mineexcellence

DASHBOARD

Analytical graphs

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INTRODUCTION

Mine Excellence is establishing itself as a global leader in drilling and blasting software technology space. Core of our offerings is an Enterprise Platform for blasting .The technology helps improve and optimize blasting which can result in significant benefits operationally and eliminate potential risks / problems during blasting. Blast Design, Blast optimization, Blast data collection and Analytics – accessible anywhere anytime in an integrated manner. The platform is currently used by Tier-1 large mining companies cross mines, small mining companies at individual mines and blasting contractors.

EXECUTIVE SUMMARY

Dashboard shows the blasting records in the form of a Analytical graphs which gives a clear cut vision regarding the blasting operations conducted in a mine at different locations, It gives the instructions to the users like(mine supervisor, managers, and higher management of the mines)

TYPES OF ANALYTICAL GRAPHS

Different kinds of analytical graphs of blasting has been recorded which helps in getting useful information regarding blasting the following are different kinds of Analytical graphs available:

1) Average blasting cost
2) Blast cost per Ton
3) Total explosive consumption / powder factor
4) Burden & spacing/stemming
5) Ground and Air vibration
6) Fly rock
7) Production per hole / total hole blasted
8) Production per meter / total meterage blasted
9) Specific Charge
10) Specific Drill
11) Total blasting cost

SCREEN LAYOUT

To view the different analytical graphs of blasting we have to follow the following procedure, the below figure 1.1 shows the main screen layout of graphs in which the different filter option is available by which we can easily get the graph of any mines.

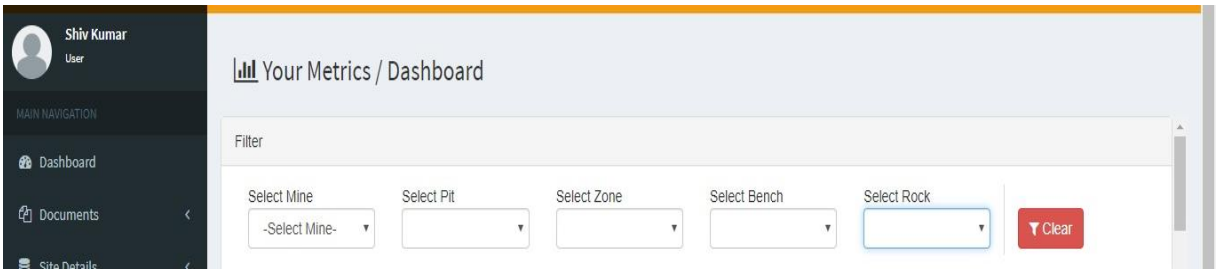

Figure 1 - Filters

From above mentioned figure we can see a columns like

- **Select mine:** In this we can select the mines which ever we need to study the analytical graph of a selected mines.
- **Select pit:** usually the open cast mines will be divided in to different pits, by using this filter we can choose the required pit.
- **Select Zone:** The mines will have different zones where the production and operation will take place by the help of this filter we can chose a particular zone.
- **Select bench:** The mines consists of many benches where the regular production operations and removal of over burden will be done by the means of this filter we can select the particular as per our need.
- **Select Rock:** by the application of this filter we will be able to choose the rock type weather the rock contains ore , overburden rock etc.

ANALYTIC GRAPHS

Mine excellence provides the data regarding the blasting cost in the form of analytic graphs of different mines and graphs gives the clear view of the blast records. The data given in the graphs is very detailed that is year to year, month to month and day to day by one can understand the variations in the blasting operation. The purpose of the analytic graph will help in reducing the operation cost and will increase the efficiency of a mine. The following shows the different graph analytic of blasting.

Average blasting cost:

Cost analysis graph is important to show a generalized trend of the average blasting cost being borne by any mine. Year, month and date-wise cost variations are possible to be plotted. This particular graph is helpful to individual mine owners for getting a clear differentiation on the amount of capital being invested in several consumables (Explosives and Initiators) and processes (Drilling) surrounding blasting. Fig 2 shows the graph of average blast cost.

From the above graph it gives the details regarding the average blasting cost in a mine, the average total blasting cost includes the cost of explosives, initiator, drilling and manpower.

The X axis of the graph shows the year also(month, day) to see the exact cost of that particular year we need click Figure 3 shows the data of the cost a particular year. And Y axis shows the cost of the drill

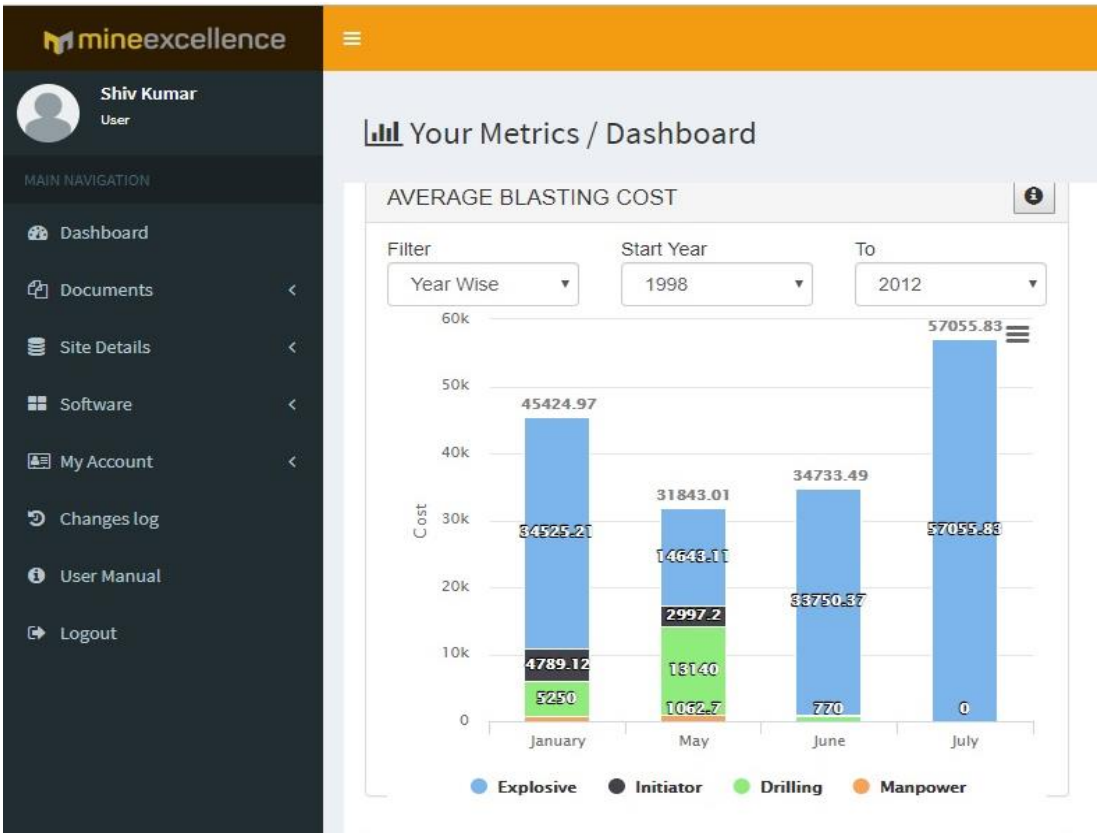

Figure 2 - Average Blast Cost of Year

From the above graph it shows the details of the average drilling cost of the year 2012, it gives the details of the cost of drilling in the year of 2012.we can also get the details of a particular month in that particular year, to know the details of the cost of that particular month (Individual day) we just need to click on the month.

Figure 3 shows the graph of average blast cost in that particular month of a year.

Figure 3 - Average blast cost in that particular month of a year

Blast cost per Ton:

This graph is helpful in determining the amount of capital that is being invested w.r.t the production Comparing cost per tonne and analyzing the general trends can help determine the effect of changing blast parameters on cost.

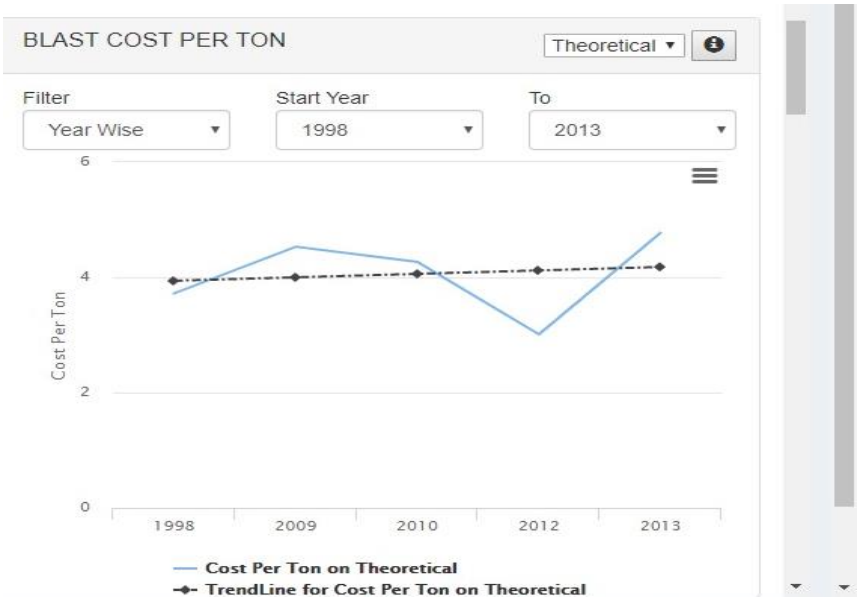

Figure 4 - Blast Cost Per Ton

On the graphs the X shows indicates the year and Y axis indicates the cost per ton.

The blast cost per ton section provides a graphical view of changes in cost per ton over the period. This line graph presents data on “Cost Per Ton on Raising” and “Cost Per Ton Theoretical” per month.

Select or deselect the titles on the graph legend to view/hide the raising or theoretical costs.

Click on the particular year to know the cost of blast per ton in that year similarly after selecting the year click on the required month to know the cost of per day.

Total explosive consumption / powder factor:

This graph is very helpful in understanding the explosive consumption of each mine in kgs. A linearly increasing trend line shows that over several months the explosive consumption of the mine has increased. This can be attributed to the mine encountering hard geology/strata for which they might have to consider using higher quantity of explosives. Also Powder factor is a key performance indicator for any mine. Hence any graph showing its variation over a specific time period can help the mine in figuring out their overall performance of blasts.

The below figure 5 shows detailed graph of explosives consumption

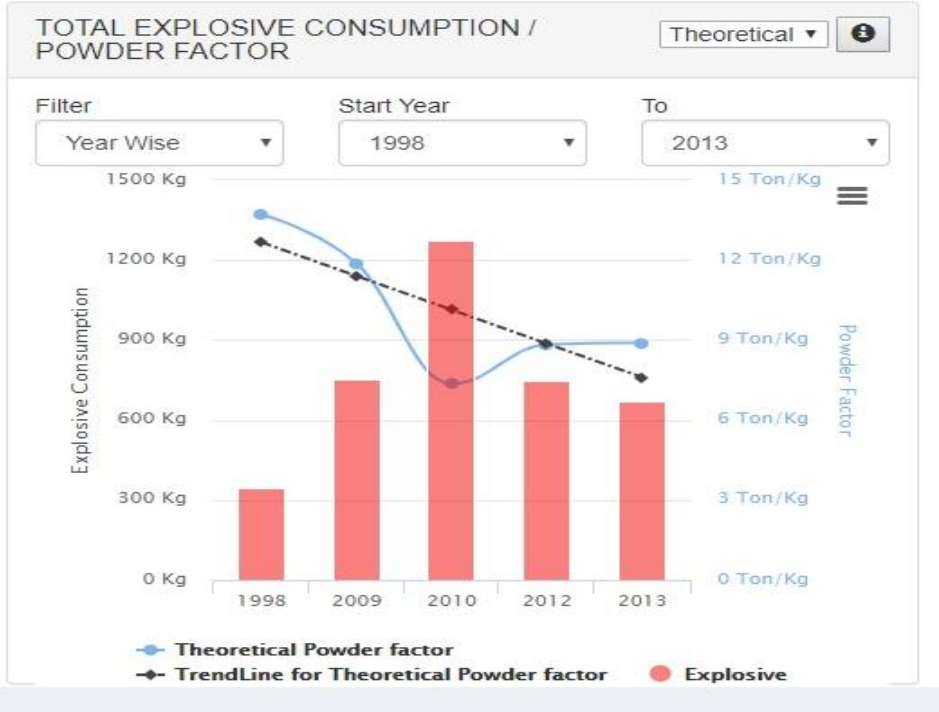

Figure 5 - Explosive Consumption

This analytical report displays both total explosive consumption and powder factor using both a bar and line graph. The explosive consumption measured in kg. By default, the report is generated for total explosive consumption and powder factor per month.

You may wish to view only the explosive consumption or powder factor by selecting the titles from graph legend appropriately.

The above graph gives an idea regarding the explosives consumption of a particular year and also gradual decrease and increase in the graph shows the powder factor of theoretical powder factor.

Similarly to know the explosive consumption of that particular year select that year and to know more about the individual month click on that it gives the data of day to day explosive consumption.

Burden & spacing/stemming:

Burden and Spacing being the primary parameters in any blast design influence several post blast repercussions. For e.g. a simple technique well-known to the mining industry is to keep the burden constant and increase the spacing by 0.1-0.3m. This would aid the mine site in reducing blasting costs at the mine.

The below figure 6 shows the graph of burden and spacing/stemming in few cases at open cast mines stemming is not done

Figure 6 - Burden and spacing/stemming

This clustered graph represents status of burden and spacing for the selected year.

Similar to other graphs, the user may view only the required factor in the graph by selecting appropriate titles from the graph legend.

A detailed date wise tend may be obtained by selecting the month in the X-axis of the graph.

From the above graph we can notice spacing appears the same state spacing is one of the important factors in case of blasting.

Ground and Air vibration:

Environment Performance graph indicates the performance of the blasting activity at a mine-site w.r.t its subsequent impacts on the environment. This graph can aid the mine in imposing statutory/mine-specific limits for air blast over pressure, ground vibration and fly rock and ensuring whether proper compliance is achieved over time.

During the blasting the explosive produces enormous vibration as the chemical components used in the explosive will explode with greater intensity these vibration may cause damages to civil structures and environment. Similarly the moment of the vibration in air is known as air vibration.

The following figure 7 shows the graph of ground vibration and air vibration.

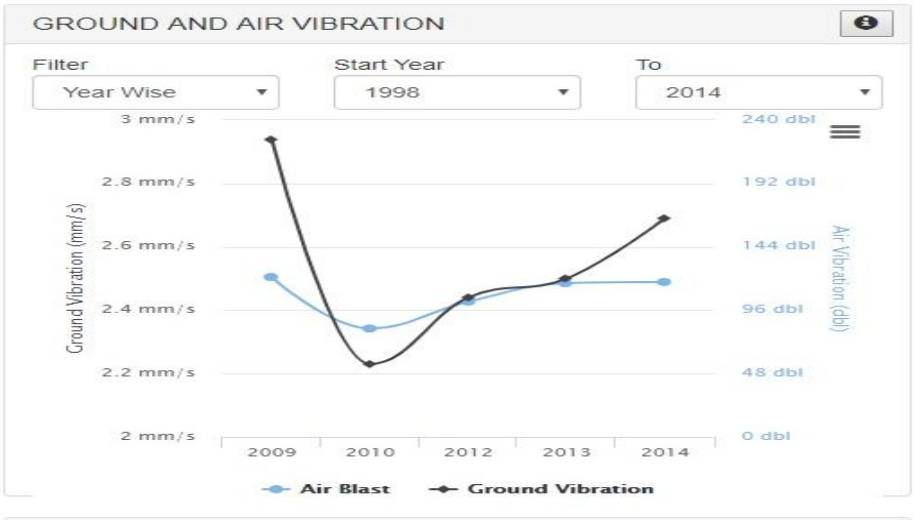

Figure 7 - Ground & Air Vibration

From the graph we can see the variations in air and ground vibration from year to year similarly to about a particular year select that year and to know about speed of vibrations of a month and day to day select the month to know the amount of vibrations.

Fly rock:

Environment Performance graph indicates the performance of the blasting activity at a mine-site w.r.t its subsequent impacts on the environment. This graph can aid the mine in imposing statutory/mine-

specific limits for air blast over pressure, ground vibration and fly rock and ensuring whether proper compliance is achieved over time.

Fly rocks flies in to atmosphere when the rock conditions is weak in that cases the rate of fly rock is high.

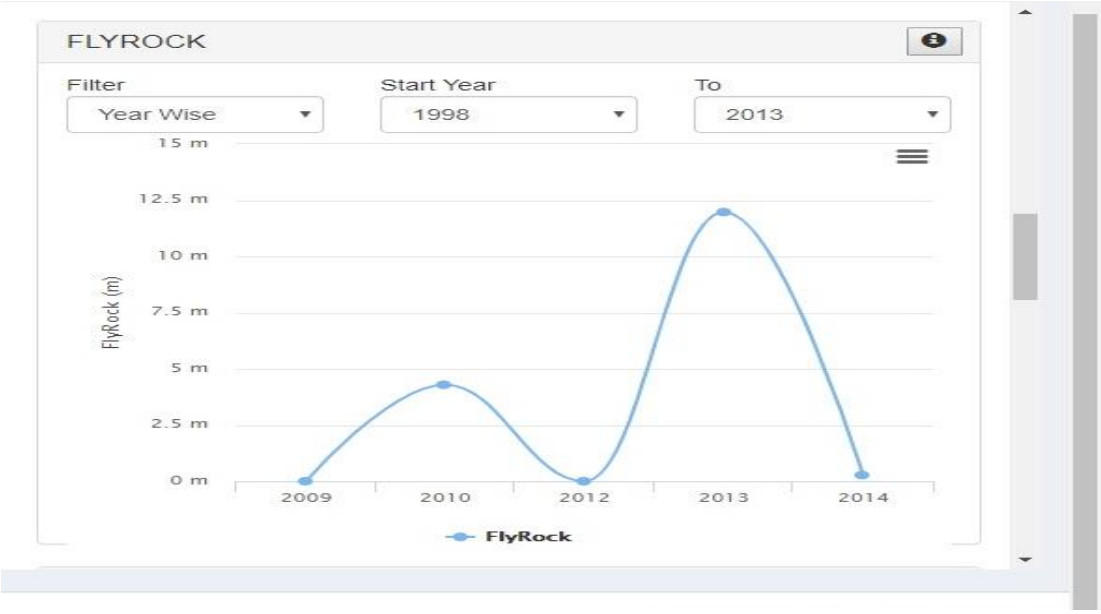

Figure 8 - Flyrock

From the above graph the rate of fly rock gradually increase and in the year 2013 the graph report shows there was a gradual increase in fly rock and sudden decrease in the year 2014

The X- axis shows the year and Y-axis shows the distance up to what extent the rocks has flied.this graphs helps to know the reason behind increase and decrease in the fly rock.

Similarly as said From the graph we can see the variations in fly rock from year to year similarly to about a particular year select that year and to know about the fly rock rate of a month and day to day select the month to know the fly rock rate.

Production per hole / total hole blasted:

Production per hole determines the tonnage that can be obtained from each hole that is being blasted. This can help in determining whether to increase or decrease the total number of holes to be blasted per blast (size of the blast) considering that blast parameters have been fixed as per geological/geotechnical parameters (from previous benchmarking analysis.

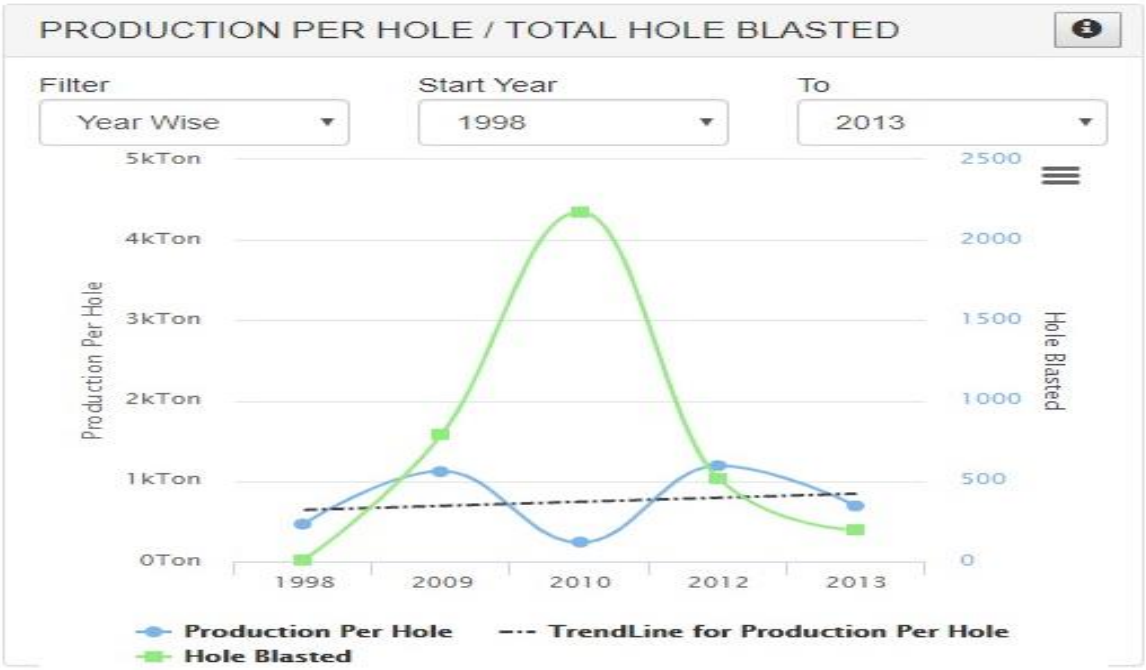

Figure 9 - Production per hole / total hole blasted

This graph is show per hole production (in tons) and total blasted holes.

You can select any of them in the graph legend to view the graph of that particular factor only.

The above graphs is one of the important graph which is the main aim of every mine that is production we can see the gradual increment and decrement in the production per hole to the total hole blasted.

The X-axis shows the year and Y-axis shows the production.

Production per meter / total meterage blasted:

This graph is helpful in determining the variation of another important KPI w.r.t drilling and blasting activity i.e. production obtained per meter drilled (drill factor).

To increase the rate of production one should be able to know the amount of production per every meter during the blasting in few cases the rock structure may be massive compact or loose the total length hole drilled may not give the expected productions so the above graph helps us to know about the production per meter.

From the below figure 10 shows the different rate of production varying from year to year and month to month and also day to day.

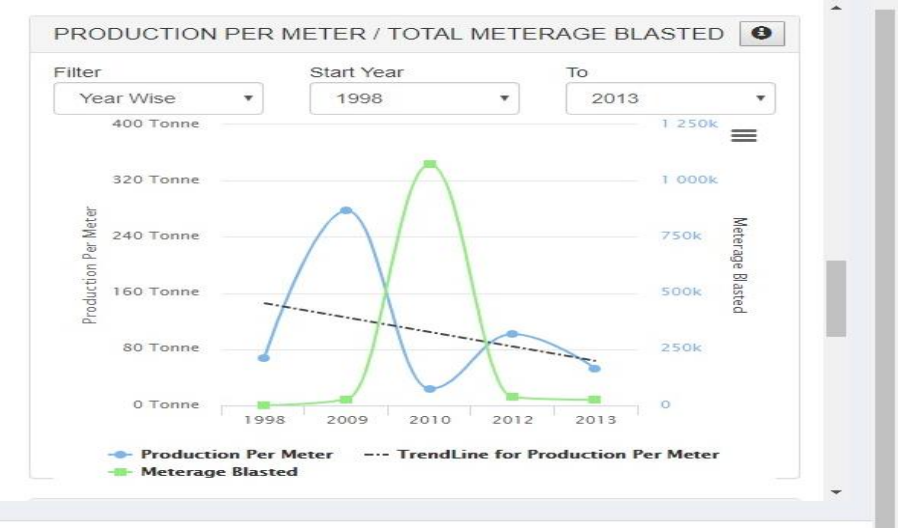

Figure 10 - Rate of production per year

This graph is show per hole production (in tons) and total blasted holes.

You can select any of them in the graph legend to view the graph of that particular factor only.

Specific Charge:

Specific Charge or Rock constant is a measure of the amount of explosives needed/consumed to break one cubic meter of rock and it is determined by controlled trial blasts in a vertical bench (Langefors and Kihlström 1967).

It gives the detailed report about the charges/explosives needed for blasting

The figure 11 gives the graphical representation about charge increment and decrement.

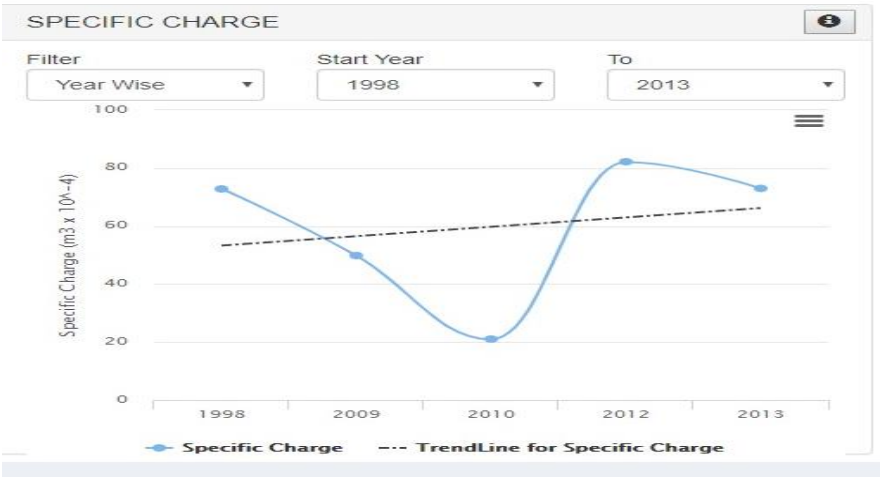

Figure 11 - Specific Charge

The graph shows the use of specific charge usage has gone increment decrement and again decrement from year to year and day to day.

This graph will be helpful to know the effective usage of explosives

Specific Drill:

Specific Drilling is a measure of the meterage needed to be drilled to break one cubic meter of rock.

The following graph figure 12 shows the specific drill which has been plotted on the graphs which shows the specific drillablity per cubic meter.

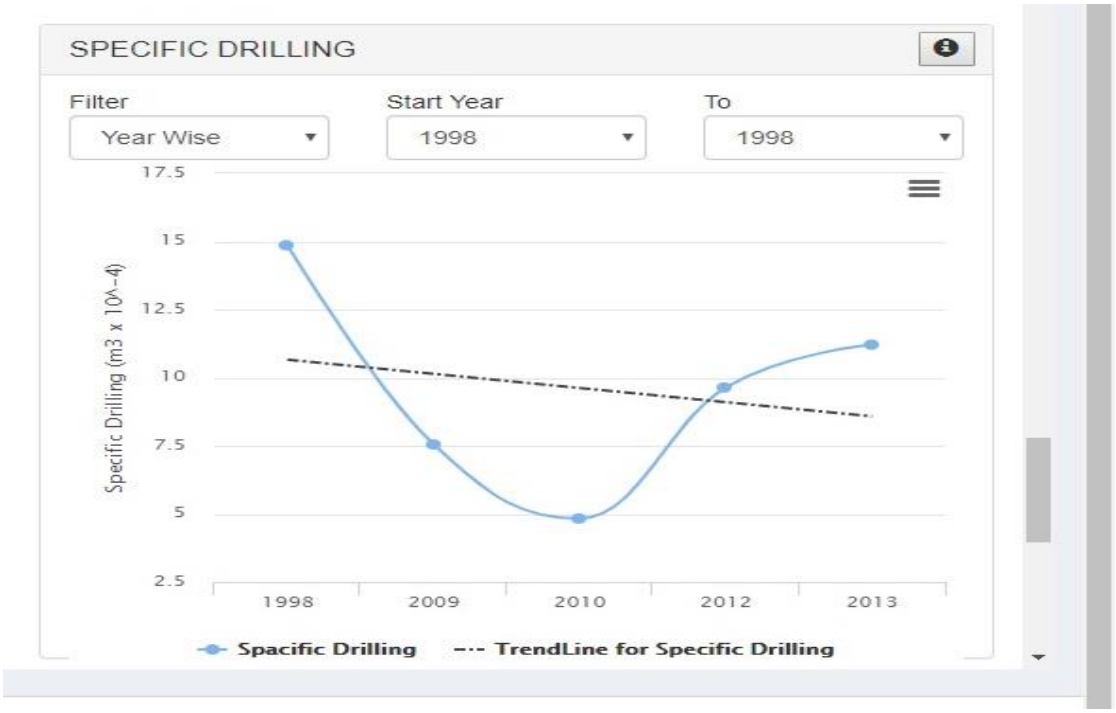

Figure 12 - Specific drill

Total blasting cost:

Cost analysis graph is important to show a generalized trend of the total blasting cost being borne by any mine. Year, month and date-wise cost variations are possible to be plotted. This particular graph is helpful to individual mine owners for getting a clear differentiation on the amount of capital being invested in several consumables (Explosives and Initiators) and processes (Drilling) surrounding blasting.

Figure 13 - Total Blasting Cost

From the above graph figure 13 it gives the clear view of the overall total blasting cost of a mine, from the above graph it indicates the variation in cost of total blasting. The total blasting includes the cost of explosives, drilling, initiator and also manpower.