



Pattern Simulator And Analyzer Training Manual

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Top Level Intro

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1 Introduction

Pattern Analyser is a graphical software program for the laying blast pattern. It gives engineers and blasting personnel the ability to the layout initiation sequence of almost any type of bench blasting, as most commonly used in open cut mining. It allows the designer to:

- Provide surface delays, with tie line connections.
- Analyze wave front reinforcement.
- Import data and print the design.
- Save design to database and as image files in widely used formats.

Individual elements of the pattern are defined by the user and can be combined in a variety of scenario.

Pattern Analyser is blasting pattern analysis software. This software allows users to

- Draw blast hole pattern.
- Join blast holes by tie lines.
- Assign delays between the holes.
- Perform Wave front Reinforcement Analysis.
- View number of holes fired in the time window specified by the user.
- Save pattern design information to database.
- Import design(s).
- Save Blast hole plan, Wave front Reinforcement, Time Window Analysis diagram as widely used image file formats.

Top Level Intro

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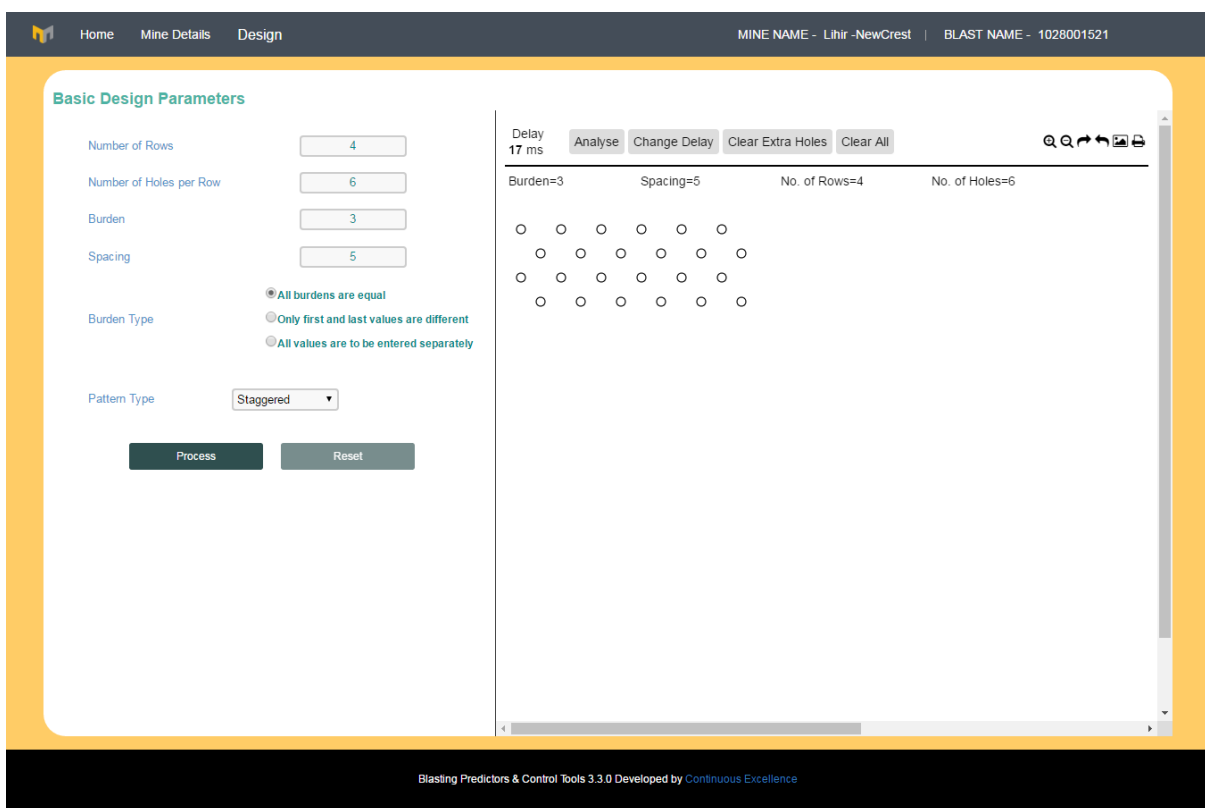
Part



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2 Screen Layout

Pattern Analyser main screen has the design area in which designs can be made and edited. Main screen consist of several components, which helps during making of designs. All components are explained below.



2.1 Menu Bar

This is top most part of the screen. This bar displays menu items defining the basic functionality of the software. Following are menu items are present in the menu bar:



1. Home - Redirect user to the Home Page of the website

2. Mine Details - Here we can edit the Mine Name and the Blast location
3. Mine Name - Name of the mine
4. Blast Name - Name of the blast

2.2 Design Parameters

Following parameters are required for pattern analysis. It includes:

- Number of Rows
- Number of Holes per Row
- Burden
- Spacing
- Burden Type (Radio Buttons)
 - All Burdens are equal
 - Only First and Last values are different
 - All values are to be entered separately
- Pattern Type (Staggered or Square)

Top Level Intro

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3 Design

3.1 New Design

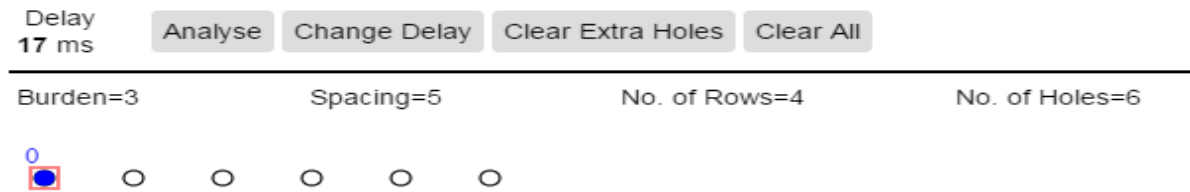
New Design can be opened by choosing new option from design menu.

Draw design: Initially default pattern (either Square or staggered chosen by user) appear with holes according given information in basic design parameter. Now user can draw design by connecting holes.

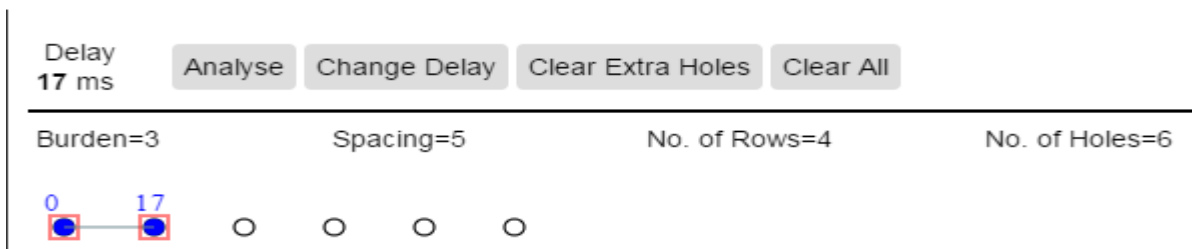
3.1.1 Single Timeline

Following is the procedure to draw hole to hole single tie line

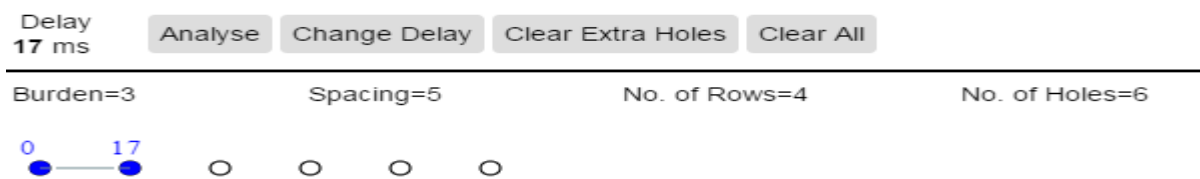
1. Place the mouse cursor on one hole click the hole, that hole will become activated (i.e. hole with red square outside and filled with blue).



2. Move the mouse cursor to next hole which is to be connected from active hole. On click next hole blue colour tie line will appear and next hole also activated with red colour square outside and filled with blue colour.



3. After that click on last selected hole. User will get tie line between selected holes and holes filled with blue colour with without red square and delay will appear above the hole.



4. Repeat the process 1 – 3 to connect the holes to be tied.

3.1.2 Multiple Timelines

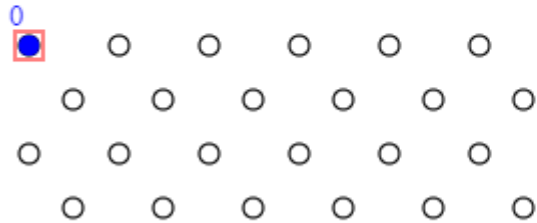
Following is the procedure to draw hole to hole time line:

1. Place the mouse cursor on one hole click the hole, that hole will become activated (i.e. hole with

red square outside and filled with blue).

Delay 17 ms Analyse Change Delay Clear Extra Holes Clear All

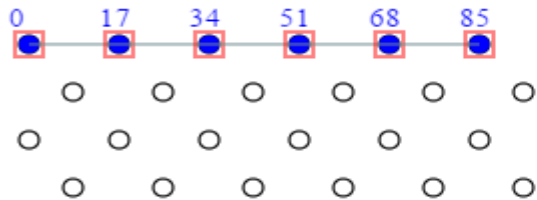
Burden=3 Spacing=5 No. of Rows=4 No. of Holes=6



2. Move the mouse cursor to next hole which is to be connected from active hole. On click selected hole blue colour tie lines will appear between all holes those come in line of selected two holes. All holes also activated with red colour square outside and filled with blue colour.

Delay 17 ms Analyse Change Delay Clear Extra Holes Clear All

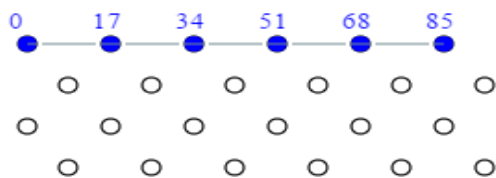
Burden=3 Spacing=5 No. of Rows=4 No. of Holes=6



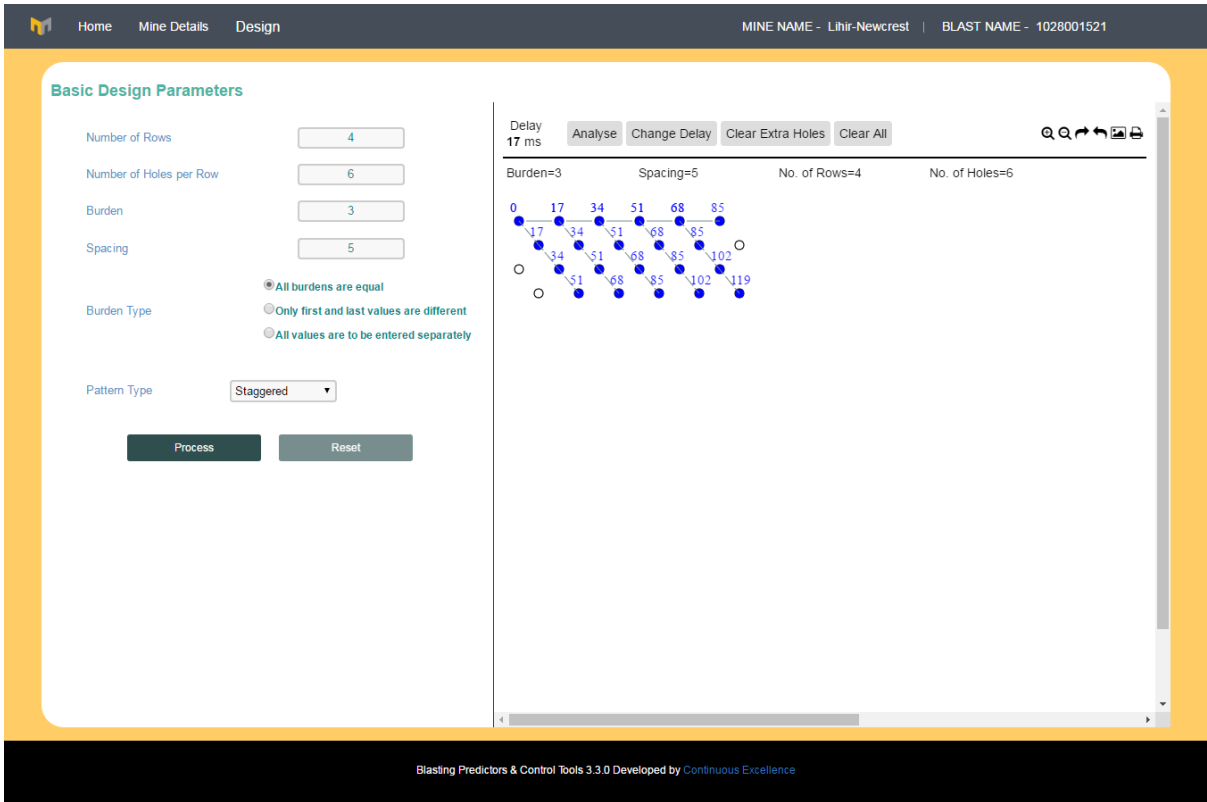
3. After that click on last selected hole. User gets tie lines between all holes and holes filled with blue colour with without red square and delay will appear above the holes.

Delay 17 ms Analyse Change Delay Clear Extra Holes Clear All

Burden=3 Spacing=5 No. of Rows=4 No. of Holes=6

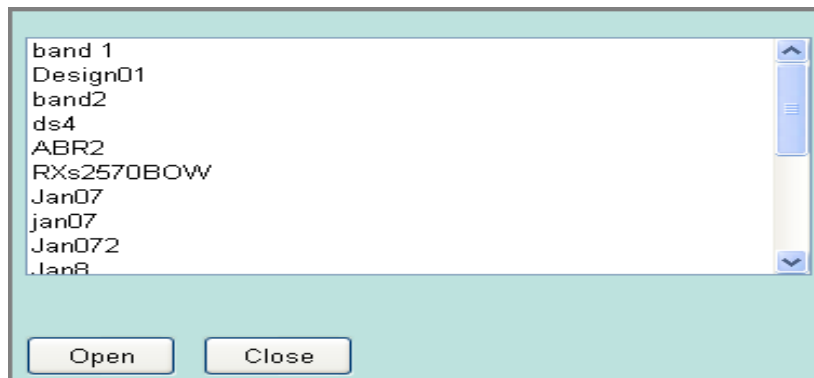


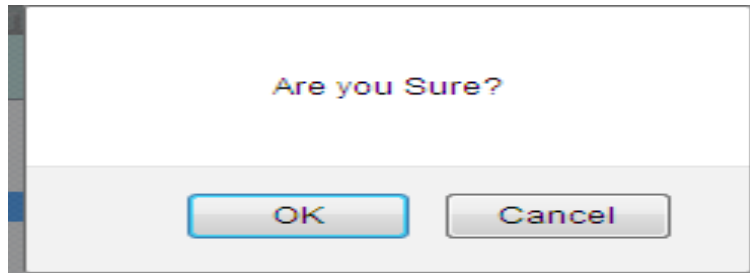
4. Repeat the process 1 – 3 to connect the holes to be tied.
(Example: user can draw design like this :)



3.2 Opening Existing Design

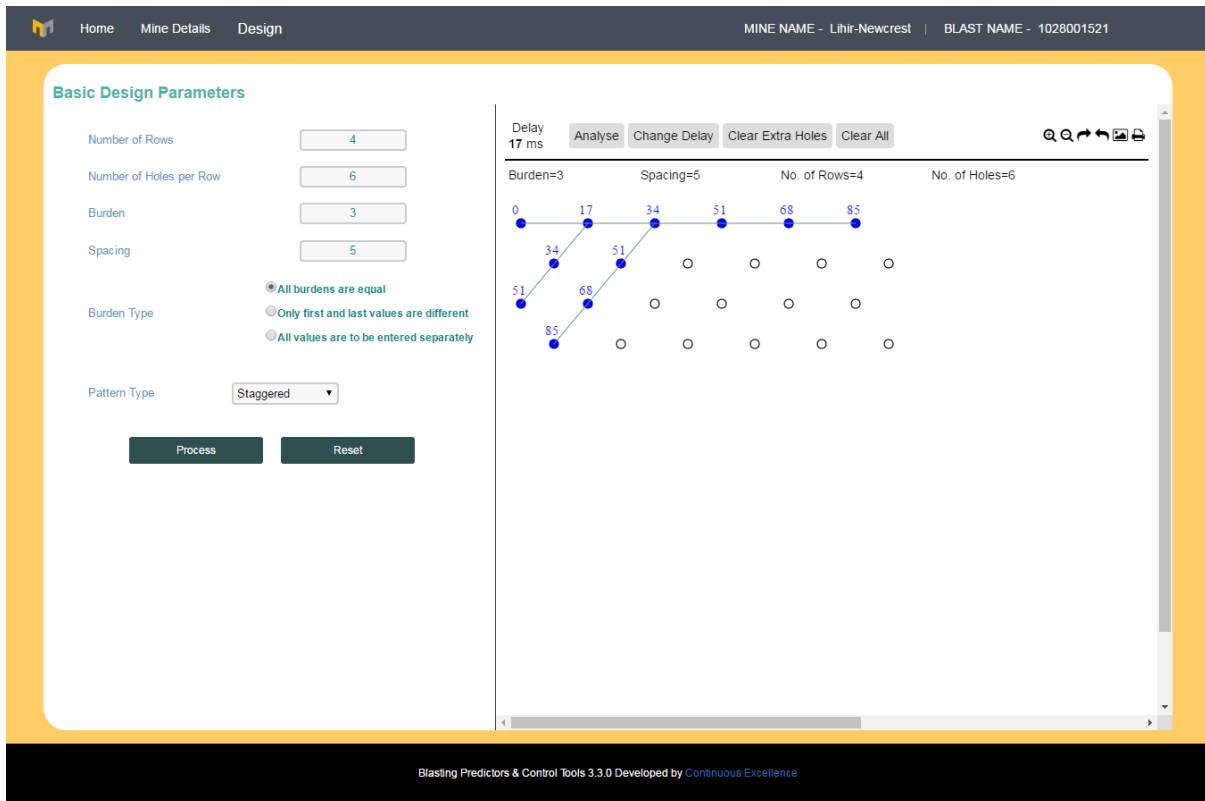
Open Design option allows to open already saved design. This option can be chosen from Design Menu bar. On clicking Open Design dialog box will appear showing list of design saved to database. User select design to open and click Open button.





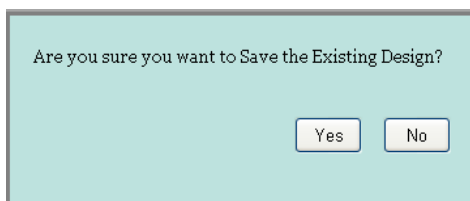
On clicking Open button one more dialog box will appear for confirmation.

On clicking Ok button selected design will open like this-

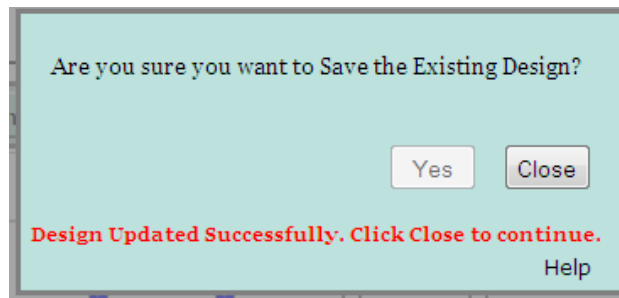


3.3 Saving Design

Save Design option allows user to save the active design on design area. Design information (i.e. related to holes, tie lines and design parameter etc.) is stored in database. Save design option can be chosen from Design Menu bar. On click Save Design dialog box appears.

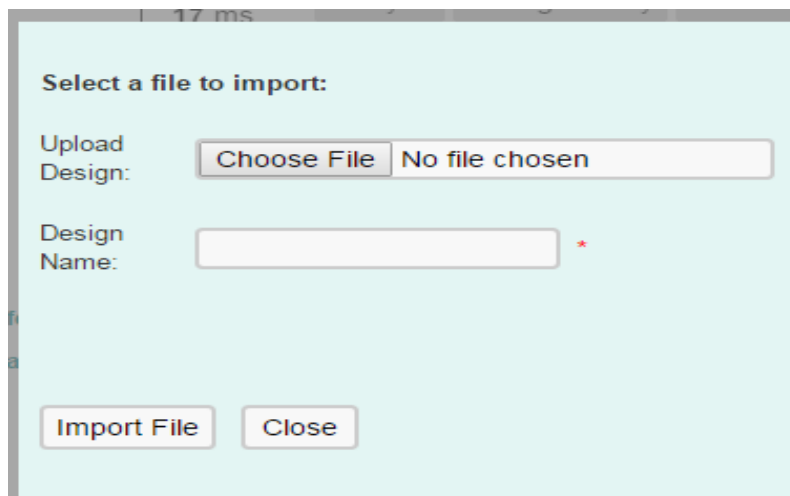


On click yes button design will save. After successfully save it will show like this and clicking on close you can continue your work. After saving if you want to open new design then user must have to close it first by going on design menu and then click on new for opening new design.

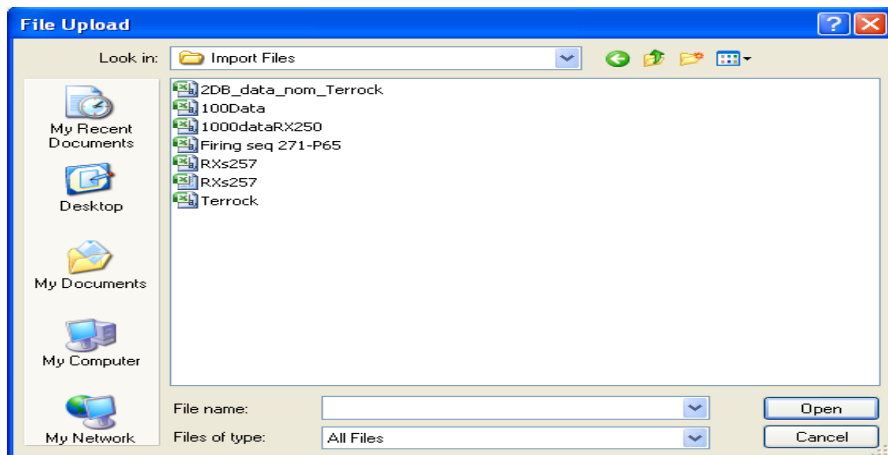


3.5 Import Design

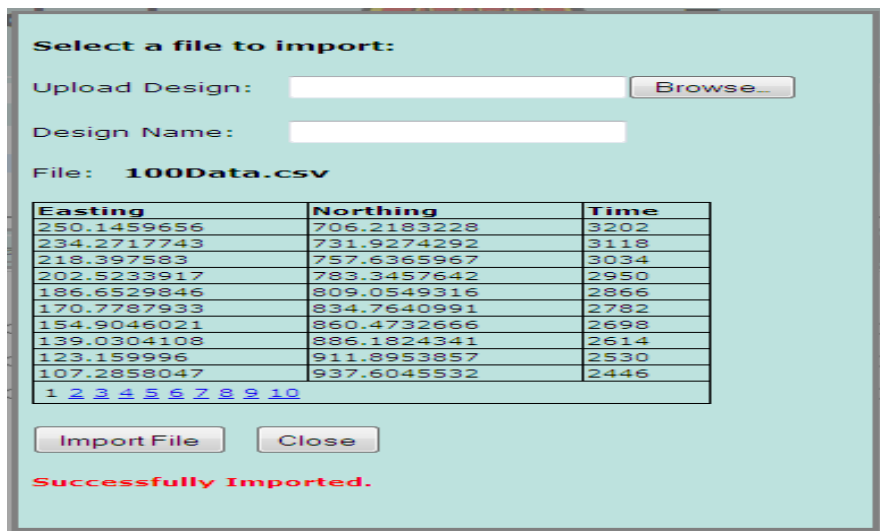
Import Design option allows user to import design. This option can be chosen from Design Menu bar. On click Import screen will appear like this :



On click Browse Button window will appear user can choose design and must give design name in Design Name text box.

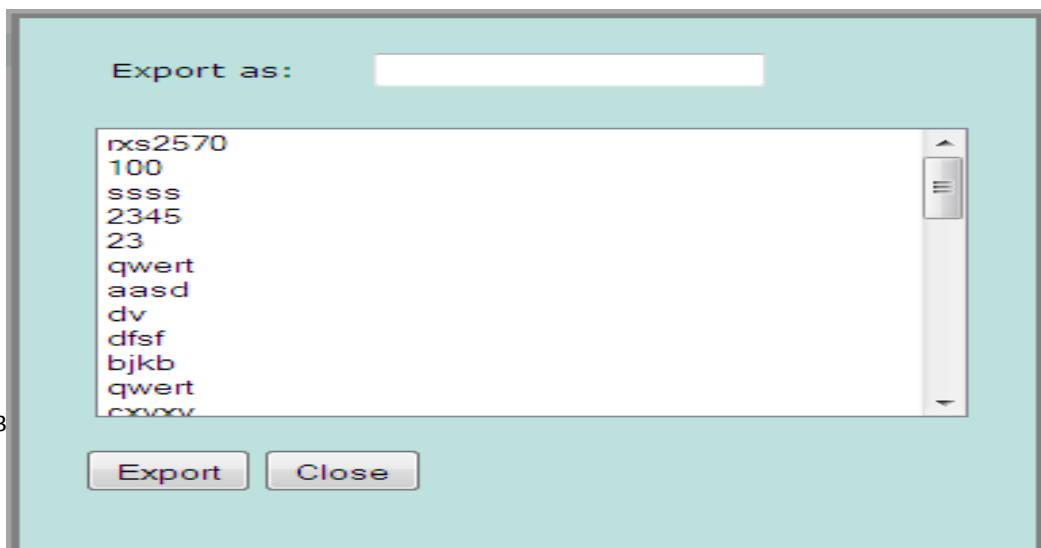


After this design data appears in table format.

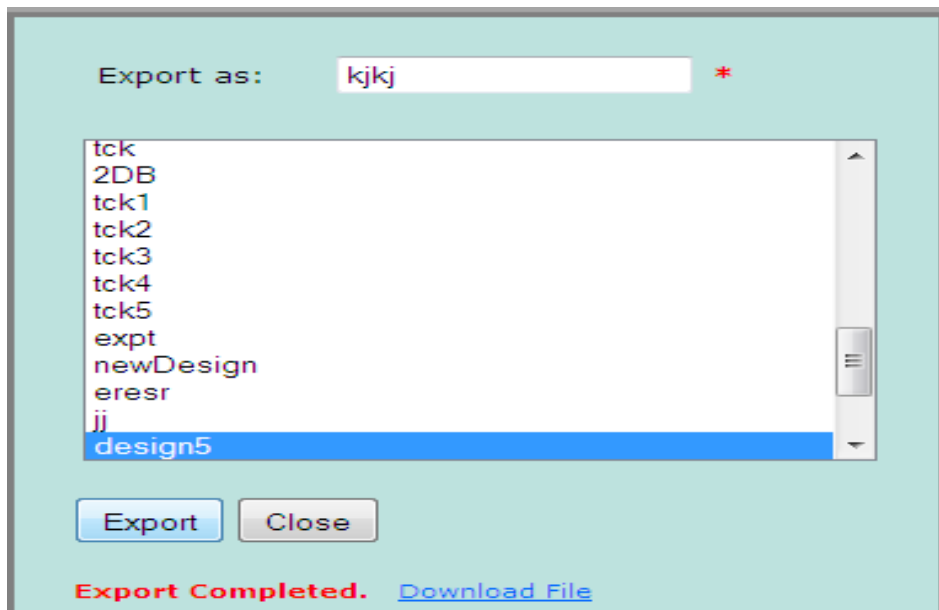


3.7 Export Design

By clicking on Export user get a window like



So a user can select a exporting file and user must give the filename as Export as: unless file will not export. Now after selecting and clicking on Export button. User can easily download a Exported file by clicking on Download file.

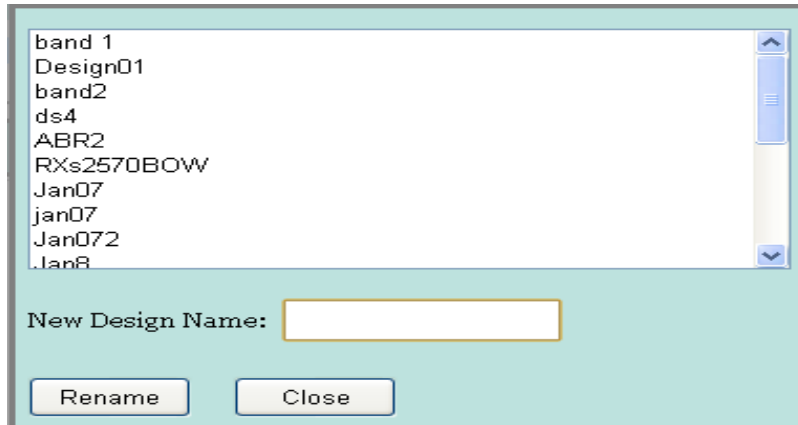


3.6 Close Design

Close Design option allows user to close current design. Close design option can be chosen from Design Menu bar.

3.7 Rename Design

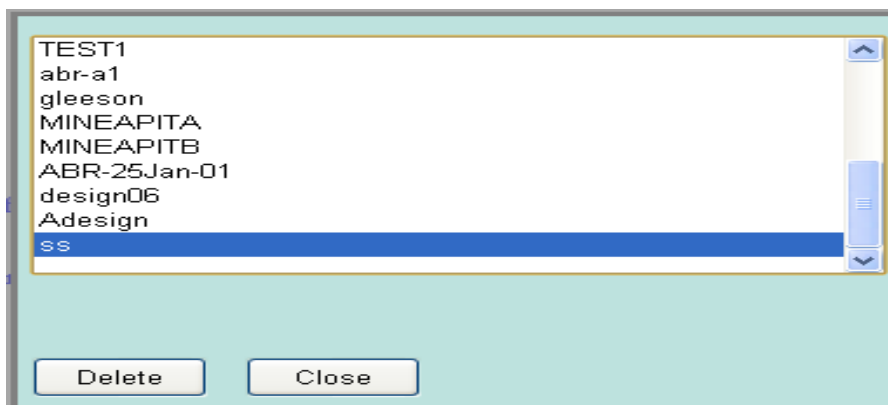
Rename Design option allows user to rename design name. Rename design option can be chosen from Design Menu bar. On click Rename Design dialog box appear.



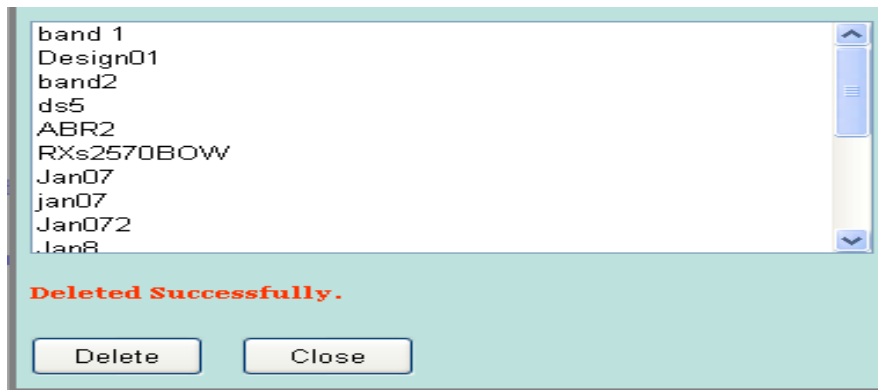
First user choose design from list for rename after selecting design must enter new name of design in New Design Name field and click Rename Button.

3.8 Delete Design

Delete Design option allows user to delete Design information (i.e. related to holes, tie lines and design parameter etc.) from database. Delete design option can be chosen from Design Menu bar. On click Delete Design dialog box appears.



User first choose design name from list for deletion and click on Delete button. The following dialog will appear that shows design deleted successfully.



After import file user must close design. User can see imported design by open option.

Top Level Intro

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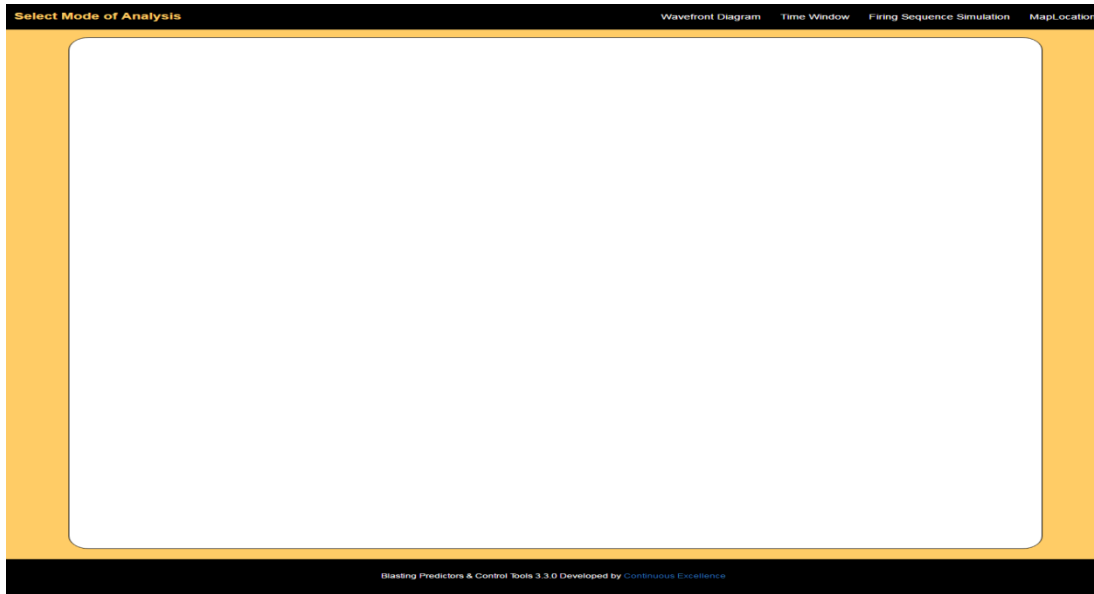
4

4. Analysis

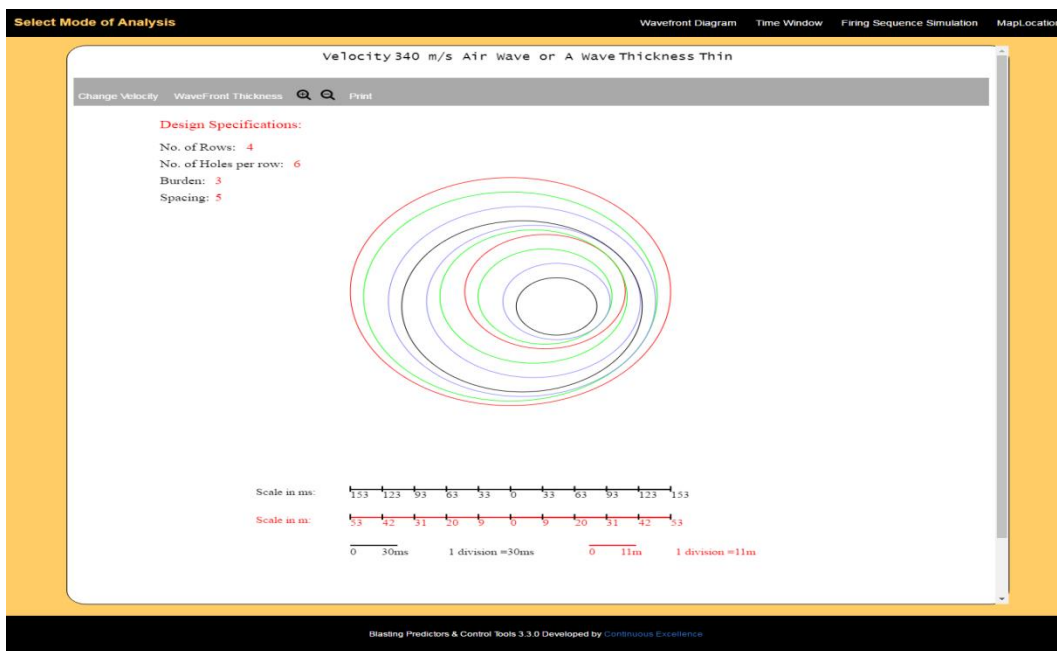
Pattern Analyser can be used as tool to assess the likely impact of a particular design. This analysis tool allows for time window analysis and viewing Wavefront reinforcement diagram for air and ground waves.

4.1 Wavefront Reinforcement Diagram Analysis

Pattern analyser allows user to visualise the reinforcement of wavefronts generated from blast holes pattern. This option can be accessed from Analysis → Wavefront Diagram Button.

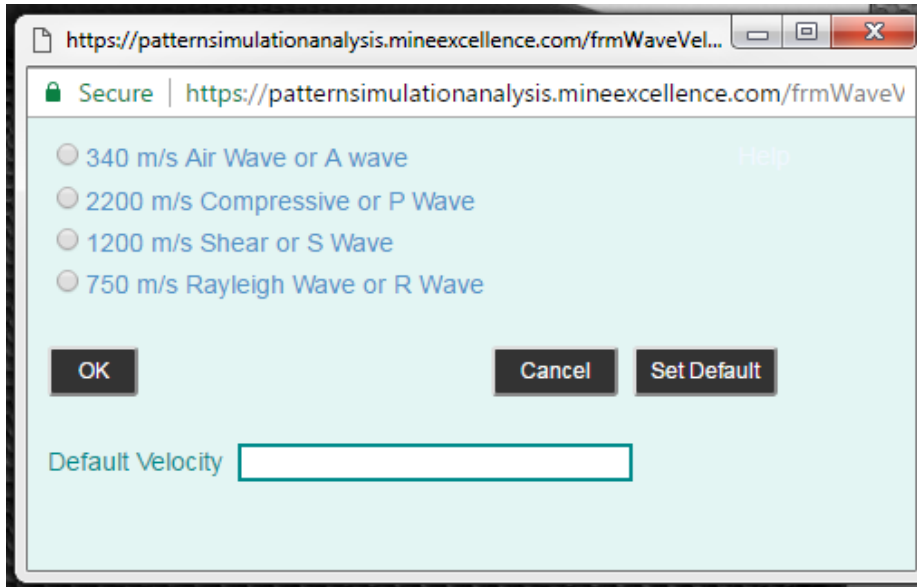


On click Wavefront Diagram Button 2D wavefront reinforcement diagram will appear with design information Like this



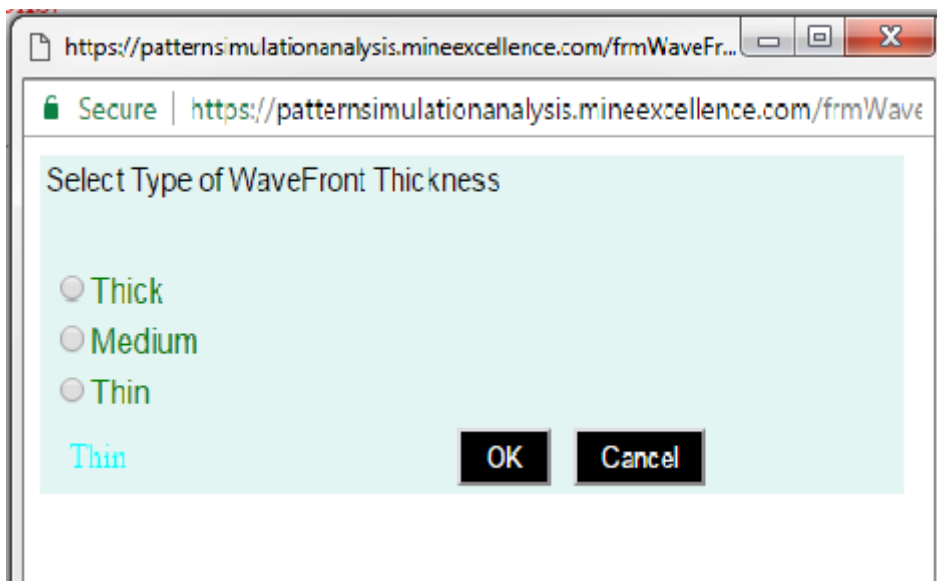
4.1.1 Change Velocity

User can change Wave Velocity for this user click on Change Velocity button on left side. On clicking velocity window will appear displaying several velocity options. These velocity values indicates sound velocity and ground wave propagations velocity which includes body waves including Primary wave or Compressive wave or P wave and secondary wave or shear wave or S-Wave and surface wave or rayleigh wave or R-Wave.



4.1.2 Change WaveFront Thickness

User can change wavefront thickness for this user click on Change WaveFront Thickness button on left side. On clicking new window will appear display three thickness options.



User can select any one and then click on Ok button New wavefront diagram will appear with new thickness

4.2 Time Window Analysis

This functionality allows user to view graphical representation of number of hole firing within a time frame. This analysis is based on time window, which starts from 0 and moves forward. In each window numbers of holes firing are calculated and are shown on Y-axis of the graphs.

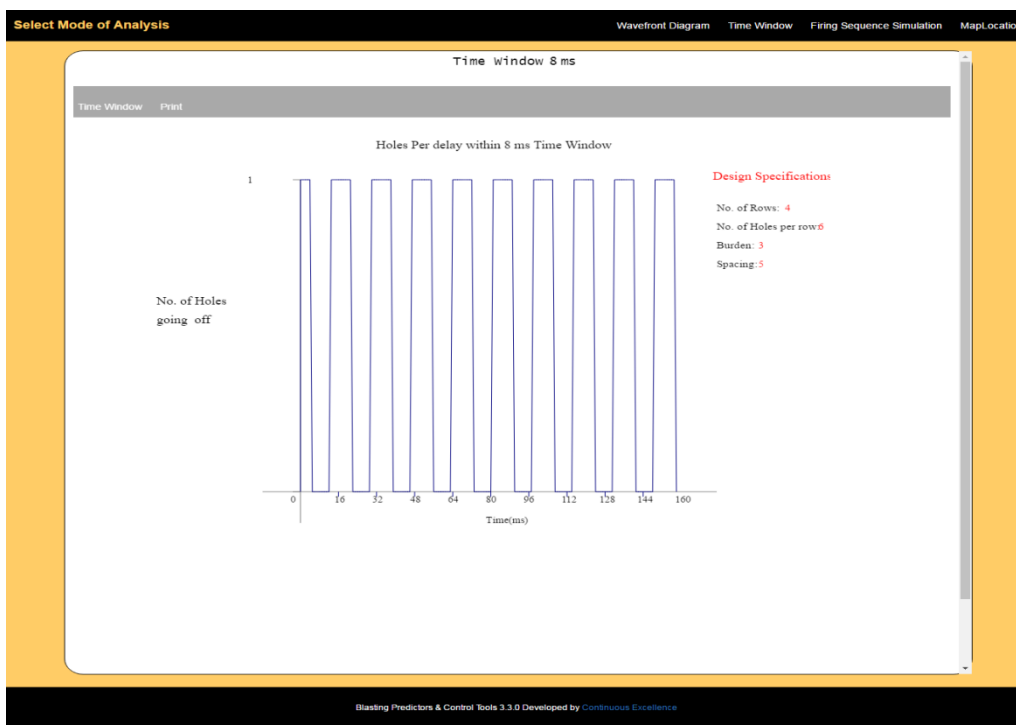
Graph

X - Axis: Time in millisecond

Y – Axis: Number of holes firing within that time interval.

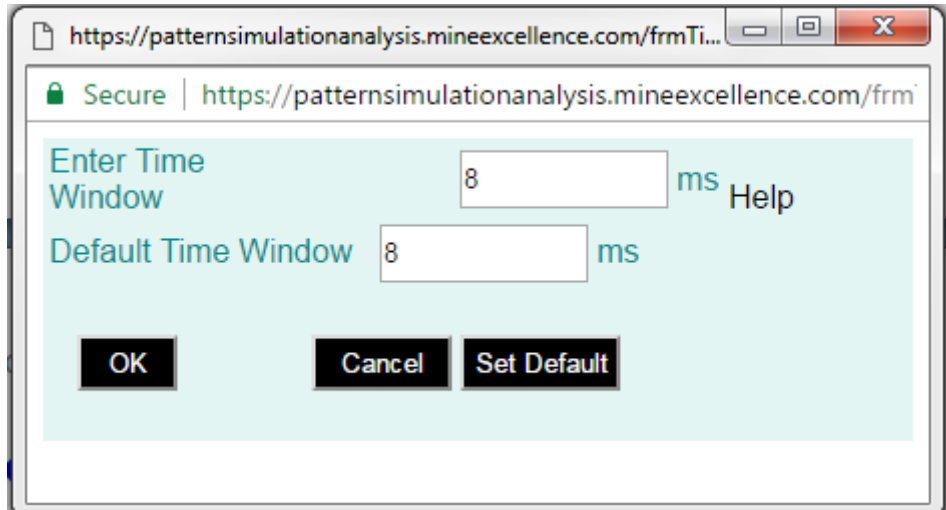
This option can be accessed from Analysis → Time Window Button.

On click Time Window Button result is displayed with design information Like this



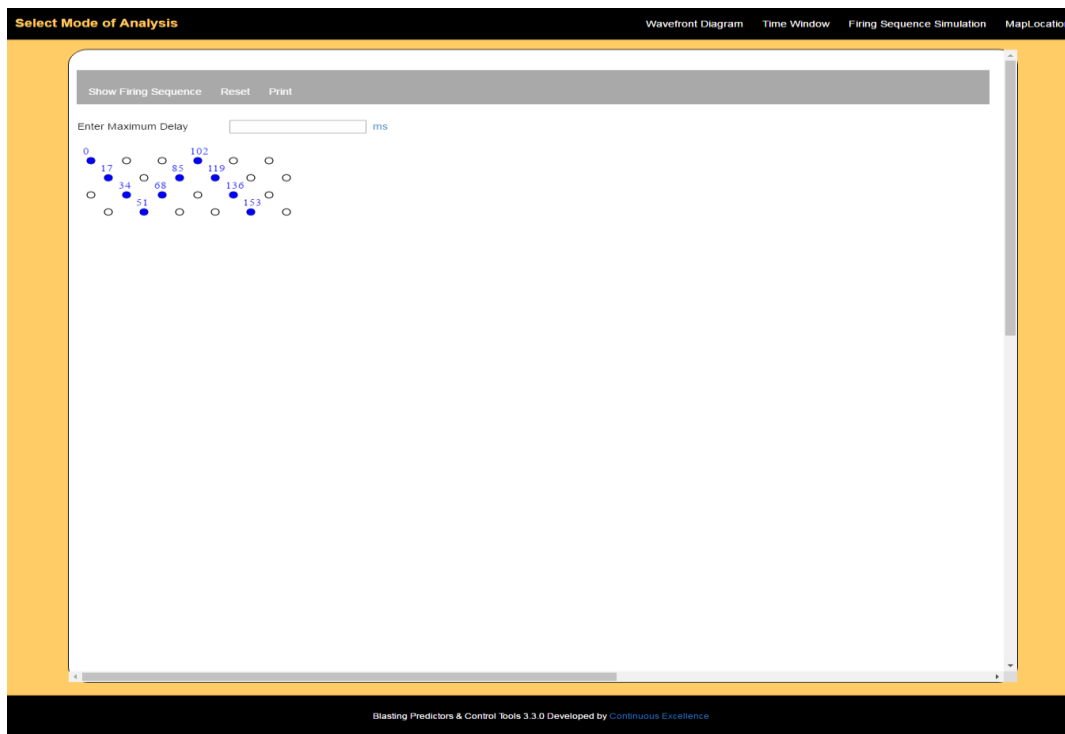
4.2.1 Time Window

User can change time on click on Time Window button on left side on diagram. On clicking time window will appear user enter new time in box and click Ok button. After click on Ok button the new analysis will appear.

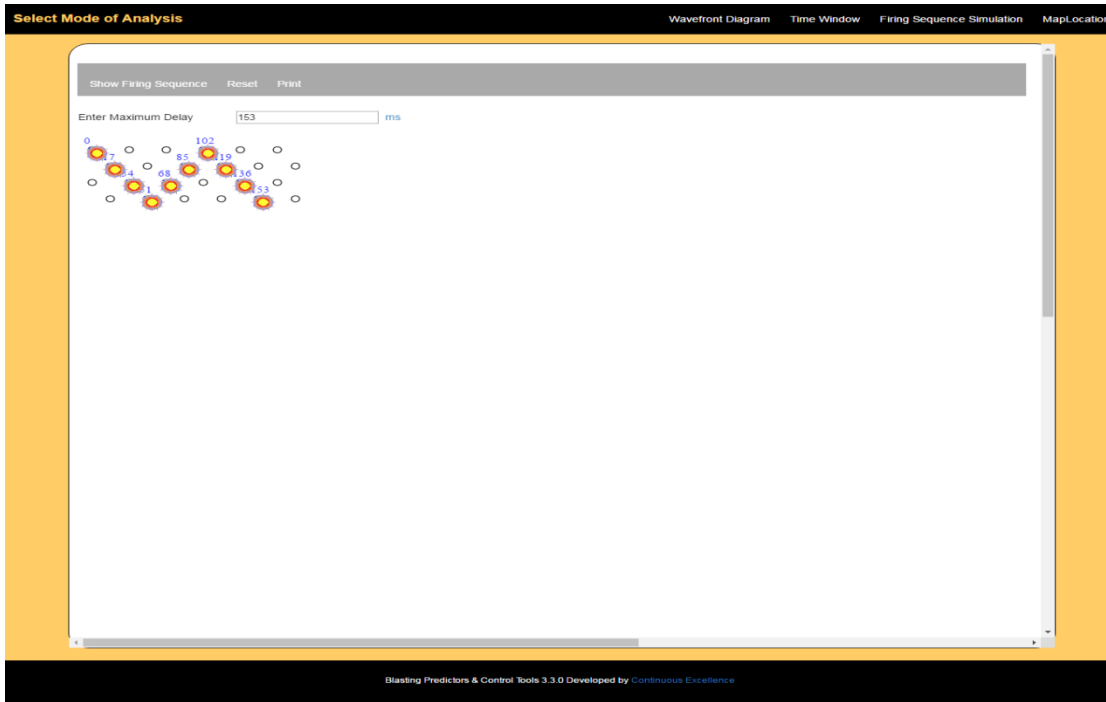


4.2.2 Firing Sequence Simulation

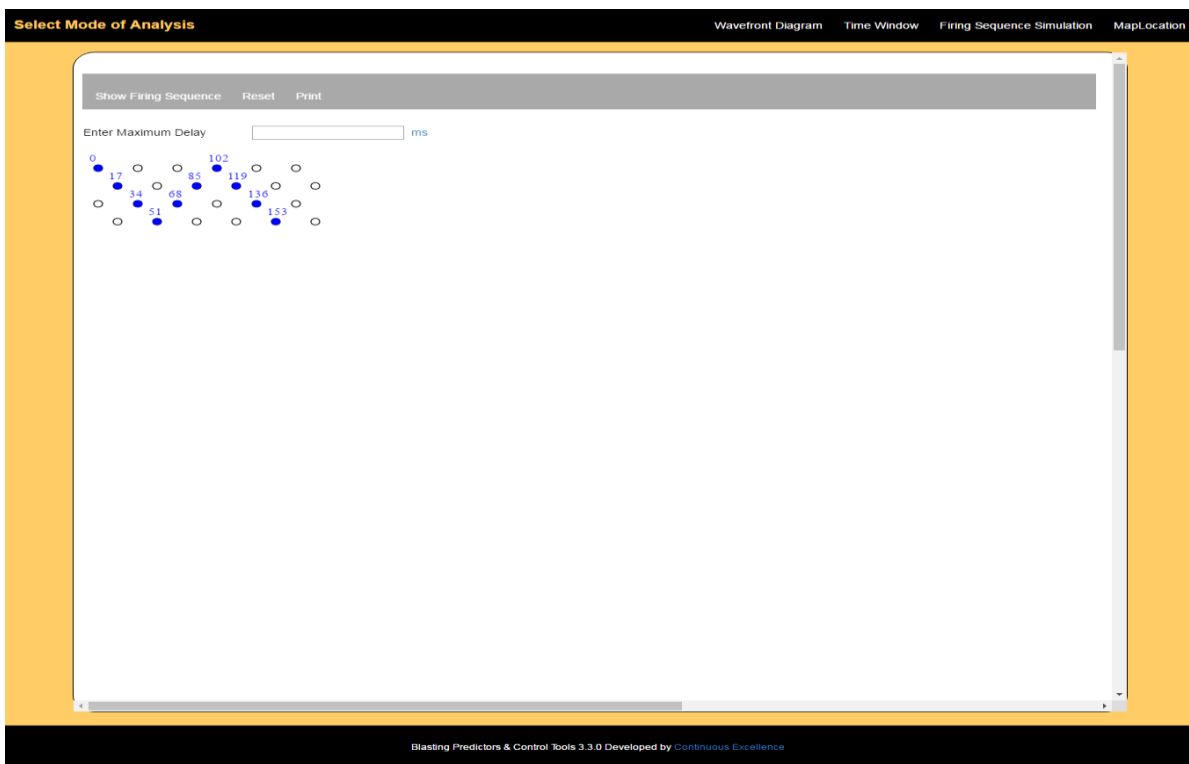
On click of firing sequence simulation following pattern is enabled.



When we enter maximum delay, following firing sequence will be created.



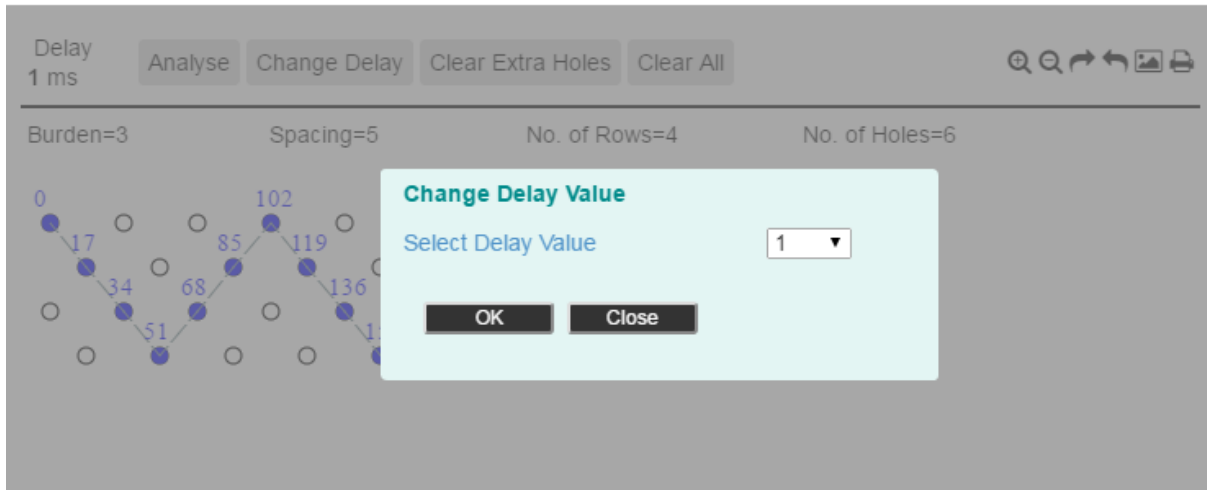
On click of Reset button, previous pattern is set to default.



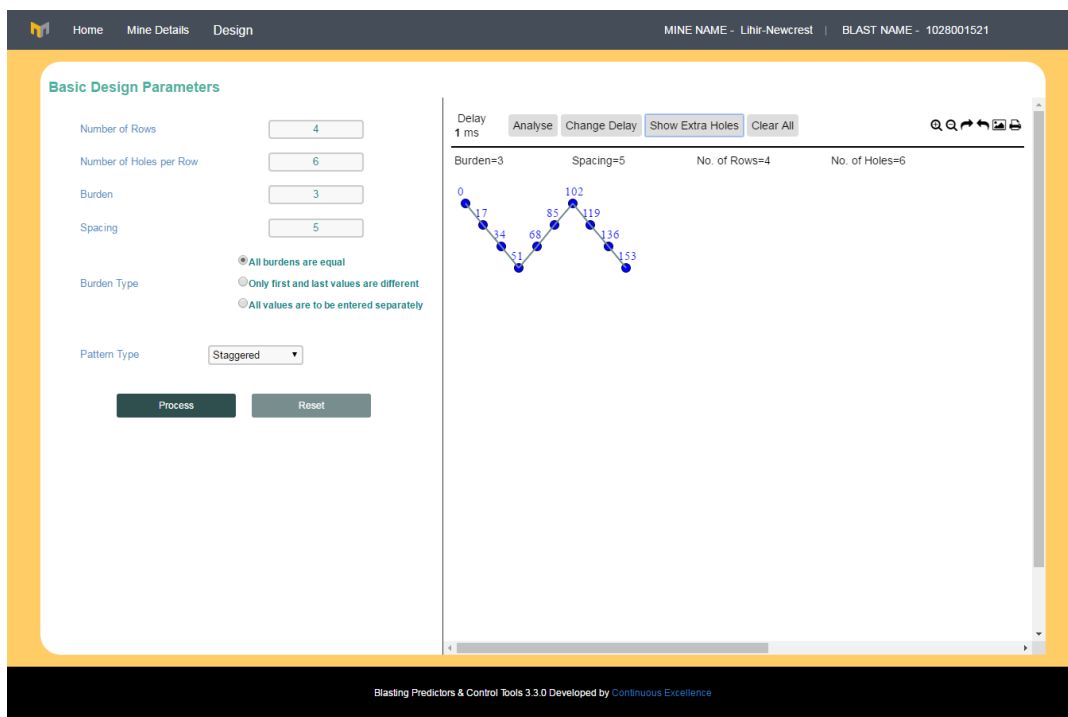
4.2.3 Change delay

Pattern Analyser allows changing delay. On changing the delay the next timeline delay will appear

according to new change delay and holes connected to those tielines will change progressively. On click of **Change Delay** button on top of Design panel. On clicking it one dialog box will appear user can select either from drop down list or by typing in textbox. After selection user must click on Ok button. (E.g.: User selected 1 ms delay)



After that, timeline delay will change and result in progressive connected holes will also change. When we click on clear extra holes, all the extra holes will be cleared.



When we click on Clear all, complete pattern is cleared, as shown

Home Mine Details Design MINE NAME - Lihir-Newcrest | BLAST NAME - 1028001521

Basic Design Parameters

Number of Rows: 4
Number of Holes per Row: 6
Burden: 3
Spacing: 5

Burden Type:
 All burdens are equal
 Only first and last values are different
 All values are to be entered separately

Pattern Type: Staggered

Process Reset

Delay: 1 ms
Analyse Change Delay Show Extra Holes Show All

Burden=3 Spacing=5 No. of Rows=4 No. of Holes=6

Blasting Predictors & Control Tools 3.3.0 Developed by Continuous Excellence