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Mining Engineers' Association of India
Flat-608 & 609, Raghava Ratna Towers, A-Block, VI Floor, Chirag Ali Lane, Abids, Hyderabad - 500001
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this issue contains...

Correspondence Address

MEAI National Headquarters

Contact: **Secretary General,**
Mining Engineers' Association of India
F-608 & 609, Raghavaratna Towers, 'A' Block, VI Floor,
Chirag Ali Lane, Abids, Hyderabad - 500 001.
Ph.: 040-66339625, 23200510

E-mail : meai1957@gmail.com
website : www.meai.org

President's Message.....

Dear Readers

Greetings!

The COVID-19 pandemic triggered a global economic downturn, the most severe one since the Global Financial Crisis. The lockdowns and social distancing norms brought the already slowing global economy to a standstill. India was not any exception to this and suffered enormously. The second wave did not give any time to the Government and the people at large to think and spelled devastation.

As the Covid conditions improve in India, the need and urgency to work relentlessly during this period to prepare for the anticipated third wave, has attained unprecedented importance. While the Government and Industry are racing towards making preparations, long term planning should incorporate-

Strengthening Healthcare for a Stronger Indian Economy: It is a known fact that good health is good economics. Higher investments in healthcare infrastructure not only help making healthcare services affordable and accessible but can also help India strengthen its vast potential in the area of medical tourism.

Building World-class Infrastructure for Rapid and Inclusive Growth: The recent Economic Survey termed investment in infrastructure as quintessential for rapid and inclusive economic growth given its strong backward-forward linkages. Kicking off infrastructure projects can facilitate inclusive growth by generating jobs and helping revive demand. Developing infrastructure at par with global standards will ensure that the economy operates at an optimal level, becomes competitive and moves closer to realising its potential.

Enhancing Industry's Competitive Edge: Enhancing competitiveness of Indian industry will be vital in transforming the emerging crises into opportunities for laying a strong foundation for a sound economic future. The journey to creating acompetitive industry and an Atmanirbhar Bharat will need to be undertaken simultaneously.

The Metal and Mining sector is proving to be an important contributor towards India's economic revival and the recent amendments made by the Government in Mining domain will help mining realise its full potential and contribute towards the Nation's growth.

It gives me immense pleasure to note that in the recently amended 'Evidence of Mineral Content Rules, 2015', CRIRSCO Template definitions, though modified, have been incorporated for classifying mineral resources and reserves. It is a testimony to our efforts to recognise CRIRSCO compliant IMIC for mineral reporting system along with UNFC in India.

All our MEAI Chapters celebrated world Environment Day with great zeal and enthusiasm. Ahmedabad Chapter organized a webinar on World Environment Day and deliberations upon the current theme of 'Ecosystem restoration' and the role of mining in ensuring it was emphasised upon. Hyderabad Chapter also organised a webinar on World Environment Day, where senior officials from MoEF & CC also participated. Veraval-Porbandar Chapter celebrated the event by planting Saplings in the mined-out areas of the nearby Mines.

The Hyderabad Chapter and Alumni of Mining Association (Osmania university and Kakatiya University) organised a two-day webinar on 'Application of Artificial Intelligence in Mining Industry'. The Visakhapatnam Chapter organised a webinar on 'Mineral Concessions- First Cum First Served & Auctions' comparing various modes of Mineral concessions around the world.

I would like to urge the readers that as the country is opening up, we should not let our guards against Covid down. Take utmost caution and get vaccinated.

Regards,

Stay Safe!

Sanjay Kumar Pattnaik
President

Mining Engineers' Association of India

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EDITOR'S DESK

Dr. P.V. Rao
Editor, MEJ

Adoption of Environmental, Social, and Governance (ESG) principles in the industry in general and mining industry in particular are the most talked about topic in recent times and this page is therefore devoted to presentation of their significance by replication or synthesizing from literature. ESG grew out of investment philosophies assembled around sustainability and, thereafter, socially responsible investing. We are all talking a lot more about ESG than we might have otherwise and that keeps the pressure on companies to reassess how they run their businesses. The companies that are not thinking about operating in a more environmentally and socially conscious approach are bound to see their business vanish. ESG and the issues that it embraces are not new to the mining industry and miners have long been struggling with matters related to the sustainability agenda. ESG now brings together all these subjects in a comprehensive framework that can help mining companies navigate and balance the benefits to the planet and people, and profit successfully.

Environmental risks for mining companies are among the highest across all sectors – mostly social tensions arising from fears of pollution, water usage conflicts, and economic/landscape impacts on neighboring communities.

Once considered a topic of minimal relevance, ESG is finally getting the attention it deserves from the mining industry

Due to the very nature of the metals and mining industry, ESG has long been a focus point for governments, NGOs, industry bodies and broader society. The ESG Initiative is in response to growing expectations from boards, investors, regulators, employees, customers, vendors, and communities that companies must show leadership on ESG or risk being punished for lack of transparency and compliance. Institutional and other large investors are taking increased interest in a company's ESG performance and including this in their investment decisions and in some cases excluding from their investment portfolios, companies that do not live up to ESG expectations. ESG reporting affords access to the financial markets since financial institutions and investors are increasingly making investment decisions based on ESG criteria. Stock market regulators are beginning to look at ESG ratings before letting mergers and acquisitions of publicly traded resource companies. The ESG demands on industry are becoming increasingly complex and at the same time essential.

The UN Sustainable Development Goals (SDGs) requires persistent demand for metals and minerals over the coming decades, which has rightly led to greater scrutiny of provenance of materials and their responsible production. Enhanced Mining Principles of International Council on Mining & Metals (ICMM) define good practice environmental, social and governance requirements for the mining and metals industry; and they are aligned with the objectives of other responsible sourcing initiatives. Modifying Factors reckoned in CRIRSCO Template as considerations to convert Mineral Resources to Mineral Reserves include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, Environmental, Social and Governmental factors. CRIRSCO compliant Public Reports must discuss environmental, social, and health and safety impacts that may arise during development, operation and after closure stages of mining projects.

Mining industry has been adopting ESG principles progressively and major changes on this agenda date back to the 1980s. Environmental disasters like the Vale tailings dam burst in Brazil (2019) and the Mount Polley tailings breach in British Columbia (2014) are the kind of things companies with a focus on ESG issues are always striving to avoid. Rio Tinto has also seen a barrage of negative publicity, following the destruction of ancient aboriginal caves in Australia (2020).

For many years, the industry as a whole managed to sidestep ESG but the period of evading responsibility has ended. Mining firms are gradually being called upon to explain how they plan to incorporate ESG into their planning. While there are obviously extra costs involved in implementing ESG policies, payback may come in the form of increased shareholders and shareholder confidence. Added evidence of the growing importance of ESG in mining comes from a survey of 67 decision-makers conducted during the latter half of 2020 by global law firm White & Case. Eighty percent of respondents think ESG will play a greater part in investors' decision-making in the 2020s. Twenty-two percent see ESG as a way to build greater resilience in future, second only to supply chain excellence. According to Bloomberg Intelligence, ESG-focused ETFs recorded net inflows of $89 billion in 2020, almost three times the previous year. Once considered a topic of minimal relevance, ESG is finally getting the attention it deserves from the mining industry.

- Editor

EDITOR

Dr. P.V. Rao
(Off. : 040 - 23200510)
Cell : 96180 91039
Email: editor.mej.meai@gmail.com

PUBLISHER

M. Narsaiah
Secretary General,
Mining Engineers' Association of India
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NEWS FROM THE MINING WORLD

➢ Formalization of small-scale mining detrimental for the environment — study

Many gold mines in the Peruvian Amazon are unregulated, small-scale operations, leaving governments without ways to protect the surrounding environment or track how much forest is lost to mining. (Image by Lisa Naughton, courtesy of University of Wisconsin–Madison).

A study conducted in the Peruvian Amazon by researchers at the University of Wisconsin–Madison found that, if not properly conducted, formalization of small-scale mining operations could create more damages to the environment rather than prevent them.

According to the scientists, without environmental impact assessments and enforcement, formalization could just encourage more dangerous mining or the expansion of such operations under the pretense that what they're doing is legal. Published in the journal *Environmental Research Letters*, the study focused on what happened at the Tambopata National Reserve from 2001 to 2014.

During this time frame, demand for gold rose, roads penetrated the region and mining surged. In parallel, mining-related deforestation rose by almost 100,000 acres. Also during this period, local agencies issued provisional titles to miners to conduct their operations safely. After receiving a provisional title, miners would, in theory, undergo a series of environmental impact and compliance assessments before they started work.

However, the researchers noticed that the regulation process took a long time and, thus, many miners simply took their provisional title as a green light to start mining, and never went through with the environmental impact assessments. In fact, during those 13 years, no mining operations made it through the full compliance process, and as such the researchers found little evidence for improved environmental outcomes in formalized mining areas.

To assess those environmental outcomes, the team used satellite imagery analysis to see how much of the forest had been cut down, as compared to areas without formalized mining regulations. After looking at the differences, the group concluded that while formalizing mining has the potential to decrease environmental damage, it needs enforcement and regulations that match the local context.

"To sort out in a fair way who owns what land, with what rights, that is a slow process," Lisa Naughton, coauthor of the study, said in a media statement. "[But] this gold rush is explosive. By the time you have well-regulated and transparent public land and property rights, the forest will be gone."

According to Naughton, many members of the community at Tambopata are aware of the problems with mining formalization but have not had a chance to systematically study the environmental consequences. Now, the researcher and her co-authors hope their study will set a precedent for monitoring formalization interventions in Tambopata and other tropical sites in Colombia, Brazil and Bolivia, which are losing forest to mining.

MINING.COM Staff Writer | June 12, 2021

➢ Moody's flags significant ESG risks to mining with new ratings

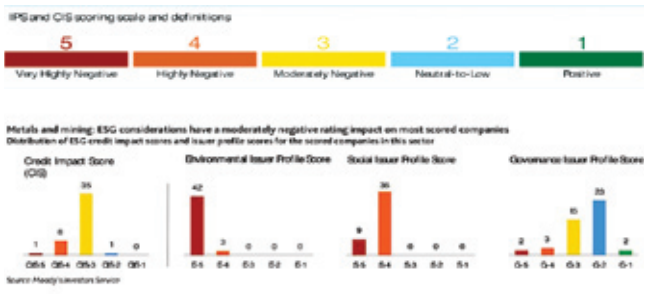
Whether it be inequality, damaging the environment or labour rights, companies are now called out when they are perceived as doing wrong. (Stock image.)

Ratings agency Moody's has released new environmental, social and governance (ESG) issuer profile and credit impact scores for the global metals and mining sector, which could negatively impact companies lagging behind. They come on the heels of the agency's ESG scores for a range of corporate issuers, utilities and US governments earlier this month and for sovereign issuers published in January.

With the ongoing transition to green energy set to boost demand for key materials including copper, cobalt, nickel and lithium, many miners have trumpeted their green credentials. Companies, however, have not been assigned scores for their undertakings nor for how they would impact their risk exposure, until now.

"Nearly all metals and mining companies, including coal companies, have exposure to environmental considerations that carry very high credit risks," Benjamin Nelson, Moody's VP-senior credit officer, said in a statement. Moody's is integrating more ESG in its credit analysis, which provides greater clarity, consistency and differentiation on risk exposure and the degree of credit impact.

Most metals and mining companies have good financial strategy, risk management and management track records, the rating agency says, naming BHP (A2 stable) and South32 (Baa1 stable) as example of have strong governance.



For eight metals and mining companies, the impact of ESG considerations is more severe than for their peers: highly negative (CIS-4). Moody's names Vedanta Resources (B2 negative), as miner for which the impact is very highly negative (CIS-5). By contrast, Chile's Codelco, (A3 negative) is the only metals and mining company for which ESG considerations have a neutral to low rating impact (CIS-2).

Environmental groups, who have tended to target the energy industry, are now turning their attention to big energy-consuming industries, especially mining, which is responsible for about 4% to 7% of global greenhouse gas emissions. Climate advocates are also looking at likely impacts of mining the metals used in digital and other devices, spreading attention from the resources sector to technology groups.

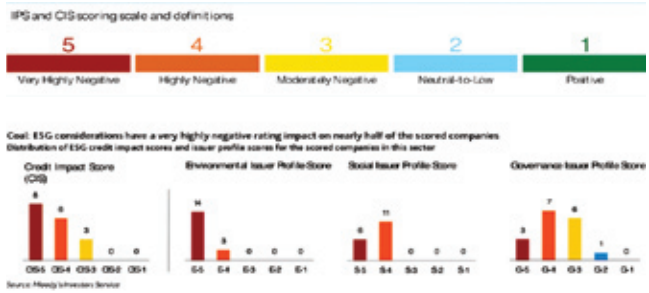
Carbon transition is the biggest environmental risk for thermal coal companies, especially in the US, which is driven by growing global demand and policy support for less carbon-intensive and cleaner energy. Not surprisingly, the impact of ESG considerations is very highly negative (CIS-5) for nearly half of the coal companies Moody's scored. For Yanzhou Coal (Ba1 stable), Adaro Indonesia (P.T.) (Ba1 stable) and SUEK JSC (Ba2 stable) the impact is moderately negative (CIS-3).

Moody's says Glencore (Baa1 negative) is a mixed case. "It has a conservative financial strategy and strong risk management. But it also has legacy legal exposure with regards to investigations by a number of authorities including the US Department of Justice," the agency says.

Moody's believes that metals and mining companies face the most risk from their dependence on natural capital and the physical damage that mining can cause. For nearly all companies rated, exposure to ESG factors is very highly negative (E-5). Six companies are less exposed because of their modest physical footprints – mostly small diamond and met coal companies operating only underground mines. Still, their exposure is highly negative, as reflected by their E-4 scores. Examples include Mountain Province Diamonds (Caa3 negative), Petra Diamonds (Caa1 positive) and Warrior Met Coal Inc. (B2 positive).

Social approval

The firm also says that social risks are significant in the sector. "[They are] driven by health and safety issues and responsible production risks, with some differentiation by commodity and location of operations," Nelson said. Whether it be inequality, damaging the environment or labour rights, companies are now called out when they are perceived as doing wrong.



Peabody Energy (Caa1 stable) fairs poorly when factoring the responsible production item. Its North Goonyella mine in Queensland, Australia caught fire in 2018 and the company has not been able to obtain the necessary permits to restart production. A company's ability to mitigate these various ESG considerations and their significance relative to other credit drivers determines the degree to which the considerations affect its credit rating.

Strong governance is an important mitigant for many highly rated companies in the metals and mining and

coal sectors, says Moody's. Moody's ESG issuer profile scores are opinions of an issuer's exposure to ESG considerations that could be material to credit risk. ESG credit impact scores communicate the impact those ESG considerations have on an issuer's credit rating. Both scores use a five-point scale – one is positive, two neutral to low, three moderately negative, four highly negative and five very highly negative.

Cecilia Jamasmie, Mining.com | June 8, 2021

➢ **Scientists develop 'cheap and easy' method to extract lithium from seawater**

Researchers at King Abdullah University of Science and Technology developed what they believe is an economically viable system to extract high-purity lithium from seawater.

Previous efforts to tease lithium from the mixture the metal makes together with sodium, magnesium and potassium in seawater yielded very little. Although the liquid contains 5,000 times more lithium than what can be found on land, it is present at extremely low concentrations of about 0.2 parts per million (ppm).

To address this issue, the team led by Zhiping Lai tried a method that had never been used before to extract lithium ions. They employed an electrochemical cell containing a ceramic membrane made from lithium lanthanum titanium oxide (LLTO). In a paper published in the journal *Energy & Environmental Science*, the researchers explain that the membrane's crystal structure contains holes just wide enough to let lithium ions pass through while blocking larger metal ions.

The cell itself, on the other hand, contains three compartments. Seawater flows into a central feed chamber, where positive lithium ions pass through the LLTO membrane into a side compartment that contains a buffer solution and a copper cathode coated with platinum and ruthenium. At the same time, negative ions exit the feed chamber through a standard anion exchange membrane, passing into a third compartment containing a sodium chloride solution and a platinum-ruthenium anode.

Lai and his group tested the system using seawater from the Red Sea. At a voltage of 3.25V, the cell generates hydrogen gas at the cathode and chlorine gas at the anode. This drives the transport of lithium through the LLTO membrane, where it accumulates in the side-chamber. This lithium-enriched water then becomes the feedstock for four more cycles of processing, eventually reaching a concentration of more than 9,000 ppm.

To make the final product pure enough so that it meets battery manufacturers' requirements, the scientists then adjusted the pH of the solution to deliver solid lithium phosphate that contains mere traces of other metal ions. According to the researchers, the cell will probably need $5 of electricity to extract 1 kilogram of lithium from seawater. This means that the value of hydrogen and chlorine produced by the cell would end up offsetting the cost of power, and residual seawater could also be used in desalination plants to provide freshwater.

MINING.COM Staff Writer | June 5, 2021

➢ **RMI unveils set of rules to help miners fulfill ESG expectations**

US-based Responsible Minerals Initiative (RMI), multi-industry initiative focused on delivering guidelines and rules for better traceability and responsibility along the mineral supply chains, has launched an Environmental, Social & Governance (ESG) Standard to further improve conditions for workers, the environment and communities.

As economies start to re-emerge from covid-crisis mode, mining companies are feeling increased pressure from shareholders and institutional investors to give ESG factors the centre stage. The Responsible Minerals Assurance Process (RMAP) ESG standard seeks to help miners navigate expectations by providing a set of criteria applicable to mineral processors, smelters and refiners, including those integrated with mine sites.

RMI, which counts with more than 400 member companies, identified for major areas for miners to focus on — environment, social obligations, occupational health and safety provisions, and governance requirements. The environmental criteria cover the impact from operations on the environment and biodiversity as well as on communities adjacent to companies' operations.

Occupational health and safety provisions address company hygiene, safe operation of equipment, personal protection requirements and access to first aid and canteens. Social obligations are related to range of labour practices such as age of employment, fair working hours, minimum wages and overtime, including women's rights and under-represented communities. Under governance requirements, the new ESG standard provides guidelines to ensure that businesses are duly registered, adhere to laws and regulations.

Leah Butler, vice president of responsible sourcing at the Responsible Business Alliance (RBA), said the new standard will help companies navigate current frameworks, such as those set up by the London Metals Exchange (LME).

(Continued on Page 31)

UNDERSTANDING THE BEHAVIOUR OF BLAST-INDUCED GROUND VIBRATION AT TUNNEL FACE USING STATISTICAL REGRESSION ANALYSIS AND BLASTWARE SOFTWARE (PART-1)

Bhukya Naveen Kumar*, Dr. Bhanwar Singh Choudhary*

Abstract

The most popular rock excavation method, by far, is that of drilling and blasting. During the last few years, the advancement of tunnel driving techniques has been enormous. But more and more focus has been drawn to blast-induced ground vibration and its propagation in the rock mass. A site-specific predictor equation to predict PPV has to be developed considering blast design parameters like the number of blast holes, hole diameter, total explosive charge in a blasting round, and distance of vibration monitoring station from the tunnel face. In this study,the behaviour of blast induced ground vibration at tunnel face has been studied. It is tried to optimize the maximum charge per delay using the statistical regression analysis for the blast design of the Tunnel. And also comparing the predicted maximum charge per delay with the Blastware module. Blast design has been proposed based on the statistical regression analysis to optimize the blast design parameters keeping PPV as per regulation.

Keywords: Peak particle velocity (PPV), Blast-induced ground vibration, Statistical regression analysis, Maximum charge per delay (MCPD).

1. INTRODUCTION

Drilling and blasting is the far most technique used for underground as well as surface blast because of several advantages such as only technique for very hard rock, cost effective etc. For the underground, the Tunnel is one of the active and most required development to access into the ore body as well as for civil construction. In tunnel drivage,blast design plays an important role. In the ideal condition, designers would have unlimited limitations regarding blast design. However, in most situations,the blast designer does not have complete control over all the parameters affecting blast design. The size of the tunnel is usually pre-set, and designers must accept the limitations that come. Despite some limitations, many other design parameters can be adjusted to reduce the ground vibration.

During blasting, the three-dimensional distribution of explosive energy around the blast hole is developed. This energy is categorized into two types, useful energy, and useless energy. Useful energy work for the rock breakage, grinding, and crushing of rock mass. Useless energy work in the seismic wave development of the explosive. Each column of charge is treated as the source of energy which spreads out with geometric attenuation. Explosive energy release in the form of high pressure, high-temperature gaseous product due to chemical reaction in the explosive (Jimeno et al, 1995). This rate of reaction is denoted as the velocity of detonation (VOD) and release pressure is called detonation pressure.Firstly, the explosive energy in the form of shock/stress wave on the blast hole is in compression form in all three-dimension (radial, tangential and axial). When this wave reaches the free face, they reflect and form in the tensile force. The velocity with which the particles move is the particle velocity and the maximum magnitude is known as the PPV (Peak Particle Velocity). The blast-induced ground vibration is affected by a blast parameter such as charge size, charge weight, distance, delay time, hole dimensions, etc.The design parameters,explosive parameters, and rock parameters play important role in influencing the blast-induced ground vibration.

1.1. OBJECTIVES OF STUDY

- To study the influence of Blast design parameters on blast vibration.
- Statistical analysis for prediction of maximum charge per delay for the study site.
- Prediction of maximum charge per delay using Blastware software
- Comparing on field data with software results and review

Blasting is the most effective method for tunnel drivage, the sole purpose of blasting operations being efficient rock breakage and good fragmentation which is achieved by the use of a large number of explosive materials. A large

**Department of Mining Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, India*

amount of energy is released as a result of explosion out of which only 20-30% energy is utilized for the breaking and displacement of the rock whereas the rest of the major amount is wasted accounting for other side effects affecting the environment (Parida and Mishra, 2015).

The environmental effects of rock blasting such as noise, dust, ground vibrations, etc., often lead to disturbances, fear, and annoyance of the people residing in the nearby residential and the community areas which results in strong reaction by them even when the blasting activities are not likely to render any such after-effects most importantly no significant physical damage to the nearby buildings and structures.

The effects of the exposure were analyzed in detail with acceptable statistical errors and it was decided that the best way to minimize the local intervention is by providing them with detailed information about the blasting activities in advance.

2. EXPLOSIVE ENERGY

2.2. TYPES OF EXPLOSIVE ENERGY

As a result of blasting, the explosive energy released is broadly classified into two class: -

The energy type that is emitted depends on the type of explosive that is used. The detonation of a low explosive produced only gas energy, whereas a higher explosive release both shock energy and gas energy after detonation. The pressure produced by the explosive depends on the number of gases released per unit weight of explosive and the amount of heat released during the process

2.2 PROPAGATION OF EXPLOSIVE ENERGY

The rock breakage is governed by the nature of the propagation of the explosive energy. Firstly, the compressive shock wave produced compresses the rock mass around the borehole walls, resulting in extreme crushing of the rock mass. As the pressure exceeds the compressive strength of the rock it leads to the development of radial cracks outside the crushing zone is due to the tangential strain exceeding the rock's tensile strength as shown in (Fig-1).

On encounter with a free surface, the shock wave is reflected into two waveforms, i.e., the shear wave and the tensile wave that results in the free face fracturing as long as the tensile wave exceeds its tensile power. With distance from the borehole, the strength of this pressure wave diminishes. Finally, during the detonation phase, the gas resulting from the chemical reactions penetrates the cracks and spreads, exerting a pressure known as the gas pressure that expands the fractures, resulting in fragmentation and finally disintegrating it.

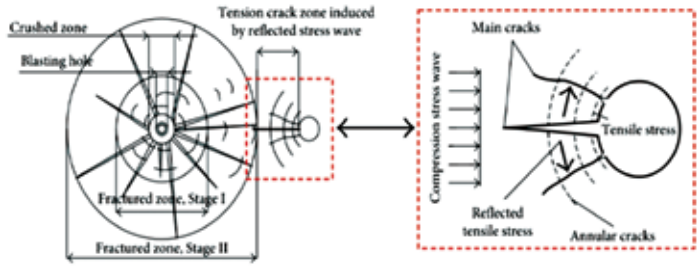


Fig 1: Showing different formations of crushing zone, fracture zone, and fragment formation zone. (Baobao Chen., 2018)

2.3. TUNNEL FACE BLAST DESIGN

Several considerations must be taken into consideration when developing the drilling pattern: Rock drilling and Blastability, and the type of explosives, the vibration constraint, and the accuracy requirements of the blasted wall, etc. Many mining and excavation sites still design their drilling patterns manually, although advanced computer programmers are available and commonly used. Computer programmers make it easier to adjust trends and predict the effects of changes in drilling, loading, and output reasonably accurately. Software programmers are built on the same design knowledge that is used manually in the preparation of patterns. The design of the drilling pattern for tunneling and drifting is based on the following factors:

- Dimensions of Tunnel.
- The geometry of Tunnels.
- The size of the hole.
- Final standards for performance.
- Mechanical rock and geological conditions
- The availability of explosives and means of detonation.
- Limits on Ground Vibration.
- Drilling equipment.

Depending on the site conditions, all or some of the above variables are considered to be sufficiently significant to establish the pattern of tunnel drilling. Construction sites usually change drilling patterns to take into account the changing conditions in each tunnel. Mine drifting is carried out with 5 to 10 drilling patterns for various tunnel sizes (Production drifters, conveyor drifters, railings, ramps, etc.). the pattern is finalized at the drilling site.

When designing a drilling pattern in tunneling, the main objective is to ensure an optimal number of drilled holes that are correctly located and precisely drilled. This helps ensure effective charging and blasting, as well as the development of correct and smooth tunnel walls, roof, and floor. The drilling pattern configured in this way is also the most economical and effective for the conditions stated. The drift face tunnel can be roughly divided into four parts (fig. 2).

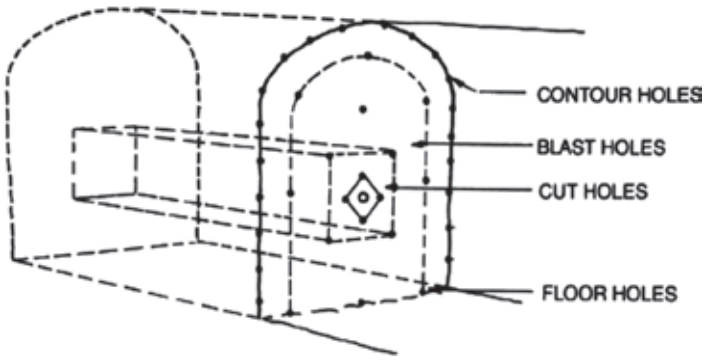


Fig 2. Types of holes in tunnel face

2.3.1. Cycle of operation

Drilling and blasting methods, due to their ability to comply with large variations in geology, are primarily used to excavate most of the tunnels. As a result, proper blast design in tunnels is the key to improving blast efficiency and reducing tunnel wall damage, vibration, and noise levels. Critical tunnel blast design variables include load, spacing, drilling dia, empty hole dia, forward face, and tunnel field. The operating cycle involves drilling, charging, blasting, ventilation, scaling. Support work, grouting, loading, and transport, and set out for the next blast.

2.3.2. The Sequence of excavations

The sequence of excavation of various underground structures, depending on the area of cross-section of the excavation, is given in Fig. 3. Partial-face-blasting is often more realistic or can require restrictions on the ground or equipment. Thus, tunnel-driving approaches can be separated as follows:

- Full-face tunneling,
- Top heading and Bottom bench method,
- Benching with horizontal blasting hole,
- Benching down the holes.

Tunnels usually smaller than 60-70 m^2 cross-sections, full-face excavation offers optimum economy and efficiency. Full-face drilling is applicable for rough rock with small joints blast holes are drilled either at right angles to the face or right angles to the face of the tunnel. For good roofing conditions and with the availability of a better support system tunnel with a large cross-section than 60-70 m^2 it is also possible to excavate it effectively using a full-face process.

For the medium tunnel more than 60-70 m^2 cross-section area typically the top-section and the bench-sequence are adopted. In the process, one-third to half of the final tunnel section drives the upper section across the full distance. Later, the lower portion is eliminated by benching. The top heading is usually guided across the entire length of the tunnel until the benching starts. In certain activities, the blowing of the bench is carried out concurrently, but at another position inside the tunnel.

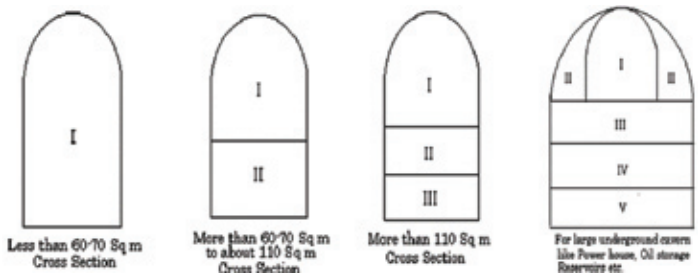


Fig 3. The sequence of Excavations (Sharma, 2009).

2.3.3. The blasting Method

At present, tunneling in rocks is mainly carried out by blasting, as this method is capable only of providing sufficient electiveness and economics in the construction of tunnels in hard rocks.

Blasts in tunnels and drifts are characterized by a lack of adequate free surfaces on which breakage can be successful. Unlike bench blasting, tunnel blasting has only one free face and holes are drilled normally to the free surface of the face. In such a case, the explosive charge will blow out a narrow, tunnel-shaped crater. But if the hole is drilled at a certain angle to the free face, the outcome will be better, as most of the gases will crack the rock in the direction of the free face. Alternatively, if the large diameter dummy holes parallel to the blast hole are drilled, the breakage output is stronger as the large diameter dummy holes have an additional free surface.

Thus, the idea behind tunnel blasting is to create an opening by cutting (a group of holes that provide an initial freeface) and then sloping to widen the opening. The cut typically has a surface area of 1-2 m^2, but with wide drilling holes it can go up to 4 m^2. The different drill hole zones in the tunnel face blast are shown in Fig. 4.

The initial opening/cut created either by angled holes or by holes drilled parallel to large diameter **dummy holes/relief holes** are then expanded by holes fired around the cut are cut spreader hole after the holes have been cut using proper delay. As a consequence, the rock is more constricted in the case of tunneling, and a second free face to which the rock can crack and be thrown away from the surface must be formed.

The second face (**Stoping holes**) is created by a cut in the face of the tunnel, which can be a parallel hole cut, a V-cut, or a fan-cut. After the opening of the cut is made, the cut starts to end. Stopping can be compared geometrically with bank blasting, but it needs powder factors that are 4 to 10 times higher. Such high explosive use is mainly due to the

drilling mistake, the demand for swelling, the lack of hole inclination, the lack of cooperation between the adjacent charges, and even the blasting of gravity in the case of lift holes. (Sharma, 2009)

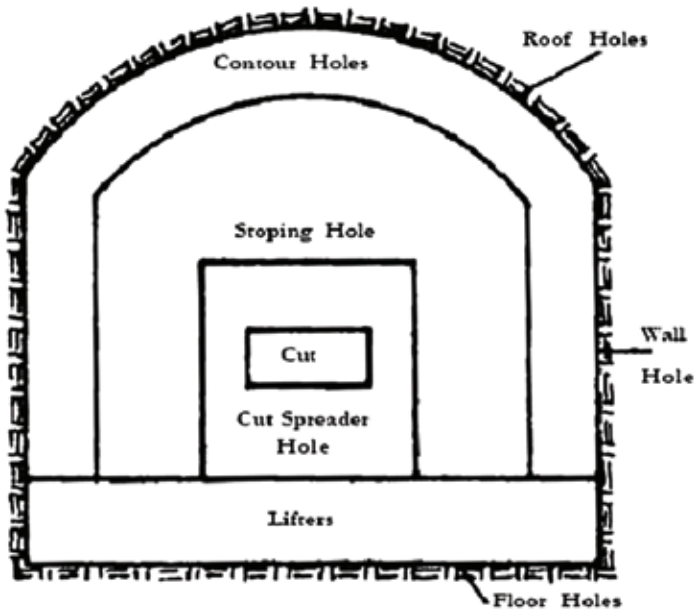


Fig 4. Different types of holes in tunnel face

The final shape of the cross-section is provided by **trimmers or contour holes** with a spacer and a relatively smaller load. The contour holes are narrowly spaced (0.2 m to 0.4 m apart) and guided outwards to make room for the drill in collaring and forwarding. The location of the cut affects the rock projection, fracturing, and also the number of the blast holes. Of the three locations, the corner, the lower Centre, the upper Centre, the latter is typically chosen as it prevents the free fall of the material, the profile of the broken rock is more prolonged, less compact, and more fractured.

The drilling pattern often includes details on the **Look-out angle** required at different points on the tunnel face. The viewing angle is the angle between the practical (drilled) and the theoretical profile Fig. 5.

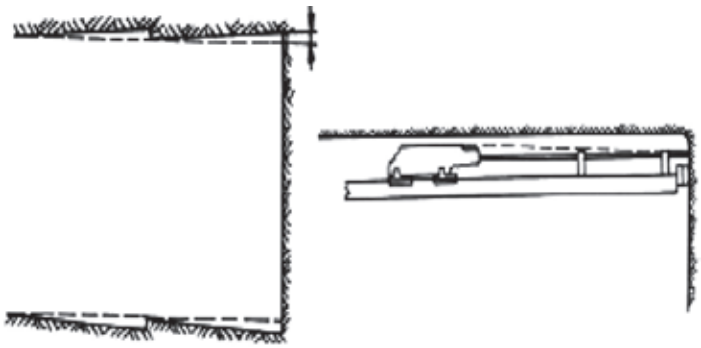


Fig 5. The look-out angle (O Satici, 2000)

If the contour holes are drilled parallel to the theoretical line of the tunnel, the face of the tunnel would be smaller and smaller after each round. To ensure that the correct tunnel profile is to be established, each contour hole is drilled at a slight angle to the tunnel wall, a viewing angle which of course, cannot be smaller than that required by the rock drill profile. Perimeter holes are typically drilled with a Look-out, ranging from the possible wall line up to around 100 mm (4 in) (O Satici, 2000). As it is not possible to drill right at the edge of the excavation. The scale of the drilling equipment includes an angle set back to cover the volume to be excavated. Successive blasts result in a tunnel wall surface shaped like a zigzag.

2.3.4. Most popular types of Cuts for Tunneling

In tunnel blasting, cutting selection plays a key role in achieving optimized blasting. It can be done based on the rock characteristics, tunnel area, and cut parameters and their implementations. Burn cut is a widely used cut for tunnels and as well as for developing headings.

BURN CUT

A series of parallel holes are drilled near to the right angles of the face. One or more holes in the middle of the face are unloaded. It's called a Burn cut Fig. 6.

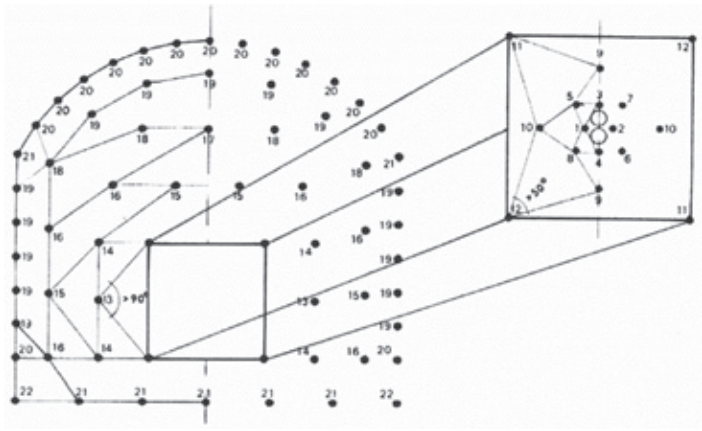


Fig 6. Burn cut with firing sequence (Sharma, 2009)

Unloaded holes are often large in diameter than loaded holes and form vulnerability zones that allow the adjacent loaded holes to break out of the ground. Because all the holes are at right angles to the face, the positioning and orientation of the holes are simpler than in other forms of cuts. Burn cut is especially suitable for use in massive rock such as granite, basalt, etc.

2.4 BLAST DESIGN PARAMETER

2.4.1. Burden

The burden is the distance between the free face and center of charge, which affects the blasting quantity per meter of blast hole, fragmentation effects, and dispersion distance.

Liu and Ludwig (1996), measured the ground vibration with different charge and burden lengths and stated that one of the factors affecting ground vibration was the burden.

Utilizing single blast-hole tests Blair and Birney (1994) monitored the PPV for two distinct burdens and found that there was insufficient evidence that the strain affected the ground vibration.

2.4.2. Free face

The free face is the interface between rock and vacuum. This facilitates the rock rupture occurrence and encourages the fractured rock to travel to other media (Blair., 1995).

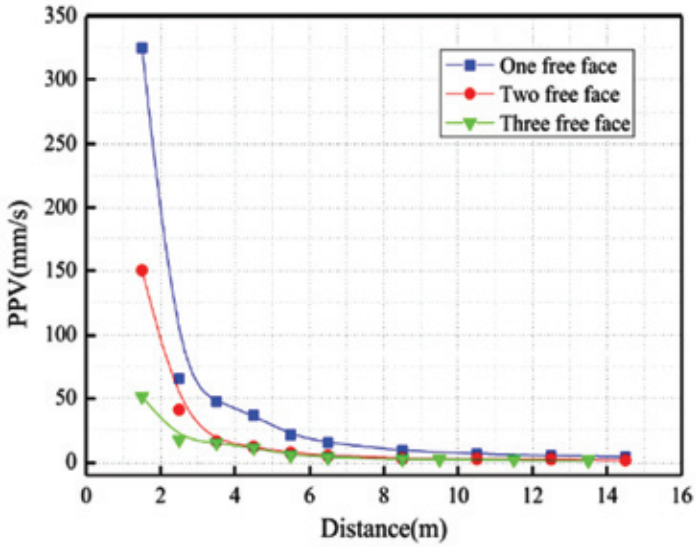


Fig 7: Plots of PPV with different free faces (Chen et al.., 2009).

In addition, with the reflection and refraction of the waves, a free surface interferes. Blair and Jiang (1995), proposed that the propagation process of the wave should examine the effect of a free face on the blasting radiation, whether controlled under the near-field surface or the far-field surface. They interfere with each other and create complex disruptive effects when these waves are reflected.

As a function of the scaled distance and different free faces, if the other parameters remain unchanged resultant PPV is shown in Fig. 7(Chen et al.., 2009).

2.4.3. Charge structure

The design of the charge structure relates to the way explosives are deployed in the blast-hole, as shown in Fig. 8.The air decking at the bottom of the hole, which was first discovered in early 1940, could produce better fragmentation (Park and Jeon, 2010). Blair. (2004) compared decked and undecked single blast-holes experimentally and challenged the efficacy of air-decking to interfere with blast waves to minimize blast vibration.

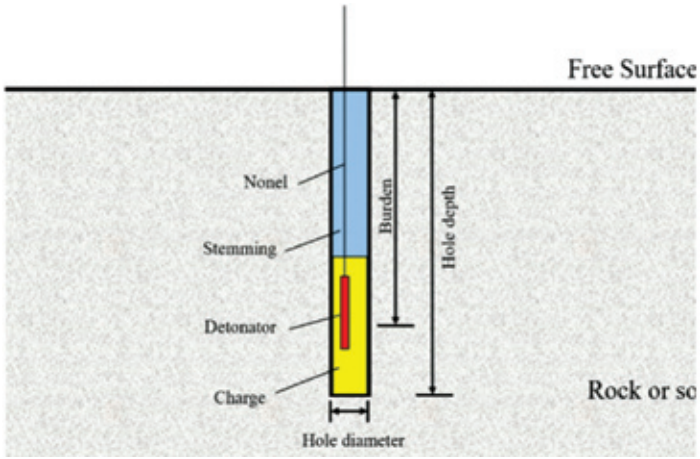


Fig 8: Structure of a blast-hole

Park and Jeon (2010) found that blast vibration was reduced by conducting numerical analyses and field experiments with an improvement in air-decking coefficients at the bottom of the blast hole. And Lin (2014), examined the impact of air decking positioning on blasting vibration and concluded that compared to the top air decking, the PPV was greater for the middle air decking as shown in Fig. 9.

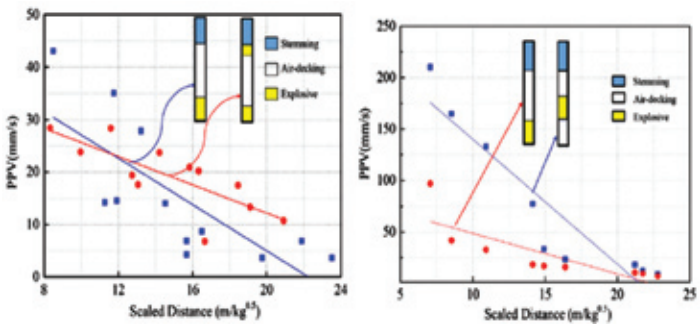


Fig 9: PPV versus the scaled distance with different charge structures (Lin., 2014).

2.4.4. Delay blasting

Delay blasting is an efficient technique for enhancing the fragmentation of rocks and reducing vibration caused by blasting. Not only does it increase the effectiveness of rock crushing, but also the effect of blasting vibration can be realized (Katsabanis et al., 2006).

(a) Single blast-hole

(b) Short-delay blasting with two holes.

a) Long delay blasting with two holes

Qiu et al. (2018) described the blasting crater formation process under various conditions, as shown in Fig.8.And also compared the PPVs of two holes with different delays (0ms, 13ms, 17ms) and found that compared to the simultaneous initiation, the short-delay blasting could increase the intensity of ground vibration.

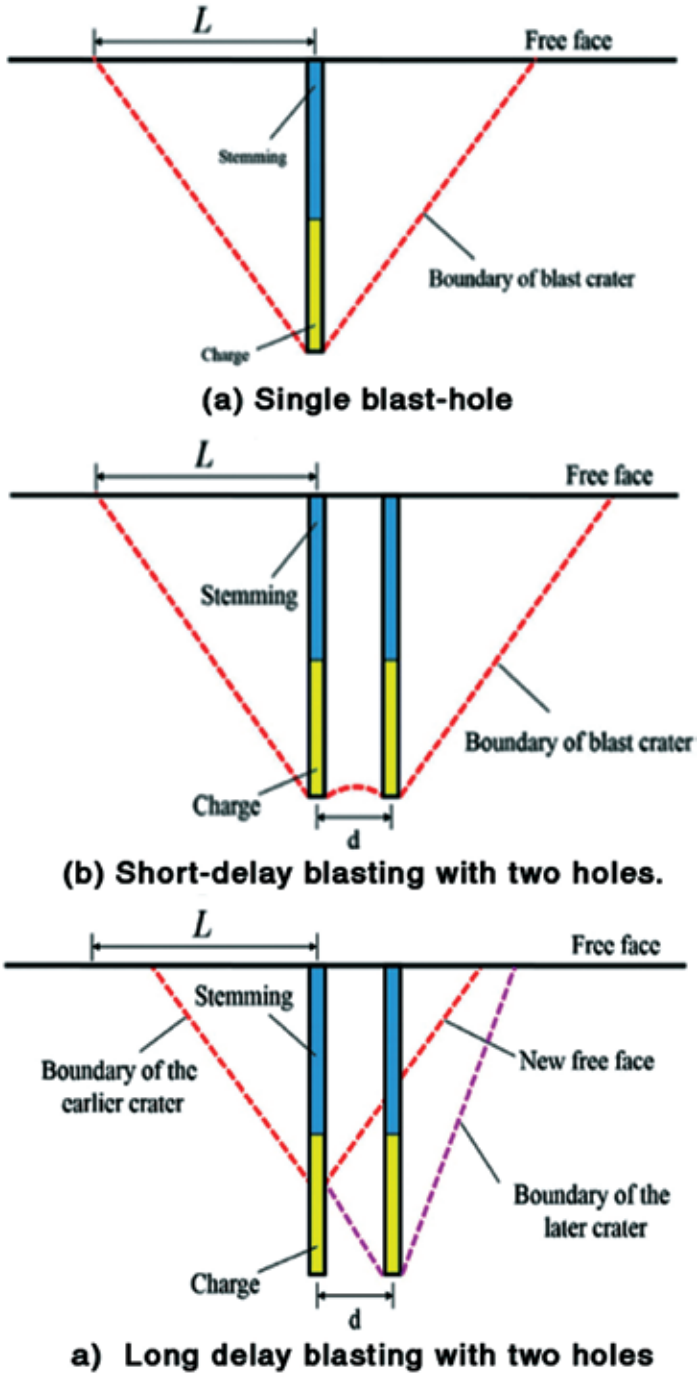


Fig 10: Mechanism of delay blasting (Qiu et al., 2018).

For various periods of delays Fig. 11 shows that there was no apparent effect of the delay time on the ground vibration.

2.4.5. Hole design

Usually, a hole design involves diameter, depth, and number. It is determined according to the various criteria for blasting. According to the degree of rock fragmentation and the blasting protection legislation, engineers develop hole parameters.

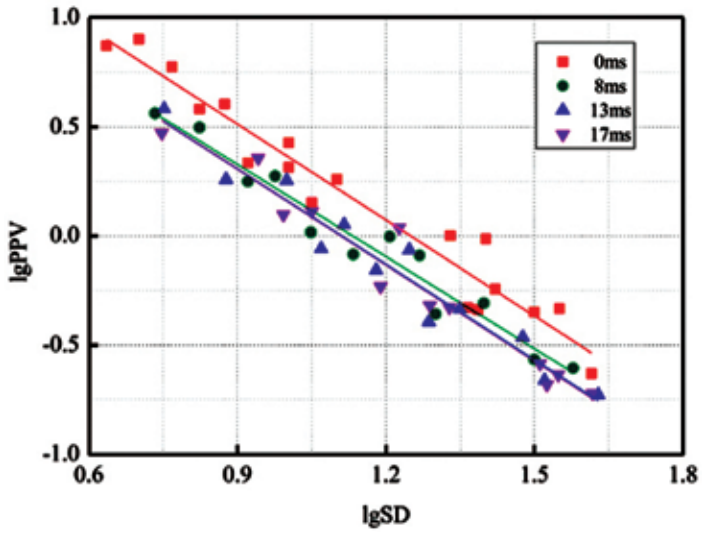


Fig 11: PPV versus the scaled distance with different delay times (Qiu et al., 2018).

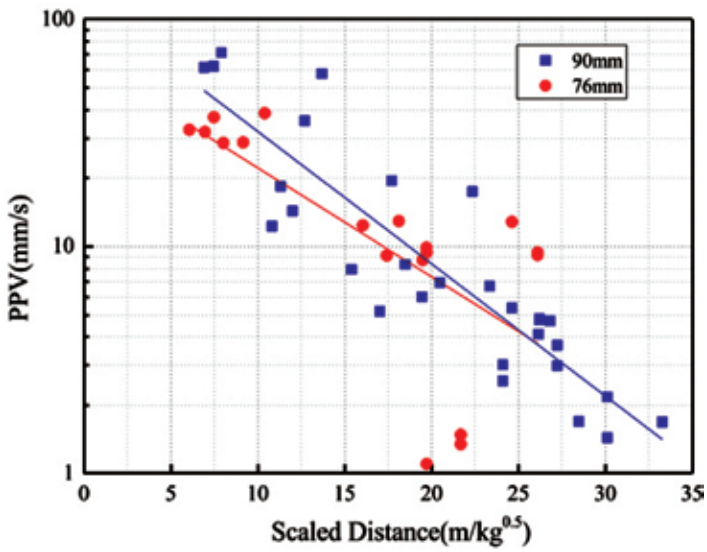


Fig 12: PPV versus the scaled distance with different hole diameters (Hu et al., 2014).

A. Hole diameter

Blair. (2010) indicated that the diameter range of standard blast holes ranged from 0.05m to 0.32m and found that the diameter of blastholes had a substantial effect on the vibration of the blast. Hu et al. (2014) found, based on earth-rock blasting examination, that the PPV in a large borehole was greater than that in a small borehole Fig. 12.

B. Hole depth

According to the blasting conditions or blasting results, hole depth is typically disturbed. Much of the charge energy is dissipated in the form of body waves in the rock mass when the hole depth is relatively high, which reduces the amount of ground vibration.

Liu. (2018) investigated the relationship between the PPV and the depth of the hole and found that if the depth of the hole was above a critical length, the PPV was maximal, as shown in Fig. 13.

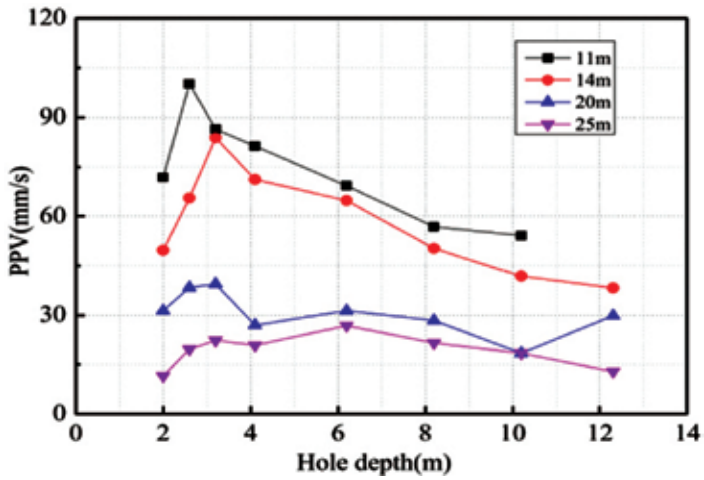


Fig 13: PPV versus hole depth (Liu., 2018)

C. The number of holes

There is confusion about the effect of the number of holes on ground vibration. Experimentally, Yuvka et al. (2017) demonstrated that by using blasting detonators without electrical delay, the number of holes did not affect blasting vibration Fig. 14.

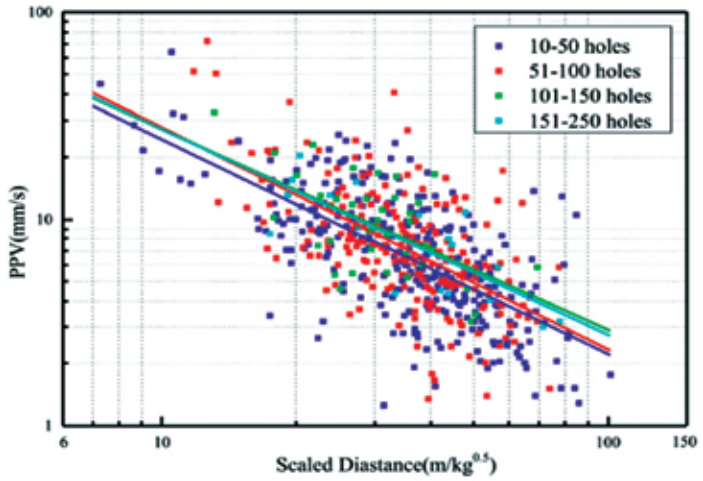


Fig 14: PPV versus the scaled distance with different hole numbers (Yuvka et al., 2017).

2.4.6. Stemming

Stemming is an inter-agent that is used in a blast hole to separate explosives. Solid, colloidal, liquid, and other different materials can currently be regarded as the primary stemming materials. Lu and Zhang (2001) compared the blast-hole internal pressure relationship with time for stemming and non-stemming cases Fig. 15.

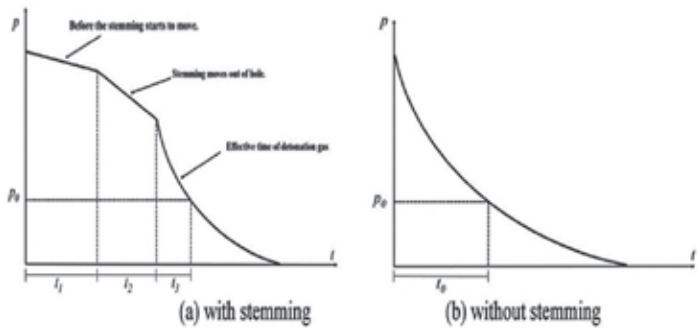


Fig 15: The pressure of blast-hole with time

Stemming research, however, focus mainly on the relationship between rock fragmentation and various stemming lengths, and rarely investigates the impact of stemming on blast-induced vibration. The effect of stemming should be considered as a factor affecting ground vibration because the duration of stemming is proportional to charge depth.

2.4.7. Spacing

Spacing between adjoining holes is built as a blasting parameter, due to the disparity in design methods and blasting sizes. As the explosive is simultaneously exploded in adjacent holes, the stress waves are superimposed on the line connecting the two holes. The tensile stress produced at the midpoint of the adjoining holes then increases exponentially. Adjacent blast holes can be simultaneously exploded with the application of electronic detonators, so by developing a reasonable spacing, rock fragmentation can be effectively enhanced.

2.4.8. Charge parameters

Industrial explosives are known to be explosive mixture consisting of an oxidizer and a reduction agent based on the oxygen balance principle. Explosives can be categorized by explosive form, composition, and characteristics. Charging parameters also include charging diameter and charge length, except for charging types, which cannot be ignored in the study of the impact of charging parameters on ground vibration. The energy, pressure, detonation velocity (VOD), and gas produced during the explosion are all dependent on the types of charge (cooper, 1996).

By conducting a numerical analysis, Blair and Jiang (1995) observed that the PPV increased in the far-field with VOD, but the PPV first increased in the near-field and decreased beyond a certain increase in VOD Fig. 16.

Blair (2014) concluded that when the ratio of length to the diameter of charge was less than 0.45, the Peak vibration became independent of VOD. VOD ranges from 2500 to 7000 m/s and is an important index for evaluating explosive output (Tete et al., 2016).

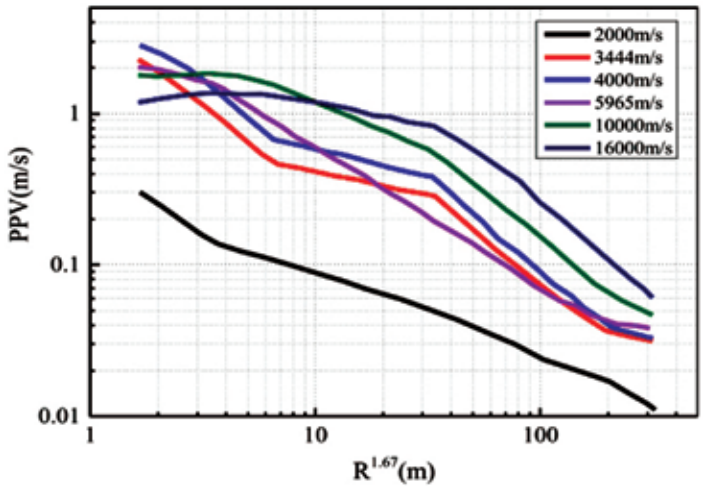


Fig 16: The influence of the VOD upon the PPV

2.4.9. Geological conditions

Geological conditions have an important effect on the rock mass properties and blasting vibration attenuation law (Kuzu,2008).

Hu et al. (2017) investigated the attenuation of blasting vibration and, the deceleration of the blasting vibration attenuation was lower in winter than in summer sessions. The findings showed that whether influenced the mechanical output and wave impedance properties.

3. BLAST-INDUCED GROUND VIBRATION

3.1.GROUND VIBRATION

The vibration of the particles of the medium through which the seismic wave propagates is known as ground vibrations. This is because of the seismic wave interaction that causes the medium's particles to vibrate. The velocity at which the particles of the medium travel is referred to as the particle velocity and the maximum value is referred to as the velocity of the Peak Particles (PPV). The primary or compression wave causes the particles to move in a to and from movement (compression and relaxation) along the wave propagation path, resulting in a shift in the volume of the medium without any changes in shape, while the shear wave causes the medium particle to move in the directional perpendicular to the wave movement direction, resulting in the shape of a change. The Rayleigh wave causes particles to travel in an elliptical orbit on the surface of the medium, usually a movement that is opposite to its propagation path. Surface waves are the largest carrier of energy as well as the source of the largest movements of the ground. Three main variables, such as the peak particle velocity(PPV), the length of the vibrations, and the time, control the degree of ground vibration. Factors such as the relative amplitudes of the individual vibration components aligned in three mutually perpendicular directions, which are longitudinal, vertical, and transverse, also have a significant impact on the magnitude of vibration and the reaction of the structures in the vicinity. Other than that, the quantity of ground vibration and its impact at a specific distance is also influenced by parameters such as geological conditions, blast design, and the quality of the explosives used. It has been statistically observed that the majority of the local intervention and complaints are associated with the vibration of the local structures rather than the ground vibrations. The majority of local interference and concerns have been statistically found to be correlated with the vibration of the local systems rather than the movements of the ground.

3.2. DIRECTION OF GROUND VIBRATION

The blast-induced ground vibrations are aligned along with three mutually perpendicular directions. They are:

- Longitudinal: The **longitudinal direction** refers to the wave's travel from the detonation point to the horizontal point of observation
- Transverse: **Transverse direction** is the motion of the wave horizontally but perpendicular to the blast.
- Vertical: The **vertical direction** is the to and from the motion of the wave along vertical.

Among the three mutually perpendicular vibration paths, as the structures are designed to withstand vertical forces, the vertical portion of vibration has a minimum impact on structural damage. Due to the shear effect of the forces, it is the longitudinal and transverse components that cause most damage since the various parts of the house or structures are subjected to variable speed under, which creates cracks and causes damages to them.

Numerous scientific and regulatory authorities have commonly recognized Peak particle velocity (PPV) as the standard parameters of blast-induced ground vibrations. When a single particle moves through the waves, the PPV is the highest velocity at which an individual earth particle moves or vibrates.

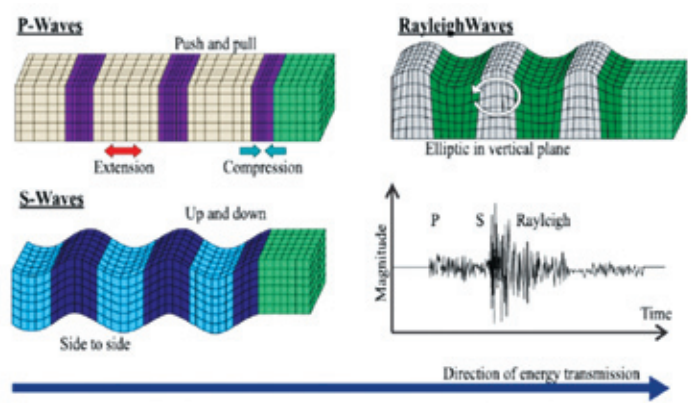


Fig. 17. The direction of energy transmission.

3.3. PREDICTION MODELS FOR GROUND VIBRATION

Table 1: Summary of the predicted PPV models by various researchers

Sl. No	Researchers	Year	Predictor Equation
1	Langefors and kihlstrom	1958	$V_{max} = k(Q/D^{2/3})^{b/2}$
2	Duvall and Petkof	1959	$V_{max} = k(D/Q^{1/2})^{-b}$
3	Devine et al	1963	$V_{max} = k(D/Q^{1/2})^{-b}$
4	Ambraseys and Hendron	1968	$V_{max} = k(D/Q^{1/3})^{-b}$
5	Nicholls et al.	1971	$V_{max} = k\ (Q^aD^b)$
6	Is 6922	1973	$V_{max} = k(D/Q^{2/3})^b$
7	Just-Free	1980	$Vmax = k(D/Q^{1/3})\ -b e_{-\alpha}D/Q^{1/3}$
8	Ghose and Daemen	1983	$Vmax = k(D/Q^{1/2})\ -b e^{-\alpha}D$
9	Ghose and Daemen	1983	$Vmax = k(D/Q^{1/3})\ -b e^{-\alpha}D$
10	Gupta et al.	1987	$Vmax = k(D/Q^{1/2})\ n e(\alpha XD/Q)$
11	Pal Roy	1993	$Vmax = n + k(D/Q^{1/3})^{-1}$
12	CMRI	1993	$Vmax = n + k(D/Q^{1/2})^{-1}$
13	Rai and Singh	2004	$Vmax = k\ R^{-b}\ Qmax\ e^{-\alpha}$
14	Ramulu	2004	$V_{max} = V(2(Bd/Bo)^{1/2} -1)$
15	Rai et al.	2005	$Vmax = 0.438D^{-1.52}$
16	Nicholson	2005	$Q_{max} = k(vD^2)^b$
17	Kahriman et al.	2006	$Vmax = 0.561D^{-1.432}$
18	Ozer (sandstone)	2008	$Vmax = 0.257D^{-1.03}$
19	Ozer (shale)	2008	$Vmax = 6.31D^{-1.9}$
20	Ozer (limestone)	2008	$Vmax = 3.02D^{-1.69}$
21	Kumar et al.	2016	$V_{max} = ((0.3396 \times 1.02^{GSI} GSI^{1.13})^{0.642}D^{1.463})/r$

Based on the scaled distance, investigators formed relationships, defined as the scaled distance (D) from the blasting face of the measuring point, divided by a certain maximum explosive weight per delay capacity (Q_{max}). Different studies have suggested various values for exponents.

Where; V_{max} is the magnitude of ground vibration, Q is the maximum charge weight in any delay interval, Dis the distance from the blasting,K, a, b is the constants whose values depend on the condition of the site, B is theslope of the best fit line of the V_{max} versus scale distance, $e^{-\alpha D}$ is the inelastic attenuation factor, α is the inelastic attenuation coefficient,and is the parameter related to the rock properties and geometrical discontinuities, V is the Vibration due to optimum burden,Bd is the Deviated burden, Bo is the Optimum burden, GSI is the geological strength index.

3.4. PEAK PARTICLE VELOCITY

Peak Particle Velocity is the maximum velocity attained by the particle under the influence of the wave propagating through the rock mass or on the surface of the rock mass recorded over a while. It is a vector quantity whereas Peak Vector Sum (PVS) is a scalar quantity that is the square root of the sum of the squares of the individual PPVs along three mutually perpendicular directions measured by the seismograph and is greater than the individual PPV values along each direction. It has been observed both scientifically and statistically that PPV is a better basis for assessment of the damage caused due to the ground vibration as compared to others. The vibration data collected from the field is analyzed statistically and then is modeled to generate predictive models which are site-specific. There are many predictive models of which the most commonly used equations are described below.

$$V = K \times W^a \times R^b \quad (1)$$

Where V is the Ground vibration (mm/s), W is the Maximum charge (kg), R is the Radial distance (m), K, a & b is the site constants which are determined statistically by multiple regression analysis.

The PPV at a scaled distance from the point of detonation for a column charge (L/D>6) considered as a cylindrically shaped chamber containing the explosive energy and expanding with its volume proportional to the square of the radius is given by

$$V = K \times (SD)^{-b} \quad (2)$$

WhereV is the Peak Particle Velocity (mm/s), K is the Ground transmission coefficient, b is the Specific geotechnicalconstant, SD is the Scaled distance (m/kg).

3.4.1. USBM PREDICTOR EQUATION

This equation predicts the PPV in which the scaled distance varies directly with the radial distance and inversely with the square root of maximum charge per delay. It is given as

$$V = K \times (R/\sqrt{Qmax})^{-B} \quad (3)$$

Where,V is the Peak Particle Velocity, R is the Radial Distance, Q max is the maximum charge per delay and, K,

B is the site constants which are determined graphically by plotting the PPV against the scaled distance in logarithmic scale by multiple regression analysis.

3.4.2. LANGEFORS-KILSTROM PREDICTOR EQUATION

In this predictor equation, the scaled distance varies as the square root of the ratio of maximum charge per delay and radial distance is raised to two-thirds power. It is denoted as

$$V = K \times (\sqrt{Q}max/R^{(2/3)})^{-B} \quad (4)$$

WhereV is the Peak Particle Velocity, Ris the Radial Distance, Q max is the maximum charge per delay and, K, Bis thesite constants which are determinedgraphically byplotting the PPV against the scaled distance.

3.4.3. AMBRASEYS-HENDRON EQUATION

According to Ambraseys-Hendron's prediction, the scaled distance is defined as the ratio of radial distance to the cube root of the maximum charge. The predictor equation for PPV is denoted by

$$V = K \times (R/\sqrt{Q}max^{1/3})^{-B} \quad (5)$$

WhereVis the Peak Particle Velocity, Ris the Radial Distance, Q maxis the maximum charge per delay and, K, Bis the site constants which are determined graphically by plotting the PPV against the scaled distance in logarithmic scale by use of multiple regression analysis.

3.4.4. INDIAN STANDARD EQUATION:

According to the Indian standard equation, scaled distance is defined as the ratio of maximum charge per delay raised to the power of two-third to the radial distance. The predictor equation is given as

$$V = K \times (Qmax /R^{2/3})^{B} \quad (6)$$

WhereVis the Peak Particle Velocity, Ris the Radial Distance, Q max is the maximum charge per delay, and K, B = site constants which are determined graphically by plotting the PPV against the scaled distance.

3.4.5. CMRI PREDICTOR EQUATION

Various scientific and statistical studies led to the establishment of a predictor equation for the prediction of efficient ground vibrations induced by blasting based on wave propagation law. In this model, the decrease in amplitude of ground vibration is attributed to geometrical spreading and was given by

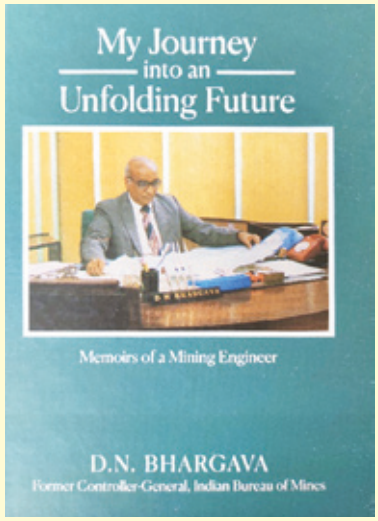
$$V = n + k (D/\sqrt{Q})^{-1} \quad (7)$$

Where Empirical constant 'n' depends on the rock properties and geological discontinuities. The other parameter k is dependent on charge weight, distance from the point of detonation, charge diameter, delay interval, blast design, etc.

(Part - II to continuee in subsequent issues)

"MY JOURNEY INTO AN UNFOLDING FUTURE" - A BOOK WRITTEN BY MR DN BHARGAVA

In the words of the author……



Some time ago, I had undertaken the task of writing the above-said book. The task is now over. On glancing through it, I felt that I must share my experiences with fellow Mining Engineers, Technocrats, Administrators and Business Executives, so I decided to publish it. The Director, Indian Institute of Technology, Banaras Hindu University, formally released the book. It is now available for sale.

When the printers asked me what price they should print on its cover, I confessed my inability; I asked them to indicate it. On the basis of their experience they indicated the range between Rs. 500 to Rs. 680. Keeping the interest of the readers I requested to specify the price as Rs. 450 only. At my age I have finished my task; my son is looking after its marketing. I have conveyed to him that the net amount received from the sale of the book must be donated to already identified institutions engaged in social service. To protect their interest I am not giving complimentary copies to my friends or relatives. I therefore regret to enclose a copy.

In this book, I have recalled my years as a Research Student of Mineral Beneficiation at Atomic Energy Commission, Assistant Quarry Manager with Associated Cement Companies, Quarry Manager with Nangal Fertilizers & Chemicals, Deputy Controller of Mines in Indian Bureau of Mines, Mine Manager at Sallitho Ores P. Ltd., Goa and again with Indian Bureau of Mines as Controller of Mines. All this happened between the years 1953 and 1973.

I took charge of the Indian Bureau in August 1973 and retired as the Controller General of the Bureau in April 1989. This long period provided me an opportunity to streamline procedures for the regulation of metalliferous mining in India and to organize Indian Bureau of Mines to play a positive role in the development of the Mining industry.

On superannuation, I was a Professor of Mining Engineering for two years at Nagpur. In between these two years, I visited China during the World Mining Congress and remained as a guest of the Chinese Ministry of Mineral Resources. Thereafter, I was sponsored by the Commonwealth office, London to review the status of small-scale mining in Namibia. The Secretary, Mines and Energy however solicited my association with the drafting of the Minerals (Exploration and Mining) Act for Namibia. I undertook to take up both the tasks.

The book runs into nearly 320 pages; Mr. M.S. Nagar, former CMD, Indian Rare Earths limited has written its foreword. He was generous enough to purchase five copies of the book for distribution to his friends. You may like to get the news about the book printed briefly in the Mining Engineers' Journal for information of fellow members.

D. N. BHARGAVA

EXPLORING HIGH ATTRITION IN MINING INDUSTRY

Rewati Raman Srivastava*

In this period of Pandemic, no one is actually monitoring attrition, as due to Covid, the situation in Industry's various sectors have been just reverse. Due to covid, the attrition of Industries has increased leading to joblessness.

Mining Industry is at the bottom of the pyramid of the entire economy. Unless we have good growth in this sector, growth of the other sectors will not be sustainable. In order to have best sustainable development of Mining, we require good/ or the best Mining Professionals working in this area rather than migrating to other sectors of the economy. Unless, this happens, the dream for all round robust development of Mining with so many good initiatives of the Government and that various Mining Professional bodies are advocating, would only be a castle built in air.

In Mining, apart from this Covid period, attrition in job has led to a scary situation. There is real dearth of good mining professionals in Industry. Those who are looking and exploring various resumes for open positions in their companies are aware of this situation. This situation is due to various reasons, few of which may be as discussed below.

General perception on Mining which also is the first impression students have when they enter into a College after successfully clearing competition in India is the first hurdle to Long term career in Mining. Study of Mining Engineering & Geology/ Applied Geology is definitely not the first option. It is read as a default option to one's rank in competition, and is being read to get a graduation degree for further studies or else for getting into white collar IT jobs, which are aplenty. To expect better mining professionals from this lot of students is a fallacy of the entire education system. The General perception that the industry further creates is no less a dampener.

For the students who are left to finally join the industry, mostly leave after few years of service to undertake MBA or higher studies. Mining Industry sure has not created that pull and attraction to retain good talents.

In past the concept of studying Mining Engineering & Applied Geology was different. In England, Mining Engineering and its allied subjects were studied in a separate Institute called the "Royale School of Mines". On similar ground, our country had created a separate Mining college called "Indian School of Mines". The mind set of students graduating from these colleges were to work in Mining Industry passionately till their eternity. With time, due to need, these colleges did not remain specialized colleges, but became generalists, like any other college, thus diluting the very concept with which the institutes were started. Mining Engineering & Geology also got established as course in many colleges teaching other streams of Engineering, wherein it became a practice to learn Mining Engineering or Geology as default option than to study it separately in a dedicated college to become only a good Mining Professional.

Perception on mining created world over is a manifestation of actions of various forces over a period of times. Unfortunately, the same still continues, and in this environment, I find this topic for discussion very pertinent. Mining Professionals are amongst one of the factors too. How are they responsible? They are responsible due to rejected attitude towards their own profession, due to own selfish gain, due to poor planning, foresight and execution of work, due to infighting and not supporting other professionals in the same field, not supporting youngsters, not planning for better infrastructure and yielding to the demand of high EBIDTA and PBT of the top management, not mentoring, not celebrating the profession of Mining.

All the above along with other factors like Corporate Management, Government Acts, Policies and its workings, Socio-Political atmosphere, Vested interest groups, etc.

Over years, there are various Mining Professional bodies that along with Government have brought in tremendous change and betterment in many policy matters for sustainable Mining in our country. Leading them are bodies like Mining Engineers Association of India and MGMI. However, we need to strengthen these bodies further, which can happen only through good mining professionals who are retained in this field so that these bodies become professional bodies like the AusIMM and WASET. We need to work towards creating bonhomie among professionals the way it is there for medical professionals through bodies like Indian Medical Association.

In past, due to various policies, there has been deterioration in prospects in Mining. Though Mines Act was enacted in 1952, instead of attaining a stature of standardization, we are still discovering. Various amendments are being passed, which will further take time to get translated into actions. Government's punitive actions, like large scale coal block de-allocations and implementation of Shah Commission, has increased unemployment. Professionals, who are getting employed post this scenario, are being employed in disadvantage and at less salary than before, so their commitment to the company and to the profession is less. Attrition rate in such case will be high, as the day they find a better pasture elsewhere, they will leave. Such environment has far reaching repercussions in creation of a good sustainable mining condition that will foster better employability and low attrition in future.

The attraction that was created for Mining Professionals during pre and post Independence time of highest paid profession is

**B Tech Mining Engineering, IIT (ISM) Dhanbad; Exec Diploma General Management, XLRI; GM New Projects, Adani Enterprise Ltd*

no longer true. During that time, Mining Professionals were one of the highest paid professionals.

To make matters worse, Jobs in mining are now being created by Public sector government enterprises for short term engagement of 2 to 5 years. This kind of tenure employment will further deteriorate Mining employment conditions. If the thinking of long term career that existed before and which was also supported by the greed of having a better post retiral life, is eliminated all together, how can we develop passionate Mining Professionals to work for long term betterment of Mining Industry. Even the plantation that is done during & post mining as progressive mine closure activity, requires nurturing of trees for 10 years to create a good green cover. How will such green covers be created? To compound the situation, there is Coal Mines Provident Fund (CMPF) organization in the country that mandates opening of accounts of all workers in Coal Mining Industry. The contribution rate to this organization is highest at 19% of the employee's salary, leading to lesser take home of all the people who are working in Coal Mining. However, the pension that will be provided after serving for whole life and contributing in its account will not increase every year, as it happens in any other pension fund of State and Central Government. Mining Professionals have been fighting for better treatment by CMPF on this matter since long, but to no avail. Now with starting of completely new era of employment on fixed term basis, that culture of working, for long term in an organization to have decent retiral benefit, is gone.

With the above backdrop, we have opened up Mining for commercial exploitation. The precedence of profiteering has been set through auctions, foundation of which is based on profit the companies are going to share with Government. Even before, auction of blocks was based on the same concept. This will lead to lesser margins for companies and more exploitation of labor in the industry. This scenario do not support creation of world class facilities of accommodations at mining site, or investing in other forms of infrastructure for better living like schools and hospitals. It only supports portable cabin office culture of accommodations for Mining Professionals which will further lead to high attrition and less retention of talented people in Mining Industry.

To wrap up, there are number of reasons for high attrition. We require good examples to be created by good companies in mining field like CIL, SAIL, NMDC, HCL, Tata Steel, AEL, ABG, Vendanta, JSPL, JSW, Ambuja, etc to name few. Unless we create a good environment for Mining Professionals to flourish, the development of sustainable Mining in India will be a distant dream and attrition level will be unchecked. We also look upon on the best of the Mining Professionals who are in IBM, DGMS, CCO and MoC to guide this journey for a better tomorrow. Care for Mining Professionals and their families should increase. For all the professionals who have worked relentless without fearing for their lives during this period of Pandemic, there has been no mention regarding them in media. Why? Have they not contributed by ensuring that none of the power plants starve for coal during this period, so that all the homes and hospitals get electricity? Could Doctors and Nurses would have done their service to Nation without electricity? Could people have stayed comfortably in their homes without electricity? This is only a small example of direct contribution of Mining Professionals. There are many. The economy of the country is dependent on the Mining Professionals at the bottom of the pyramid, who are the unsung Heroes of our Economy and they need acknowledgment for their contribution to improve their retention in the industry.

Disclaimer: The views expressed in the article are purely of the author and not of the company he is associated with. The Company does not endorse any of the views stated, nor any claims or representations made in this paper and accept no responsibility or liability to any person for loss or damage suffered because of their placing reliance upon any views, claim or representation made in this article. The information and expression of opinion contained in this paper are not intended to be a comprehensive study, nor to provide actuarial advice or advice of any nature and should not be treated as a substitute for specific judgment.

OBITUARY

Shri Vijay L Gohil
(16.10.1981-27.05.2021)

With heavy heart and despair, the members of Mining Engineer's Association of India express their condolences on the sad demise of Shri Vijay L Gohil who departed for the heavenly abode on 27th May 2021 at Ahmedabad.

Shri Vijay L Gohil was born on 16.10.1981 at Pipali village of Kodinar, Gujarat. Shri Vijay was a life member of Ahmedabad chapter (LM no. 4121/AMD). He was the committee member of Bhavnagar Local centre for the term 2019-21. He did Diploma in Mining from Government Polytechnic College Bhuj in the year 2001. He joined Gujarat Mineral Development Corporation (GMDC Ltd) in the year 2002 at Lignite Project Panandhro. After that he was transferred from Lignite Project Panadhro to Lignite Project Bhavnagar in the year 2008.

Demise of Vijay is a great loss to the Mining Industry. He was an excellent Mining man, a disciplined and hard working employee of GMDC always filled with positivity, an energetic, lively person, an enthusiastic and devoted sportsman and a caring person for his family.

Late Shri Vijay is survived by his wife Mrs Pujaben and son Shaktisinh Gohil. It is extremely tough time for his family members. The members of MEAI pray for the departed soul to rest in peace and express their deepest condolences to the bereaved family members.

MEAI NEWS

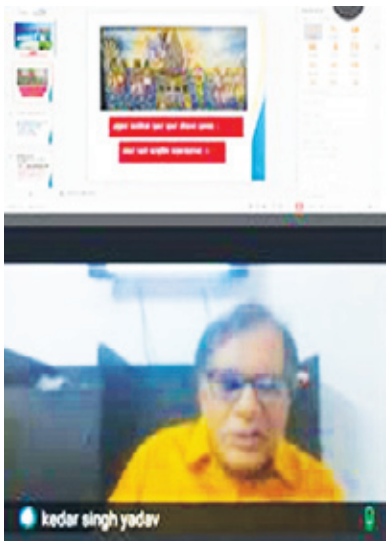
AHMEDABAD CHAPTER

Celebration of World Environment Day

Ahmedabad Chapter organized virtual World Environment Day on 5th June 2021. MEAI Members and Senior officers from various organizations participated in the virtual program. Chapter Chairman Shri A.K. Garg, Former Sr. General Manager (Technical) GMDC Ltd. delivered the Welcome address, emphasizing on the theme of the WED, i.e. "the Ecosystem Restoration".

Shri Chirag Shah, General Manager (Environment), GMDC Ltd. presented his message on World Environment Day, explaining various themes of WED given by UNEP, and the importance of current theme of "Ecosystem Restoration" along with an appeal to Mining Industries to take pledge for ensuring their best efforts in healing the mother Earth & in Ecosystem Restoration.

Shri S.N. Mathur, MEAI VP-II delivered the Key Note Address, emphasizing over the importance of Theme and the role of Mining Industries for betterment of Environment. He suggested conservation and scientific management of top soil and potable ground water. He also suggested creating a number of small ponds / Reservoirs at mine surface for storage of rainwater for use of dust suppression & other uses in mines instead if using ground water for the same.



Shri K. S. Yadav, Former Regional Controller, IBM presented his views over "Mined out Voids: as Potential Eco-Tourism spots". He emphasized on accommodating a few reclaimed mining sites in the existing tourist/pilgrimage circuit of Dwarka-Porbandar-Somnath-Diu. He also shared details of a few such identified sites where good ecosystem restoration works have been carried out.

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Shri Swagat Ray, a senior MEAI Life member & General Manager (P), GMDC Ltd. Rajpardi Project, Gujarat narrated the history of World Environment Day, the various components of Environment, the need of conservation of resources and contribution of GMDC Rajpardi Mines towards the Restoration of Ecosystem & Environment friendly mining.

Shri Pulak Mathur, Vice Chairman of the Chapter & General Manager (Technical), GMDC Ltd. Proposed Vote of Thanks. The webinar was coordinated by Ms. Gunjan Pande A.M (Env), GMDC Ltd. & Secretary-elect of the Chapter.

World Environment day was also celebrated at all Local Centres of the Chapter and the mines within their area of operation. A brief resume of such celebrations is given below:

Kutch Local Centre

GMDC Umarsar Lignite Mine:

Lignite Project Umarsar celebrated World Environment Day as per the guidelines provided by & in collaboration with the local Forest Department, maintaining Covid 19 protocol. The chief guest of the program was Shri Viral Sinh Chavda (RFO Dayapar) & Shri Rasik Meriya (RFO Social Forestry) the Guest of honour.

The Program was started by planting over 100 tree saplings and distribution of about 100 Tulsi podha (Plants) to company's and contractor's office staff.

Group of Bauxite Mines:

Gadhsisa Group of Bauxite Mines also celebrated World Environment Day on 5th June 2021. The importance of the Program and its theme was briefed by Shri S K Joshi, General Manager (P) laying thrust upon improvement of survival rate of plants. The program was followed by planting 150 Plant saplings at Naredi and Roha Kotda Mine.

Mata no Madh Lignite Mines of GMDC:

Lignite Project Mata No Madh celebrated the World Environment Day 2021 with theme topic of "Ecosystem Restoration" with participation of projects employees and the MDO staff with full enthusiasm. Mass plantation drive was undertaken by planting about 750 saplings. 200 nos. of Tulsi (Ocimum sanctum) and 50 nos of other plant saplings were distributed at Ravapar Township and nearby villages as per the guideline from Gujarat Pollution Control Board.

Sanghi Industries, Sanghipuram:

Sr. Executives like, Shri N B Gohil (Executive Director-SIL), Shri Pappu Kumar (AVP-Mines), Shri Yogendra Mangal (EHS Head), Shri Somvir Singh (Environment Dept. Sr. Manager) and other staff were present during WED celebration at Sanghipuram. The theme of program was 'Reimagine. Recreate. Restore' and its focal point was ecosystem restoration. Planting of saplings and distribution of plant saplings to the staff members received tremendous response.

Sewagram Cement works, Ultra--tech Cement Limited:

Sewagram Cement works celebrated World Environment Day 2021 conducting:

- Poster on Environment & Ecosystem Restoration were displayed in plant area, Captive Power Plant & Project Office
- E-quiz competition arranged for O&S in which 60 participants have taken active participation.
- Plantation in front of Maine Gate, Safety Park, RMHS area, TPP, Mines and in Colony in which about 250 tree saplings of Gulmohor, Peltoforum, Cassia & Tulsi were planted.
- Message from Resp. UH on World Environment Day 2021

Shri Anurag Angris said "At Sevagram we can be focused on sustainable practices like responsible use of electricity and water, increase plantation and greenery in our surroundings. Stop using plastic bags and starts using bags made of jute/ Cloths. Segregation of house hold waste and its proper disposal etc. for helping the ecology restoration".

South Gujarat Local Centre
GMDC Rajpardi Lignite Mine:

The Celebrations started with plantation of over 200 saplings of "Neem" species by the MEAI members, other employees of the mine in joint collaboration with Social Forestry Division of Jhagadia Taluka. The RFO and other staffs of Forest Department joined their hands with great enthusiasm on this occasion. A few of the members from local community also participated in the plantation programme and through this mass plantation drive a social awareness message was communicated for positive environmental actions.

GMDC Lignite Mine Tadkeshwar:

The project celebrated World Environment Day creating awareness of current, theme of WED the "Eco system restoration" under guidance of G.M. (P), Shri NN Mupkalwar and Shri J.G. Gadhavi Range Forest Officer, Mangrol Range and maintaining guidelines of Covid 19 issued by Government.

The Chief guest and the G.M.(P) along with other staff members planted over 200 tree saplings on this event. These saplings were provided by Social Forestry, Mangrol division.

GIPCL Vastan Lignite Mine:

Massive plantation carried out in the mining areas of

Vastan Mines on 05/06/2021 on the occasion of the World Environment Day-2021. Following point discussed during celebration of World Environment Day 2021 at Vastan Mine, GIPCL.

1. 35 Numbers of fruits trees planted near Vastan Mine office.
2. It has been decided that during upcoming monsoon 2021 around 30 Ha shall be covered by plantation in reclaimed area and 100 m area around mine periphery.
3. Care should be taken on minimum waste generation at source.
4. Use of Bio-plastics and natural fiber instead of synthetic fiber should be encouraged
5. Avoid use of plastic.


Bhavnagar Local Centre

GMDC Surkha (North) Lignite Mine:

World Environment Day 2021 was celebrated at GMDC Ltd. Bhavnagar Project, with full zeal & zest, on the theme as allocated by United Nations Environment Program (UNEP) “Ecosystem Restoration”. Owing the Theme, Bhavnagar Project organized a “Plantation Drive of 1000 Tulsi Plants”. The Day was celebrated at GMDC Mines and Township along with the involvement of Contractors and employees, families so as to spread the message of Environmental awareness in mass. Celebration commenced with Plantation Drive at ADM Office of Mines. General Manager (P) Shri N. Pareek had planted a Tulsi Sapling and initiated the Drive. GMDC Officers, Employees and Contractors of GMDC joined the drive and planted the saplings at various locations of Mines. The Plantation Drive of 1000 Tulsi Sapling was encouraged by Gujarat Pollution Control Board under the Government of Gujarat Program of Tulsi Plantation in State on World Environment Day. Around 500 Saplings were planted in Mines.


To promote the awareness & Cover a larger area under Afforestation, nearby Core Zone Villages were also distributed with 200 Tulsi saplings.

GPCL Khadsaliya Lignite Mine, Bhavnagar:

The entire event has been hosted by M/s Gujarat Power Corporation limited with help of MDO m/s P C Patel Mahalaxmi Infra LLP under the guidance of Gujarat Pollution Control Board Bhavnagar Region. Shri Y K Singh Mine Manager welcomed Shri Pawan Sharma GPCB officer with all the dignitaries and elaborated the steps taken by GPCL for protection of environment and for maintaining green and clean mine premises. Planting of sapling of Neem was undertaken in small area of mine premise. GPCL family with MDO took a pledge to make its campuses non-recyclable plastics-free.


GHCL Lignite Mine Bhavnagar:

Khadsaliya Lignite Mine of M/s. GHCL Limited celebrated the World Environment Day on 5th of June 2021 to encourage awareness and environmental protection. This year theme was "Ecosystem restoration”; and its focal point is 'Reimage. Recreate. Restore'. The aim was to reduce 50 % of our emissions, focus on waste management, water & energy conservation, good housekeeping & adoption of cleaner production for a sustainable future.

A campaign was organized to promote people to change their attitude towards the environment for making a safe future for next generation and reduce the extinction of natural species.


HYDERABAD CHAPTER

New Executive committee formed and charge taken over

The Executive committee and AGM meeting held on 8th March 2021. Mr B. R. V. Susheel Kumar, Chairman, Hyderabad chapter was in Chair and conducted the meeting as per Agenda items. The Chairman appraised the committee

about the activities conducted by the Chapter during last four and half years.

The Committee members discussed elaborately on elections and unanimously finalized the following team for the period 2021-23:

1) Sri Sumit Deb, CMD., NMDC as Chairman
2) Dr Venkataramayya Prof., MREC as Vice Chairman
3) Sri B. Mahesh Chief Liaison Officer & PRO _ SCCL., as Secretary
4) Sri Swamy Krishnaji Rao ADMG., as Joint Secretary
5) Sri P. V. R. S. Raju, G.M, MHIPL as Treasurer

On 24th of May 2021, another online meeting was held and the above team have taken over the charge of their respective positions for the term 2021-2023. The members and participants expressed their heartfelt condolences to Ms Spandana, a contract employee of the MEAI, who passed away due to covid related complications and the chapter contributed Rs 50000 to her family.

World Environment Day Celebrations

The Hyderabad Chapter organized a webinar celebrating the "World Environment Day" on 5th of June 2021.

Sri Sumit Deb, Chairman, Dr M.S. Venkataramayya, Vice-Chairman, Sri B. Mahesh, Secretary, Sri Swamy Krishnaji Rao, Joint Secretary, Sri P. V. R. S. Raju, Treasurer of Hyderabad Chapter along with several office bearers and senior members of MEAI participated in the webinar. More than 100 other members also enthusiastically participated in the webinar and discussed about the activities the mining communities should take up to protect the environment.

Online Certification Program on ANSYS software

Hyderabad Chapter Co-sponsored a 6-day online certification program on ANSYS software and its applications in Geo – Technical Domain held from 14th of June 2021. The Department of mining engineering of Malla Reddy engineering college – Hyderabad, organized this program.

Dr Venkataramayya, Vice Chairman and Sri B. Mahesh, Secretary of Hyderabad chapter participated in the Inauguration of the program and addressed the participants.

Hyderabad Chapter - A Way Forward

A Webinar and interactive session on Future Activities of Hyderabad, Chapter - A Way Forward was held on 20th June of 2021. Several Past Presidents of MEAI, Past Chairmen, Office bearers and Life members of Hyderabad Chapter attended the Webinar and discussed about the proposed Future Activities, which Hyderabad Chapter is planning to take-up. They include Professional Development Program, Consultancy, Skill Development, Lectures to Students in Local Language, and Industry Institution Interaction.

RAJASTHAN CHAPTER-UDAIPUR

To consider all stone waste/ slurry /dust/ dump material as economic mineral resources

CDOS, Rajasthan, a unit of RICCO, took the initiative to highlight how stone waste can be utilized in commercial venture. They held online workshop (three hours duration) on April 9, 2021 on GAINFUL UTILIZATION OF STONE WASTES AND SLURRY. Full proceedings of the workshop are available on internet on https://www.youtube.com/watch?v=A25YBJEqLDY.

In the workshop, a good number of papers were presented by scientists from CSIR, IITs and Professors from Malviya Engineering college.

SALIENT POINTS FROM THE PAPERS PRESENTED ARE:

1. 25-30% granite cutting waste can be used in concrete making.
2. In hollow blocks 30-35% stone waste can be used.
3. In cement, up to 10% marble stone cutting waste/slurry can be mixed without compromising quality.
4. Lot of research has been done on the use of Kota stone cutting waste
5. New variant of cement having 50% clinker named as LC3 may hit market soon. The clinker will be mixed with calcined clay and limestone powder (un-burnt and can be of lower grade). OB of clay mines would be suitable. Kota stone cutting waste up to 15% can be added.
6. Work is going on to promote bi-layered bricks so that the brick looks attractive having the colour of stone waste which has been used to make it.
7. One of the presenter said that today no river sand is mined in Maharashtra.
8. Now location of cement plant is decided on the basis of nearness to site where fly-ash would be available instead near to limestone deposit.

From the deliberations, one can easily conclude that:

1. It is time to consider all stone waste/ dump material as economic mineral resources obtained during mining operation. No such material is waste now.
2. It is time to consider all slurry /dust as economic mineral resources obtained during cutting/sawing/processing/ polishing of dimensional stones.

STATUS OF PRODUCTION OF DIMENSIONAL AND BUILDING STONES IN RAJASTHAN VIS A VIS INDIA

It needs no emphasis that Rajasthan is the largest producer of dimensional and building stones in the country. Looking to all these data, the Executive committee of Mining Engineers' Association of India, in its meeting held on May 22, 2021 decided to send a representation to the government to impress that it is time to consider all stone waste/ slurry /dust/ dump material as economic mineral resources. Accordingly the Chapter Chairman wrote a letter to DMG.

No such material is waste now. In addition, each waste has its own characteristics. Only DMG is the right organization to identify such resources. After these resources have been identified, a compilation is done and subsequently made available to general public. Compilation need not include quantity. Just indicated in words like tiny, small, medium and large would suffice. This work can be done in stages.

Each group of rock/ dimensional/building stone deposit is unique with separate chemical composition and characteristics, so only the DMG can make available compilation to general public. More than that even general awareness may not be there about the huge waste generated at the slate stone/ phyllites mines and their slab cutting plants. Only the DMG knows about it.

The details of rock formation & chemical composition is already known to the Geological wing of the Deptt. Also the availability is known to the field staff of Mining wing. It is only a matter of clubbing both these details. Such compilation would be helpful in implementation of M Sand policy. Examining following would be helpful to facilitate compilation:

1. All areas held in the past under PL for silica sand.
2. All areas held/surrendered in the past under ML for silica sand.
3. Dumps of existing ML of silica sand

VERAVAL-PORBANDAR CHAPTER

Veraval-Porbandar Chapter of Gujarat organised plantation drive on World Environment Day 2021 in Saurashtra Region. The theme taken up for this year was “Ecosystem Restoration

call for urgent action to revive our damaged ecosystems, changing diets, cleaning rivers and coast".

On this occasion, Chapter Chairman Mr. Ajay Kumar Jain expressed his views on how to kick-start the mission growing trees, green mines along with the production, how we can collectively work together in protecting our environment, and also how to protect ecosystem at our mining areas.

On this occasion Chapter Vice Chairman Mr. Manish Kumar Yadav, along with the other members of the Chapter, also organised plantation drive at Harsana Limestone Mines of GHCL ltd.

VISAKHAPATNAM CHAPTER

Webinar on " Mineral Concessions – First-cum-first cerve and Vs Auctions" held on 12th June, 2021: Conclusions and Recommendations

Dr. C.H. RAO, Chairman of the Visakhapatnam Chapter has welcomed the Speakers to the Webinar.

The Vice-President of MEAI -India, **Sri. K. Madusudana** has presented a comprehensive view on auctions and explained that how Govt. of Karnataka Introduced auction system in 2016 for Mineral concessions for Minor Minerals and how not a single auction happened; and how through FCFC system at least 50 Quarry leases were sanctioned every year. He explained how auctions have put pressures on margins and running at Loss and made Sustainability at risk and created monopolistic condition and resulted in loss of revenue to the Government. He also narrated how how commodities rates are increased and eemployment is in threat.

In the Key note address by **Mr. B.K. Bhatia**, Joint secretary General of Federation of Indian Mineral Industries, FIMI, made a comprehensive dissection of Auction regime of major mineral of India, evaluated the auction mechanism for grant of mineral concessions, analysed the revenues.

He suggested that the First-come-First-Served (FCFS) mechanism should be adopted with effective checks and balances for grant of mineral concession as adopted by most of the mineral resource rich countries; He explained how as per international practice no resource rich country spends tax payers' money on risky venture like exploration, where success rate of prospects is 1:100;

The private sector should be the main source of investment in reconnaissance, exploration and mining with right to seamless transition, transferability with security of tenure.

To open up exploration area to the private sector, with a structured financial support particularly for establishing deep seated minerals by attracting international exploration companies.

B.K. Bhatia has emphasised that Mining to be considered as an 'Independent Stand Alone Activity'.

Sri. D. Mahesh babu, the Additional Director of Directorate of Geology and Mining of Chhattisgarh has categorically narrated his experiences of auction process of minor minerals with few examples and how auction system is mis-used, cartelized and how it neither helped the mineral industry nor the state to get desired revenues. His presentation is an excellent example of how auction process is mis-used in India.

Sri. V.D.Rajgopal Garu, Former Director of Mines and Geology, has comprehensively explained the Legal background for Auctioning System, auction in patta- lands, effects of auctions in coal blocks, captive mines, miner minerals, granite, road metal.

According to him, even if LOI cases are exempted from auction system, the cases covered by non-issue of LOIs may also try to litigate since the system of issue of LOI may be not on first received basis.

Sri. B.V.R. Susheel Kumar, Director, Telangana Government has explained in detail about the Status of auctioned Non-Coal Mineral Blocks, Status of Auctioned / Allotted Coal Mines, and the Effective Tax Rate World Vis-a-Vis India.

Levy of tax rate To be levied as percentage of sale price and the Range of percentage 10 to 20 of sale price; Taxes Shall be finalized by interacting with Entrepreneurs; Rationalize the rates as there are DMF,SMET; Rate of Royalty/ SF shall have the cognizance of DMF, SMET; Constitute a Committee at State Level;

Sri. B.V.R.Susheel Kumar has narrated how the development of market for a particular granite variety is only done by entrepreneur. And how percentage of recovery cannot be estimated for the same color in neighboring quarries and how within the same quarry as well the percentage of recovery cannot be estimated uniformly and has supported the FCFS system over auction of minor minerals Any State Government cannot take-up such entrepreneurship for releasing the colors into domestic or international market; Even for the established colors by entrepreneurs, no State Government can establish the percentage of recovery and the quantum of Granite for a particular color to be extracted;

The Ministry of Mines, Government of India, may formulate uniform Guidelines for Granite & Marble considering the above recommendations, as was formulated for Sand in

the form of Sand Mining Framework to all the States in the Country.

Sri. Krishna Prasad, General Secretary of Federation of Indian Granite and Stone Industry (FIGSI) has explained how auctions of granite and natural stones curtailed the development of granite industry in the states of Karnataka and Tamil Nadu and emphasized the FCFS system for Granites and other natural stones over auctions.

Later, **P. Ramakrishna**, DGM RINL has explained the Public sector perspective on auctions and compared both FCFS and auction processes in detail and explained the challenges. He explained that a successful bidder shall obtain approximately 20 clearances from different Authorities before signing the mining lease and often lead to delays in production. There were over-estimation of value of an auctioned mineral block by bidders, so that 'wining' the auction turns out to be cause a loss- the winner curse.

He narrated how RINL has participated in several iron ore and coal blocks auctions, could not succeeded due to factors like aggressive participation of private players, 2. Techno-economical price not suitable. He suggested a mixed/ hybrid system may be defined by appointing a high level expert committee which will live long and help the nation by increasing GDP.

Sri. GVRKNSS Sharma, Treasurer, MEAI – Visakhapatnam Chapter has explained the SAIL – Mining leases and their current status and operational issues.

Akshadeep Mathur – Secretary General of Federation of Mineral Associations of Rajasthan has explained the need for a separate classification of MSME of Mines. Mathur ji has captured the issues of minor minerals in the MSME framework and created a template for MSME-Mines for the first time in India.

Mr. Tanmay Reddy, a granite owner from Chittoor and representing FAPGI spoke about effects of auction of minor minerals on GST, Vat on diesel , local employment, minerals industries, and government expenditure on development like BPL housing and roads, impact on exploration . He emphasises that minerals cannot be seen as direct revenue generators for govt but for development and employment at lower cost price resulting in higher taxes indirectly.

Dr. C.H. RAO, Chairman of MEAI, Visakhapatnam Chapter and the Founder General Secretary of FAPGI and EC member of FIGSI acted as moderator of the session and has concluded that how in the webinar two of Public Sector Organisations representatives SAIL and RINL, two Former Directors of Mines and Geology of AP and Telangana, One current Additional Director of Chhattisgarh where auction was implemented and Four Premier National Level Mineral mining Associations, FIMI, FIGSI, FMAR, and MEAI have outrightly condemned the auction process and especially for Minor Minerals.

He concluded that After thoroughly going through the Judgement on Presidential reference on 2G , it appears that auction process has been used as a facade to bring uneven legitimacy to the process, so bureaucracy can escape under the grab of transparency, fairness. He commented that how auctions are manipulated, not only in India is a open secret.

Mr. V.G. Venkat Reddy garu, Director, Mines and Geology, who is the chief guest to the webinar could not attend due to some urgency.

Mr. Hari Krishna, General Secretary of MEAI – Visakhapatnam Chapter has presented the vote of thanks to the esteemed speakers, participants on behalf of Visakhapatnam Chapter.

The deliberations of the webinar, the Presentations of the Webinar are being sent to Hon'ble CM of AP, Hon'ble Mines Min of AP, Principle Secretary.

(Continued from Page 11)

Unifying individual efforts

The LME, the world's biggest market for industrial metals, introduced in 2019 responsible-sourcing standards covering all metals traded on the bourse. The move forced producers to probe their supply chains and demonstrate compliance with due-diligence guidelines drawn up by the Organization for Economic Co-operation and Development (OECD). Miners, including Anglo-Russian Polymetal (LON: POLY), have long complained about the lack of standards when it comes to ESG.

Chief executive Vitaly Nesis said there were many cases where investors were led to believe that a certain company was advanced in terms of ESG only to later discover that "it's not true." "In the cases where you need to measure actual relationships with the workforce or the host communities…rating agencies frequently lack a robust analytical framework," Nesis said in an October interview. A new conflict minerals regulation came into full force across the European Union this year. It focuses on four minerals commonly referred to as "3TG" – tin, tantalum, tungsten and gold – which have been found to occasionally finance armed conflict or have been mined using forced labour.

The EU is currently evaluating whether existing schemes to certify that refiners are sourcing gold responsibly conform with the rules that came into effect in January. If the bloc accepts existing accreditations, it will be simpler for gold importers to show they comply with the regulation.

Cecilia Jamasmie, Mining.com | June 3, 2021

CONFERENCES, SEMINARS, WORKSHOPS ETC.

ABROAD

1-2 Jul 2021: **MINE WASTE AND TAILINGS CONFERENCE 2021**. Online conference organized by AusIMM Brisbane, Australia

26-27 Jul 2021: **OPEN PIT OPERATORS CONFERENCE 2021**. Online conference organized by AusIMM Perth, Australia

22-23 Jul 2021: **International Conference on Mining and Economic Geology ICMEG** in Berlin, Germany. Website URL: https://waset.org/mining-and-economic-geology-conference-in-july-2021-in-berlin; Contact URL: https://panel.waset.org/Support

22-23 Jul 2021: **International Conference on Geology, Mineral Exploration and Mining ICGMEM** in Rome, Italy. Website URL: https://waset.org/geology-mineral-exploration-and-mining-conference-in-july-2021-in-rome; Contact URL: https://panel.waset.org/Support

23-24 Aug 2021: **ICCGG 2021 - International Conference on Computational Geology and Geosciences** in Rome, Italy. For more details, please visit: https://waset.org/computational-geology-and-geosciences-conference-in-july-2021-in-rome

23-24 Aug 2021: **International Conference on Geology, Mineral Exploration and Mining ICGMEM** in Rome, Italy. Website URL: https://waset.org/geology-mineral-exploration-and-mining-conference-in-august-2021-in-rome; Contact URL: https://waset.org

12th Sep 2021: **International Conference on Geological and Environmental Sustainability (ICGES-21)** in Kuching, Sarawak, Canada. Contact Info: Phone: +91 8870915303; Email: info@scienceleagues.com

20-21 Sep 2021: **ICGG 2021 - International Conference on Geochronology and Geography** in Toronto, Canada. For more details, please visit: https://waset.org/geochronology-and-geography-conference-in-september-2021-in-toronto

28-29 Sep 2021: **NEW LEADERS CONFERENCE 2021**. Online conference organized by AusIMM Brisbane, Australia

6-7 Oct 2021: **ICEGGE 2021 - International Conference on Engineering Geology and Geomorphology Engineering** in Beijing, China. For more details, please visit: https://waset.org/engineering-geology-and-geomorphology-engineering-conference-in-october-2021-in-beijing

18-19 Oct 2021: **ICEG 2021 - International Conference on Earthquake Geology** in Rome, Italy. For more details, please visit: https://waset.org/earthquake-geology-conference-in-october-2021-in-rome

21-22 Oct 2021: **ICRSSGA 2021- International Conference on Remote Sensing Sensors for Geoscience Applications** in Athens, Greece. For more details, please visit: https://waset.org/remote-sensing-sensors-for-geoscience-applications-conference-in-october-2021-in-athens

8-10 Nov 2021: **IRON ORE CONFERENCE 2021**. Online conference organized by AusIMM Perth, Australia

8-9 Nov 2021: **ICEGGP 2021 - International Conference on Environmental Geology and Geological Problems** in Istanbul, Turkey. For more details, please visit: https://waset.org/environmental-geology-and-geological-problems-conference-in-november-2021-in-istanbul

18-19 Nov 2021: **International Conference on Mining Geology, Exploration and Mining ICMGEM** in Singapore, Singapore. Website URL: https://waset.org/mining-geology-exploration-and-mining-conference-in-november-2021-in-singapore; Contact URL: https://waset.org

2-3 Dec 2021: **ICRMGEA 2021 - International Conference on Rock Mechanics for Geotechnical Engineering Applications** in Tokyo, Japan. For more details, please visit: https://waset.org/rock-mechanics-for-geotechnical-engineering-applications-conference-in-december-2021-in-tokyo

6-7 Dec 2021: **ICCGM 2021 - International Conference on Computational Geosciences and Mathematical Modelling** in Kuala Lumpur, Malaysia. For more details, please visit: https://waset.org/computational-geosciences-and-mathematical-modelling-conference-in-december-2021-in-kuala-lumpur

6-8 Dec 2021: **INTERNATIONAL FUTURE MINING CONFERENCE 2021**. Online conference organized by AusIMM Perth, Australia

13-14 December 2021: **ICRGGACS 2021 - International Conference on Regional Geology, Geologic Analysis and Computer Simulations** in Cairo, Egypt. For more details, please visit: https://waset.org/regional-geology-geologic-analysis-and-computer-simulations-conference-in-december-2021-in-cairo

21-22 Jan 2022: **International Conference on Economic Geology, Mineralogy and Mining ICEGMM** in Amsterdam, Netherlands. Website URL: https://waset.org/economic-geology-mineralogy-and-mining-conference-in-january-2022-in-amsterdam; Contact URL: https://waset.org

11-12 Feb 2022: **International Conference on Geology and Mining ICGM** in Kuala Lumpur, Malaysia; Website URL: https://waset.org/geology-and-mining-conference-in-february-2022-in-kuala-lumpur; Contact URL: https://waset.org

25-26 Mar 2022: **International Conference on Mining Geology and Ore Treatment ICMGOT** in Madrid, Spain. Website URL: https://waset.org/mining-geology-and-ore-treatment-conference-in-march-2022-in-madrid; Contact URL: https://waset.org

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