2898
-299.4091	0.1836	-193.4594	-301.283	0.0325	-190.573	-299.3689
-255.8021	0.2008	-133.9403	-258.8373	0.0478	-130.3672	-255.7711
-208.4002	0.2512	-76.6378	-210.7365	0.0676	-72.7599	-208.4164
-152.2582	0.3487	-10.5567	-159.1875	0.1158	-3.4702	-152.3498
1.1308	0.2285	108.7662	1.1308	0.2285	108.7662	1.1308

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676
-0.2336	-653.6117	-93.3137	-0.4146	-653.6117	-84.0028	-0.6383
-0.2445	-653.6117	-161.8138	-0.4106	-653.6117	-155.4924	-0.6314
-0.2307	-626.5601	-220.0226	-0.4006	-630.9387	-215.8583	-0.6316
-0.2263	-565.4523	-267.1779	-0.3987	-568.5315	-264.7151	-0.633
-0.2131	-503.0245	-303.6345	-0.3886	-504.8008	-302.289	-0.627
-0.1968	-438.5535	-329.9774	-0.3786	-438.9574	-329.1136	-0.6254
-0.1704	-370.9161	-346.9321	-0.3577	-369.9879	-346.0247	-0.6119
-0.1446	-308.2396	-345.4619	-0.3156	-305.9068	-344.6125	-0.5482
-0.1306	-247.6752	-328.0858	-0.3023	-244.2604	-326.2376	-0.5386
-0.1173	-187.2391	-297.0787	-0.2899	-182.6932	-293.8238	-0.5243
-0.1036	-126.1204	-251.9287	-0.2839	-119.9983	-246.1435	-0.5464
-0.1096	-68.1178	-205.4267	-0.3195	-61.4954	-200.7977	-0.6154
-0.1066	6.2239	-140.7196	-0.4331	20.4045	-121.719	-0.924
0.2285	108.7662	1.1308	0.2285	108.7662	1.1308	0.2285

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117
-653.6117	-68.2572	-0.9831	-653.6117	-50.2546	-1.0777	-653.6117
-653.6117	-143.8932	-1.0228	-653.6117	-110.9687	-2.0129	-653.6117
-638.4778	-208.3418	-1.0281	-653.6117	-185.9045	-2.0903	-600.4276
-573.8287	-260.2354	-1.0356	-587.9286	-246.457	-2.1134	-533.4125
-507.7584	-299.7233	-1.0407	-515.6436	-291.6634	-2.1379	-464.4669
-439.5084	-327.5107	-1.0419	-441.0832	-321.9958	-2.1796	-392.6704
-368.3528	-344.2977	-1.0476	-363.3728	-338.1009	-2.2309	-316.4067
-301.9734	-342.8307	-0.9475	-290.7003	-334.6888	-2.1104	-269.409
-238.3363	-322.6764	-0.9465	-220.8955	-309.2585	-2.113	-221.5463
-174.2702	-287.1027	-0.9566	-150.7272	-265.0153	-2.1741	-170.6939
-109.6541	-235.8257	-0.9864	-81.4075	-206.5101	-2.3163	-116.1658
-48.1325	-189.9712	-1.2205	-8.6538	-151.5995	-2.8905	-59.5566
42.1957	-91.6358	-1.6201	67.892	-55.3988	-1.9761	48.3907
108.7662	1.1308	0.2285	108.7662	1.1308	0.2285	108.7662

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.8297	-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297
-0.531	-5.7761	-653.6117	49.2158	-1.0709	-653.6117	66.6258
-0.4938	-9.3598	-653.6117	108.9294	-2.0269	-653.6117	142.3669
-0.4484	-12.2531	-653.6117	184.1592	-2.091	-639.1528	206.7396
-0.3752	-14.5513	-588.9838	244.8267	-2.1129	-574.9913	258.6741
-0.282	-16.2168	-517.0883	290.3634	-2.1372	-509.1748	298.5094
-1.59E-01	-17.2969	-442.9209	321.2069	-2.1797	-441.3482	326.777
1.03E-02	-17.8746	-365.5792	337.9391	-2.2325	-370.642	344.1939
2.72E-02	-17.2521	-292.5002	335.2499	-2.1123	-303.8439	343.3503
5.31E-02	-16.0143	-222.1961	310.1199	-2.1211	-239.7765	323.5629
1.10E-01	-14.1903	-151.5631	266.0484	-2.1812	-175.1762	288.0614
0.2057	-11.7442	-81.5794	207.2275	-2.3184	-109.9925	236.6123
0.424	-9.3493	-8.0464	152.2735	-2.9022	-47.5675	190.3469
1.1086	-3.9941	69.4248	55.1535	-1.8899	43.9367	90.9144
1.1308	0.2285	108.7662	1.1308	0.2285	108.7662	1.1308

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.1676	-653.6117	-0.8297	-0.1676	-653.6117	-0.8297	-0.1676
-0.964	-653.6117	82.3604	-0.6207	-653.6117	91.6961	-0.3971
-1.0229	-653.6117	153.8778	-0.6382	-653.6117	160.3644	-0.4107
-1.0275	-631.591	214.3034	-0.6305	-627.2042	218.4987	-0.3996
-1.0281	-569.5635	263.2715	-0.6319	-566.4769	265.7626	-0.3977
-1.0405	-506.2121	301.1133	-0.6267	-504.4477	302.4952	-0.3875
-1.0416	-440.7888	328.3891	-0.6255	-440.38	329.2598	-0.379
-1.0455	-372.2724	345.9014	-0.6104	-373.1979	346.7974	-0.3566
-0.9473	-307.9271	345.1561	-0.5408	-310.1356	345.9484	-0.3147
-0.9485	-245.7318	327.1233	-0.5388	-249.1582	328.9893	-0.3017
-0.9619	-183.6546	294.794	-0.5263	-188.2602	298.0976	-0.2886
-0.9985	-120.45	247.0327	-0.5522	-126.5035	252.7411	-0.293
-1.2354	-61.175	201.2692	-0.6146	-67.8314	205.9126	-0.3168
-1.6645	22.2102	120.7567	-0.967	8.3957	139.2033	-0.4931
0.2285	108.7662	1.1308	0.2285	108.7662	1.1308	0.2285

Curve 24	345. degrees	
P	M3	M2
-653.6117	-0.8297	-0.1676
-653.6117	98.3797	-0.2327
-653.6117	165.001	-0.2435
-624.1006	221.3872	-0.2365
-564.2068	267.5301	-0.2253
-503.1324	303.4532	-0.2122
-440.072	329.8608	-0.1974
-373.9859	347.4113	-0.1763
-311.8413	346.4906	-0.1438
-251.6249	330.1812	-0.1297
-191.5896	300.3619	-0.1163
-131.0094	256.8407	-0.099
-72.4678	208.8548	-0.107
-1.6195	151.8463	-0.1056
108.7662	1.1308	0.2285

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

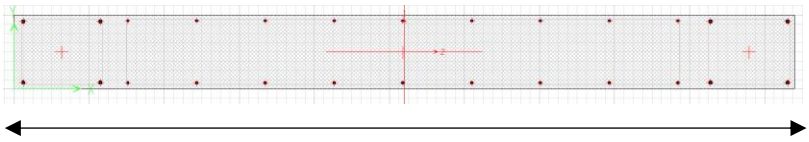
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 7)

1. INGRESO DE DATOS GENERALES

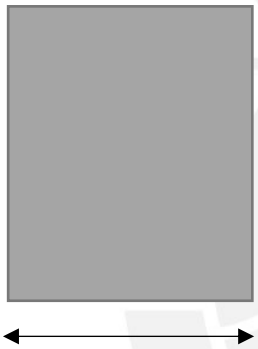
Lm (m)	2.6



t (m)

d (m) = 0.85xLm	2.21

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	2.6

hm/Lm	5.1

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**82.76**	(Axial del etabs)
Mua (ton)	**42.52**	(Momento del etabs)
Mn (ton)	**42.52**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**37.70**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**37.70**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	41.65

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-4.65

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-199.78	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-283.69	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-515.44	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

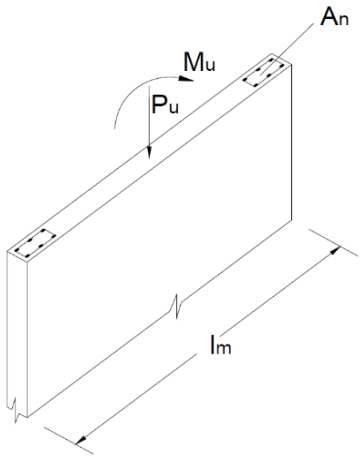
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	70.05	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 623.8 ton > Pu = 70.05 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	42.52
Long. (m)	2.6
F (ton)	16.4
Fy (kg/cm2)	4200
As (cm2)	3.89

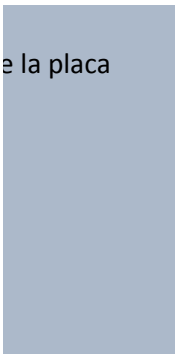
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392
2	-929.0166	118.7705	-0.0255	-929.0166	105.1331	0.6033
3	-929.0166	200.6211	-0.0237	-929.0166	191.0365	0.6266
4	-893.5281	269.3978	-0.0212	-901.5183	263.096	0.6498
5	-810.403	324.5095	-0.0182	-816.2793	320.7887	0.6617
6	-725.9223	366.4599	-0.0146	-729.6523	364.4826	0.68
7	-639.4222	395.5537	-0.01	-641.013	394.5097	0.7047
8	-550.1258	412.4565	-3.98E-03	-549.4787	411.5463	0.7175
9	-462.6551	410.5974	1.03E-03	-459.6767	409.799	0.6769
10	-377.8745	389.9364	4.69E-03	-372.818	387.7986	0.6988
11	-292.7467	352.6978	8.53E-03	-285.3593	348.2569	0.7263
12	-206.5663	298.159	0.0129	-197.0601	290.839	0.7529
13	-121.1162	229.7891	0.0183	-111.6699	223.7952	0.8467
14	-29.8384	159.5181	0.0328	-11.4649	142.31	1.176
15	106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P7	LIVE	Top	-6.04	2	-0.13
PISO4	P7	LIVE	Bottom	-6.04	2	-0.13
PISO4	P7	DEAD-SQ	Top	-40.52	9.31	-0.57
PISO4	P7	DEAD-SQ	Bottom	-40.52	9.31	-0.57
PISO4	P7	RX MAX	Top	21.84	23.85	0.12
PISO4	P7	RX MAX	Bottom	21.84	23.85	0.12
PISO4	P7	RX MIN	Top	-21.84	-23.85	-0.12
PISO4	P7	RX MIN	Bottom	-21.84	-23.85	-0.12
PISO4	P7	RY MAX	Top	7.1	4.98	1.75
PISO4	P7	RY MAX	Bottom	7.1	4.98	1.75
PISO4	P7	RY MIN	Top	-7.1	-4.98	-1.75
PISO4	P7	RY MIN	Bottom	-7.1	-4.98	-1.75

1.4CM+1.7CV	67.00	Tn	RX
1.25(CM+CV)	58.20	Tn	

CM	M22	-0.32	Tn.m	RY
	M33	-3.09	Tn.m	
CV	M22	-0.16	Tn.m	
	M33	2.07	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	67.00	-0.72	-0.81
1.25(CM+CV)+CS	80.04	-0.69	28.14
1.25(CM+CV)-CS	36.36	-0.50	-30.68
0.9CM+CS	58.31	-0.38	26.63
0.9CM-CS	14.63	-0.20	-27.55

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	929.0	-0.5	929.0	-0.5
2	929.0	118.8	929.0	-119.4
3	929.0	200.6	929.0	-201.3
4	893.5	269.4	893.5	-270.1
5	810.4	324.5	810.2	-325.1
6	725.9	366.5	725.6	-366.9
7	639.4	395.6	639.0	-395.8
8	550.1	412.5	549.3	-412.4
9	462.7	410.6	462.1	-410.4
10	377.9	389.9	377.6	-389.7
11	292.7	352.7	292.7	-352.5
12	206.6	298.2	206.9	-298.1
13	121.1	229.8	121.7	-229.7
14	29.8	159.5	31.9	-160.3
15	-106.8	0.7	-106.8	0.7

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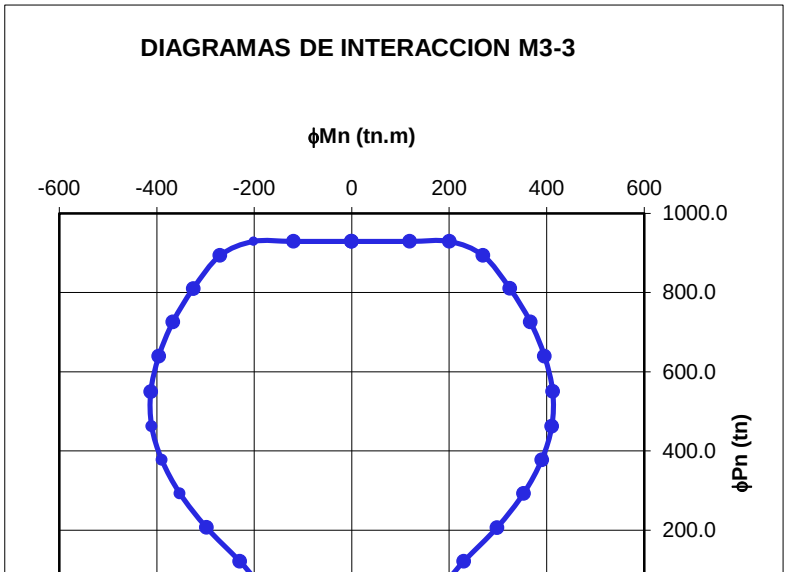
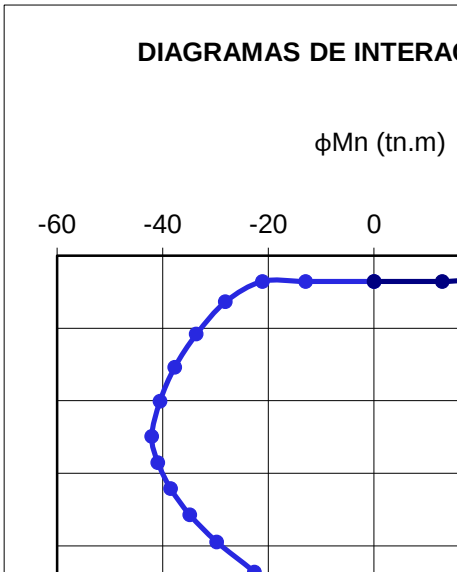
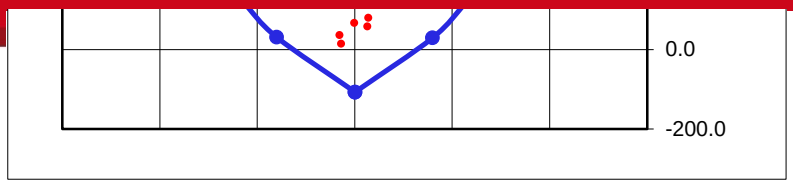
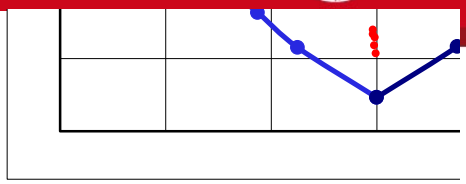
SISMO EN XX

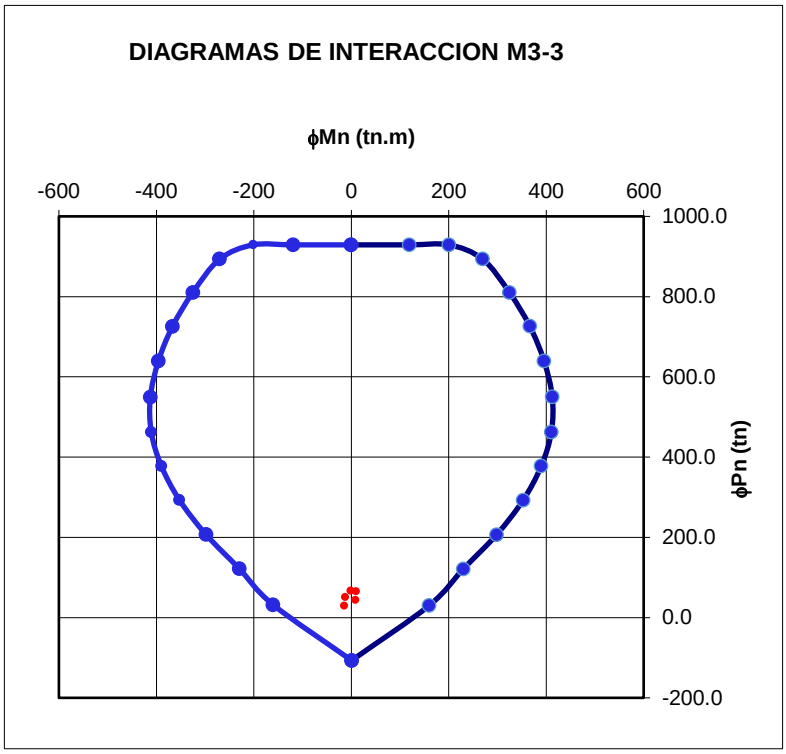


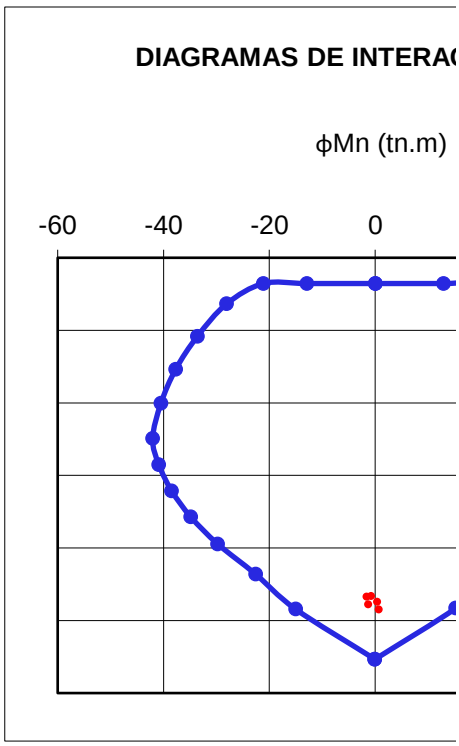






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166
-929.0166	88.5054	1.3534	-929.0166	67.2948	2.1638	-929.0166
-929.0166	179.6146	1.3636	-929.0166	162.9407	2.393	-929.0166
-910.7163	255.4905	1.4192	-923.3546	244.4417	2.4492	-929.0166
-823.0288	316.2441	1.4416	-832.1205	309.5508	2.5064	-847.7686
-733.8906	361.9865	1.4797	-739.5189	358.3101	2.5488	-749.4327
-642.7026	393.1796	1.51	-645.1258	391.051	2.6148	-648.8924
-548.838	410.344	1.5563	-547.7989	408.3252	2.7008	-545.4551
-456.3495	408.4697	1.4644	-451.5915	405.7898	2.5957	-443.3406
-366.7264	384.8099	1.5222	-358.51	380.2894	2.6285	-343.7957
-276.8743	342.842	1.5475	-265.1205	334.4367	2.7091	-244.2358
-185.8295	281.5151	1.6309	-170.4124	267.9308	2.834	-143.4706
-99.9922	215.5505	1.8488	-81.7858	200.9386	3.4161	-47.4645
11.4639	117.3381	2.5955	38.6165	84.0409	4.0359	58.9072
106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153

T	M2	M3
0.121	0.186	-3.223
0.121	-0.155	2.071
0.581	1.193	-27.767
0.581	-0.323	-3.09
0.51	0.239	39.179
0.51	0.093	29.41
-0.51	-0.239	-39.179
-0.51	-0.093	-29.41
1.206	3.664	9.995
1.206	0.982	11.241
-1.206	-3.664	-9.995
-1.206	-0.982	-11.241

P	21.84	Tn
M22	-0.09	Tn.m
M33	29.41	Tn.m

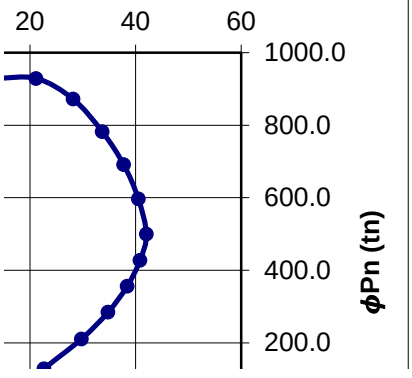
P	7.10	Tn
M22	-0.98	Tn.m
M33	11.24	Tn.m

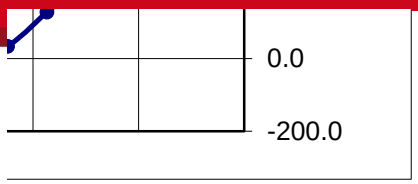
COMBINACIONES SISMO EN Y		
P	M22	M33

67.00	-0.72	-0.81
65.30	-1.58	9.97
51.10	0.38	-12.51
43.57	-1.27	8.46
29.37	0.69	-14.02

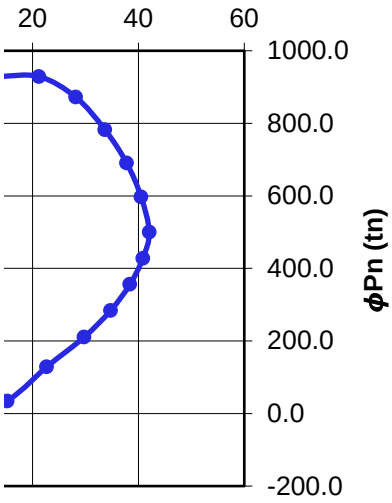
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
929.0	0.0	929.0	0.0
929.0	-12.9	929.0	13.0
929.0	-21.1	929.0	21.2
873.0	-28.1	872.3	28.2
783.5	-33.6	782.4	33.7
692.3	-37.7	690.9	37.8
598.8	-40.5	597.0	40.5
501.7	-42.1	499.5	42.0
429.4	-40.9	427.5	40.8
357.4	-38.5	355.9	38.4
285.5	-34.8	284.2	34.8
210.7	-29.7	210.7	29.8
127.8	-22.6	128.6	22.7
31.3	-15.0	34.2	15.2
-106.8	-0.1	-106.8	-0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01
51.441	2.2531	-929.0166	38.5336	2.2266	-929.0166	-3.01E-01
132.1711	4.1392	-929.0166	89.9395	5.4593	-929.0166	-2.87E-01
224.1067	4.2124	-929.0166	165.2256	8.3612	-873.0057	-2.51E-01
296.8087	4.3021	-888.7999	253.5499	9.2104	-783.5109	-2.06E-01
350.8582	4.3891	-774.1731	323.1325	9.4498	-692.3466	-1.51E-01
386.2909	4.5305	-657.1446	366.5095	9.7321	-598.8064	-8.07E-02
403.6438	4.6946	-537.0591	384.0711	10.0936	-501.7192	1.30E-02
399.4752	4.5961	-420.8522	372.9446	10.1539	-429.3791	1.54E-02
370.2895	4.612	-303.7755	334.0189	10.0005	-357.4236	1.54E-02
317.6809	4.7659	-189.2047	263.1728	10.1229	-285.4681	1.54E-02
242.0701	4.9079	-89.305	190.3052	10.4509	-210.6643	3.37E-02
169.3485	6.2289	3.4884	116.8365	8.8829	-127.8063	1.05E-01
58.7381	4.4041	70.2178	44.5494	3.8252	-31.3177	0.3717
6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392
12.8942	-929.0166	-39.1618	2.2262	-929.0166	-52.0548	2.2565
21.1036	-929.0166	-90.6768	5.462	-929.0166	-132.9775	4.1363
28.0753	-929.0166	-166.064	8.3622	-929.0166	-224.9097	4.2094
33.5941	-888.5633	-254.4363	9.2006	-847.5242	-297.5385	4.3006
37.7073	-773.8336	-323.8573	9.4399	-748.9569	-351.4631	4.3983
40.4891	-656.6814	-366.9475	9.7217	-648.4571	-386.6603	4.5219
42.0622	-536.4916	-384.124	10.0848	-544.9173	-403.6757	4.6876
40.8773	-420.4348	-372.6801	10.1526	-442.9834	-399.2742	4.5939
38.4571	-303.5329	-333.4916	9.9995	-343.5468	-370.0074	4.5992
34.8415	-189.0975	-262.6132	10.1179	-244.1144	-317.3129	4.7429
29.7354	-89.5488	-189.775	10.4407	-143.7525	-241.8386	4.9019
22.5972	3.0103	-116.2716	8.9323	-48.1789	-169.1092	6.2262
15.039	69.2127	-44.4302	3.9297	57.8005	-58.7209	4.4969
0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166
-929.0166	-67.9446	2.1651	-929.0166	-89.172	1.3518	-929.0166
-929.0166	-163.6981	2.3914	-929.0166	-180.3462	1.3619	-929.0166
-923.248	-245.2025	2.4492	-910.6226	-256.2214	1.4191	-901.4347
-831.7802	-310.3205	2.4923	-822.8092	-316.8954	1.4409	-816.064
-739.1667	-358.8312	2.547	-733.553	-362.4858	1.4777	-729.326
-644.6643	-391.3396	2.6152	-642.2568	-393.4506	1.5102	-640.5793
-547.2301	-408.2965	2.699	-548.2613	-410.2854	1.5567	-548.9142
-451.1929	-405.6015	2.594	-455.8336	-408.2815	1.4638	-459.142
-358.2572	-380.0542	2.614	-366.4733	-384.5642	1.5112	-372.4951
-265.1554	-334.198	2.6995	-276.8539	-342.5856	1.5434	-285.3407
-170.6278	-267.7341	2.8144	-186.1578	-281.4294	1.6267	-197.4014
-82.4639	-200.7899	3.4154	-100.7155	-215.482	1.8395	-112.321
37.1442	-84.468	4.0999	9.9608	-117.8445	2.6647	-13.547
106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01
-105.7764	0.6031	-929.0166	-119.4014	-2.57E-02	-929.0166	-105.7812
-191.7527	0.6249	-929.0166	-201.3242	-2.39E-02	-929.0166	-191.7639
-263.8053	0.6496	-893.4537	-270.088	-2.14E-02	-901.4171	-263.8198
-321.4144	0.6616	-810.1973	-325.116	-1.85E-02	-816.0383	-321.4291
-364.964	0.6778	-725.5857	-366.91	-1.48E-02	-729.2921	-364.9765
-394.7689	0.7047	-638.9994	-395.8007	-0.0103	-640.5369	-394.7764
-411.4807	0.7175	-549.3358	-412.3845	-4.12E-03	-548.862	-411.4806
-409.5908	0.6792	-462.1074	-410.4179	8.41E-04	-459.0982	-409.5821
-387.4911	0.6979	-377.5685	-389.6509	4.46E-03	-372.4603	-387.4774
-348.0469	0.7202	-292.6916	-352.4673	8.25E-03	-285.3162	-348.0334
-290.7464	0.7493	-206.8943	-298.0702	0.0125	-197.3882	-290.7365
-223.7012	0.8451	-121.7457	-229.7189	0.0176	-112.3225	-223.7034
-143.1111	1.18	-31.933	-160.3362	0.0315	-13.5788	-143.1406
6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392
-0.6546	-929.0166	-89.1835	-1.4037	-929.0166	-67.9593	-2.2179
-0.673	-929.0166	-180.3714	-1.4102	-929.0166	-163.7443	-2.4402
-0.6928	-910.5845	-256.2538	-1.4628	-923.1811	-245.2617	-2.4938
-0.699	-822.7534	-316.9284	-1.4789	-831.6838	-310.3812	-2.5307
-0.708	-733.4797	-362.5135	-1.5083	-739.039	-358.8811	-2.5782
-0.7257	-642.1651	-393.4671	-1.5317	-644.5049	-391.3687	-2.6375
-0.7265	-548.1489	-410.2847	-1.5662	-547.0365	-408.2954	-2.7092
-0.6774	-455.7399	-408.2629	-1.4621	-451.0337	-405.5697	-2.592
-0.6886	-366.4003	-384.5359	-1.5011	-358.1296	-380.0018	-2.603
-0.7028	-276.8013	-342.5545	-1.5251	-265.0679	-334.1461	-2.6794
-0.7232	-186.1313	-281.4107	-1.599	-170.5868	-267.7059	-2.7836
-0.8069	-100.7235	-215.491	-1.7972	-82.4709	-200.7996	-3.3672
-1.1109	9.9087	-117.9029	-2.5898	37.0529	-84.5698	-4.0201
0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166
-929.0166	-52.0621	-2.3112	-929.0166	-39.1546	-2.2831	-929.0166
-929.0166	-133.0667	-4.1856	-929.0166	-90.7716	-5.5188	-929.0166
-929.0166	-225.0215	-4.2542	-929.0166	-166.2855	-8.4131	-872.2685
-847.3551	-297.6518	-4.3401	-888.2005	-254.7428	-9.2392	-782.447
-748.7357	-351.5574	-4.4303	-773.3663	-324.1176	-9.4709	-690.9423
-648.1833	-386.7173	-4.5443	-656.0954	-367.0977	-9.7431	-597.0369
-544.5852	-403.6743	-4.6981	-535.783	-384.1162	-10.0942	-499.5379
-442.7117	-399.2161	-4.5912	-419.8486	-372.5163	-10.1489	-427.508
-343.3358	-369.922	-4.5853	-303.0656	-333.2369	-9.9813	-355.8643
-243.9665	-317.2208	-4.7186	-188.7548	-262.3381	-10.0882	-284.2207
-143.6742	-241.7741	-4.867	-89.4284	-189.6842	-10.3906	-210.6702
-48.1835	-169.1119	-6.1686	2.984	-116.2915	-8.8618	-128.5947
57.6782	-58.8566	-4.4161	68.9507	-44.7253	-3.8708	-34.2451
106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01
-3.03E-01	-12.9518	-929.0166	38.5282	-2.2829	-929.0166	51.4477
-2.88E-01	-21.1803	-929.0166	90.0332	-5.5157	-929.0166	132.26
-2.52E-01	-28.1563	-929.0166	165.4457	-8.4117	-929.0166	224.2182
-2.08E-01	-33.6671	-888.4369	253.8559	-9.2487	-847.5994	296.9218
-1.52E-01	-37.7601	-773.7055	323.3926	-9.4803	-749.2113	350.9525
-8.14E-02	-40.5099	-656.5581	366.6601	-9.753	-648.6184	386.3481
1.30E-02	-42.0405	-536.3498	384.0644	-10.1025	-545.1226	403.6429
1.54E-02	-40.8272	-420.2653	372.781	-10.1497	-443.0685	399.4172
1.54E-02	-38.389	-303.3075	333.7638	-9.9818	-343.5844	370.2039
1.54E-02	-34.7659	-188.8654	262.9006	-10.0932	-244.0937	317.5967
2.75E-02	-29.7585	-89.1833	190.2117	-10.4001	-143.3917	242.0042
9.55E-02	-22.6719	3.4633	116.8529	-8.8117	-47.4682	169.3487
0.3474	-15.2337	69.9574	44.8389	-3.765	58.7859	58.8708
6.98E-01	0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.0392	-929.0166	-5.12E-01	-0.0392	-929.0166	-5.12E-01	-0.0392
-2.3076	-929.0166	67.3091	-2.2163	-929.0166	88.5167	-1.405
-4.1882	-929.0166	162.9867	-2.4415	-929.0166	179.6396	-1.4116
-4.2569	-923.2877	244.5007	-2.4934	-910.6781	255.5229	-1.4625
-4.3412	-832.0241	309.6114	-2.5445	-822.9735	316.2774	-1.4791
-4.4208	-739.391	358.36	-2.5796	-733.8172	362.0142	-1.5099
-4.5525	-644.9662	391.0803	-2.6366	-642.6108	393.1962	-1.531
-4.7046	-547.6051	408.3245	-2.7104	-548.7254	410.3436	-1.5654
-4.5929	-451.4321	405.7579	-2.5932	-456.2556	408.4512	-1.4623
-4.5975	-358.3877	380.2439	-2.6169	-366.6545	384.7828	-1.5117
-4.7422	-265.0379	334.3895	-2.6888	-276.8238	342.814	-1.5288
-4.8722	-170.3709	267.9017	-2.8026	-185.8028	281.4959	-1.6023
-6.17	-81.7923	200.947	-3.3668	-99.9999	215.5588	-1.8053
-4.3221	38.526	84.1403	-3.9544	11.4122	117.395	-2.519
0.0534	106.8153	6.98E-01	0.0534	106.8153	6.98E-01	0.0534

Curve 24	345. degrees	
P	M3	M2
-929.0166	-5.12E-01	-0.0392
-929.0166	105.1378	-0.6545
-929.0166	191.0476	-0.6744
-901.5007	263.1104	-0.6926
-816.2535	320.8034	-0.6987
-729.6184	364.495	-0.7097
-640.9705	394.5172	-0.7253
-549.4265	411.5463	-0.7259
-459.6328	409.7904	-0.6748
-372.7838	387.7855	-0.6891
-285.3362	348.2447	-0.7085
-197.0489	290.8313	-0.7258
-111.6713	223.797	-0.8073
-11.4965	142.3389	-1.1044
106.8153	6.98E-01	0.0534

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

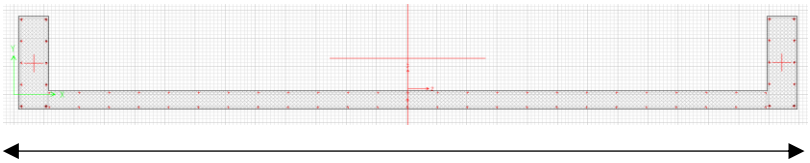
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 8)

1. INGRESO DE DATOS GENERALES

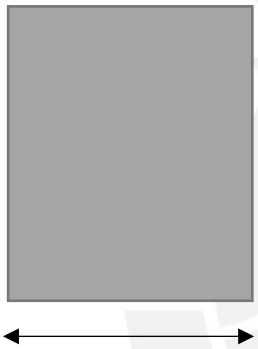
Lm (m)	5.7



t (m)

d (m) = 0.85xLm	4.85

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	5.7

hm/Lm	**2.3**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**101.64**	(Axial del etabs)
Mua (ton)	**128.75**	(Momento del etabs)
Mn (ton)	**128.75**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**48.92**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**48.92**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	54.78

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-6.90

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-294.93	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-418.80	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-760.92	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

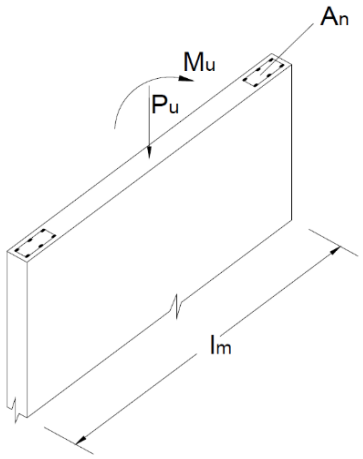
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	54.71	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 640.8 ton > Pu = 102.18 **OK!**

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	128.75
Long. (m)	5.7
F (ton)	22.6
Fy (kg/cm2)	4200
As (cm2)	5.38

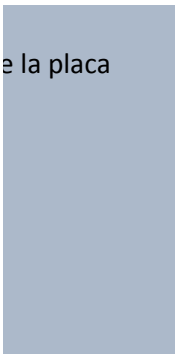
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-2002	-0.2172	20.97	-2002	-0.2172	20.97
2	-2002	1440.9531	-62.1258	-2002	1432.3721	-61.4295
3	-1885	1780.7618	-51.2545	-1883	1782.2501	-50.0705
4	-1748	2070.0081	-40.5944	-1742	2077.5258	-38.9131
5	-1608	2310.3239	-30.2116	-1597	2319.6806	-28.0124
6	-1463	2503.9495	-20.1938	-1448	2511.0128	-17.4572
7	-1313	2654.2687	-10.6759	-1294	2654.9297	-7.3789
8	-1154	2766.7472	-1.8538	-1131	2756.6295	2.0227
9	-1010	2764.0051	11.5274	-979.143	2747.9078	14.8
10	-868.8664	2684.5328	2.55E+01	-833.0979	2649.9431	29.2785
11	-727.5016	2536.8394	39.5556	-687.0817	2479.0951	43.7529
12	-586.198	2320.9182	53.5636	-540.8398	2234.7474	58.2414
13	-444.8333	2036.2075	67.5777	-393.5788	1914.1646	72.8256
14	-297.8757	1666.5357	80.2868	-240.9542	1531.9603	88.5905
15	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P8	LIVE	Top	-4.25	-0.62	0.53
PISO4	P8	LIVE	Bottom	-4.25	-0.62	0.53
PISO4	P8	DEAD-SQ	Top	-31.57	-2.3	1.88
PISO4	P8	DEAD-SQ	Bottom	-31.57	-2.3	1.88
PISO4	P8	RX MAX	Top	53.93	12.11	19.89
PISO4	P8	RX MAX	Bottom	53.93	12.11	19.89
PISO4	P8	RX MIN	Top	-53.93	-12.11	-19.89
PISO4	P8	RX MIN	Bottom	-53.93	-12.11	-19.89
PISO4	P8	RY MAX	Top	25.59	44.01	10.25
PISO4	P8	RY MAX	Bottom	25.59	44.01	10.25
PISO4	P8	RY MIN	Top	-25.59	-44.01	-10.25
PISO4	P8	RY MIN	Bottom	-25.59	-44.01	-10.25

1.4CM+1.7CV	51.42	Tn	RX
1.25(CM+CV)	44.78	Tn	

CM	M22	2.89	Tn.m	RY
	M33	-9.82	Tn.m	
CV	M22	0.87	Tn.m	
	M33	-2.35	Tn.m	

COMBINACIONES SISMO EN X				C
	P	M22	M33	

1.4CM+1.7CV	51.42	5.53	-17.74
1.25(CM+CV)+CS	98.71	-20.64	14.43
1.25(CM+CV)-CS	-9.16	30.04	-44.84
0.9CM+CS	82.34	-22.74	20.80
0.9CM-CS	-25.52	27.94	-31.75

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	2002.0	-0.2	2002.0	-0.2
2	2002.0	1441.0	2002.0	-1441.0
3	1885.0	1780.8	1885.0	-1781.0
4	1748.0	2070.0	1748.0	-2070.0
5	1608.0	2310.3	1608.0	-2311.0
6	1463.0	2503.9	1463.0	-2504.0
7	1313.0	2654.3	1313.0	-2654.0
8	1154.0	2766.7	1154.0	-2767.0
9	1010.0	2764.0	1010.0	-2764.0
10	868.9	2684.5	868.9	-2684.0
11	727.5	2536.8	727.6	-2537.0
12	586.2	2320.9	586.3	-2321.0
13	444.8	2036.2	444.9	-2036.0
14	297.9	1666.5	298.0	-1666.0
15	-315.6	0.3	-315.6	0.3

PUNTO
1
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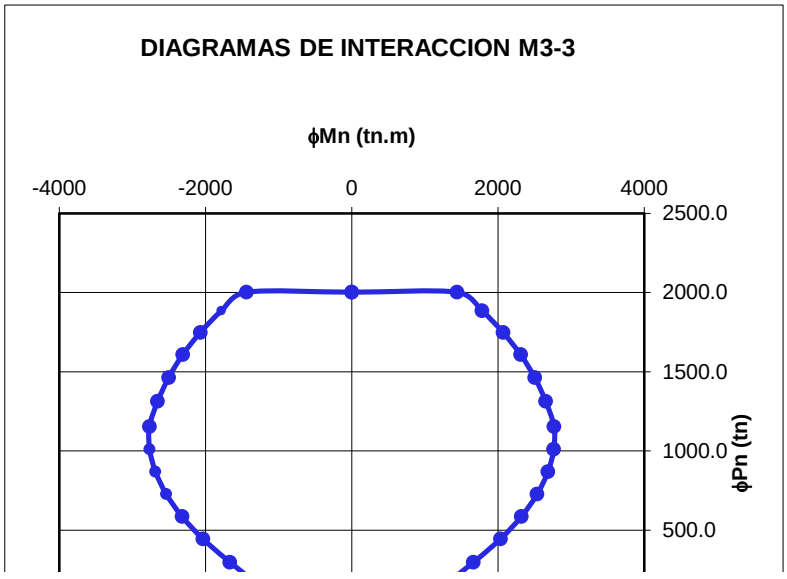
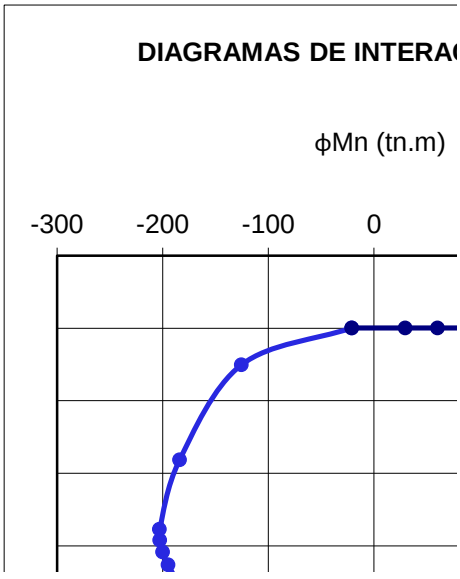
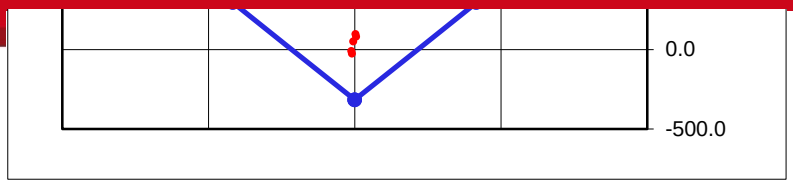
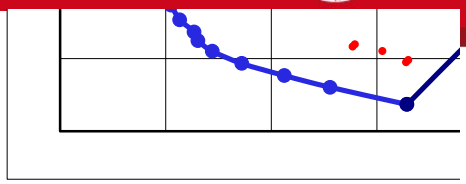
SISMO EN XX

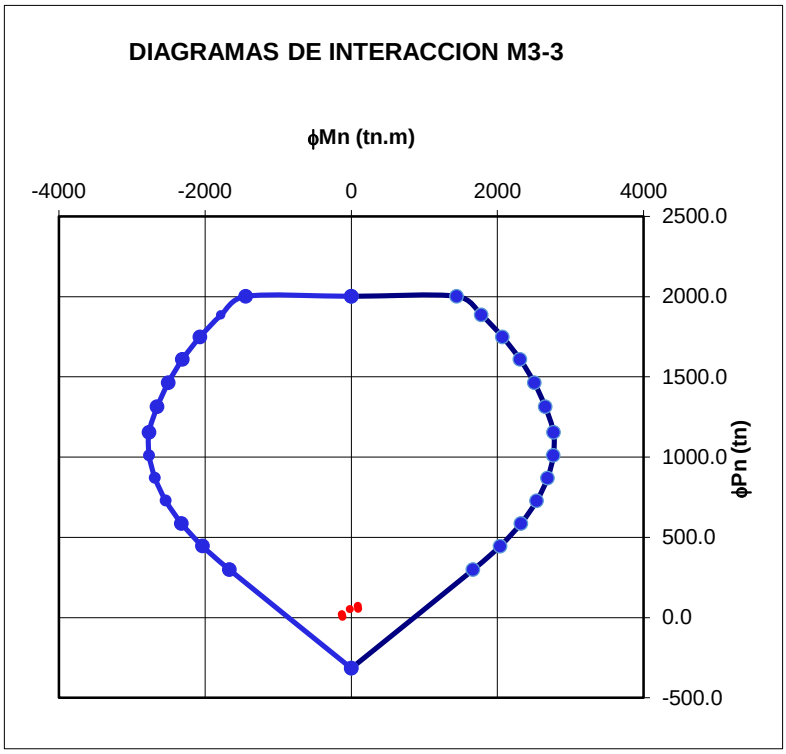


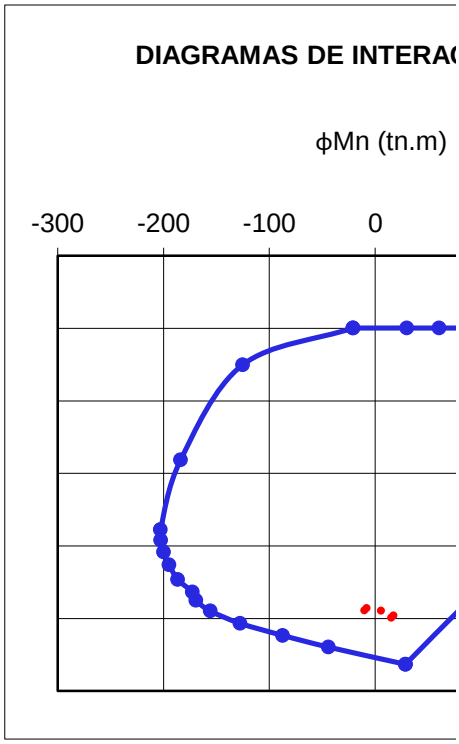






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	1192.124	-22.2543	-2002	867.4595	14.2769	-2002
-1881	1784.1973	-48.7564	-1878	1784.0516	-46.4672	-1970
-1734	2086.1567	-37.0233	-1724	2097.7176	-34.5469	-1705
-1585	2330.1375	-25.5327	-1567	2343.6141	-22.2585	-1537
-1431	2518.3655	-14.3669	-1406	2526.6284	-10.2644	-1364
-1271	2654.0754	-3.6458	-1240	2649.9948	1.3244	-1185
-1103	2742.4068	6.4467	-1065	2718.7314	12.3342	-997.1932
-943.0311	2725.0826	18.6004	-893.9519	2686.7626	23.765	-809.3797
-791.517	2604.3015	33.6214	-734.7773	2532.0268	39.5537	-633.968
-639.9821	2404.8769	48.6414	-574.5833	2287.6649	55.4414	-458.8043
-487.4732	2123.925	63.7746	-411.9138	1949.2247	71.3639	-280.4355
-330.6388	1751.2782	78.8484	-248.9183	1542.004	88.8102	-121.0734
-147.0773	1333.437	103.0853	1.4863	977.5662	101.0542	111.4085
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

T	M2	M3
-0.413	-0.545	-0.719
-0.413	0.87	-2.35
-1.654	-2.08	-3.735
-1.654	2.891	-9.817
14.578	27.566	33.022
14.578	25.338	29.634
-14.578	-27.566	-33.022
-14.578	-25.338	-29.634
40.778	14.823	66.937
40.778	12.754	108.008
-40.778	-14.823	-66.937
-40.778	-12.754	-108.008

P	53.93	Tn
M22	-25.34	Tn.m
M33	29.63	Tn.m

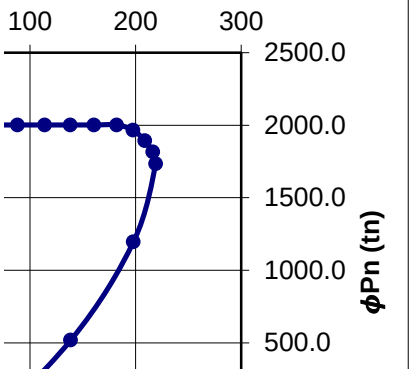
P	25.59	Tn
M22	-12.75	Tn.m
M33	108.01	Tn.m

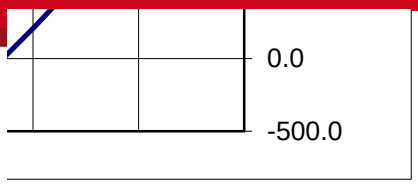
COMBINACIONES SISMO EN Y		
P	M22	M33

51.42	5.53	-17.74
70.37	-8.05	92.80
19.19	17.46	-123.22
54.00	-10.15	99.17
2.82	15.36	-116.84

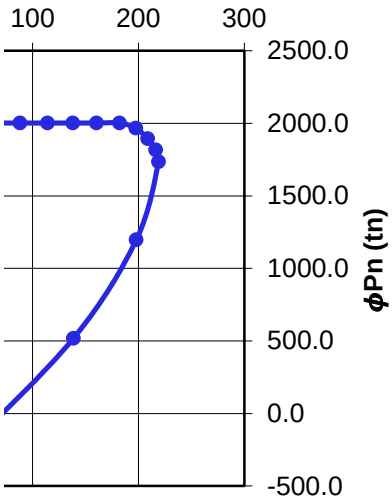
90 GRADOS	M_{2-2}	270 GRADOS	M_{2-2}
ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
2002.0	-21.0	2002.0	-21.0
1748.0	-125.3	2002.0	29.8
1093.0	-183.8	2002.0	60.4
613.6	-202.8	2002.0	88.3
539.2	-202.7	2002.0	114.1
458.3	-200.0	2002.0	138.2
370.3	-194.8	2002.0	160.4
268.1	-186.5	2002.0	182.2
183.5	-172.8	1966.0	197.6
125.1	-169.3	1893.0	208.8
51.9	-155.8	1816.0	216.3
-33.1	-127.7	1734.0	219.0
-116.6	-87.4	1197.0	198.0
-197.0	-44.2	518.2	138.6
-315.6	28.6	-315.6	28.6

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
664.721	24.7432	-2002	493.4654	29.4552	-1748	1.2663
1483.7788	7.2634	-2002	1185.1035	42.1373	-1093	1.44E+00
2117.6395	-30.4199	-1777	1774.561	41.3337	-613.5737	-4.40E-01
2364.8263	-16.7723	-1500	2246.2665	26.5862	-539.1823	1.7983
2536.2433	-3.3875	-1243	2523.4762	14.5029	-458.3146	2.0159
2634.8819	9.676	-1030	2529.7178	31.4736	-370.2589	2.92E+00
2664.4333	22.3005	-807.0399	2424.4672	48.1013	-268.1214	3.38E+00
2591.6767	33.8745	-581.6412	2186.3686	63.0905	-183.4745	3.34E+00
2373.5181	50.0357	-361.9874	1780.6244	78.1035	-125.1016	3.47E+00
2044.422	67.1195	-194.836	1413.8522	101.5055	-51.9396	3.32E+00
1604.9278	83.8303	-84.7804	1180.411	109.8199	33.0996	4.5273
1268.2255	109.1912	53.7324	812.442	92.5003	116.6256	3.5779
635.2936	73.326	191.0966	386.9929	41.5001	196.9921	6.7196
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
125.3292	-2002	-495.2501	29.2862	-2002	-665.4769	24.4825
183.8442	-2002	-1187	41.9314	-1970	-1485	6.88
202.7865	-1776	-1778	40.9258	-1705	-2118	-30.7271
202.7159	-1498	-2248	26.1183	-1536	-2365	-17.1208
200.0107	-1241	-2523	14.3041	-1363	-2537	-3.7904
194.7714	-1028	-2528	31.2366	-1184	-2635	9.201
186.4557	-804.4562	-2421	47.7874	-996.0638	-2664	21.7312
172.8146	-579.2691	-2181	62.6825	-808.3487	-2590	33.1954
169.3387	-359.7766	-1774	77.5632	-633.0131	-2372	49.3165
155.7704	-193.741	-1411	100.8702	-457.9524	-2042	66.4012
127.7078	-83.3207	-1177	109.0344	-279.6334	-1602	83.1261
87.3654	55.5042	-806.4068	91.5034	-120.1038	-1266	108.4181
44.2286	192.7164	-381.4081	40.4393	112.9386	-630.018	72.3203
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	-868.1714	13.9622	-2002	-1193	-22.6158	-2002
-1878	-1785	-46.8107	-1881	-1785	-49.1079	-1883
-1724	-2098	-34.9096	-1734	-2087	-37.4207	-1742
-1567	-2344	-22.6722	-1584	-2331	-25.9866	-1597
-1406	-2527	-10.7425	-1430	-2519	-14.8911	-1448
-1239	-2650	0.7631	-1271	-2654	-4.2595	-1293
-1064	-2718	11.6629	-1102	-2742	5.7165	-1130
-893.4135	-2686	22.9964	-942.7565	-2725	17.8057	-979.062
-734.3257	-2531	38.7781	-791.3	-2604	32.8208	-833.0459
-574.1893	-2287	54.6657	-639.8217	-2404	47.8355	-687.0542
-411.5394	-1948	70.5979	-487.3484	-2123	62.9688	-540.8344
-248.544	-1541	88.0845	-330.4476	-1750	78.0597	-393.5671
2.8881	-972.6964	100.0987	-146.4789	-1332	102.29	-240.8238
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
-1433	-61.7617	-2002	-1441	-6.25E+01	-2002	-1296
-1783	-50.4447	-1885	-1781	-5.16E+01	-1933	-1668
-2078	-39.3375	-1748	-2070	-4.10E+01	-1792	-1985
-2320	-28.4972	-1608	-2311	-3.07E+01	-1648	-2250
-2511	-18.0167	-1463	-2504	-2.08E+01	-1499	-2463
-2655	-8.0324	-1313	-2654	-11.3646	-1345	-2629
-2757	1.2482	-1154	-2767	-2.6681	-1183	-2753
-2748	13.986	-1010	-2764	10.6971	-1032	-2770
-2650	28.4616	-868.9496	-2684	24.7112	-886.0854	-2697
-2479	42.9332	-727.5844	-2537	38.7253	-740.0473	-2552
-2234	57.4199	-586.2802	-2321	52.7334	-594.0532	-2334
-1914	72.0067	-444.915	-2036	66.7476	-446.8174	-2039
-1531	87.8071	-297.9547	-1666	79.4888	-285.6582	-1630
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
-67.5416	-2002	-1037	-71.7376	-2002	-715.7079	-61.2363
-56.3052	-1988	-1528	-61.6901	-2002	-1323	-68.9923
-45.2886	-1842	-1880	-50.2068	-1911	-1725	-56.8612
-34.5657	-1694	-2174	-39.0126	-1756	-2061	-45.0456
-24.2232	-1541	-2412	-28.2073	-1597	-2335	-33.6057
-14.4099	-1383	-2598	-17.9376	-1433	-2550	-22.7066
-5.3517	-1216	-2736	-8.429	-1261	-2710	-12.5785
8.3391	-1058	-2774	5.6099	-1092	-2776	1.9093
22.8224	-905.9712	-2711	20.6339	-932.7897	-2726	17.5556
37.299	-754.4439	-2569	35.6543	-772.5464	-2587	32.6017
51.7734	-601.9954	-2346	50.1469	-609.3026	-2352	46.1997
65.6562	-444.7546	-2030	62.4648	-437.7514	-2004	56.2436
74.9509	-206.3939	-1448	31.4221	-75.9177	-1147	-21.4294
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-2002	-0.2172	20.97	-2002	-0.2172	20.97	-2002
-2002	-520.5279	-43.6364	-2002	-357.3104	-25.5269	-2002
-2002	-962.6291	-75.2564	-2002	-615.5638	-57.2283	-2002
-2002	-1421	-68.3998	-2002	-876.3445	-75.5476	-2002
-1862	-1840	-55.4476	-2002	-1143	-80.6434	-2002
-1692	-2183	-42.8983	-1945	-1626	-69.5793	-2002
-1518	-2453	-30.9028	-1739	-2081	-55.5063	-2002
-1335	-2655	-19.8942	-1526	-2424	-42.6672	-2002
-1152	-2762	-5.4855	-1310	-2639	-27.6773	-1966
-976.2126	-2738	10.5439	-1092	-2711	-10.0416	-1893
-799.9819	-2602	25.4063	-821.7037	-2454	-23.717	-1816
-619.4522	-2351	38.4856	-523.5646	-1956	-41.53	-1734
-327.7366	-1656	-4.1063	-223.8713	-1342	-53.0507	-1197
35.1447	-852.0782	-45.3731	121.6994	-581.3158	-50.8104	-518.2183
315.5684	0.2961	-28.581	315.5684	0.2961	-28.581	315.5684

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.2172	20.97	-2002	-0.2172	20.97	-2002	-0.2172
-1.7132	-29.8332	-2002	358.0717	-25.4541	-2002	520.5192
-1.8508	-60.4194	-2002	615.8234	-57.0075	-2002	963.2469
0.0508	-88.3342	-2002	878.2077	-75.3015	-2002	1422.4727
-2.2035	-114.0757	-2002	1144.9703	-80.1923	-1861	1841.2227
-2.4362	-138.213	-1942	1631.8053	-68.9009	-1691	2184.0902
-3.23E+00	-160.4361	-1736	2085.4216	-54.7381	-1516	2454.0693
-3.67E+00	-182.2096	-1522	2427.2678	-41.8075	-1334	2655.4705
-3.34E+00	-197.57	-1306	2639.9925	-26.815	-1150	2761.478
-2.92E+00	-208.8322	-1089	2709.4737	-9.2561	-974.6287	2736.6248
-2.39E+00	-216.2559	-817.8401	2447.4235	-23.5214	-798.5922	2599.7067
-3.0742	-218.9775	-520.2939	1949.1724	-41.3677	-618.1829	2348.2357
-2.199	-197.9934	-221.527	1338.6489	-53.0719	-325.9766	1651.5547
-3.7193	-138.6017	123.8681	575.3891	-50.5106	37.1426	846.5811
0.2961	-28.581	315.5684	0.2961	-28.581	315.5684	0.2961

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
20.97	-2002	-0.2172	20.97	-2002	-0.2172	20.97
-43.3771	-2002	715.8305	-60.9429	-2002	1037.0989	-71.3943
-74.9001	-2002	1323.1595	-68.5821	-1988	1528.0814	-61.2865
-67.905	-1910	1724.7793	-56.4059	-1842	1880.0804	-49.7439
-54.8713	-1755	2061.7149	-44.4972	-1693	2174.0521	-38.4799
-42.2285	-1596	2335.7759	-32.9705	-1541	2412.1899	-27.5914
-30.1424	-1432	2550.2179	-21.9676	-1382	2597.8609	-17.2202
-19.0011	-1259	2710.1163	-11.7106	-1216	2736.2677	-7.5848
-4.5673	-1091	2776.3026	2.8262	-1057	2773.941	6.4926
11.3943	-931.9159	2725.9614	18.4469	-905.4467	2710.638	21.5079
26.1668	-771.7622	2585.9801	33.4378	-754.0062	2568.8995	36.5197
39.1166	-608.5914	2350.3004	46.9512	-601.6093	2345.7954	50.9737
-3.8932	-436.9177	2002.2076	56.8063	-444.3308	2029.3555	63.1884
-45.1443	-74.1941	1143.5456	-21.3165	-205.5827	1447.1918	31.8274
-28.581	315.5684	0.2961	-28.581	315.5684	0.2961	-28.581

Curve 24	345. degrees	
P	M3	M2
-2002	-0.2172	20.97
-2002	1294.9643	-67.2103
-1933	1667.511	-55.9064
-1792	1985.307	-44.8333
-1648	2249.7489	-34.044
-1499	2463.297	-23.6209
-1345	2629.3804	-13.7081
-1183	2753.3341	-4.5236
-1032	2769.6293	9.1934
-885.7967	2697.3201	23.6734
-739.7925	2552.0515	38.1463
-593.8444	2333.9783	52.6157
-446.6163	2039.1833	66.4667
-285.3354	1629.094	75.6136
315.5684	0.2961	-28.581

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

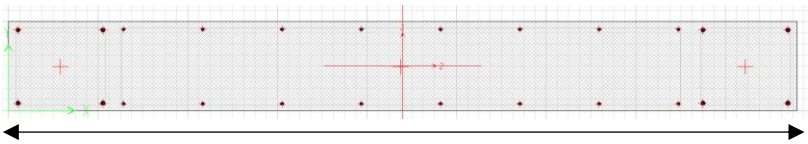
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 9)

1. INGRESO DE DATOS GENERALES

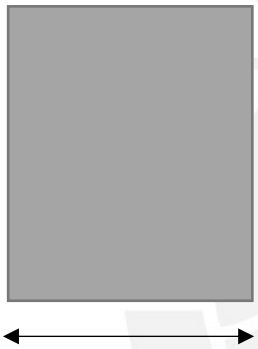
Lm (m)	2.2



t (m)

d (m) = 0.85xLm	1.87

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	2.2

hm/Lm	**6.0**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**69.71**	(Axial del etabs)
Mua (ton)	**61.12**	(Momento del etabs)
Mn (ton)	**61.12**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**37.23**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**37.23**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	35.24

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	2.34

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	335.74	3t=75.0 cm	40.0 cm	**40.0 cm**	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	476.75	3t=75.0 cm	40.0 cm	**40.0 cm**	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	866.21	3t=75.0 cm	40.0 cm	**40.0 cm**	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	**16.00 cm**	3t=75.0 cm	40.0 cm
0.0025	0.0025	**22.72 cm**	3t=75.0 cm	40.0 cm
0.0025	0.0025	**41.28 cm**	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	**16.00 cm**	6.25 cm2/m	**2 ϕ 8 mm =**	**16.00 cm**	6.25 cm2/m
2 ϕ 3/8" =	**22.72 cm**	6.25 cm2/m	**2 ϕ 3/8" =**	**22.72 cm**	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

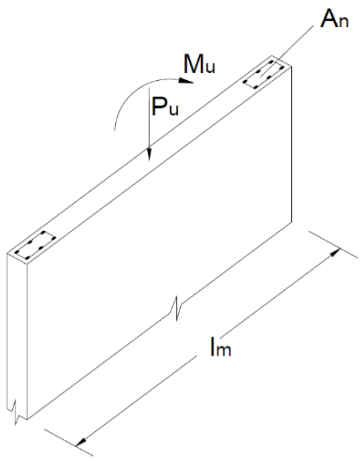
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	64.89	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 527.8 ton > Pu = 64.89 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	61.12
Long. (m)	2.2
F (ton)	27.8
Fy (kg/cm2)	4200
As (cm2)	6.61

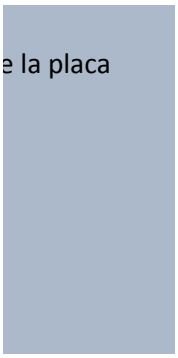
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042
2	-792.5874	87.3531	-0.0683	-792.5874	75.7369	0.5726
3	-792.5874	146.5534	-0.0632	-792.5874	138.4747	0.5845
4	-759.7052	196.0602	-0.0568	-767.7751	190.6813	0.621
5	-688.4588	235.914	-0.0491	-694.3984	232.703	0.6417
6	-615.8077	266.2743	-0.0394	-619.5009	264.5779	0.6585
7	-541.0104	287.4954	-0.0267	-542.7218	286.5541	0.6998
8	-463.8368	300.0365	-1.07E-02	-463.4484	299.1943	0.7369
9	-388.9954	299.2778	2.83E-03	-386.0375	298.458	0.6988
10	-316.9428	284.0476	1.25E-02	-311.8001	282.08	0.7184
11	-244.2498	256.7966	0.023	-236.8349	252.9742	0.7663
12	-171.1414	217.386	0.0341	-161.3277	210.8519	0.8013
13	-98.7977	169.5264	0.0497	-88.8191	164.2927	0.9287
14	-15.8048	116.7063	0.0921	3.7769	100.6501	1.3069
15	101.4501	0.0276	0.142	101.4501	0.0276	0.142

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P9	LIVE	Top	-7	1.1	0
PISO4	P9	LIVE	Bottom	-7	1.1	0
PISO4	P9	DEAD-SQ	Top	-22.96	3.86	0
PISO4	P9	DEAD-SQ	Bottom	-22.96	3.86	0
PISO4	P9	RX MAX	Top	12.49	29.6	0.01
PISO4	P9	RX MAX	Bottom	12.49	29.6	0.01
PISO4	P9	RX MIN	Top	-12.49	-29.6	-0.01
PISO4	P9	RX MIN	Bottom	-12.49	-29.6	-0.01
PISO4	P9	RY MAX	Top	13.56	25.41	0.03
PISO4	P9	RY MAX	Bottom	13.56	25.41	0.03
PISO4	P9	RY MIN	Top	-13.56	-25.41	-0.03
PISO4	P9	RY MIN	Bottom	-13.56	-25.41	-0.03

1.4CM+1.7CV	44.04	Tn	RX
1.25(CM+CV)	37.45	Tn	

CM	M22	0.00	Tn.m	RY
	M33	0.66	Tn.m	
CV	M22	0.00	Tn.m	
	M33	1.06	Tn.m	

COMBINACIONES SISMO EN X				C
	P	M22	M33	

1.4CM+1.7CV	44.04	0.00	2.72
1.25(CM+CV)+CS	49.94	-0.03	34.05
1.25(CM+CV)-CS	24.96	0.03	-29.76
0.9CM+CS	33.15	-0.03	32.50
0.9CM-CS	8.17	0.03	-30.95

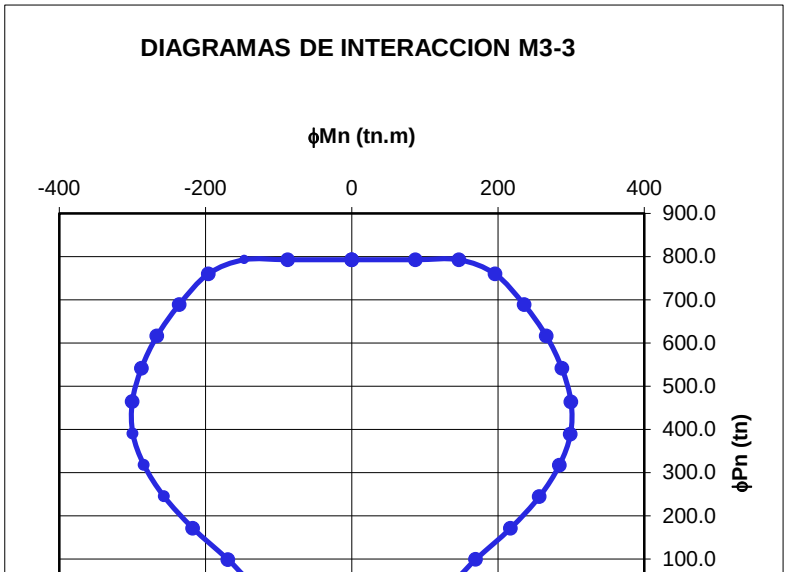
1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

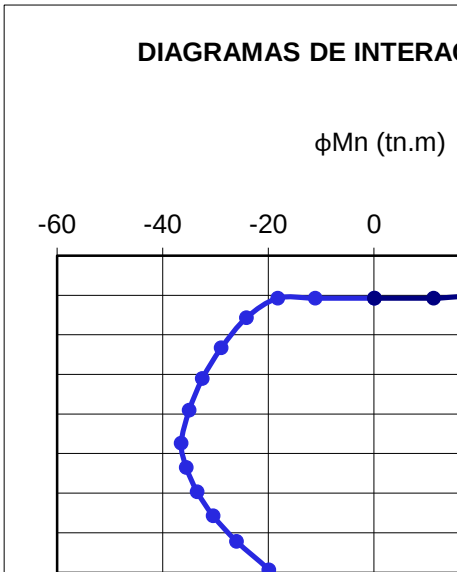
MOMENTO MINIMO DE DISEÑO

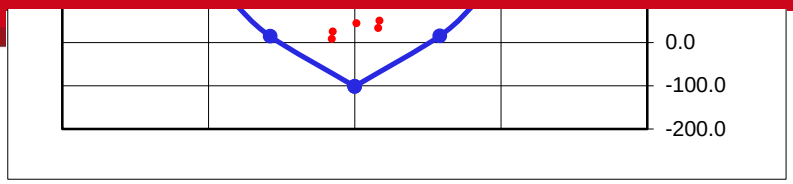
PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	792.6	0.0	792.6	0.0
2	792.6	87.4	792.6	-87.4
3	792.6	146.6	792.6	-146.6
4	759.7	196.1	759.9	-196.1
5	688.5	235.9	688.6	-236.0
6	615.8	266.3	616.1	-266.4
7	541.0	287.5	541.3	-287.6
8	463.8	300.0	464.2	-300.2
9	389.0	299.3	389.5	-299.3
10	316.9	284.0	317.5	-284.1
11	244.2	256.8	244.6	-256.7
12	171.1	217.4	171.3	-217.2
13	98.8	169.5	98.7	-169.2
14	15.8	116.7	14.5	-115.6
15	-101.5	0.0	-101.5	0.0

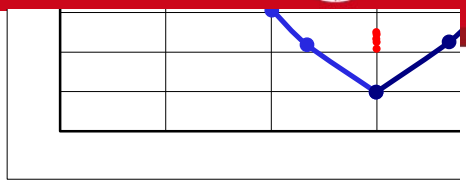
PUNTO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SISMO EN XX

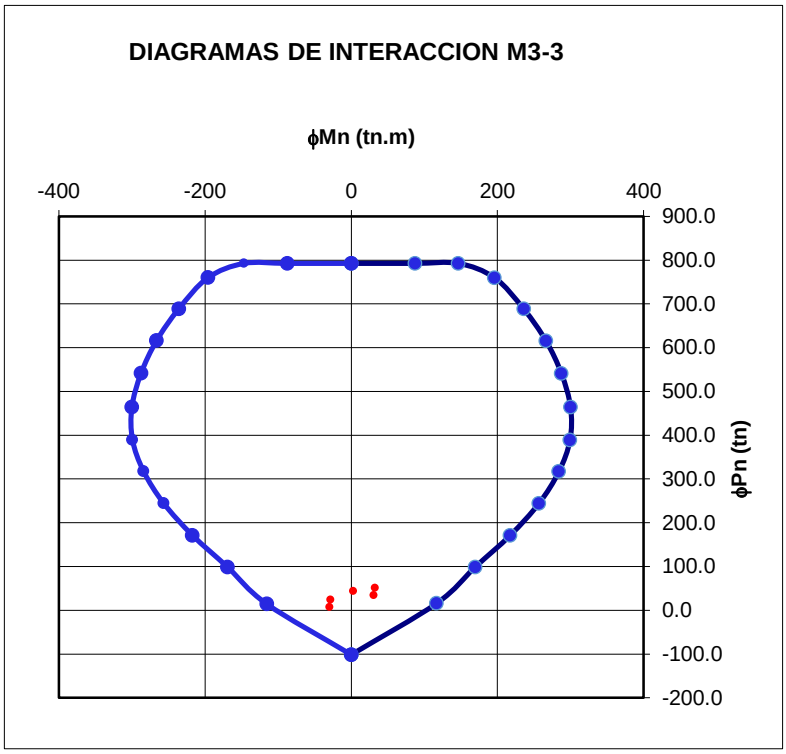


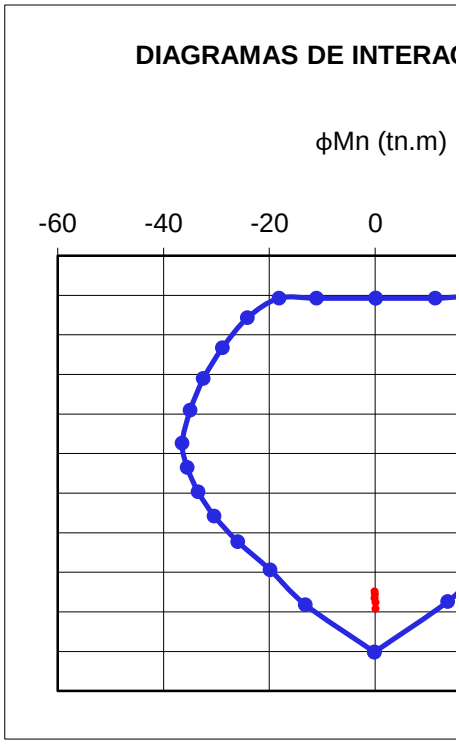






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874
-792.5874	61.5037	1.3302	-792.5874	46.2771	1.8866	-792.5874
-792.5874	128.4117	1.339	-792.5874	114.2187	2.3567	-792.5874
-777.0441	184.1359	1.3983	-789.4553	174.672	2.4452	-792.5874
-701.1731	228.7282	1.4368	-710.2557	222.9418	2.4983	-726.0054
-623.8644	262.3909	1.4698	-629.7607	259.077	2.5636	-639.4855
-544.7765	285.3025	1.5164	-547.2648	283.2692	2.6438	-550.8648
-462.8771	298.0131	1.5979	-461.8805	295.9299	2.7724	-459.3429
-382.6807	296.912	1.5458	-377.8823	294.3271	2.6925	-369.7888
-305.6521	279.4394	1.5505	-297.1097	275.0613	2.7175	-282.108
-228.3065	248.0814	1.6159	-216.3435	240.5944	2.8021	-194.9666
-149.8246	202.7214	1.7026	-133.8888	190.5209	2.9679	-107.019
-75.9227	156.4551	2.0568	-56.6135	143.0482	3.6999	-20.9751
26.5863	77.5894	2.6763	49.4236	53.7682	3.7093	63.0874
101.4501	0.0276	0.142	101.4501	0.0276	0.142	101.4501

T	M2	M3
-0.012	0	-1.855
-0.012	0.001	1.057
-0.011	-0.006	-9.574
-0.011	-0.002	0.659
0.429	0.016	47.788
0.429	0.029	31.904
-0.429	-0.016	-47.788
-0.429	-0.029	-31.904
1.018	0.048	40.048
1.018	0.084	30.356
-1.018	-0.048	-40.048
-1.018	-0.084	-30.356

P	**12.49**	Tn
M22	**-0.03**	Tn.m
M33	**31.90**	Tn.m

P	**13.56**	Tn
M22	**-0.08**	Tn.m
M33	**30.36**	Tn.m

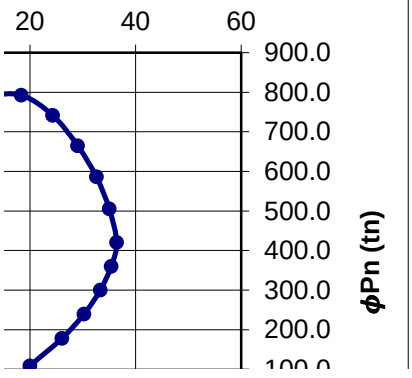
COMBINACIONES SISMO EN Y

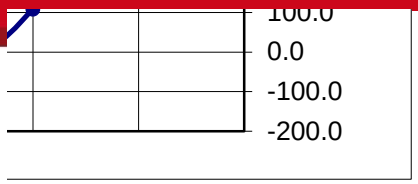
P	M22	M33

44.04	0.00	2.72
51.01	-0.09	32.50
23.89	0.08	-28.21
34.22	-0.09	30.95
7.10	0.08	-29.76

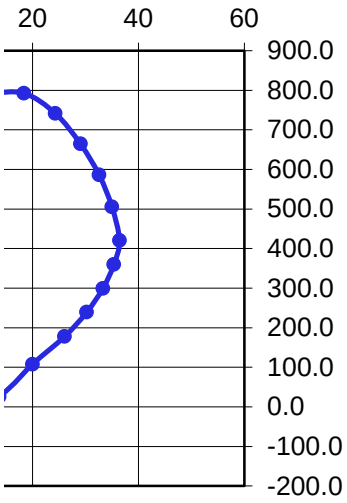
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
792.6	0.1	792.6	0.1
792.6	-11.1	792.6	11.4
792.6	-18.2	792.6	18.4
743.2	-24.1	741.5	24.3
667.1	-28.9	664.6	29.0
589.3	-32.5	586.0	32.6
509.3	-35.0	505.2	35.0
426.0	-36.5	420.8	36.4
364.5	-35.5	360.1	35.4
303.4	-33.5	299.7	33.3
242.3	-30.4	239.3	30.2
177.6	-26.0	177.9	26.1
106.1	-19.9	108.0	20.0
18.0	-13.2	26.1	13.7
-101.5	-0.1	-101.5	-0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203
36.3145	1.8864	-792.5874	28.0042	1.9952	-792.5874	-0.016
88.732	3.9772	-792.5874	62.1967	4.7806	-792.5874	-1.06E-02
156.7162	4.2311	-792.5874	112.1479	7.697	-743.2247	-9.05E-03
211.5806	4.3354	-766.5041	171.9204	9.2874	-667.0503	-7.22E-03
252.1593	4.4561	-663.9207	225.9977	9.5756	-589.3026	-4.94E-03
278.6604	4.5946	-558.9636	259.4569	9.8904	-509.3196	-2.02E-03
291.2606	4.8102	-450.9823	272.3203	10.2879	-426.0078	1.86E-03
287.9614	4.7637	-347.592	262.6485	10.418	-364.5017	6.09E-04
265.781	4.7595	-243.2188	231.8758	10.245	-303.3788	6.09E-04
225.3326	4.908	-140.9868	176.9592	10.2062	-242.2559	6.09E-04
167.8198	5.1169	-61.0311	132.5719	10.1097	-177.5848	-1.59E-03
114.9231	6.4887	16.8229	79.6468	7.9151	-106.1326	-2.38E-04
39.3042	3.7915	71.1493	30.6285	3.2853	-18.0454	4.01E-03
0.0276	0.142	101.4501	0.0276	0.142	101.4501	0.0276

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042
11.1075	-792.5874	-27.8608	1.9706	-792.5874	-36.395	1.8833
18.1649	-792.5874	-62.2289	4.7793	-792.5874	-88.7826	3.974
24.1208	-792.5874	-112.1599	7.6955	-792.5874	-156.7529	4.2296
28.8699	-766.6472	-171.9129	9.2887	-726.2078	-211.626	4.3322
32.457	-664.0981	-225.9936	9.5772	-639.6934	-252.1881	4.4561
34.9519	-559.1767	-259.4729	9.8921	-551.1138	-278.698	4.5981
36.4704	-451.2539	-272.3739	10.2915	-459.6351	-291.3176	4.8144
35.4959	-347.8973	-262.678	10.4179	-370.1232	-287.9819	4.764
33.4618	-243.5007	-231.9273	10.2524	-282.5113	-265.752	4.7724
30.4084	-141.2081	-176.871	10.2221	-195.2174	-225.2235	4.9186
25.971	-61.1066	-132.3602	10.1354	-107.0896	-167.6023	5.1317
19.8538	16.8154	-79.4338	7.9152	-20.7114	-114.515	6.5032
13.1732	71.5224	-30.1702	3.2474	63.5065	-38.8073	3.7485
0.142	101.4501	0.0276	0.142	101.4501	0.0276	0.142

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874
-792.5874	-46.3513	1.8847	-792.5874	-61.5746	1.3289	-792.5874
-792.5874	-114.2776	2.3553	-792.5874	-128.5588	1.3515	-792.5874
-789.6149	-174.7179	2.4436	-777.2053	-184.1891	1.3969	-767.9268
-710.4508	-222.9892	2.4965	-701.2544	-228.8492	1.4227	-694.6014
-629.9945	-259.1335	2.5615	-624.1211	-262.4648	1.4695	-619.7622
-547.5738	-283.3602	2.6421	-545.0799	-285.3927	1.5161	-543.0305
-462.2062	-296.0144	2.7745	-463.2587	-298.1416	1.595	-463.8132
-378.2774	-294.3383	2.6935	-383.0977	-296.9337	1.5457	-386.5786
-297.5386	-275.0195	2.7307	-306.0965	-279.4431	1.557	-312.2546
-216.5783	-240.4763	2.811	-228.5517	-247.959	1.6246	-237.1719
-134.0404	-190.342	2.9798	-149.9309	-202.53	1.7087	-161.4344
-56.2524	-142.5797	3.6994	-75.6955	-156.0582	2.0689	-88.6822
49.7778	-53.3588	3.6769	27.2182	-76.9107	2.6627	4.4405
101.4501	0.0276	0.142	101.4501	0.0276	0.142	101.4501

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203
-75.8129	0.5717	-792.5874	-87.4337	-6.84E-02	-792.5874	-75.8233
-138.5341	0.5844	-792.5874	-146.614	-6.33E-02	-792.5874	-138.5594
-190.7327	0.6209	-759.8593	-196.1158	-5.70E-02	-767.8791	-190.7656
-232.7652	0.6398	-688.6481	-235.9718	-4.92E-02	-694.5316	-232.7994
-264.6581	0.6583	-616.0732	-266.3612	-3.96E-02	-619.6697	-264.6868
-286.6491	0.6996	-541.324	-287.5959	-0.027	-542.9128	-286.6655
-299.3114	0.7366	-464.2075	-300.1588	-0.011	-463.6677	-299.3102
-298.4814	0.6983	-389.4894	-299.3021	2.34E-03	-386.4575	-298.4614
-282.0825	0.7252	-317.4796	-284.1087	1.19E-02	-312.163	-282.0542
-252.8846	0.7661	-244.5958	-256.705	0.0226	-237.1107	-252.856
-210.652	0.8077	-171.3133	-217.2412	0.034	-161.4039	-210.6348
-163.9247	0.9292	-98.6662	-169.1645	0.05	-88.693	-163.9307
-99.9251	1.2921	-14.4672	-115.6167	0.0943	4.6427	-99.7335
0.0276	0.142	101.4501	0.0276	0.142	101.4501	0.0276

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042
-0.709	-792.5874	-61.5994	-1.4675	-792.5874	-46.372	-2.0266
-0.7119	-792.5874	-128.6168	-1.4805	-792.5874	-114.3865	-2.4859
-0.7363	-777.1012	-184.2638	-1.5139	-789.4354	-174.8577	-2.5618
-0.7398	-701.1028	-228.9262	-1.5238	-710.1855	-223.1303	-2.5995
-0.7388	-623.9205	-262.5291	-1.5518	-629.6408	-259.2483	-2.6456
-0.7552	-544.8254	-285.429	-1.5739	-547.1423	-283.4339	-2.7012
-0.7604	-462.9478	-298.1396	-1.6204	-461.6751	-296.014	-2.8008
-0.6934	-382.7251	-296.8782	-1.5272	-377.8446	-294.2684	-2.6855
-0.6997	-305.8972	-279.3781	-1.5292	-297.2047	-274.908	-2.6986
-0.7185	-228.4246	-247.9021	-1.5736	-216.3616	-240.3757	-2.7543
-0.735	-149.8615	-202.4869	-1.6306	-133.943	-190.2786	-2.8925
-0.8199	-75.6185	-156.0251	-1.9321	-56.3	-142.6098	-3.5576
-1.0595	27.0686	-77.0487	-2.4459	49.5431	-53.568	-3.4593
0.142	101.4501	0.0276	0.142	101.4501	0.0276	0.142

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874
-792.5874	-36.3984	-2.0294	-792.5874	-28.0495	-2.1415	-792.5874
-792.5874	-88.9553	-4.1094	-792.5874	-62.4239	-4.9294	-792.5874
-792.5874	-157.02	-4.3501	-792.5874	-112.6146	-7.8352	-741.5356
-725.7469	-211.8983	-4.4375	-765.6932	-172.6653	-9.3913	-664.5832
-639.0921	-252.4184	-4.5408	-662.8038	-226.6245	-9.6579	-586.0205
-550.3737	-278.8434	-4.6571	-557.5481	-259.8257	-9.9473	-505.1568
-458.7237	-291.3175	-4.8404	-449.279	-272.3281	-10.3151	-420.8406
-369.385	-287.8522	-4.7534	-346.2656	-262.248	-10.4071	-360.0687
-281.9404	-265.5502	-4.7319	-242.2101	-231.2648	-10.2036	-299.6846
-194.8408	-225.0191	-4.8519	-140.3899	-176.2998	-10.1347	-239.3006
-106.9414	-167.5358	-5.0363	-60.838	-132.1727	-9.9836	-177.8714
-20.8155	-114.5736	-6.3253	16.7408	-79.4405	-7.7375	-107.9624
63.2265	-39.0366	-3.5435	70.677	-30.9447	-3.0987	-26.1063
101.4501	0.0276	0.142	101.4501	0.0276	0.142	101.4501

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-0.0203	-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203
-0.0114	-11.3522	-792.5874	27.9885	-2.1438	-792.5874	36.5208
-0.0107	-18.3531	-792.5874	62.3915	-4.9306	-792.5874	88.9045
-9.20E-03	-24.3179	-792.5874	112.6023	-7.8367	-792.5874	156.9829
-7.35E-03	-29.0465	-765.5498	172.6725	-9.3898	-725.5444	211.8523
-5.04E-03	-32.5841	-662.6264	226.6277	-9.6561	-638.8842	252.389
-2.08E-03	-35.0019	-557.3348	259.8085	-9.9454	-550.1116	278.7929
1.88E-03	-36.4184	-449.0071	272.2729	-10.3112	-458.4314	291.2597
6.09E-04	-35.3764	-345.9598	262.2171	-10.4068	-369.0503	287.831
6.09E-04	-33.2999	-241.9465	231.2264	-10.1977	-281.534	265.5793
6.09E-04	-30.2286	-140.1558	176.3948	-10.1171	-194.5826	225.1304
-2.31E-03	-26.0526	-60.7626	132.3849	-9.9576	-106.8706	167.7535
-1.32E-03	-19.985	16.748	79.6545	-7.7375	-21.08	114.9836
1.29E-03	-13.6995	70.3024	31.4081	-3.1379	63.0921	39.2662
0.0276	0.142	101.4501	0.0276	0.142	101.4501	0.0276

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-0.1042	-792.5874	-0.0203	-0.1042	-792.5874	-0.0203	-0.1042
-2.0543	-792.5874	46.5008	-2.0503	-792.5874	61.5285	-1.4687
-4.1124	-792.5874	114.3284	-2.4869	-792.5874	128.4695	-1.4682
-4.3513	-789.2758	174.8115	-2.5632	-776.9422	184.2116	-1.5149
-4.4404	-709.9904	223.0826	-2.601	-701.0215	228.805	-1.538
-4.5406	-629.4069	259.1914	-2.6474	-623.6639	262.4549	-1.5517
-4.6546	-546.8263	283.3367	-2.7031	-544.5219	285.3385	-1.5738
-4.8357	-461.3492	295.9289	-2.7983	-462.5661	298.0106	-1.6227
-4.7526	-377.4387	294.2467	-2.6849	-382.4261	296.8699	-1.5391
-4.7184	-296.7755	274.9493	-2.6845	-305.4526	279.374	-1.5218
-4.8401	-216.1218	240.4884	-2.7456	-228.1794	248.0245	-1.5644
-5.0214	-133.7914	190.4576	-2.8803	-149.7552	202.6784	-1.6243
-6.3117	-56.6614	143.0794	-3.5594	-75.9547	156.4796	-1.9343
-3.5578	49.2342	53.9439	-3.4878	26.4359	77.7294	-2.4614
0.142	101.4501	0.0276	0.142	101.4501	0.0276	0.142

Curve 24	345. degrees	
P	M3	M2
-792.5874	-0.0203	-0.1042
-792.5874	75.7476	-0.7099
-792.5874	138.5001	-0.7118
-767.7274	190.7142	-0.7362
-694.3286	232.737	-0.7414
-619.4084	264.6066	-0.7386
-542.604	286.5704	-0.755
-463.3028	299.1929	-0.7602
-385.9163	298.4378	-0.6928
-311.7084	282.0516	-0.6919
-236.7723	252.9457	-0.7181
-161.2972	210.8348	-0.7285
-88.83	164.2989	-0.82
3.7024	100.7206	-1.1053
101.4501	0.0276	0.142

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

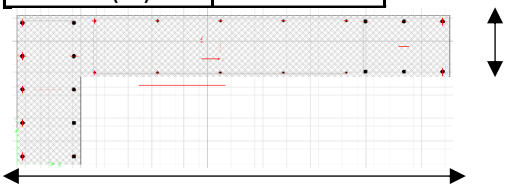
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 10)

1. INGRESO DE DATOS GENERALES

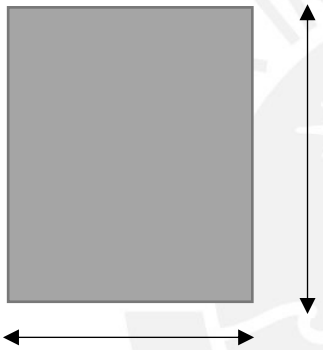
Lm (m)	1.6



t (m)

d (m) = 0.85xLm	1.36

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	1.6

hm/Lm	**8.3**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**60.74**	(Axial del etabs)
Mua (ton)	**24.78**	(Momento del etabs)
Mn (ton)	**24.78**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**16.94**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**16.94**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	25.63

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-10.22

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-55.87	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-79.33	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-144.14	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

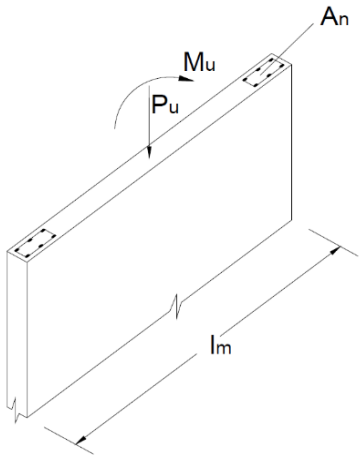
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	60.74	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 383.9 ton > Pu = 60.74 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	24.78
Long. (m)	1.6
F (ton)	15.5
Fy (kg/cm2)	4200
As (cm2)	3.69

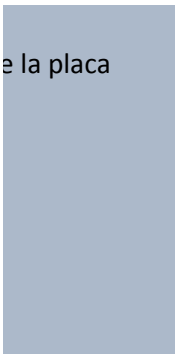
0.25

0.80
0.53
1.205

0.53

Mu)

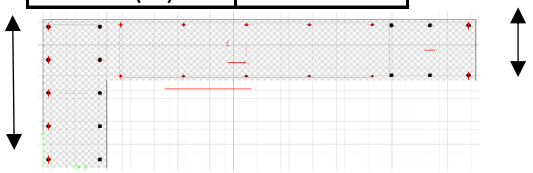
Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



DISEÑO DE MUROS DE CORTE (PLACA - 10)

1. INGRESO DE DATOS GENERALES

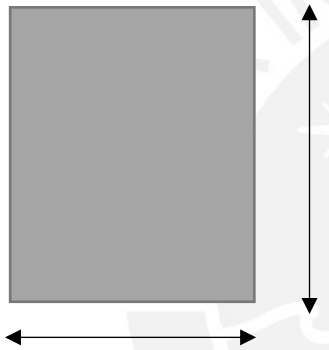
Lm (m)	0.6



t (m)

d (m) = 0.85xLm	0.51

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	0.6

hm/Lm	**22.1**

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**60.74**	(Axial del etabs)
Mua (ton)	**8.08**	(Momento del etabs)
Mn (ton)	**8.08**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**5.78**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**5.78**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	9.61

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-4.51

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-47.52	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-67.48	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-122.60	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

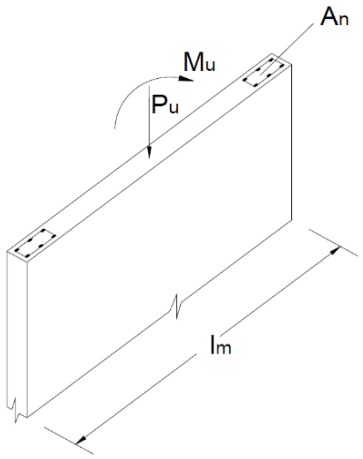
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	41.02	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 144.0 ton > Pu = 41.02 ton **OK!**

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	8.08
Long. (m)	0.6
F (ton)	13.5
Fy (kg/cm2)	4200
As (cm2)	3.21

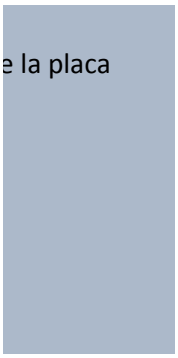
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127
2	-767.4109	98.759	16.0409	-767.4109	53.5085	15.3016
3	-656.3813	168.8544	31.9927	-717.7795	136.3692	32.7301
4	-593.7776	196.2927	30.961	-636.3516	178.4534	33.7049
5	-532.2909	216.9797	29.2904	-570.4614	205.183	31.8072
6	-468.6831	232.6062	27.8522	-502.1594	225.6386	30.1163
7	-401.5901	243.7297	26.706	-430.7065	240.199	28.7633
8	-330.0801	251.0329	26.0069	-354.7636	249.5456	27.8578
9	-265.9457	246.096	24.2117	-282.5602	248.2192	25.7942
10	-209.6354	229.81	2.13E+01	-219.6891	232.7216	22.5653
11	-152.3901	205.7401	18.3236	-157.4236	207.6845	19.3581
12	-95.8852	176.8848	15.5716	-95.6846	176.5829	16.3684
13	-40.8858	158.9574	14.5025	-35.1139	156.2087	15.2703
14	42.4246	104.5473	11.2217	56.9251	91.581	11.6814
15	138.0307	16.118	6.2869	138.0307	16.118	6.2869

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P10	LIVE	Top	-6.58	-1.49	0.26
PISO4	P10	LIVE	Bottom	-6.58	-1.49	0.26
PISO4	P10	DEAD-SQ	Top	-33.14	-3.93	0.65
PISO4	P10	DEAD-SQ	Bottom	-33.14	-3.93	0.65
PISO4	P10	RX MAX	Top	3.89	3.85	2.61
PISO4	P10	RX MAX	Bottom	3.89	3.85	2.61
PISO4	P10	RX MIN	Top	-3.89	-3.85	-2.61
PISO4	P10	RX MIN	Bottom	-3.89	-3.85	-2.61
PISO4	P10	RY MAX	Top	5.62	9.69	4.72
PISO4	P10	RY MAX	Bottom	5.62	9.69	4.72
PISO4	P10	RY MIN	Top	-5.62	-9.69	-4.72
PISO4	P10	RY MIN	Bottom	-5.62	-9.69	-4.72

1.4CM+1.7CV	57.58	Tn	RX
1.25(CM+CV)	49.65	Tn	

CM	M22	1.29	Tn.m	RY
	M33	-1.36	Tn.m	
CV	M22	0.40	Tn.m	
	M33	-1.80	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	57.58	2.49	-4.97
1.25(CM+CV)+CS	53.54	-0.37	2.58
1.25(CM+CV)-CS	45.76	4.61	-10.49
0.9CM+CS	33.72	-1.33	5.31
0.9CM-CS	25.94	3.65	-8.16

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	767.4	-11.8	767.4	-11.8
2	767.4	98.8	767.4	-76.7
3	656.4	168.9	767.4	-119.3
4	593.8	196.3	767.4	-156.5
5	532.3	217.0	718.2	-188.1
6	468.7	232.6	660.8	-214.2
7	401.6	243.7	601.4	-235.1
8	330.1	251.0	539.8	-251.4
9	265.9	246.1	481.1	-258.4
10	209.6	229.8	425.2	-256.1
11	152.4	205.7	366.2	-245.3
12	95.9	176.9	305.0	-226.4
13	40.9	159.0	233.7	-195.5
14	-42.4	104.5	81.5	-119.0
15	-138.0	16.1	-138.0	16.1

PUNTO
1
2
3
4
5
6
7
8
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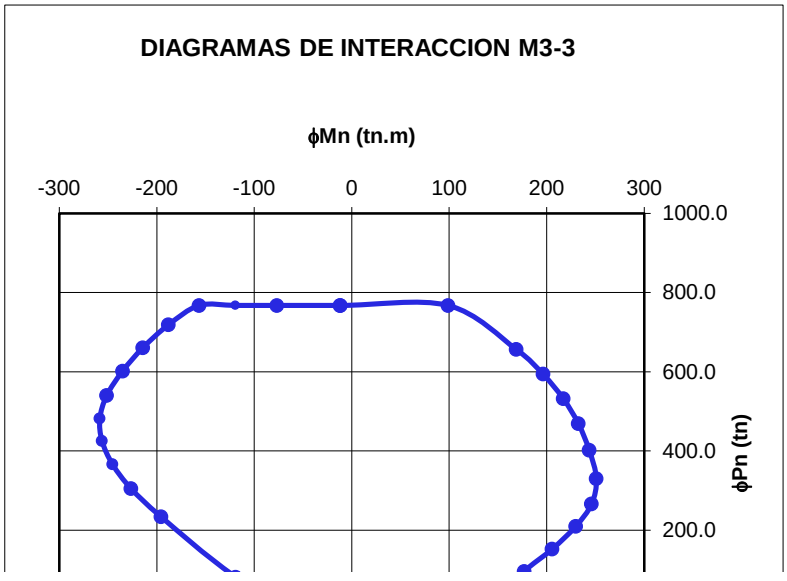
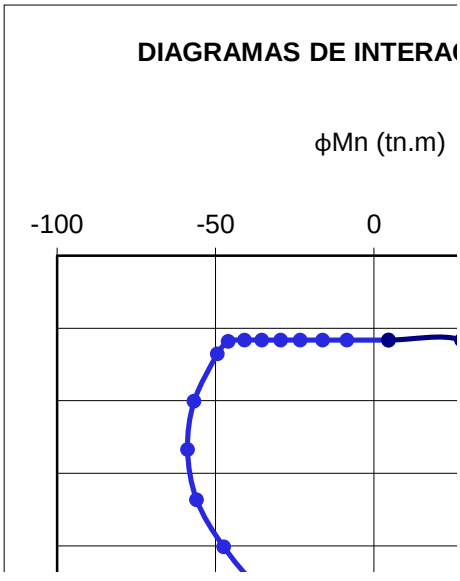
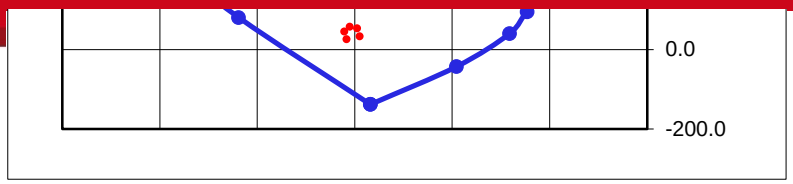
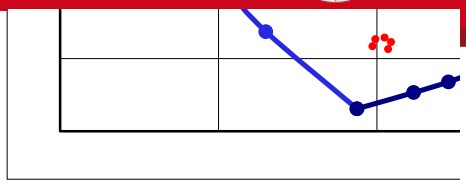
10
11
12
13
14
15

SISMO EN XX

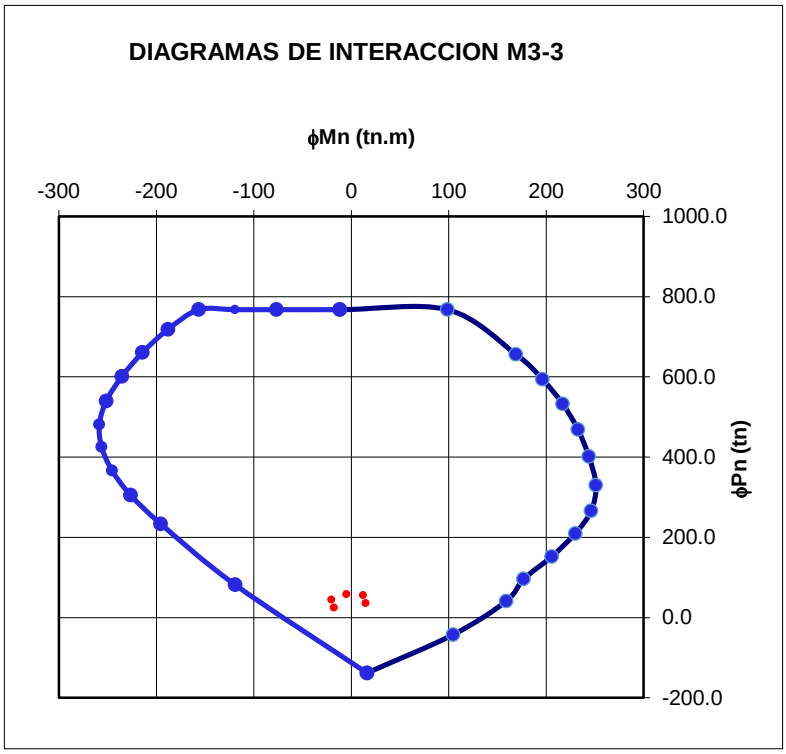


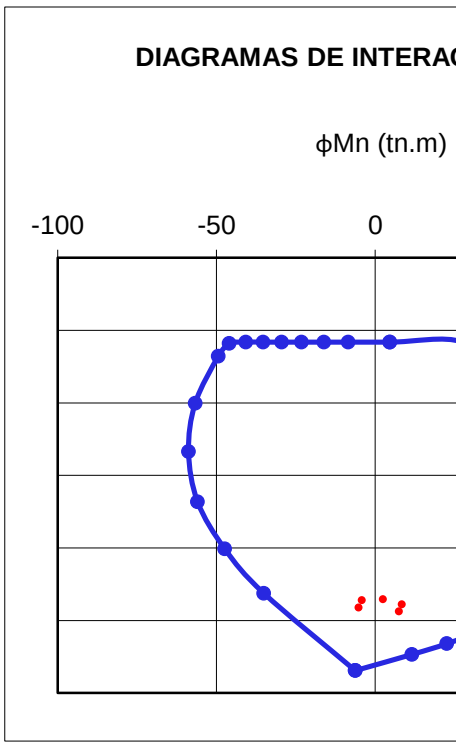






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109
-767.4109	35.0807	11.6969	-767.4109	27.4062	9.7362	-767.4109
-767.4109	94.9039	32.7189	-767.4109	69.3563	28.6854	-767.4109
-684.3423	153.8082	36.7804	-748.7475	115.0143	38.844	-767.4109
-613.4955	188.5565	34.6574	-670.72	160.4524	38.4719	-740.6495
-539.9433	215.4837	32.709	-590.0245	197.8507	36.1838	-672.9013
-463.1855	234.8479	31.0909	-505.9627	225.1139	34.1904	-576.899
-381.9234	247.2671	29.9171	-417.3541	242.7219	32.6912	-475.6842
-302.2656	249.1713	27.6464	-330.0632	248.2528	30.2259	-376.5033
-231.106	235.5828	23.994	-247.652	238.1758	26.069	-278.4485
-163.0235	209.6529	20.4931	-170.842	211.7628	22.077	-183.6387
-95.6826	176.0553	17.2559	-94.6849	174.4713	18.5505	-93.9509
-26.8106	151.4287	16.3502	-15.3441	144.1192	17.8026	2.8429
73.3835	76.1822	12.1576	87.4864	62.6148	12.3888	94.5603
138.0307	16.118	6.2869	138.0307	16.118	6.2869	138.0307

T	M2	M3
-0.082	-0.284	2.14
-0.082	0.4	-1.803
-0.182	-0.44	9.07
-0.182	1.293	-1.358
1.93	4.664	9.551
1.93	2.489	6.535
-1.93	-4.664	-9.551
-1.93	-2.489	-6.535
4.228	6.9	17.016
4.228	6.321	16.235
-4.228	-6.9	-17.016
-4.228	-6.321	-16.235

P	**3.89**	Tn
M22	**-2.49**	Tn.m
M33	**6.54**	Tn.m

P	**5.62**	Tn
M22	**-6.32**	Tn.m
M33	**16.24**	Tn.m

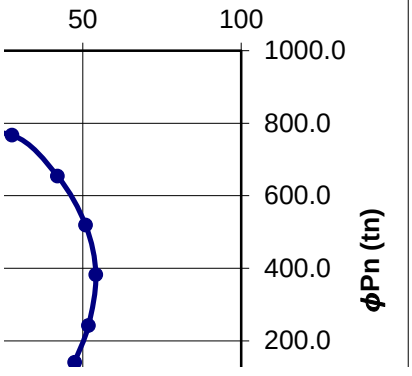
COMBINACIONES SISMO EN Y

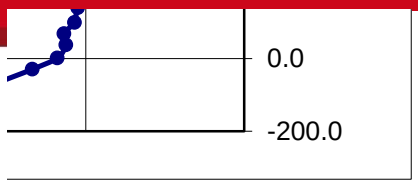
P	M22	M33

57.58	2.49	-4.97
55.27	-4.20	12.28
44.03	8.44	-20.19
35.45	-5.16	15.01
24.21	7.48	-17.46

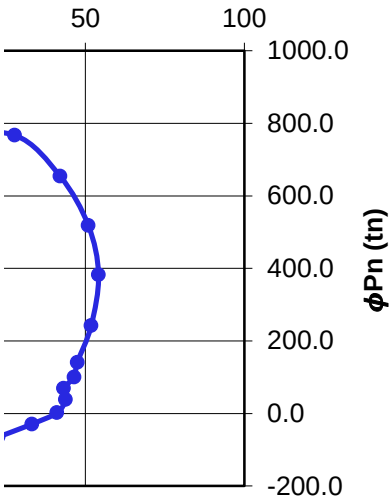
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
767.4	4.6	767.4	4.6
767.4	-8.5	767.4	27.6
767.4	-16.2	654.0	42.0
767.4	-23.2	518.9	50.9
767.4	-29.4	382.3	54.1
767.4	-35.3	242.2	51.8
767.4	-40.7	140.9	47.4
763.6	-45.9	100.5	46.4
728.9	-49.4	69.1	43.1
598.8	-56.7	38.3	43.7
465.6	-58.8	2.0	41.0
327.2	-55.9	-29.1	33.1
197.1	-47.3	-64.0	22.6
74.8	-35.0	-93.5	11.6
-138.0	-6.3	-138.0	-6.3

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258
21.7994	8.7278	-767.4109	16.4599	8.8358	-767.4109	9.4138
53.0884	24.5105	-767.4109	38.7137	20.7106	-767.4109	2.20E+01
85.5547	35.4579	-767.4109	61.266	30.1589	-767.4109	3.49E+01
118.7881	41.0869	-767.4109	84.5483	37.4184	-767.4109	47.9166
157.1377	41.8449	-754.6741	108.7012	42.4142	-767.4109	61.9809
201.0125	39.4136	-703.3069	136.5161	45.6807	-767.4109	7.68E+01
230.7993	37.3311	-613.2173	175.9067	47.7152	-763.5998	9.23E+01
243.7387	34.3692	-492.4476	213.2003	44.9281	-728.8603	1.04E+02
238.5833	29.84	-359.9539	226.7075	39.2691	-598.7716	9.24E+01
213.3139	24.8098	-225.6735	206.9423	32.684	-465.5909	7.83E+01
170.9036	20.6729	-96.111	156.3483	25.8228	-327.2243	61.3757
130.3346	19.9096	11.2335	116.4505	22.7581	-197.064	50.473
55.3436	12.6333	92.8129	55.6197	13.1897	-74.8108	39.056
16.118	6.2869	138.0307	16.118	6.2869	138.0307	16.118

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127
8.465	-767.4109	-23.5667	0.9077	-767.4109	-36.0791	-3.3163
16.1617	-767.4109	-36.9165	7.9517	-767.4109	-67.4365	-2.9093
23.186	-767.4109	-55.5067	16.8836	-767.4109	-113.9347	-4.7876
29.4174	-708.7658	-80.5775	23.5649	-746.7716	-157.8476	-7.6637
35.2859	-600.5508	-108.6043	27.078	-672.6169	-192.062	-10.4515
40.749	-483.7576	-126.3886	28.9149	-591.3507	-214.437	-11.3518
45.9323	-361.9556	-128.8726	30.0627	-484.3473	-214.6615	-3.9367
49.3937	-248.64	-115.5792	29.9553	-370.1663	-196.7702	4.8509
56.6994	-147.5106	-95.9232	27.1283	-254.2014	-165.0755	11.3227
58.7872	-69.6491	-78.8949	25.1063	-138.7944	-119.8294	15.8197
55.9337	4.6805	-56.8934	22.7623	-48.5782	-86.4637	18.9924
47.3484	69.496	-25.1259	16.0129	42.6607	-43.5067	16.8548
35.0463	115.8962	1.1322	9.6733	109.4201	-3.4303	10.5128
6.2869	138.0307	16.118	6.2869	138.0307	16.118	6.2869

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109
-767.4109	-43.8382	-4.8323	-767.4109	-53.2644	-5.7392	-767.4109
-767.4109	-88.2781	-6.5005	-767.4109	-102.3852	-8.7449	-767.4109
-767.4109	-134.9144	-9.509	-767.4109	-144.8248	-11.7548	-767.4109
-737.7241	-173.1931	-12.3837	-730.7436	-180.526	-14.7722	-724.2487
-670.4931	-203.9453	-15.2621	-668.1177	-209.3548	-17.7582	-664.6671
-601.0811	-226.8227	-17.9865	-603.3102	-231.6917	-20.7539	-603.2567
-528.299	-242.3701	-20.6096	-535.397	-247.7529	-23.6619	-538.8309
-455.6425	-247.1141	-22.7093	-468.8756	-253.9159	-26.3678	-476.1828
-362.3158	-227.5608	-16.1499	-404.1329	-248.5356	-28.4913	-415.8965
-237.7027	-177.9494	-1.7364	-328.4293	-228.6942	-26.7666	-353.9806
-106.8819	-114.6417	8.7249	-202.4279	-172.4057	-11.392	-284.4533
2.3005	-70.1504	15.5564	-60.1018	-102.0522	6.056	-147.196
96.1244	-12.7199	11.3426	76.3198	-26.5005	11.3822	21.9652
138.0307	16.118	6.2869	138.0307	16.118	6.2869	138.0307

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258
-65.8625	-7.1691	-767.4109	-76.6818	-8.48E+00	-767.4109	-68.5476
-111.8037	-10.135	-767.4109	-119.3387	-1.13E+01	-767.4109	-116.2338
-151.2113	-13.0554	-767.4109	-156.4944	-1.42E+01	-767.4109	-156.6496
-184.7899	-16.0891	-718.2366	-188.117	-1.71E+01	-712.0878	-190.4515
-212.2399	-19.1687	-660.7561	-214.1566	-2.01E+01	-649.4063	-217.4701
-234.0274	-22.3258	-601.3756	-235.1339	-23.1715	-585.0428	-237.9818
-250.2793	-25.3886	-539.8426	-251.3742	-26.359	-517.576	-252.3669
-257.0934	-28.2791	-481.1184	-258.3949	-29.4016	-452.2461	-256.5061
-253.1806	-30.7497	-425.1789	-256.14	-32.2907	-389.3666	-249.1543
-240.7527	-33.0533	-366.1859	-245.318	-34.7566	-324.7657	-232.587
-217.03	-33.1648	-305.0076	-226.3675	-36.9396	-257.2275	-206.1251
-148.7407	-15.9064	-233.7089	-195.5066	-37.1322	-161.5933	-156.8972
-64.293	4.4831	-81.4635	-118.967	-19.3068	12.4311	-70.5499
16.118	6.2869	138.0307	16.118	6.2869	138.0307	16.118

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127
-8.6848	-767.4109	-59.0658	-8.8964	-767.4109	-50.643	-8.9473
-11.7595	-767.4109	-112.1763	-12.2954	-767.4109	-106.005	-13.0524
-14.9256	-767.4109	-156.6717	-15.7837	-767.4109	-156.203	-17.0172
-18.1154	-704.6377	-192.8648	-19.3149	-693.4919	-195.227	-21.0153
-21.4008	-635.6832	-220.5058	-22.9706	-615.9747	-223.1347	-25.137
-24.7663	-564.6679	-239.8229	-26.7172	-536.0995	-240.1794	-29.3615
-28.3128	-490.5684	-251.3387	-30.5912	-452.5769	-246.6305	-33.7648
-31.6341	-418.3192	-251.304	-34.2165	-371.14	-239.448	-37.7434
-34.7277	-348.2204	-237.8536	-37.6218	-291.2638	-216.4161	-41.5557
-37.5216	-275.7923	-212.8382	-40.8922	-209.8062	-179.1659	-45.2314
-40.0592	-198.7791	-175.2527	-43.7446	-122.9694	-129.2945	-45.6453
-38.5762	-83.1813	-111.9912	-41.1572	-31.5712	-86.9727	-41.4397
-22.5634	64.2213	-34.3464	-17.5539	83.4932	-20.6743	-13.6312
6.2869	138.0307	16.118	6.2869	138.0307	16.118	6.2869

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109
-767.4109	-45.4955	-9.1061	-767.4109	-40.9642	-9.9344	-767.4109
-767.4109	-94.5934	-14.4036	-767.4109	-84.1994	-16.7741	-654.0081
-763.2349	-153.8237	-19.166	-747.4295	-142.832	-24.5329	-518.8875
-673.1725	-197.135	-23.9684	-620.0531	-195.049	-31.3715	-382.2595
-580.7652	-224.5054	-28.8526	-489.3455	-214.1631	-38.2357	-242.1886
-486.1132	-235.9726	-33.8557	-356.2482	-199.3511	-45.1331	-140.8855
-387.7045	-231.6752	-39.0025	-241.3107	-169.1854	-48.8482	-100.4608
-291.5425	-209.6841	-43.5085	-165.0744	-141.4544	-48.7835	-69.0803
-199.9329	-169.7158	-47.3996	-113.008	-118.5863	-47.0312	-38.2705
-132.0908	-132.6092	-47.4278	-70.3583	-100.5498	-47.3529	-2.0488
-69.9702	-102.2047	-46.1865	-20.051	-77.9794	-43.4603	29.0688
8.7422	-64.7582	-37.0997	37.6914	-45.736	-30.1693	63.9516
91.9974	-14.3644	-11.3465	95.8897	-10.7096	-10.5509	93.5372
138.0307	16.118	6.2869	138.0307	16.118	6.2869	138.0307

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-11.8258	-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258
-30.2733	-27.6448	-767.4109	4.9779	-7.7026	-767.4109	14.3004
-46.4279	-42.0315	-767.4109	21.3082	-11.3862	-767.4109	38.3263
-62.6415	-50.8793	-767.4109	43.8707	-16.4069	-767.4109	72.9872
-79.1244	-54.1153	-767.4109	69.0433	-21.7433	-715.8122	113.8835
-95.1178	-51.8012	-692.3853	93.8736	-26.5657	-604.0897	155.8336
-1.00E+02	-47.4317	-585.988	114.9805	-30.0385	-487.16	190.0037
-8.97E+01	-46.4252	-466.6246	126.2349	-31.9555	-367.5941	214.3801
-7.81E+01	-43.1105	-355.1209	122.1074	-32.139	-268.1113	217.3268
-7.58E+01	-43.7035	-242.5335	103.7018	-30.8463	-184.9814	200.1125
-6.80E+01	-41.0249	-137.6469	79.9711	-26.4055	-104.3717	169.721
-49.6023	-33.1119	-51.2085	65.9706	-21.6	-33.264	149.3566
-28.5651	-22.5941	39.263	53.8732	-9.747	50.44	92.4837
-10.7318	-11.576	108.7653	35.883	2.9914	108.6858	43.3642
16.118	6.2869	138.0307	16.118	6.2869	138.0307	16.118

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
-4.6127	-767.4109	-11.8258	-4.6127	-767.4109	-11.8258	-4.6127
-5.6824	-767.4109	21.946	-4.3603	-767.4109	30.6723	-3.5705
-9.126	-767.4109	56.0288	-7.2265	-767.4109	82.0971	-2.7802
-12.4696	-754.4793	105.5972	-6.4673	-673.3815	154.6445	10.8608
-13.5876	-632.0221	164.2217	2.3271	-557.7057	205.6051	24.0401
-10.7927	-511.9767	211.2828	15.4568	-484.5543	225.4611	24.2786
-4.264	-421.0998	231.2336	19.7171	-413.6782	236.6226	22.5674
5.103	-342.7018	235.9704	17.8245	-338.1204	242.4099	21.1447
10.0973	-264.718	232.5632	16.8363	-263.3977	239.8985	20.5209
9.6974	-190.7653	217.6077	16.357	-197.0379	223.9322	19.0181
9.051	-122.4288	187.8695	13.9006	-135.4482	196.207	15.8022
8.0167	-63.058	165.5643	11.6416	-78.3309	172.0415	13.4997
4.8227	18.8303	120.924	8.179	-8.4212	142.0285	11.2939
4.874	100.6907	50.9718	5.1104	83.5691	67.1525	6.6538
6.2869	138.0307	16.118	6.2869	138.0307	16.118	6.2869

Curve 24	345. degrees	
P	M3	M2
-767.4109	-11.8258	-4.6127
-767.4109	49.7198	-1.0115
-729.6674	129.4316	14.1516
-607.6695	189.8024	28.6739
-541.6654	213.0118	27.8203
-476.2404	229.2805	26.1442
-407.527	240.4406	24.7497
-334.1238	247.0606	23.7042
-264.0384	243.8986	22.7426
-203.6661	227.1671	20.2137
-144.4854	201.4423	17.1446
-88.0292	175.1133	14.6589
-27.4236	152.5333	13.2192
61.705	87.4607	9.0693
138.0307	16.118	6.2869

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

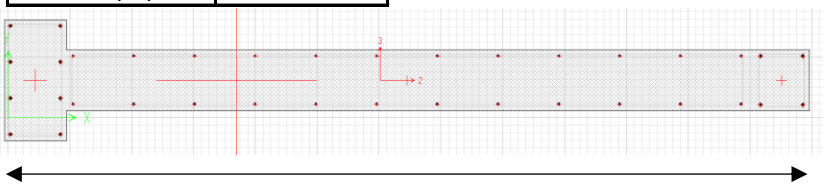
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 11)

1. INGRESO DE DATOS GENERALES

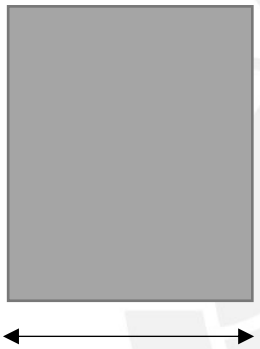
Lm (m)	3.25



t (m)

d (m) = 0.85xLm	2.76

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	3.25

hm/Lm	4.1

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**109.87**	(Axial del etabs)
Mua (ton)	**45.70**	(Momento del etabs)
Mn (ton)	**45.70**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**26.39**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**26.39**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	52.06

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-30.20

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-38.42	3t=75.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-54.55	3t=75.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-99.12	3t=75.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	16.00 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	22.72 cm	3t=75.0 cm	40.0 cm
0.0025	0.0025	41.28 cm	3t=75.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	16.00 cm	6.25 cm2/m	2 ϕ 8 mm =	16.00 cm	6.25 cm2/m
2 ϕ 3/8" =	22.72 cm	6.25 cm2/m	2 ϕ 3/8" =	22.72 cm	6.25 cm2/m

2 ϕ 1/2" =	41.28 cm	6.25 cm2/m	2 ϕ 1/2" =	41.28 cm	6.25 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

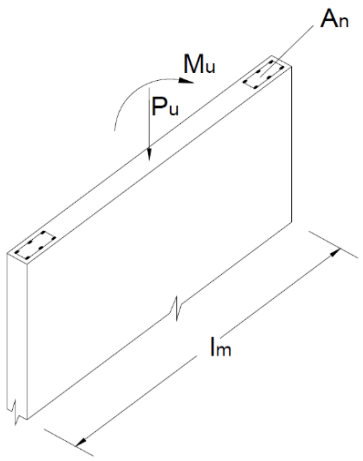
$h_{c\ (entrepiso)}$ =	265.00	cm
K =	1.00	Ver Norma
N_u =	109.61	[1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 779.8 ton > Pu = 298.12 ton **OK!**

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	109.87
Long. (m)	3.25
F (ton)	33.8
Fy (kg/cm2)	4200
As (cm2)	8.05

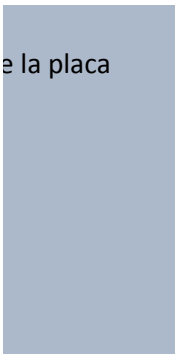
0.25

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	6.25 cm2/m	16.00
0.0009	0.0025	6.25 cm2/m	22.72
0.0016	0.0025	6.25 cm2/m	41.28



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
2	-1259	311.3199	0.0359	-1259	244.937	4.7862
3	-1219	442.1211	0.0293	-1242	416.6834	0.802
4	-1113	542.5388	0.0214	-1133	524.7209	0.8155
5	-1006	622.4262	1.19E-02	-1023	610.6887	0.8273
6	-896.2039	682.4513	1.99E-04	-910.3025	675.215	0.8455
7	-782.9732	723.3658	-0.0147	-794.1091	719.1265	0.8665
8	-664.9728	746.8342	-0.0339	-673.1739	744.0129	0.8902
9	-555.6276	732.9118	-0.0452	-558.9074	733.3054	0.6326
10	-449.6528	688.7918	-5.35E-02	-449.8809	688.4796	0.6205
11	-343.7909	619.4535	-0.0617	-340.9852	616.9483	0.6063
12	-238.0202	524.8677	-0.0698	-232.0399	518.4533	0.6075
13	-139.867	430.0563	-0.0833	-131.3963	422.756	0.7254
14	-23.9718	311.3512	-0.1075	-7.7144	291.4051	0.8689
15	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P11	LIVE	Top	-12.95	-1.01	0.13
PISO4	P11	LIVE	Bottom	-12.95	-1.01	0.13
PISO4	P11	DEAD-SQ	Top	-59.38	-0.11	0.5
PISO4	P11	DEAD-SQ	Bottom	-59.38	-0.11	0.5
PISO4	P11	RX MAX	Top	1.69	6.6	3.92
PISO4	P11	RX MAX	Bottom	1.69	6.6	3.92
PISO4	P11	RX MIN	Top	-1.69	-6.6	-3.92
PISO4	P11	RX MIN	Bottom	-1.69	-6.6	-3.92
PISO4	P11	RY MAX	Top	1.26	15.96	6.25
PISO4	P11	RY MAX	Bottom	1.26	15.96	6.25
PISO4	P11	RY MIN	Top	-1.26	-15.96	-6.25
PISO4	P11	RY MIN	Bottom	-1.26	-15.96	-6.25

1.4CM+1.7CV	105.15	Tn	RX
1.25(CM+CV)	90.41	Tn	

CM	M22	0.77	Tn.m	RY
	M33	-0.67	Tn.m	
CV	M22	0.20	Tn.m	
	M33	-1.00	Tn.m	

COMBINACIONES SISMO EN X			
	P	M22	M33

1.4CM+1.7CV	105.15	1.42	-2.64
1.25(CM+CV)+CS	92.10	-3.69	15.27
1.25(CM+CV)-CS	88.72	6.11	-19.45
0.9CM+CS	55.13	-4.21	16.75
0.9CM-CS	51.75	5.60	-18.26

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)	180 GRADOS ϕPn (tn)	M_{3-3} ϕMn(tn.m)
1	1259.0	-20.8	1259.0	-20.8
2	1259.0	311.3	1259.0	-219.8
3	1219.0	442.1	1259.0	-359.7
4	1113.0	542.5	1240.0	-478.1
5	1006.0	622.4	1137.0	-575.3
6	896.2	682.5	1031.0	-651.9
7	783.0	723.4	923.1	-708.4
8	665.0	746.8	812.0	-745.9
9	555.6	732.9	704.8	-752.2
10	449.7	688.8	598.9	-730.7
11	343.8	619.5	493.2	-683.9
12	238.0	524.9	387.5	-612.0
13	139.9	430.1	278.1	-510.0
14	24.0	311.4	156.0	-371.7
15	-155.1	28.4	-155.1	28.4

PUNTO
1
2
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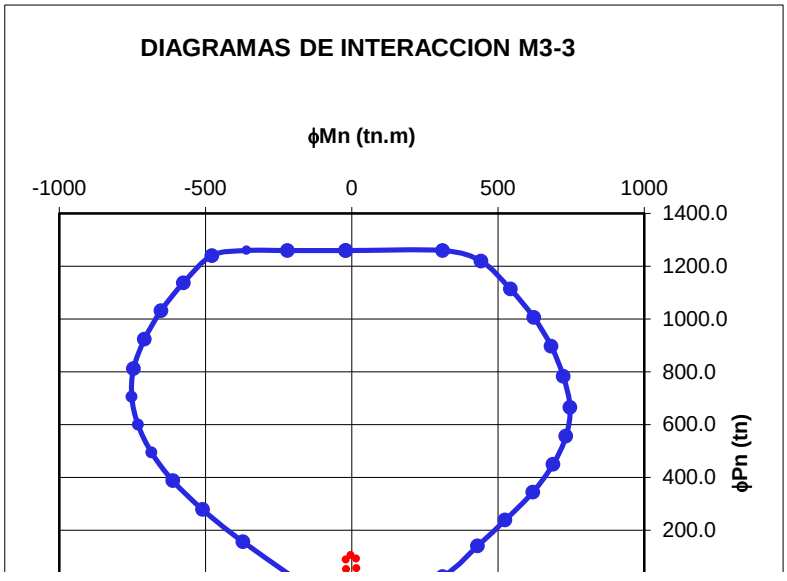
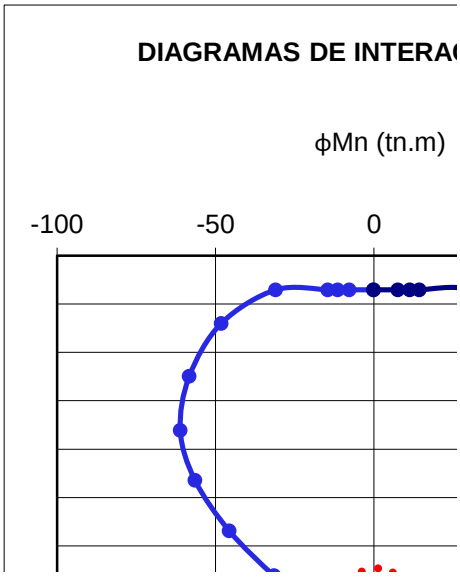
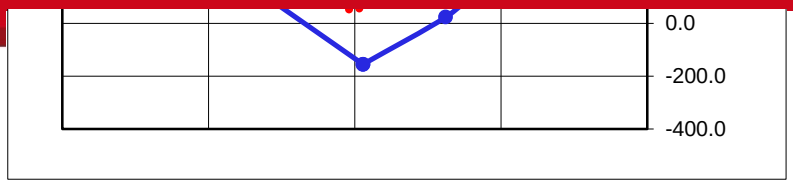
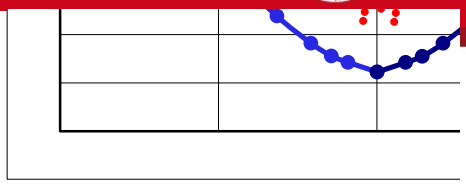
14
15

SISMO EN XX

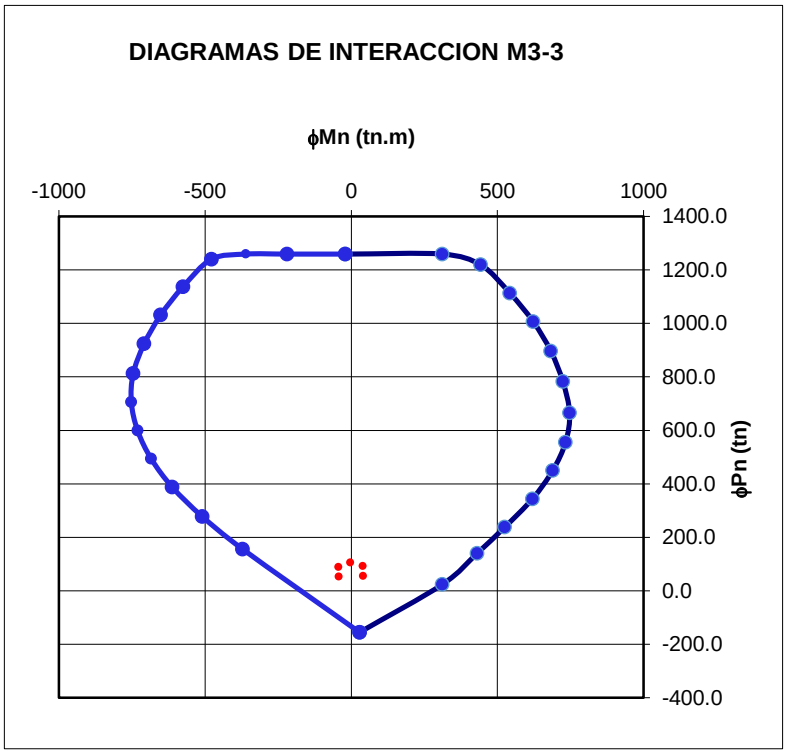


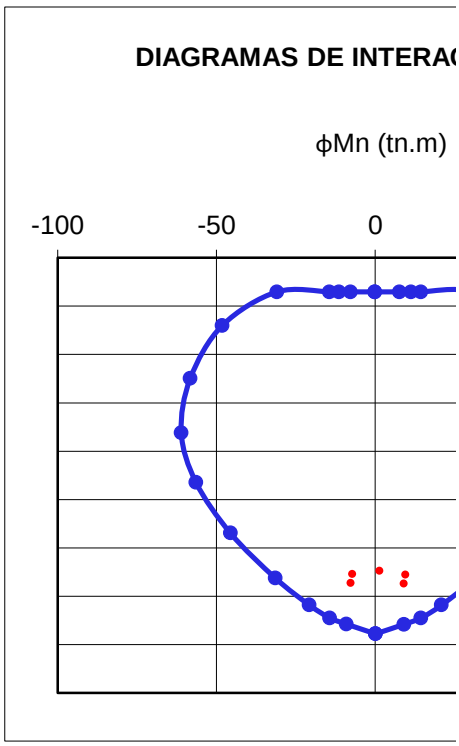






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	165.7197	9.7542	-1259	116.2615	9.6927	-1259
-1259	383.2227	2.1505	-1259	295.5348	9.4826	-1259
-1157	503.1076	1.7174	-1188	471.8656	2.9128	-1259
-1043	596.4275	1.7524	-1069	575.7432	2.9823	-1115
-926.4273	666.4201	1.8038	-948.1046	653.6842	3.0723	-985.3101
-806.8055	714.0116	1.8635	-823.7775	706.6395	3.1813	-852.6622
-682.4474	740.6674	1.9362	-694.6516	735.8671	3.3236	-715.3574
-562.6482	733.5579	1.4073	-568.3342	732.5919	2.5973	-580.1693
-450.1291	687.9412	1.3925	-450.3654	686.6994	2.4393	-450.6281
-337.6406	613.6957	1.3823	-332.7953	608.3595	2.4732	-324.1807
-224.6412	509.9939	1.4348	-214.5425	497.9212	2.5617	-196.5737
-121.3043	413.4505	1.6771	-106.1245	398.0091	3.1118	-78.7325
14.4484	258.698	2.2948	44.2578	210.4852	4.1793	76.2022
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

T	M2	M3
-0.184	-0.139	1.684
-0.184	0.2	-0.998
-0.669	-0.561	-0.385
-0.669	0.769	-0.674
5.369	5.507	8.545
5.369	4.903	17.36
-5.369	-5.507	-8.545
-5.369	-4.903	-17.36
9.72	8.248	19.408
9.72	8.374	41.426
-9.72	-8.248	-19.408
-9.72	-8.374	-41.426

P	**1.69**	Tn
M22	**-4.90**	Tn.m
M33	**17.36**	Tn.m

P	**1.26**	Tn
M22	**-8.37**	Tn.m
M33	**41.43**	Tn.m

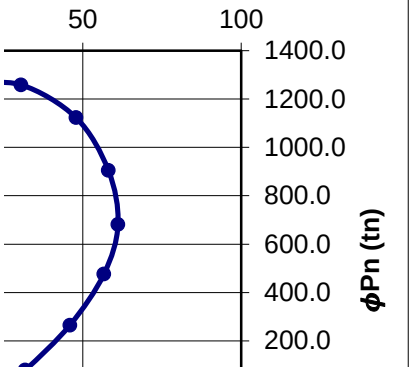
COMBINACIONES SISMO EN Y

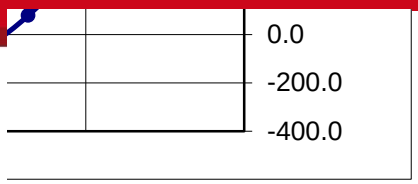
P	M22	M33

105.15	1.42	-2.64
91.67	-7.16	39.34
89.15	9.59	-43.52
54.70	-7.68	40.82
52.18	9.07	-42.03

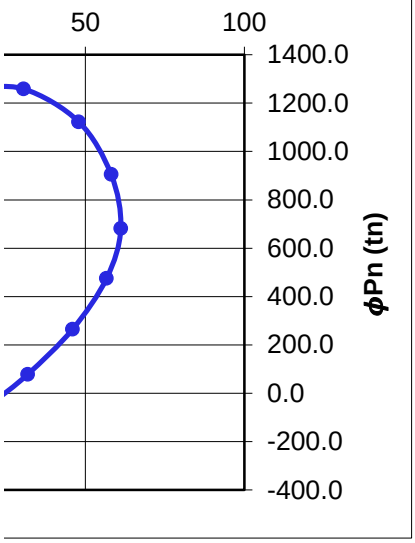
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1259.0	-0.1	1259.0	-0.1
1259.0	-7.7	1259.0	7.6
1259.0	-11.4	1259.0	11.3
1259.0	-14.5	1259.0	14.4
1259.0	-31.0	1259.0	30.5
1120.0	-48.2	1123.0	47.9
901.0	-58.2	905.0	58.1
677.0	-61.1	681.8	61.1
471.7	-56.5	475.7	56.7
261.7	-45.6	265.0	45.9
75.9	-31.5	78.6	31.8
-35.7	-20.8	-36.0	20.9
-89.5	-14.3	-89.9	14.4
-114.9	-9.1	-115.7	9.1
-155.1	0.1	-155.1	0.1

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
85.3204	8.227	-1259	56.4782	6.8621	-1259	9.7203
191.951	14.0256	-1259	116.0122	12.6008	-1259	3.34E+01
367.8131	11.5319	-1259	199.3255	16.8537	-1259	5.70E+01
536.3307	5.0629	-1259	333.8455	20.0089	-1259	51.7441
629.2761	5.2224	-1116	502.3398	17.483	-1120	32.4277
692.4243	5.4184	-929.5151	641.9718	11.5197	-901.0353	1.34E+01
727.0395	5.66	-767.8013	696.8246	11.6903	-677.0486	-4.81E+00
727.1758	4.9834	-611.1483	701.5303	11.4658	-471.6663	-2.69E+01
682.9138	4.3085	-454.2	657.4492	10.4955	-261.724	-4.90E+01
597.4634	4.3775	-299.9197	558.897	9.6842	-75.9389	-7.85E+01
474.4103	4.5741	-154.8355	418.1415	10.2458	35.7005	-78.31
366.7836	5.6806	-16.9907	285.8744	10.7284	89.5238	-63.1166
157.665	5.5591	97.0954	122.3963	5.5494	114.8553	-27.7705
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
7.7385	-1259	-97.9897	3.3437	-1259	-123.5256	3.0654
11.3809	-1259	-215.1502	7.7023	-1259	-288.2167	4.181
14.4808	-1259	-384.0313	9.4652	-1259	-440.2113	4.2456
30.9766	-1151	-532.3757	9.802	-1145	-560.9951	4.3181
48.1586	-999.5286	-634.2815	10.1937	-1019	-650.0079	4.4633
58.2401	-844.6451	-690.2895	10.6751	-889.6025	-708.1886	4.6579
61.0779	-685.7074	-700.9274	11.2896	-756.0866	-735.6567	4.9897
56.4683	-525.5878	-654.1105	12.8086	-625.5294	-725.5737	5.0722
45.6182	-336.7394	-512.6643	19.9053	-497.162	-673.1836	5.4858
31.5031	-171.2689	-349.9339	22.2861	-366.8613	-582.2806	6.0823
20.7701	-58.9589	-250.917	24.6248	-197.3411	-402.1554	14.2213
14.2909	32.0197	-143.8011	21.086	-53.9106	-252.7075	21.5566
9.0711	102.6626	-46.1042	11.5109	76.4885	-84.1407	14.9901
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	-154.9102	2.4235	-1259	-183.2761	1.4172	-1259
-1259	-319.4386	2.4795	-1259	-336.9065	1.4668	-1259
-1258	-457.1127	2.5054	-1250	-466.2821	1.4779	-1245
-1142	-567.6982	2.5277	-1140	-571.1993	1.497	-1138
-1024	-651.8014	2.5641	-1027	-652.0939	1.5204	-1029
-904.441	-709.908	2.6153	-912.3602	-709.642	1.5421	-918.1361
-780.9905	-743.0085	2.7097	-794.1385	-744.8339	1.5827	-803.7506
-660.5295	-741.395	2.6716	-679.4843	-747.2009	1.4941	-693.0132
-542.0619	-703.5221	2.8709	-566.8132	-717.1947	1.5381	-584.1217
-422.264	-632.676	3.2765	-453.3144	-657.4773	1.7313	-475.3408
-299.5571	-526.7436	3.9335	-337.8397	-566.5311	2.0739	-364.9658
-143.1681	-352.8149	12.7156	-214.2483	-436.1736	3.3639	-250.5179
38.0307	-139.4791	17.5371	-22.9055	-222.6288	16.0213	-102.6611
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
-203.3869	0.6787	-1259	-219.848	7.03E-02	-1259	-203.3923
-349.2777	0.7193	-1259	-359.7047	6.85E-02	-1259	-349.2848
-472.695	0.7239	-1240	-478.0715	6.63E-02	-1245	-472.7031
-573.4936	0.7288	-1137	-575.3138	6.35E-02	-1138	-573.5024
-652.0634	0.7411	-1031	-651.9063	6.01E-02	-1029	-652.0714
-709.0553	0.749	-923.1335	-708.3679	0.0556	-918.114	-709.0628
-745.6204	0.7592	-811.9599	-745.904	0.0496	-803.7247	-745.6271
-750.1168	0.7188	-704.771	-752.1843	0.0417	-692.9862	-750.1178
-724.9321	0.7065	-598.9053	-730.6592	0.0334	-584.097	-724.927
-673.0343	0.6971	-493.1537	-683.9448	0.0253	-475.3174	-673.0229
-592.2376	0.9196	-387.4828	-612.0023	0.0172	-364.9286	-592.201
-479.3447	1.1207	-278.1423	-510.0021	5.75E-03	-250.4691	-479.2868
-316.6999	6.8033	-155.9789	-371.712	-1.57E-02	-102.5599	-316.5903
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
-0.5381	-1259	-183.2872	-1.2769	-1259	-154.9292	-2.2834
-0.5824	-1259	-336.9211	-1.3301	-1259	-319.4638	-2.3431
-0.5916	-1250	-466.2993	-1.3458	-1258	-457.141	-2.374
-0.602	-1140	-571.217	-1.3708	-1142	-567.7284	-2.4019
-0.6214	-1027	-652.1106	-1.4013	-1024	-651.8275	-2.4458
-0.6386	-912.3135	-709.6575	-1.4323	-904.3598	-709.9312	-2.5067
-0.6607	-794.0822	-744.8457	-1.4855	-780.8852	-743.0147	-2.6154
-0.6367	-679.4273	-747.2022	-1.4134	-660.425	-741.3763	-2.5956
-0.6413	-566.7526	-717.1725	-1.477	-541.9431	-703.4512	-2.8188
-0.6488	-453.2495	-657.4322	-1.6906	-422.1294	-632.556	-3.2472
-0.8919	-337.7512	-566.4384	-2.0582	-299.3983	-526.5633	-3.9354
-1.1189	-214.1131	-436.003	-3.3811	-142.9643	-352.6108	-12.761
-6.865	-22.643	-222.3211	-16.1258	38.3942	-138.9688	-17.6669
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1259	-20.8277	0.0811	-1259	-20.8277	0.0811	-1259
-1259	-123.5503	-2.9264	-1259	-97.9922	-3.2143	-1259
-1259	-288.1146	-4.0338	-1259	-215.1742	-7.5794	-1259
-1259	-440.2575	-4.1153	-1259	-384.0675	-9.3502	-1259
-1145	-561.0301	-4.1958	-1151	-532.3232	-9.6855	-1259
-1019	-650.0391	-4.3494	-999.2298	-634.2626	-10.1015	-1123
-889.4428	-708.1911	-4.558	-844.2902	-690.2264	-10.5985	-904.9906
-755.8835	-735.6239	-4.9067	-685.2704	-700.7825	-11.2325	-681.82
-625.323	-725.5068	-5.01	-525.1112	-653.8448	-12.7803	-475.6978
-496.9268	-673.0084	-5.4494	-336.2372	-512.233	-19.9061	-264.9593
-366.6184	-582.047	-6.0761	-170.8276	-349.5273	-22.3264	-78.6157
-197.0421	-401.7991	-14.2507	-58.4868	-250.4395	-24.7232	36.0444
-53.4903	-252.242	-21.6543	32.4992	-143.1513	-21.184	89.8541
76.8568	-83.6434	-15.1086	102.6316	-46.1046	-11.6964	115.726
155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
-20.8277	0.0811	-1259	-20.8277	0.0811	-1259	-20.8277
9.8731	-7.633	-1259	56.5409	-6.7561	-1259	85.3227
33.5181	-11.2757	-1259	115.5011	-12.4804	-1259	191.8241
57.0182	-14.3699	-1259	199.008	-16.763	-1259	366.8919
52.4791	-30.4717	-1259	333.1368	-19.9473	-1115	536.0851
33.1068	-47.868	-1117	501.2899	-17.4915	-985.7008	629.0769
1.42E+01	-58.0793	-930.6989	641.4021	-11.5309	-853.1557	692.3139
-3.93E+00	-61.1022	-769.1153	696.758	-11.7059	-715.9636	727.0593
-2.61E+01	-56.6544	-612.2455	701.8797	-11.5161	-580.6741	727.3371
-4.83E+01	-45.9271	-455.0799	658.0549	-10.5787	-451.0418	683.1567
-7.75E+01	-31.8109	-300.6265	559.5893	-9.8013	-324.5006	597.752
-78.1385	-20.8742	-155.2263	418.4958	-10.3771	-196.7959	474.676
-62.6556	-14.3801	-17.2795	286.2473	-10.9283	-78.8838	366.9667
-26.5556	-9.0583	97.0709	122.4654	-5.7699	76.1203	157.8019
28.3871	-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
0.0811	-1259	-20.8277	0.0811	-1259	-20.8277	0.0811
-8.1347	-1259	116.2343	-9.6078	-1259	165.6734	-9.677
-13.9489	-1259	295.368	-9.4251	-1259	382.7232	-2.164
-11.5698	-1188	471.75	-2.8587	-1157	503.0477	-1.6675
-5.0194	-1069	575.6248	-2.9463	-1043	596.368	-1.721
-5.2003	-948.3281	653.5914	-3.0587	-926.5555	666.3739	-1.7954
-5.4239	-824.0612	706.5943	-3.1957	-806.969	713.9914	-1.8838
-5.7007	-695.0022	735.8893	-3.375	-682.6501	740.6835	-1.994
-5.0609	-568.6303	732.6884	-2.6834	-562.8198	733.6137	-1.4961
-4.4125	-450.5995	686.8341	-2.5451	-450.266	688.0207	-1.4986
-4.5003	-332.9745	608.5152	-2.5969	-337.7425	613.7806	-1.5062
-4.7138	-214.6605	498.0573	-2.7027	-224.7098	510.0694	-1.5756
-5.8627	-106.2003	398.0913	-3.2903	-121.342	413.4881	-1.8511
-5.78	44.1934	210.5939	-4.4003	14.4136	258.7555	-2.516
-0.1106	155.1016	28.3871	-0.1106	155.1016	28.3871	-0.1106

Curve 24	345. degrees	
P	M3	M2
-1259	-20.8277	0.0811
-1259	244.9118	-4.7134
-1242	416.6647	-0.7403
-1133	524.6956	-0.7693
-1023	610.6637	-0.7999
-910.3618	675.196	-0.8413
-794.1849	719.1191	-0.8916
-673.2687	744.0222	-0.9533
-558.9869	733.3318	-0.7222
-449.9442	688.5162	-0.7271
-341.0333	616.9887	-0.7297
-232.0704	518.4857	-0.7478
-131.4126	422.7713	-0.8955
-7.7294	291.425	-1.0883
155.1016	28.3871	-0.1106

S/C (ton/m2)	
AZOTEA	0.1
TIPICO	0.2
SOTANOS	0.25

PLACA 1	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.24	16.24	1.06
PISO 4	16.24	32.48	0.82
PISO 3	16.24	48.72	0.72
PISO 2	16.24	64.96	0.65
PISO 1	16.24	81.2	0.61

PLACA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	0.85

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	37.72	37.72	0.78
PISO 4	37.72	75.44	0.62
PISO 3	37.72	113.16	0.56
PISO 2	37.72	150.88	0.51
PISO 1	37.72	188.6	0.49

PLACA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	25.42	25.42	0.90
PISO 4	25.42	50.84	0.71
PISO 3	25.42	76.26	0.62
PISO 2	25.42	101.68	0.57
PISO 1	25.42	127.1	0.54

PLACA 4	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	22.56	22.56	0.93
PISO 4	22.56	45.12	0.73
PISO 3	22.56	67.68	0.65
PISO 2	22.56	90.24	0.59
PISO 1	22.56	112.8	0.56

PLACA 5	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.85	8.85	1.34
PISO 4	8.85	17.7	1.02
PISO 3	8.85	26.55	0.88
PISO 2	8.85	35.4	0.80
PISO 1	8.85	44.25	0.74

PLACA 6	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	2.67	2.67	2.24
PISO 4	2.67	5.34	1.66
PISO 3	2.67	8.01	1.40
PISO 2	2.67	10.68	1.25

PISO 1	2.67	13.35	1.14

PLACA 7	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	21.82	21.82	0.95
PISO 4	21.82	43.64	0.74
PISO 3	21.82	65.46	0.65
PISO 2	21.82	87.28	0.60
PISO 1	21.82	109.1	0.56

PLACA 8	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	8.93	8.93	1.34
PISO 4	8.93	17.86	1.02
PISO 3	8.93	26.79	0.88
PISO 2	8.93	35.72	0.79
PISO 1	8.93	44.65	0.74

PLACA 9	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.77	18.77	1.00
PISO 4	18.77	37.54	0.78
PISO 3	18.77	56.31	0.68
PISO 2	18.77	75.08	0.63
PISO 1	18.77	93.85	0.59

PLACA 10	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20	20	0.98
PISO 4	20	40	0.76
PISO 3	20	60	0.67
PISO 2	20	80	0.61
PISO 1	20	100	0.58

PLACA 11	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	41.43	41.43	0.76
PISO 4	41.43	82.86	0.61
PISO 3	41.43	124.29	0.54
PISO 2	41.43	165.72	0.50
PISO 1	41.43	207.15	0.48

PLACA 12	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.39	20.39	0.97
PISO 4	20.39	40.78	0.76
PISO 3	20.39	61.17	0.67
PISO 2	20.39	81.56	0.61
PISO 1	20.39	101.95	0.57

COLUMNA 1
CM (ton/m2)

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	16.32	16.32	1.06

AZOTEA	0.90
TIPICO	1.00
SOTANOS	1.00

PISO 4	16.32	32.64	0.82
PISO 3	16.32	48.96	0.71
PISO 2	16.32	65.28	0.65
PISO 1	16.32	81.6	0.61

COLUMNA 2	
CM (ton/m2)	
AZOTEA	0.8
TIPICO	0.9
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	18.69	18.69	1.00
PISO 4	18.69	37.38	0.78
PISO 3	18.69	56.07	0.68
PISO 2	18.69	74.76	0.63
PISO 1	18.69	93.45	0.59

COLUMNA 3	
CM (ton/m2)	
AZOTEA	0.95
TIPICO	1.05
SOTANOS	1

	Atrib (m2)	Atrib acum (m2)	Fr
PISO 5	20.79	20.79	0.96
PISO 4	20.79	41.58	0.75
PISO 3	20.79	62.37	0.66
PISO 2	20.79	83.16	0.61
PISO 1	20.79	103.95	0.57

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.624	17.05	1.624	17.05
3.248	17.05	4.872	34.10
3.248	17.05	8.12	51.16
3.248	17.05	11.368	68.21
3.248	17.05	14.616	85.26

	CM (ton)
Por area trib	85.3
Por etabs	71.1
Para diseño	**85.3**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
3.772	39.61	3.772	39.61
7.544	39.61	11.316	79.21
7.544	39.61	18.86	118.82
7.544	39.61	26.404	158.42
7.544	39.61	33.948	198.03

	CM (ton)
Por area trib	198.0
Por etabs	162.5
Para diseño	**198.0**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.542	26.69	2.542	26.69
5.084	26.69	7.626	53.38
5.084	26.69	12.71	80.07
5.084	26.69	17.794	106.76
5.084	26.69	22.88	133.46

	CM (ton)
Por area trib	133.5
Por etabs	114.0
Para diseño	**133.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.256	23.69	2.256	23.69
4.512	23.69	6.768	47.38
4.512	23.69	11.28	71.06
4.512	23.69	15.792	94.75
4.512	23.69	20.3	118.44

	CM (ton)
Por area trib	118.4
Por etabs	177.7
Para diseño	**177.7**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.885	9.29	0.885	9.29
1.77	9.29	2.655	18.59
1.77	9.29	4.425	27.88
1.77	9.29	6.195	37.17
1.77	9.29	7.97	46.46

	CM (ton)
Por area trib	46.5
Por etabs	42.3
Para diseño	**46.5**

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.267	2.80	0.267	2.80
0.534	2.80	0.801	5.61
0.534	2.80	1.335	8.41
0.534	2.80	1.869	11.21

	CM (ton)
Por area trib	14.0
Por etabs	39.9
Para diseño	

0.534	2.80	2.403	14.02

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.182	22.91	2.182	22.91
4.364	22.91	6.546	45.82
4.364	22.91	10.91	68.73
4.364	22.91	15.274	91.64
4.364	22.91	19.638	114.56

	CM (ton)
Por area trib	114.6
Por etabs	105.8
Para diseño	114.6

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
0.893	9.38	0.893	9.38
1.786	9.38	2.679	18.75
1.786	9.38	4.465	28.13
1.786	9.38	6.251	37.51
1.786	9.38	8.037	46.88

	CM (ton)
Por area trib	46.9
Por etabs	55.0
Para diseño	55.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.877	19.71	1.877	19.71
3.754	19.71	5.631	39.42
3.754	19.71	9.385	59.13
3.754	19.71	13.139	78.83
3.754	19.71	16.893	98.54

	CM (ton)
Por area trib	98.5
Por etabs	86.9
Para diseño	98.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2	21.00	2	21.00
4	21.00	6	42.00
4	21.00	10	63.00
4	21.00	14	84.00
4	21.00	18	105.00

	CM (ton)
Por area trib	105.0
Por etabs	77.0
Para diseño	105.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
4.143	43.50	4.143	43.50
8.286	43.50	12.429	87.00
8.286	43.50	20.715	130.50
8.286	43.50	29.001	174.01
8.286	43.50	37.287	217.51

	CM (ton)
Por area trib	217.5
Por etabs	154.6
Para diseño	217.5

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.039	21.41	2.039	21.41
4.078	21.41	6.117	42.82
4.078	21.41	10.195	64.23
4.078	21.41	14.273	85.64
4.078	21.41	18.351	107.05

	CM (ton)
Por area trib	107.0
Por etabs	98.8
Para diseño	107.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.632	14.69	1.632	14.69

	CM (ton)
Por area trib	80.0

3.264	16.32	4.896	31.01
3.264	16.32	8.16	47.33
3.264	16.32	11.424	63.65
3.264	16.32	14.688	79.97

Por etabs	66.0
Para diseño	80.0

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
1.869	14.95	1.869	14.95
3.738	16.82	5.607	31.77
3.738	16.82	9.345	48.59
3.738	16.82	13.083	65.42
3.738	16.82	16.821	82.24

	CM (ton)
Por area trib	82.2
Por etabs	94.1
Para diseño	91.1

Pv/piso (ton)	Pm/piso (ton)	Nv (ton)	Nm (ton)
2.079	21.83	2.079	21.83
4.158	21.83	6.237	43.66
4.158	21.83	10.395	65.49
4.158	21.83	14.553	87.32
4.158	21.83	18.711	109.15

	CM (ton)
Por area trib	109.1
Por etabs	
Para diseño	

CV (ton)
14.6
17.6
14.6

CV (ton)
33.9
40.7
33.9

CV (ton)
22.9
21.2
22.9

CV (ton)
20.3
27.1
27.1

CV (ton)
8.0
8.4
8.0

CV (ton)
2.4
6.4

CV (ton)
19.6
22.1
19.6

CV (ton)
8.0
3.2
3.2

CV (ton)
16.9
19.4
16.9

CV (ton)
18.0
18.8
18.0

CV (ton)
37.3
39.4
37.3

CV (ton)
18.4
19.8
18.4

CV (ton)
14.7

13.2
14.7

CV (ton)

16.8
19.0
19.0

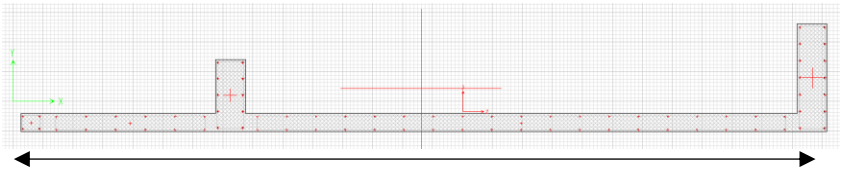
CV (ton)

18.7

DISEÑO DE MUROS DE CORTE (PLACA - 12)

1. INGRESO DE DATOS GENERALES

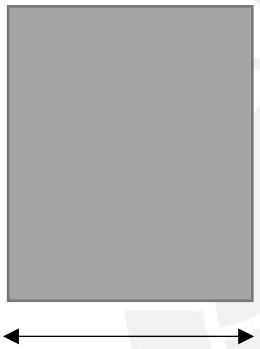
Lm (m)	6.85



t (m)

d (m) = 0.85xLm	5.82

f'c (kg/cm2)	280
fy (kg/cm2)	4200



hm (m)	13.25

Lm (m)	6.85

hm/Lm	1.9

Norma	hm / Lm = <	1.50	α =
	hm / Lm = >	2.50	α =
	Interpolacion 1.5 < hm/Lm <		α =

α =

2. DISEÑO POR CORTANTE

Pu (ton)	**69.53**	(Axial del etabs)
Mua (ton)	**118.75**	(Momento del etabs)
Mn (ton)	**118.75**	(Momento nominal del diagrama de interaccion, al inicio =
Vua (ton)	**32.92**	(Cortante del etabs)

2.1. CORTANTE AMPLIFICADO

Vu = Vua * Mn / Mua

Vu (ton)	**32.92**

2.2. CORTANTE DEL CONCRETO

$$\phi Vc = 0.85 \times \alpha c \times \sqrt{f'c} \times b \times d$$

ΦVc (ton)	65.84

verificar si Vu < ΦVc/2 usar

ρh≥0.0020
ρv≥0.0015

si Vu > ΦVc/2 usar

ρh≥0.0025	OK!
ρv≥0.0025	OK!

2.2. CÁLCULO DE ACERO Y ESPACIAMIENTO

$$Vs = \frac{Vu - \phi Vc}{\phi}$$

Vs (ton)	-38.73

$$Sh = \frac{Ah \times d \times fy}{Vs}$$

Ah = área de acero horizontal

= (2 * A barra) ó (1 * A barra)

Doble malla si el espesor del muro ≥ 20cm

Asumir $A_v = A_h$ y $S_v = S_h$

2.2.1. CÁLCULO DE ACERO HORIZONTAL

	Ah (cm2)	S (cm)	Separación máxima (cm)		S a usar	As (cm2/m)
2 ϕ 8 mm =	1.00 cm2	-63.15	3t=45.0 cm	40.0 cm	40.0 cm	2.50 cm2/m
2 ϕ 3/8" =	1.42 cm2	-89.67	3t=45.0 cm	40.0 cm	40.0 cm	3.55 cm2/m
2 ϕ 1/2" =	2.58 cm2	-162.92	3t=45.0 cm	40.0 cm	40.0 cm	6.45 cm2/m

2.2.2. CÁLCULO DE ACERO VERTICAL

PV = 0.0025 + 0.5* (2.5 - hm/lm)* (ph - 0.0025) =

Pv	Pv min	S a usar	Separación máxima (cm)	
0.0025	0.0025	26.67 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	37.87 cm	3t=45.0 cm	40.0 cm
0.0025	0.0025	68.80 cm	3t=45.0 cm	40.0 cm

RESUMEN

Refuerzo Horizontal			Refuerzo Vertical		
	S a usar	As (cm2/ml)		S a usar	As (cm2/ml)
2 ϕ 8 mm =	26.67 cm	3.75 cm2/m	2 ϕ 8 mm =	26.67 cm	3.75 cm2/m
2 ϕ 3/8" =	37.87 cm	3.75 cm2/m	2 ϕ 3/8" =	37.87 cm	3.75 cm2/m

2 ϕ 1/2" =	68.80 cm	3.75 cm2/m	2 ϕ 1/2" =	68.80 cm	3.75 cm2/m

3. VERIFICACIÓN DE RESISTENCIA PARA CARGAS DE GRAVEDAD

$h_{c\ (entrepiso)}$ = 265.00 cm

K = 1.00 Ver Norma

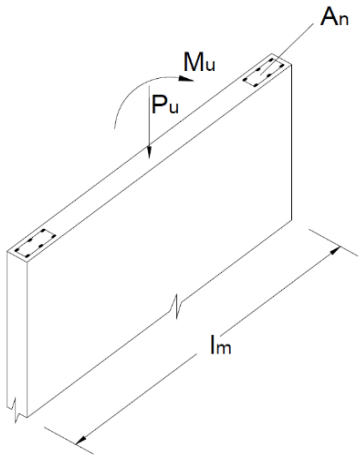
N_u = 69.53 [1.4 CM + 1.7CV]

$$\phi P_{nw} = 0.55 \phi f'c Ag [1 - (k lc / 32 h)^2]$$

ϕ Pnw = 770.0 ton > Pu = 69.53 ton OK!

entonces h está bien

4. ARMADURA PRELIMINAR DE NÚCLEOS



Fuerza actuante en cada uno de los nucleos extremos F
F = Momento máximo de las combinaciones / Longitud de
As = F / Fy

Mu (ton-m)	118.75
Long. (m)	6.85
F (ton)	17.3
Fy (kg/cm2)	4200
As (cm2)	4.13

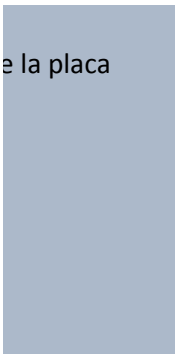
0.15

0.80
0.53
1.205

0.53

Mu)

Ph	Phmin	Asmin (cm2/m)	S (cm)
0.0006	0.0025	3.75 cm2/m	26.67
0.0009	0.0025	3.75 cm2/m	37.87
0.0016	0.0025	3.75 cm2/m	68.80



	Curve 1	0. degrees		Curve 2	15. degrees	
	P	M3	M2	P	M3	M2
1	-1950	13.2907	18.2638	-1950	13.2907	18.2638
2	-1950	609.0892	29.2822	-1950	606.8096	29.5901
3	-1950	989.0257	40.1998	-1950	998.9529	40.9365
4	-1950	1316.8347	51.1375	-1950	1334.6779	52.3085
5	-1653	1955.2743	22.5766	-1649	1959.3996	27.6006
6	-1512	2183.5233	33.5776	-1494	2203.9776	35.6317
7	-1366	2365.882	44.6319	-1343	2381.3188	47.1514
8	-1212	2507.046	55.7561	-1184	2513.1023	58.7604
9	-1055	2579.2664	66.1277	-1022	2571.3772	69.6311
10	-896.7137	2579.9982	7.62E+01	-858.45	2553.8656	79.8739
11	-757.0992	2474.6389	89.0702	-713.9069	2424.3522	93.1975
12	-617.5346	2298.6128	101.9342	-569.4193	2219.0911	106.516
13	-478.0586	2052.0609	114.7897	-423.7149	1934.531	119.9135
14	-333.5327	1720.5599	126.2868	-263.8097	1533.9739	130.6678
15	344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926

DISEÑO POR FLEXOCOMPRESIÓN

Story	Pier	Load	Loc	P	V2	V3
PISO4	P12	LIVE	Top	-6.46	-0.49	-0.5
PISO4	P12	LIVE	Bottom	-6.46	-0.49	-0.5
PISO4	P12	DEAD-SQ	Top	-37.88	-1.75	-2.3
PISO4	P12	DEAD-SQ	Bottom	-37.88	-1.75	-2.3
PISO4	P12	RX MAX	Top	5.13	6.75	5.41
PISO4	P12	RX MAX	Bottom	5.13	6.75	5.41
PISO4	P12	RX MIN	Top	-5.13	-6.75	-5.41
PISO4	P12	RX MIN	Bottom	-5.13	-6.75	-5.41
PISO4	P12	RY MAX	Top	8.48	28.92	7.81
PISO4	P12	RY MAX	Bottom	8.48	28.92	7.81
PISO4	P12	RY MIN	Top	-8.48	-28.92	-7.81
PISO4	P12	RY MIN	Bottom	-8.48	-28.92	-7.81

1.4CM+1.7CV	64.01	Tn	
1.25(CM+CV)	55.43	Tn	

CM	M22	-0.92	Tn.m
	M33	-4.59	Tn.m
CV	M22	-0.57	Tn.m
	M33	-1.38	Tn.m

RX

RY

COMBINACIONES SISMO EN X			
	P	M22	M33

C

1.4CM+1.7CV	64.01	-2.27	-8.78
1.25(CM+CV)+CS	60.56	-7.24	23.73
1.25(CM+CV)-CS	50.30	3.49	-38.67
0.9CM+CS	39.22	-6.20	27.07
0.9CM-CS	28.96	4.53	-32.45

1.4CM+1.7CV
1.25(CM+CV)+CS
1.25(CM+CV)-CS
0.9CM+CS
0.9CM-CS

MOMENTO MINIMO DE DISEÑO

PUNTO	0 GRADOS M_{3-3}		180 GRADOS M_{3-3}	
	ϕPn (tn)	ϕMn(tn.m)	ϕPn (tn)	ϕMn(tn.m)
1	1950.0	13.3	1950.0	13.3
2	1950.0	609.1	1909.0	-1469.0
3	1950.0	989.0	1776.0	-1776.0
4	1950.0	1316.8	1640.0	-2032.0
5	1653.0	1955.3	1500.0	-2237.0
6	1512.0	2183.5	1354.0	-2392.0
7	1366.0	2365.9	1200.0	-2500.0
8	1212.0	2507.0	1037.0	-2568.0
9	1055.0	2579.3	888.4	-2510.0
10	896.7	2580.0	740.5	-2368.0
11	757.1	2474.6	588.6	-2148.0
12	617.5	2298.6	245.6	-1501.0
13	478.1	2052.1	74.3	-1292.0
14	333.5	1720.6	-118.1	-802.1
15	-344.8	-18.1	-344.8	-18.1

PUNTO
1
2
3
4
5
6
7
8
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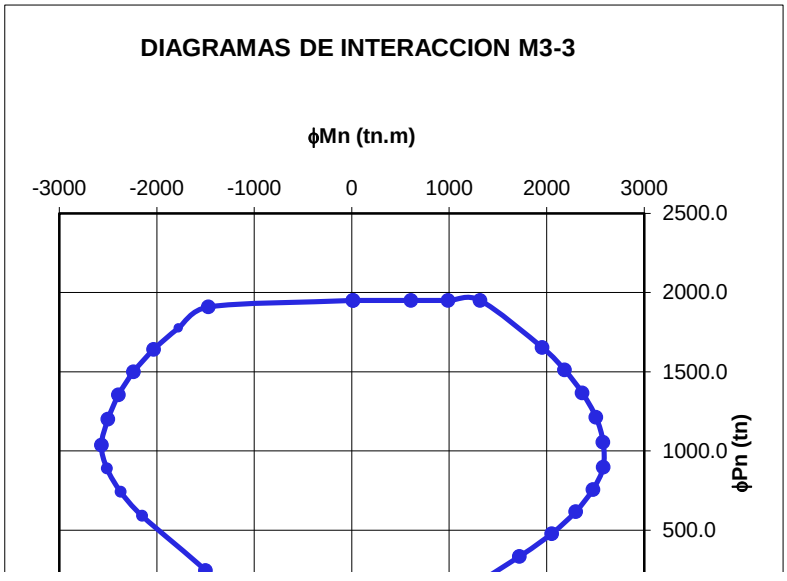
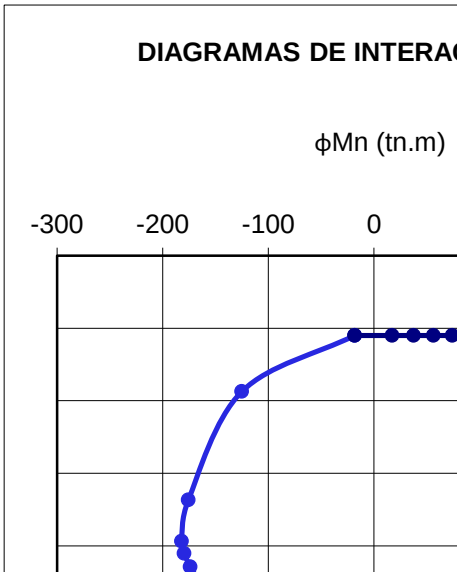
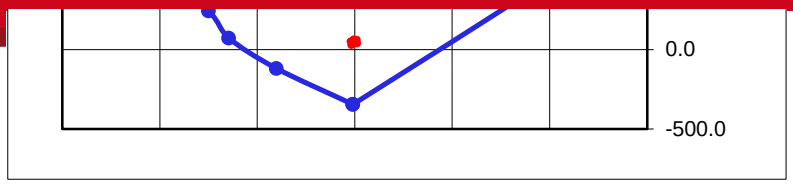
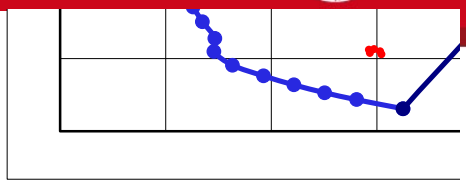
10
11
12
13
14
15

SISMO EN XX

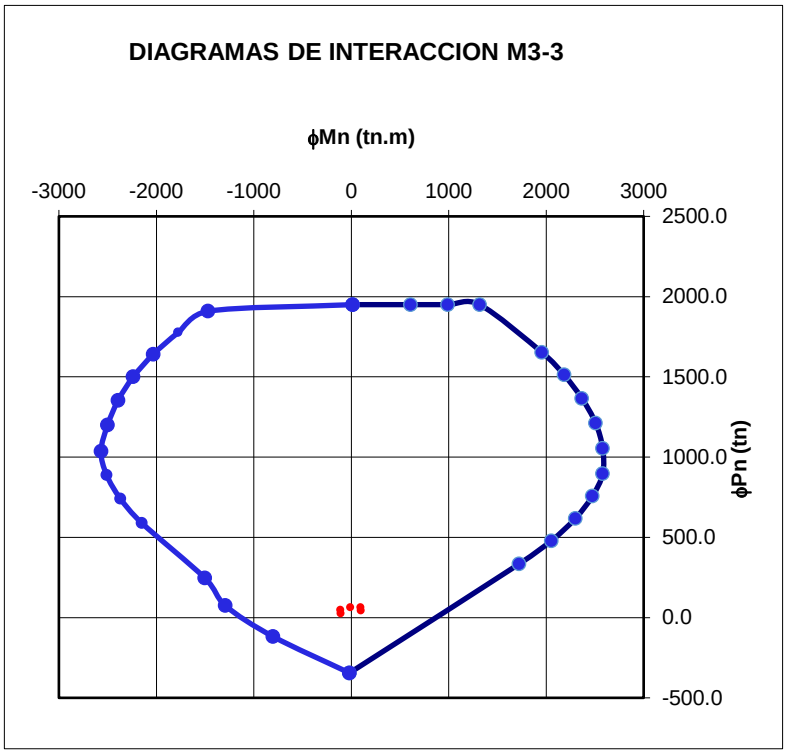


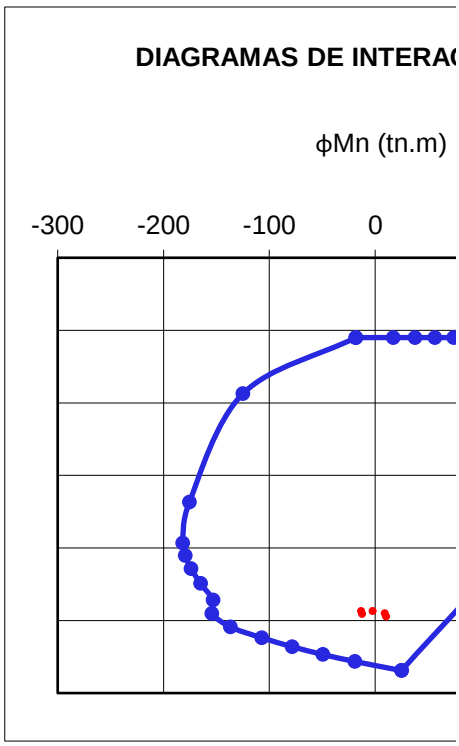






SISMO EN YY





Curve 3	30. degrees		Curve 4	45. degrees		Curve 5
P	M3	M2	P	M3	M2	P
-1950	13.2907	18.2638	-1950	13.2907	18.2638	-1950
-1950	604.1065	29.9318	-1950	600.2332	30.3815	-1950
-1950	1010.2472	41.7735	-1950	1024.9998	42.8823	-1950
-1950	1354.5151	53.6313	-1942	1381.133	55.4428	-1917
-1661	1930.7078	38.8256	-1676	1888.1601	53.3872	-1666
-1473	2225.9999	38.0013	-1444	2253.389	41.2206	-1393
-1316	2396.6246	50.058	-1280	2413.0854	53.9924	-1216
-1152	2516.3425	62.228	-1107	2514.4134	66.9254	-1030
-983.5279	2557.1946	73.6778	-931.5119	2529.2361	79.1418	-839.8685
-814.3779	2516.2847	84.2525	-754.2785	2452.8741	90.297	-647.783
-663.9498	2357.7212	97.967	-594.1534	2248.0438	104.6238	-470.4087
-512.684	2113.7093	111.9085	-431.8785	1942.36	119.162	-291.4614
-356.6288	1773.9566	125.58	-262.8021	1526.5791	132.6015	-126.3135
-157.0614	1329.8239	149.1476	2.4663	983.9315	143.3186	122.0603
344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329

T	M2	M3
-0.949	0.752	-0.094
-0.949	-0.573	-1.384
-5.684	5.166	0.046
-5.684	-0.924	-4.592
4.094	9.532	27.494
4.094	5.365	31.202
-4.094	-9.532	-27.494
-4.094	-5.365	-31.202
7.232	11.615	51.075
7.232	11.192	103.76
-7.232	-11.615	-51.075
-7.232	-11.192	-103.76

P	**5.13**	Tn
M22	**-5.37**	Tn.m
M33	**31.20**	Tn.m

P	**8.48**	Tn
M22	**-11.19**	Tn.m
M33	**103.76**	Tn.m

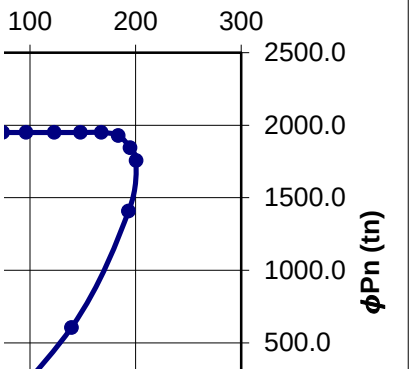
COMBINACIONES SISMO EN Y

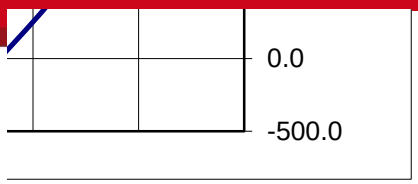
P	M22	M33

64.01	-2.27	-8.78
63.91	-13.06	96.29
46.95	9.32	-111.23
42.57	-12.02	99.63
25.61	10.36	-107.89

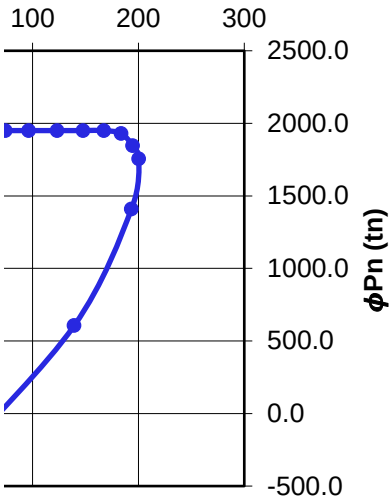
90 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)	270 GRADOS ϕPn (tn)	M_{2-2} ϕMn(tn.m)
1950.0	-18.3	1950.0	-18.3
1564.0	-124.9	1950.0	17.3
816.5	-175.5	1950.0	37.7
533.0	-181.9	1950.0	56.4
447.6	-179.5	1950.0	74.4
356.6	-173.9	1950.0	96.3
254.6	-165.0	1950.0	123.1
139.9	-153.1	1950.0	147.8
49.0	-154.2	1950.0	167.5
-44.7	-136.7	1930.0	183.6
-119.0	-107.1	1846.0	194.7
-180.4	-78.5	1756.0	200.4
-234.4	-49.3	1409.0	193.4
-282.6	-19.2	606.0	139.3
-344.8	24.9	-344.8	24.9

CCION M2-2





CCION M2-2



60. degrees		Curve 6	75. degrees		Curve 7	90. degrees
M3	M2	P	M3	M2	P	M3
13.2907	18.2638	-1950	13.2907	18.2638	-1950	13.2907
592.6191	31.1026	-1950	570.0948	32.9586	-1564	311.6279
1050.1564	44.7898	-1950	1111.1328	49.8264	-816.4581	5.54E+02
1423.9688	58.4845	-1848	1525.362	66.7349	-532.9628	6.17E+02
1881.9646	64.5718	-1582	1939.4005	79.8279	-447.6104	601.0463
2292.6532	46.718	-1296	2259.7237	78.269	-356.5985	588.1592
2429.3872	60.7521	-1039	2387.4538	78.9722	-254.6046	5.78E+02
2492.7083	75.0405	-815.6221	2313.5672	96.557	-139.9412	5.72E+02
2453.3832	88.6647	-587.7019	2092.8497	113.2384	-49.0208	6.41E+02
2303.3699	101.0013	-359.922	1709.5015	128.187	44.6661	6.55E+02
2010.5195	115.7503	-203.0248	1395.7075	147.1631	118.9949	5.58E+02
1596.5452	130.6892	-88.3672	1179.1475	155.4502	180.4305	434.3489
1261.4157	155.4391	59.6297	813.8687	130.2958	234.4473	303.3896
633.549	104.8662	210.037	375.8125	62.8573	282.5831	163.2056
-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145

	Curve 8	105. degrees		Curve 9	120. degrees	
M2	P	M3	M2	P	M3	M2
18.2638	-1950	13.2907	18.2638	-1950	13.2907	18.2638
124.9279	-1950	-335.5517	20.1855	-1950	-538.1218	15.1658
175.5497	-1950	-813.5483	29.682	-1950	-1213	1.8108
181.8909	-1910	-1276	31.4354	-1716	-1830	-45.9107
179.4796	-1701	-1674	24.6654	-1526	-2178	-67.6244
173.9317	-1488	-2008	9.2994	-1378	-2339	-58.8626
164.9507	-1268	-2283	-14.7938	-1222	-2448	-50.7674
153.1356	-1063	-2434	-29.9679	-1057	-2511	-43.6724
154.2204	-890.6223	-2411	-22.5827	-890.3408	-2499	-38.4467
136.6909	-719.6204	-2294	-16.5794	-735.1001	-2366	-28.8937
107.1301	-552.6245	-2073	-9.1624	-581.4813	-2136	-16.752
78.5233	-359.4087	-1675	3.2269	-360.5845	-1702	-9.2066
49.2938	-144.0437	-1267	10.8882	-83.1189	-1272	-36.7148
19.1824	149.1451	-559.766	4.7448	163.7139	-649.47	-39.2637
-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926

Curve 10	135. degrees		Curve 11	150. degrees		Curve 12
P	M3	M2	P	M3	M2	P
-1950	13.2907	18.2638	-1950	13.2907	18.2638	-1950
-1950	-762.3227	5.1873	-1950	-1100	-32.8318	-1915
-1821	-1656	-71.4926	-1787	-1747	-89.6321	-1781
-1658	-1991	-79.326	-1650	-2008	-80.8041	-1645
-1516	-2203	-70.6151	-1509	-2217	-72.3791	-1504
-1369	-2362	-62.423	-1363	-2376	-64.5598	-1358
-1214	-2472	-55.0377	-1209	-2484	-57.745	-1204
-1050	-2536	-48.9716	-1044	-2549	-52.3479	-1040
-887.1643	-2512	-43.2093	-887.5894	-2512	-44.476	-888.0253
-737.5201	-2367	-31.2049	-738.8212	-2368	-32.5631	-739.7382
-584.7275	-2142	-19.5839	-586.1858	-2144	-21.1907	-587.474
-311.4522	-1612	-23.6864	-254.3018	-1503	-45.0099	-244.7221
-71.7255	-1273	-48.8429	-72.9668	-1282	-52.2533	-73.7415
145.0717	-714.0526	-42.4454	133.5003	-752.147	-43.8827	125.072
344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329

165. degrees		Curve 13	180. degrees		Curve 14	195. degrees
M3	M2	P	M3	M2	P	M3
13.2907	18.2638	-1950	13.2907	18.2638	-1950	13.2907
-1451	-99.2476	-1909	-1469	-1.00E+02	-1950	-1326
-1763	-90.5441	-1776	-1776	-9.13E+01	-1826	-1667
-2021	-81.9047	-1640	-2032	-8.29E+01	-1686	-1952
-2228	-73.6953	-1500	-2237	-7.49E+01	-1542	-2182
-2385	-66.2562	-1354	-2392	-6.78E+01	-1392	-2358
-2493	-59.8838	-1200	-2500	-61.7821	-1235	-2482
-2559	-54.8831	-1037	-2568	-57.0997	-1068	-2560
-2511	-45.3102	-888.3656	-2510	-46.0336	-911.301	-2522
-2368	-33.5633	-740.5189	-2368	-34.4354	-758.4349	-2387
-2146	-22.4105	-588.5733	-2148	-23.4742	-597.2379	-2160
-1500	-52.8073	-245.594	-1501	-54.0996	-251.3715	-1505
-1288	-54.7626	-74.3321	-1292	-56.9475	-77.2769	-1299
-779.6504	-44.9286	118.1215	-802.0721	-45.7831	119.3834	-797.888
-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145

	Curve 15	210. degrees		Curve 16	225. degrees	
M2	P	M3	M2	P	M3	M2
18.2638	-1950	13.2907	18.2638	-1950	13.2907	18.2638
-104.9661	-1950	-1033	-107.0746	-1950	-711.3908	-88.9203
-95.7375	-1884	-1531	-100.8061	-1950	-1328	-107.6949
-86.8644	-1740	-1852	-91.5249	-1812	-1700	-97.9256
-78.6226	-1591	-2112	-82.9116	-1656	-2005	-88.8017
-71.2274	-1436	-2313	-75.1599	-1496	-2243	-80.4781
-64.8339	-1274	-2457	-68.3598	-1328	-2417	-73.1101
-59.8067	-1103	-2550	-62.9247	-1150	-2533	-67.1167
-48.6587	-938.128	-2534	-51.6938	-974.7459	-2547	-55.7872
-36.6697	-779.5023	-2408	-39.2493	-808.2462	-2433	-42.712
-27.0193	-585.8902	-2134	-38.3959	-567.0582	-2087	-54.1792
-55.235	-259.0608	-1516	-56.6927	-271.7968	-1541	-59.0687
-58.4889	-81.9298	-1307	-59.766	-88.7022	-1318	-61.1086
-45.8803	121.0613	-792.2173	-45.9807	123.2869	-784.4455	-46.1364
-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926

Curve 17	240. degrees		Curve 18	255. degrees		Curve 19
P	M3	M2	P	M3	M2	P
-1950	13.2907	18.2638	-1950	13.2907	18.2638	-1950
-1950	-516.2372	-65.4074	-1950	-351.9208	-42.4817	-1950
-1950	-955.2466	-109.6166	-1950	-609.2193	-83.3218	-1950
-1935	-1397	-109.0669	-1950	-871.3972	-109.199	-1950
-1768	-1789	-98.9388	-1950	-1137	-120.0578	-1950
-1597	-2099	-89.6067	-1865	-1550	-114.1689	-1950
-1418	-2332	-81.2398	-1657	-1986	-103.018	-1950
-1230	-2492	-74.2966	-1439	-2305	-93.3588	-1950
-1040	-2551	-62.9538	-1219	-2487	-80.8846	-1950
-858.2889	-2470	-48.6304	-951.1037	-2429	-81.884	-1930
-572.1349	-2074	-66.8965	-649.1177	-2133	-83.6301	-1846
-293.7987	-1584	-62.9686	-356.2303	-1692	-72.8828	-1756
-101.8468	-1338	-62.6155	-136.623	-1384	-65.7707	-1409
127.1973	-770.4491	-46.3899	137.3164	-731.921	-47.1126	-606.0375
344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329

270. degrees		Curve 20	285. degrees		Curve 21	300. degrees
M3	M2	P	M3	M2	P	M3
13.2907	18.2638	-1950	13.2907	18.2638	-1950	13.2907
-123.2762	-17.2716	-1950	448.54	-0.595	-1950	523.9023
-212.7207	-37.668	-1950	1003.2742	-5.1143	-1950	956.6802
-301.7703	-56.3915	-1852	1502.2669	-1.1472	-1862	1530.894
-394.9788	-74.3509	-1674	1871.5012	8.8887	-1660	1940.5466
-465.4874	-96.3082	-1517	2127.2906	18.9177	-1513	2181.1384
-5.12E+02	-123.1397	-1352	2322.888	28.4547	-1361	2370.557
-5.65E+02	-147.8001	-1177	2461.3534	37.254	-1199	2511.9523
-6.11E+02	-167.4578	-962.6143	2390.191	18.3287	-1033	2579.1202
-6.48E+02	-183.6	-736.7944	2158.4071	-5.3501	-874.7791	2544.5225
-6.77E+02	-194.7021	-511.734	1815.3859	-24.0765	-723.3437	2407.3683
-701.4367	-200.4468	-277.7171	1362.3432	-38.2287	-519.3796	2042.7759
-619.3058	-193.445	-53.0385	1019.9234	-50.1649	-234.8844	1387.9177
-330.0448	-139.3258	220.9576	336.4621	-39.1564	114.7618	642.9752
-18.1145	-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145

	Curve 22	315. degrees		Curve 23	330. degrees	
M2	P	M3	M2	P	M3	M2
18.2638	-1950	13.2907	18.2638	-1950	13.2907	18.2638
24.5523	-1950	560.2412	26.5276	-1950	581.0761	27.6872
30.8789	-1950	956.5106	37.6525	-1950	970.4042	38.7241
11.4104	-1911	1439.3452	24.6295	-1950	1330.2202	45.1775
18.8881	-1657	1947.3116	20.4496	-1655	1950.4175	21.3169
30.0233	-1513	2182.6269	31.5648	-1513	2183.097	32.4092
40.9387	-1363	2369.9475	42.7459	-1364	2368.3093	43.5364
51.3748	-1205	2513.3355	53.9565	-1208	2510.7637	54.7098
60.4889	-1044	2587.1198	64.3703	-1049	2583.9574	65.1169
71.2352	-888.1757	2572.0949	75.8522	-892.2227	2576.7393	76.2825
80.6747	-743.3305	2452.9733	87.3333	-751.026	2467.6013	89.2676
55.9253	-594.4843	2248.752	96.7407	-608.3155	2281.8254	101.2705
-1.4355	-411.677	1873.9132	85.2318	-459.305	2005.5805	109.9162
-38.0457	-22.0364	1024.7325	-15.5038	-185.1981	1370.5344	45.988
-24.8926	344.8329	-18.1145	-24.8926	344.8329	-18.1145	-24.8926

Curve 24	345. degrees	
P	M3	M2
-1950	13.2907	18.2638
-1950	596.153	28.5403
-1950	980.4338	39.5133
-1950	1311.8106	50.5032
-1654	1953.0523	21.99
-1512	2183.364	33.0329
-1365	2367.0355	44.1212
-1210	2508.8009	55.268
-1052	2581.4812	65.6559
-894.6338	2578.5238	76.2387
-754.2963	2471.4534	89.1739
-614.0018	2292.9645	102.1046
-472.3883	2039.2517	114.1421
-314.1941	1667.0907	119.5038
344.8329	-18.1145	-24.8926

MATERIAL	PESOS UNITARIOS (kg/m3)
Concreto Armado	2400
Unidades de albañileria	1800
Agua	1000

USO	S/C (kg/m2)
VIVIENDAS	200
AZOTEA	100

PREDIMENSIONAMIENTO DE COLUMNAS POR

COLUMNA	ÁREA TRIBUTARIA (m2)	CARGA (ton/m2)	P servicio
1	80	1	80
2	91	1	113
3	109	1	128

VERIFICACIÓN POR

	ÁREA ASIGNADA	CARGA ULTIMA (Pu)	Inercia Crítica
C1	0.145	114.84	0.0008
C2	0.1875	187.17	0.001
C3	0.3125	184.39	0.0016

120
169.5
192

ł CARGA AXIAL

sea f'c= 210kg/cm2

ÁREA REQUERIDA (cm2)	ÁREA ASIGNADA (cm2)
634.9	1450
722.2	1875
865.1	3125

846.6
963.0
1153.4

PANDEO EN EL 1ER NIVEL

H de entrepiso	phi*Pcr (Col)	phi*Pcr/Pu > 1.6 (Col)	
2.4	41.72	0.36	Cumple
2.4	52.14	0.28	Cumple
2.4	83.43	0.45	Cumple

	SISMO XX	SISMO YY
V (TON)	257	194
AREA REQUERIDA (cm2)	31493.3	23773.2
PLACA 1		4625
PLACA 2	1500	11875
PLACA 3	3750	14625
PLACA 4	15500	6750
PLACA 5	3375	
PLACA 6	4425	
PLACA 7	6500	
PLACA 8	4500	8550
PLACA 9	5500	
PLACA 10	1500	3625
PLACA 11	1250	7500
PLACA 12	3000	9900
AREA DISPONIBLE (cm2)	50800	67450

MATERIAL	PESOS UNITARIOS (kg/m3)
Concreto Armado	2400
Unidades de albañileria	1800
Agua	1000

USO	S/C (kg/m2)
VIVIENDAS	200
AZOTEA	100

PREDIMENSIONAMIENTO DE COLUMNAS POR CA

COLUMNA	ÁREA TRIBUTARIA (m2)	CARGA (ton/m2)	P servicio (tn)
1	95	1	95
2	99	1	99
3	127.9	1	127.9

$$\phi P_{cr} > 1.6 P_U$$

VERIFICACIÓN POR PA

	ÁREA ASIGNADA	CARGA ULTIMA (Pu) tn	Inercia Crítica (cm4)
C1	0.145	142.5	80000
C2	0.1875	148.5	100000
C3	0.3125	191.85	160000

142.5
148.5
191.85

ARGA AXIAL

sea f'c= 210kg/cm2

ÁREA REQUERIDA (cm2)	ÁREA ASIGNADA (cm2)
1005.3	1450
1047.6	1875
1353.4	3125

1005.3
1047.6
1353.4

NDEO EN EL 1ER NIVEL

$$Pcr = \left(\frac{\pi}{kh}\right)^2 E\ Ief, \quad k = 1.0$$

H de entrepiso (m)	phi*Pcr (Col)	phi*Pcr/Pu > 1.6 (Col)	
2.4	394.00	2.76	Cumple
2.4	509.00	3.43	Cumple
2.4	849.00	4.43	Cumple

	SISMO XX	SISMO YY
Vest (TON)	347.6	347.6
Vdin (TON)	257	194

$$A_c = \frac{}{\phi \times}$$

AREA REQUERIDA (cm2)	**42,595.7**	**42,595.7**

	Área (cm2)	
PLACA 1		4625
PLACA 2	1500	11875
PLACA 3	3750	14625
PLACA 4	15500	6750
PLACA 5	3375	
PLACA 6	4425	
PLACA 7	6500	
PLACA 8	4500	8550
PLACA 9	5500	
PLACA 10	1500	3625
PLACA 11	1250	7500
PLACA 12	3000	9900
AREA DISPONIBLE (cm2)	**50,800.00**	**67,450.00**

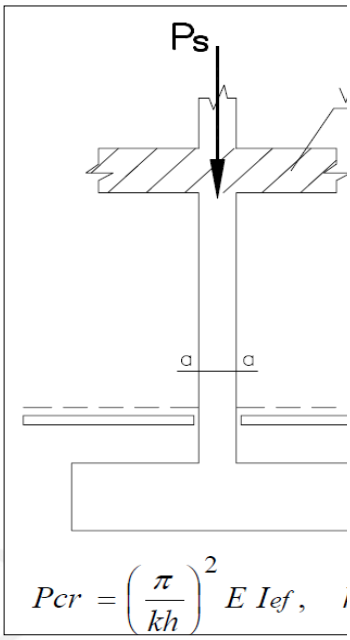
$$\frac{0.8 \times V}{0.53 \times \sqrt{f'c}}$$

Vdin (TON)	257	194

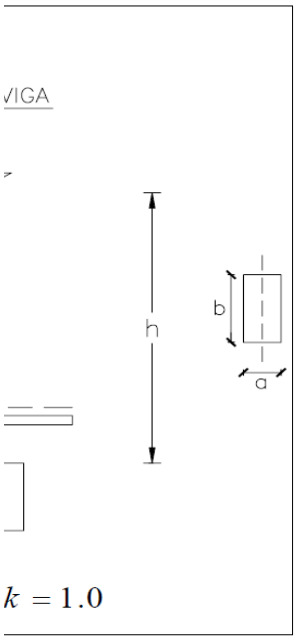
Vest (TON)	347.6	347.6

PANDEO EN COLUMNAS

fc=	210	Kg/cm2
E=	2173706.512	T/m2
e=	25	cm
L=	125	cm
I=	162760.4167	cm^4
h	2.4	
k	1	
Pu	192	
Pcr=	1212.431	Ton
ϕPcr=	848.7015533	Ton
ϕPcr/Pu=	4.42032059	pasa Pandeo



$$Pcr = \left(\frac{\pi}{kh}\right)^2 E\, I_{ef},$$



#3	0.9525
#4	1.27
#5	1.5875
#6	1.905
#8	2.54