

BLADES

Instruction Manual



Web User Guide

BLADES User Manual

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This user manual is intended to provide instructions only and does not imply a promise of any service. Access to certain features will vary from account to account.

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EXECUTIVE SUMMARY

The software allows easy design of blasts, calculates blast parameters i.e. burden, spacing, square/staggered pattern layout, and layout with charging options. The program provides designed output, charts and graphs, as well as reports, in real-time and allows output of data via customizable printing capabilities.

Surface blast design software provides design of blasting pattern according to rock conditions, rock structure, and conditions required for optimized results, considering explosives, drilling, environmental restrictions, equipment sizing and subsequent operations.

In BLADES (Blast Designer), the pattern drawn can also be saved and blaster can be provided with the charging sheet. It gives approximate vibration values, fragment size and an initial idea about the danger zone. Empirical constant inputs are utilized for first design output calculations.

However, once data has been accumulated by the use of BLADES then the historical data can be used to determine the specific constants for each pit/bench. Predictions of the rock fragmentation, air and ground vibration prediction and fly rock are obtained. Software has Drilling and Blasting cost analysis capabilities too.

Key features include:

- Design of new blasts, manage existing blast records and generation of post blast design reports as required by the user
- Generation of charging and drilling sheets which can be provided to blaster and driller respectively to be utilized directly on the field
- Prediction of fragmentation, air and ground vibrations and fly rock based on the selected blast design input parameters
- Cost analysis option for drilling and blasting costs
- Optimization of blast designs based on cost and post blast predictions
- Generation of regulatory/ mine-specific triggers/alerts to assess the post blast predictions and re-design the blast as required by the user

GUIDELINES FOR MANUAL USAGE

The intent of this user's guide is to provide you with an overview of the applications and each of the modules, but not to provide details on the modules' use. BLADES contains an extensive help system that provides detailed instructions on how to use the modules and applications. This guide is designed to function together with the on-line Help system and can best be used to help orient you with BLADES. It contains descriptions of the modules and applications, as well as general information about their use and relationships. Each chapter also contains a list of reports that can be generated from each module. There is a chapter listing all the reports with instructions for their display, use and distribution. In general, this guide provides an introduction to the applications with on-line Help providing the detail.

CLOUD BASED DESIGN SOFTWARE FOR OPEN PIT

This manual mainly focuses on the features of BLADES and its working. To check out all the open pit software available on the MineExcellence web portal, check the snapshot provided below:

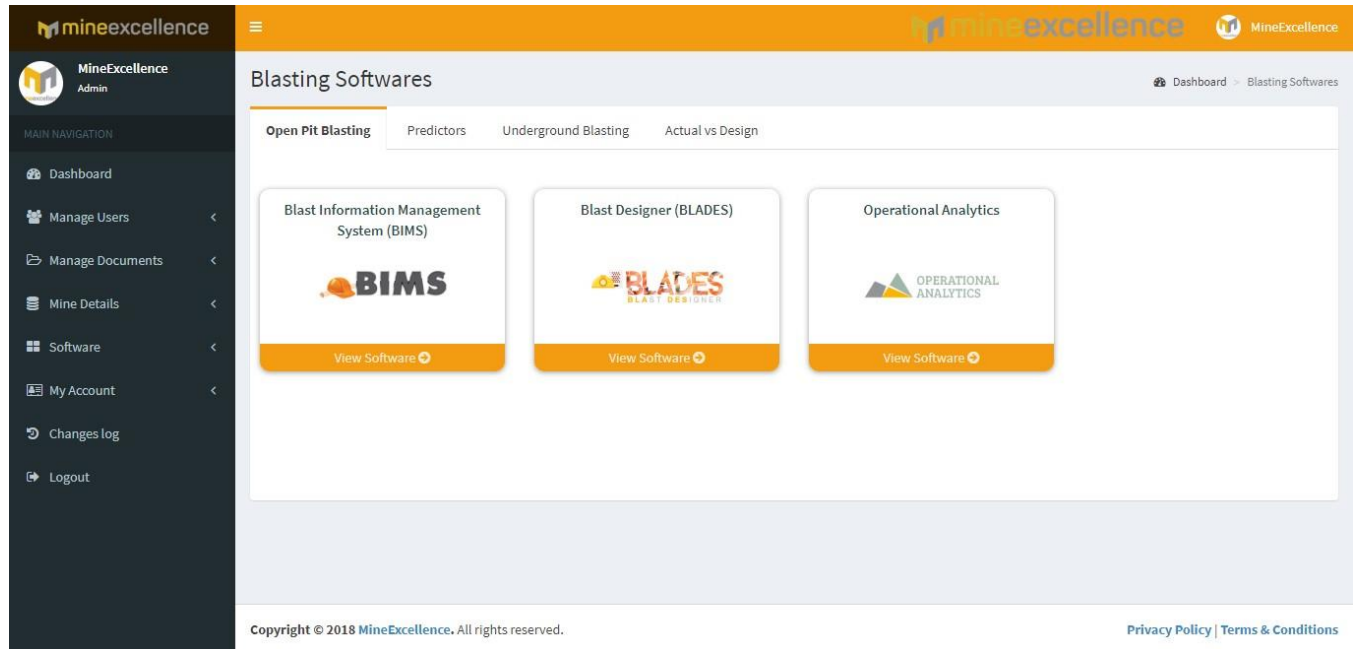
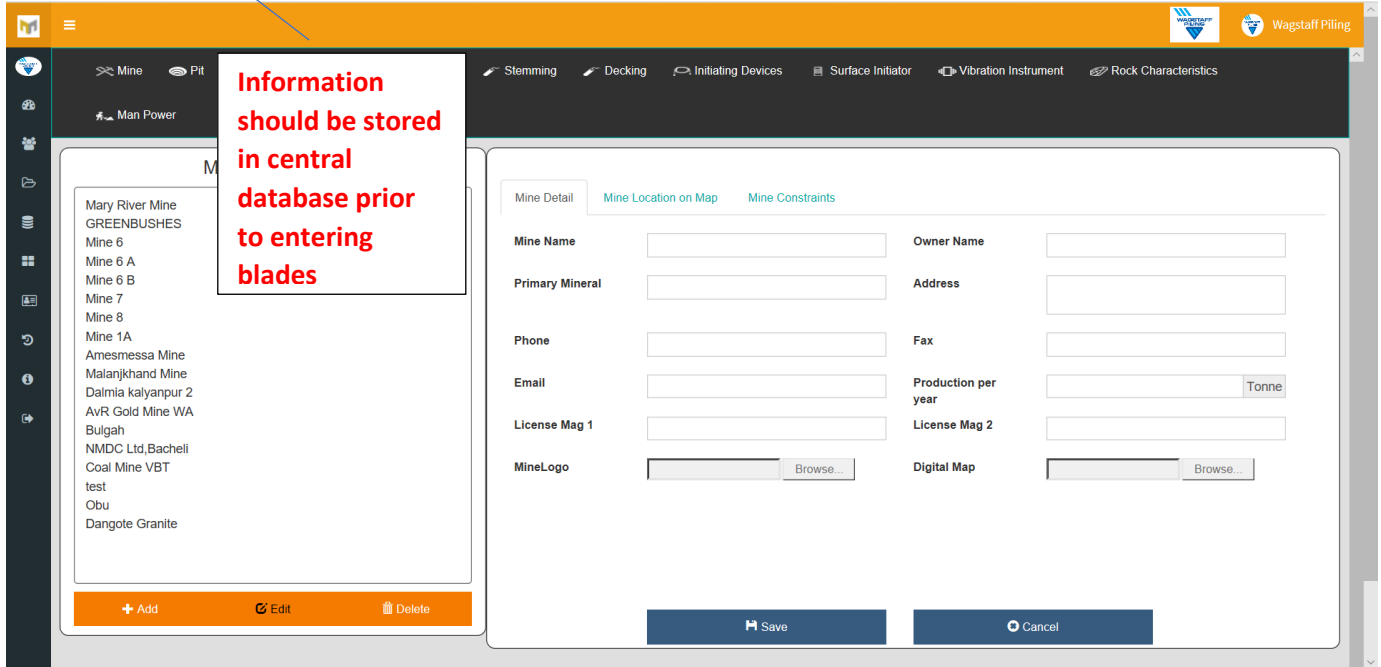


Figure: All Open Pit Blasting Software

CENTRAL DATABASE INFORMATION

Database Information has to be provided in the beginning by the user and would be visible in each and every software. It includes information about the mine, pit, zone, bench as well as details about explosive, initiating devices, vibration instrument and rock characteristics. Further, any additional information can be stored depending on the user's requirement.

Information Information



Information should be stored in central database prior to entering blades

Mary River Mine
GREENBUSHES
Mine 6
Mine 6 A
Mine 6 B
Mine 7
Mine 8
Mine 1A
Amesmesa Mine
Malanjhand Mine
Dalmia kalyanpur 2
AVR Gold Mine WA
Bulgah
NMDC Ltd,Bacheli
Coal Mine VBT
test
Obu
Dangote Granite

Mine Detail | Mine Location on Map | Mine Constraints

Mine Name Owner Name

Primary Mineral Address

Phone Fax

Email Production per year Tonne

License Mag 1 License Mag 2

MineLogo Browse... Digital Map Browse...

Save Cancel

Figure: Central Database Information Capture

STARTING THE WEB APPLICATION

You start BLADES as illustrated in the figure below:

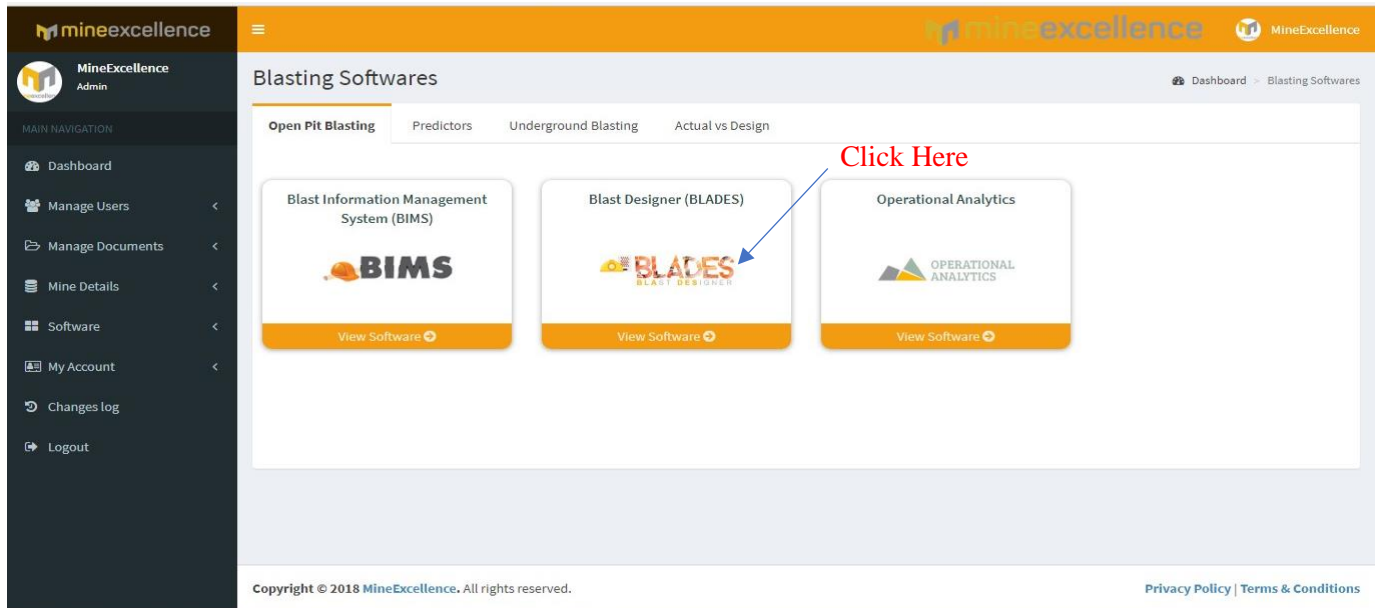
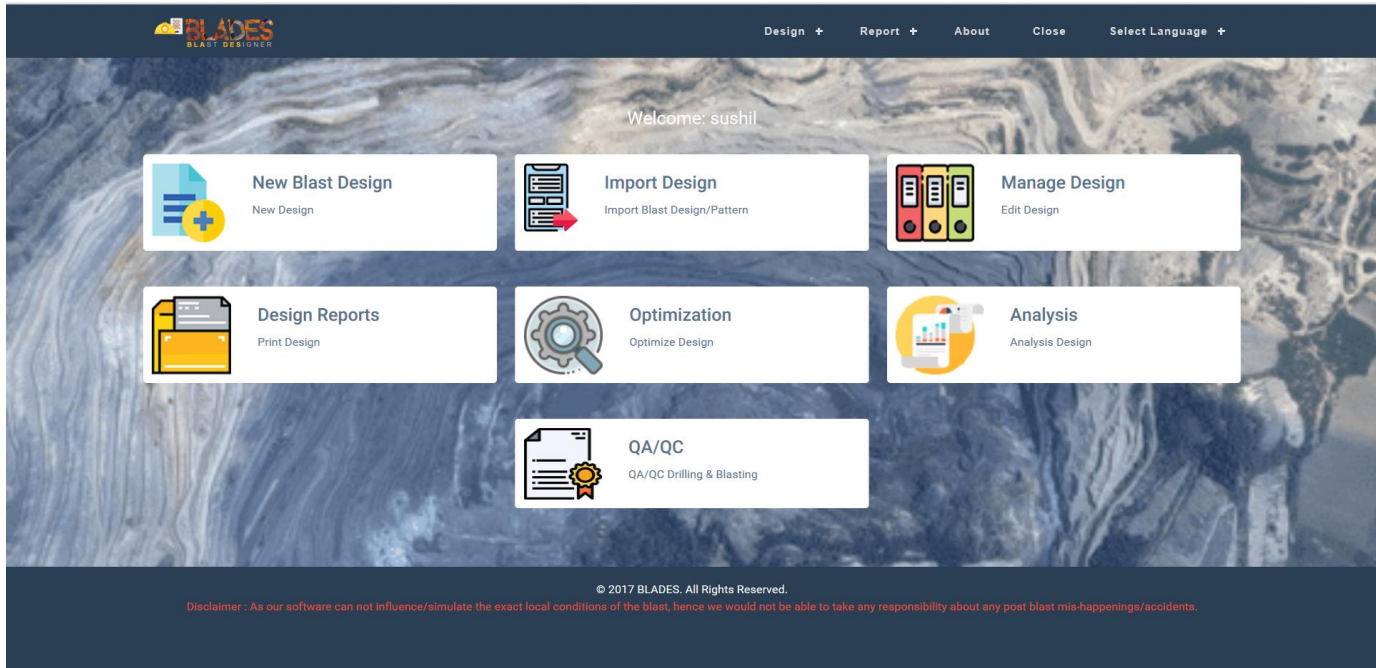


Figure Opening BLADES

BLADES MAIN MENU



Main menu gives five options to the user: Perform a new blast design, manage existing blast designs, quick generation of reports and optimization and analysis of existing designs. The optimization and analysis features are available in the enterprise version of BLADES.

BLADES TASK BAR



DESIGN: this shows the options on clicking [+] sign, new/import design/open these will lead to respective pages.

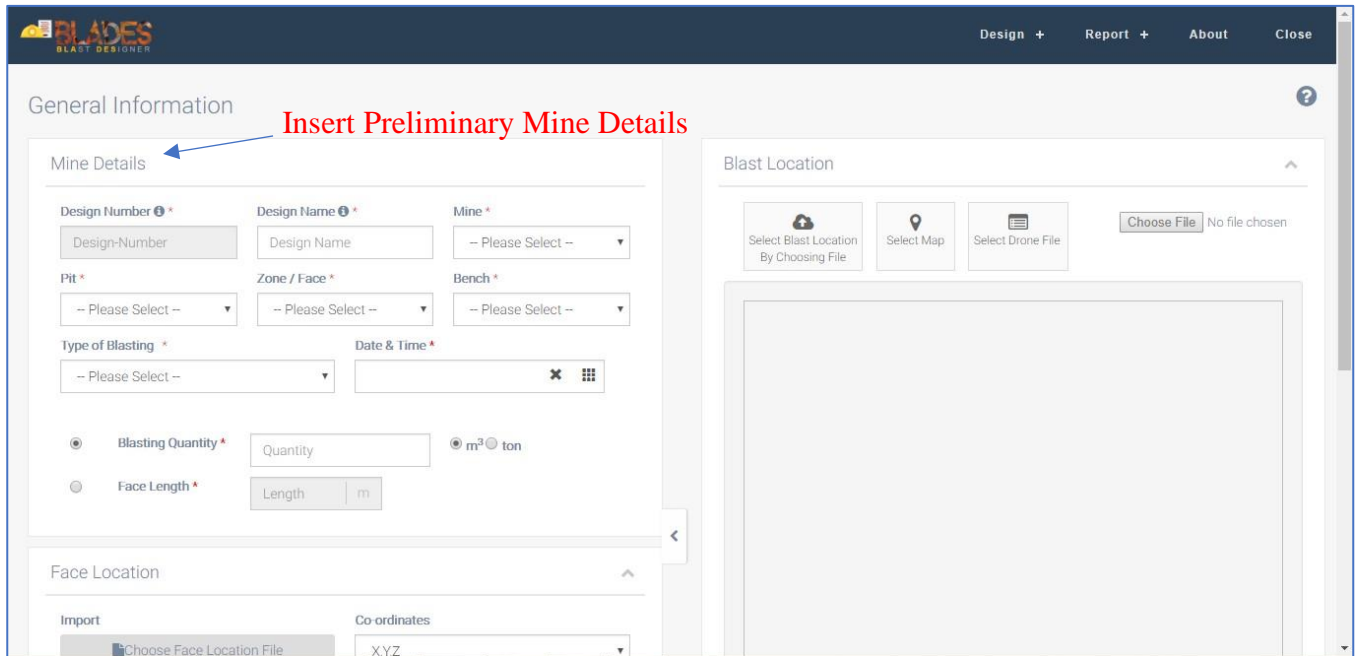
REPORT: on clicking the [+] icon few options confining your report size will appear, you can select as desired.

ABOUT: this gives a brief description of 'BLADES'.

CLOSE: clicking on this will lead you to the dashboard of mineexcellence.

SELECT LANGUAGE: 'BLADES' provides us with an additional feature of selecting language, either in English or Spanish.

NEW BLAST DESIGN



The screenshot shows the 'General Information' tab in the BLADES BLAST DESIGNER software. The 'Mine Details' section is highlighted with a red arrow and the text 'Insert Preliminary Mine Details'. The 'Blast Location' section is also visible.

Mine Details

Design Number * [Design-Number] Design Name * [Design Name] Mine * [-- Please Select --]

Pit * [-- Please Select --] Zone / Face * [-- Please Select --] Bench * [-- Please Select --]

Type of Blasting * [-- Please Select --] Date & Time * []

Blasting Quantity * [Quantity] m³ / ton

Face Length * [Length] m

Blast Location

Select Blast Location By Choosing File [Choose File] No file chosen

Select Map [] Select Drone File []

Face Location

Import [Choose Face Location File] Co ordinates [XYZ]

Figure: Inserting preliminary mine detail

New Blast Design: To design a new blast or to open an existing blast design, click the main menu accordingly. Now you can enter mine details in the given format.

Design Number: Reference Number for Design. This is auto-generated. It generates in following format – “MineName_DateTime”

Design Name: Unique Name for your Blast Design. Please specify the design name in following format – “Zone/Face Name.”

Mine Name: Select from the dropdown combo box. If not given in the combo box then go to Mine Details (Surface) information and add that name.

Pit: Select from the dropdown combo box. If not given in the combo box then go to Mine Details (Surface) information and add that name.

Zone/Face: Select from the dropdown combo box. If not given in the combo box then go to Mine Details (Surface) information and add that name.

Bench: Select from the dropdown combo box. If not given in the combo box then go to Mine Details (Surface) information and add that name.

Type of Blasting: Select from the dropdown combo box.

Blasting Quantity: This is the basic parameter using which the blast would be designed. It can be filled in either m³ or tones.

The following are to be filled in:

Blast Date: Fill in the blast date. For example, DD/MM/YYYY (21/05/2005).

Blast Time: Fill in the blast time. For example, hours/minute/second (09:30:45). Important to note is that hours should be in 24 hours. e.g. 2.45 p.m. should be entered as 14.45.

Face Location Coordinates can be filled manually or can be imported. You should enter the face coordinates provided by the surveyor over here. Click on the dropdown to enter coordinates in Easting, Northing and RL instead of X, Y and Z.

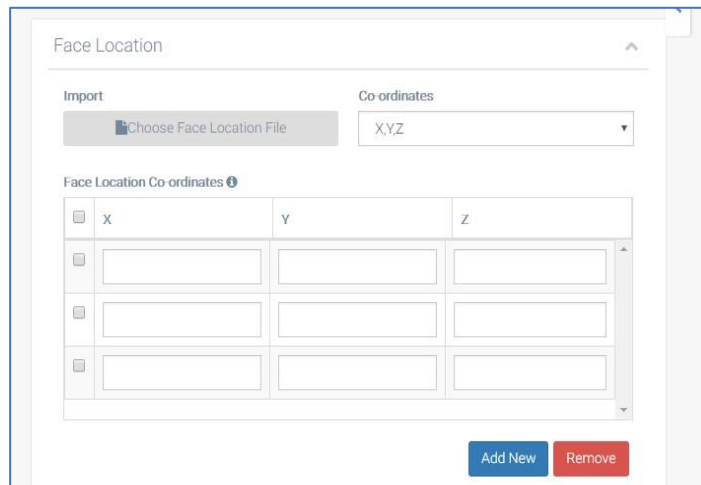


Figure 6: Input/Import Face Coordinates

Blast Location can be imported via digital file/photo, map or drone.

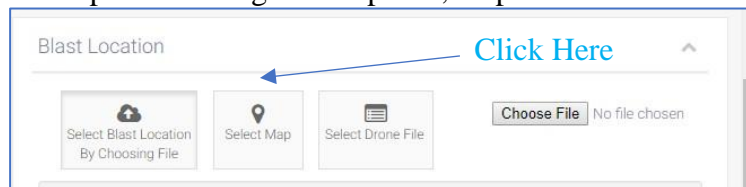


Figure 7: Blast Location Importing Options

Map:

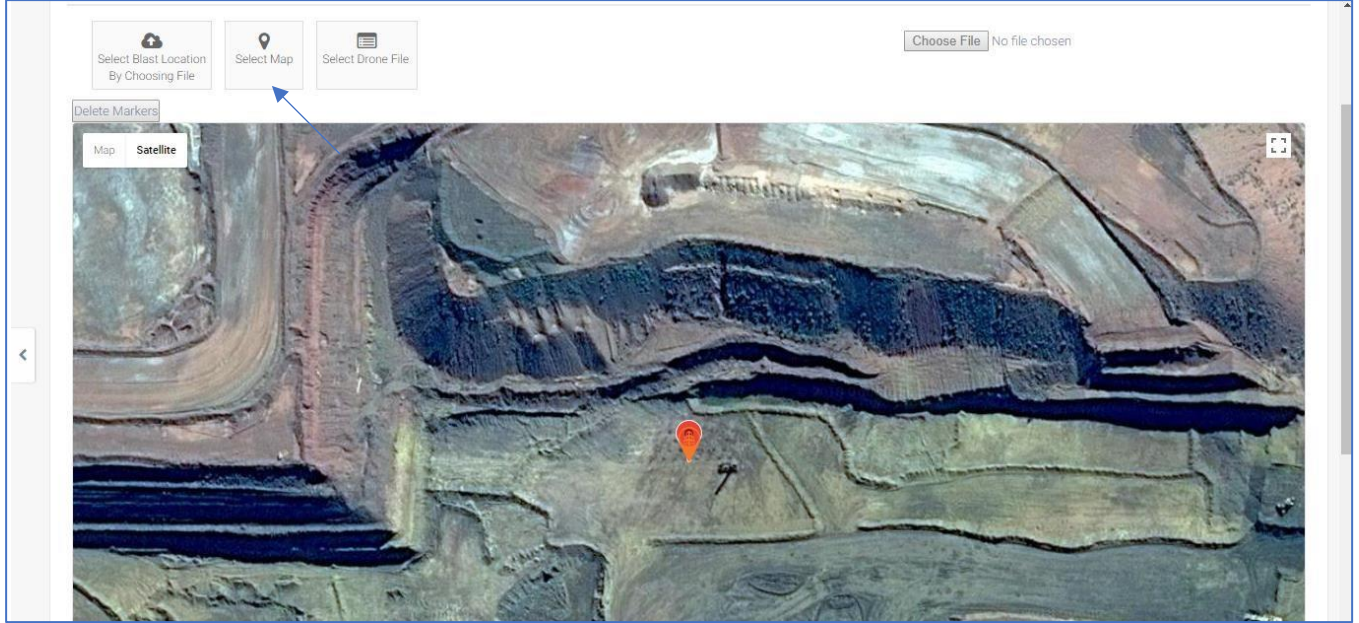


Figure 8: Google Map View of a Mine

Drone:

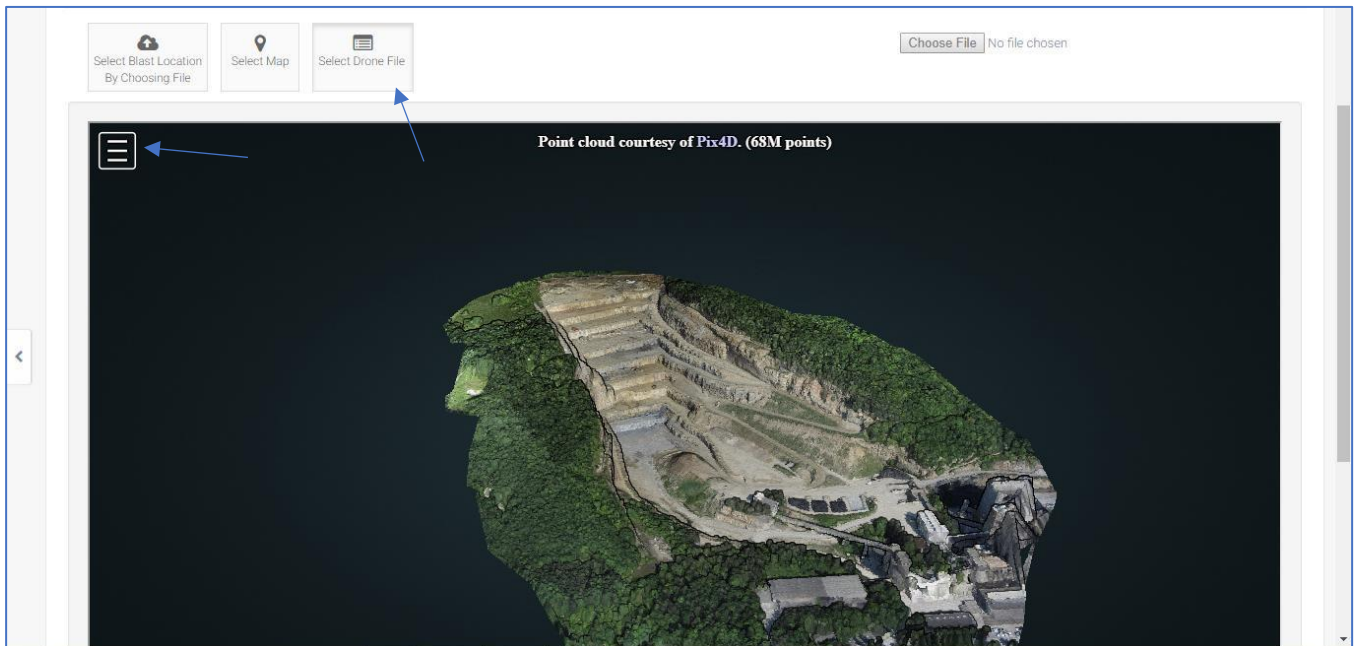


Figure : Sample drone file feature

One can assess the measurements like height, distance, angle and area of blast using the drone menu:

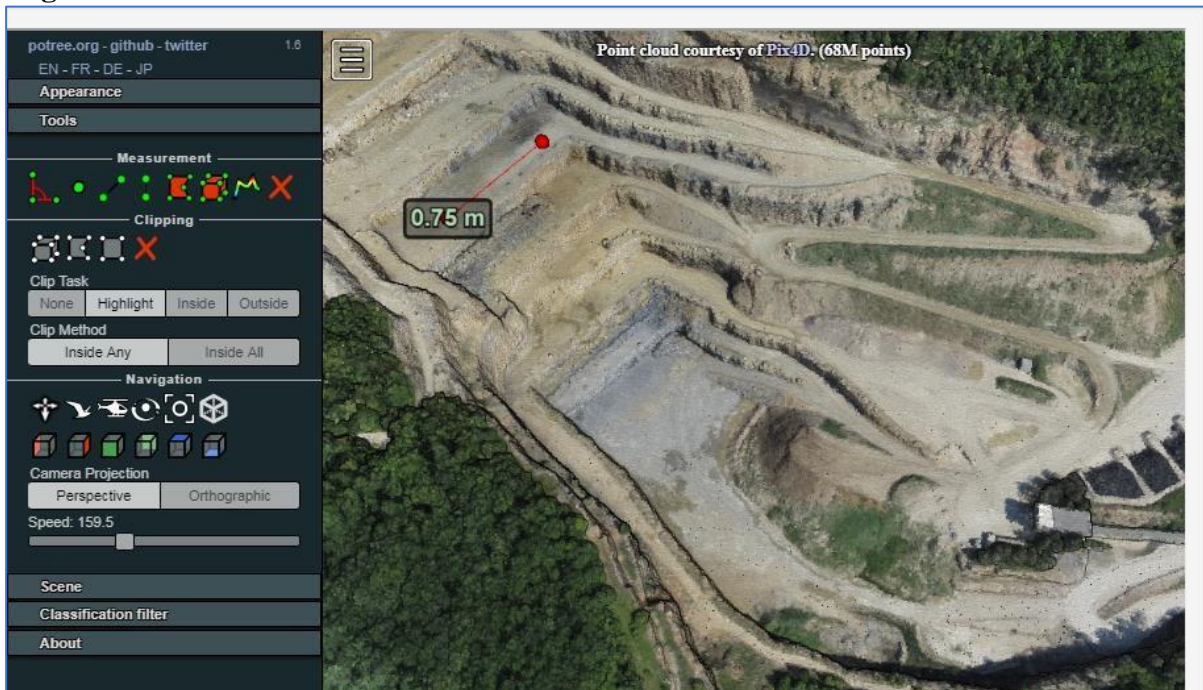


Figure : Drone specific advanced features

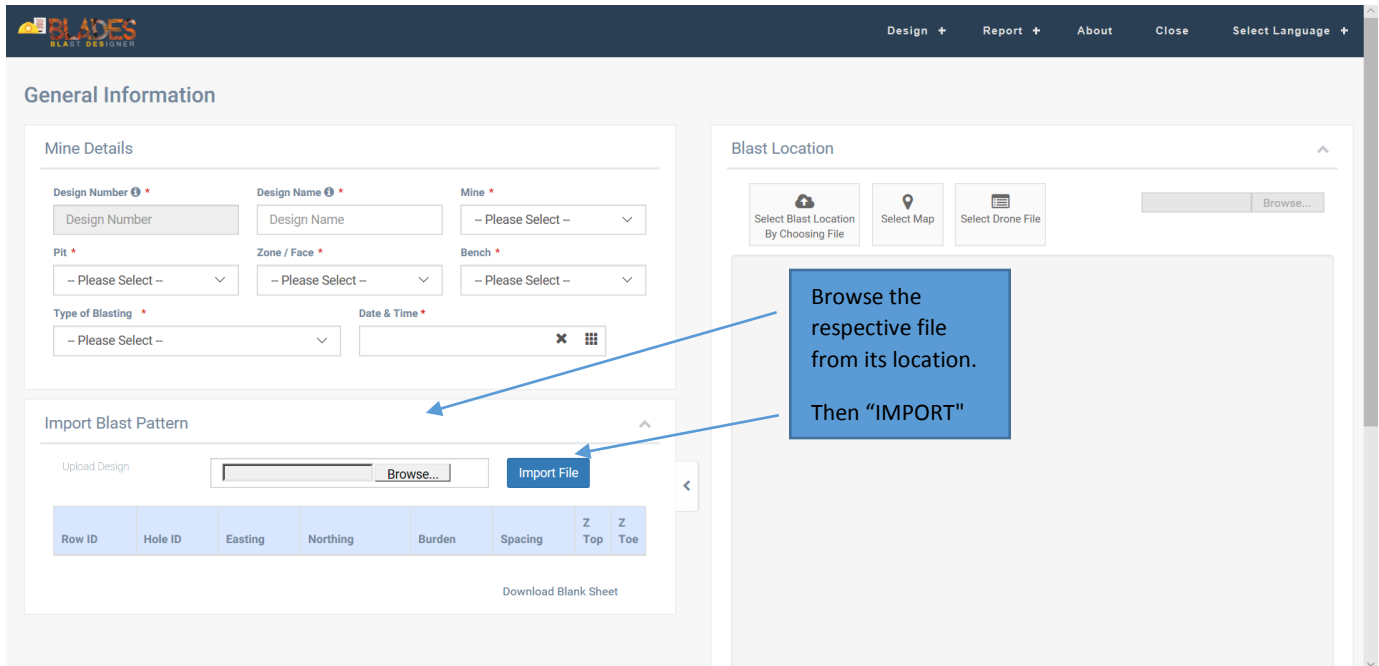
Save: On saving this information, Blast ID is generated.

Close: If you do not want to save this information, click the CANCEL button.

The unique ID number for the blast is generated and shown with a short name. Example: **Blast No. MIN_20180103_01**. The first 3 letters shown are from the Mine name itself, followed by year, month and date of the blast and the last letters i.e. “01” means it is the first blast of the day.

Next: After completing the above form go to next form.

IMPORT BLAST DESIGN



General Information

Mine Details

Design Number * Design Name * Mine *

Pit * Zone / Face * Bench *

Type of Blasting * Date & Time *

Import Blast Pattern

Upload Design

| Row ID | Hole ID | Easting | Northing | Burden | Spacing | Z Top | Z Toe |
|--------|---------|---------|----------|--------|---------|-------|-------|
|--------|---------|---------|----------|--------|---------|-------|-------|

[Download Blank Sheet](#)

Step 1: fill the following mandatory information of the respective mine :

DESIGN NUMBER

DESIGN NAME

MINE

PIT

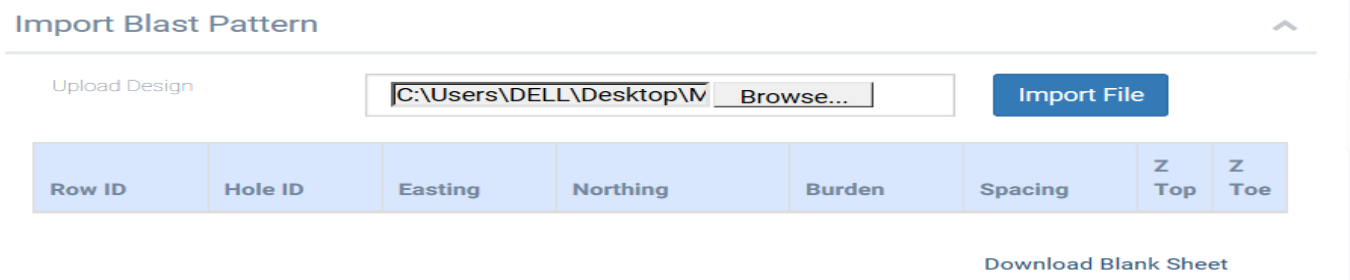
ZONE/FACE

BENCH

TYPE OF BLASTING

DATE AND TIME

Step 2: click on browse and then import the file.



Import Blast Pattern

Upload Design

| Row ID | Hole ID | Easting | Northing | Burden | Spacing | Z Top | Z Toe |
|--------|---------|---------|----------|--------|---------|-------|-------|
|--------|---------|---------|----------|--------|---------|-------|-------|

[Download Blank Sheet](#)

The imported file format should be in the format of MS Excel.

You will see the following on the screen .

Import Blast Pattern

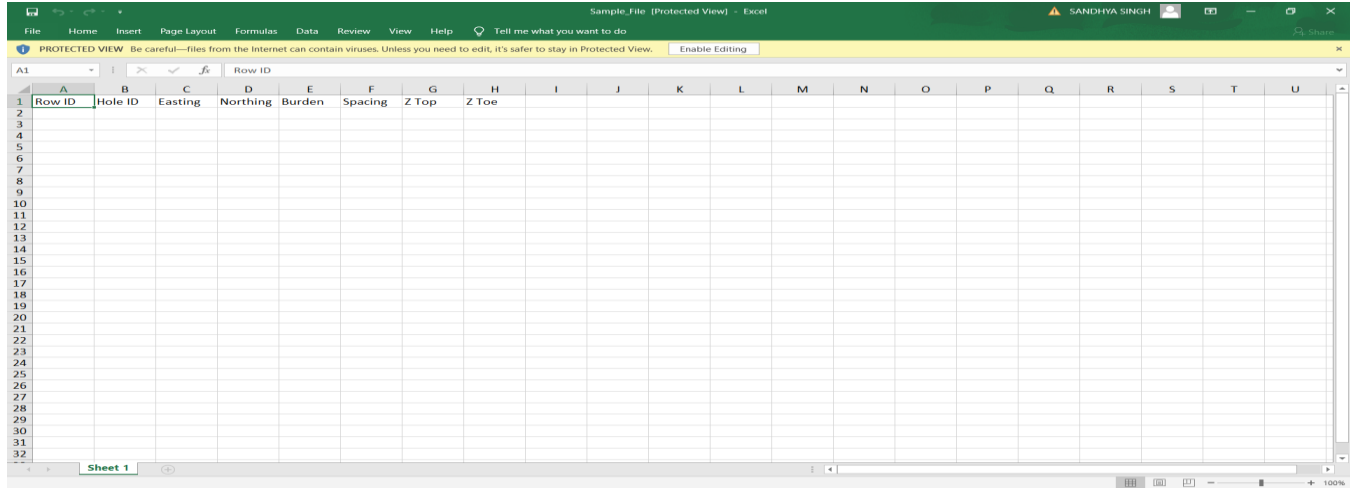
Upload Design

| | | | | | | | |
|---|-----|----------|-----------|---|---|---------|---------|
| 3 | 118 | 5963.499 | 10903.982 | 4 | 5 | 248.901 | 248.901 |
| 4 | 119 | 5963.325 | 10907.269 | 4 | 5 | 248.501 | 248.501 |
| 4 | 120 | 5960.575 | 10908.471 | 4 | 5 | 248.001 | 248.001 |
| 4 | 121 | 5957.827 | 10909.671 | 4 | 5 | 248.001 | 248.001 |
| 4 | 122 | 5955.077 | 10910.872 | 4 | 5 | 247.601 | 247.601 |
| 4 | 123 | 5952.328 | 10912.073 | 4 | 5 | 247.201 | 247.201 |
| 4 | 124 | 5950.441 | 10913.557 | 4 | 5 | 247.301 | 247.301 |
| 4 | 125 | 5950.173 | 10916.424 | 4 | 5 | 247.501 | 247.501 |
| 4 | 126 | 5950.006 | 10919.426 | 4 | 5 | 247.001 | 247.001 |
| 4 | 127 | 5949.839 | 10922.428 | 4 | 5 | 246.401 | 246.401 |
| 4 | 128 | 5949.672 | 10925.431 | 4 | 5 | 245.701 | 245.701 |
| 4 | 129 | 5949.505 | 10928.433 | 4 | 5 | 245.701 | 245.701 |
| 4 | 130 | 5949.337 | 10931.436 | 4 | 5 | 245.151 | 245.151 |

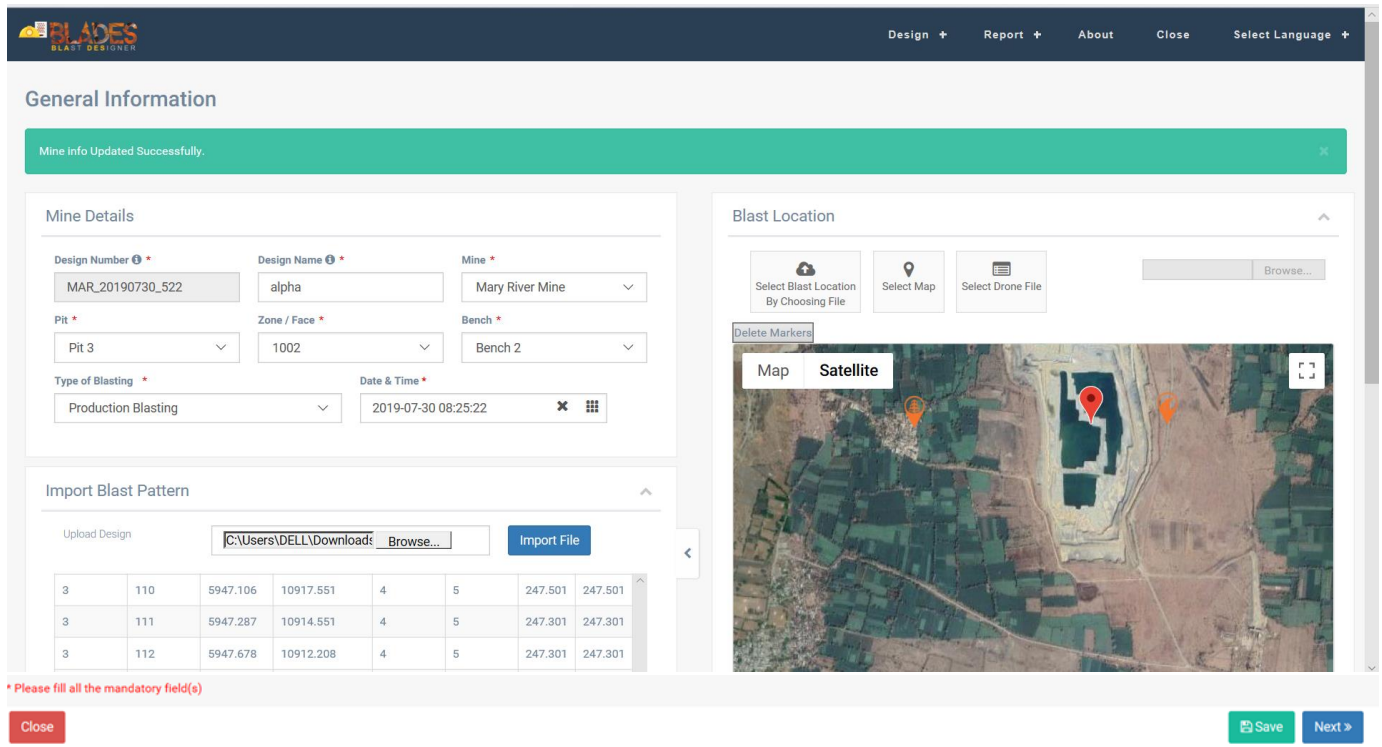
[Download Blank Sheet](#)

DOWNLOAD BLANK SHEET

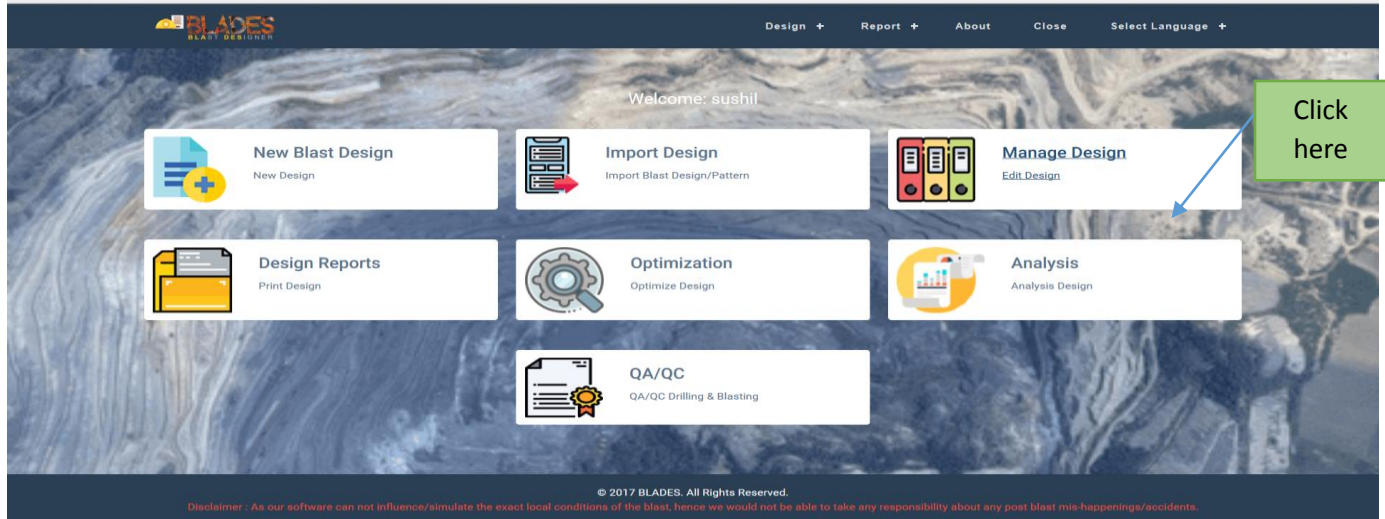
- One can also download a blank sheet in case they want to fill data and then import file.



Step 3: click on save and then next



MANAGE EXISTING DESIGNS

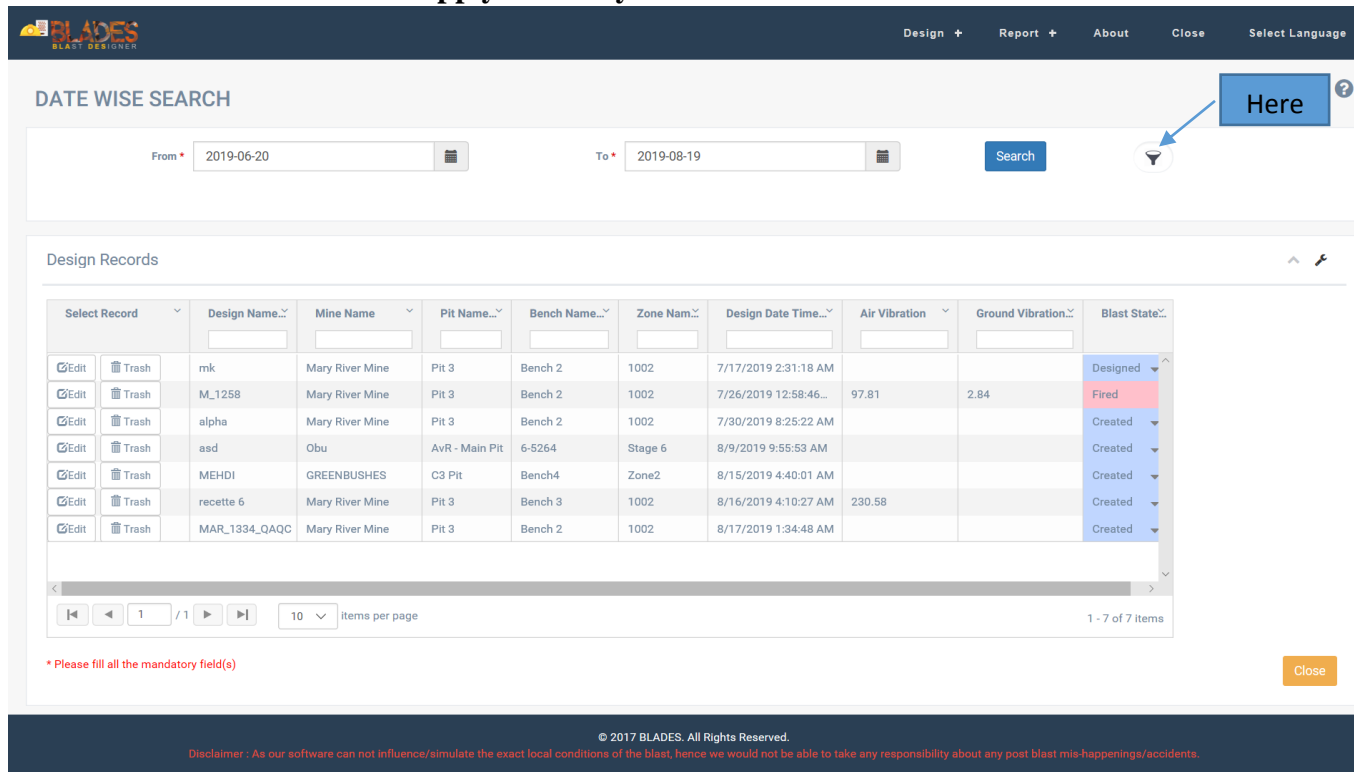


Welcome: sushil

- New Blast Design (New Design)
- Import Design (Import Blast Design/Pattern)
- Manage Design (Edit Design) **Click here**
- Design Reports (Print Design)
- Optimization (Optimize Design)
- Analysis (Analysis Design)
- QA/QC (QA/QC Drilling & Blasting)

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Disclaimer: As our software can not influence/simulate the exact local conditions of the blast, hence we would not be able to take any responsibility about any post blast mis-happenings/accidents.

- Click on this icon  to apply filter to your search



DATE WISE SEARCH

From: 2019-06-20 To: 2019-08-19 Search **Here**

Design Records

| Select Record | Design Name | Mine Name | Pit Name | Bench Name | Zone Name | Design Date Time | Air Vibration | Ground Vibration | Blast State |
|---------------|---------------|-----------------|----------------|------------|-----------|-----------------------|---------------|------------------|-------------|
| | mk | Mary River Mine | Pit 3 | Bench 2 | 1002 | 7/17/2019 2:31:18 AM | | | Designed |
| | M_1258 | Mary River Mine | Pit 3 | Bench 2 | 1002 | 7/26/2019 12:58:46... | 97.81 | 2.84 | Fired |
| | alpha | Mary River Mine | Pit 3 | Bench 2 | 1002 | 7/30/2019 8:25:22 AM | | | Created |
| | asd | Obu | AvR - Main Pit | 6-5264 | Stage 6 | 8/9/2019 9:55:53 AM | | | Created |
| | MEHDI | GREENBUSHES | C3 Pit | Bench4 | Zone2 | 8/15/2019 4:40:01 AM | | | Created |
| | recette 6 | Mary River Mine | Pit 3 | Bench 3 | 1002 | 8/16/2019 4:10:27 AM | 230.58 | | Created |
| | MAR_1334_QAQC | Mary River Mine | Pit 3 | Bench 2 | 1002 | 8/17/2019 1:34:48 AM | | | Created |

1 - 7 of 7 items

* Please fill all the mandatory field(s)

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Disclaimer: As our software can not influence/simulate the exact local conditions of the blast, hence we would not be able to take any responsibility about any post blast mis-happenings/accidents.

The following page will pop up on screen on clicking on filter icon:

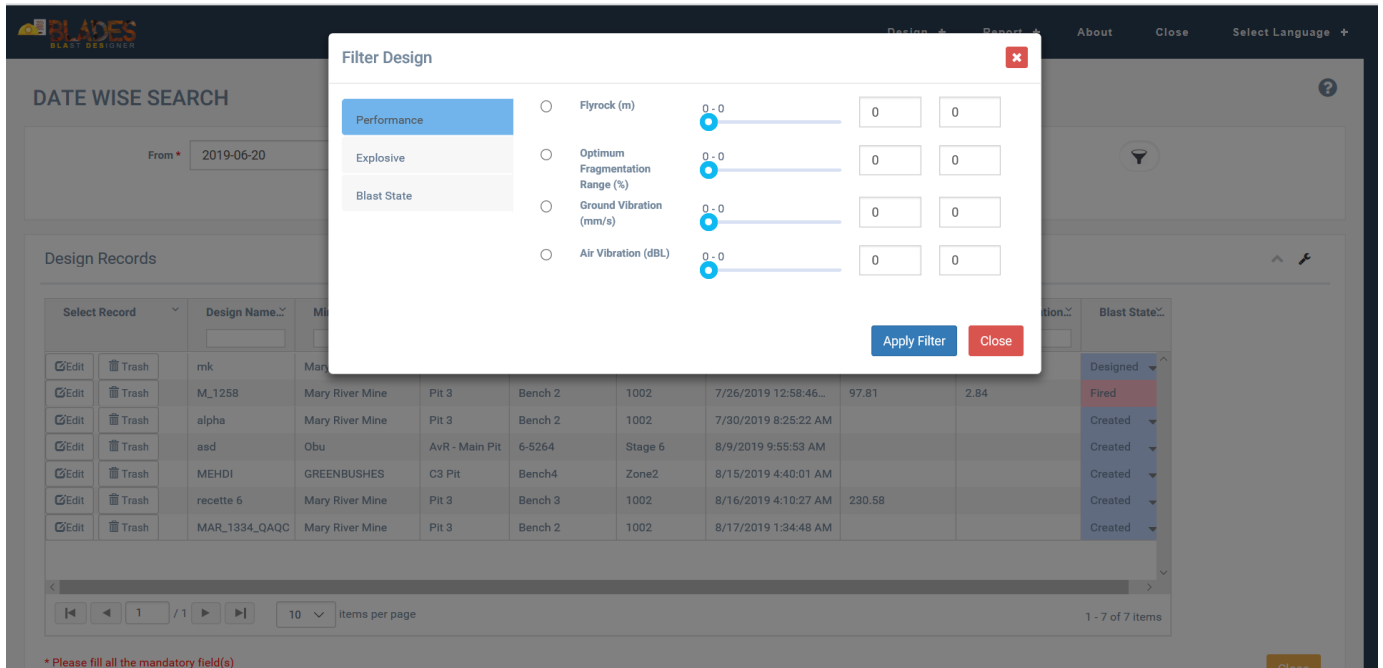
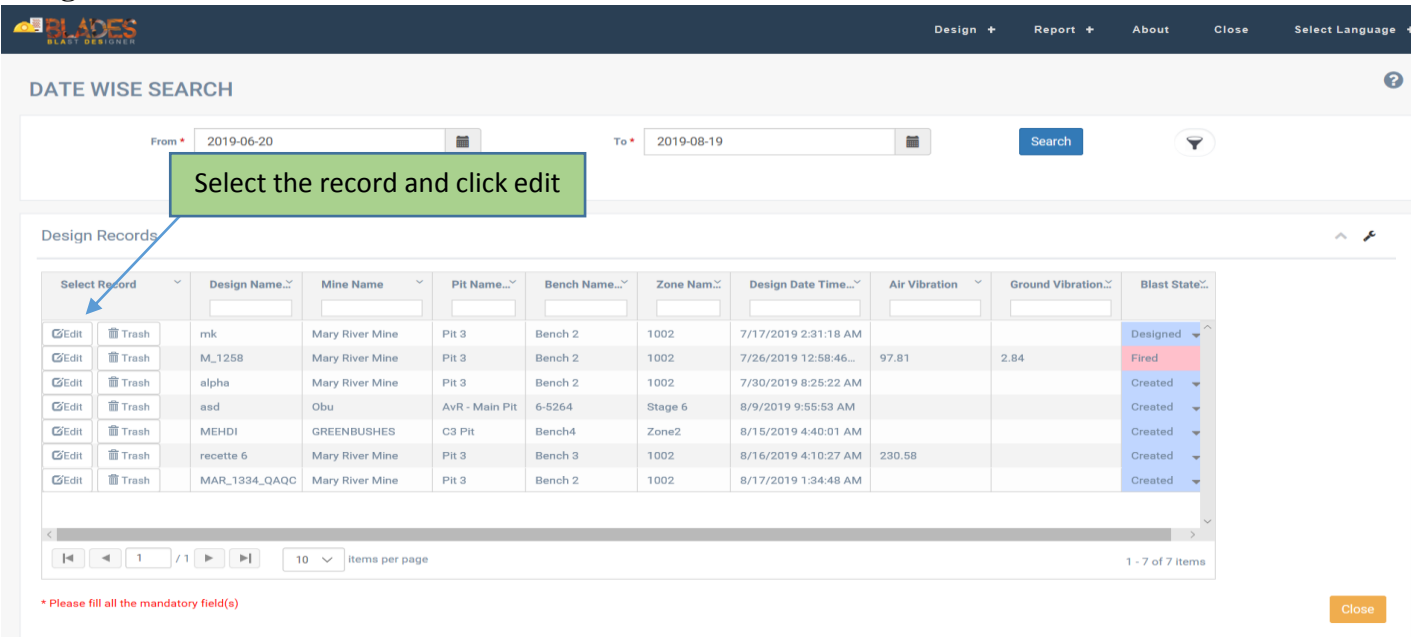
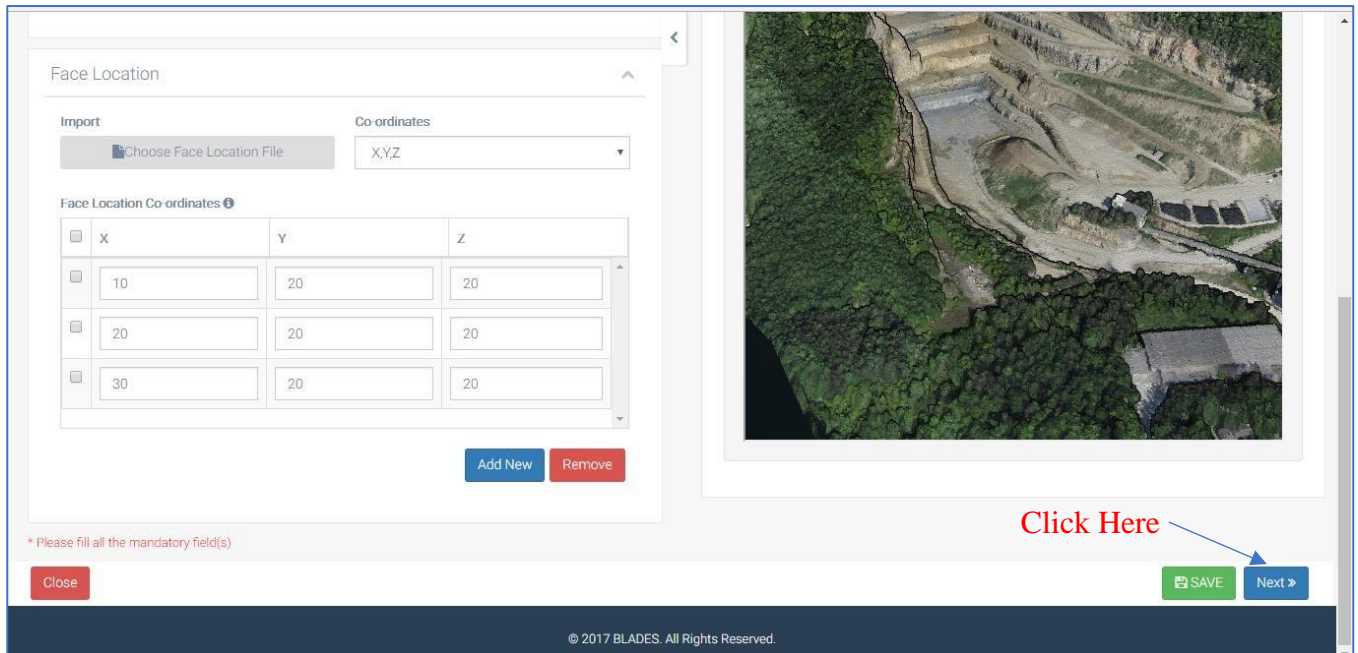


Figure: Fly rock, Fragmentation, Vibration and Explosive Filters available

Select the Design you want to manage and click on edit button for that particular Design.



If you are satisfied with the preliminary inputs page, you can move onto the secondary inputs page by clicking on Next.



Face Location

Import Co ordinates

X,Y,Z

Face Location Co ordinates

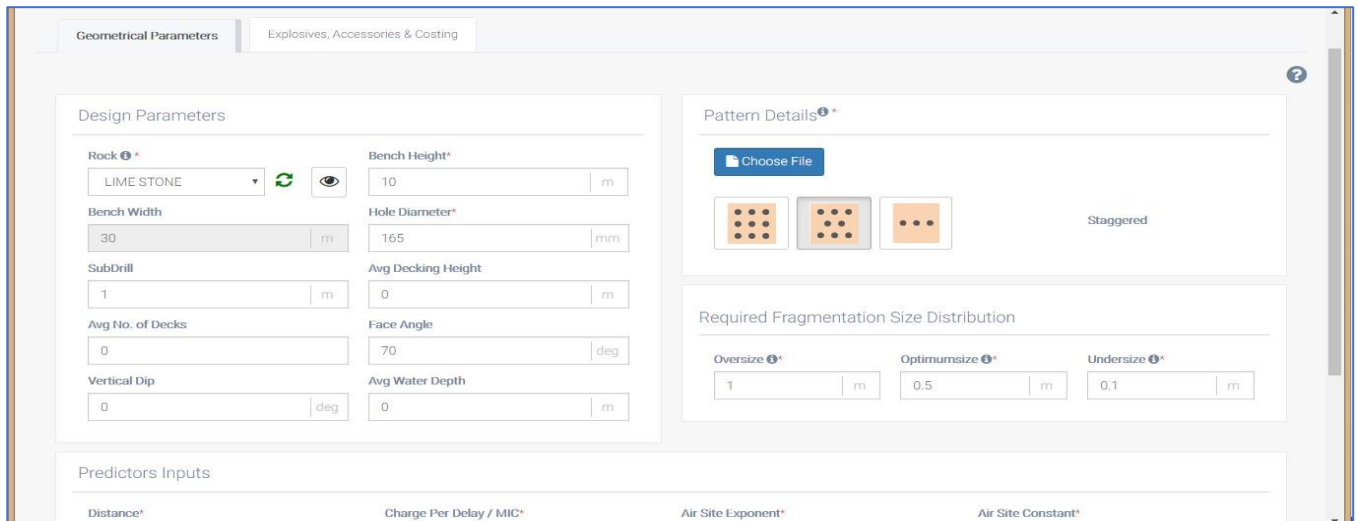
| X | Y | Z |
|----|----|----|
| 10 | 20 | 20 |
| 20 | 20 | 20 |
| 30 | 20 | 20 |

* Please fill all the mandatory field(s)

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Figure : Moving onto the secondary inputs page

- Secondary inputs include geometrical design parameters, explosives and accessories used, inputs needed for the different predictors and costing information (optional)



Geometrical Parameters Explosives, Accessories & Costing

Design Parameters

Rock

Bench Height* m

Bench Width m

Hole Diameter* mm

SubDrill m

Avg Decking Height m

Avg No. of Decks

Face Angle deg

Vertical Dip deg

Avg Water Depth m

Pattern Details*

Staggered

Required Fragmentation Size Distribution

Oversize* m

Optimumsize* m

Undersize* m

Predictors Inputs

Distance* Charge Per Delay / MIC* Air Site Exponent* Air Site Constant*

- i) Design Parameters:
1. Rock Name
 2. Bench Height

3. Bench width
4. Hole Diameter
5. Sub drill
6. Avg. Decking Height
7. Avg no. of decks
8. Face Angle
9. Vertical dip
10. Avg. Water Depth

ii) Required Fragmentation Size Distribution

1. Oversize
2. Optimum Size
3. Undersize

iii) Predictors Inputs

1. Distance
2. Charge per Delay/MIC
3. Air Site Exponent
4. Air Site Constant
5. Ground Site Exponent
6. Ground Site Constant
7. Fly rock Constant

Choose Pattern Details

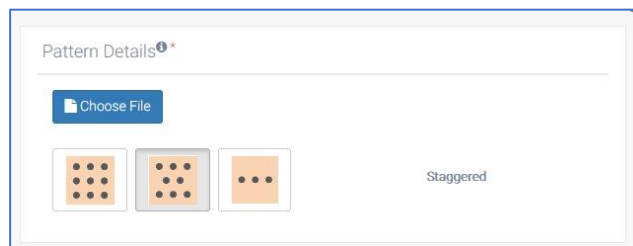


Figure: Square, Staggered and Single Line pattern options available

- Click on Eye Icon  to see Rock Characteristics:

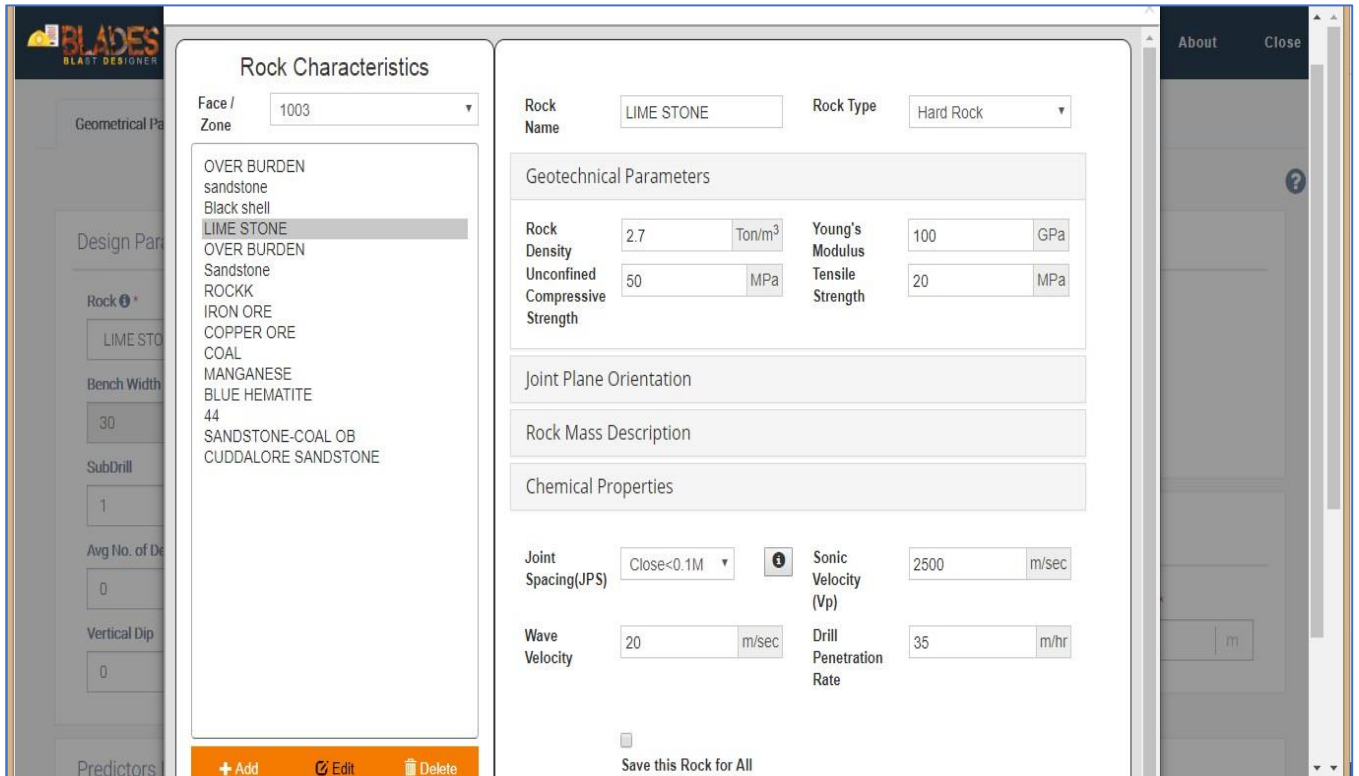
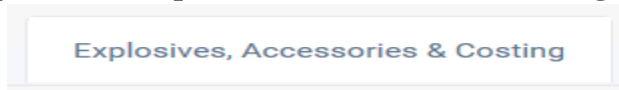


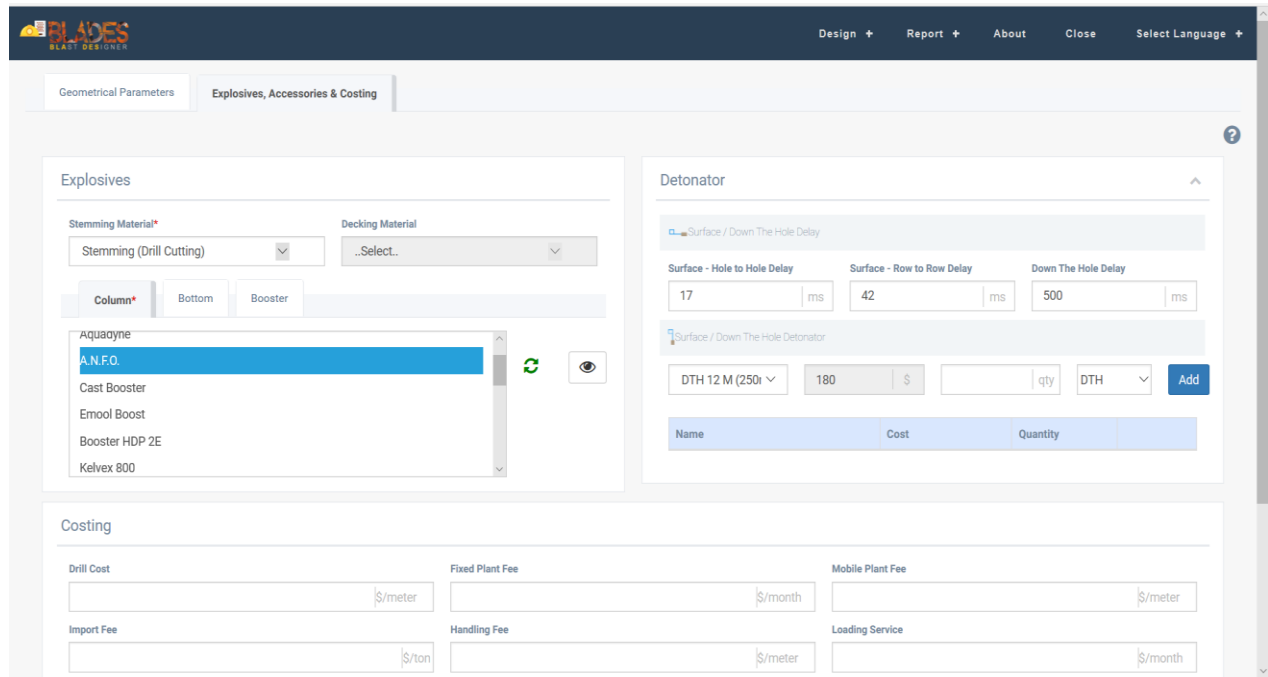
Figure: Rock Characteristics page in the central database is directly accessible from here

Step: click on explosives, accessories and costing



to enter further details:

Click here



The screenshot shows the 'Explosives, Accessories & Costing' section of the BLADES BLAST DESIGNER software. The interface is divided into three main panels:

- Explosives Panel:** Contains dropdown menus for 'Stemming Material*' (set to 'Stemming (Drill Cutting)') and 'Decking Material' (set to '..Select..'). Below these are buttons for 'Column*', 'Bottom', and 'Booster'. A list of explosive materials is shown, with 'A.N.F.O.' selected. Other materials include 'Cast Booster', 'Emool Boost', 'Booster HDP 2E', and 'Kelvex 800'.
- Detonator Panel:** Features a search bar for 'Surface / Down The Hole Delay'. It includes input fields for 'Surface - Hole to Hole Delay' (17 ms), 'Surface - Row to Row Delay' (42 ms), and 'Down The Hole Delay' (500 ms). Below this is a section for 'Surface / Down The Hole Detonator' with a dropdown for 'DTH 12 M (250)' and a value of '180'. An 'Add' button is present.
- Costing Panel:** Contains input fields for 'Drill Cost' (\$/meter), 'Fixed Plant Fee' (\$/month), 'Mobile Plant Fee' (\$/meter), 'Import Fee' (\$/ton), 'Handling Fee' (\$/meter), and 'Loading Service' (\$/month).

➤ **Fill in the explosive, initiating device and costing information as secondary inputs to blast design**

i) Explosives:

1. Stemming Material
2. Decking Material
3. Column Charge
4. Bottom Charge
5. Booster Charge

ii) Detonator:


1. **Surface Detonator**
 - Hole to hole delay
 - Row to row delay
 - Down the hole delay

2. In-hole Detonator

- Name
- Cost
- Quantity

iii) Costing (Optional, can be customized according to user)

1. Drill cost
2. Fixed Plant Fee
3. Mobile Plant Fee
4. Import Fee
5. Handling Fee
6. Loading Service
7. Manpower cost

Click on the Eye Icon  to see Explosive Information:

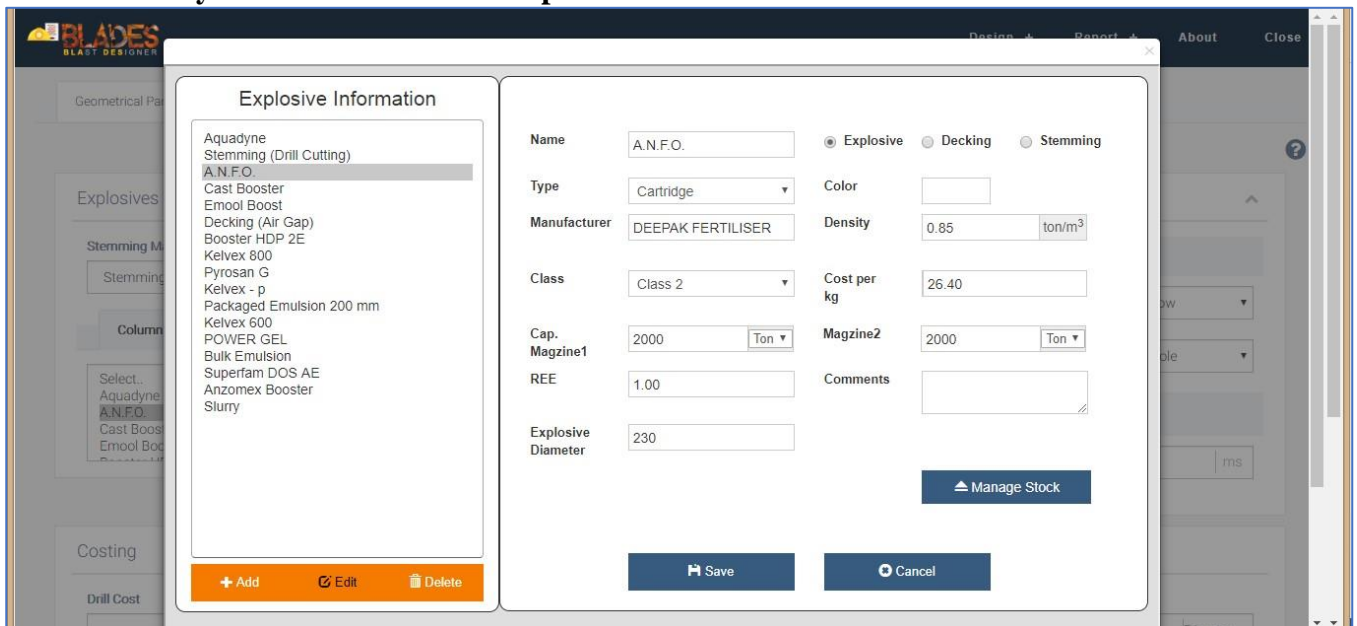




Figure: Explosive information on central database is accessible from here

Design Parameters

Rock ⓘ*
COAL ▼  

Bench Height*
24 m

Bench Width
0 m

Hole Diameter*
251 mm

SubDrill
1.5 m

Avg Decking Height
0 m

Avg No. of Decks
0

Face Angle
0 deg


Vertical Dip
0 deg

Avg Water Depth
0 m

[Click Here](#)

Figure : Refresh button to re-populate the explosive list

This green refresh button helps in re-populating the list of explosives (similar to rock characteristics page).

Press Next  to move onto subsequent pages.

BLAST DESIGN OUTPUT

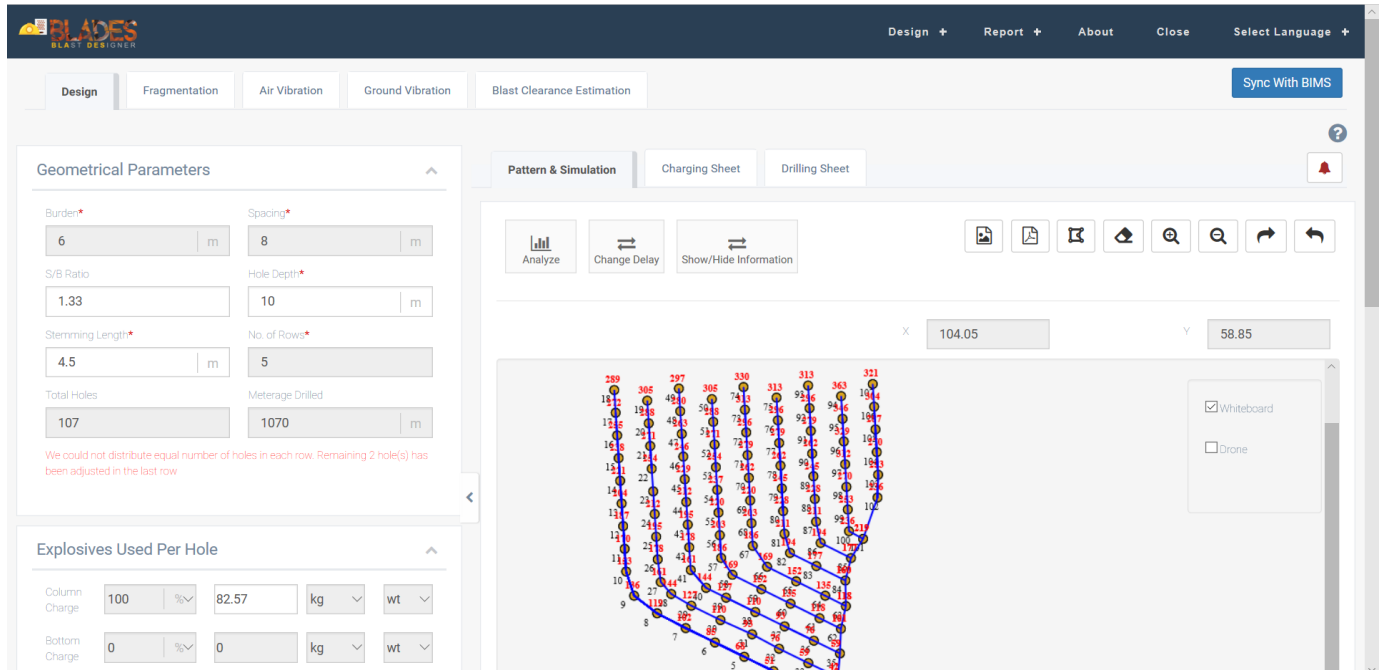


Figure: Blast Design Pattern

This page gives you Initial Blast Design with the blast pattern. You can change the outputs here and pattern would be adjusted in real time.

i) Geometrical Parameters:

1. Face Length
2. Burden
3. Spacing
4. S/B Ratio
5. Hole Depth
6. Stemming Length
7. No. of Rows
8. Total holes
9. Meterage Drilled

ii) Explosives used per holes

1. Column Charge
2. Bottom Charge
3. Booster Charge
4. No. of Boosters
5. Total charge

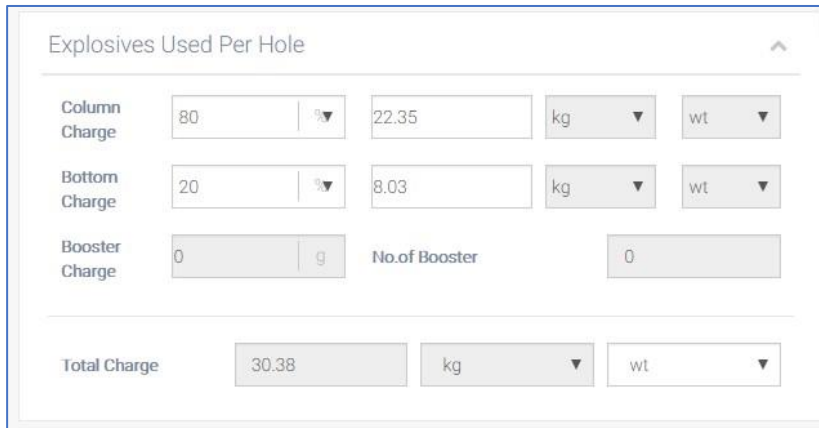
iii) Blast Costs

1. Total Explosive Cost
2. Cost/Tones
3. Total Initiating System Cost
4. Stemming Cost
5. Total Drilling Cost
6. Total Manpower cost
7. Plant and other services
8. Total Blasting cost

iv) Blast Performance

1. Total Rock Broken
2. Powder factor

*****Please Note: Regulatory/Mine specific triggers can be generated on the Blast Design Output page that get dynamically updated as soon as the user makes any change in the Blast Design parameters/pattern.***

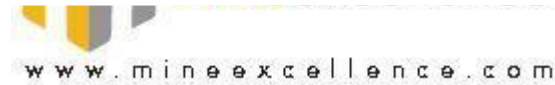


The screenshot shows a web form titled "Explosives Used Per Hole". It contains several input fields and dropdown menus. The "Column Charge" field has a value of 80 and a unit dropdown set to "kg". The "Bottom Charge" field has a value of 20 and a unit dropdown set to "kg". The "Booster Charge" field has a value of 0 and a unit dropdown set to "g". The "No. of Booster" field has a value of 0. The "Total Charge" field has a value of 30.38 and a unit dropdown set to "kg".

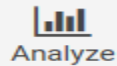
| Charge Type | Value | Unit | Weight |
|----------------|-------|------|--------|
| Column Charge | 80 | kg | 22.35 |
| Bottom Charge | 20 | kg | 8.03 |
| Booster Charge | 0 | g | |
| No. of Booster | 0 | | |
| Total Charge | 30.38 | kg | |

Figure : Charge variation possible by weight/length

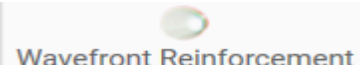
➤ BLAST DESIGN PATTERN– WHITEBOARD MODE

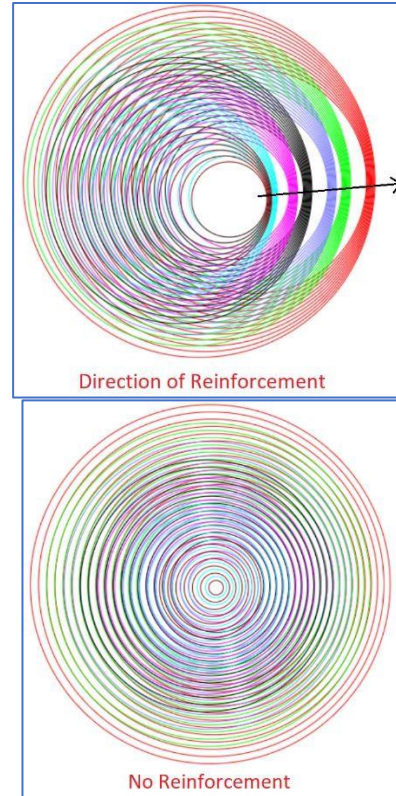


● ANALYZE



- Analysis of blast design pattern can be done on the following basis:

- 1) **Wave front reinforcement**  :It helps the user determine the direction in which either ground or air waves get reinforced. If this direction is the same as the direction of inhabitants/wildlife nearby then the pattern delay must be changed to change this direction.



Air Wave

**Ground Wave (P wave,
2200m/s)**



- 2) **Time window analysis** **Time Window** : This analysis helps the user understand his/her charge per delay based on the number of holes going off simultaneously in a specified time window (usually 8ms as per international blasting standards)

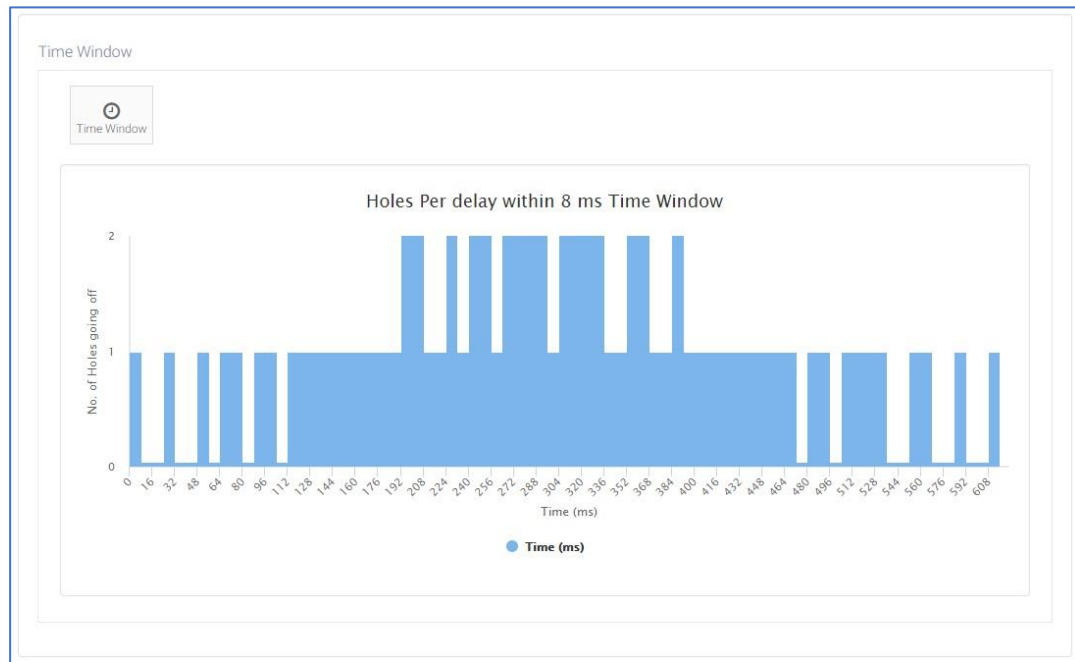
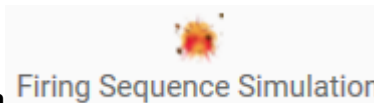


Figure : Time Window Analysis

****This analysis can be utilized to determine the charge per delay associated with the pattern. The charge per delay is usually used in calculation of air and ground vibration using standard scaled distance square root and cube root formulas.**



3) Firing Sequence Simulation **Firing Sequence Simulation** : The user can check out the sequence in which his pattern would get fired. This can aid in understanding if there is any misfire/ cut-off happening prior to conducting the blast.

Using the firing sequence simulation module, the user can:

1. Understand the sequence in which the holes detonate/fire off
2. Predict a possibility of misfire happening because of TLD getting cut-off
3. By entering the maximum delay, the user can see that how many holes would have gone off in that specific time frame.

Firing Sequence

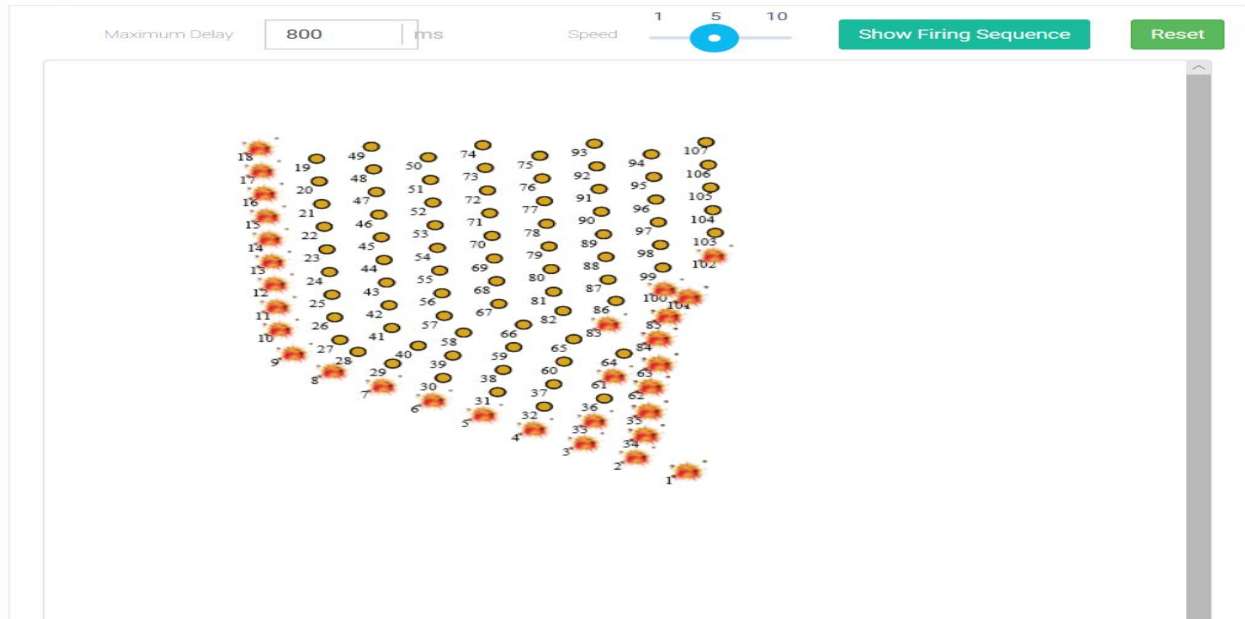


Figure : firing sequence simulation

Speed variations are possible to be done in this module (1=Fastest, 10= Slowest)

****Please note:** *Pattern Zoom In, Zoom Out, Undo and Redo are standard functionalities also present in our system. X and Y Coordinates are displayed for each points in the pattern whiteboard.*

Right clicking on each hole provides with the hole detail menu:

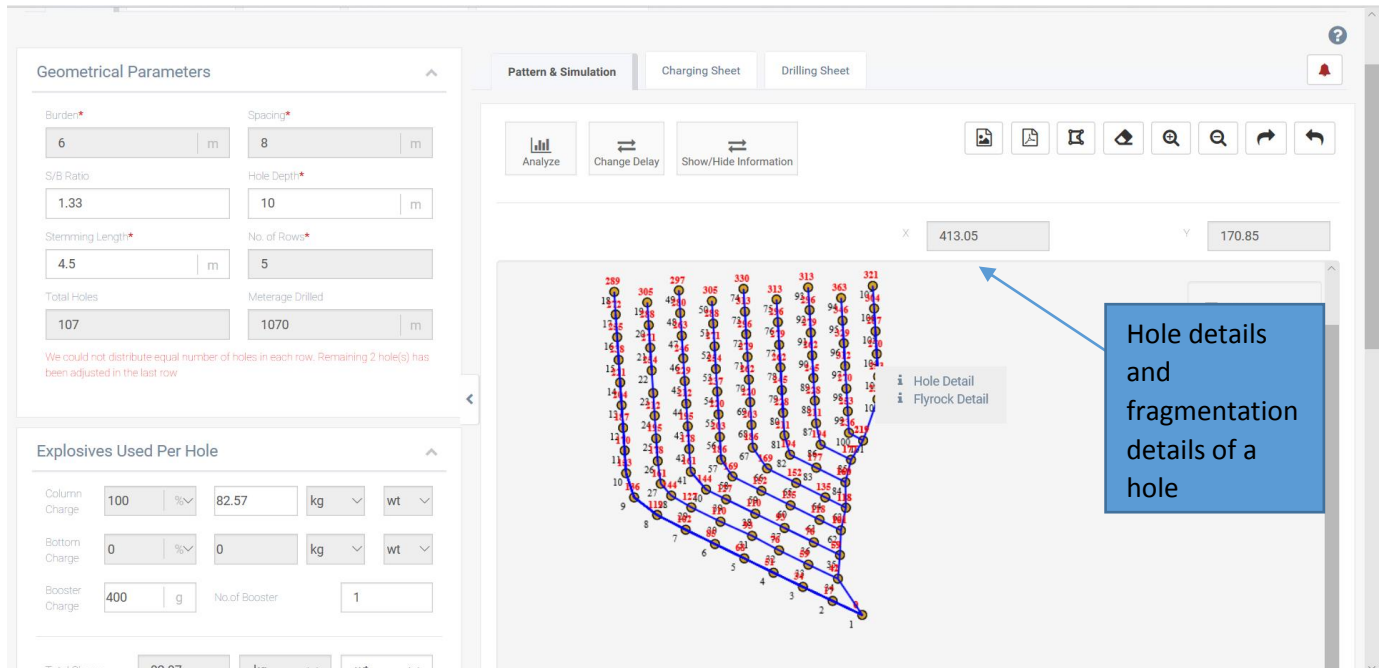










Figure: blast plan, in hole details and fragmentation details

-  : this icon avails us to download a blast plan in image format.
-  : by clicking on this icon, we can download the blast plan in pdf format.
-  : this icon allows us to select multiple holes on the blast plan.
-  : this icon is used to erase something on the blast plan.
-  : this icon is used for zoom in option.
-  : this option is for zoom out option.
-  : this option is for undo on the blast plan.
-  : this option is for redo on the blast plan.

- **Hole Detail Menu:**

Hole Details

Geometry

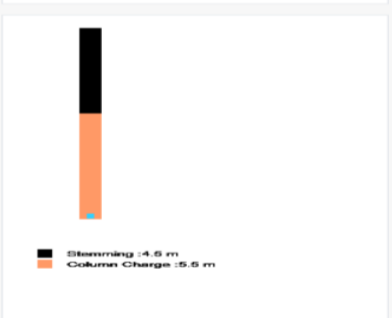
| | | | | | |
|--------------------|-------|-----------------|-------|-------------------|-------|
| Hole ID | 68 | Hole Depth | 10 m | Burden | 6 m |
| Spacing | 8 m | Stemming Height | 4.5 m | Hole Diameter | 0 m |
| Vertical Dip | 0 deg | Dip Azimuth | 0 deg | Dip Azimuth Error | 0 deg |
| Vertical Dip Error | 0 deg | Water Depth | 0 m | Block Hole | No |
| Block Start At | | | | | |

Charge

| | | | |
|----------------|--------------|----------------|-------|
| Column Charge | A.N.F.O. | 82.57 kg | 5.5 m |
| Bottom Charge | Select | 0 kg | 0 m |
| Booster Charge | Cast Booster | Booster Weight | 400 g |

Row Number: 3 Hole Number: 19

Production Hole
 Buffer Hole
 Pre-split Hole



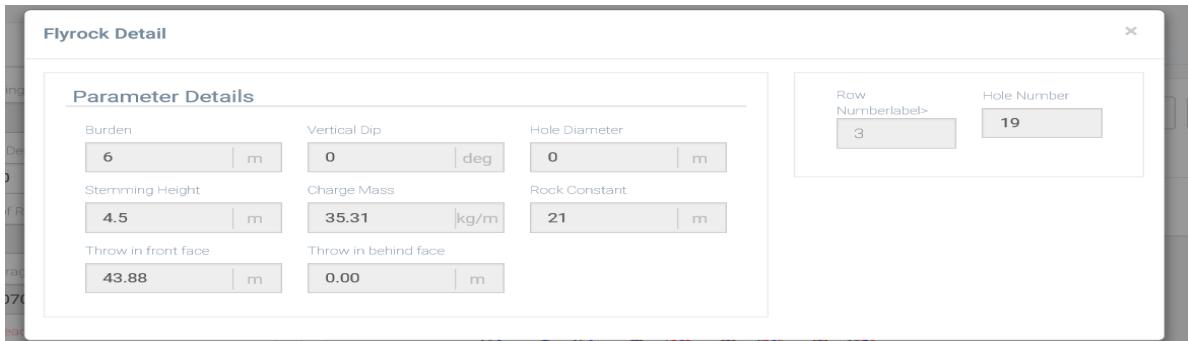
■ Stemming : 4.5 m
■ Column Charge : 5.5 m

In this menu several important parameters can be filled:

1. Hole Depth
2. Burden and Spacing
3. Stemming Height
4. Hole Diameter
5. Vertical Dip and its error
6. Dip Azimuth and its error
7. Water Depth
8. Blockage in hole
9. Number of decks
10. Type of charge in the hole: column, bottom and booster

*****There is also a provision to see the down the hole characteristics of the hole in 2D drawing based on different selections made by the user. This can aid in conducting/ensuring post drilling QA/QC operations to optimize blast designs in a better manner.***

FLYROCK DETAIL MENU:



Flyrock Detail

Parameter Details

| | | |
|---------------------|----------------------|---------------|
| Burden | Vertical Dip | Hole Diameter |
| 6 m | 0 deg | 0 m |
| Stemming Height | Charge Mass | Rock Constant |
| 4.5 m | 35.31 kg/m | 21 m |
| Throw in front face | Throw in behind face | |
| 43.88 m | 0.00 m | |

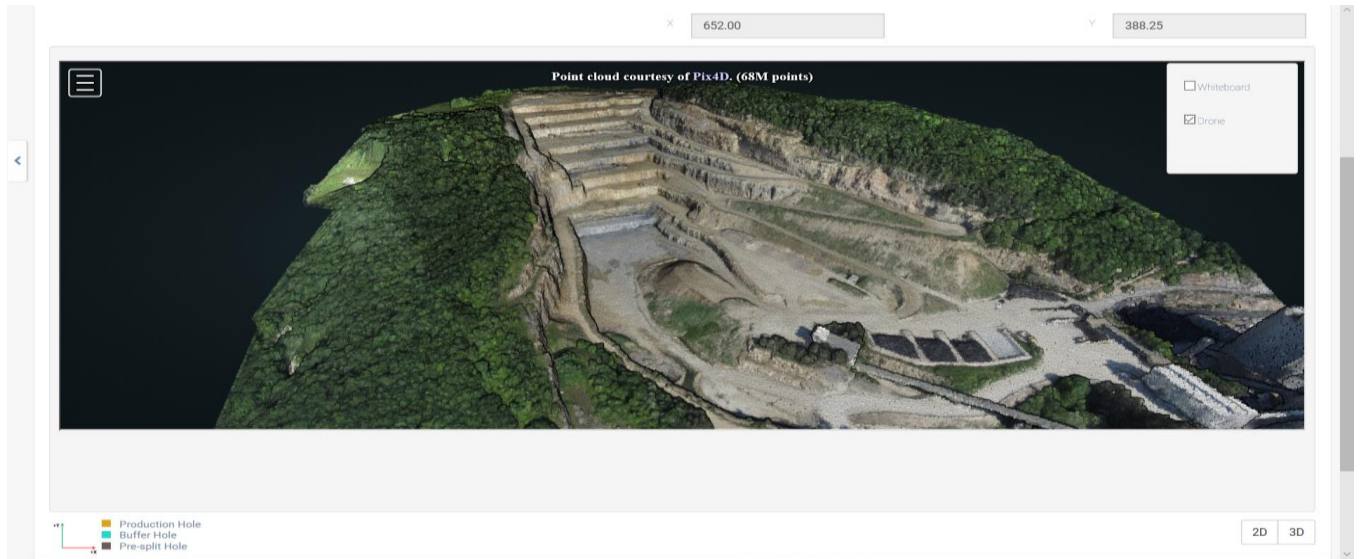
Row Numberlabel: 3 Hole Number: 19


This will show all the details of fly rock related to that selected hole

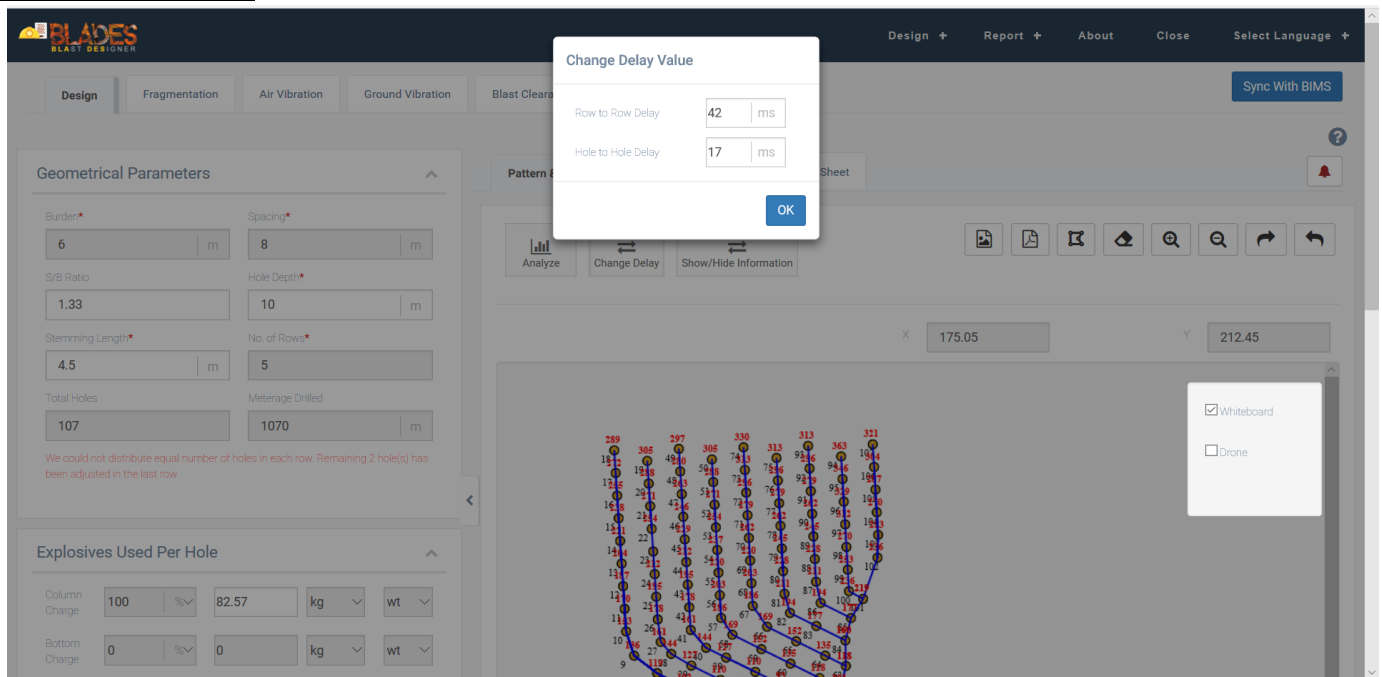
It will show the following:

- **Burden of that hole**
- **Vertical dip of the hole**
- **Hole diameter**
- **Stemming length in that hole**
- **Charge mass**
- **Rock constant**
- **Throw in front face by that hole**
- **Throw behind the face by that hole**
- **Row number label of that hole**
- **Hole number of that hole**

BLAST DESIGN PATTERN (DRONE MODE): It contains features like face flip, pattern draw and firing sequence simulation

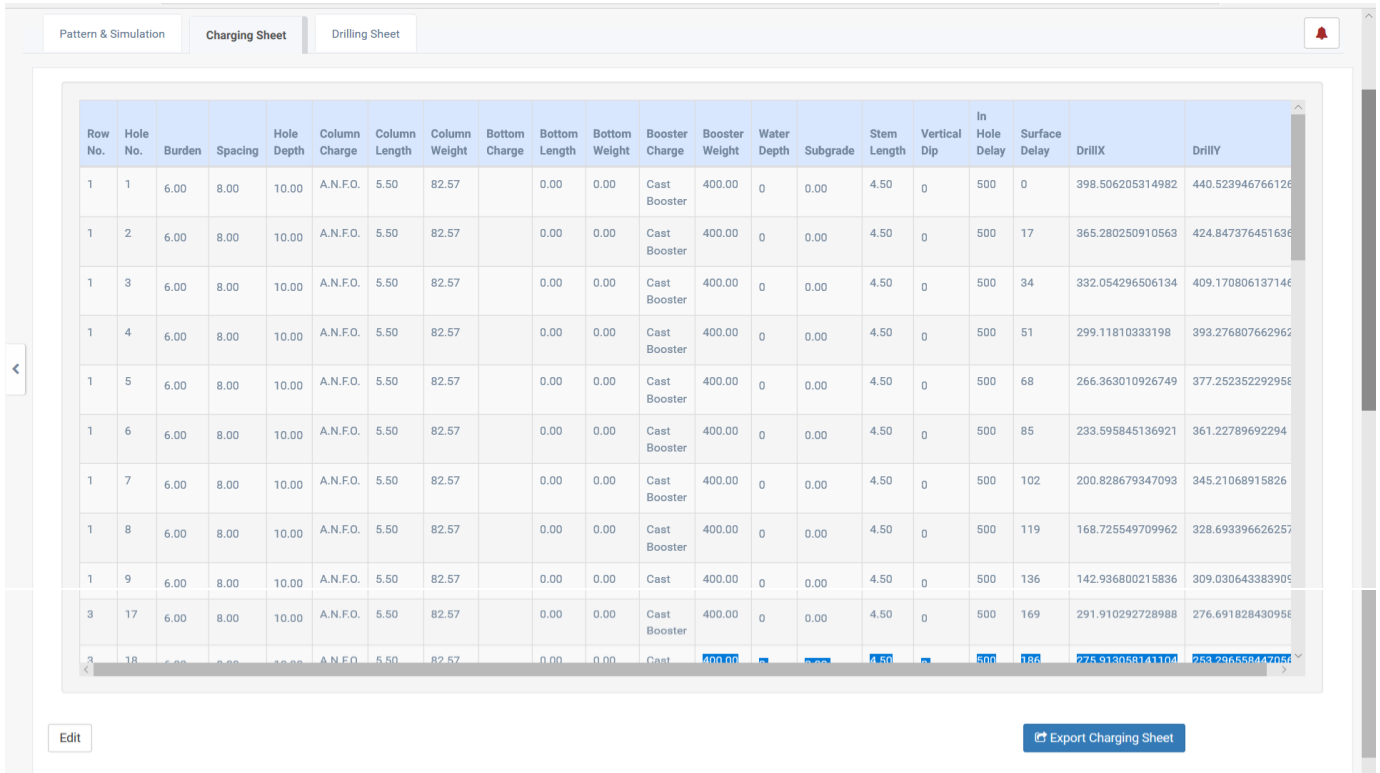


Change delay value  : using this you can change the delay values.



Charging Sheet

Charging Sheet Tab : this gives the information of charging of holes in sheet format.



| Row No. | Hole No. | Burden | Spacing | Hole Depth | Column Charge | Column Length | Column Weight | Bottom Charge | Bottom Length | Bottom Weight | Booster Charge | Booster Weight | Water Depth | Subgrade | Stem Length | Vertical Dip | In Hole Delay | Surface Delay | DrillIX | DrillY |
|---------|----------|--------|---------|------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|-------------|----------|-------------|--------------|---------------|---------------|------------------|------------------|
| 1 | 1 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 0 | 398.506205314982 | 440.523946766126 |
| 1 | 2 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 17 | 365.280250910563 | 424.847376451636 |
| 1 | 3 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 34 | 332.054296506134 | 409.170806137146 |
| 1 | 4 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 51 | 299.11810333198 | 393.276807662962 |
| 1 | 5 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 68 | 266.363010926749 | 377.252352292956 |
| 1 | 6 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 85 | 233.595845136921 | 361.22789692294 |
| 1 | 7 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 102 | 200.828679347093 | 345.21068915826 |
| 1 | 8 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 119 | 168.725549709962 | 328.69396626257 |
| 1 | 9 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 136 | 142.936800215836 | 309.030643383905 |
| 3 | 17 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast Booster | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 169 | 291.910292728988 | 276.691828430956 |
| 3 | 18 | 6.00 | 8.00 | 10.00 | A.N.F.O. | 5.50 | 82.57 | | 0.00 | 0.00 | Cast | 400.00 | 0 | 0.00 | 4.50 | 0 | 500 | 186 | 275.913068141104 | 253.286568447050 |

Figure: Charging sheet (it gets dynamically updated if user makes any change in parameters)

****Charging sheet can be exported in a standard excel format by clicking on**

 **Export Charging Sheet**

this icon given at the end of the sheet. Another option for the user is to simply export the drilling sheet (dip sheet) in an excel format to be provided to the driller.

****Charging sheet can also be edited according to the desire/field requirement by clicking on**

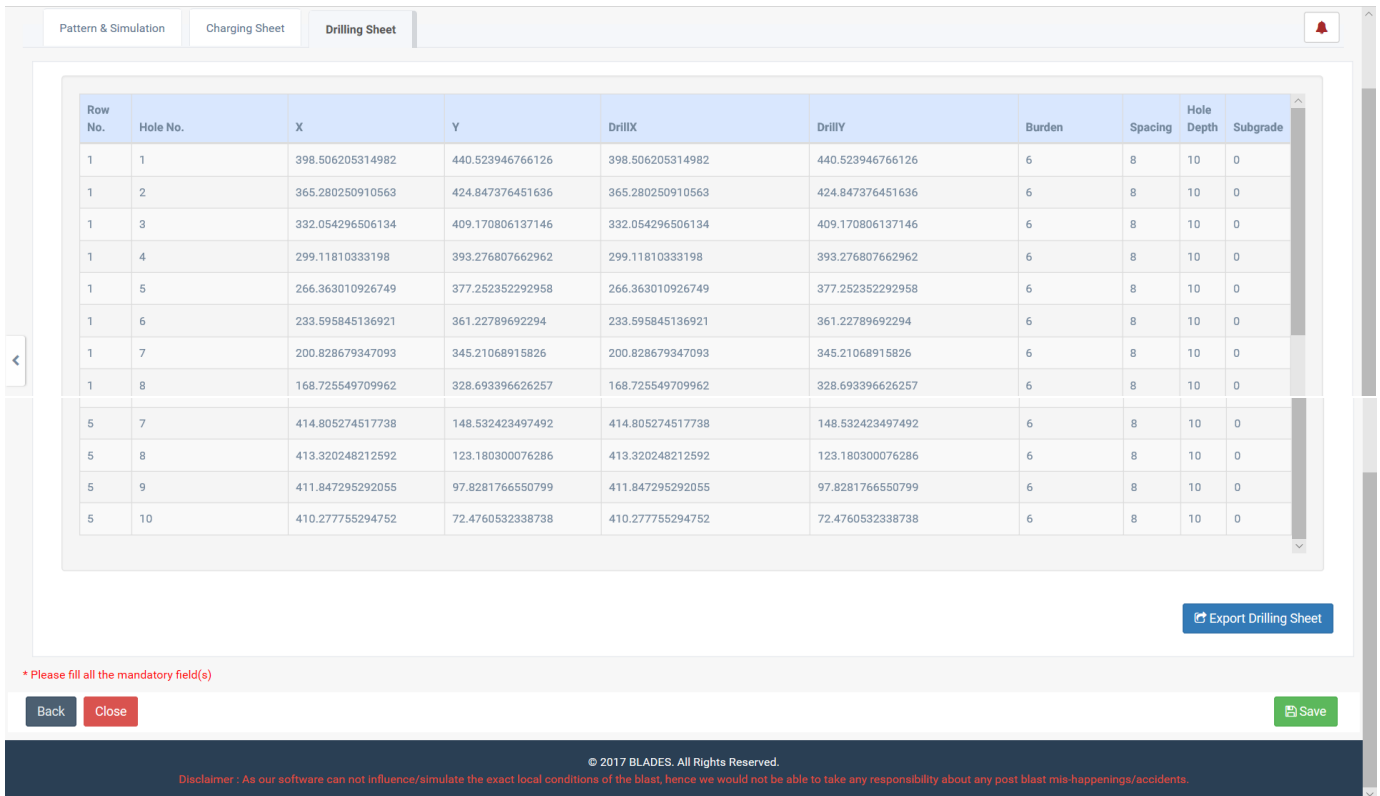
Edit button given at end of the page.

Drilling Sheet

Drilling Sheet Tab

related to the drilling of the holes in the sheet format.

: This tab provides all the information




| Row No. | Hole No. | X | Y | DrillX | DrillY | Burden | Spacing | Hole Depth | Subgrade |
|---------|----------|------------------|------------------|------------------|------------------|--------|---------|------------|----------|
| 1 | 1 | 398.506205314982 | 440.523946766126 | 398.506205314982 | 440.523946766126 | 6 | 8 | 10 | 0 |
| 1 | 2 | 365.280250910563 | 424.847376451636 | 365.280250910563 | 424.847376451636 | 6 | 8 | 10 | 0 |
| 1 | 3 | 332.054296506134 | 409.170806137146 | 332.054296506134 | 409.170806137146 | 6 | 8 | 10 | 0 |
| 1 | 4 | 299.11810333198 | 393.276807662962 | 299.11810333198 | 393.276807662962 | 6 | 8 | 10 | 0 |
| 1 | 5 | 266.363010926749 | 377.252352292958 | 266.363010926749 | 377.252352292958 | 6 | 8 | 10 | 0 |
| 1 | 6 | 233.595845136921 | 361.22789692294 | 233.595845136921 | 361.22789692294 | 6 | 8 | 10 | 0 |
| 1 | 7 | 200.828679347093 | 345.21068915826 | 200.828679347093 | 345.21068915826 | 6 | 8 | 10 | 0 |
| 1 | 8 | 168.725549709962 | 328.693396626257 | 168.725549709962 | 328.693396626257 | 6 | 8 | 10 | 0 |
| 5 | 7 | 414.805274517738 | 148.532423497492 | 414.805274517738 | 148.532423497492 | 6 | 8 | 10 | 0 |
| 5 | 8 | 413.320248212592 | 123.180300076286 | 413.320248212592 | 123.180300076286 | 6 | 8 | 10 | 0 |
| 5 | 9 | 411.847295292055 | 97.8281766550799 | 411.847295292055 | 97.8281766550799 | 6 | 8 | 10 | 0 |
| 5 | 10 | 410.277755294752 | 72.4760532338738 | 410.277755294752 | 72.4760532338738 | 6 | 8 | 10 | 0 |

* Please fill all the mandatory field(s)

Back Close Save

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Disclaimer : As our software can not influence/simulate the exact local conditions of the blast, hence we would not be able to take any responsibility about any post blast mis-happenings/accidents.

****similar to charging sheet tab this tab also provides the exportation of drilling sheet by clicking on the export drilling sheet  icon. Another option for the user is to simply export the drilling sheet (dip sheet) in an excel format to be provided to the driller.**

FRAGMENTATION

Design
Fragmentation
Air Vibration
Ground Vibration
Blast Clearance Estimation
Sync With BIMs

Fragmentation Input

Fragmentation Model: Kuzram Modified Kuzram

Bench Height* m Hole Diameter* mm Hole Depth* m Subgrade* m

Burden* m Spacing* m Stemming* m Drilling Accuracy* m

Oversize* m Optimumsize* m Undersize* m

OK

Predicted Fragmentation Result

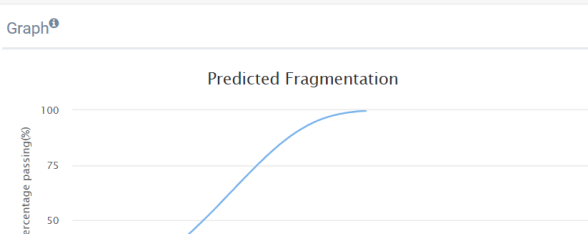
Blastability Index Mean Fragment Size of Material cm

Uniformity Exponent Characteristic Size m

Predicted Fragmentation

Percent Oversize % Percent in Range % Percent Under Size %

Graph



Table

| | |
|---|--|
| Fragment P80 <input type="text" value="1.37"/> m | Fragment P50 <input type="text" value="0.58"/> m |
| Increment Size(m) <input type="text" value="0.05"/> m OK | |
| Tabular Format | |
| Size(m) | Percentage Passing(%) |

Figure: Kuz-Ram model fragmentation predictions

****Kuz-Ram and Modified Kuz-Ram Model has been implemented for obtaining a prediction of the initial fragmentation i.e. percentage undersize, in-range and oversize and its corresponding cumulative size distribution graph and table.**

Fragmentation Model: Kuzram Modified Kuzram

*You can select any of the above models for the further calculations according to our desired results.

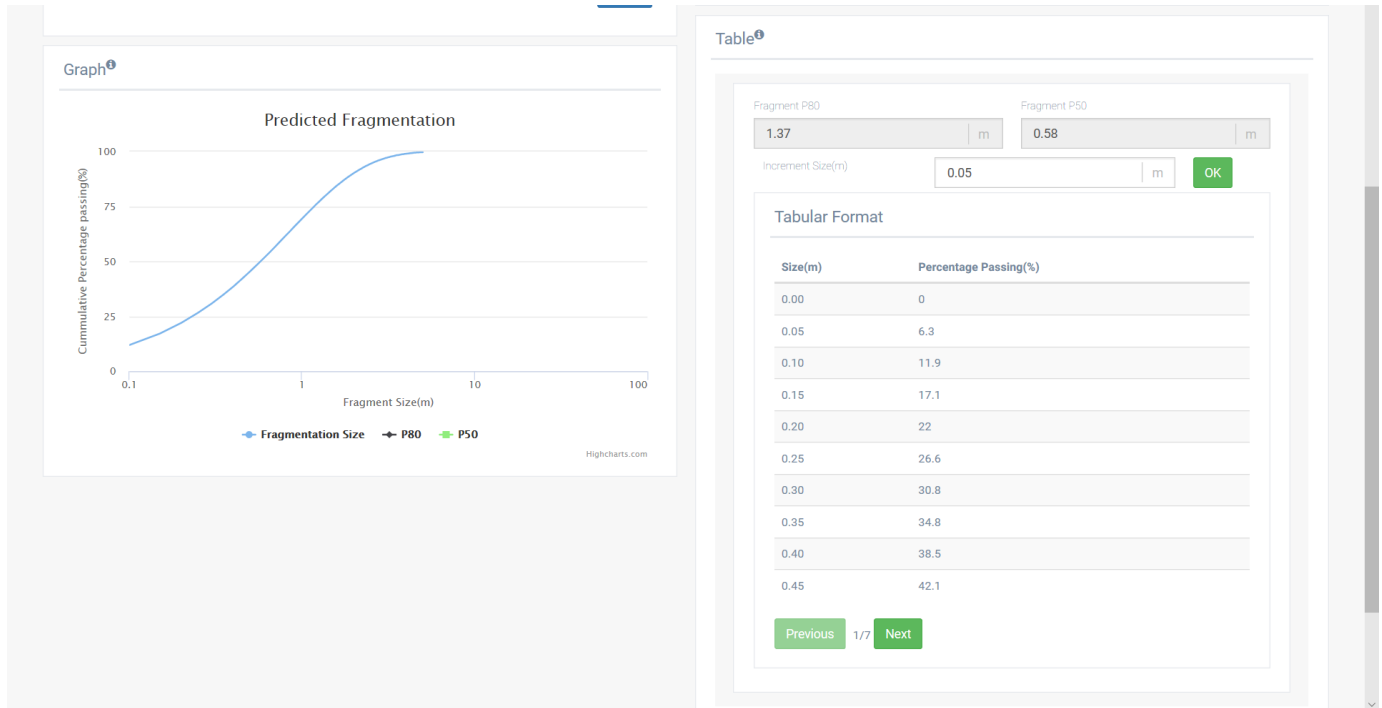
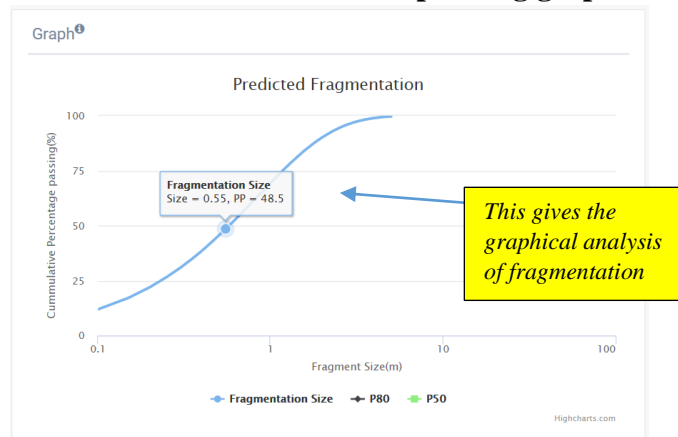


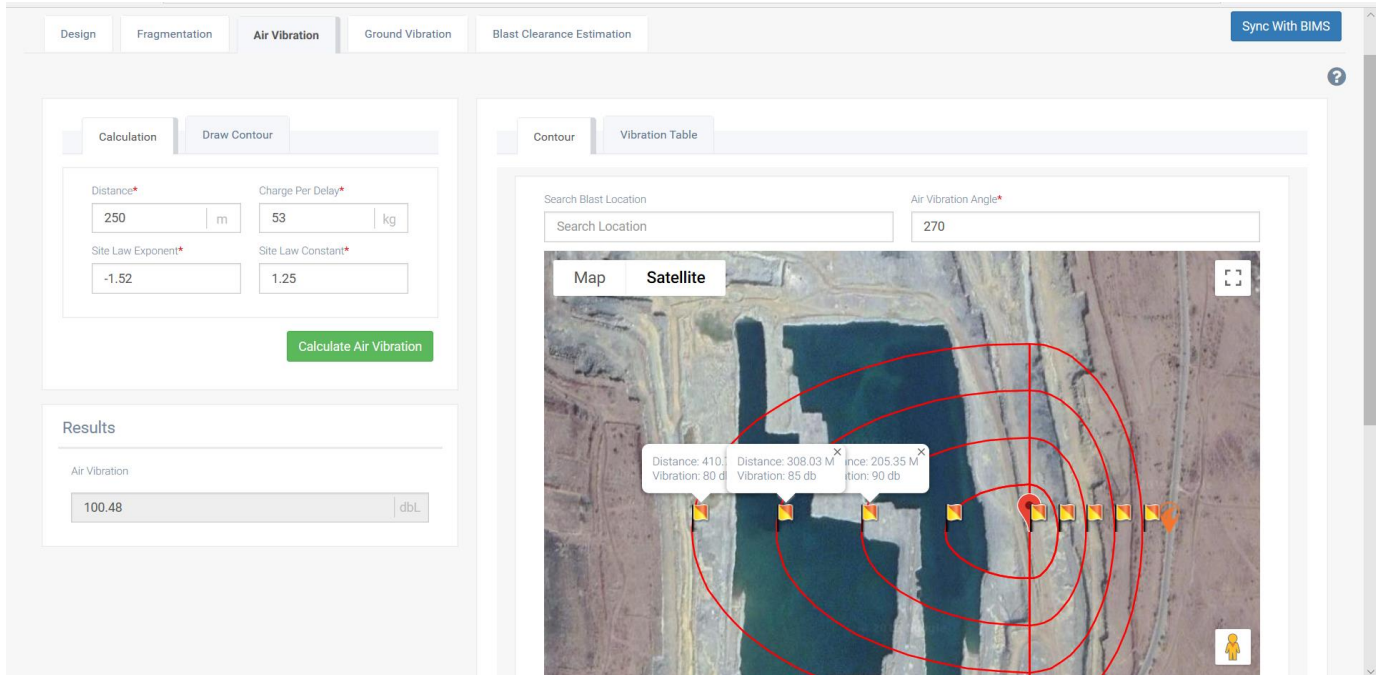
Figure: Cumulative size distribution semi-log graph and table

The user can increment sizes according to his requirement and see dynamic changes in the size distribution table and corresponding graph.



**This fragmentation page may give you opportunity to understand the expected fragmentation in comparison to both P80 and P50 sizes.

AIR VIBRATION



- **This is Air Vibration Page. Here you can calculate Air vibration by entering Distance, Charge per Delay, Site Law exponent, Site Law constant.**
- **Here you can also draw contours at desired air vibration angle.**
- **This also gives a warning message if any infrastructure is in danger due to blast on that infrastructure.**
- **It also gives the distance from the point of blast along with information of the vibration level at that distance.**

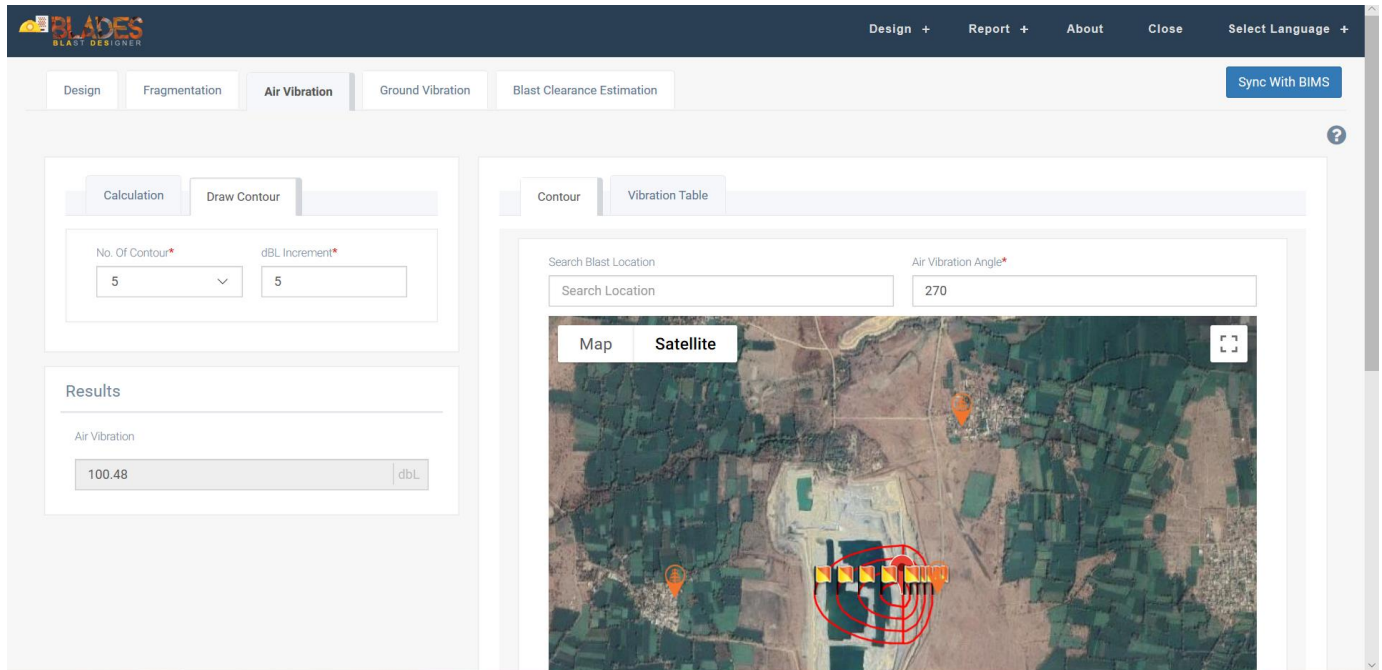


Figure 39: Air Vibration Contouring

Here you can Draw Vibration Contours at your desired interval and with desired numbers of contour lines.



Vibration table would be generated for user's reference to explore different distance and charge per delay scenarios.



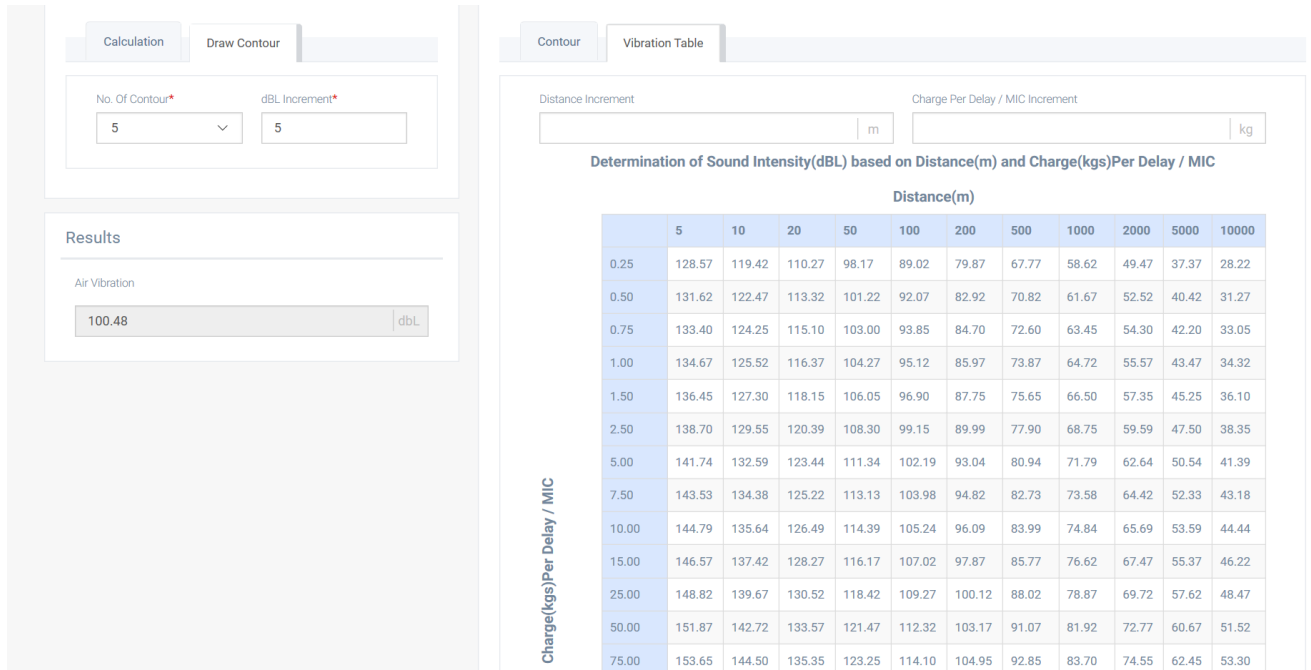


Figure : Air Vibration table (based on distance and charge per delay values)

****This table is Determination of Sound Intensity(dBL) based on Distance(m) and Charge(kgs)Per Delay / MIC distance V/S Charge(kgs)Per Delay / MIC.**

GROUND VIBRATION

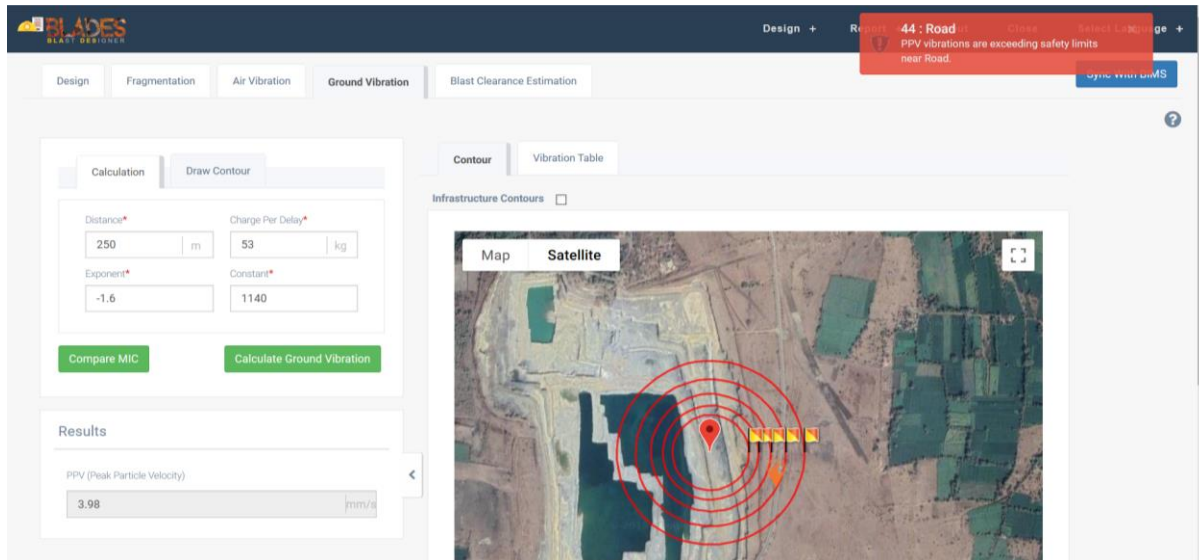
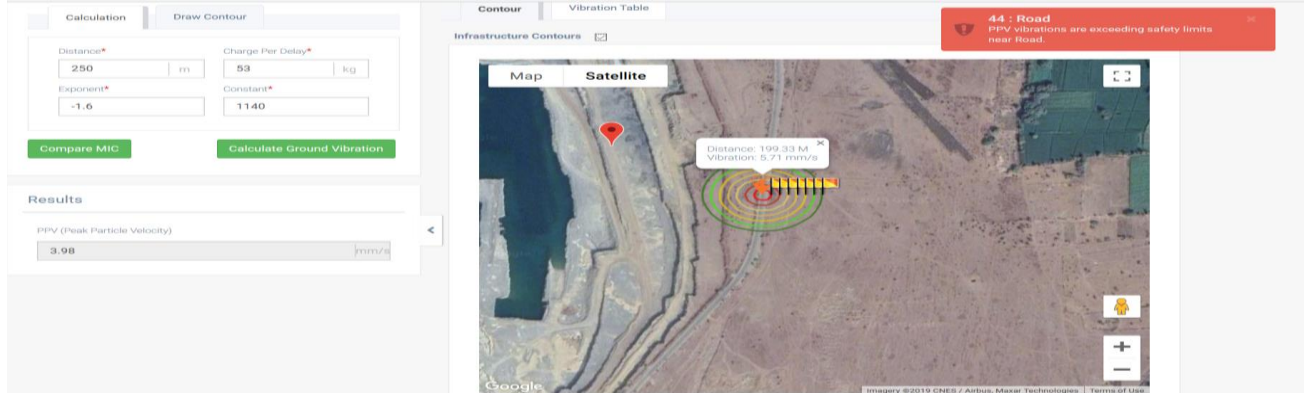


Figure: Ground vibration prediction and contouring

- **Very similar to air vibration, the ground vibration page can be utilized to predict the ground vibration values at different distances based on the charge per delay, exponent and constant fed into the system.**
- It consist of an addition feature of the followings:
 1. Comparing MIC **Compare MIC**
 2. Calculating ground vibration **Calculate Ground Vibration**
 3. Infrastructure contours **Infrastructure Contours**

Infrastructure contour mode:



A very similar vibration table can also be generated for ground vibration in mm/s.

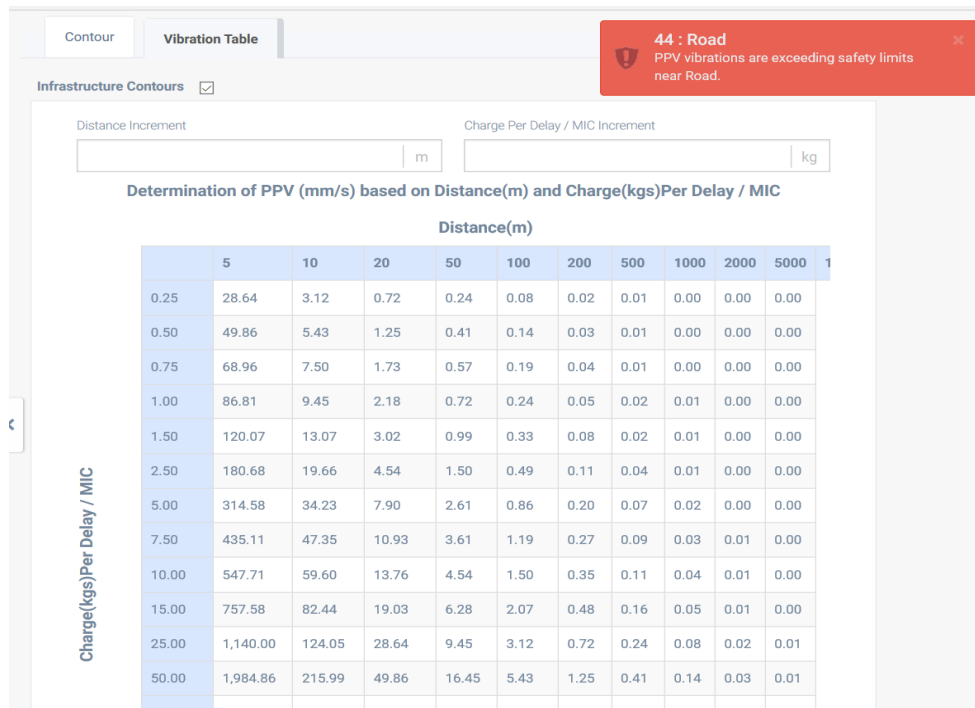
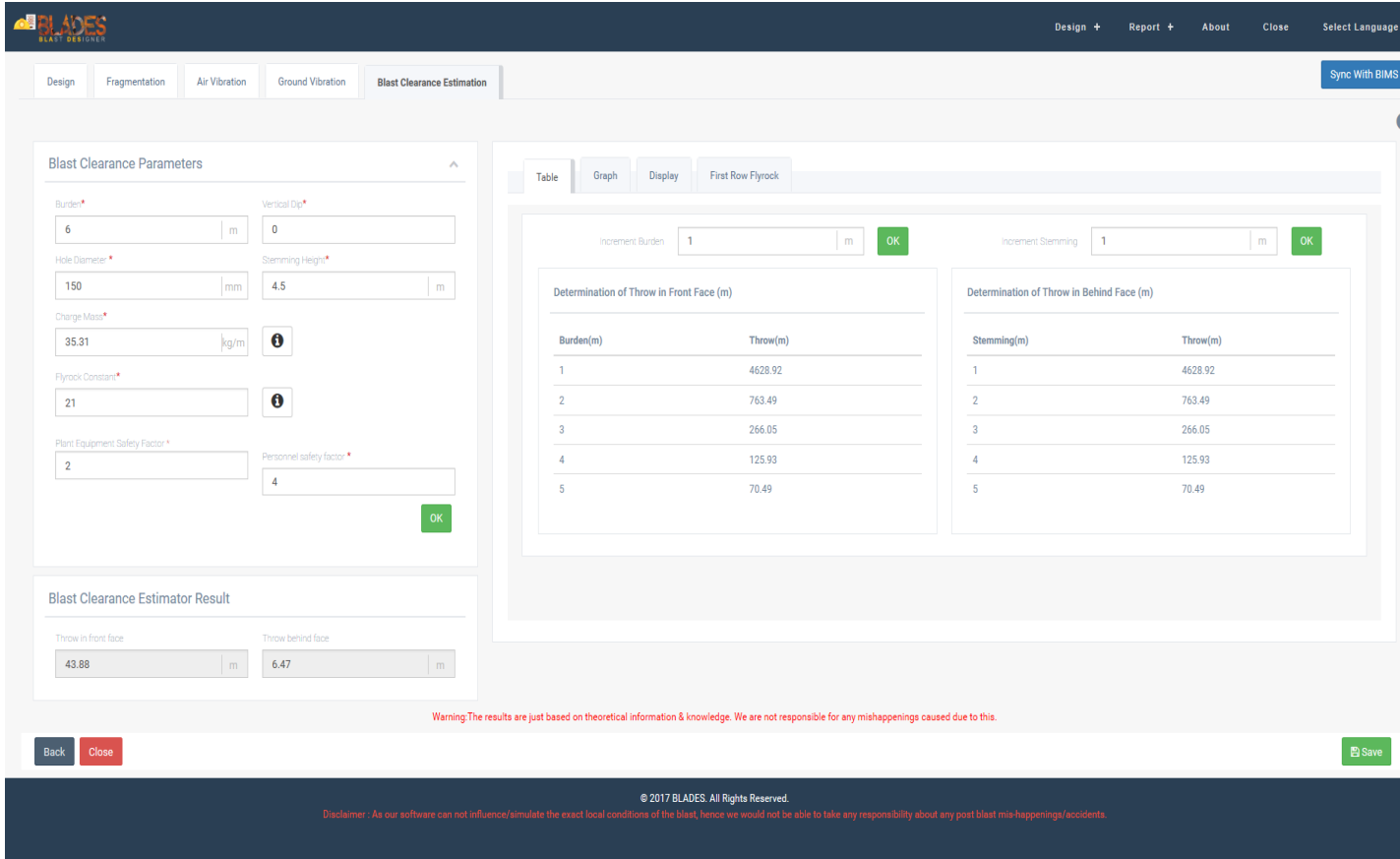


Figure: Vibration table for ground vibration

BLAST CLEARANCE ESTIMATION



Blast Clearance Parameters

Burden* m Vertical Dip*

Hole Diameter* mm Stemming Height* m

Charge Mass* kg/m ⓘ

Flyrock Constant* ⓘ

Plant Equipment Safety Factor* Personnel safety factor*

Blast Clearance Estimator Result

Throw in front face m Throw behind face m

Warning: The results are just based on theoretical information & knowledge. We are not responsible for any mishappenings caused due to this.

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Disclaimer: As our software can not influence/simulate the exact local conditions of the blast, hence we would not be able to take any responsibility about any past blast mis-happenings/accidents.

Figure: Fly rock prediction is based on a fly rock constant and desired safety factor for plant and personnel

- **This page lets you enter Blast Clearance Parameters and generates Blast Clearance estimator result. You can change the parameters here and real time tables, graphs and displays will be generated.**
- **As we know that front throw depends on the burden whereas back throw depends on hole inclination and stemming, hence these values can be adjusted accordingly to see the variation in the 2 throws respectively.**

TABLE:

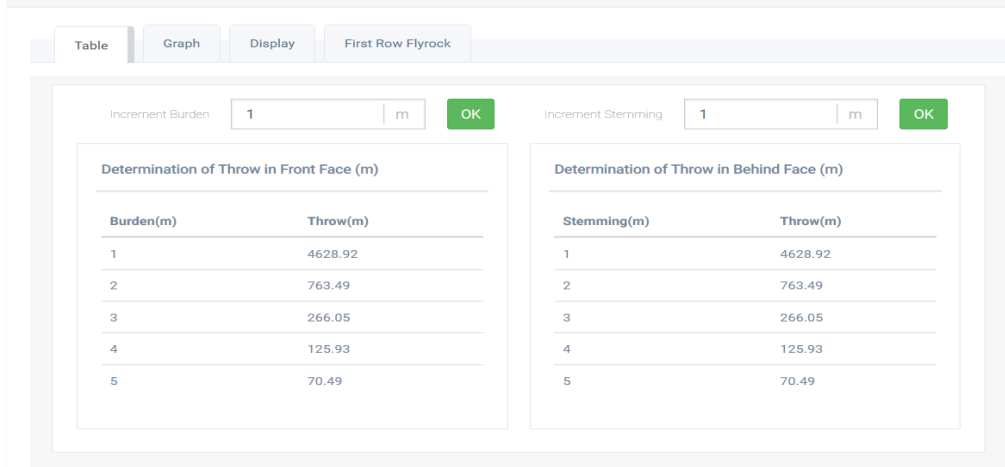


Figure: fly rock front and back throw

GRAPH:

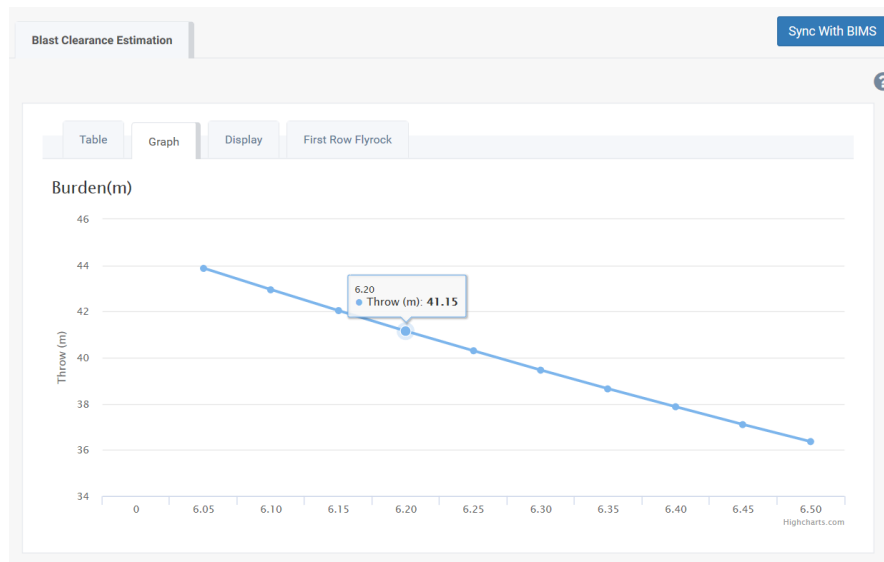


Figure: Front throw variation w.r.t Burden

DISPLAY:

Fly rock angle (fly rock usually goes 90 degrees to the face) and fly rock circle radius (Statutory limit to be imposed at your mine site) to be entered here:

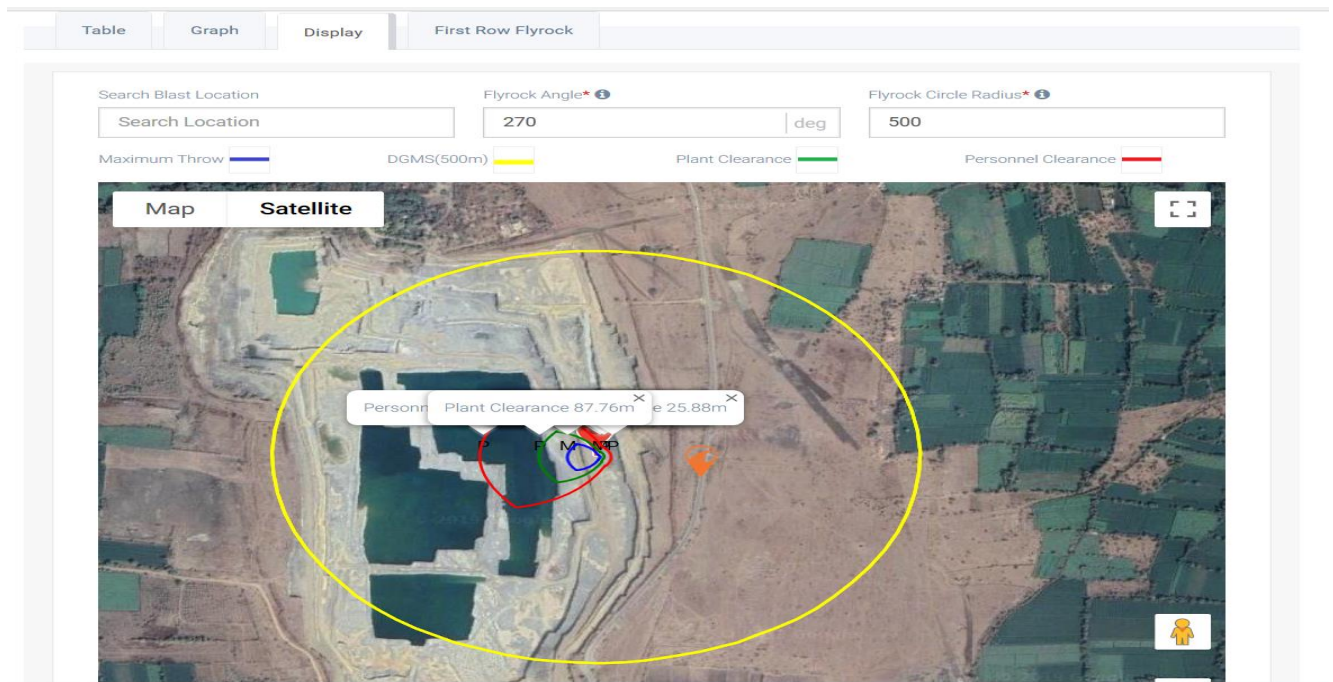



Figure: Fly rock contours on-site along with safe distances for personnel, equipment and statutory limits


- 
 On clicking on this icon all the information regarding that particular column will be flashed on the screen, this function is available for the following :

Charge Mass*

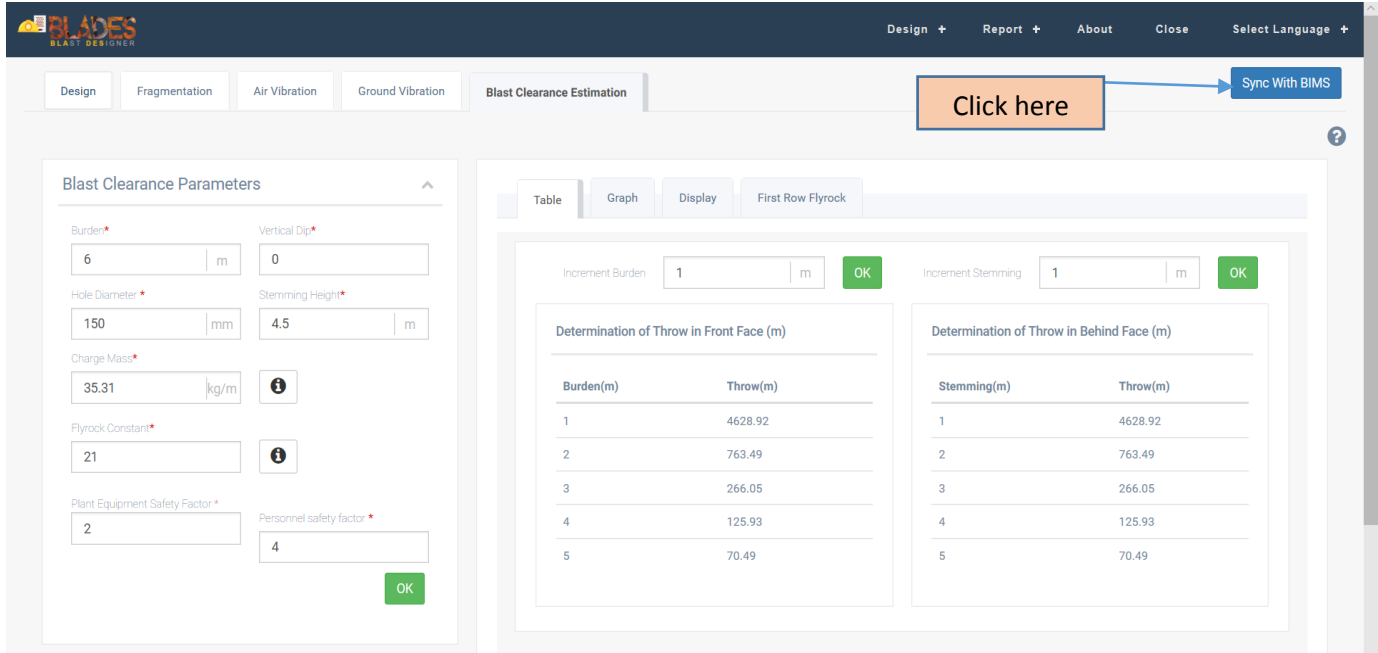
1. Charge information kg/m 

- Fly rock constant for different types of rock type

Flyrock Constant*



SYNC WITH BIMS

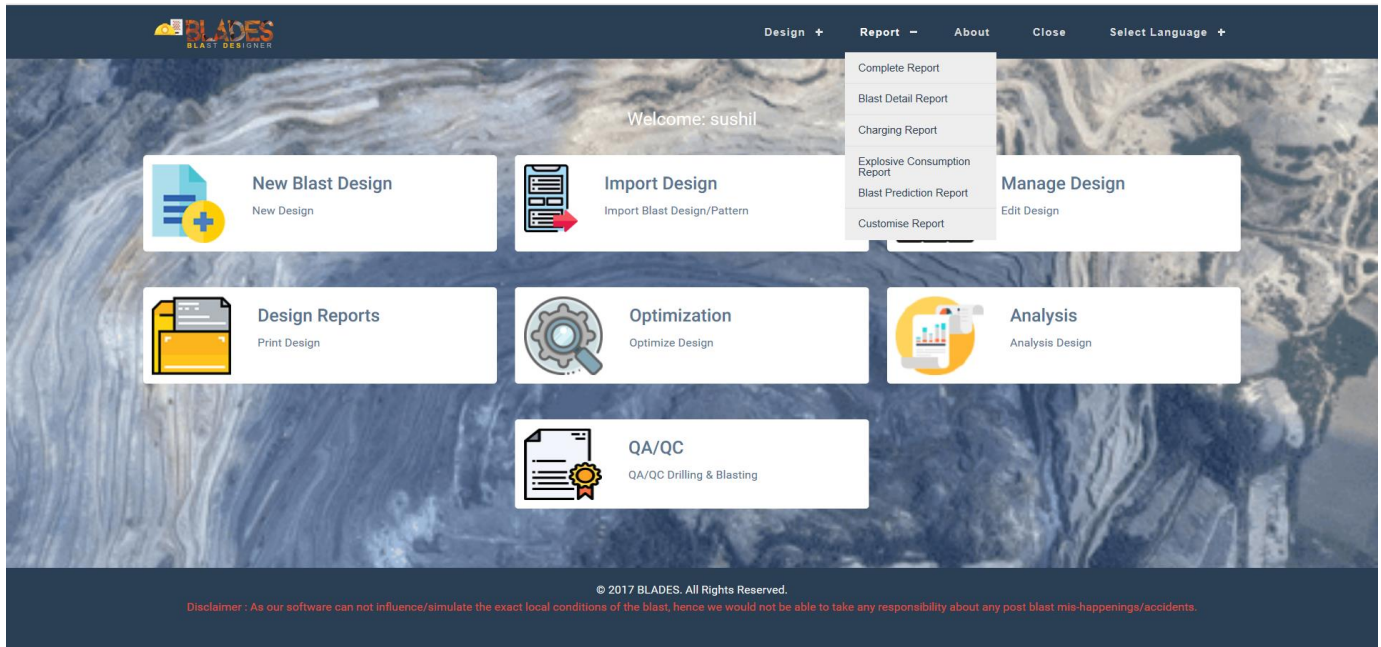


The screenshot shows the 'Blast Clearance Estimation' tab in the BLADES software. On the left, there are input fields for 'Blast Clearance Parameters' including Burden (6 m), Vertical Dip (0 m), Hole Diameter (150 mm), Stemming Height (4.5 m), Charge Mass (35.31 kg/m), Flyrock Constant (21), Plant Equipment Safety Factor (2), and Personnel safety factor (4). On the right, there are two tables showing 'Determination of Throw in Front Face (m)' and 'Determination of Throw in Behind Face (m)'. Both tables have columns for Burden(m) and Throw(m). The 'Increment Burden' and 'Increment Stemming' are both set to 1 m. A 'Sync With BIMS' button is located in the top right corner, with a callout box pointing to it that says 'Click here'.

Figure: Sync with BIMS feature for ease of data capture and analysis

****This option allows you to sync all the designs that you want with our blast information management system (BIMS) to avoid redundancy in manual data capturing.**

REPORTING FEATURE



- **In this menu we can represent different reports related to blast details, charging report, explosive and initiator consumption report & blast prediction report. Other reports can be customized based on user's requirement.**

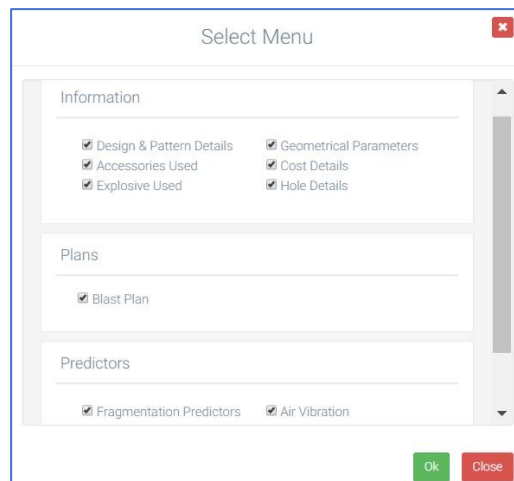


Figure: Customize report menu

SAMPLE REPORTS

| mineexcellence | | mineexcellence | |
|-----------------------------------|----------------|--|---|
| Blast Detail | | | |
| Design Name: SCCL_Coal | | Blast Date/Time: 1/3/2018 11:50:47 AM | |
| Mine Name: | Glencore mine1 | Operation: | Production Blasting |
| Pit Name: | Pit 3 | Rock Type: | |
| Bench Name: | Bench 2 | Zone/Face Name: | 1002 |
| Design and Pattern Details | | | |
| Bench Height | 24 | m | Pattern: Square |
| Bench Width: | 0 | m | Total Rows: 3 |
| Face Length: | 78.58 | m | Holes Per Row: 9 |
| Face Angle: | 0 | degree | Total Holes: 100 |
| Sub Grade Drill: | 1.5 | | Hole Angle: 0 degree |
| Explosive Used | | Performance | |
| Column Charge: | 20.50 | kg | Rock Broken: 50922.00 m ³ |
| Bottom Charge: | 0.00 | kg | Powder Factor: 2.40 ton/kg |
| Booster Charge: | 0.00 | kg | |
| Geometrical Parameters | | | |
| Burden: | 9.00 | m | Spacing: 9.00 m |
| S/b Ratio: | 1.00 | m | Hole Depth: 25.50 m |
| Stemming Length: | 5.00 | m | Meterege Drill: 667.96 m |

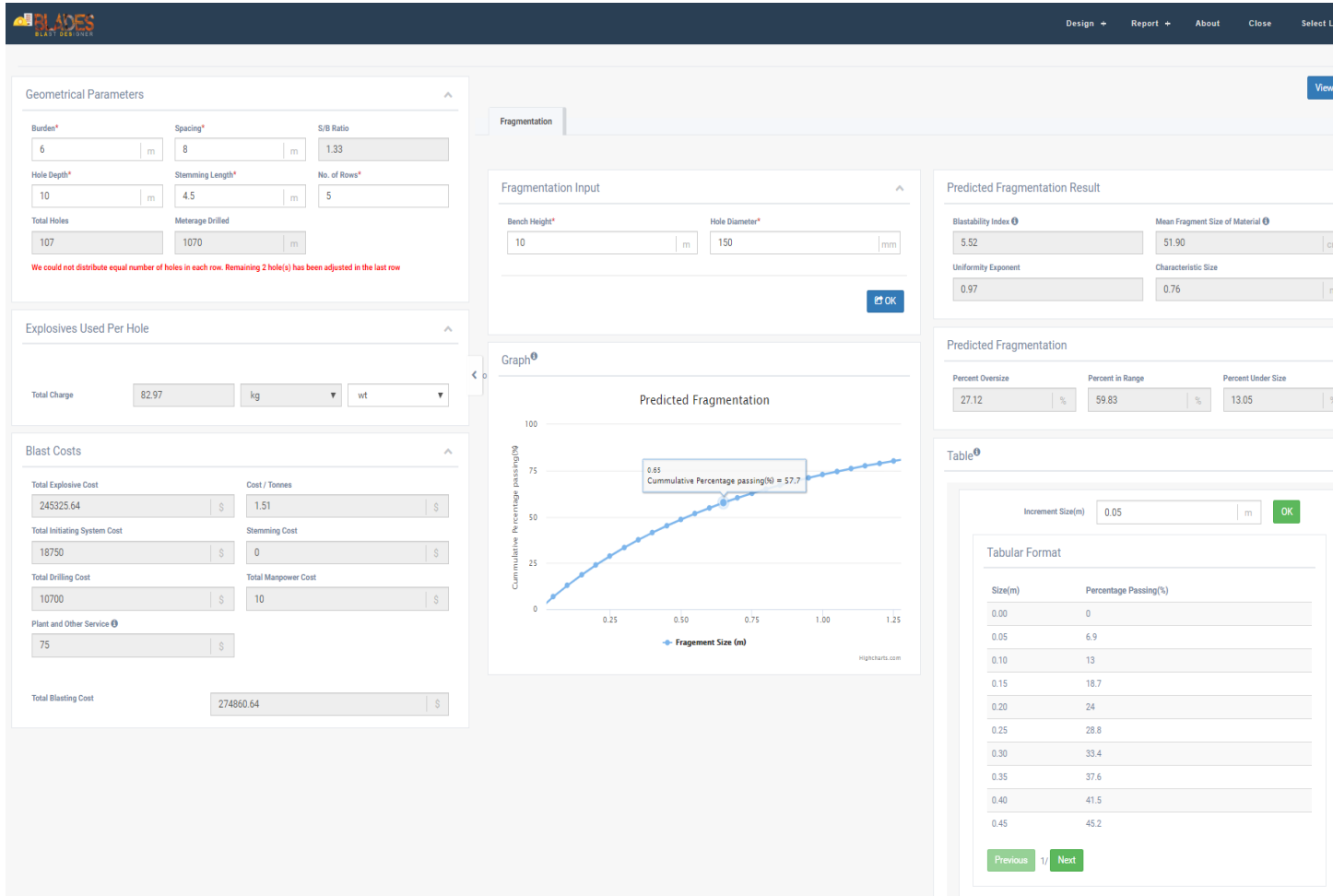
Figure : Report Sample 1

| BlastPlan | | | | | | | | | | | |
|---------------------|----------|--------|---------|------------|---------------|---------------|---------------|---------------|-------|-------------|-------------|
| Hole Details | | | | | | | | | | | |
| Row No. | Hole No. | Burden | Spacing | Hole Depth | Column Length | Column Weight | Bottom Length | Bottom Weight | Delay | Water Depth | Stem Length |
| 1 | 1 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 2 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 3 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 4 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 5 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 6 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 7 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 8 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 1 | 9 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 1 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 2 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 3 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 4 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 5 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 6 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 7 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 8 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 2 | 9 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 1 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 2 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 3 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 4 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 5 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 6 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 7 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |
| 3 | 8 | 9 | 9 | 25.5 | 20.5 | 1216.61 | 0 | 0 | 150 | 0 | 5 |

Figure: Report Sample 2

ANALYSIS:

This section helps in analyzing our design by comparing it with different designs by alteration in various parameters.



The screenshot displays the BLADES Blast Estimator software interface, which is used for analyzing and predicting fragmentation results based on various input parameters.

Geometrical Parameters:

- Burden: 6 m
- Spacing: 8 m
- S/B Ratio: 1.33
- Hole Depth: 10 m
- Stemming Length: 4.5 m
- No. of Rows: 5
- Total Holes: 107
- Meterage Drilled: 1070 m

Explosives Used Per Hole:

- Total Charge: 82.97 kg

Blast Costs:

- Total Explosive Cost: 245325.64 \$
- Cost / Tonnes: 1.51 \$
- Total Initiating System Cost: 18750 \$
- Stemming Cost: 0 \$
- Total Drilling Cost: 10700 \$
- Total Manpower Cost: 10 \$
- Plant and Other Service: 75 \$
- Total Blasting Cost: 274860.64 \$

Fragmentation Input:

- Bench Height: 10 m
- Hole Diameter: 150 mm

Predicted Fragmentation Result:

- Blastability Index: 5.52
- Mean Fragment Size of Material: 51.90
- Uniformity Exponent: 0.97
- Characteristic Size: 0.76

Predicted Fragmentation Graph:

The graph shows the predicted fragmentation curve, plotting Cumulative Percentage passing (%) against Fragmentation Size (m). A specific point is highlighted at 0.65 m, where the Cumulative Percentage passing is 57.7%.

Predicted Fragmentation Table:

| Size(m) | Percentage Passing(%) |
|---------|-----------------------|
| 0.00 | 0 |
| 0.05 | 6.9 |
| 0.10 | 13 |
| 0.15 | 18.7 |
| 0.20 | 24 |
| 0.25 | 28.8 |
| 0.30 | 33.4 |
| 0.35 | 37.6 |
| 0.40 | 41.5 |
| 0.45 | 45.2 |

Summary Statistics:

- Percent Oversize: 27.12 %
- Percent in Range: 59.83 %
- Percent Under Size: 13.05 %

- This page comprises of various factors for comparison like:
 - Geometrical parameters
 - Explosives used per hole
 - Blast costs
 - Fragmentation input data
 - Predicted fragmentation result
 - Predicted fragmentation in both

- Graphical form
- Tabular form

GRAPH:

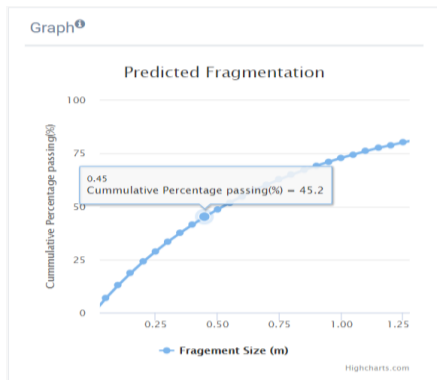


TABLE:

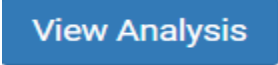
Table³

Increment Size(m)

Tabular Format

| Size(m) | Percentage Passing(%) |
|---------|-----------------------|
| 0.00 | 0 |
| 0.05 | 6.9 |
| 0.10 | 13 |
| 0.15 | 18.7 |
| 0.20 | 24 |
| 0.25 | 28.8 |
| 0.30 | 33.4 |
| 0.35 | 37.6 |
| 0.40 | 41.5 |
| 0.45 | 45.2 |

1/

➤ For analysing the design click on the icon  on clickin on this icon this will be flashed on the computer screen.

| FULL DIFFERENCES | | DESIGN 1 | DESIGN 2 | DESIGN 3 | DESIGN 4 |
|--------------------------|-----------------------------------|-----------|-----------|-----------|----------|
| Change Compare Mode | | | | | |
| Geo Parameter | Burden (m) | 6 | 6.5 | 7.5 | 8 |
| | Spacing (m) | 8 | 8.5 | 9 | 9.5 |
| | Bench Height (m) | 10 | 10 | 10 | 10 |
| | SB Ratio | 1.33 | 1.31 | 1.2 | 1.19 |
| | Face Length | 171.2 | 158.03 | 136.96 | 128.4 |
| | Hole Depth (m) | 10 | 10 | 10 | 10 |
| | Stemming Length (m) | 4.5 | 4.88 | 5.63 | 6 |
| | Total Holes | 107.00 | 92.96 | 76.09 | 67.58 |
| | Meterage Drilled (m) | 1070 | 929.59 | 760.89 | 675.79 |
| Design Parameter | Bench Height (m) | 10 | 10 | 10 | 10 |
| | Hole Diameter (m) | 150 | 150 | 150 | 150 |
| Blast Cost | Total Explosive Cost (\$) | 245325.64 | 199264.72 | 140398.01 | 114613.3 |
| | Cost / Tonnes (\$) | 1.51 | 1.23 | 0.87 | 0.72 |
| | Total Initiating System Cost (\$) | 18750 | 0 | 0 | 0 |
| | Stemming Cost (\$) | 0 | 0 | 0 | 0 |
| | Total Drilling Cost (\$) | 10700 | 9295.93 | 7608.89 | 6757.89 |
| | Total Manpower Cost (\$) | 10 | 0 | 0 | 0 |
| | Plant and Other Service (\$) | 75 | 0 | 0 | 0 |
| Explosives Used Per Hole | Total Blasting Cost (\$) | 274860.64 | 208560.65 | 148006.9 | 121371.2 |
| | Column Charge | 82.57 | 76.94 | 65.68 | 60.05 |
| | Bottom Charge | 0.00 | 0 | 0 | 0 |
| | Booster Charge | 400.00 | 400 | 400 | 400 |
| | Total Charge | 82.97 | 77.34 | 66.08 | 60.45 |

| | | | | | |
|--------------------------------|-------------------------------------|-------|-------|-------|-------|
| Predicted Fragmentation Result | Blastability Index | 5.52 | 6.12 | 6.12 | 6.12 |
| | Uniformity Exponent | 0.97 | 0.87 | 0.68 | 0.61 |
| | Mean Fragment Size of Material (cm) | 51.90 | 66.41 | 84.65 | 99.71 |
| | Characteristic Size (m) | 0.76 | 1.01 | 1.45 | 1.82 |
| Predicted Fragmentation | Percent Oversize (%) | 27.12 | 37.11 | 45.99 | 49.96 |
| | Percent in Range (%) | 59.83 | 50.38 | 39.03 | 34.38 |
| | Percent Under Size (%) | 13.05 | 12.52 | 14.98 | 15.66 |

| Fragmentation Table Result | | Size(m) | Percentage Passing(%) | Size(m) | Percentage Passing(%) | Size(m) | Percentage Passing(%) | Size(m) | Percentage Passing(%) |
|----------------------------|--|---------|-----------------------|---------|-----------------------|---------|-----------------------|---------|-----------------------|
| | | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 |
| | | 0.05 | 6.9 | 0.05 | 7.1 | 0.05 | 9.6 | 0.05 | 10.6 |
| | | 0.10 | 13 | 0.10 | 12.5 | 0.10 | 15 | 0.10 | 15.7 |
| | | 0.15 | 18.7 | 0.15 | 17.3 | 0.15 | 19.2 | 0.15 | 19.6 |
| | | 0.20 | 24 | 0.20 | 21.7 | 0.20 | 22.9 | 0.20 | 22.9 |
| | | 0.25 | 28.8 | 0.25 | 25.7 | 0.25 | 26.1 | 0.25 | 25.8 |
| | | 0.30 | 33.4 | 0.30 | 29.4 | 0.30 | 29 | 0.30 | 28.3 |
| | | 0.35 | 37.6 | 0.35 | 32.8 | 0.35 | 31.6 | 0.35 | 30.6 |
| | | 0.40 | 41.5 | 0.40 | 36 | 0.40 | 34.1 | 0.40 | 32.8 |
| | | 0.45 | 45.2 | 0.45 | 39 | 0.45 | 36.3 | 0.45 | 34.7 |

Previous 1/3 Next

Previous 1/3 Next

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Previous 1/3 Next

Choose File No file chosen

Import PDF Export

Choose File No file chosen

Import

PDF

Export

➤ This section avails us the following

features:

- **IMPORT**

Import

: if one want to import a file

- **PDF**

PDF

: using this we can download this result in pdf format


•

- **EXPORT**

Export

: using this we can export this result in excel format.


QA/QC:



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QA/QC ANALYSIS

| Row No. | Hole No. | Hole ID | Design Hole Depth | Actual Hole Depth | Final Hole Depth | Hole Status | Final Hole Status | Variance Depth | Design Burden | Actual Burden | Design Spacing | Actual Spacing | Charge Length | Design Charge Weight | Final Charge Weight | Actual Charge Weight | Variance Charge Weight | Design Stemming Length | Actual Stemming Length |
|---------|----------|---------|-------------------|----------------------|----------------------|-------------|----------------------|----------------------|---------------|----------------------|----------------|----------------------|---------------|----------------------|----------------------|----------------------|------------------------|------------------------|------------------------|
| 1 | 1 | 1 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 2 | 2 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 3 | 3 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 4 | 4 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 5 | 5 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 6 | 6 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 1 | 7 | 7 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 4 | 101 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 5 | 102 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 6 | 103 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 7 | 104 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 8 | 105 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 9 | 106 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |
| 5 | 10 | 107 | 10.00 | <input type="text"/> | <input type="text"/> | Not Drilled | <input type="text"/> | <input type="text"/> | 6 | <input type="text"/> | 8 | <input type="text"/> | 5.50 | 82.57 | <input type="text"/> | <input type="text"/> | <input type="text"/> | 4.50 | <input type="text"/> |

 **IMPORT**
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Disclaimer : As our software can not influence/simulate the exact local conditions of the blast, hence we would not be able to take any responsibility about any post blast mis-happenings/accidents.

*QA/QC: Quality assurance and quality control this sheet is for the analysis of both drilling and blasting for the whole blast plan.

It provides with the following features

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 **IMPORT**

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OUTPUT PAGE OF QA/QC

| QA/QC ANALYSIS | | | | | | | | | | | | | | | | | | | | |
|----------------|----------|---------|-------------------|-------------------|------------------|-------------|-------------------|----------------|---------------|---------------|----------------|----------------|---------------|----------------------|---------------------|----------------------|------------------------|------------------------|------------------------|--|
| Row No. | Hole No. | Hole ID | Design Hole Depth | Actual Hole Depth | Final Hole Depth | Hole Status | Final Hole Status | Variance Depth | Design Burden | Actual Burden | Design Spacing | Actual Spacing | Charge Length | Design Charge Weight | Final Charge Weight | Actual Charge Weight | Variance Charge Weight | Design Stemming Length | Actual Stemming Length | |
| 1 | 1 | 1 | 10.00 | 9 | 10 | Redrill | Correct | 0 | 6 | 3.2 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 2 | 2 | 10.00 | 9 | 11 | Redrill | Overdrill | 1.00 | 6 | 3.1 | 8 | 3.4 | 5.50 | 82.57 | 97.59 | 65 | -17.57 | 4.50 | 6.67 | |
| 1 | 3 | 3 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.4 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 4 | 4 | 10.00 | 11 | 10 | Backfill | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 5 | 5 | 10.00 | 11 | 11 | Backfill | Overdrill | 1.00 | 6 | 2.9 | 8 | 3.6 | 5.50 | 82.57 | 97.59 | 65 | -17.57 | 4.50 | 6.67 | |
| 1 | 6 | 6 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3.2 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 7 | 7 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 8 | 8 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3.1 | 8 | 3.3 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 9 | 9 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 10 | 10 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.4 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 11 | 11 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 12 | 12 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 13 | 13 | 10.00 | 10 | 10 | OK | Correct | 0 | 6 | 3 | 8 | 3.6 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 14 | 14 | 10.00 | 11 | 10 | Backfill | Correct | 0 | 6 | 3.2 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |
| 1 | 15 | 15 | 10.00 | 12 | 10 | Backfill | Correct | 0 | 6 | 3 | 8 | 3.5 | 5.50 | 82.57 | 82.57 | 65 | -17.57 | 4.50 | 5.67 | |