

ギア比	L寸法	A寸法	C寸法
1 :5 ~ 15	223	42	8
1 :25 ~ 180	241	60	10

True North – South

Description of a geometrical method

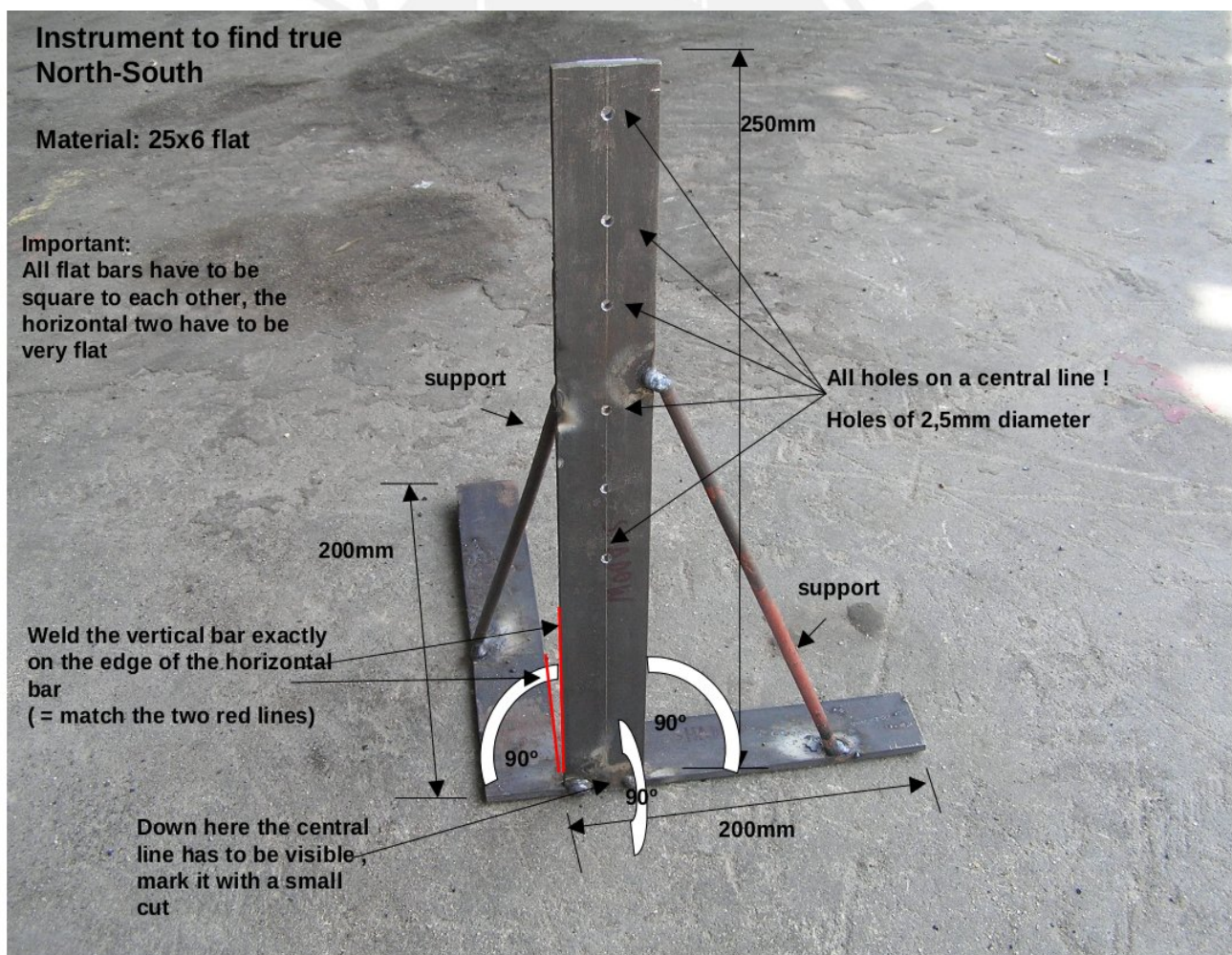
The daily movement of the sun across the sky is characterized by the symmetry between its trajectory before and after solar noon.

This symmetry can be used to find true North – South:

For a random position of the sun before solar noon the corresponding position (same height of the sun) after solar noon is found empirically.

This is a purely geometrical method to determine East and West. North-South can then be derived by as an axis perpendicular to East-West.

You need the North -South instrument described here:



Note:

Solar noon is the time of the day when the sun reaches the highest elevation angle of that day. Solar noon is at a slightly different time every day.

Step by Step instructions:



A smooth and plane surface is the base for the measurements. You can use a tile or stone-plate. Minimum size is 60cm x 60cm.

It can be helpful to create a level surface from concrete as base.

Advantage: it will not move.



Wood or ply is not suitable because it warps with the moisture coming of the ground.

Use the spirit level across and diagonally to level your surface.

Make sure you support the surface well, so that it doesn't wobble.



It is very important that this surface will not move at all during the whole day.

To guarantee this you can either work on a level and smooth concrete directly, or – in case of a tile or stone plate – hammer iron rods or pegs into the ground around the tile.



Make a mark on the surface. This will be the reference point or “center” for the measurement of the sun's position.

It helps if you make a small hole/dent in the exact center (e.g. with a nail).

Position the North-South Instrument with its central line exactly over the “center” mark.

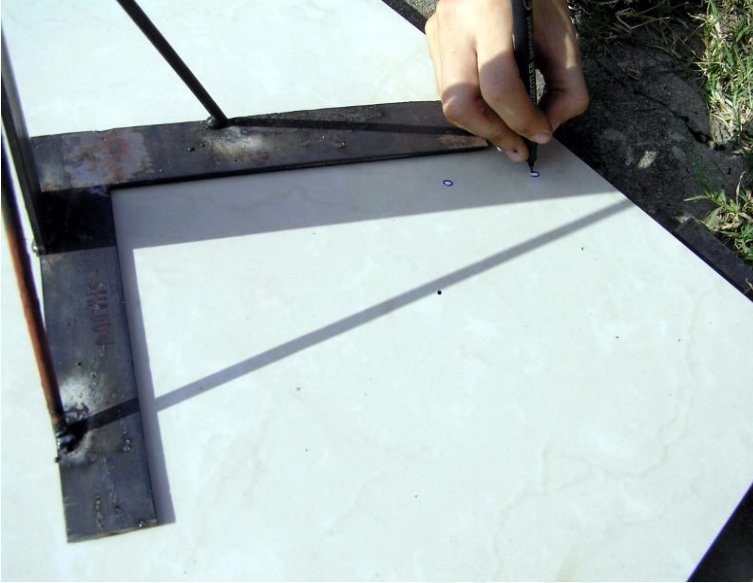


If you can: weld a small pin into the cut on the central line of the instrument. This pin should protrude (downwards) only slightly and sit into the hole in the tile. This really helps to assure the correct position of the instrument.

The correct position of the instrument is obtained when:

- ✓ the center line of the instrument coincides with the “center” on the tile.
- ✓ There is no gap and no overlap between the shadow and the flat iron. (see foto)





When the instrument is in correct position: mark the spots of light projected onto the surface by the wholes. Use a thin permanent marker to make the marks on the surface. Be very accurate!



Important: "name" each spot of light to avoid confusion later.

Use the number of the whole that projected this spot as name.

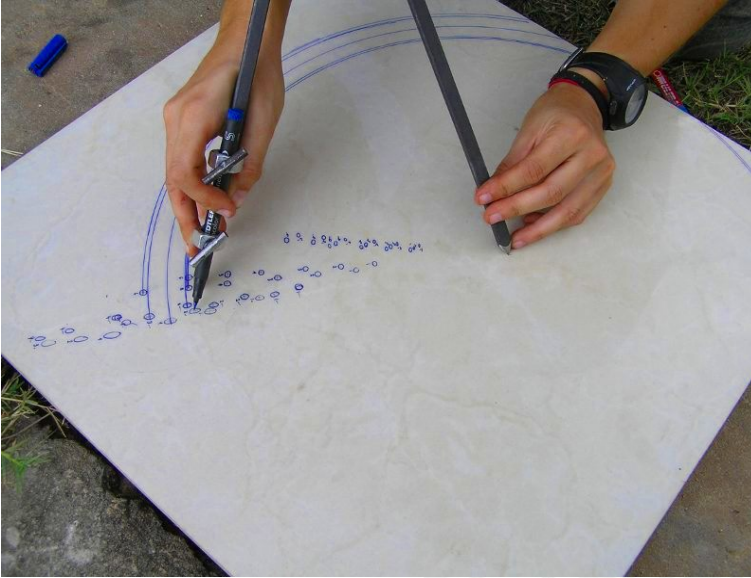
All spots of light from whole "1" will be called "1", from whole "2" "2" and so on.

Maintain the instrument properly aligned whilst rotating it.



Keep marking spots of light onto the surface. You should leave 10 to 15 minutes between each series of marks.

Don't forget to number the spots. It is no problem that you will have several marks with the same number. Mark only spots with a clearly visible outline (after 10 a.m. and with clear weather).



Find the exact center of each mark and draw a circle through it.

Center of the circles is the reference point “center” of the North-South instrument.



Now the task is to mark the same light spot again in the afternoon, when it crosses “its” circle.

Example: a spot number “2” will slowly move across the horizontal surface. You have to mark its position, when its center lies exactly on a circle that runs through a spot “2” of the morning session.



Important: check the correct alignment of the instrument before you make a mark!

No problem if you miss a few markings – that's why there are many.



The marks (projections of same hole) that lie on the same circle represent corresponding positions of the sun (symmetric to solar noon). When you connect them you get East - West lines.

- ✓ Check yourself:
are all East - West lines parallel?

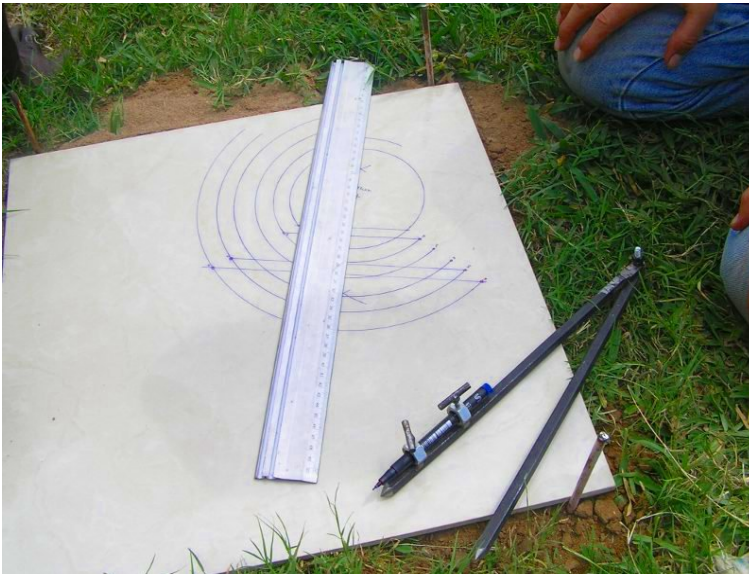


If not: repeat the measurement on an other day.

You did not work accurately enough or your base (tile etc.) has moved in between.



To obtain North-South you need to get the perpendicular line to East-West.



Find the perpendicular for all your East-West lines.



- ✓ Check: all North - South lines have to coincide and run through the "center" reference point of the instrument (= center of all circles).

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March 2009

Prueba tostado cacao

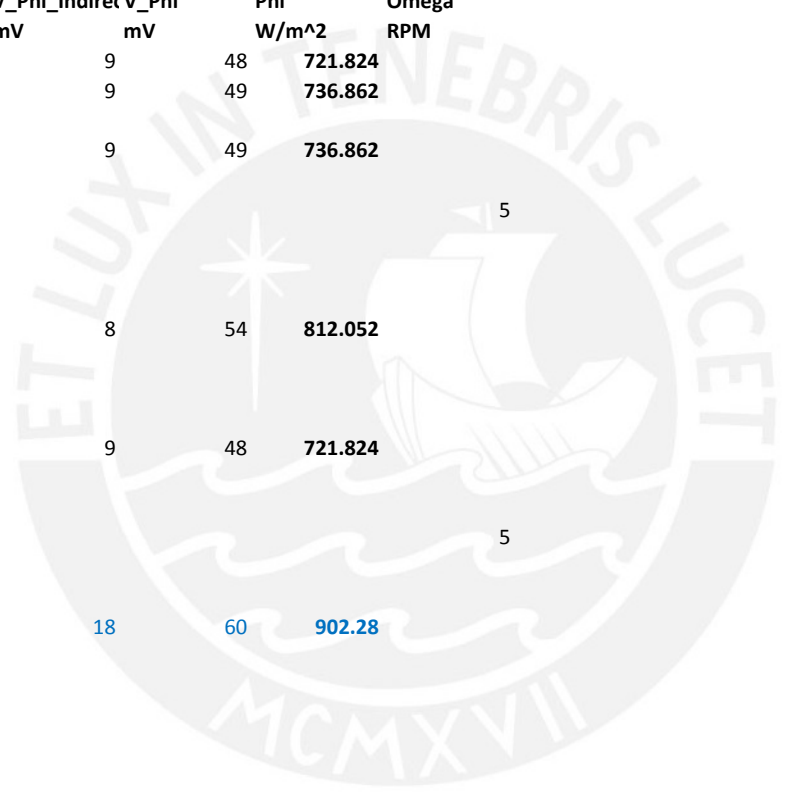
Prueba con olla pintada en la base

Parametros

numero pruel	Scheffler	Radiacion sol	Cantidad de c.	Aislamiento	Velocidad de	Absorptividad	Hora	Fecha	Cantidad final	Temperatura	Tiempo tuest	Tiempo preca
#	S_scheffler	Phi	m	A	Omega	alpha	h	d	m_f	T_f	t_tuesta	t_pre
-	m^2	W/m^2	kg	0 o 1	RPM	°	hh:mm	dd/mm/aaaa	kg	°C	min	min
0	8		3	0.5	27	Alta	10:08	09/11/2014				

Temperatura de la caldera, precalentamiento (°C) 10:08

tiempo t min	Temperatura promedio de T _{gm} °C	Radiacion sigma	V_Phi_Global mV	V_Phi_Indirec mV	V_Phi mV	Phi W/m^2	Velocidad de Omega RPM	Comentarios
0			57	9	48	721.824		
10.5			58	9	49	736.862		
12.5	49	2.00						
14	54	2.00	58	9	49	736.862		
16	65	2.00						
19	73	2.00						5
21.6666667	80	2.00						
25.75	88	2.00						
27.6666667	92	2.00						
31.3333333	102	2.00	62	8	54	812.052		
34	109	2.00						
36	111	2.00						
39	112	2.00						
44	114	2.00	57	9	48	721.824		
47	118	2.00						
61	124	2.00						
65	129	2.00						5
67	130	2.00						
68	131	2.00						
69			78	18	60	902.28		



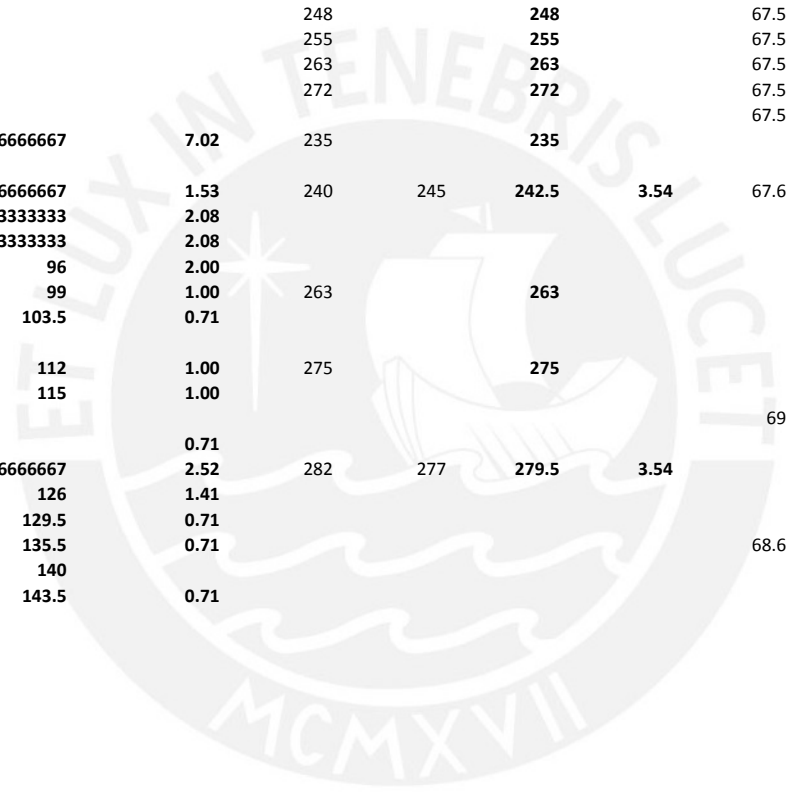
Prueba tostado cacao

Parametros

numero pruet	Scheffler	Radiacion sol	Cantidad de c.	Aislamiento	Cono al fondo	Inclinacion	Velocidad de	Absorptividad	Hora	Fecha	Cantidad final	Temperatura	Tiempo tuest	Tiempo preca
#	S_scheffler	Phi	m	A	C	Theta	Omega	alpha	h	d	m_f	T_f	t_tuesta	t_pre
-	m^2	W/m^2	kg	0 o 1	0 o 1	°	RPM	°	hh:mm	dd/mm/aaaa	kg	°C	min	min
1	8		3	0.5			27	Alta	10:08	11/11/2014				

10:08

tiempo t min	Temperatura de los granos			Temperatura promedio de los granos		Tempratura de la Olla		mperatura promedio de la o		Radiacion				Velocidad de	Comentarios
	T_g °C	T_g °C	T_g °C	T_gm °C	sigma	T_g °C	T_g °C	T_gm °C	sigma	V_Phi_Global mV	V_Phi_Indirec mV	V_Phi mV	Phi W/m^2	Omega RPM	
1.00						248		248		67.5	8.4	59.1	888.7458		Precalentamiento
2.00						255		255		67.5	8.4	59.1	888.7458		Precalentamiento
2.50						263		263		67.5	8.4	59.1	888.7458		Precalentamiento
3.33						272		272		67.5	8.4	59.1	888.7458		Precalentamiento
7.00										67.5	8.4	59.1	888.7458		Ingreso de cacao
9.00	54	48		62	54.66666667	7.02	235	235							
11.75	72	76													
12.50	83	84		81	82.66666667	1.53	240	245	242.5	3.54	67.6	7.8	59.8	899.2724	
14.50	84	87		88	86.33333333	2.08									Olor
15.58	88	92		91	90.33333333	2.08									
16.42	98	96		94	96	2.00									
17.50	98	99		100	99	1.00	263	263							
19.17	103	104			103.5	0.71									
20.50															Crack
21.25	112	111		113	112	1.00	275	275							
22.67	114	115		116	115	1.00									
23.33										69	6.6	62.4	938.3712		Crack
24.33	118	119				0.71									
25.67	125	127		122	124.66666667	2.52	282	277	279.5	3.54					
27.42	127	125			126	1.41									Crack
28.83	129	130			129.5	0.71									
31.00	135	136			135.5	0.71				68.6	6.5	62.1	933.8598		Crack
33.00	140				140										Crack
34.67	144	143			143.5	0.71									Termino de prueba



Prueba tostado cacao

Parametros

numero pruel	Scheffler	Radiacion sol:	Cantidad de c	Aislamiento	Cono al fondo	Inclinacion	Velocidad de	Absorptividad	Hora	Fecha	Cantidad final	Temperatura	Tiempo tuest:	Tiempo preca
#	S_scheffler	Phi	m	A	C	Theta	Omega	alpha	h	d	m_f	T_f	t_tuesta	t_pre
-	m^2	W/m^2	kg	0 o 1	0 o 1	°	RPM	°	hh:mm	dd/mm/aaaa	kg	°C	min	min
2	8		6	0.5			27	Alta		11:22	11/11/2014			

11:22

tiempo	Temperatura de los granos			Temperatura promedio de los granos		Tempratura de la Olla		mperatura promedio de la c		Radiacion			Velocidad de		Comentarios
t	T_g	T_g	T_g	T_gm	sigma	T_g	T_g	T_gm	sigma	V_Phi_Global	V_Phi_Indire	V_Phi	Phi	Omega	
min	°C	°C	°C	°C		°C	°C	°C		mV	mV	mV	W/m^2	RPM	
1.3333333							189	203	196	9.90	68.4	6.4	62	932.356	Pre calentamiento
3.25							240	270	255	21.21	68.4	6.4	62	932.356	Pre calentamiento
5.1666667							264	290	277	18.38	68.4	6.4	62	932.356	Pre calentamiento
7											68.5	5.9	62.6	941.3788	Ingreso de cacao (6kg)
8.8333333	38	43	41	40.6666667	2.52										
10.75	47	52	49	49.3333333	2.52										
12	52	54		53	1.41										
14	54	55		54.5	0.71										Problemas con mecanismo
20	66	67	68	67	1.00										
21.1666667	68	69	69.5	68.8333333	0.76										
22.25	72	73.9		72.95	1.34										
23.5	77	73		75	2.83										
24.8333333						210	238	224	19.80						
25.6666667	80	81.6	82	81.2	1.06					68.4	7	61.4	923.3332		
27	82.7	84.8	85	84.1666667	1.27										
28.4166667	79.6	86.5	86	84.0333333	3.85										
29.6666667	90.5	89.7	89.1	89.7666667	0.70										
31.3333333	92.7	94.4	94.6	93.9	1.04										
33.25	94.6	97.4	96	96	1.40										
35.5	97	99		98	1.41					67.8	6.6	61.2	920.3256		Olor
38.5833333	101	104.6		102.8	2.55										Crack
40															
41	107	109		108	1.41										
43.3333333	110	111		110.5	0.71										
44.6666667	113	114		113.5	0.71										Olor, humo
46.4166667	115	113.5		114.25	1.06										
48.1666667	116	117		116.5	0.71										
50	117	118		117.5	0.71										Acomodo de Scheffler
52.8333333	118	119		118.5	0.71										
54.5	119	120		119.5	0.71										
56.75	122	123		122.5	0.71										
59.1666667	127	128		127.5	0.71										
61.5	128	129		128.5	0.71					67.7	7.6	60.1	903.7838		
64.5833333	131	133		132	1.41										Problemas con mecanismo
70	139	140		139.5	0.71										
72	140	142		141	1.41										Fin de tostado

