

# TLC Winprof



L.M.P Valentim  
TLC Software

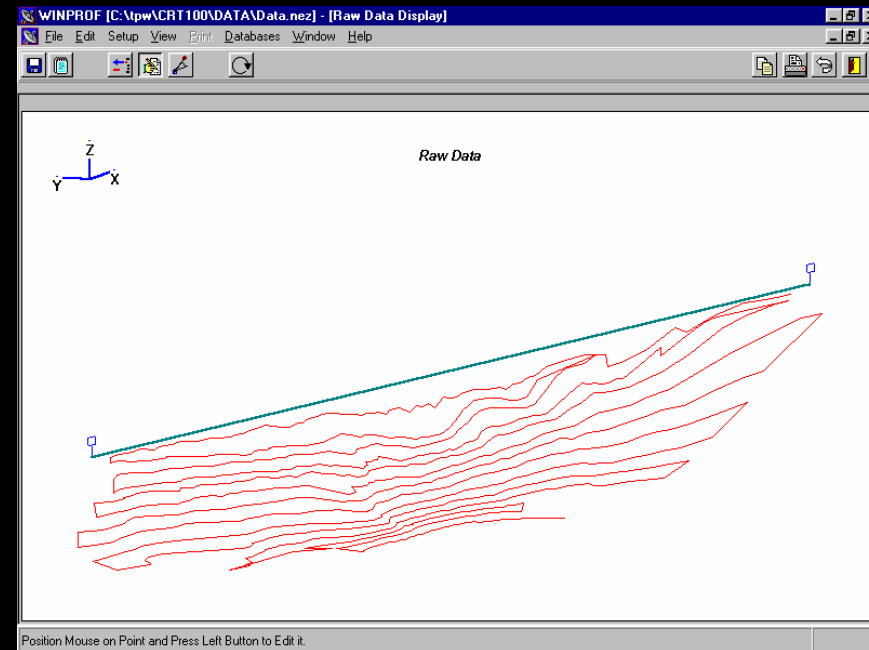
# Overview

- **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



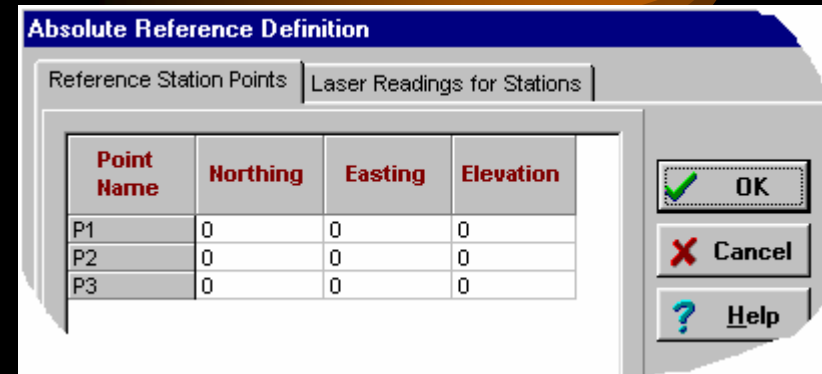
# Overall Features

- Ability to read data from a number of laser surveying instruments:
  - Laser Technologies Criterion, Autoscan and Impulse 200
  - MDL Autoscan, 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

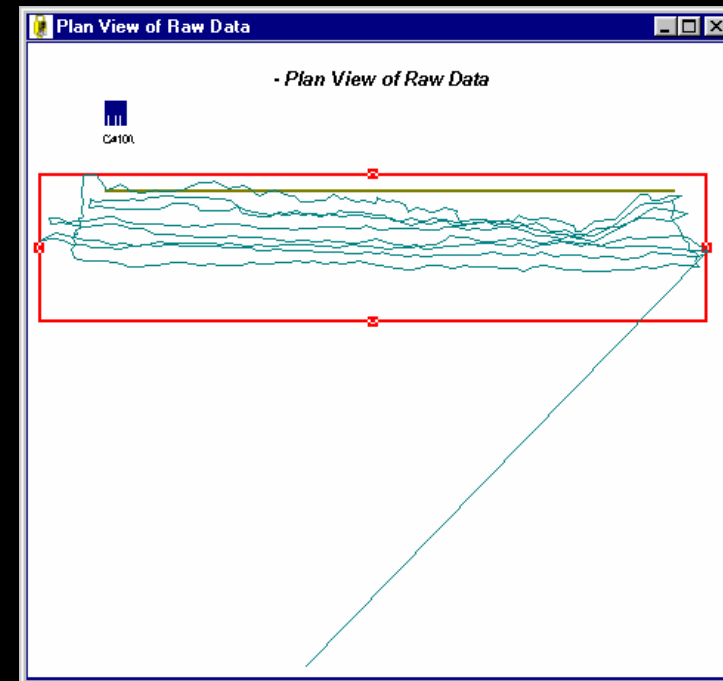


# Raw Data Editing Tools

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

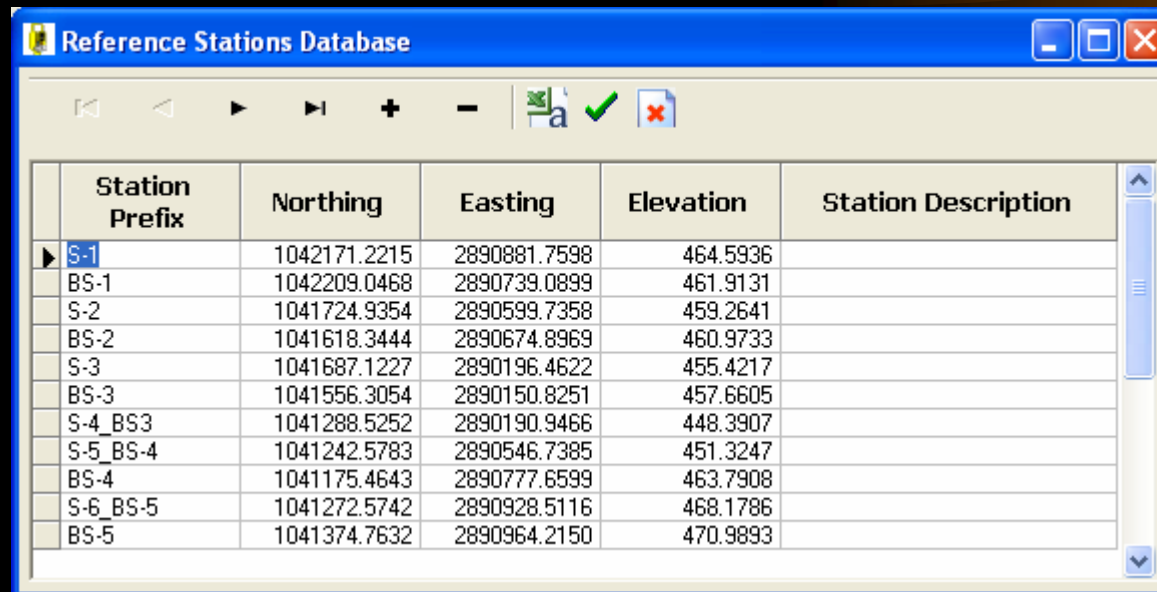


- Raw Data points may be removed individually
- Data Limits can be used on the plan view to remove unwanted data points:



# Database of Fixed Stations

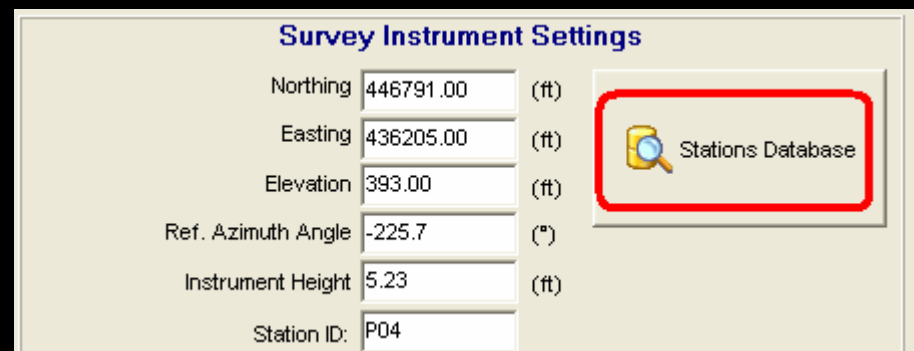
- Database of fixed surveyed station points:



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 "S-1" with Northing 1042171.2215, Easting 2890881.7598, and Elevation 464.5936. Other rows include BS-1, S-2, BS-2, S-3, BS-3, S-4\_BS3, S-5\_BS-4, BS-4, S-6\_BS-5, and BS-5.

| 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 | 2890777.6599 | 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 button labeled "Stations Database" with a magnifying glass icon is highlighted with a red rectangle.

# Features of 3D survey software

- Generates the Bench Face Surface based on user criteria:

**Generate Boreholes and Profiles**

Distance Between Left and Right Markers 289.055

Generate Mode  
 Left to Right  Right to Left

Offset from Left Marker  (ft)

Hole Spacing  (ft)

Hole Depth  (ft)

Hole Inclination Angle

Floor Slope

Burden Depth Increment  (ft)

**Optimization Settings**

Optimize Hole Length

Adjust Hole Collars to Crest

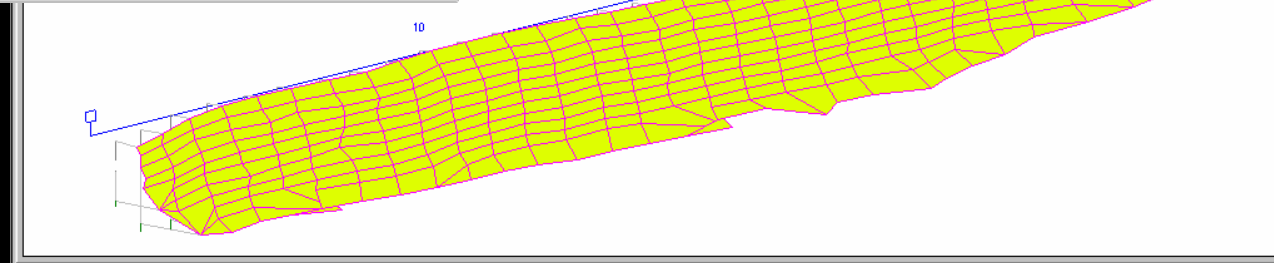
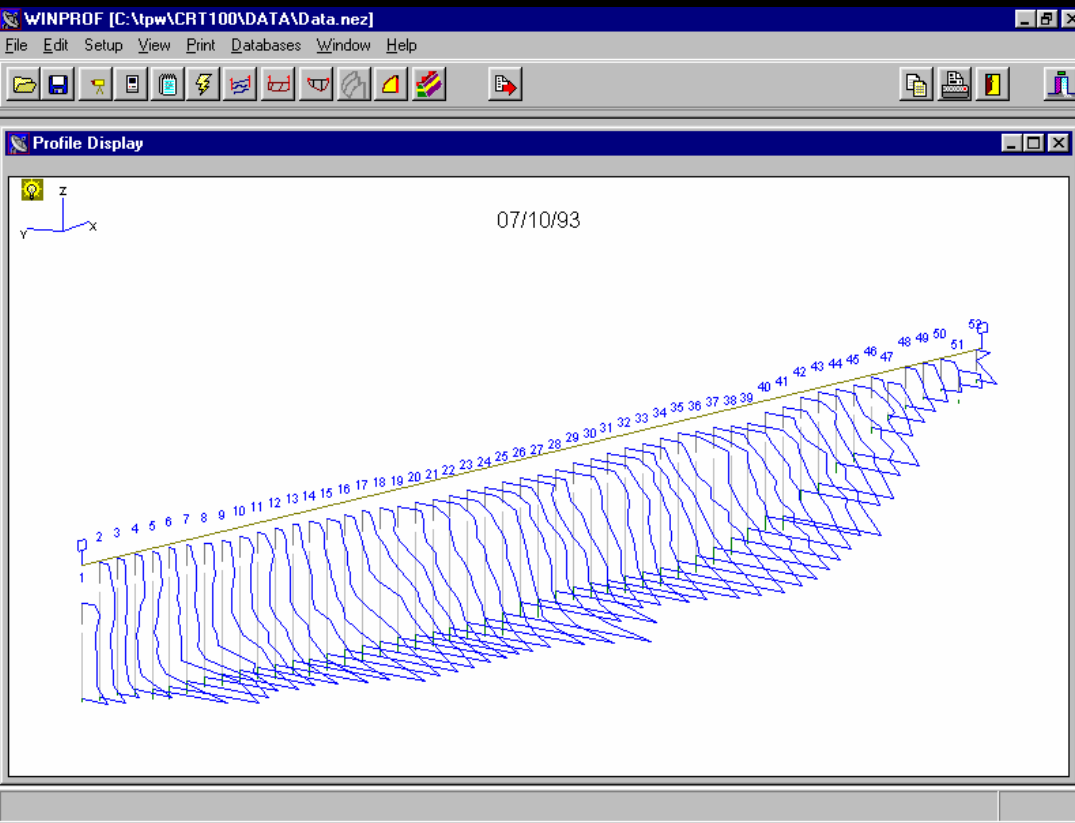
Optimize Hole Subdrill  % toe Burden

Optimize Crest Definition

Analyse Surrounding Surface (Circular Algorithm Method)

- 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)

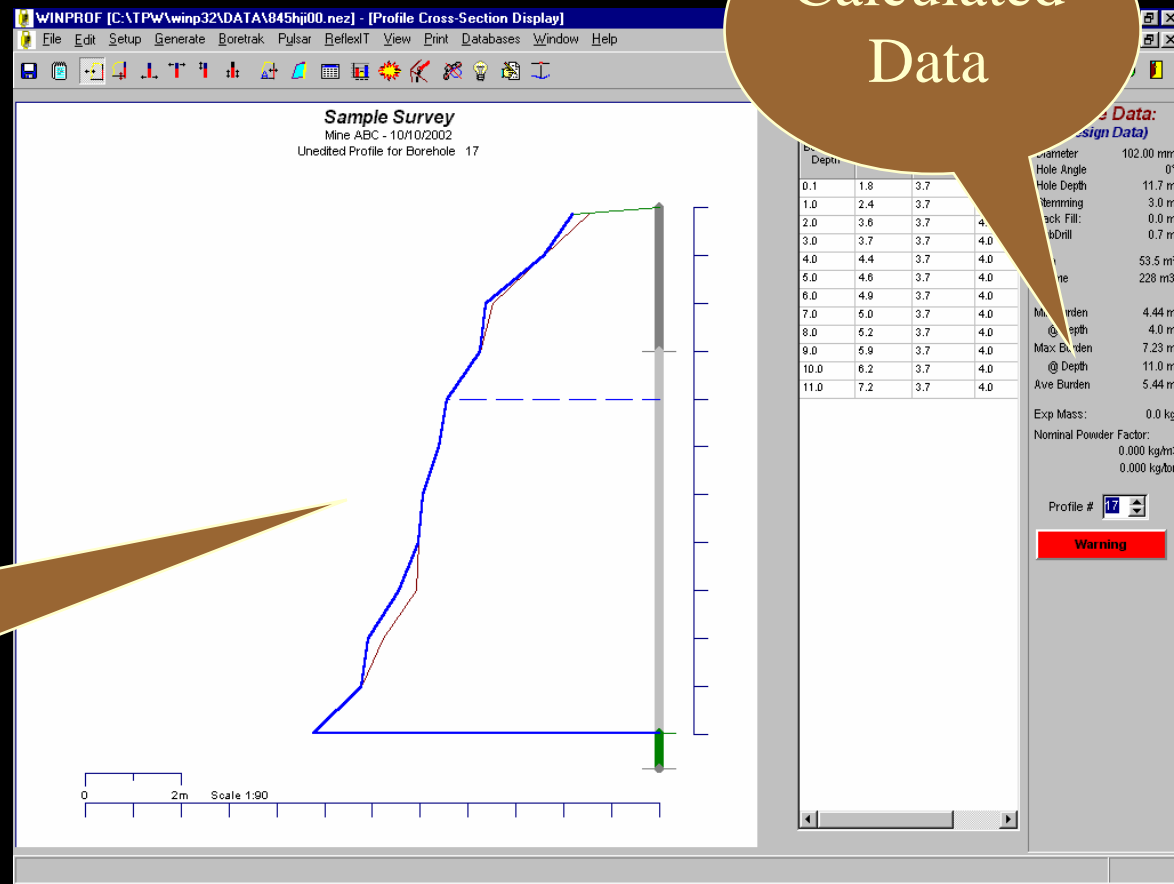
# Generated 3D Survey Faces



# Borehole Profiles

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

Profile Generated from random Laser Surveyed Points

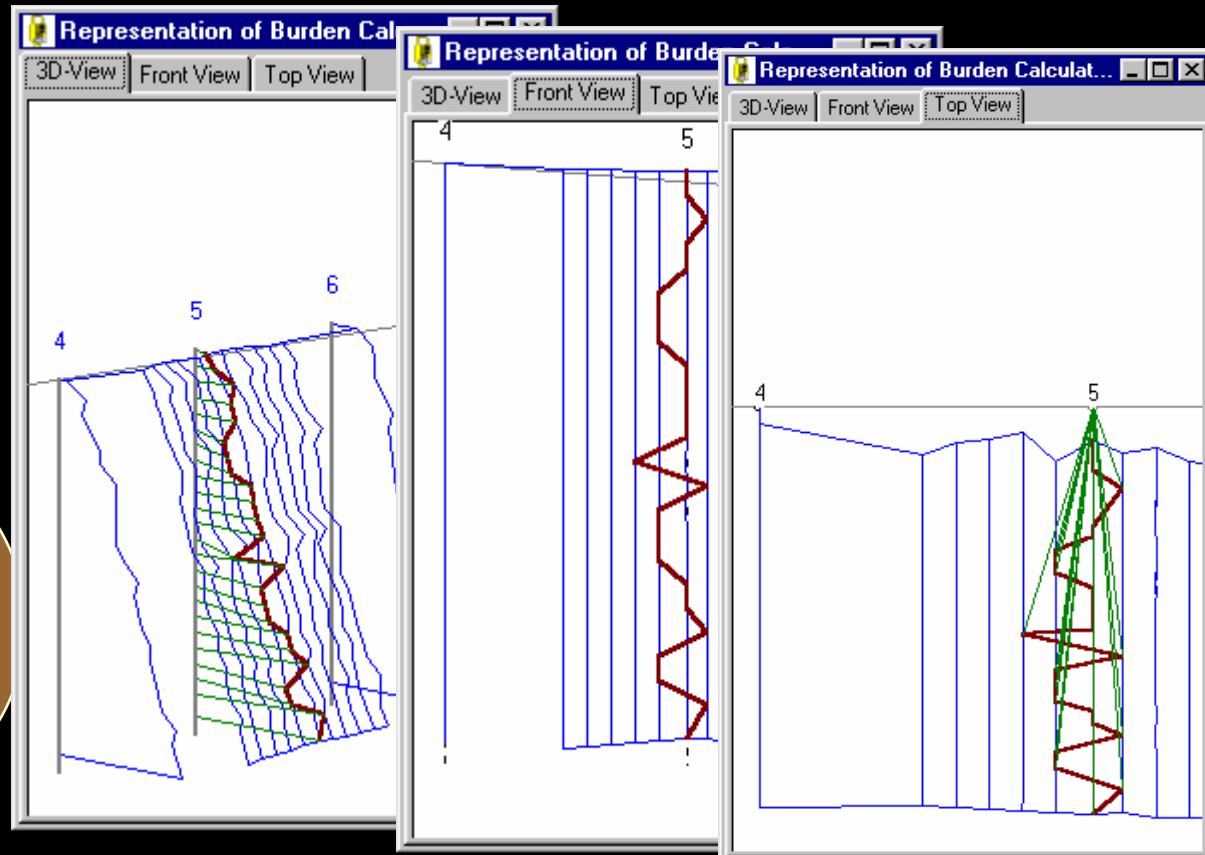
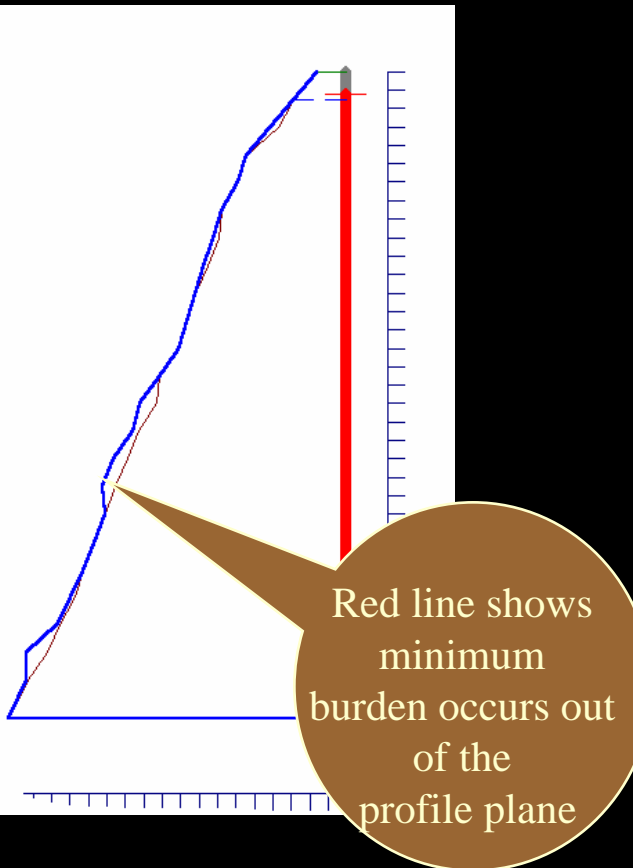




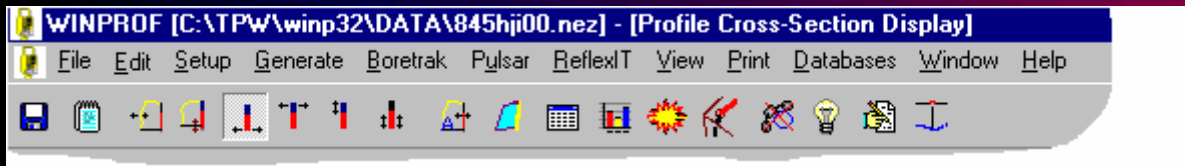
# Surround Algorithm Calculations

- 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.






3D visualization of algorithm calculations:

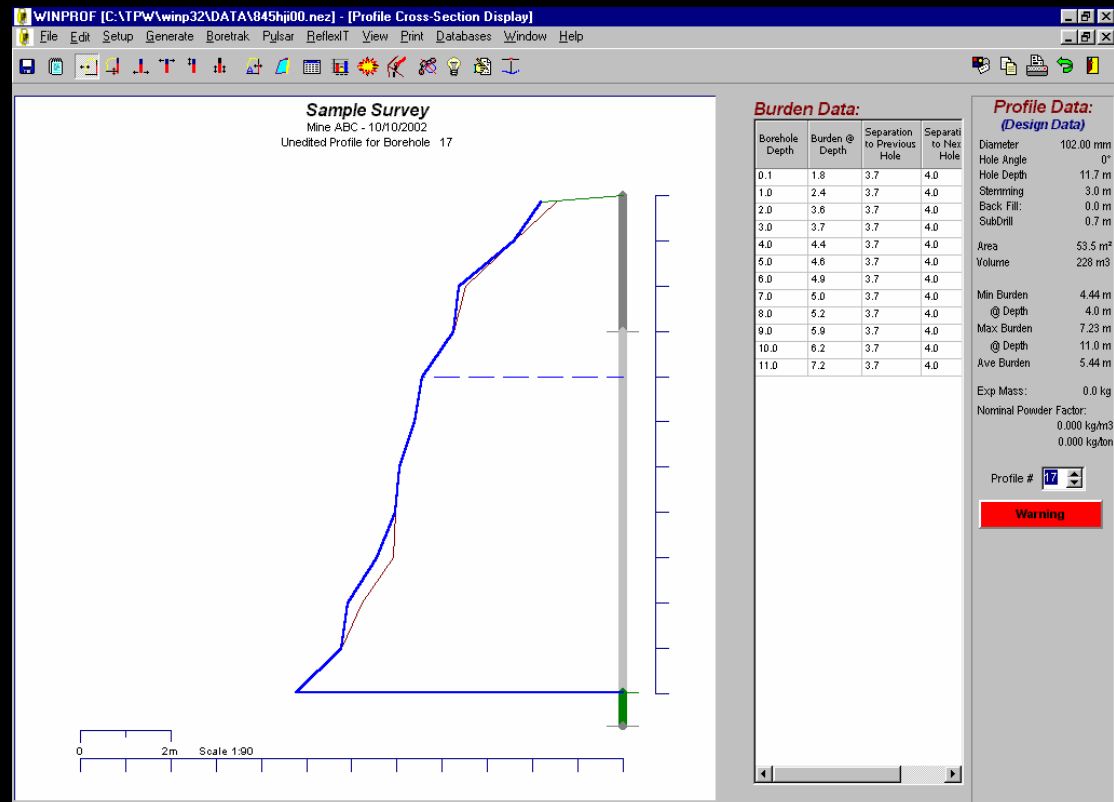


# Profile Editing Tools



## • Interactive Optimization of Burden Spacing

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



# Borehole Angle 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

| Borehole Depth | Burden @ Depth | Separation to Previous Hole | Separation to Next Hole |
|----------------|----------------|-----------------------------|-------------------------|
| 0.1            | 2.1            | Undefined                   | Undefined               |
| 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                     |

|                        |   |
|------------------------|---|
| Diameter               | 102.00 mm                               |
| Hole Angle             | 0°                                      |
| Hole Depth             | 12.7 m                                  |
| Sterming               | 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 @ Depth     | 5.01 m                                  |
| Max Burden @ Depth     | 7.59 m                                  |
| Ave Burden             | 6.11 m                                  |
| Exp Mass:              | 0.0 kg                                  |
| Nominal Powder Factor: | 0.000 kg/m <sup>3</sup><br>0.000 kg/ton |
| Profile #              | 14                                      |

0 2m Scale 1:98

Angle= 17

Warning

New Angle Setting

Mouse drags borehole

# Borehole Depth Editing

WINPROF [C:\TPW\winp32\DATA\845hji00.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 Nex 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

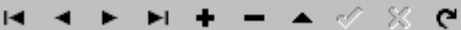
Abs Weight Strength (AWS) (cal/g): 912.000

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 |
|--------|--------------------------|-------------------------|----------------|
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |
|        |                          |                         |                |

Profile Information:

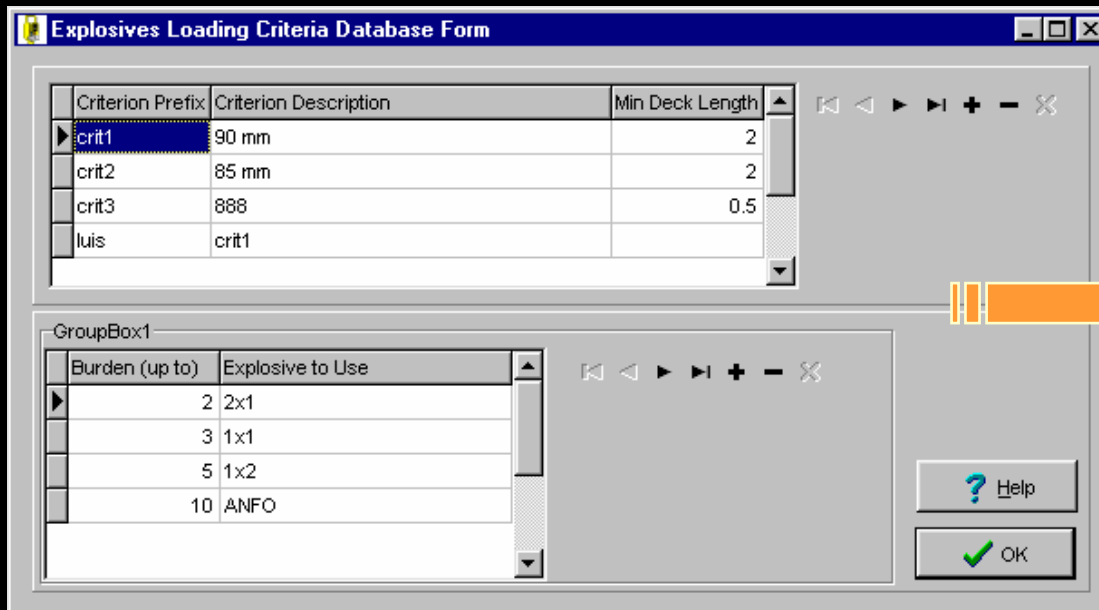
| Borehole Depth | Burden @ Depth | Separation to Previous Hole |
|----------------|----------------|-----------------------------|
| 0.1            | 1.8            | 3.7                         |
| 1.0            | 2.4            | 3.7                         |
| 2.0            | 3.6            | 3.7                         |
| 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



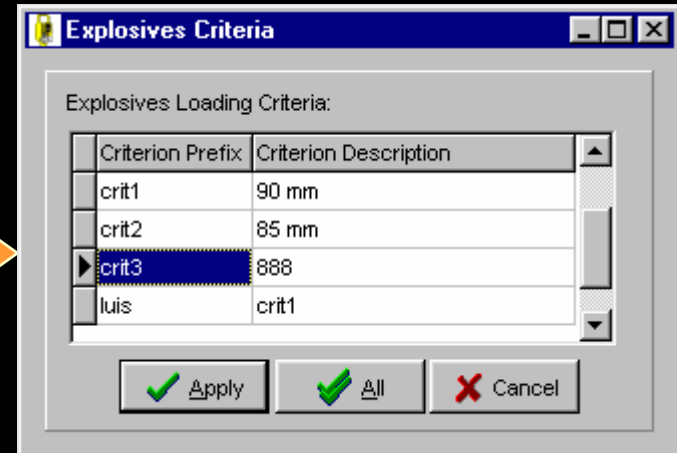
Explosives Loading Criteria Database Form

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

GroupBox1

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

Buttons: ? Help, OK



Explosives Criteria

Explosives Loading Criteria:

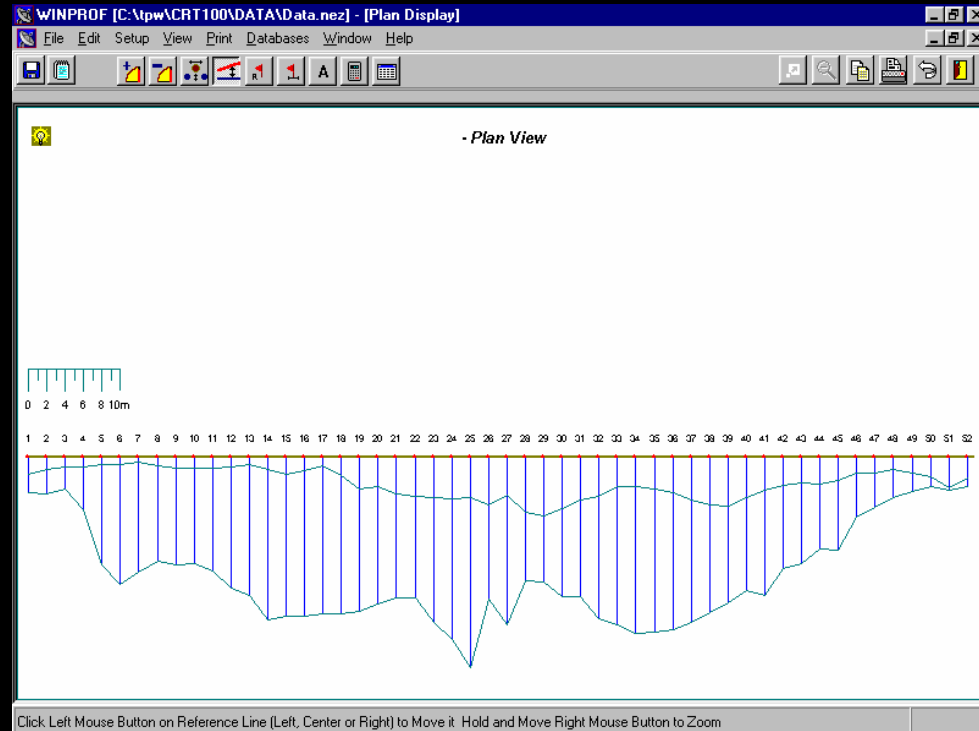
| Criterion Prefix | Criterion Description |
|------------------|-----------------------|
| crit1            | 90 mm                 |
| crit2            | 85 mm                 |
| crit3            | 888                   |
| luis             | crit1                 |

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)

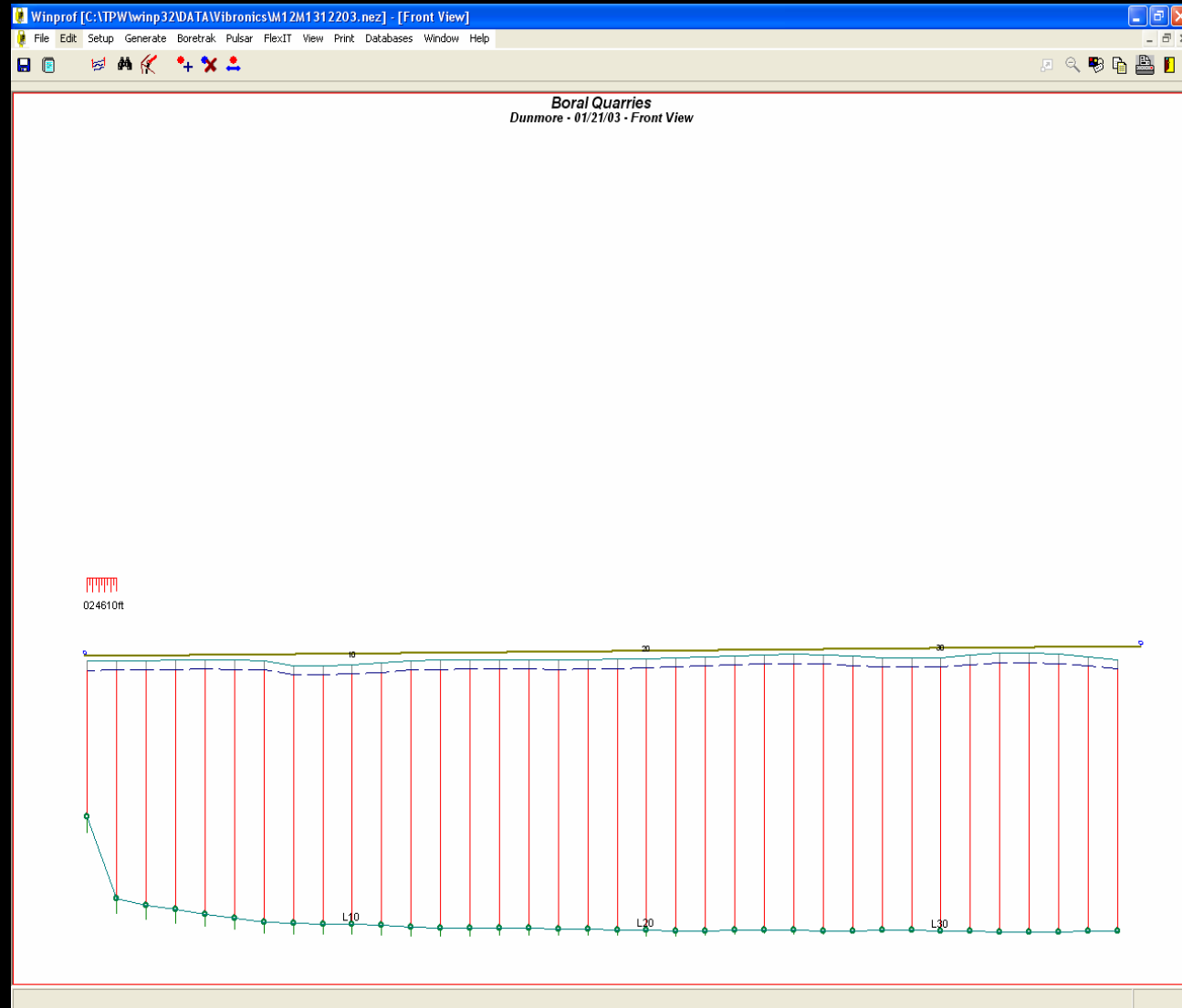
At the bottom left, there are 'Generate' and 'Cancel' buttons. Below the input fields, the text 'Calculating Lifter Hole Coordinates...' is visible.

On the right side, 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 includes a vertical dashed line for 'Elevation', a horizontal dashed line for 'Easting', and a dashed line for 'Northing'. The 'Length' of the borehole is indicated, along with the 'Horizontal Angle' and 'Vertical Angle'.

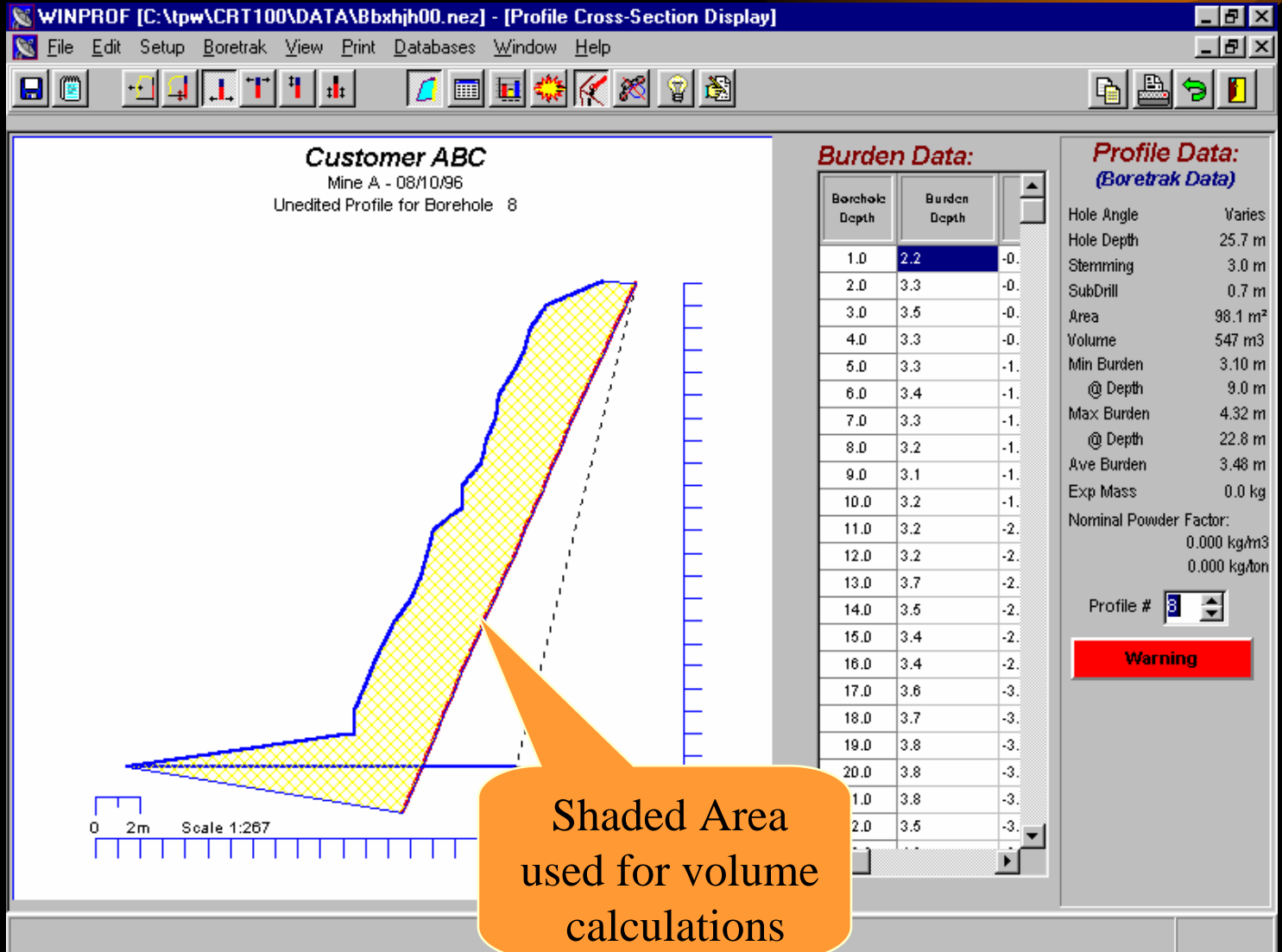
At the bottom center, a 'WinProf' dialog box displays the message: '36 Lifter Holes were generated' with an 'OK' button.

# Lifter boreholes - Front View

- Holes can be
  - Added 
  - Moved 
  - Deleted 



# 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

# Profile Printout

| Depth m | True Burden m | Offset m  |
|---------|---------------|-----------|
| 0.1     | Undefined     | Undefined |
| 1.0     | 2.5           | -0.4      |
| 2.0     | 3.1           | -0.9      |
| 3.0     | 2.9           | -1.3      |
| 4.0     | 3.0           | -1.8      |
| 5.0     | 2.8           | -2.3      |
| 6.0     | 3.2           | -2.7      |
| 7.0     | 2.7           | -3.2      |
| 8.0     | 2.6           | -3.6      |
| 9.0     | 3.0           | -4.0      |
| 10.2    | Undefined     | -4.5      |

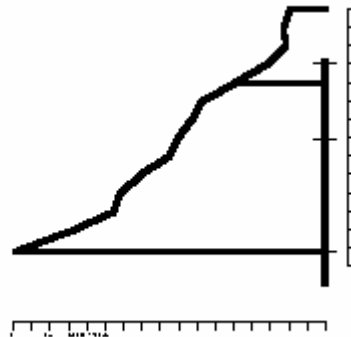
## Profile Printout

Unloaded Profile of Shot Hole: 14  
 Survey Date: 07/16/01

| Exp No. | Exp Name | Exp Date | Exp Time |
|---------|----------|----------|----------|
| 1       | Anfo2    | 07/16/01 | 10:00    |
| 2       | Anfo3    | 07/16/01 | 10:05    |

| Exp No. | Exp Name | Exp Date | Exp Time |
|---------|----------|----------|----------|
| 1       | Anfo2    | 07/16/01 | 10:00    |
| 2       | Anfo3    | 07/16/01 | 10:05    |

|                        |                         |
|------------------------|-------------------------|
| Hole Diameter          | 102 mm                  |
| Hole Length            | 14.9 m                  |
| Stemming               | 3.0 m                   |
| Subdrill               | 1.7 m                   |
| Hole Angle             | 0°                      |
| Profile Cross-Section  | 116.6 m                 |
| Minimum Burden         | 5.0 m @ 4.0 m           |
| Maximum Burden         | 16.9 m @ 13.2 m         |
| Ave Burden             | 8.2 m                   |
| Nominal Powder Factor: | 0.269 kg/m <sup>3</sup> |
|                        | 0.100 kg/ton            |



| Depth to Exp m | Column Length m | Exp Name | Mass kg |
|----------------|-----------------|----------|---------|
| 7.14           | 7.76            | Anfo2    | 63.4    |
| 3.00           | 4.14            | Anfo3    | 0.0     |

# 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: 114.6 (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 (ft <sup>2</sup> ) | Volume (m3) | Floor Ang* |
|-----------|------------|--------|--------------|--------------|----------------|----------------|----------------|---------------------------|-------------|------------|
| 1         | 6.3        | 0      | 2.5          | 0.6          | 3.89           | 3.89           | 3.0            | 49.2                      | 165.5       | 0          |
| 2         | 9.7        | 0      | 2.5          | 0.9          | 2.21           | 3.04           | 2.7            | 57.6                      | 182.6       | 0          |
| 3         | 10.9       | 0      | 2.5          | 0.9          | 2.44           | 3.40           | 3.0            | 50.9                      | 195.9       | 0          |
| 4         | 11.0       | 0      | 2.5          | 0.8          | 2.55           | 3.23           | 2.9            | 49.6                      | 188.5       | 0          |
| 5         | 11.0       | 0      | 2.5          | 0.7          | 1.15           | 2.53           | 2.0            | 41.0                      | 149.4       | 0          |
| 6         | 11.3       | 0      | 2.5          | 0.7          | 1.28           | 2.48           | 2.1            | 33.5                      | 127.6       | 0          |
| 7         | 11.3       | 0      | 2.5          | 0.6          | 1.13           | 2.35           | 1.8            | 27.8                      | 133.6       | 0          |
| 8         | 11.4       | 0      | 2.5          | 0.8          | 2.57           | 2.97           | 2.8            | 47.1                      | 154.4       | 0          |
| 9         | 11.6       | 0      | 2.5          | 0.7          | 2.20           | 11.42          | 4.3            | 39.2                      | 162.7       | 0          |
| 10        | 12.0       | 0      | 2.5          | 0.7          | 2.32           | 26.35          | 6.0            | 47.0                      | 157.5       | 0          |
| 11        | 12.1       | 0      | 2.5          | 0.7          | 1.53           | 2.82           | 2.1            | 38.3                      | 139.6       | 0          |
| 12        | 12.3       | 0      | 2.5          | 0.7          | 0.79           | 2.36           | 1.5            | 26.3                      | 116.8       | 0          |
| 13        | 12.4       | 0      | 2.5          | 0.7          | 1.58           | 2.65           | 2.1            | 32.3                      | 115.7       | 0          |
| 14        | 12.6       | 0      | 2.5          | 0.7          | 1.15           | 2.03           | 1.7            | 25.0                      | 115.3       | 0          |
| 15        | 12.5       | 0      | 2.5          | 0.8          | 1.87           | 2.51           | 2.3            | 38.8                      | 139.9       | 0          |
| 16        | 12.4       | 0      | 2.5          | 0.8          | 2.01           | 6.81           | 3.2            | 51.3                      | 153.0       | 0          |
| 17        | 11.7       | 0      | 2.5          | 0.7          | 0.60           | 2.56           | 1.6            | 21.6                      | 144.9       | 0          |
| 18        | 11.4       | 0      | 2.5          | 0.9          | 2.18           | 3.31           | 3.0            | 57.0                      | 204.3       | 0          |
| 19        | 12.6       | 0      | 2.5          | 1.3          | 2.63           | 3.12           | 2.8            | 77.4                      | 266.3       | 0          |
| 20        | 12.3       | 0      | 2.5          | 0.9          | 3.51           | 3.97           | 3.9            | 68.1                      | 255.0       | 0          |
| 21        | 12.3       | 0      | 2.5          | 1.0          | 2.98           | 4.38           | 3.7            | 64.4                      | 270.9       | 0          |
| 22        | 12.7       | 0      | 2.5          | 1.3          | 2.86           | 3.39           | 3.8            | 91.9                      | 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 m3**

Left Marker Offset **0.000 m**      Right Marker Offset **0.000 m**

| 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  
Station ID: 001  
Operator: Luis Valentim,  
Survey Date: October 2002

Number of Data Points: 190  
Number of Boreholes: 31  
Pre-Drilled Boreholes: 31  
Face Length: 114.6 (m)  
Left Marker Offset: 0.0 (m)  
Right Marker Offset: 0.0 (m)  
Rock Volume: 5895.0 (m3)  
Total Vol (incl back rows): 5895.0 (m3)

| 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           | 12.6      | 0         | 53.9                          | 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           | 12.6      | 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         | 91.9                          | 1.6                            |              |
| 26                  | Front      | Pre-Drilled   | 102           | 10.9      | 0         | 95.7                          | 1.8                            |              |
| 27                  | Front      | Pre-Drilled   | 102           | 10.3      | 0         | 99.9                          | 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                         | 1.0                            |              |

Notes:

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

Report Date: 02/10/11

Website: [http://www.tic-sol.com](#)

Page 1

# Inter-Hole Spacing Printout

| 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            |

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



| 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



# Specifications

- WinProf is a Windows 2000/XP software product (32bit).
- WinProf supports two other languages directly:
  - Portuguese
  - German



# Availability

- TLC Software (Johannesburg, South Africa)
  - [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
  - Luis Valentim, Terry Cousins
  
- Vibronics (Evansville, Indiana, USA)
  - John Wiegand, Jeff Baker, John Smith
  - [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

