

**TLC** WINPROF



TLC SOFTWARE, 2007

**TLC** TLC ENGINEERING SOLUTIONS PTY(LTD)  
SOLUTIONS SOFTWARE TECHNOLOGY

L.M.P Valentim  
TLC ENGINEERING  
SOLUTIONS

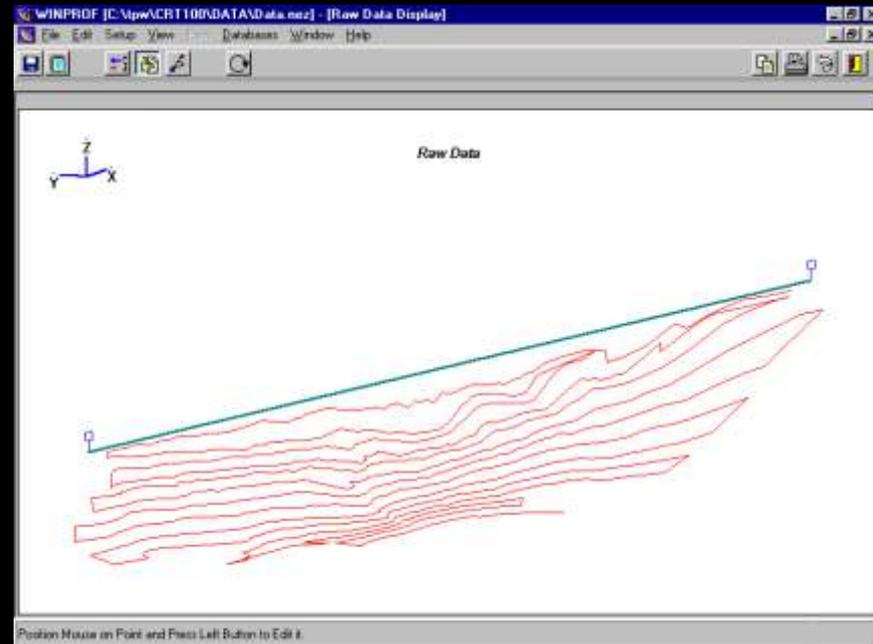
# Overview

- **WINPROF** is a software system which facilitates the design and control of bench blasts by generating face profile details
- **WINPROF** supports various laser surveying equipments and also interfaces to borehole deviation measurement devices



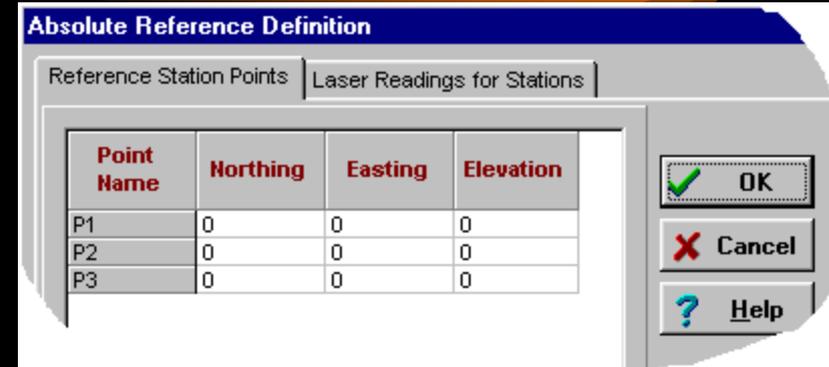
# Overall Features

- Ability to read data from a number of laser surveying instruments:
  - Laser Technologies Criterion, Autoscan and Impulse 200
  - MDL Autoscan and FastScan format, Quarryman II
  - Pulsar Lasers
  - Ascii File (generated from CAD or survey packages)
- Displaying the raw data in graphical format for editing
- Point identification for:
  - Crest
  - Toe
  - Geometry sets
  - Boreholes (front and 2..9 rows): up to 1000 boreholes can be measured



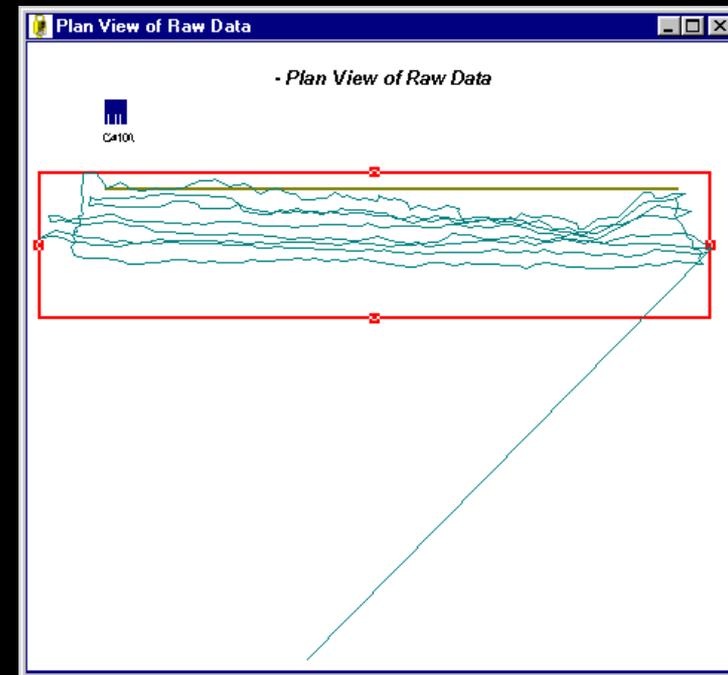
# Raw Data Editing Tools

- Raw Data can be converted to real mine coordinates by using a back sight, or by surveying three known stations.

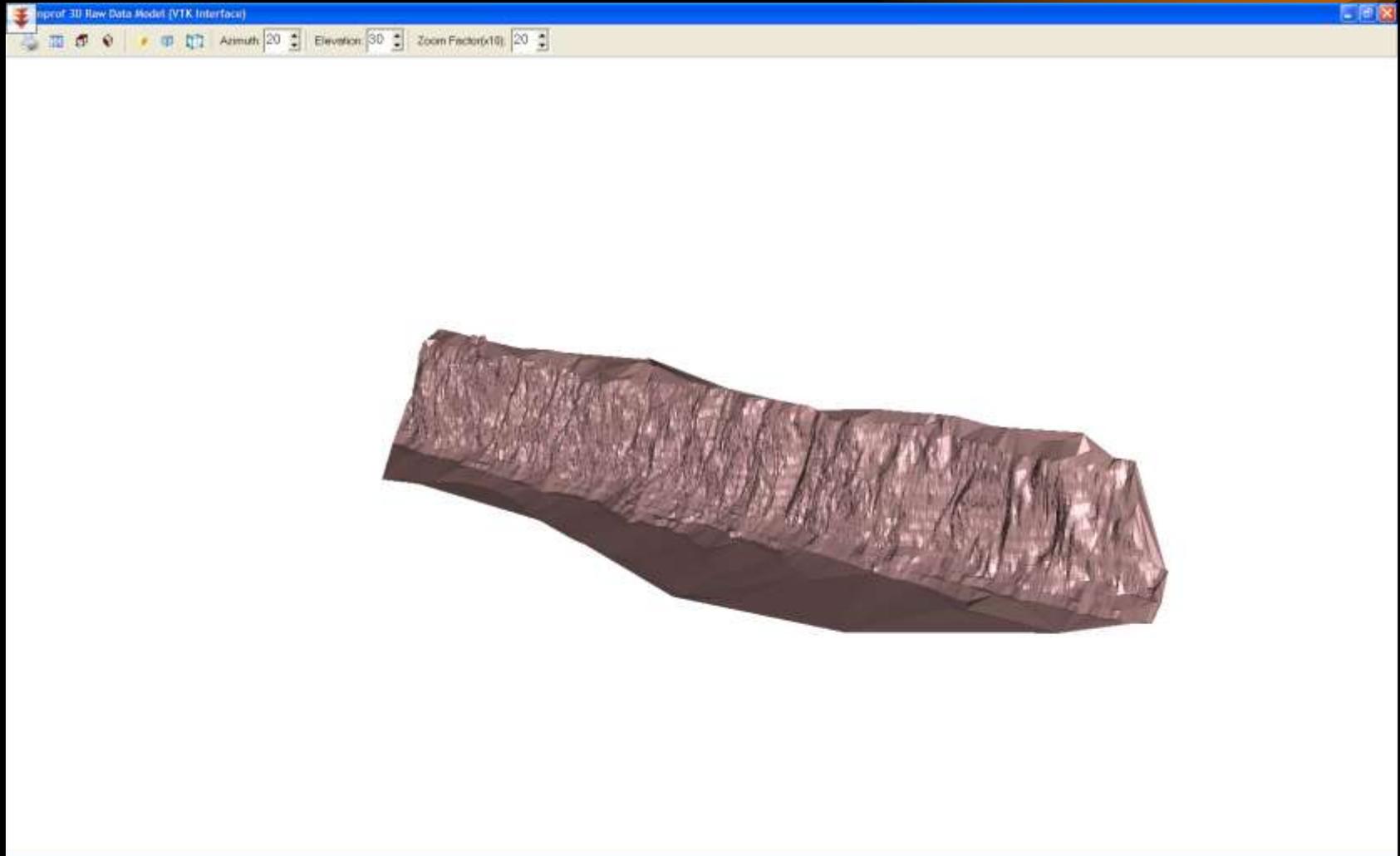


Point Name	Northing	Easting	Elevation
P1	0	0	0
P2	0	0	0
P3	0	0	0

- Raw Data points may be removed individually
- Data Limits can be used on the plan view to remove unwanted data points:

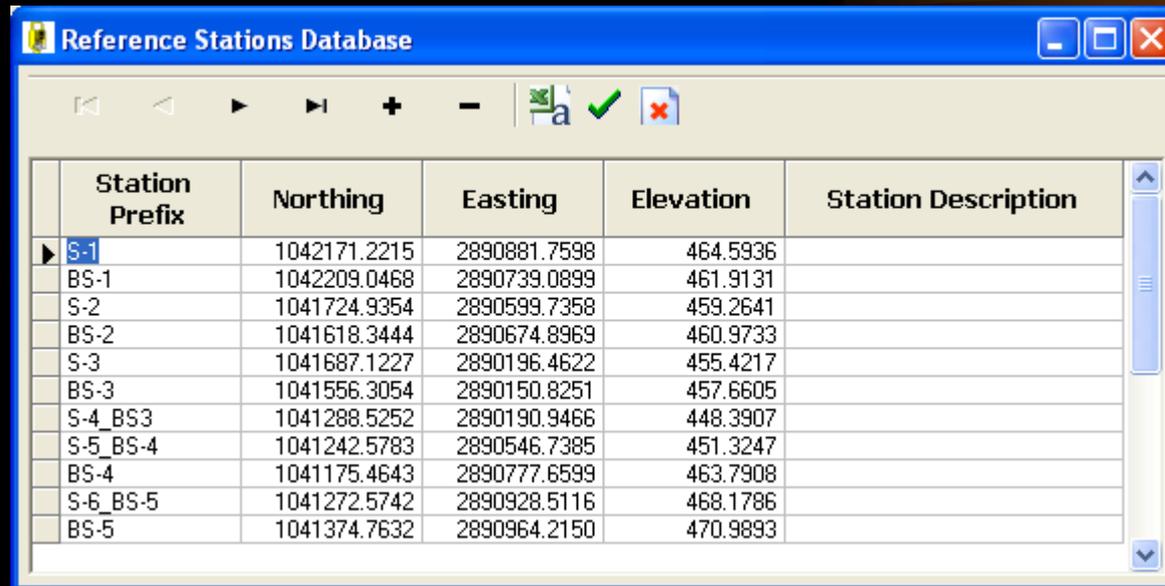


# *3d Visualization of Raw Data*



# Database of Fixed Stations

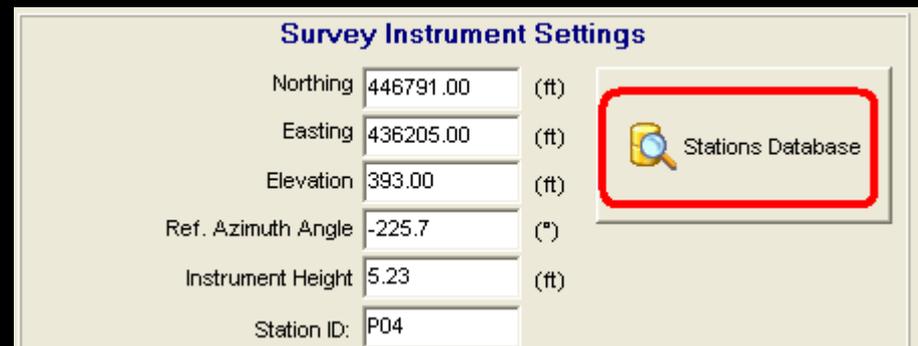
- Database of fixed surveyed station points:



The screenshot shows a software window titled "Reference Stations Database". It contains a table with the following columns: Station Prefix, Northing, Easting, Elevation, and Station Description. The first row is selected, showing station S-1 with coordinates Northing: 1042171.2215, Easting: 2890881.7598, and Elevation: 464.5936.

Station Prefix	Northing	Easting	Elevation	Station Description
S-1	1042171.2215	2890881.7598	464.5936	
BS-1	1042209.0468	2890739.0899	461.9131	
S-2	1041724.9354	2890599.7358	459.2641	
BS-2	1041618.3444	2890674.8969	460.9733	
S-3	1041687.1227	2890196.4622	455.4217	
BS-3	1041556.3054	2890150.8251	457.6605	
S-4_BS3	1041288.5252	2890190.9466	448.3907	
S-5_BS-4	1041242.5783	2890546.7385	451.3247	
BS-4	1041175.4643	2890777.8599	463.7908	
S-6_BS-5	1041272.5742	2890928.5116	468.1786	
BS-5	1041374.7632	2890964.2150	470.9893	

- Surveyed station points data can be inserted at different points:
  - To define laser station
  - To define measured sights



The screenshot shows the "Survey Instrument Settings" dialog box. It contains several input fields for survey data: Northing (446791.00 ft), Easting (436205.00 ft), Elevation (393.00 ft), Ref. Azimuth Angle (-225.7 degrees), Instrument Height (5.23 ft), and Station ID (P04). A red box highlights a button labeled "Stations Database" with a magnifying glass icon.

Northing	446791.00	(ft)
Easting	436205.00	(ft)
Elevation	393.00	(ft)
Ref. Azimuth Angle	-225.7	(°)
Instrument Height	5.23	(ft)
Station ID:	P04	

# Features of 3D survey software

- Generates the Bench Face Surface based on user criteria:

Distance Between Left and Right Markers 358.835

Generate Mode  
 Left to Right  Right to Left

Offset from Right Marker 20.79 (ft)

Hole Spacing 25.00 (ft)

Hole Depth 10.00 (ft)

Hole Inclination Angle 0

Floor Slope 0.0

Burden Depth Increment 5.000 (ft)

**Optimization Settings**

Optimize Hole Length

Adjust Hole Collars to Crest

Optimize Hole Subdrill % toe Burden 10.0

Optimize Crest Definition

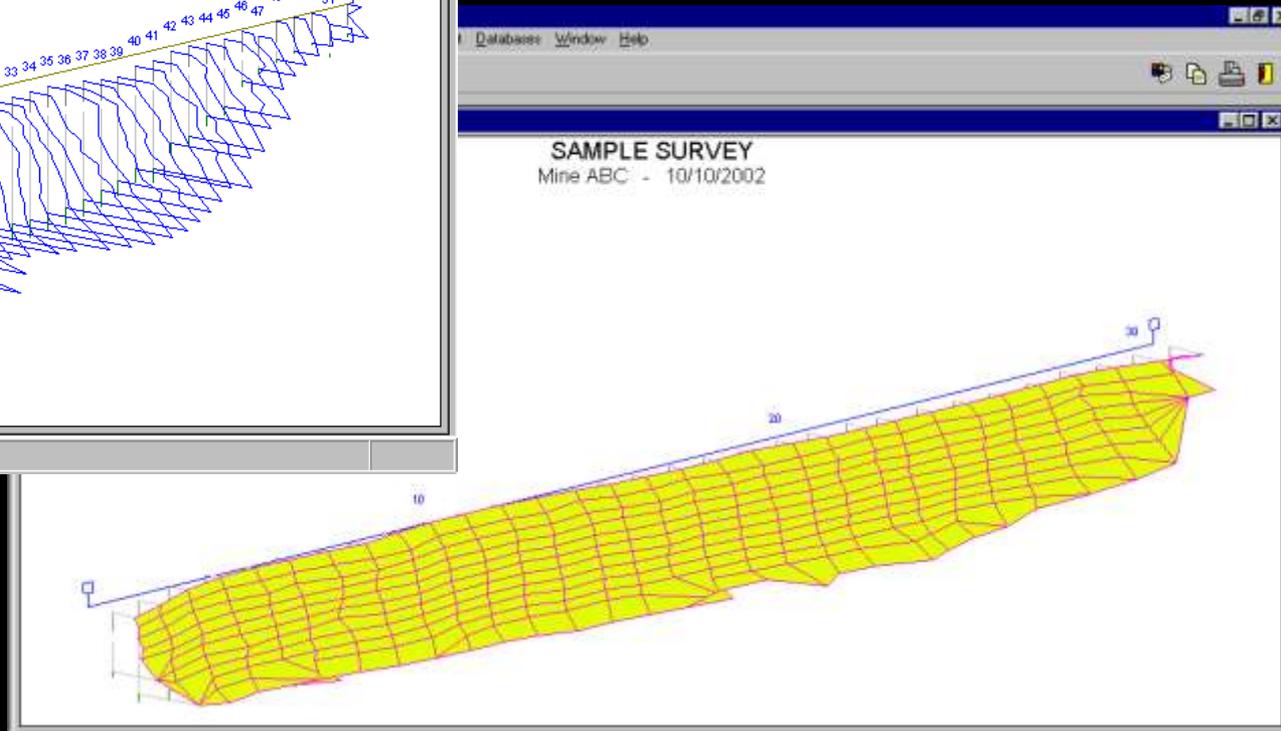
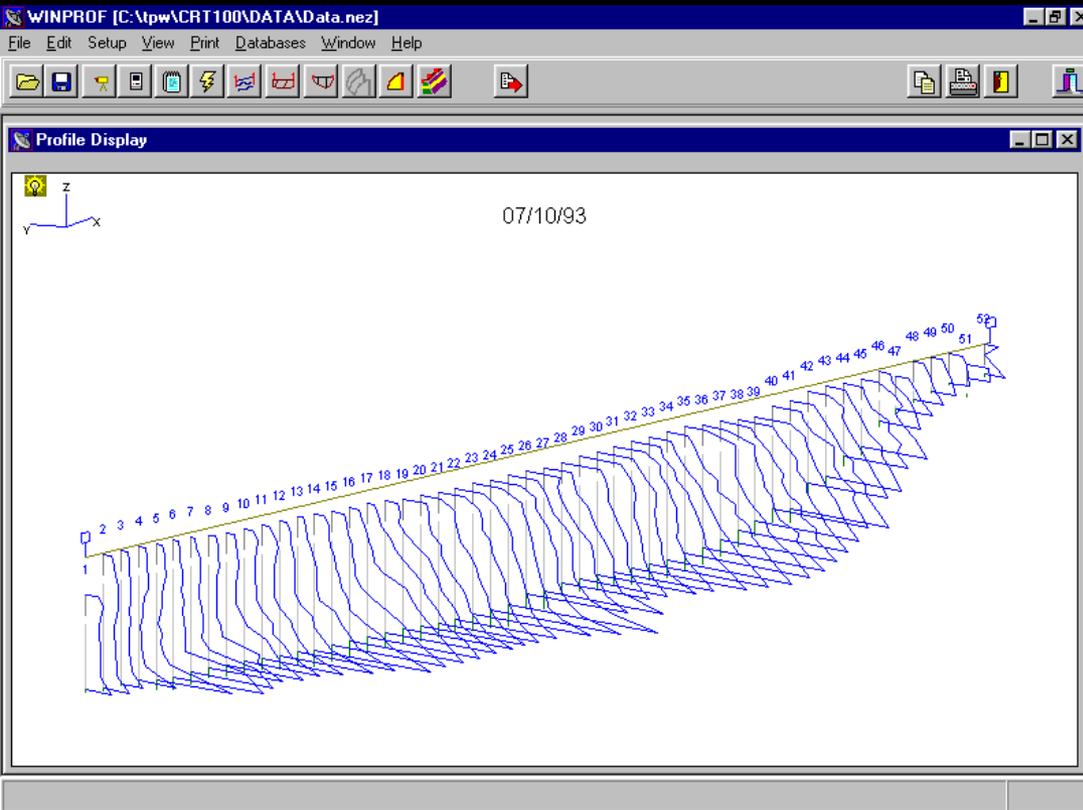
Analyse Surrounding Surface (Circular Algorithm Method)

Minimum Burden (Up and Down Check)

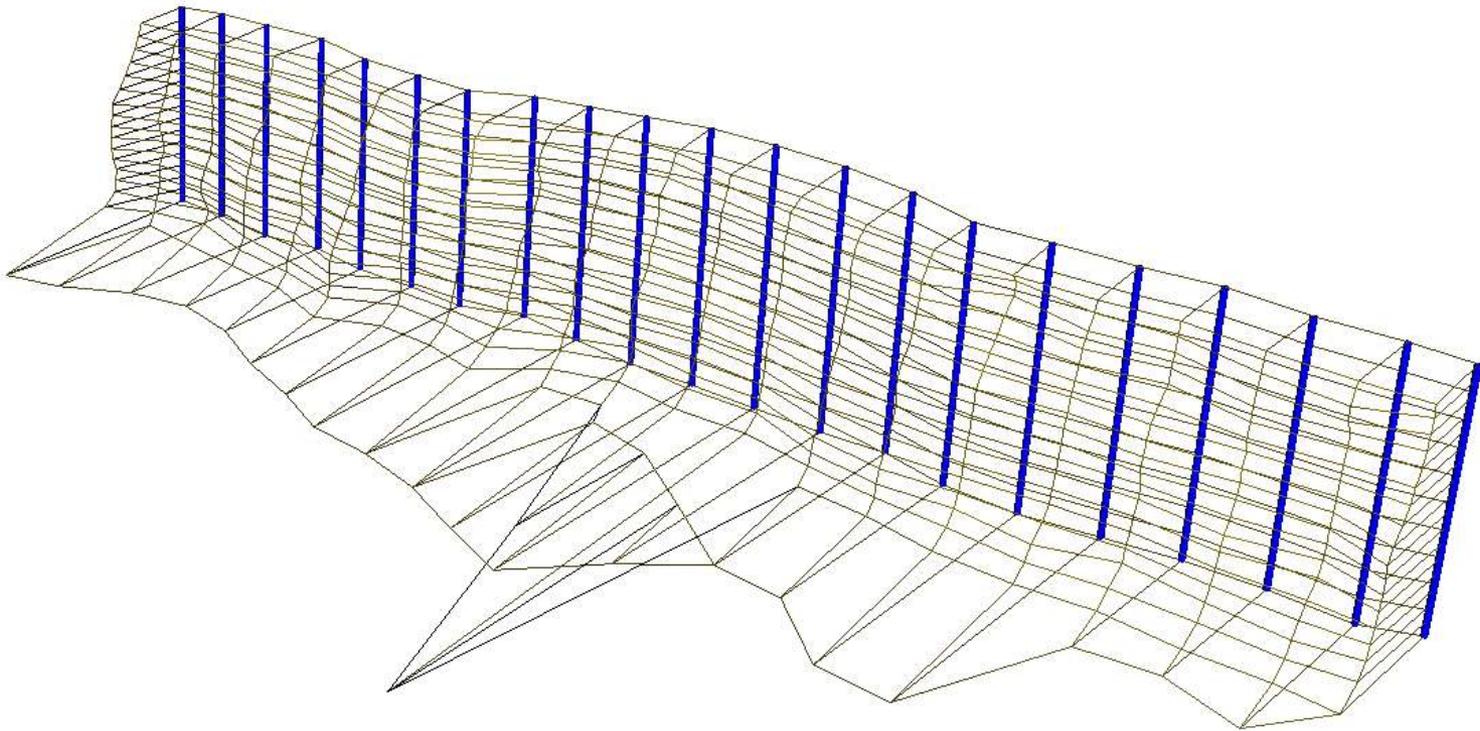
Buttons: Generate, Cancel, Help

- Optimize borehole length according to bench height
- Adjust elevation of borehole collars to elevation of the crest
- Automatic calculation of sub-drill amount as a percentage of toe burden
- Calculate borehole profile using a 3D surround algorithm (i.e. looking to the sides of each profile for minimum burdens)
- Check for minimum burden above and below at each burden depth

# Generated 3D Survey Faces



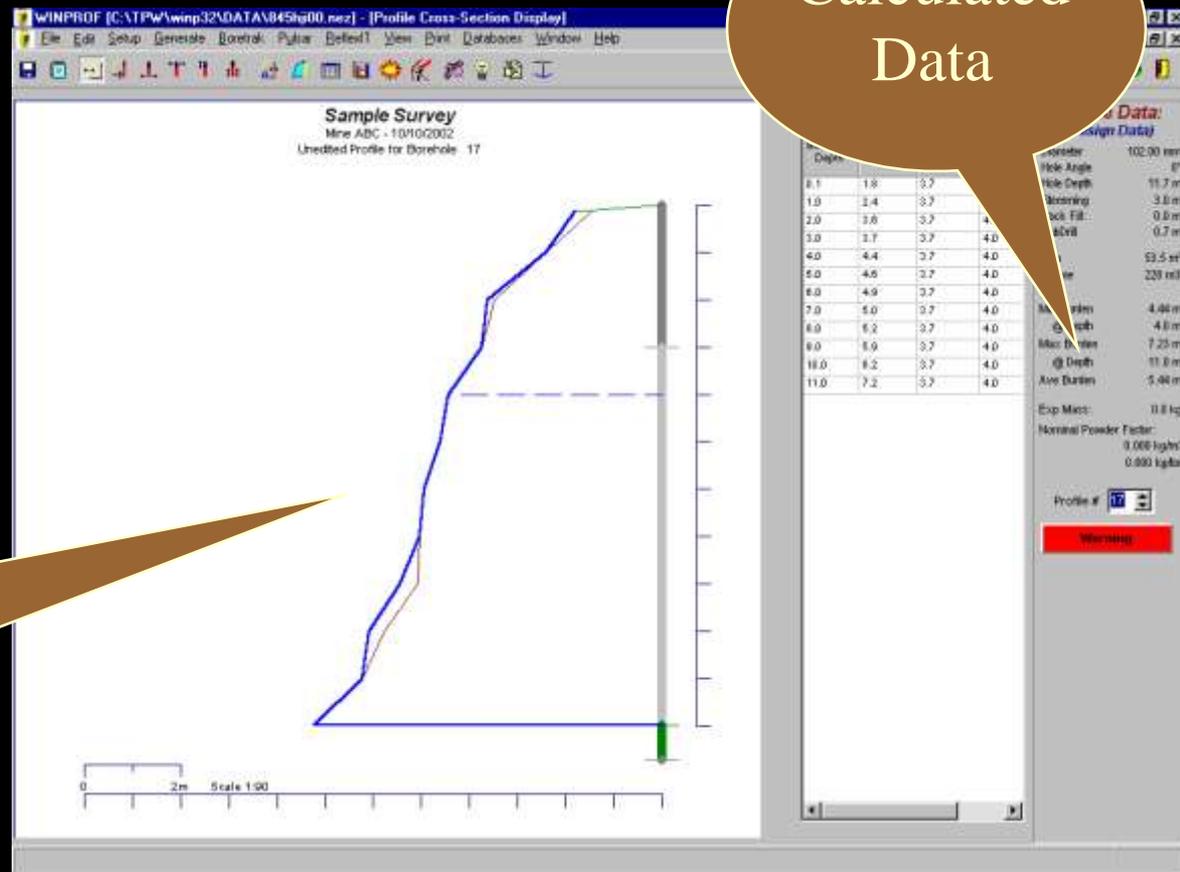
# *3d View of Generated Face*



# Borehole Profiles

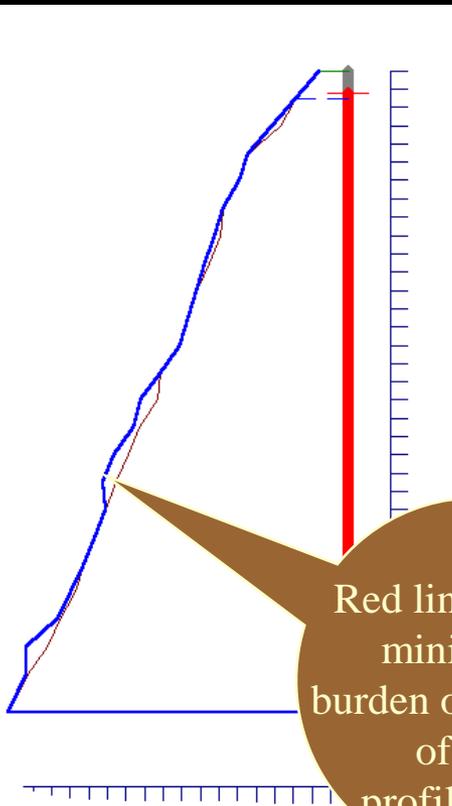
- Determination of Borehole Variables:
  - Burden at Depth
  - Borehole Volume
  - Profile Area
  - Optimum Borehole Position

Profile Generated from random Laser Surveyed Points



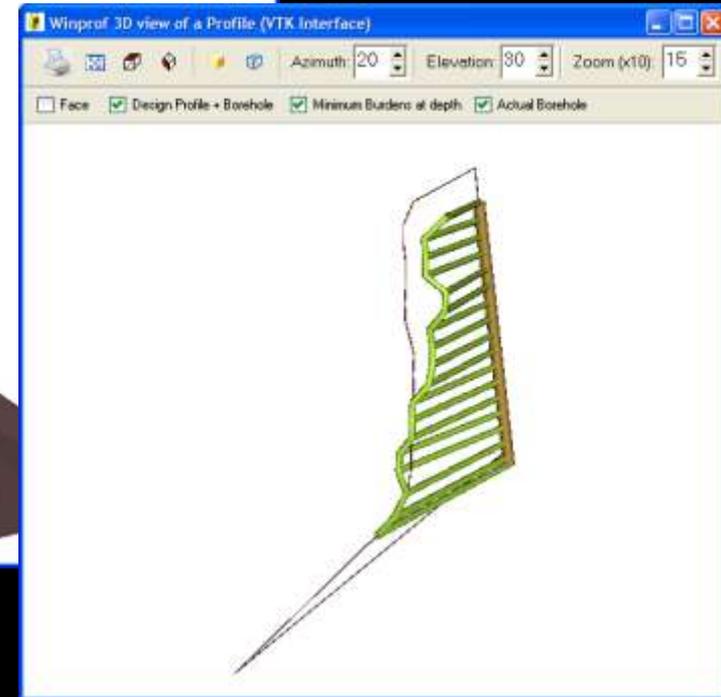
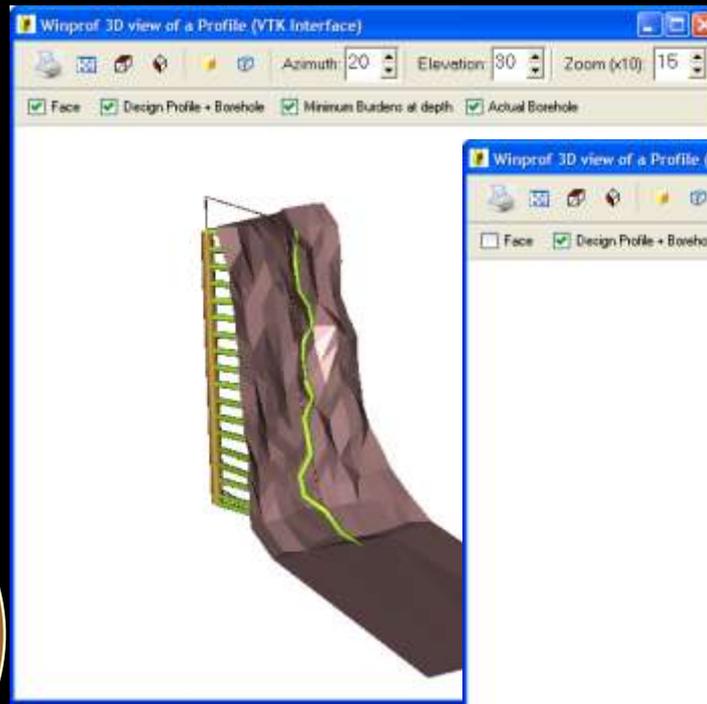
# Surround Algorithm Calculations

- For each profile, Winprof determines the minimum burden at depth by calculating the minimum distance to any point on the rock surface for the burden plane.

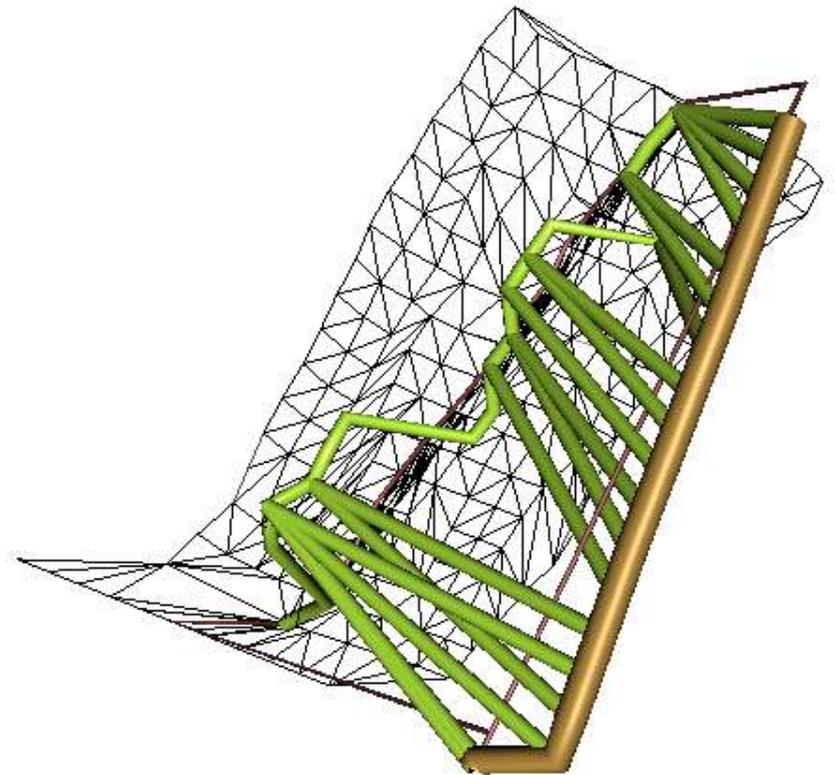
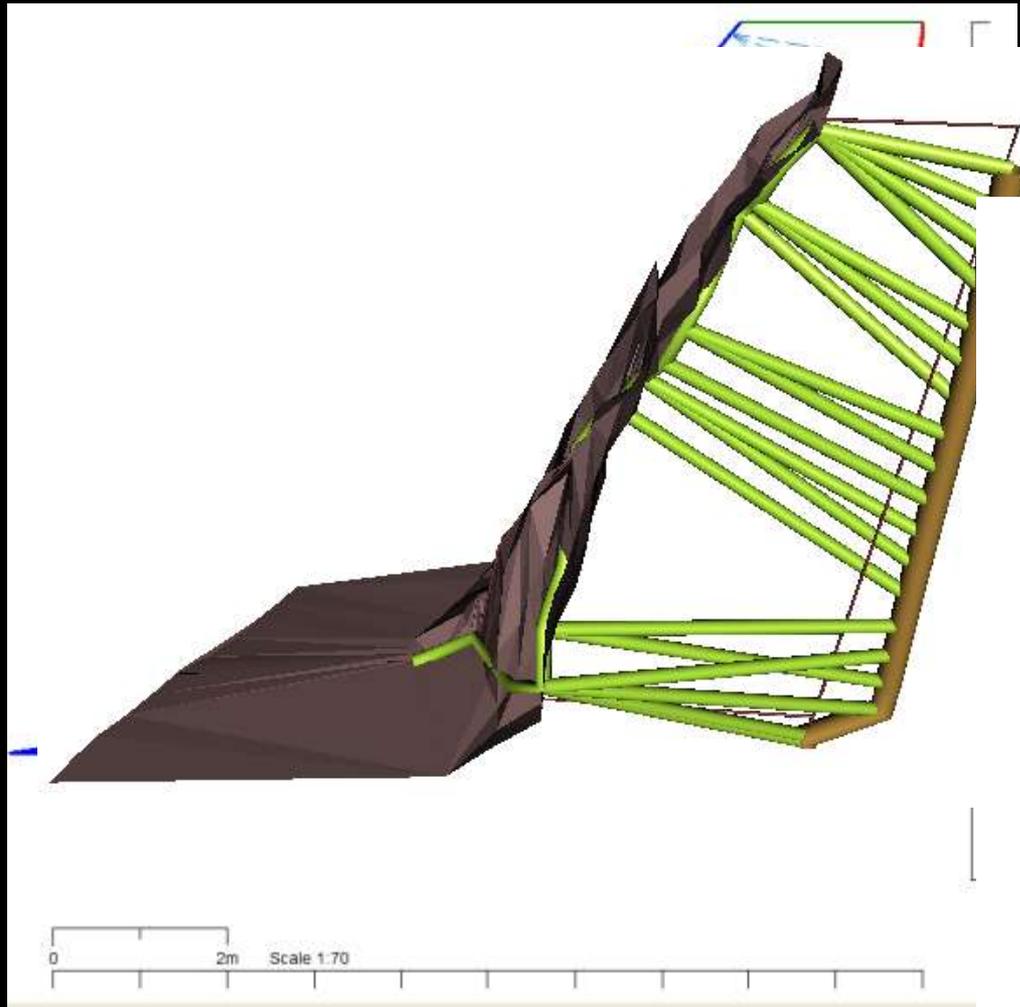


Red line shows minimum burden occurs out of the profile plane

3D visualization of algorithm calculations:



# *Burden check above/below:*

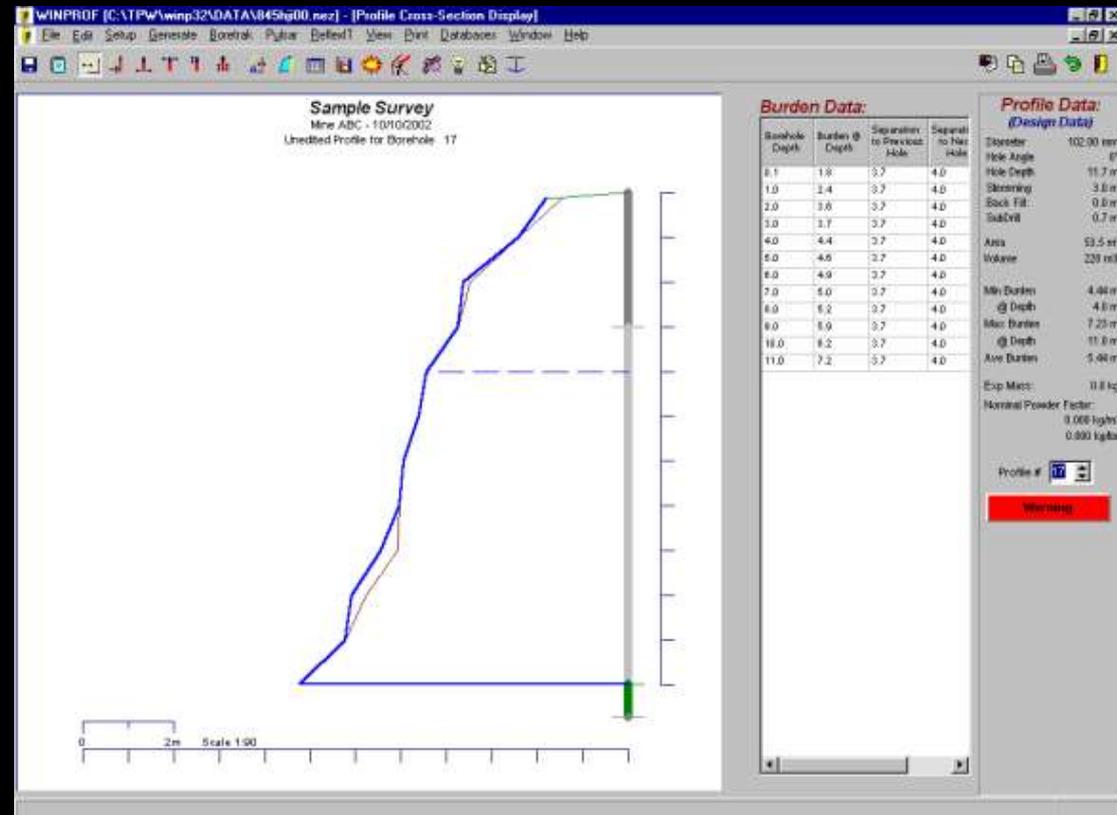


# Profile Editing Tools



- Interactive Optimization of Burden Spacing

- Borehole Angle 
- Borehole Depth 
- Borehole Collar Positioning 
- Profile Line 
- Bench floor slope 



# Borehole Angle Editing

The screenshot displays the WINPROF software interface. The main window shows a profile cross-section of a borehole. The title bar reads "WINPROF [C:\TPW\wimp32\DATA\845hj00.nez] - [Profile Cross-Section Display]". The menu bar includes File, Edit, Setup, Generate, Boretrak, Pulsar, ReflexIT, View, Print, Databases, Window, and Help. The toolbar contains various icons for file operations and editing. The main plot area is titled "SAMPLE SURVEY" and "Mine ABC - 10/10/2002", with the subtitle "Unedited Profile for Borehole 14". The plot shows a blue profile line and a black vertical line representing the borehole. A scale bar at the bottom left indicates a scale of 1:98, with a 2m reference length. A status bar at the bottom left shows "Angle= 17".

On the right side, there are two data tables:

**Burden Data:**

Borehole Depth	Burden @ Depth	Separation to Previous Hole	Separati to Next Hole
0.1	2.1	Undefined	Undefin
1.0	2.9	4.2	3.6
2.0	3.8	4.2	3.6
3.0	4.6	4.2	3.6
4.0	5.0	4.2	3.6
5.0	5.2	4.2	3.6
6.0	5.6	4.2	3.6
7.0	6.0	4.2	3.6
8.0	6.3	4.2	3.6
9.0	6.4	4.2	3.6
10.0	6.8	4.2	3.6
11.9	7.6	4.2	3.6

**Profile Data: (Design Data)**

Diameter	102.00 mm
Hole Angle	0°
Hole Depth	12.7 m
Stemming	3.0 m
Back Fill:	0.0 m
SubDrill	0.8 m
Area	67.2 m <sup>2</sup>
Volume	238 m <sup>3</sup>
Min Burden	5.01 m
@ Depth	4.0 m
Max Burden	7.59 m
@ Depth	11.9 m
Ave Burden	6.11 m
Exp Mass:	0.0 kg
Nominal Powder Factor:	0.000 kg/m <sup>3</sup>
	0.000 kg/ton

Below the tables, there is a "Profile #" dropdown menu set to "14" and a yellow "Warning" button.

New Angle Setting

Mouse drags borehole

# Borehole Depth Editing

WINPROF [C:\TPW\winp32\DATA\845hj00.nez] - [Profile Cross-Section Display]

File Edit Setup Generate Boretrak Pulsar ReflexIT View Print Databases Window Help

**SAMPLE SURVEY**  
Mine ABC - 10/10/2002  
Unedited Profile for Borehole 14

**Burden Data:**

Borehole Depth	Burden @ Depth	Separation to Previous Hole	Separati to Next Hole
1.0	2.1	4.3	3.6
2.0	2.6	4.3	3.7
3.0	3.1	4.4	3.8
4.0	3.5	4.6	4.0
5.0	3.7	4.7	4.1
6.0	3.6	4.8	4.3
7.0	3.7	5.0	4.4
8.0	3.7	5.2	4.6
9.0	3.7	5.3	4.8
10.0	3.6	5.5	5.0
11.0	3.7	5.7	5.3
12.0	4.2	5.9	5.5

**Profile Data:  
(Design Data)**

Diameter 102.00 mm  
Hole Angle 17°  
Hole Depth 12.9 m  
Stemming 3.0 m  
Back Fill: 0.0 m  
SubDrill 0.4 m  
Area 43.3 m<sup>2</sup>  
Volume 192 m<sup>3</sup>  
Min Burden 3.51 m  
@ Depth 4.0 m  
Max Burden 4.21 m  
@ Depth 12.0 m  
Ave Burden 3.71 m  
Exp Mass: 0.0 kg  
Nominal Powder Factor:  
0.000 kg/m<sup>3</sup>  
0.000 kg/ton  
Profile # 4  
**Warning**

Depth = 14.1

New Depth Setting

Mouse changes borehole depth

# Burden Optimization

- This option calculates the required borehole collar position to meet one of the following criteria:
  - Minimum Burden
  - Average Burden
  - Maximum Burden
  - Fixed Offset from crest
  - Powder Factor

**Automatic Burden Adjustment**

This Option adjusts the offset of each borehole to satisfy the following user settings:

Burden Variable to Control	Data for BoreHole 7
<input checked="" type="radio"/> Minimum Burden	Minimum Burden :19.0 ft
<input type="radio"/> Average Burden	Average Burden :24.6 ft
<input type="radio"/> Maximum Burden	Maximum Burden :30.5 ft
<input type="radio"/> Distance from Crest	Crest Offset :10.6 ft
<input type="radio"/> Powder Factor	Powder Factor :0.000lb/cuy

New Burden Value    ft

0

- Can be applied to individual profiles or to all profiles simultaneously

# Borehole Charging

- Winprof provides facilities to define an Explosives Database with user specific explosives/formulations

Explosives Entry Form

Explosive Name: ANFO

Density (g/cc): 0.81

Expl Dia (mm): 100.0

Abs Weight Strength (AWS) (cal/g): 912.000

Abs Bulk Strength (ABS) (cal/cc): 739.000

Display Colour:

Derived Explosives Properties

Relative Weight Strength (RWS):	1.00	Exp Weight in 10 bh dia (kg)	6.36
Relative Bulk Strength (RBS):	1.00	Exp Energy per m (MJ/m)	24.2
Weight of Exp per linear m (kg/m)	6.36	Cube Root of Explosive Energy per Metre	2.89
Exp Length for 10 bh dia (m)	1.0	Cube Root of Weight	1.85

Navigation icons:

OK

# Borehole Charging (cont...)

- Each borehole may be loaded individually with:
  - Up to 10 decks
  - Unloaded decks (sand/air etc)
  - User defined stemming and backfill
  - Equally spaced decks with air gaps

**Explosives Decks Definition**

*Hole Number: 17*  
Hole Depth: 11.7

Hole Stemming: 3.0  
Hole BackFill: 0.0

Explosives Available:

Explosive Name	Display Colour
1x2	Blue
2x1	Red
▶ ANFO	Green

No Explosive in this Deck

Borehole Loading:

Deck #	Depth to Explosive Level	Explosive Column Length	Explosive Name

L=4.3  
D=7.4

Profile Information:

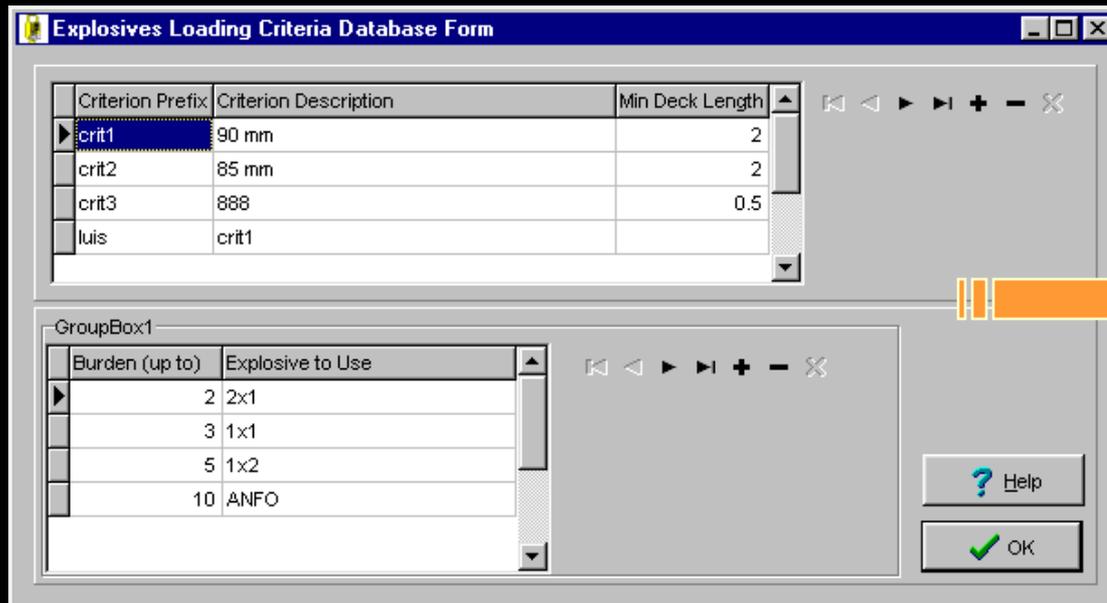
Borehole Depth	Burden @ Depth	Separation to Previous Hole
0.1	1.8	3.7
1.0	2.4	3.7
2.0	3.6	3.7
3.0	3.7	3.7
4.0	4.4	3.7
5.0	4.6	3.7
6.0	4.9	3.7
7.0	5.0	3.7
8.0	5.2	3.7
9.0	5.9	3.7
10.0	6.2	3.7
11.0	7.2	3.7

OK Cancel Wizard Help

Defining  
Explosives  
Decks with the Mouse

# Borehole Charging (cont...)

- All boreholes may be loaded automatically:
  - According to a predefined loading pattern
  - According to user defined criteria based on calculated burden spacings and borehole depths



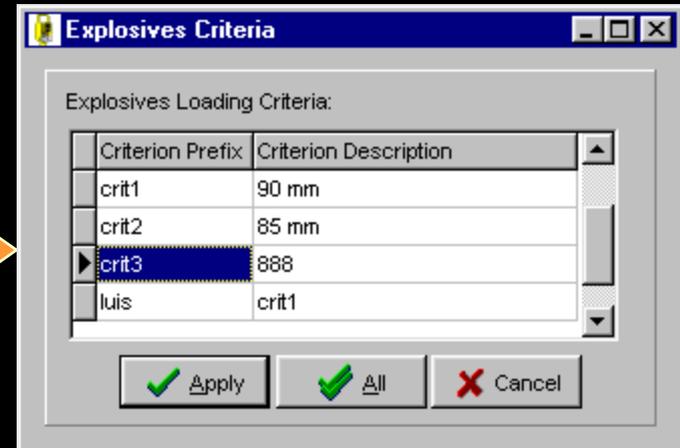
The screenshot shows the 'Explosives Loading Criteria Database Form' window. It contains two tables and several controls.

Criterion Prefix	Criterion Description	Min Deck Length
crit1	90 mm	2
crit2	85 mm	2
crit3	888	0.5
luis	crit1	

Burden (up to)	Explosive to Use
2	2x1
3	1x1
5	1x2
10	ANFO

Buttons: ? Help, OK



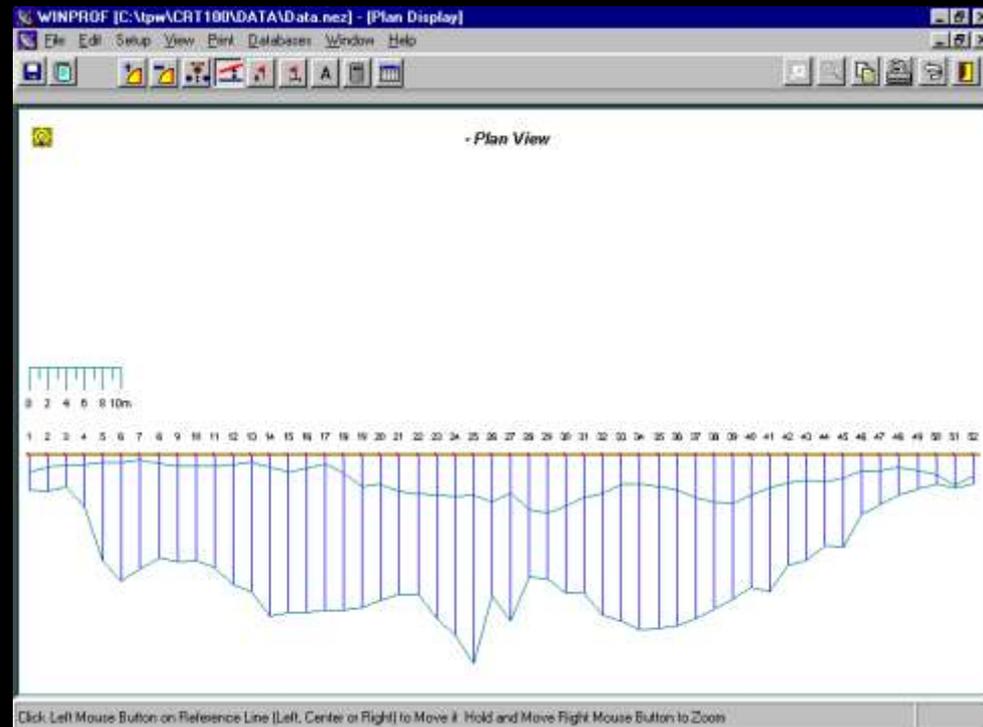
The screenshot shows the 'Explosives Criteria' dialog box. It contains a table with the following data:

Criterion Prefix	Criterion Description
crit1	90 mm
crit2	85 mm
crit3	888
luis	crit1

Buttons: Apply, All, Cancel

# Overall Burden Optimization

- Bench Data may be viewed in plan where:
  - Boreholes can easily be moved, added and/or deleted
  - The Reference Base Line may be adjusted manually and/or automatically to produce better burden spacings throughout the face
  - The hole collar positions are adjusted automatically to ensure that all profile burdens comply with a user selected rule (minimum, average or maximum burdens)



# *Lifter Boreholes*



- Boreholes drilled into the FACE can be defined as part of the design
- These boreholes are called “LIFTER” boreholes and are defined in the next page.
- A maximum of 100 lifter boreholes can be assigned.

# Definition of Lifter Boreholes

- Wizard places lifter boreholes along toe line at specified spacing:

The screenshot displays the 'Generate Lifter Boreholes' software interface. On the left, a list of input parameters is shown:

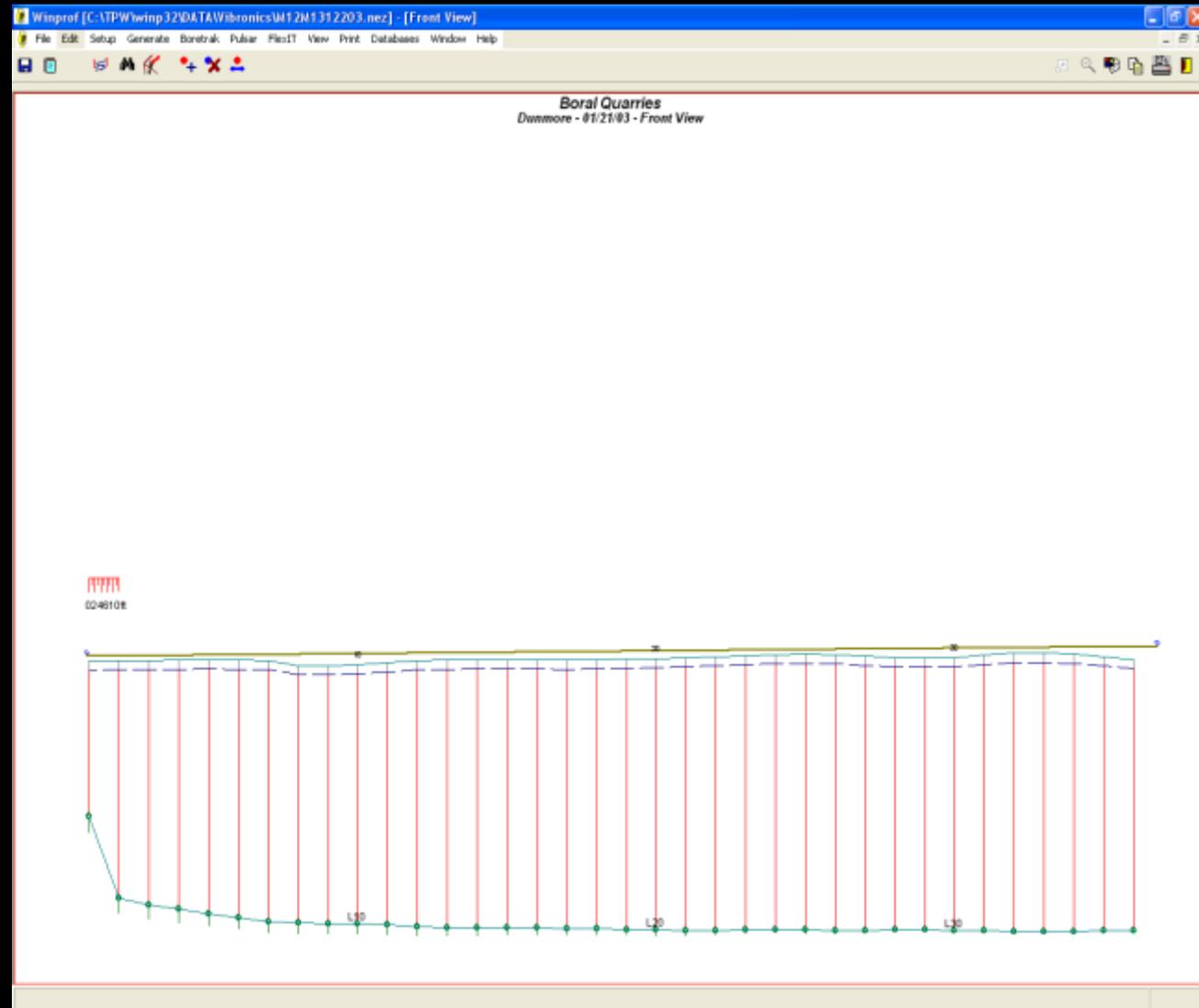
- Distance Between Left and Right Markers: 358.9 (ft)
- Distance from Left Marker: 0.0 (ft)
- Hole Spacing: 10 (ft)
- Hole Diameter: 8 (in)
- Hole Depth: 30 (ft)
- Hole Horizontal Angle: 10 (°)
- Hole Vertical Angle: 0.0 (°)
- Stemming Depth: 0.0 (ft)
- SubDrill: 0.0 (ft)
- BackFill Amount: 0.0 (ft)

At the bottom left, there are 'Generate' and 'Cancel' buttons. A status bar at the bottom indicates 'Calculating Lifter Hole Coordinates...'. On the right, a diagram titled 'Definition of Terms for Lifter Boreholes' illustrates the geometry. It shows a red line representing the borehole, starting from a 'Borehole Collar on Face'. The diagram labels the 'Elevation' axis (vertical), 'Easting' axis (horizontal), and 'Northing' axis (diagonal). The 'Length' of the borehole is shown as a red line. The 'Horizontal Angle' is the angle between the borehole and the Easting axis. The 'Vertical Angle' is the angle between the borehole and the Northing axis.

A 'WinProf' dialog box is overlaid at the bottom center, displaying the message: '36 Lifter Holes were generated' with an 'OK' button.

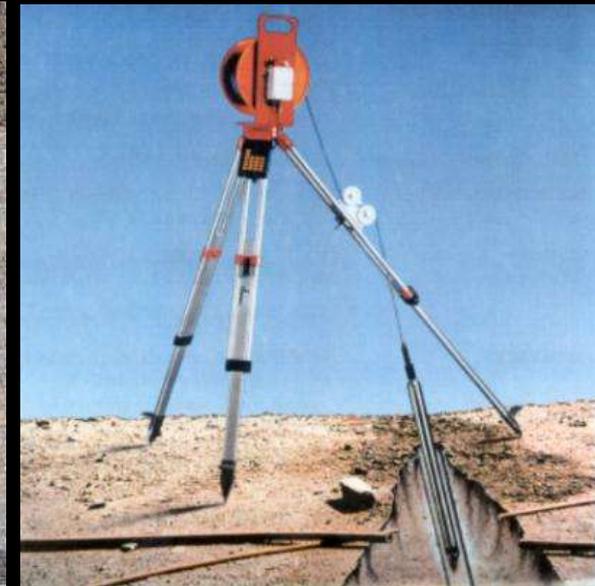
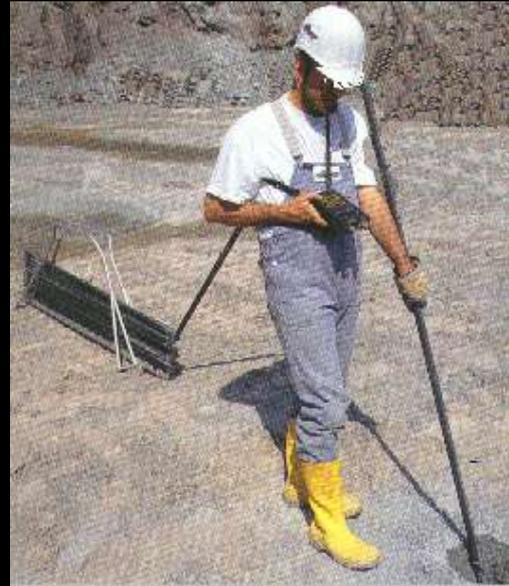
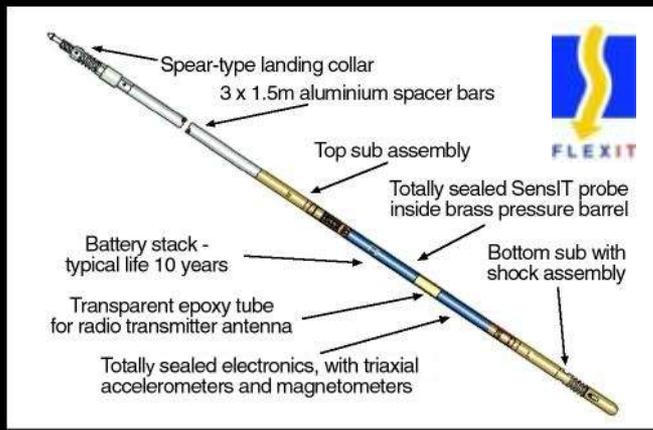
# Lifter boreholes - Front View

- Holes can be
  - Added 
  - Moved 
  - Deleted 



## *Interface with Borehole Angular Deviation Devices*

- Winprof interfaces with the following borehole angular deviation devices:
- BORETRAK
- PULSAR (UK)
- FLEXIT (Sweden)
- DEVIBENCH



# Boretrak™ Interface

- Winprof downloads data directly from the Boretrak CDU unit. The raw CDU and probe data are immediately available for editing:

The screenshot displays the Boretrak Raw Data software interface. It features two main windows. The left window, titled "Boretrak Raw Data", has a "CDU Data" tab selected. It shows "Readings for Hole #1" with input fields for Rod Length (1.00), Azimuth (180.00), and Rod Left (0.00). Below these is a table of CDU data:

Rod #	CDU Time
1	181603
2	181607
3	181616
4	181623
5	181628

The right window, also titled "Boretrak Raw Data", has a "Probe Data" tab selected. It displays a table of probe data with 15 rows. The first row is highlighted in blue:

Reading #	Pitch	Roll	Probe Time
1	99.980	-30.950	180524
2	99.980	-30.950	180527
3	99.980	-30.940	180530
4	99.980	-30.950	180533
5	99.980	-30.950	180536
6	99.980	-30.940	180539
7	99.980	-30.950	180542
8	99.980	-30.950	180545
9	99.980	-30.950	180548
10	99.980	-30.940	180551
11	99.980	-30.940	180554
12	99.980	-30.950	180557
13	99.980	-30.950	180600
14	99.980	-30.950	180603
15	99.980	-30.940	180606

Navigation buttons include "Previous Hole", "Next Hole", "First Hole", "Last Hole", and "Delete Row". A status bar indicates "# of Readings: 1947". Control buttons for "OK", "Cancel", and "Help" are located at the bottom right.

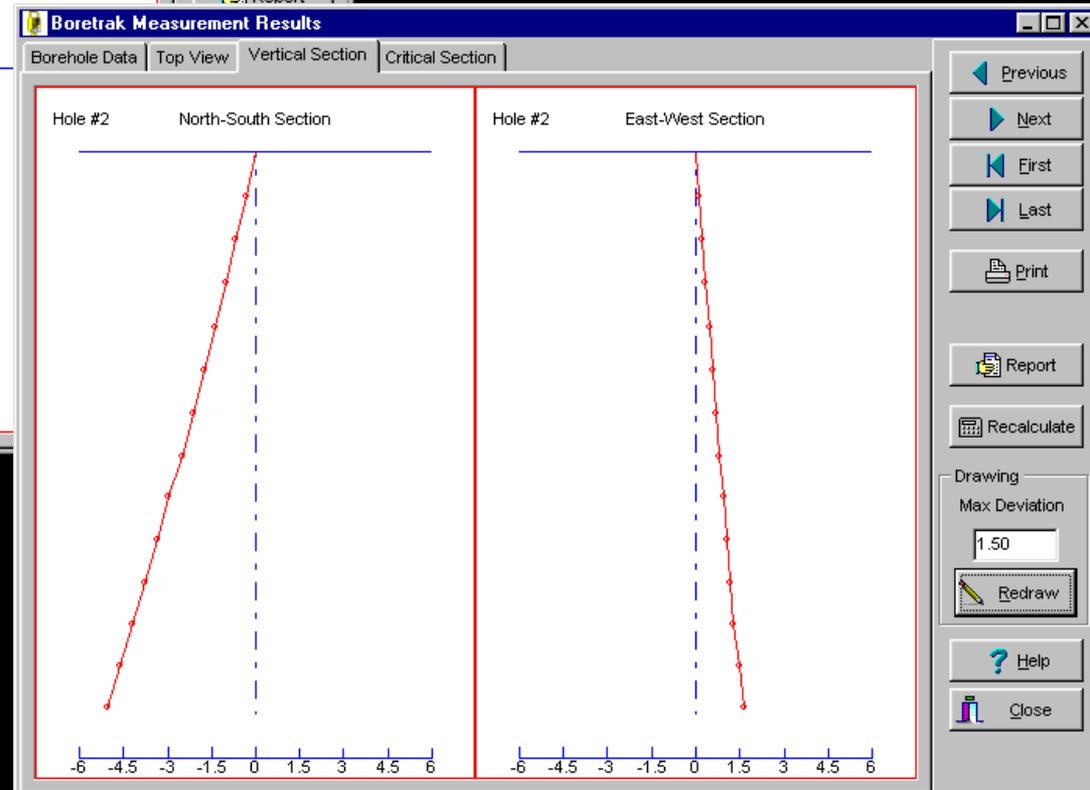
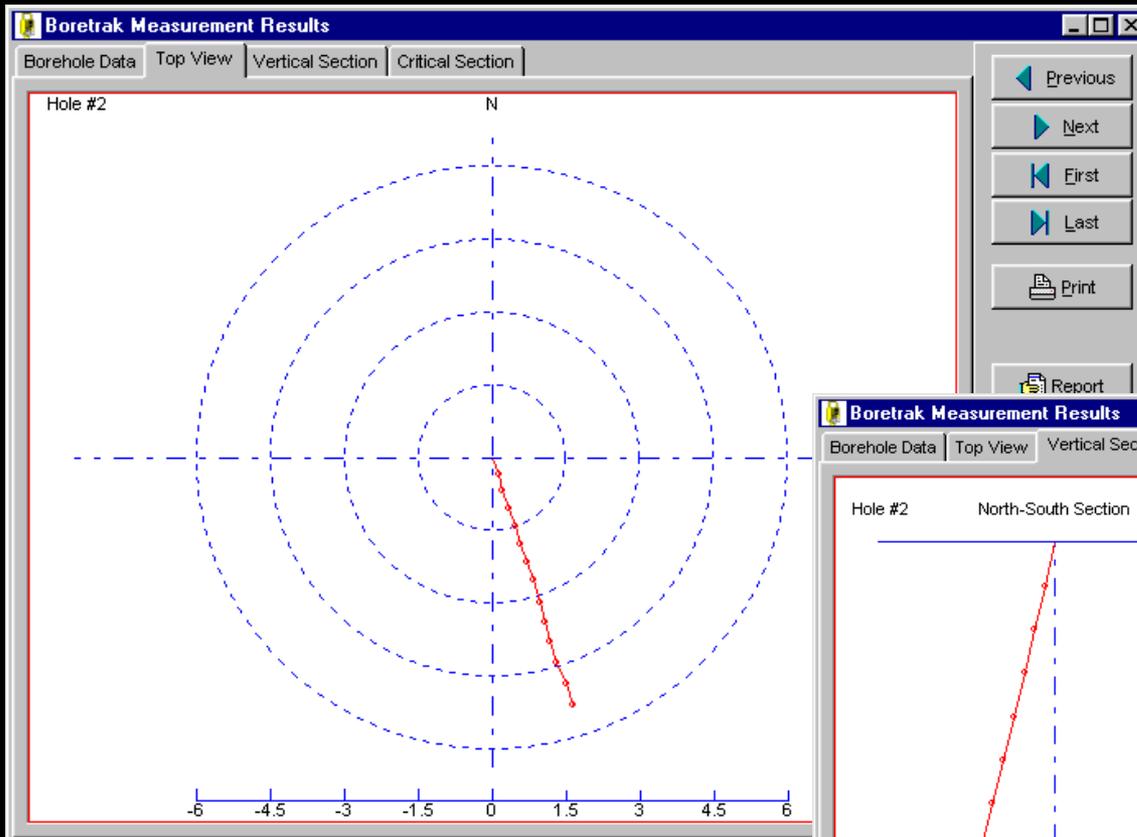
# Boretrak™ Interface (cont)

- Raw data is interpreted to provide information for each measured borehole:

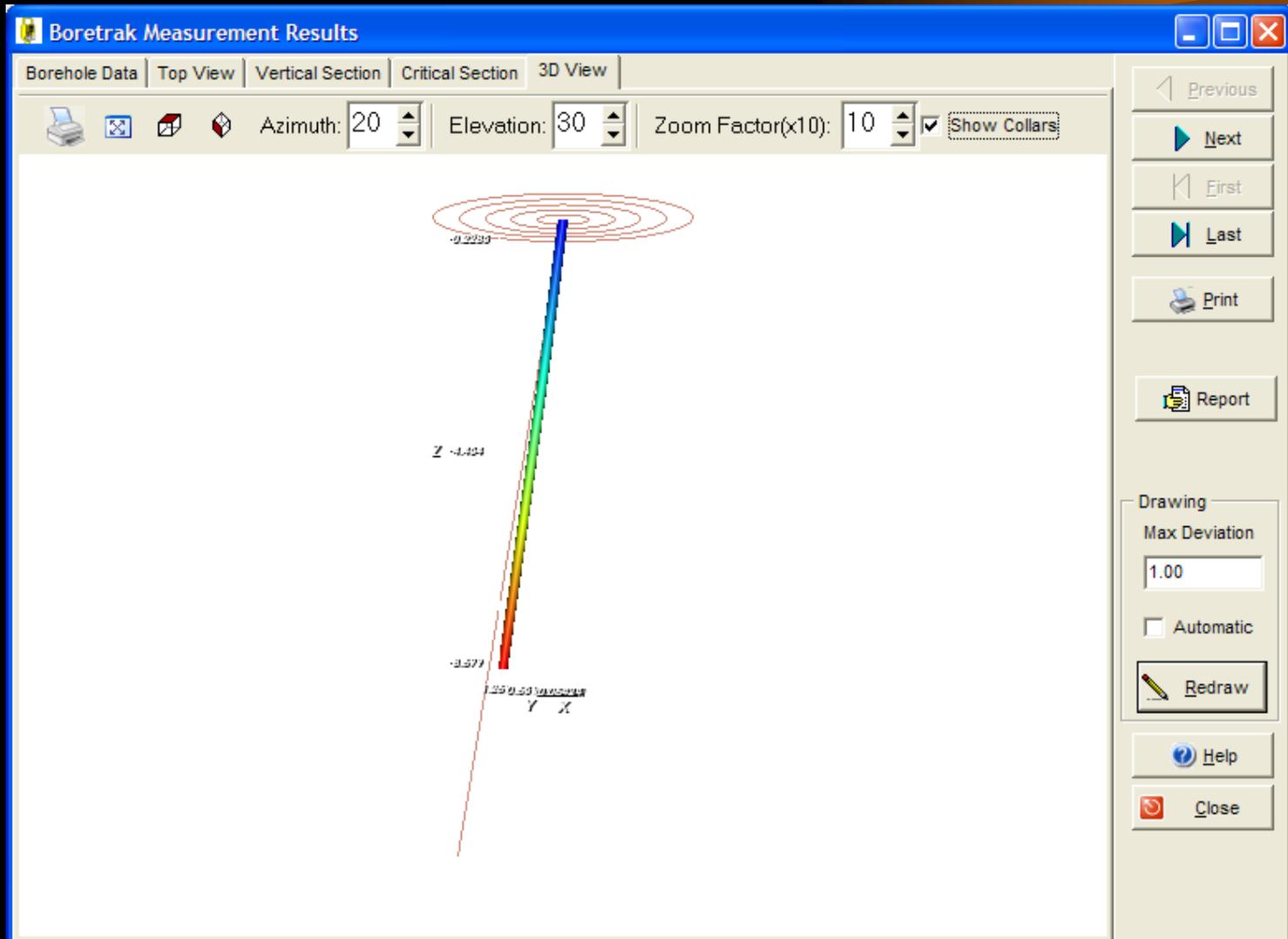
The screenshot displays the 'Boretrak Measurement Results' window. It features a tabbed interface with 'Borehole Data', 'Top View', 'Vertical Section', and 'Critical Section'. The main area shows 'Results for Boretrak Hole #2' with a 'Reference Azimuth 270°'. Below this, there are three sections: 'Borehole Collar' (Northing, Easting, Elevation), 'Desired' (Hole Angle, Hole Depth, Azimuth), and 'Measured Deviation' (X, Y, True Vertical Depth, Hole Depth, Final Azimuth). A table at the bottom lists data for five rods, with the first rod highlighted in blue. A right-hand sidebar contains navigation buttons (Previous, Next, First, Last), a Print button, a Report button, a Recalculate button, and a Drawing section with a Max Deviation input and a Redraw button.

Rod #	TDepth	Offset	Rod Depth	X	Y	Pitch	Roll	Dip	Azimuth
1	0.937	0.326	1.000	0.123	-0.326	-19.040	7.460	19.216	159.383
2	1.870	0.676	2.000	0.209	-0.676	-20.460	5.280	19.800	166.144
3	2.799	1.031	3.000	0.318	-1.031	-20.780	6.690	20.361	162.933
4	3.722	1.391	4.000	0.455	-1.391	-21.110	8.470	21.081	159.117
5		1.754	5.000	0.583	-1.754	-21.290	7.880	21.052	160.617
6				0.712	-2.123	-21.680	7.980	21.370	160.750

# Boretrak™ Interface (cont)



# 3d Visualization of Borehole



# Flexit Interface

**FLEXIT Interface**

Borehole Data | Top View | Vertical Section | Critical Section

### Results for FLEXIT Profile # 200

Profile #200	Desired	Measured Deviation
Northing: 0.000	Drill Angle: 0	X: 0.014    Y: -2.719
Easting: 0.000	Hole Depth: 0	Actual Deviation: 2.72
Elevation: 0.000	Azimuth: 180	True Vertical Depth: 15.77
		Hole Depth: 16.00
		Final Azimuth: 169.8

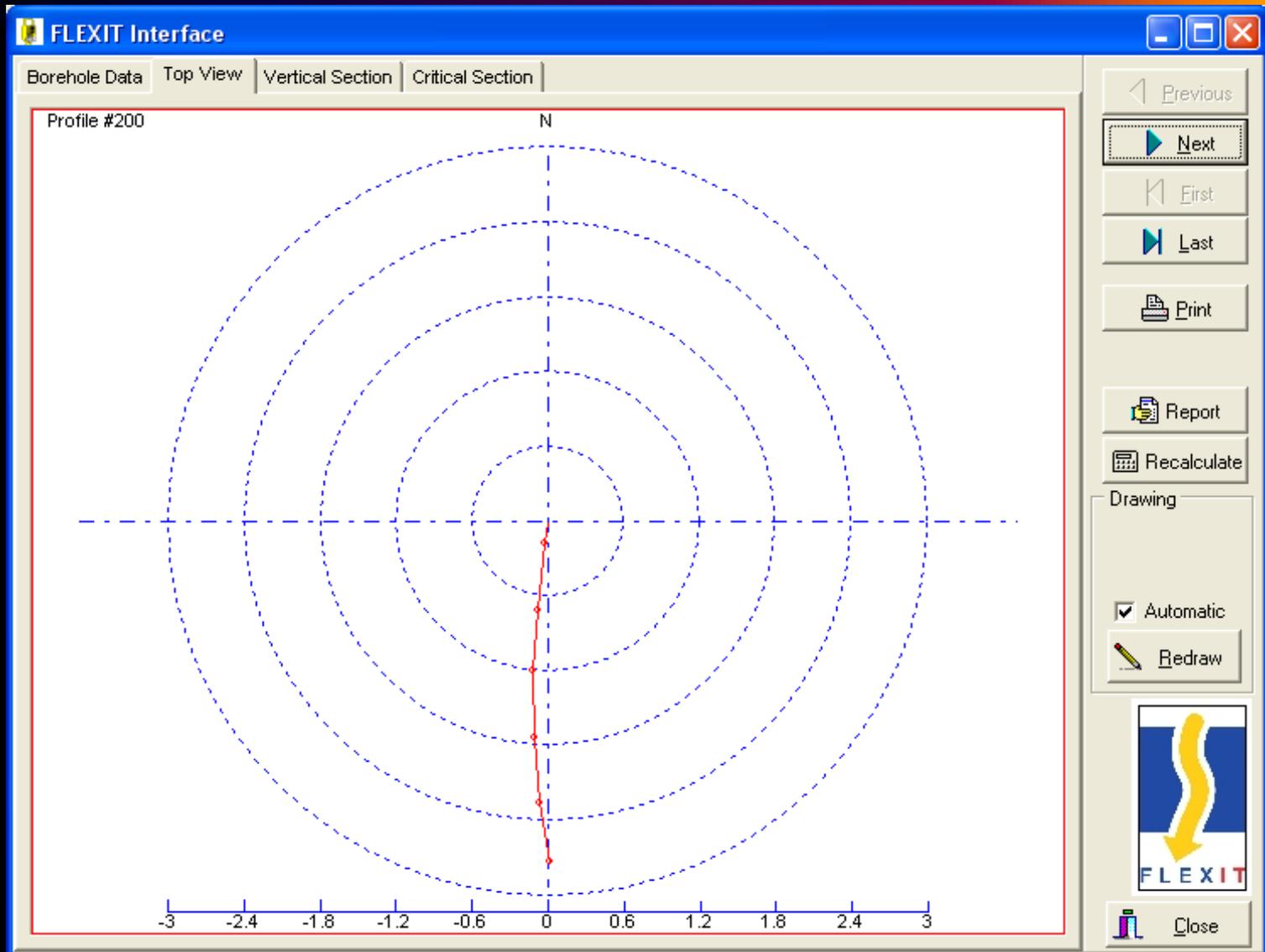
	X (m)	Y (m)	True Depth (m)	Depth (m)	Inclination (°)	Azimuth (°)
▶	-0.03	-0.17	0.99	1.0000	-80.1000	190.0000
	-0.08	-0.71	3.94	4.0000	-79.6000	185.1000
	-0.12	-1.19	6.90	7.0000	-80.8000	185.4000
	-0.11	-1.73	9.85	10.0000	-79.6000	178.5000
	-0.07	-2.25	12.80	13.0000	-79.9000	175.8000
	0.01	-2.72	15.77	16.0000	-80.9000	169.8000
*						

All Dimensions in m

Navigation: Previous, Next, First, Last, Print, Report, Recalculate, Drawing, Automatic, Redraw, Close

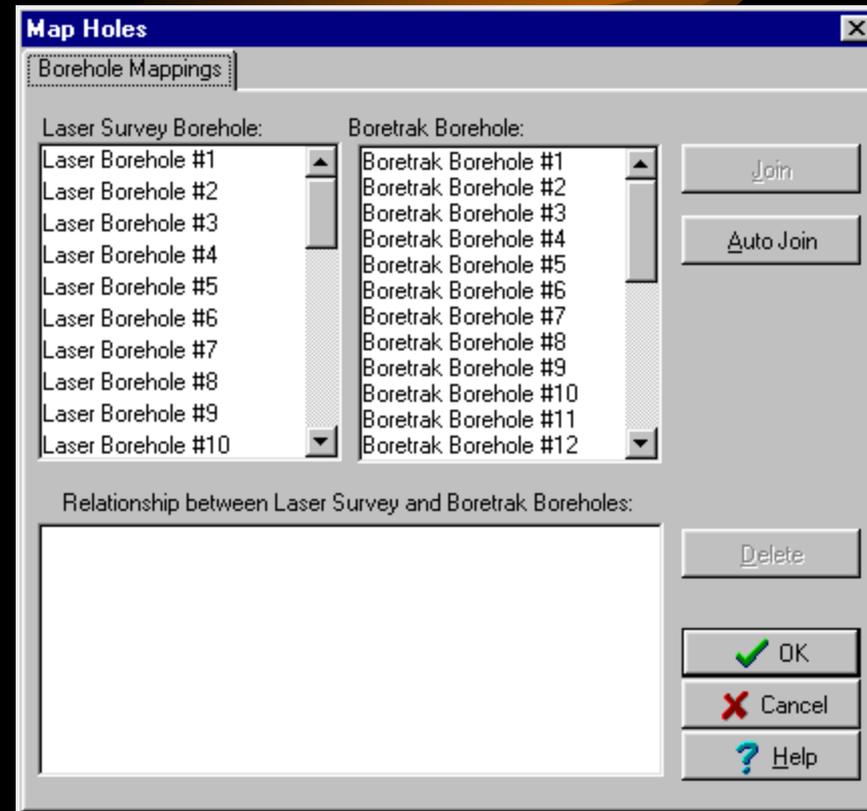


# *Flexit Interface (cont)*

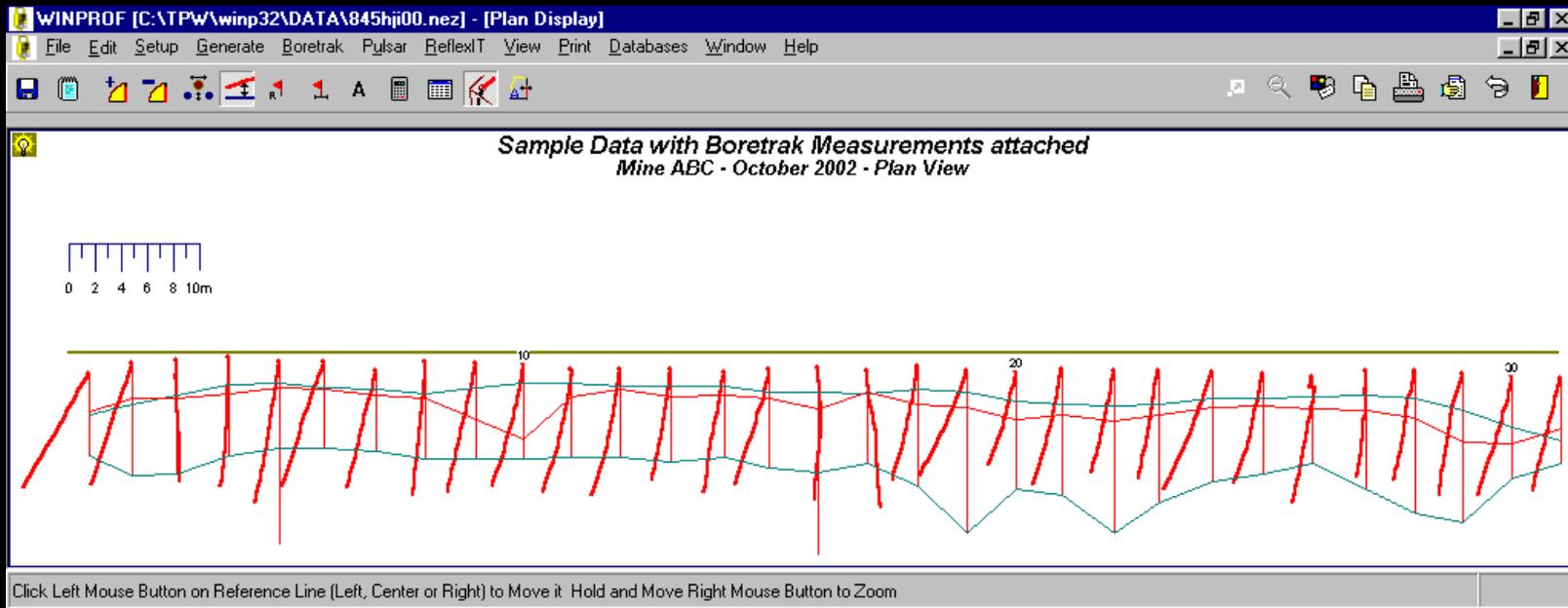
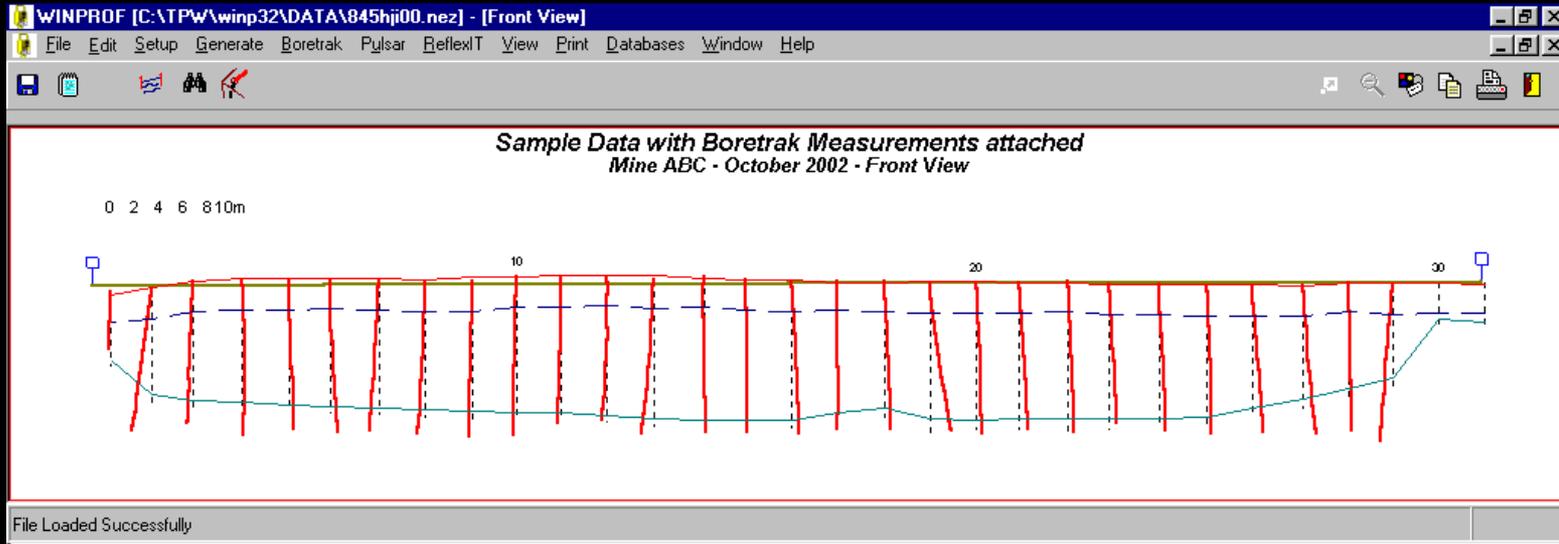


# Angular Deviation Measurements Interface

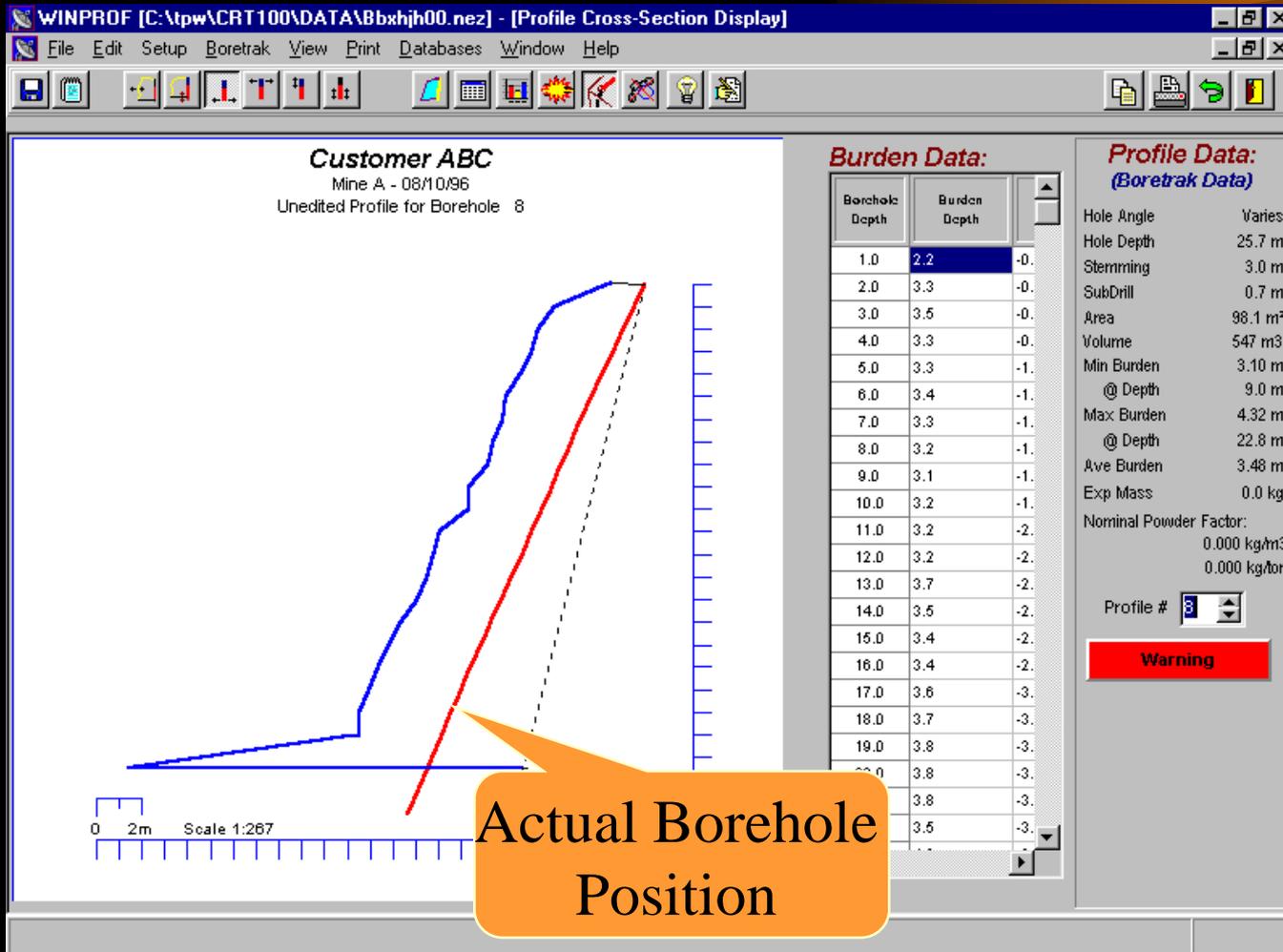
- Borehole angular deviation measurements can be linked to the survey data, automatically, or one at a time.
- Once the two measurements are linked, all burden calculations will be based on the actual measurements as shown in the following screens.



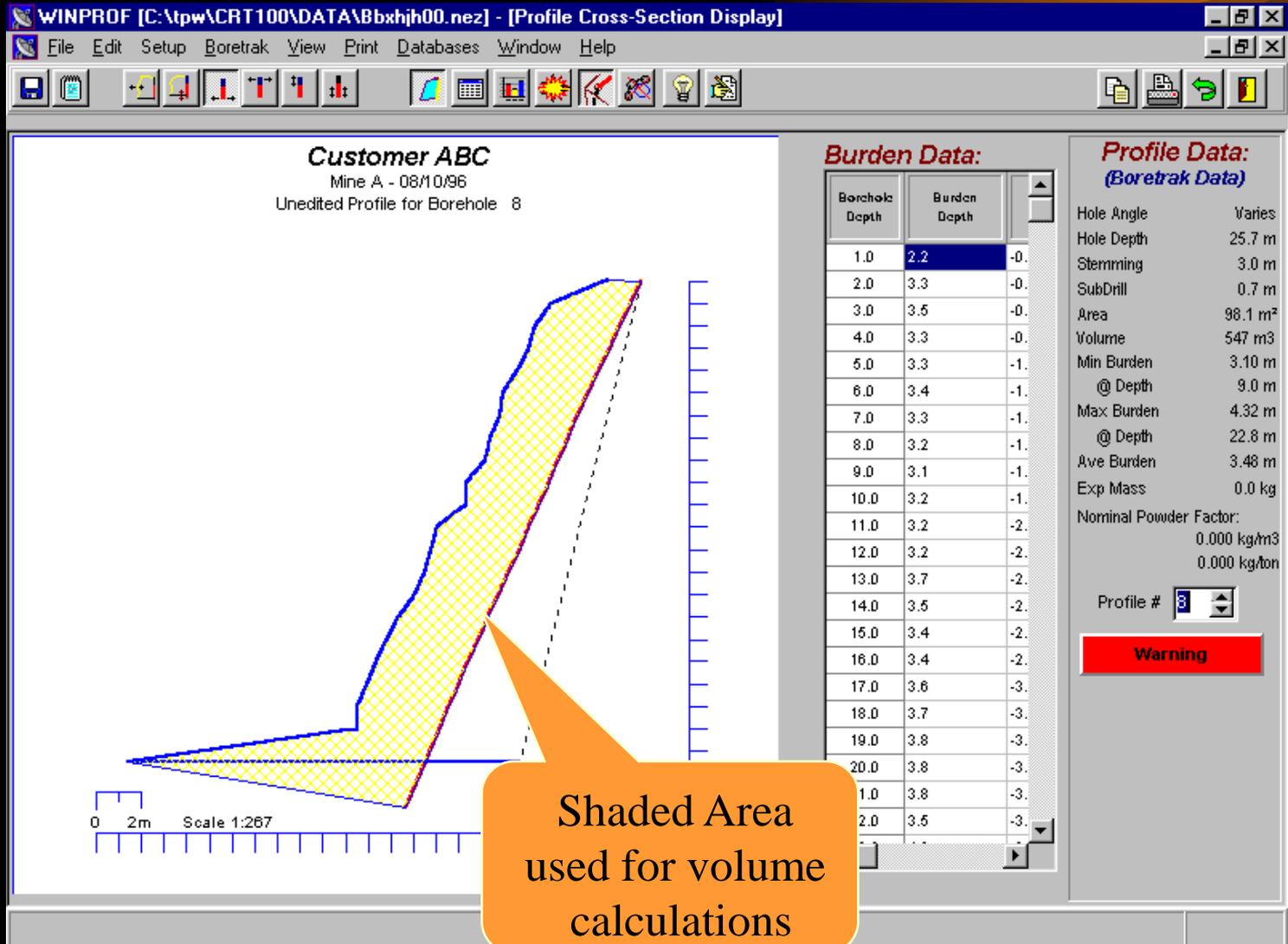
# 3D Survey with Borehole Angular Measurements attached



# Borehole Deviation



# Calculations based on Actual (true) Hole Position



# Reports



- Winprof provides a comprehensive list of reports including:
  - Printout of individual profiles with borehole details, burden and charging information
  - Survey Summary Report
  - Borehole Positioning Report
  - Inter-Hole Spacing Report (for option with Angular Deviation Measurement Inputs)
- All reports and printouts can be exported directly to PDF/RTF/HTML format



# Survey Summary Printout

**Summary of Results**

Customer: **Sample Data with Boretrak Measurements attached** Points: **1593**

Survey Location: **Mine ABC** Number of Boreholes: **31**

Face Name: **F01** Number of Pre-Drilled Boreholes: **31**

Station ID: **P01** Face Length: **114.62 m**

Operator: **Luis Valentim,** Rock Volume: **5895.0 m3**

Survey Date: **October 2002**

Print OK Help

Prf #	Depth	Angle	Stemming m	SubDrill m	Min Burden m	Max Burden m	Ave Burden m	Area m <sup>2</sup>	Tons	Floor Angle
1	6.3	0	2.5	0.6	3.7	3.7	3.0	49.2	446.8	0
2	9.7	0	2.5	0.9	2.2	3.0	2.7	57.6	493.0	0
3	10.9	0	2.5	0.9	2.4	3.4	3.0	50.9	529.0	0
4	11.0	0	2.5	0.8	2.6	3.2	2.9	49.6	509.0	0
5	11.0	0	2.5	0.7	1.1	2.5	2.0	41.0	403.3	0
6	11.3	0	2.5	0.7	1.3	2.5	2.1	33.5	344.4	0
7	11.3	0	2.5	0.6	1.1	2.4	1.8	27.8	360.8	0
8	11.4	0	2.5	0.8	2.6	3.0	2.8	47.1	416.9	0
9	11.6	0	2.5	0.7	2.2	11.4	4.3	39.2	439.2	0
10	12.0	0	2.5	0.7	2.3	26.3	6.0	47.0	425.3	0
11	12.1	0	2.5	0.7	1.5	2.8	2.1	38.3	376.8	0
12	12.3	0	2.5	0.7	0.8	2.4	1.5	26.3	315.5	0
13	12.4	0	2.5	0.7	1.6	2.6	2.1	32.3	312.3	0
14	12.6	0	2.5	0.7	1.1	2.0	1.7	25.0	311.3	0

Notes:  
All burden calculations exclude the stemming and backfill areas  
Hole Depth includes subdrill amount

**Survey Summary Report**  
Location: Mine ABC

Customer: Sample Data with Boretrak Measurements attached

Face Name: F01  
Station ID: P01  
Operator: Luis Valentim,  
Survey Date: October 2002

Number of Data Points: 1593  
Number of Boreholes: 31  
Pre-Drilled Boreholes: 31  
Face Length: 114.62 (m)  
Left Marker Offset: 0.0 (m)  
Right Marker Offset: 0.0 (m)  
Rock Volume: 5895.0 (m3)

Profile #	Hole Depth	Angle	Stemming (m)	SubDrill (m)	Min Burden (m)	Max Burden (m)	Ave Burden (m)	X-Area (m <sup>2</sup> )	Volume (m <sup>3</sup> )	Floor Ang
1	6.3	0	2.5	0.6	3.68	3.69	3.0	49.2	446.8	0
2	9.7	0	2.5	0.9	2.25	3.04	2.7	57.6	493.0	0
3	10.9	0	2.5	0.9	2.44	3.40	3.0	50.9	529.0	0
4	11.0	0	2.5	0.8	2.68	3.23	2.9	49.6	509.0	0
5	11.0	0	2.5	0.7	1.15	2.53	2.0	41.0	403.3	0
6	11.3	0	2.5	0.7	1.28	2.48	2.1	33.5	344.4	0
7	11.3	0	2.5	0.6	1.12	2.35	1.8	27.8	360.8	0
8	11.4	0	2.5	0.8	2.57	3.07	2.8	47.1	416.9	0
9	11.6	0	2.5	0.7	2.25	11.42	4.3	39.2	439.2	0
10	12.0	0	2.5	0.7	2.32	26.35	6.0	47.0	425.3	0
11	12.1	0	2.5	0.7	1.52	2.82	2.1	38.3	376.8	0
12	12.3	0	2.5	0.7	0.79	2.36	1.5	26.3	315.5	0
13	12.4	0	2.5	0.7	1.58	2.65	2.1	32.3	312.3	0
14	12.6	0	2.5	0.7	1.15	2.03	1.7	25.0	311.3	0
15	12.5	0	2.5	0.8	1.07	2.51	2.3	30.8	339.9	0
16	12.4	0	2.5	0.8	2.05	6.81	3.2	51.3	463.0	0
17	11.7	0	2.5	0.7	0.60	2.88	1.6	21.6	144.9	0
18	11.4	0	2.5	0.9	2.18	3.21	3.0	57.0	204.3	0
19	12.0	0	2.5	1.3	2.62	3.02	2.8	77.4	260.3	0
20	12.3	0	2.5	0.9	3.51	3.97	3.9	60.1	255.0	0
21	12.3	0	2.5	1.0	2.98	4.39	3.7	64.4	270.9	0
22	12.7	0	2.5	1.3	2.85	3.38	3.6	81.9	287.9	0

# Borehole Positioning Printout

**Drilling Summary**

Customer: Sample Data with Boretrak Measurements attached:s 1593

Survey Location: Mine ABC      Number of Boreholes: 31

Operator: Luis Valentim,      Face Length: 114.62 m

Survey Date: October 2002      Rock Volume: 5895.0 m<sup>3</sup>

Left Marker Offset: 0.000 m      Right Marker Offset: 0.000 m

Print  
OK  
Help

Borehole	Distance from Left Marker	Offset m	Depth m	Diameter mm	Angle
1	1.5	1.6	6.3	102	0.0
2	4.9	0.8	9.7	102	0.0
3	8.3	0.6	10.9	102	0.0
4	12.4	0.3	11.0	102	0.0
5	16.2	0.7	11.0	102	0.0
6	19.6	0.7	11.3	102	0.0
7	23.7	1.4	11.3	102	0.0
8	27.5	0.7	11.4	102	0.0
9	31.4	0.8	11.6	102	0.0
10	35.0	0.7	12.0	102	0.0
11	38.7	1.2	12.1	102	0.0
12	42.5	1.3	12.3	102	0.0

**Notes:**  
 - Hole Depth includes subdrill amount  
 - Positive Offset represent movement toward the face;  
 - Negative Offset represent movement away from the face;

**Borehole Offsets Report**  
Customer: Mine ABC

Survey Location: Sample Data with Boretrak Measurements attached

Face Name: R01	Number of Data Points: 192
Station ID: 001	Number of Boreholes: 31
Operator: Luis Valentim	Pre-Drilled Boreholes: 31
Survey Date: October 2002	Face Length: 114.6 (m)
	Left Marker Offset: 0.0 (m)
	Right Marker Offset: 0.0 (m)
	Rock Volume: 5895.0 (m <sup>3</sup> )
	Total Vol (incl back row): 5895.0 (m <sup>3</sup> )

Borehole Number (m)	Row Number	Borehole Type	Diameter (mm)	Depth (m)	Angle (°)	Distance from Left Marker (m)	Offset from Reference Line (m)	Observations
1	Front	Pre-Drilled	102	6.3	0	1.5	1.6	
2	Front	Pre-Drilled	102	9.7	0	4.9	0.8	
3	Front	Pre-Drilled	102	10.9	0	8.3	0.6	
4	Front	Pre-Drilled	102	11.0	0	12.4	0.3	
5	Front	Pre-Drilled	102	11.0	0	16.2	0.7	
6	Front	Pre-Drilled	102	11.3	0	19.6	0.7	
7	Front	Pre-Drilled	102	11.3	0	23.7	1.4	
8	Front	Pre-Drilled	102	11.4	0	27.5	0.7	
9	Front	Pre-Drilled	102	11.6	0	31.4	0.8	
10	Front	Pre-Drilled	102	12.0	0	35.0	0.7	
11	Front	Pre-Drilled	102	12.1	0	38.7	1.2	
12	Front	Pre-Drilled	102	12.3	0	42.5	1.3	
13	Front	Pre-Drilled	102	12.4	0	46.3	1.3	
14	Front	Pre-Drilled	102	12.6	0	50.4	1.5	
15	Front	Pre-Drilled	102	12.5	0	53.2	1.2	
16	Front	Pre-Drilled	102	12.4	0	57.7	1.1	
17	Front	Pre-Drilled	102	11.7	0	61.4	1.4	
18	Front	Pre-Drilled	102	11.4	0	65.4	1.0	
19	Front	Pre-Drilled	102	12.5	0	69.1	1.3	
20	Front	Pre-Drilled	102	12.3	0	73.0	1.3	
21	Front	Pre-Drilled	102	12.3	0	76.4	1.2	
22	Front	Pre-Drilled	102	12.7	0	80.5	1.4	
23	Front	Pre-Drilled	102	12.2	0	83.8	1.3	
24	Front	Pre-Drilled	102	12.1	0	88.0	1.5	
25	Front	Pre-Drilled	102	11.8	0	91.2	1.6	
26	Front	Pre-Drilled	102	10.9	0	95.7	1.8	
27	Front	Pre-Drilled	102	10.3	0	99.2	1.4	
28	Front	Pre-Drilled	102	10.0	0	103.6	1.3	
29	Front	Pre-Drilled	102	9.0	0	107.3	1.7	
30	Front	Pre-Drilled	102	3.8	0	111.1	1.7	
31	Front	Pre-Drilled	102	4.0	0	114.8	1.9	

**Notes:**  
 - Hole Depth includes subdrill amount  
 - Positive Offset represent movement toward the face;  
 - Negative Offset represent movement away from the face;

Report Date: 02/21/01 11:11      MineSite - Boretrak by TIC Software      Page 1

# Inter-Hole Spacing Printout

Inter-hole Spacings

Hole-Hole	Minimum Spacing	@Depth	Maximum Spacing	@Depth	Average Spacing
1-2	18.3	85.3	18.5	2.0	18.4
2-3	18.0	2.0	18.0	85.2	18.0
3-4	18.1	2.0	18.2	84.7	18.1
4-5	18.2	2.0	18.3	84.5	18.3
5-6	18.0	82.0	18.0	2.0	18.0
6-7	18.0	83.7	18.1	2.0	18.1
7-8	18.4	79.7	18.5	2.0	18.4
8-9	18.0	78.9	18.0	2.0	18.0
9-10	18.0	2.0	18.0	78.0	18.0
10-11	18.0	2.0	18.0	78.0	18.0
11-12	18.1	2.0	18.2	78.0	18.1
12-13	18.5	2.0	18.6	81.0	18.6

OK  
Print

Summary  
Minimum Inter Hole Spacing is 18.0 between Boreholes 2 and 3 @ depth = 2.0  
Maximum Inter Hole Spacing is 18.6 between Boreholes 12 and 13 @ depth = 81.0



Print Preview

Date/Time: 1/10/2008 4:10:57 PM  
BLACK BEAUTY / MILLER CREEK MINE - KNOX/PIT M1M2100305 - 2nd P

Hole-Hole	Minimum Spacing	@Depth	Maximum Spacing	@Depth	Average Spacing
1-2	18.3	85.3	18.5	2.0	18.4
2-3	18.0	2.0	18.0	85.2	18.0
3-4	18.1	2.0	18.2	84.7	18.1
4-5	18.2	2.0	18.3	84.5	18.3
5-6	18.0	82.0	18.0	2.0	18.0
6-7	18.0	83.7	18.1	2.0	18.1
7-8	18.4	79.7	18.5	2.0	18.4
8-9	18.0	78.9	18.0	2.0	18.0
9-10	18.0	2.0	18.0	78.0	18.0
10-11	18.0	2.0	18.0	78.0	18.0
11-12	18.1	2.0	18.2	78.0	18.1
12-13	18.5	2.0	18.6	81.0	18.6

Minimum Inter Hole Spacing is 18.0 between Boreholes 2 and 3 @ depth = 2.0

0% Page 1 of 1

# Boretrak/Pulsar/Flexit Reports (Angular Deviation Measurements Report)

## Boretrak Summary Report

Customer: Westspreng GMBH  
 Survey Location: Gernay  
 Face Name: F01  
 Station ID: P01  
 Operator: Luis Valentim,  
 Survey Date: 08/10/96

Hole #	Hole Coordinates			Measured Deviation		True Vertical Depth	Actual Hole Depth	Design Hole Depth	Actual Final Azimuth	Desired Final Azimuth
	Northing	Easting	Elevation	x	y					
1	85.18	-1.12	11.15	5.020	8.882	22.156	24.400	5.686	29.5	180.0
2	85.18	-1.12	11.15	3.129	9.440	22.272	24.400	5.686	18.3	180.0
3	85.18	-1.12	11.15	-0.260	9.461	20.929	23.000	5.686	358.4	180.0
4	85.18	-1.12	11.15	0.735	10.100	23.931	26.000	5.686	4.2	180.0
5	85.18	-1.12	11.15	1.814	10.977	23.477	26.000	5.686	9.4	180.0
6	85.18	-1.12	11.15	3.241	9.653	22.807	25.000	5.686	18.6	180.0
7	85.18	-1.12	11.15	2.275	9.085	22.087	24.000	5.686	14.1	180.0
8	85.18	-1.12	11.15	0.943	10.342	23.495	25.700			
9	85.18	-1.12	11.15	2.201	9.983	21.923	24.200			
10	85.18	-1.12	11.15	2.406	9.570	23.494	25.500			
11	85.18	-1.12	11.15	2.187	9.614	23.363	25.400			
12	85.18	-1.12	11.15	2.263	9.826	22.311	24.500			
13	85.18	-1.12	11.15	1.417	8.578	20.202	22.000			
14	85.18	-1.12	11.15	1.665	9.255	20.948	23.000			
15	85.18	-1.12	11.15	2.604	8.941	21.015	23.000			
16	85.18	-1.12	11.15	0.323	10.348	22.063	24.400			

## Boretrak Report

### Results for Boretrak Hole # 1 (Laser Borehole # 1)

Customer: Westspreng GMBH  
 Survey Location: Gernay  
 Face Name: F01  
 Station ID: P01  
 Operator: Luis Valentim,  
 Survey Date: 08/10/96

Measured Deviation: X (m): 5.02  
 Y (m): 8.88  
 Actual True Vertical Depth = 22.16  
 Hole Depth 24.40  
 Desired Hole Depth: 5.69  
 Final Azimuth 29.48  
 Borehole #1 Collar  
 Northing 85.18  
 Easting -1.12  
 Elevation 11.15

Rod #	TDepth	Offset	Rod Depth	X	Y	Pitch	Roll	Dip	Azimuth
1	0.910	-0.351	1.000	0.222	0.351	-12.820	21.110	22.558	32.3
2	1.818	-0.711	2.000	0.436	0.711	-12.360	21.610	22.715	30.8
3	2.709	-1.118	3.000	0.634	1.118	-11.410	24.550	24.360	25.9
4	3.606	-1.510	4.000	0.842	1.510	-11.990	23.630	23.928	27.9
5	4.504	-1.895	5.000	1.052	1.895	-12.150	23.200	23.696	28.7
6	5.401	-2.280	6.000	1.272	2.280	-12.690	23.200	23.878	29.8
7	6.299	-2.669	7.000	1.476	2.669	-11.780	23.450	23.741	27.7
8	7.199	-3.055	8.000	1.678	3.055	-11.690	23.200	23.545	27.7



# Specifications

- WinProf is a Windows XP/Vista software product (32bit).
- WinProf supports two other languages directly:
  - Portuguese
  - German



# Contact Details:

- TLC Engineering Solutions (Johannesburg, South Africa)
  - Luis Valentim, Terry Cousins
  - [sales@tlc.co.za](mailto:sales@tlc.co.za) or [luis@tlc.co.za](mailto:luis@tlc.co.za)
  - [www.tlc.co.za](http://www.tlc.co.za)
  - Tel: +27 11 4633860
- Vibronics (Evansville, Indiana, USA)
  - John Wiegand, Jeff Baker
  - [sales@vibronics.com](mailto:sales@vibronics.com) or [jbaker@vibronics.com](mailto:jbaker@vibronics.com)
  - [www.vibronics.com](http://www.vibronics.com)
  - Tel: (812) 853 2300

