

SURPAC Ver 5.06 for Windows 98/NT/2000 - Underground Peg Fix using the Double Back Fix Method

File General Conversions Least Squares Topographical Engineering Mining Cadastral Help

Set-Up Peg	Inst. Height	Surveyor	Location	Shaft	F/B Page	Calc Page	Date
C1984	-0.803	J. J. Smith	BROEDERSTROOM	SOUTH SHAFT	Pg 29-07	V25/145	12-13-02

Vertical Angle Observations

Top Button	Bottom Button	Set-Up Peg
Left	Left	C1984
Right	Right	Back Peg
89:45:00	97:59:30	C1985
270:14:50	262:00:30	C1986
92:21:00	105:04:10	Horiz. Angle =
		+0:00:00

Horizontal Angle Observations

Arc No. 1	Arc No. 2
Left	Left
Right	Right
0:00:00	90:00:00
180:00:00	270:00:00
0:00:00	90:00:00
180:00:00	270:00:00
+0:00:00	+0:00:00
+0:00:00	+0:00:00

Back Peg Target	Button Position	Mean Vert Angle	Button Height	Slope Distance	Horizontal Distance	Vertical Difference	Mean Horizontal Distance	Mean Vertical Difference	Mean Forward Direction
C1985	Top Button	+0:14:55	0.476	2.934	2.934	-0.314			
C1985	Bottom Button	-7:59:30	0.901	2.964	2.935	-0.314	2.934	-0.314	181:05:38
C1986	Top Button	-2:21:00	0.700	1.980	1.978	-0.184			
C1986	Bottom Button	-15:04:05	1.151	2.049	1.978	-0.185	1.978	-0.184	181:05:38

Back Peg	Y Co-ordinate	X Co-ordinate	Elevation	Horizontal Distance	Vertical Difference	Direction
C1985	33387.369	2644576.439	354.345			
C1986	33387.350	2644575.477	354.471	0.962	0.125	181:05:38

Set-Up Peg	Y Co-ordinate	X Co-ordinate	Elevation	Calculated from Back Peg
C1984	33387.313	2644573.505	354.659	Calculated from Back Peg : C1985
C1984	33387.312	2644573.500	354.655	Calculated from Back Peg : C1986
	DY = 0.000	DX = -0.006	DZ = -0.005	Calculated Differences

C1984	33387.312	2644573.502	354.656	Weighted Mean Values
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Options

Observation File Input

ASCII Input Set Limits

Calculate Print

Clear All Abort

An underground Peg Calculation using the Double Back Fix Method



Underground Peg Calculation using the "Double Back Fix" Method

- The programme is designed to handle a number of Peg Fixing and/or Checking for the Mine Surveyor.
- The main difference between this programme and the previous Double Set-Up and Double Button Methods, is that the Peg to be fixed, or checked, is the Set-Up Peg itself.
- This programme can be used, for example, for the following :-
 - Determining the [Y, X, Z] values for any new Peg, from which two other fixed Pegs can be seen. This method has the advantage that the Surveyor can determine where he wants to put a new Peg, place the Peg, set up under it and then fix the Peg (using this method), without having to set up at any other Peg.
 - Checking the [Y, X, Z] values for any existing Peg, from which two other fixed Pegs can be seen. When checking an existing Peg, this method provides a convenient and full technique for verifying the relative positions of the Set-Up Peg and the two sighted, Back Pegs.

- Calculating the [Y, X, Z] values for a Peg on a new Inter connected by a Raise to a lower Inter. This method fixes the new Peg from twin Pegs established over the Raise and whose plumb lines can be sighted from both Inters (the Twin Raise solution). The plumb line Pegs themselves are fixed from existing Pegs on the lower Inter. The three Pegs on the upper Inter can either be in a straight line, or can form the apices of a triangle. When using this option, the following procedure should be followed :-
 - On the new Inter set two new Pegs such that their plumb lines can be lowered down through the Raise, to be visible from the lower Inter, containing the existing Pegs. These plumb line Pegs should be set as far apart as possible, to provide the best orientation accuracy. Place two buttons on each of these plumb lines to be visible from the new Inter.
 - Establish a new Peg to be used as the first Set-Up Peg on the new Inter. Set-up under this Peg and use the Double Back Fix method to obtain fixing data for this (new) Set-Up Peg. If required, the two plumb lines and the Set-Up Peg may be placed in a straight line, but this is not essential. A well conditioned triangle (approximately equilateral) should, mathematically, provide the best result.
 - On the lower Inter, change the buttons on the two plumb lines so that they are visible, set-up at the nearest fixed Peg to the two plumb lines, and then observe/measure data for fixing both the plumb lines (and hence their two respective Pegs) by means of the Double Button method.
 - When calculating, first use the Double Button programme to calculate the two plumb line Pegs from the set-up at the fixed Peg on the lower Inter. Then use this Double Back Fix application to calculate the new Set-Up Peg on the upper Inter, and also to determine the orientations from this Peg to the two plumb line Pegs.
- The programme provides for full double Arc measurements for both Horizontal and Vertical angles, and for double Buttons and double measurements for each sighted Peg. Users can either use these full observation and measurement options, or restrict the survey to a single Horizontal and Vertical Arc, the use of single Buttons and single Distance measurements to the sighted Pegs.
- The principle of the programme is relatively simple. It is based on the determination of Directions (or Bearings) plus a base distance comparison, using the “two sides and the included angle” technique for any three Pegs representing the apices of a triangle. The programme is also able to handle the situation where the three Pegs are in a straight line.
- The Height of the calculated Set-Up Peg is determined by Trigonometrical Heighting from observations taken to buttons (or bobs) suspended from the two sighted Pegs. For best results, the double buttons should be observed at each sighted Peg.
- The required method of Survey is a Set-up at the Peg to be fixed, or checked.
- At this Set-Up Peg, the following quantities should be measured and/or observed :-
 - Face Left and Face Right Vertical Angles to the Top and Bottom Buttons at both Back Pegs.
 - Up to two full Arcs (Face Left and Face Right) Horizontal Angles to both Back Pegs.
 - The Slope Distances to both Back Pegs, measured from the Height of Collimation of the Instrument to the Top and Bottom Buttons at each Back Peg.
 - The Height of Instrument (Collimation). If this value is measured from a Roof Peg, then th value must be entered as negative.
 - The Height of the two Buttons at both the Back Pegs. If these values are measure

from a Roof Peg, then the values must be entered as positive.

- The application allows for data entry by :-
 - Manual (keyboard) entry of Observations,
 - From a pre-generated ASCII Peg File (type `***.pg3`), or
 - Automatic loading of the observations from a SURPAC Observation File.
- Calculation will only take place if none of the angular and/ or linear measurements exceeds the User specified limits. These limits are compared to the calculated differences for Vertical Angles, Horizontal Angles, Horizontal Distances and Vertical Height Differences. The ability to modify these limits is limited to Users having the necessary Security Code. This Security Code prevents un-authorized Users from changing the limits.
- After calculation takes place, the Co-ordinates and Peg Elevation of the Set-Up Peg (New Peg) will be stored in the current Co-ordinate File.
- The results of the Peg calculation will also be stored in the Multi-Polar/Peg File of the current Co-ordinate File. This file will hold and display up to 4 determinations of a Peg, over and above the actual co-ordinates (current values) stored in the Co-ordinate File. Running the Edit a Multi-Polar/Peg File (found under the General main Menu) programme will generate a display of a summary of all determinations of existing Pegs in the Co-ordinate File. The stored ASCII file (type `***.pg3`) can then be called, for any the Point/Peg determinations, which will in turn generate a full display of all the observational and derived data for the New Peg calculation.
- After calculating the Set-Up Peg, an ASCII Peg File (type `***.pg3`) of all observed and derived data may be created. This ASCII file has four main uses :-
 - The results of the New Point just calculated can easily be imported back into the application at any future time, preventing the time wasting and possible errors of re-entering these data manually. Even if the observational data originally came from an Observation file, the ASCII file contains extended information relative to the Peg calculation.
 - When doing a Right Button Click on a Point displayed in the Co-ordinate File, for example it is possible to display the contents of any ASCII Peg file relative to a required Peg and to re-calculate the Peg.
 - If the User requires an output format different from the one used by SURPAC, the data from the ASCII Peg File can be easily imported into a User generated application.
 - It provides a backup for all observational data used to fix the Peg.
- The option to Print the results is available, after the on screen entries have been made and checked and the New Peg calculated.