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Not Just Mining Minerals...

MINING HAPPINESS

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Mining Engineers' Association of India
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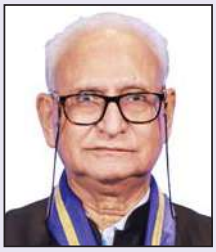

this issue contains...

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President's Message.....

Dear members..

Wish all members and the readers of the Journal and their families a Very Happy and Prosperous Diwali.

My heartfelt greetings to MEAI HQ members, Office bearers and Members of all Chapters for the grand celebration of the Indian Mining Day with great vigour and enthusiasm. The theme topic for this year's IMD was "Women in the Mining Industry". It's a matter of great pleasure and pride that the all women rescue team of HZL participated in the XIII International Mines Rescue Competition at Colombia and secured second rank. Congratulations to the team and all women members of MEAI.

Every year we organise a National Quiz on this occasion. This time we received a very good response and could have ten teams participating. In addition to the cash prizes from MEAI, M/s MSPL has also sponsored cash prizes for winners. Thanks to the efforts of Shri K Madhusudana, Immediate Past President for this sponsorship.

I would also like to congratulate the entire MPDP team for successfully completing 24 Tech. Lectures thereby two years of MTS series of lectures. Thanks to Shri Deepak Vidyarthi for his untiring efforts. The team however couldn't organise the MOST program so far. I wish this program henceforth be conducted separately at each zonal level.

We are going to have our next (5th) Council Meeting at Hutti on 9th November. Some very important points will be taken up on the agenda for deliberations but the special attraction will be a Panel Discussions on the scenario caused by the recent judgements of the Hon'ble Supreme Court. Shri R K Sinha, Controller General (Retd.), IBM, will be the leading panellist with Dr. Rajagopal, Dr C H Rao and Shri Vijay Singh, all our own Council members will be the other panellists. The event will be moderated by our VP-I, Shri Sundara ramam. Hope, some good suggestions will emerge from the panel discussion for getting some relief for the industry.

Before I conclude, let me congratulate our NACRI team, particularly its Co-Chair Dr PV Rao and Shri Sundara ramam for their impressive presentation at CRIRSCO AGM on October 15th.

Once again my best wishes for a Happy Diwali.

S.N. Mathur
President

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EDITOR'S DESK

Dr. P.V. Rao
Editor, MEJ

The Indian mining sector, rich in mineral wealth and potential, faces challenges in attracting significant Foreign Direct Investment (FDI) due to regulatory uncertainties and inconsistent reporting standards. The Indian Mineral Industry Code (IMIC) for Reporting Mineral Resources and Reserves, developed by the National Committee for Reporting Mineral Resources and Reserves in India (NACRI) and approved by the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) in 2019, offers a transformative opportunity to address these issues. This editorial explores how the IMIC could catalyse FDI in India's mining sector, its challenges, and its broader implications for the economy.

The IMIC aims to align India's mineral reporting standards with global best practices, particularly the CRIRSCO template. This alignment is crucial for attracting FDI as it provides a common language for international investors to evaluate mining projects in India. The code's primary objectives are to enhance transparency, improve communication with the global investment community, and provide a more accurate assessment of mineral resources and reserves. One of the key contributions of the IMIC is improved transparency and communication.

By adopting internationally recognized reporting standards, Indian mining companies can present their projects in a format familiar to global investors. This clarity reduces uncertainty and helps potential foreign investors better assess opportunities and risks associated with mining projects in India. Furthermore, the IMIC mandates reporting reserves that are economically viable deposits with high geological confidence. This is a significant improvement over the current United Nations International Framework Classification for Reserves/ Resources-1997 (UNFC) system, which does not adequately convey the economic viability of mining blocks, as it includes categories beyond Inferred Mineral Resources. By offering a clearer picture of a project's potential profitability, the IMIC makes Indian mining projects more attractive to foreign investors.

The code also facilitates enhanced due diligence processes required by international banks and investors. Compliance with international reporting standards streamlines the investment process for foreign entities considering Indian mining projects. This is particularly important for attracting large-scale investments from institutional investors and multinational mining companies. Additionally, the IMIC helps Indian mining companies gain better access to capital for exploration, project development, and mine expansion programs. By setting minimum public reporting standards by the Securities Exchange Board of India (SEBI) for listed mining companies, the IMIC can streamline fundraising from equity markets. This is beneficial for attracting foreign portfolio investment, as it provides a standardized framework for evaluating mining companies listed on Indian stock exchanges.

Despite these potential benefits, the Ministry of Mines has yet to accept and implement the IMIC officially. Several challenges contribute to this hesitation. Firstly, India currently uses a resource classification system based on UNFC-1997 (subsequently MEMC Rules since 2015), leading to reluctance to shift from this established framework. The ministry has concerns about transitioning to the IMIC, including training needs and updating existing geological reports. Additionally, there may be a lack of understanding among government officials about the benefits of adopting the IMIC. Regulatory inertia is evident in the ministry's failure to formulate rules aligned with the IMIC despite informal assurances.

Adopting the IMIC could transform India's mining sector, making it more competitive globally. By aligning with international standards, Indian mining companies would be better positioned for global ventures and partnerships, leading to knowledge transfer and technological advancements. Moreover, increased FDI in the mining sector could have significant ripple effects on India's economy—creating jobs directly in mining operations and indirectly in supporting industries. Increased mineral production could boost India's export potential and contribute to economic growth. Additionally, adopting international best practices could lead to more sustainable and environmentally responsible mining operations. However, while the IMIC could attract FDI, it is not a cure-all for challenges in India's mining sector. Other factors like land acquisition issues, environmental concerns, and regulatory stability are crucial in attracting foreign investment. The IMIC should be viewed as part of a broader strategy to reform and modernize India's mining sector.

In conclusion, the IMIC represents a significant opportunity for India to align its mineral reporting standards with global best practices and attract much-needed FDI in its mining sector. By enhancing transparency and improving communication with global investors while providing accurate assessments of mineral resources and reserves, the IMIC could transform India's mining landscape. Successful implementation requires overcoming regulatory inertia and resistance within government circles. As India seeks economic growth and aims to establish itself as a global mining powerhouse, adopting the IMIC could be a crucial step forward.

- Editor

NEWS FROM THE MINERAL WORLD

India set to kick off its first offshore mineral auction: Mines Secretary

He encouraged the industry to study the exploration reports of these blocks and bring in interested domestic and international players

India is set to kick off its first-ever offshore minerals auction shortly, with 10 blocks up for grabs, Mines Secretary VL Kantha Rao said on Wednesday.

"We are ready with 10 blocks on both the east and west coasts of India. These blocks will include sand, lime mud, and polymetallic nodules," Rao said during the Federation of Indian Mineral Industries (FIMI) event.

He encouraged the industry to study the exploration reports of these blocks and bring in interested domestic and international players. The Geological Survey of India (GSI) has identified polymetallic nodules, also known as manganese nodules, along with sand and gravel in offshore areas. Polymetallic nodules primarily contain iron, manganese, nickel, copper, and cobalt.

Moreover, offshore regions serve as reservoirs of sand and gravel, crucial for construction, beach nourishment, and land reclamation projects. Additionally, rare earth elements have also been discovered beneath the sea.

Offshore minerals are found in all three large bodies of water, the Indian Ocean, Arabian Sea, and Bay of Bengal, that surround the Indian peninsula.

Nitin Kumar, New Delhi, BS | Sep 18 2024

JSW Steel, ACC, NMDC among 31 bidders in 10th commercial coal mine auction

"A total of 31 companies have submitted their bids in the auction process," the coal ministry said in a statement

JSW Steel, JSW Energy, ACC Ltd, NMDC Ltd, NTPC Mining Ltd and Jindal Steel and Power Ltd (JSPL) are among the 31 companies which have submitted bids for the tenth round of commercial coal mine auction. "A total of 31 companies have submitted their bids in the auction process," the coal ministry said in a statement. More than 10 new companies have participated for the first time under commercial coal mine auction.

A total of 67 coal blocks were put up for sale in June under the tenth round of commercial mines auction. The government has received 44 bids for the 67 coal mines, the statement said.

"The bids will be evaluated by a multi-disciplinary technical evaluation committee and technically qualified bidders will be shortlisted for participation in the electronic auction, to be conducted on MSTC portal," it added.

Press Trust of India New Delhi | Oct 21 2024

Govt receives 44 bids in 10th round of commercial coal mine auction

The coal ministry in June put on sale 67 coal mines for auction under the 10th round of commercial mines auction

The government on Friday said that 44 bids have been received for 67 coal blocks put for sale under the 10th round of commercial mines auction. A total of 44 bids were submitted in physical form.

The coal ministry in June put on sale 67 coal mines for auction under the 10th round of commercial mines auction.

"The substantial number of bids underscores the continued interest and participation from stakeholders in India's evolving coal sector," the coal ministry said in a statement.

The auction process has drawn considerable participation from small and medium-sized players, indicating the inclusive nature of the auction process. This inclusivity highlights that the reforms in the coal sector have been well received across the industry, regardless of the size of the players.

Press Trust of India New Delhi | Oct 18 2024

Birla's Hindalco, Jindal's JSW Steel in race for copper mines in Jharkhand

Hindalco Industries and JSW Steel will be vying for state-owned Hindustan Copper Ltd's two copper mines in Jharkhand.

Aditya Birla Group firm Hindalco Industries and Sajjan Jindal-led JSW Steel are in the race for two copper mines in Jharkhand which will be put on sale this month, sources said.

Both mines have a combined capacity of three million tonne per annum.

Hindalco Industries and JSW Steel will be vying for state-owned Hindustan Copper Ltd's two copper mines in Jharkhand, sources said.

The auction of both the mines is likely to take place in the month of October. While one of these blocks is virgin, the other one is closed for the past 20 years.

Press Trust of India New Delhi / Oct 06 2024

➤ **NLC India eyes critical mineral mining capacity of 1 MTPA by FY30**

According to NLC India, the public sector enterprise has been into mining operations since 1967, and therefore it wants to utilise its core competence in the critical mineral sector

It aims at strengthening the value chain by enhancing technological, regulatory, and financial ecosystems to foster innovation, skill development, and global competitiveness in mineral exploration, mining, beneficiation, processing, and recycling.

State-owned NLC India has said it is in the process of participating in the upcoming auctions of critical mineral resources and aims to achieve the annual capacity of mining one million tonnes of such materials by 2029-30. NLC India's core business include mining of coal and lignite as well as power generation.

Having critical mineral capacity assumes significance amid increasing demand of these resources for a wide range of activities from semiconductor manufacturing to renewable energy projects, including those related to production of solar panels, wind turbines and advanced batteries for storage and transportation.

"With the recent developments in renewable energy sector and the strategic importance of the critical minerals required for RE (renewable energy), we are in the process of participating in upcoming auctions and envision achieving a critical mineral mining capacity of 1.0 MTPA by 2029-30," the company said in its recent report.

The company had earlier said that once it gets expertise in mining critical minerals in the domestic market, it will also explore the possibility overseas.

According to NLC India, the public sector enterprise has been into mining operations since 1967, and therefore it wants to utilise its core competence in the critical mineral sector.

The Union Budget 2024-25 has also proposed launching the Critical Mineral Mission for domestic production, recycling of such minerals and overseas acquisition of critical mineral assets.

Press Trust of India New Delhi / Sep 29 2024

➤ **Zambia pursues deals with investors to develop mining permits**

Zambia plans to develop dozens of mining licenses together with investors to boost copper output in Africa's second-biggest producer.

The nation has an ambitious plan to more than quadruple production by early next decade. The increase would require companies to spend billions of dollars to transform early stage projects into operating mines.

More than 40 permits reserved by the nation's Mines Ministry will be transferred to a state company, which will then negotiate agreements with partners, Jito Kayumba, President Hakainde Hichilema's special assistant for finance and investment, said in an interview. The government firm will hold significant minority but non-operational stakes in the ventures, he said. "The appetite is illustrated in the numerous unsolicited offers we receive," Kayumba said by phone.

Subsidiaries of miners First Quantum Minerals Ltd. and Barrick Gold Corp. accounted for about two-thirds of output last year. Those firms are already working on increasing production in the years ahead. Units of Abu Dhabi's International Resources Holding, Vedanta Resources Ltd. and China Nonferrous Mining Corp. also operate mines in the country. The state company, which will be owned by Zambia's Industrial Development Corp., will contribute with the licenses and the results of a government-funded aerial geophysical survey, according to Kayumba.

The nation is also urging investors seeking minority interests in mining assets – such as Saudi Arabia's Manara Minerals Investment Co. – to team up with an operating partner and the state to develop the available greenfield projects, Kayumba said.

Bloomberg News / October 21, 2024

➤ **How resource 'classification debt' chips away at miners' growth and investor trust**

Over the past decade, resource misclassification has saddled the mining industry with a costly problem. It's one Guy Desharnais, Osisko Gold Royalties' (TSX: OR; NYSE: OR) vice-president for project evaluation, calls "classification debt."

Explorers and developers often overstate the certainty of mineral resource classifications based on inadequate data, Desharnais said at an event in Vancouver on Wednesday. The practice has in some instances led to unexpected analyst downgrades, soaring costs and debt, and the derailment of promising assets.

"That classification debt, unfortunately, needs to get paid," he told about 430 conference participants from 21 countries at CIM's first Mineral Resources & Mineral Reserves conference. "The CEO may be walking around with a 3-million-oz. resource estimate, but they haven't earned that classification with sufficient drilling.

When the debt comes due, it's often through painful reclassifications and revisions."

Decade of missteps

Several recent projects have demonstrated the high cost of classification debt.

Rubicon Resources' catastrophic 91% downgrade in resource estimates in 2015 stands as one of the most glaring examples. After it began initial production at the F2 gold deposit on its Phoenix property in Ontario's Red Lake district, the company found the deposit to be uneconomic, shuttering the operation. It had not completed a feasibility study for the high-grade project.

The size of the downgrade blindsided investors and stakeholders, and the company had to undergo a painful restructuring to survive. Rebranded as Battle North Gold, Evolution Mining (ASX: EVN) bought it and its renamed Bateman project in 2021 for $343 million.

In 2018, Pretium Resources promoted the Brucejack gold project in northwestern British Columbia's Golden Triangle, now owned by Newmont (NYSE: NEM, TSX: NGT, ASX: NEM, PNGX: NEM), as a high-grade gold deposit. Yet, the asset disappointed when gold production grades fell far below expectations.

The nuggety nature of the gold, with Brucejack's steeply dipping quartz veins and erratic grade distribution, made it difficult to consistently meet production targets, forcing the company to push tonnage through the mill to compensate for lower-than-expected grades.

Aurora (2018), Rainy River (2019), and Gold Bar (2020) show how resource overestimation hurt Guyana Goldfields, New Gold (TSX: NGD; NYSE: NGD) and McEwen Mining (TSX: MUX; NYSE: MUX). They had to downgrade estimates mid-operation. This triggered mine plan revisions, soaring costs, production delays, and financial strain.

Grade versus geometric risk

Desharnais identifies two types of risk that contribute to resource misclassification: grade risk and geometric risk. Grade risk reflects patchiness in ore quality, while geometric risk involves uncertainty about the size and shape of mineralized domains within the deposit.

Conditional simulations help assess grade risk, Desharnais said, but tools to quantify geometric risk are lacking. Companies often overestimate deposit geometry without tighter drilling, leading to costly misjudgements. "Sparse drilling gives us a simpler picture than reality," he explained, adding that only closely spaced drilling can reveal the true complexity of orebodies.

Best practices

Mathieu Doucette, a senior geologist at ArcelorMittal (NYSE: MT), talked about the difficulty of classifying resources at Canada's largest iron mine, the Mont-Wright iron ore mine in Quebec, producing continuously since 1974. Outdated data can affect current resource estimates. He illustrated how mixing in fresh drill holes helps manage geological risk as part of a dynamic model essential to avoid misclassification.

"The first thing [a QP] will do is akin to lighting a torch," he said. "But everything on the edges is dark, and you can't really see it. Drill holes are our ability to try and get some information, but sparse data hides the full picture."

David Machuca-Mory, a principal consultant at SRK Consulting, said fixed models are risky. Deposits can be more unpredictable than they seem. Adaptive methods help ensure estimates reflect reality, reducing the chance of costly surprises.

"Even with dense drilling, some areas remain highly uncertain," Machuca-Mory said. "Confidence intervals are large, and relying solely on drill spacing doesn't always guarantee accurate classification."

Cognitive biases

Desharnais said that misclassification is not just a technical problem; human psychology plays a significant role.

Anchoring bias makes companies stick with initial estimates despite new data. Authority bias pressures geologists and consultants to confirm favourable results to please management or investors.

"The consulting firm wants the next contract," Desharnais said. "The CEO has family and friends invested and needs good news. These biases create a system where classification debt builds up across projects, only to be paid through painful revisions later."

Owning up

Desharnais argued for more conservative resource models and said benchmarking against operating mines would help set realistic expectations. He suggested that technical reports include histograms that show the distance between drill holes and classified resources, he added.

"It forces the QP or CP to look at what they've done and ask: Does this make sense?" he said. "Transparent reporting would help prevent overly aggressive classifications, ensuring companies earn their resource classifications with sufficient data."

Such measures may slow development, but they could also reduce the prevalence of misclassified resources in the industry. Desharnais urged geologists to scrutinize each block of material above the cut-off grade. "Over-promising today only delays the inevitable correction tomorrow," he said.

Henry Lazenby - The Northern Miner | October 18, 2024

➤ **India seeks critical mineral agreement with US, hopes for a trade pact**

India's trade minister on Saturday said the country has sought a critical mineral partnership agreement with the United States as he hopes for talks on a broader trade pact between the two nations.

"I had suggested that critical mineral MoU (memorandum of understanding) to be converted to a critical mineral partnership and become a starting point to become an FTA (Free Trade Agreement)," Piyush Goyal told reporters at a press briefing in New Delhi.

Earlier this month, India and US signed an initial pact to cooperate on strengthening supply chains in the two countries for lithium, cobalt and other critical minerals used in electric vehicles and clean energy applications.

The MoU fell far short of a full critical minerals trade deal that would allow India to benefit from the $7,500 US electric vehicle tax credit.

Minerals-focused trade deals are one way that the US President Joe Biden's administration hopes to open up access for trusted allies to a $7,500 per vehicle EV tax credit introduced in last year's climate-focused Inflation Reduction Act.

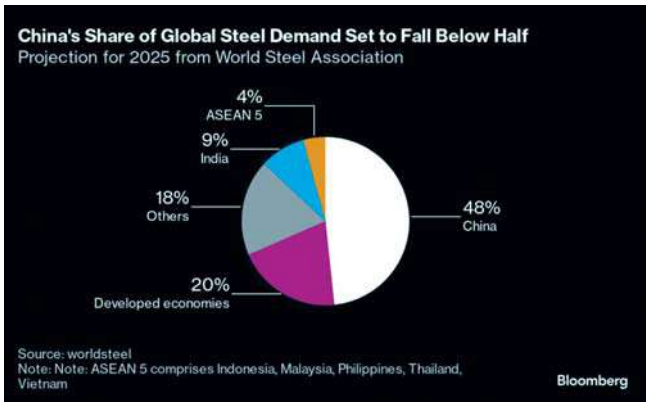
Reuters | October 19, 2024

➤ **China's steel demand has shrunk to less than half global total**

China will account for less than half of global steel consumption in 2024 for the first time in six years, according to the World Steel Association, as the decline in the country's real estate sector pummels demand for the metal.

The forecasts from Worldsteel show diverging prospects between China — for two decades the major driver of global demand growth — and steel hot spots in the rest of the world, from South Asia to the Middle East and Latin America.

"China's at the structural peak in terms of steel demand," Simon Trott, chief executive for iron ore at Rio Tinto Group, the world's largest supplier of the steelmaking ingredient, said at an address in Melbourne on Friday. "The world will need more steel in the next 20 years than it's used in the last 30, despite the sort of growth we've seen in China."



Worldsteel sees Chinese consumption racking up a fourth year of declines in 2024 to 869 million tons, while demand in the rest of the world rises 1.2% to reach 882 million tons. China's share will shrink further in 2025, according to the association.

The figures show how the end of China's decades-long infrastructure and property boom is reshaping the nation's steel consumption. But they also suggest another reason why China's exports have surged so dramatically this year to their highest since 2016: There's rising demand elsewhere.

India's market will grow by 8% this year — after rising 14% in 2023 — to 143 million tons, while other emerging and developing economies will see growth of around 7% for a second year running, according to Worldsteel.

The rest of the world last surpassed China's share of demand in 2018. Worldsteel acknowledged risks to its forecasts due to Beijing's recent barrage of stimulus measures to support growth, citing a "growing possibility of more substantial government intervention and support for the real economy, which could bolster Chinese steel demand in 2025."

Bloomberg News | October 21, 2024

(Continued on Page 27)

FLYROCK GENERATION - CAUSES, MITIGATION AND CONTROL- A BLASTER'S GUIDE

M.O. SARATHY

Abstract

Flyrock is an undesirable outcome of blasting operations in opencast mines, quarrying, trenching and other surface excavations. While flyrock generation is caused due to structural anomalies in the geology, a major contributor is human errors while carrying out drilling, charging and blasting operations. Erroneous drilling, incorrect blast designs, improper drillhole patterns, inappropriate initiation sequence, insufficient delay time, excessive burdens, low burdens, blasting against a buffer, high or low specific charge, inadequate stemming, stone pieces in stemming and secondary blasting of toe holes are identified as major sources of flyrock, not to mention misfires and improper functioning of explosives and blast initiation systems. Throw and flyrock are different entities and should not be equated with one another. Many researchers have tried to develop models to predict flyrock. A number of factors play a significant role on the distance to which fragmented-broken rock gets thrown. The uncertainties and unquantifiable nature of these factors during the blast makes distance prediction difficult. This paper discusses the various causes of flyrock generation, mitigation and control, in brief.

1. INTRODUCTION - BLASTING AND PRODUCT REQUIREMENTS

Blasting using chemical energy viz explosives is still the most cost-effective method for all excavations in mining and civil projects, both above and below ground. The shock energy (brisance) and gas energy (heave) released by the explosives after detonation needs to be harnessed properly. The energy has to be utilized effectively through scientific blast designs which ensure its appropriate distribution in-situ in the material being blasted. It is often debated that only a very small percentage of the explosive energy generated in a blast is utilized in fragmentation, while major portion of energy gets wasted in creating a crushed zone around the borehole wall, in throwing the broken material forward, creating back break, side break, generating ground vibrations, airblast and sometimes flyrock-wild flyrock too.

In multi-row blasting, accurate drilling is a pre-requisite viz correct positioning, depth and direction. Proper distribution of explosive energy in the rock mass through optimum blast design, proper loading of explosive charge having the desired characteristics, correct drill patterns and delay initiation sequence for creation of adequate free spaces in-situ during the blast for broken material to move into are crucial for good fragmentation and muckpile looseness. Explosives and blast initiation systems should be misfire-free and perform as they are expected to. Accuracy of pyrotechnic delay firing times of initiation system used is most important. Blasts should not generate back-break, side-break, excessive ground vibrations, airblast noise, flyrock or leave behind unbroken toe and humps on the bench floor after blast. Blasts which generate lot of scattering of fragments (flyrock), ground vibrations and airblast are invariably inefficient and overall results will be unsatisfactory - viz below par.

2. BLASTING - FRAGMENTATION PROCESS IN BRIEF

When an explosive detonates in a drillhole, two types of energies are transferred into the material being blasted viz shock energy generated by the velocity of detonation of the explosive and heave energy released by the expanding detonation products or gases which are under high temperature and pressure. The pressure generated by the detonation imparts a short-duration, high intensity stress wave which crushes the material around the drillhole wall, travels into the material in all directions as an elastic wave at a speed equal to the material's sonic velocity and dissipates over distance. What happens in front of drillhole viz the burden is relevant in bench blasting. In massive formations, radial cracks are formed in the burden material when the outgoing shock energy exceeds the compressive strength of the medium being blasted. The outgoing wave weakens over distance and does not form further cracks as the compressive strength of the medium is higher. Upon reaching the free face (bench face) it gets reflected back into the mass as a tensile wave. Materials are weak in tension and strong in compression, the former being almost 10-20 times lower than the latter. The tensile waves cause further cracks and then the expanding gases which are under very high pressure enter these cracks. Through a process known as 'pneumatic wedging', the gases penetrate and widen the cracks, thus completing the process of primary fragmentation. The high-pressure gases heaves (throws) the fragmented material. With bottom hole initiation, the detonation of explosive and the resulting shock wave move

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upwards towards the drillhole collar. It is very likely that the shock wave gets reflected at the bench top also and returns as a tensile wave causing fractures in collar area. In jointed formations, the effect of shock wave in radial cracking during blasting is less evident as the joints probably act as shock absorbers. Breakage occurs due to the gas energy heaving the mass and the pre-existing joint patterns determine the resulting fragment sizes. During blasting, breakage of the bench face in front of a drillhole occurs due to bending and this is known as flexural rupture of flexural failure (Figure-1). If burden is considered as a beam, then burden (B) is the beam thickness and bench height (H) is its length. Ideal condition for bending occurs when H/B = 3 (or more). H/B =2 is sub-optimal and H/B =1 must be strictly avoided since the last two conditions encourage cratering. Cratering is considered as a bad blasting mechanism. Secondary fragmentation occurs when 'V, V_1' patterns of initiation sequence are used which encourages in-flight collision and also when the primary fragments generated during the blast fall on the floor of the bench after the flight. Depending on the velocity of detonation of explosive in use and explosive column length in drillhole, the detonation will last for 3-10 ms. The process of primary fragmentation gets completed in a few milliseconds. Then the gas energy takes over and throws the broken mass from its original position which lasts a few seconds and forms the muckpile.

Figure 1 - FLEXURAL RUPTURE - FACE BENDING and NO FLYROCK EVIDENT (Image downloaded from the Internet)

3. THROW AND FLYROCK

Flyrock is an undesirable hazard of surface blasting operations in mining and civil excavation projects, where broken rock fragments travel beyond a 'specified zone' resulting in untoward accidents - mainly death-serious bodily injury to persons and animals, damage to equipment, buildings within the excavation area and also in human habitations around the periphery of the workings.

Throw is the desirable forward displacement of fragments from the parent mass during blasting by the gas energy. Throw is inevitable considering the high gas volume released by the explosive which is about 800-900 litres/kg. Throw is also required for efficient loading by the excavator. The extent of forward displacement should be within limits for the excavator machines to load with minimal handling-gathering by the bull dozer. Blasts are designed to generate a muckpile profile commensurate to the loading machine in use. Whereas, flyrock is the excessive, undesirable movement of blasted fragments beyond the specified safety zone. Under certain strata and in-blast situations, the energy of high-pressure gases released during detonation of explosive in the drillhole propel fragments of varying sizes and weight over long distances. It includes fragments generated during the blast, as well as the previously broken loose rock fragments present in the bench face and those lying freely near the drillhole collar on the bench surface. Flyrock is generated when the fragments are thrown forward from the bench face and when thrown upwards in all directions from the top of bench, falling at times behind the blast also. Flyrock has been a major cause of accidents world-wide, mostly from surface mines.

4. FLYROCK AND 'WILD' FLYROCK - DEFINITIONS

The Institute of makers of Explosives (IME) has defined Flyrock as '*the rock(s) propelled from the blast area by the force of an explosion*'.

Mines Safety and Health Administration (MSHA), USA defines flyrock as '*the fragments of rock thrown and scattered during blasting*'.

While flyrock is a term used to describe fragments which get ejected beyond the prescribed / defined safety zone from a blast, the term 'wild flyrock' refers in particular to fragmented rock that travel 'out of control' over very long distances much beyond the safety zone and at times, beyond the excavation boundaries causing injuries, death to people, animals and damage to property.

5. IMPORTANCE OF DRILLER-BLASTER COMMUNICATION

Communication between the driller-drilling in-charge and blaster-blasting in-charge is very essential while carrying out blasts for good overall results. An experienced, observant driller can provide valuable information to the blasting crew on the presence of hard-weak bands, voids, fractured-disturbed zones etc. so that appropriate corrective actions can be taken during charging of explosive in drillholes. Modern drill machines are equipped with digital monitors that provide an accurate log of the strata traversed by the drill rod and prudence dictates that the blasting-in-charge makes use of this information judiciously for charging explosives appropriately and carry out the blast.

6. CAUSES OF FLYROCK GENERATION

Generation of flyrock is attributed broadly to two main causes:

(i) *Uncontrollable*: Natural causes - geology and in-situ structural anomalies.

(ii) *Controllable*: Man-made. Factors under human control - blast inputs used and operational errors.

While geology can contribute significantly to flyrock generation, unscientific blasting procedures are also a major source of flyrock. The high energy released upon detonation of explosive in the drillhole takes the path of least resistance during the blast (in-blast) and hence, each drillhole has to be provided with the required burden distance and free space in-situ for good breakage. Excessive burden, reduced burden, low stemming length, blasting against a buffer (broken debris from the previous blast), incorrect drill pattern-initiation sequence, inadequate delay firing time, improper performance of explosive and blast initiation system, inaccurate delay initiator firing times are other potential causes of flyrock. Various in-blast conditions can influence one or more situations described above which causes flyrock, and each of the above aspects will be discussed briefly. Three blast mechanisms have been identified as the root cause of flyrock in surface blasting (Figure-2). They are:

(i) *Face burst or face rupture* due to low burdens - faulty drilling (positioning, drillhole deviation), under cutting of bench face, weak zones in bench face and high specific charge used (kg/m^3, kg/t).

(ii) *Cratering* effect due to stemming length less than burden, explosive unable to break the burden (weak explosive, low specific charge) and blasting shallow benches (H/B<2).

(iii) *Stemming ejection*, also known as '*rifling*' due to low stemming length and unsuitable stemming material used such as drill cuttings. Drill cuttings eare not effective in watery drillholes.

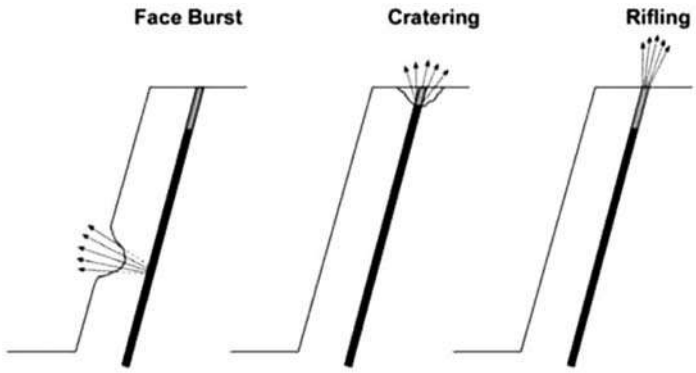

Figure 2 - BENCH FACE RUPTURE, CRATERING, RIFLING (after Richards and Moore, 2005)

6.1. Natural causes - mainly geology and geological structural anomalies

It is wrong to assume that the material being blasted is homogenous and free of structural anomalies. Cracks, fractures, discontinuities, weak bedding planes, faults, open joints, weak bands such as mud seams, blocky strata, voids-vughs (solution cavities) and other adverse deformities may be present (Figure-3).

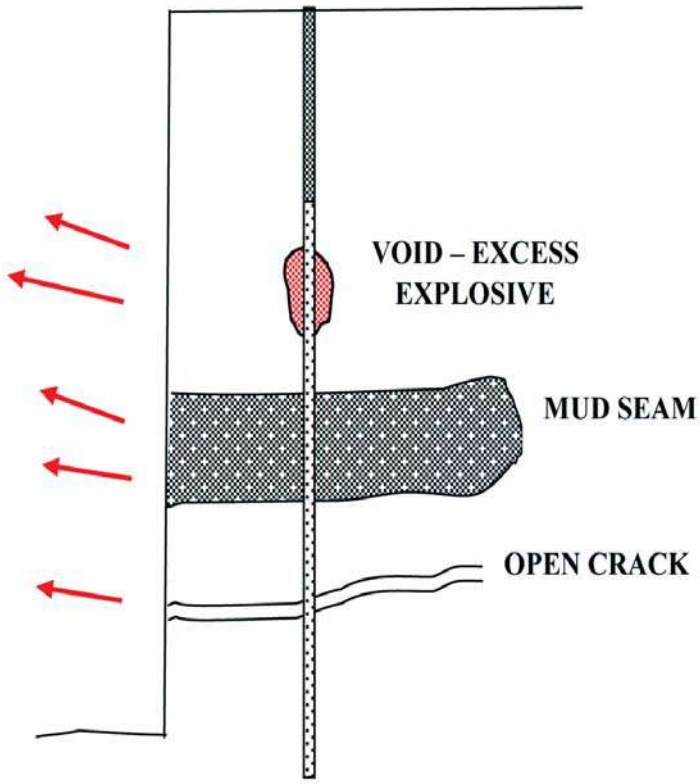

Figure 3 - GELOGICAL ANOMALIES - OPEN CRACK, MUD SEAM, VOID (Sketch adapted from USBM IC 8925)

These are identified as 'weak zones' or 'zones of varying competence'. The high-pressure gases enter these paths of low resistance resulting in a high concentration of gas energy, which vent out and propel loose and broken fragments over long distances. Ideally, this wasted energy should have been used for fragmentation and heave (throw). Venting of high-pressure gases cause airblast noise. Cracks present in the bench face due to back break from the previous blast also act similarly as natural deformities. Voids are most dangerous since their volume is not known. When a drillhole intersects a void or solution cavity, large quantity of explosive can inadvertently get loaded resulting in very high charge concentration viz high specific charge. Bulk explosives and bulk loaded free flowing AN-FO are most susceptible since they can flow into fractures resulting in high charge quantity and upon detonation, become a potential location for flyrock generation. Prior to charging, drillholes must be checked for blockage or collapse. Column

build-up of explosive during charging should be constantly checked using a weighted measuring tape. Slow rise in explosive column during charging may indicate voids, while a sudden rise will indicate collapsed or blocked drillhole. Inert stemming (deck) rather than explosives should be placed inside the drillhole where structural anomalies are present. Driller's feedback or drill logs should be used. Blaster must adopt appropriate initiation methods to set-off the explosive decks within the drillhole.

Force with which venting occurs is very difficult to predict as it would vary depending upon a number of conditions such as (i) borehole diameter and explosive type (ii) aperture/width, extent and strength of the geological anomalies present (iii) their proximity to drillhole (iv) their location viz whether near drillhole bottom, mid-way or top. Full borehole pressure would generate in the drillhole when the explosive column detonates completely without any venting. If the drillhole is passing through or beside a weak zone near the drillhole bottom, with bottom hole initiation, the venting force would be relatively less violent since detonation of the explosive column would have just begun. The venting force is likely to be greater and the flyrock potential higher if the weak zone is located higher viz in the middle of the bench face or below the stemming as a longer column of explosive would have got detonated. Premature venting will reduce the borehole pressure and explosive's effectiveness will diminish. In such a case, the residual energy will not break the burden, but crater up causing flyrock.

6.2. Human errors in flyrock generation and avoidable accidents

Human errors are a major contributor in flyrock generation and accidents (i) not following Standard Operating Procedures (SOPs) (ii) inadequate supervision during drilling, charging and blasting (iii) inaccurate drilling - placement, direction, depth (iv) incorrect blast design (v) not assessing front row burden correctly: back break from previous blast, localized zones of varying competence, undercutting by excavator (Figure-4), (vi) not carrying out corrections for collapsed-blocked drillholes (vii) Not removing buffer of broken rock in front of bench (viii) not using information from drill logs or feedback of drilling crew before charging explosive and initiation system (ix) not taking proper precautions while blasting boulders, toe holes (x) not clearing safety zone and not posting guards at entry points (xi) not sounding siren before blast (xii) taking shelter under drill machine, excavator.

6.2.1. Incorrect blast design

Essentially, surface blast designs are site-specific and have to be carried out commensurate to the strata conditions prevalent in the block being blasted and characteristics of the explosive in use. Matching explosive characteristics with characteristics of the material being blasted is essential. Design must ensure that broken rock movement is horizontal and frontal (outward) and not upwards i.e. blast geometry conditions which encourage flexural rupture. Empirical formulae for calculating blast geometry parameters viz burden, spacing, bench height, stemming length and sub-grade are all based on drillhole diameter. Initial blasts must be carried out using empirical formulae and the blast geometry parameters are optimized at site through observation of blast results and by monitoring the efficiency of loading, hauling and crushing-comminution. Larger drillhole diameters have a higher flyrock potential as they hold more explosive. As seen in the Table-1, charge concentration (kg/m) of a product having a density of 1.15 g/cc in a 269 mm diameter drillhole is approximately 65-72 kg/m, while it is only12-13 kg/m in a 115 mm drillhole viz almost 5 times more which means 5 times more gas volume and energy.

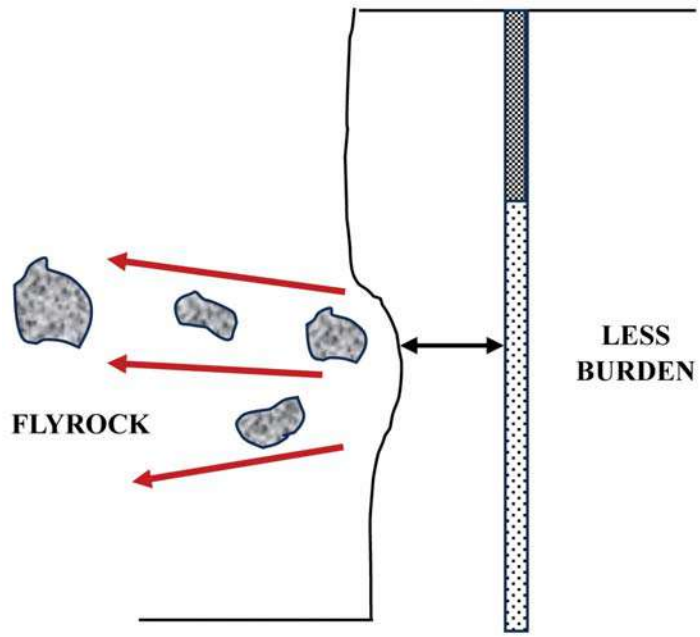

Figure 4 - REDUCED FACE BURDEN DUE TO OVER DIGGING BY EXCAVATOR BUCKET (Sketch adapted from Bhandari, 1997)

Table 1 - Explosive Loading Density (kg/m)

Drillhole Diameter (mm)	Charge Concentration for explosive with density of 0.90 g/cc (approx.) (kg/m)	Charge Concentration for explosive with density of 1.15 g/cc (approx.) (kg/m)
50, 76	1.8-2.05, 4.3-4.7	2.25-2.50, 5.2-5.7
100, 115	7.5-8.2, 9-10	10-11, 12-13
150, 165	16-18, 19-21	20-22, 24-27
250, 269	44-49, 51-56	56-62, 65-72
311	68-75	87-96
411	119-138	152-167

6.2.2. Cratering due to excess burden

A 'spherical charge' is one whose length is equal to 6 times the drillhole diameter. When loaded in a drillhole having free face only at the top and not in front or side, the blast will create an excavation shaped like an uneven inverted cone. This is known as a blast crater. Cratering is considered to be a poor blast performance mechanism. For a given rock-explosive combination, the volume of excavated cone will be highest at 'optimum depth of burial' of charge and becomes almost nil at 'critical depth of burial'. Collar zone is the mass of material in the stemming portion which was previously in the sub-grade region, will be a weakened layer fractured by the blast carried out earlier. During pre-blast preparations, excess burdens will result due to incorrect placement of drillhole (collaring error) and due to faulty drilling, which can cause the drillhole to deviate into the bench and result in excessive in-situ burden (Figure-5).

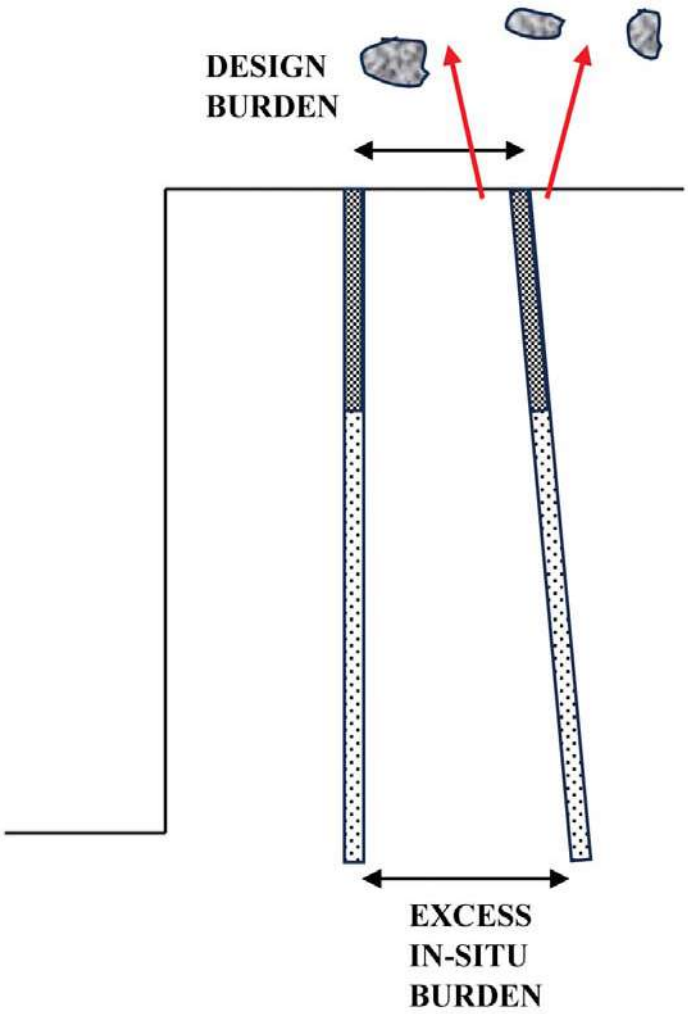

Figure 5- FAULTY DRILLING ANGLE RESULTING IN HIGH IN-SITU BURDEN (Sketch adapted from Bhandari, 1997)

Excessive drilled burden not commensurate to the rock-explosive strength will not be able to break the burden efficiently. The energy will take the line of least resistance causing the collar area to crater upwards resulting in flyrock and back break in the collar zone (Figure-6). Cratering is usually very violent with lot of vertical movement of broken fragments. Cratering causes the blasted material to heave upwards and the fragments get scattered in all directions. Flyrock occurs when blasting shallow benches using large diameter drillholes. Empirical burdens for 250-269 mm drillholes are 7.5 to 8.1 m. DGMS Regulation states that "*the height of the benches shall not be more than the digging height or reach of the excavation machine in use for digging, excavation or removal*". Some mines use 250 mm diameter drillholes and deploy hydraulic excavators whose maximum reach is 8-10 m thus causing a mismatch of bench height and burden, which creates conditions favourable to cratering. Bench heights less than 2 times burden distance have more potential to generate flyrock.

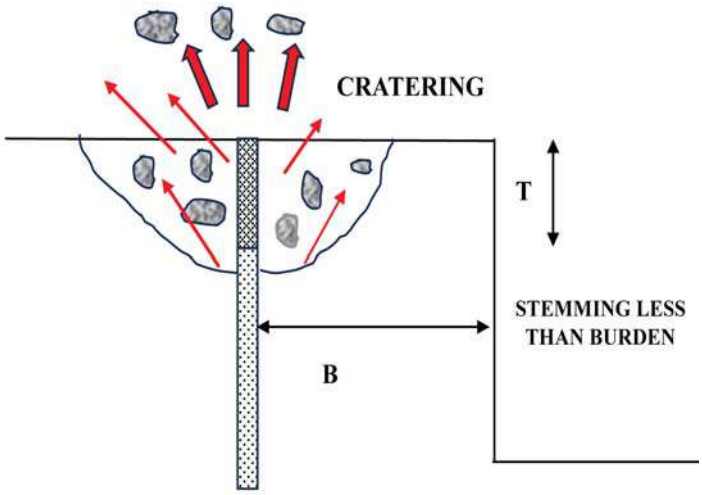

Figure 6 - STEMMING LESS THAN BURDEN (T<B) CAUSES CRATERING AS GASES SEEK LINE OF LEAST RESISTANCE (Sketch adapted from Bhandari, 1997)

6.2.3. Face rupture due to insufficient burden and weak zones

Drillhole deviation angled towards free face will result in reduced burden (Figure-7). Low burdens can also occur due to collaring error viz positioning the drillhole closer to burden at the time of drilling or a drillhole drilled behind a concave bench face caused by over-digging by excavator going unnoticed. Reduced burden in front of charged drillhole causes 'face rupture' which throws the blasted fragments over long distances from the front of the blast. Presence of weak bands, mud seams, fractures in the bench allow the gases to vent out with lot of violence rupturing the bench face and ejects the fragments.

6.2.4. Improper delay firing sequencing of drillholes

Improper initiation sequence of drill holes in multi-row shots will result in flyrock. Each drillhole has to break the assigned volume of material in front and move it out so that drillhole

detonating behind will have sufficient void (free space) to move into. Improper delay sequencing of drillholes can cause a drillhole in the back row to fire before the drillhole in front has blasted. Inaccurate delay firing times of initiator with high scatter can also cause drillhole in the back row to fire before drillhole in front gets initiated, resulting in excess in-situ burdens which will crater upwards and generate flyrock.

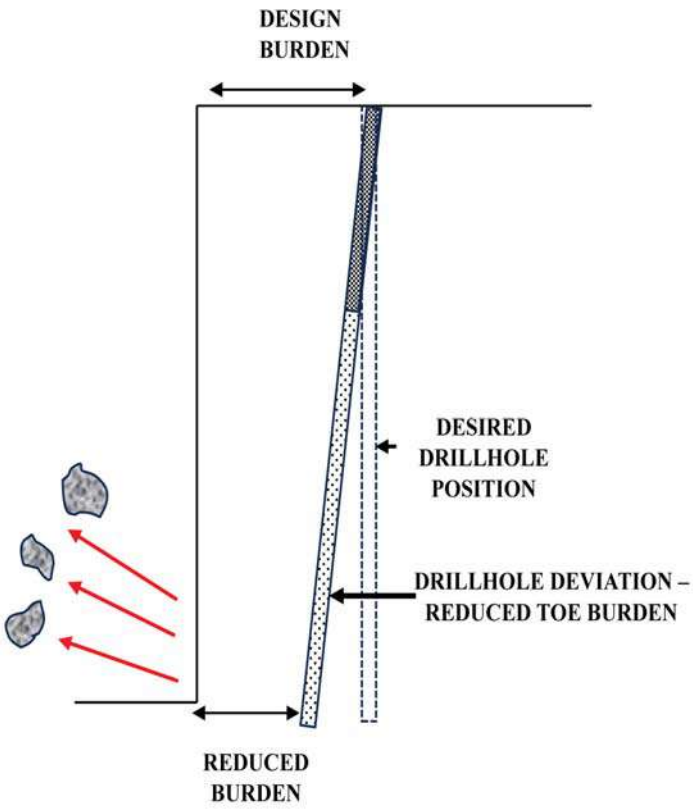

Figure 7 -FAULTY DRILLING DIRECTION – FACE RUPTURE DUE TO REDUCED BURDEN (Sketch adapted from Bhandari, 1997)

6.2.5. Insufficient delay interval (delay time)

In multi-row blasts, adequate delay has to be provided between drillholes along spacing and across burden. Not providing the desired delay contributes significantly to generation of flyrock. Sonic velocity travels faster in hard, fine-grained material compared to soft, coarse-grained material. This implies, for a given burden distance, less delay is required for the former and more for the latter. Insufficient delay interval assigned across burden results in 'crowding' viz the drillholes in the back row initiate before burden in the front row has detached fully from the bench and moved out creating a free space in-situ for the back row to move into. This results in the drillhole behind working against an apparent 'double burden distance' viz 2xB, where B is the drilled burden. The explosive charge quantity loaded meant for burden B is actually working against a burden equal to 2B resulting in heavy confinement of explosive energy. This can cause both stemming ejection and cratering resulting in broken fragments shooting up instead of moving front. Inaccurate firing times of pyrotechnic delays due to high scatter in nominal firing times also result in a similar in-situ situation described above.

6.2.6. Specific charge (kg/t, kg/m^3) - High Vs Low

Blast designs should be commensurate to the strength of material being blasted and strength of explosive used. High specific charge and high strength explosive in excess of requirement will cause violent breakage causing excess frontal throw. Use of high specific charge-strong explosive results in higher burden velocity. Using a weak strength explosive and low specific charge, lower than required will neither be able to break the burden nor heave the material forward, resulting in energy venting out at the collar zone through stemming ejection or cause cratering. For a given explosive type, the 'burden response' would be different in various types of materials. This infers-implies that a particular material being blasted would react differently when products with different characteristics and strengths such as AN-FO, HANFO, emulsions or slurry explosives are used. Selection of explosive is important.

6.2.7. Stemming height or stemming length less than burden distance

Purpose of stemming is to provide confinement and to prevent the escape-venting of high-pressure gases from the drillhole. When stemming is inadequate, the expanding gases do not get the required confinement. As mentioned earlier, the explosive energy takes the path of least resistance and hence if stemming length is less than burden distance, the blast craters upwards resulting in flyrock. Cratering usually occurs with lot of violence and fragments are ejected upwards and over long distances in all directions including the backside of the blast. Longer stemming length is required when sonic velocity of material is greater than the VOD of explosive or when material in the collar zone is heavily fractured. Choosing longer stemming length is often a trade-off between coarse fragmentation from collar zone and amount of flyrock that can be tolerated. For flyrock control, stemming length should be equal to burden distance. Where bottom hole initiation of explosive is carried out, stemming length can be reduced to 0.7 times burden distance. Use of borehole plugs reduce stemming ejection.

6.2.8. Stemming ejection

It is common in mines and civil blasts to use drill cuttings as stemming material due to easy availability at the drillhole collar and at no cost. Drill cuttings generated in coal bench is coal dust, in sandstone overburden only particles of sand and invariably small chips and dust in other materials drilled. Inability of stemming material to contain the high-pressure gases generated in the blast causes stemming ejection also known as rifling (Figure-8) leading to significant loss of energy in the drillhole. In watery drillholes drill cuttings

mix with water to form slush and hence not suitable for decking where needed. Slush offers very little resistance to the high-pressure gases and gets ejected easily. This results in incomplete breakage and excess in-situ burden for the adjoining drillholes. Unlike drill cuttings, angular crushed stone, of size approximately 1/10 - 1/25 of drillhole diameter has been found to be the best stemming material as they interlock with each other and wedge against the drillhole wall providing resistance to ejection. In watery drillholes, crushed stones displace the water and unlike drill cuttings, do not mix with water to form slush. *During stemming operations, care should be taken NOT TO DROP stone pieces into the drillhole as they can damage the initiation system leading to a misfire or get ejected to become potential missiles during rifling or cratering resulting in flyrock.*

Figure 8 - STEMMING EJECTION (RIFLING) (Photo by IDL Industries Ltd - Technical Services)

6.2.9. Bottom hole initiation - initiating explosive at drillhole bottom (floor level)

Initiating the explosive truly at the bottom of the drillhole (bottom priming / toe priming) using electronic or shock tube detonators resulting in the detonation traveling upwards towards stemming significantly reduces flyrock as compared to top initiation (collar priming) where a primer is placed just below the stemming. All conditions being equal, a top initiated drillhole will produce a larger crater compared to a bottom initiated charge. As mentioned previously, with bottom hole initiation, stemming length can be reduced by 30% (0.7 times burden distance). Use of detonating cord as downline is detrimental as it is known to eject stemming and cause de-sensitization of the booster sensitive explosive inside the drillhole due to the high brisance and gas generated by PETN.

6.3. Misfires and inconsistent product performance (explosive and initiation system)

Explosives and blast initiating devices (detonating cord, detonating relays, detonators) should perform properly for good blast results. Product malfunction, misfires, inaccurate delay firing times of delay initiators (due to scatter in delay firing time) will result in poor overall blast results and are potential causes of flyrock. Poor quality of explosives, products which have become insensitive when they have exceeded their shelf life, explosives which have become insensitive under hydrostatic pressure in deep drillholes, sleeping explosive charges in drillholes containing water/ slush, leaching of explosive charge caused by dynamic water in the strata, charge separation in watery drillholes due to density issues, charge separation due to carelessness during charging viz debris falling into drillhole can cause product to malfunction resulting in their inability to break the burden properly. An explosive charge behind a misfired drillhole will have excessive in-situ burden equal to twice normal burden (2xB). The explosive charge will not be able to break the high burden and energy vents out from the collar area generating flyrock and airblast noise. Extreme care should be exercised while re-blasting a misfired drillhole since the material surrounding it would have got broken by the blasting of other drillholes around the misfire, resulting in fractured burdens and reduced confinement. Collapsed and abandoned drillholes must be back filled with drill cuttings or debris since empty hole would act as a free face (similar to burn-cut holes in tunneling) and fragments may get ejected through them.

6.4. Secondary blasting

'Pop-shooting' is utilized for breaking large boulders and for removal of toe left on the bench floor. Small to medium diameter drillholes are drilled in large boulders or on the bench floor where toe has formed. Boulders have free face on all sides and broken fragments scatter in all directions when blasted. Toe holes drilled on the floor and do not have any free face except at the top viz the drill surface. This is almost akin to crater blasting. Upon blasting, toe holes fire like cannons and can cause severe flyrock. Secondary blasting has to be carried out under supervision to ensure that the drillholes are properly drilled and not overcharged. If required, covering material such as heavy rubber blasting mat may be used to control flyrock, especially while blasting toe holes.

7. FLYROCK CONTROL THROUGH COVERING MATERIALS

Flyrock control is carried out using covering material such as blasting mats made with old tyres which are cut, stretched and joined, old conveyor belts or wire rope. Rubber blasting mats are usually heavy since they need to contain heave from a blast and are placed in position using a crane or excavator. While use of blasting mats is not practical in large production blasts, they are useful for small blasts in mining and civil excavations in built up areas using small-medium diameter drillholes (32-100 mm, maximum 150 mm). When

blasting is being carried out under high tension lines, wire rope mats should not be used as they can get lifted by the force of the blast and get tangled with the HT line.

8. FLYROCK RANGE

Queensland Safety Alert Bulletin # 1 dated 13/8/2012, describes an incident where a piece of rock from a coal mine overburden blast traveled 1230 m (1.23 km) and damaged a small privately owned dwelling shed. Virginia Department of Mines, Minerals and Energy's 'Flyrock Hazard Alert' mentions flyrock range of 3000 feet (914.4 m) and speeds of 400 miles per hour (640 km/hour). Directorate General of Mines Safety (DGMS) has prescribed a radius of 500 m from blast as danger zone.

9. FLYROCK PREDICTION

Researchers from overseas and Bharat have carried out significant work on models to predict flyrock generation using empirical/semi-empirical formulae, statistical regression analysis and soft computing techniques such as artificial neural network (ANN), a method used in artificial intelligence (AI). The work carried out by them is praiseworthy. According to ballistics, maximum throw distance of an item takes place when launched-propelled at an angle of 45°. During the blast, many parameters are unquantifiable which can result in prediction inaccuracies such as: (i) size of fragment (ii) shape of fragment (iii) weight of fragment (iv) angle at which fragment was ejected (v) whether ejected piece was loosely lying on bench top-bench face or broken from parent mass during the blast (vi) force or velocity with which ejection took place (vii) the wind speed, wind direction and wind resistance which determines the drag. It is even more difficult and impractical to predict wild flyrock

10. FLYROCK ACCIDENTS MITIGATION

Correct blast design and following Standard Operating Procedures are essential for flyrock control. Defining the danger zone, evacuating personnel, shifting equipment away from blast, posting guards at all entry points, placing signages indicating time of blast, sounding the siren to alert personnel of impending blast are key actions for preventing inadvertent entry of persons into danger zone during blasting. Blaster must use the blast shelter while carrying out a blast and no one should be allowed to take shelter underneath drill machines or excavators parked in the vicinity of the blast.

11. CONCLUSIONS

Flyrock and wild flyrock are undesired outcomes from a surface blast which can cause serious bodily injury or death to persons and stray animals. They also cause damage to equipment, property and dwellings within and beyond the site of operations. Flyrock occurs due to non-controllable factors, mainly structural anomalies in the geology. Controllable factors are those which are under the command of persons responsible at site such as adherence to SOPs, adequate supervision during drilling-charging-blasting, accurate assessment of front row burden and structural anomalies in bench face, identifying collapsed or blocked drillholes, studying drill logs or obtaining drillers' feedback on the presence of voids-hard/soft bands-fractured zone etc. Accurate drilling, correct blast design, stemming length, stemming material, appropriate explosives and blast initiation systems, drill patterns, initiation sequence and assigning delay firing times for drillholes are important inputs for flyrock control. Misfire or malfunction of explosives and initiation system create in-blast conditions which cause flyrock. Secondary blasting of boulders and toe holes generate flyrock. Flyrock potential increases as drillhole diameter gets larger and with use of higher specific charge (kg/m^3, kg/t). Blast designs which induce breakage by flexural failure provide good blast results and are less likely to generate flyrock. Conditions which favour cratering, rifling and face rupture must be avoided. Cratering is an indication of a poorly performing blast mechanism. Shifting equipment away from the blast, clearing personnel out of danger zone, blaster using blast shelter while blasting, persons not taking shelter under equipment (drills, excavators), guarding all entry points for any inadvertent entry of persons and sounding of warning siren of impending blast are important for reducing accidents due to flyrock. While the causes of wild flyrock are not fully deciphered, proper blasting with all due care to the various factors described in the text may possibly eliminate generation of wild flyrock also.

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SCOPE TO START FIRST PLATINUM MINE IN INDIA

Dr. T.M. BABU

Abstract

Platinum, a member of the exclusive group of six precious metals, is primarily produced in few select countries in the world. Its global annual production—currently less than 200 tonnes—pales in comparison to the relatively more abundant gold production, which exceeds 3000 tonnes. As a recently discovered modern metal, platinum has garnered significant interest due to its diverse applications across various industrial fields.

In India, platinum occurrences were identified more than a decade ago. These promising locations extend from the Himalayan Mountain ranges in northern India to the southern states of the Indian peninsula, and even reach the Andaman-Nicobar Islands. More than a hundred potential prospects and target areas have been identified waiting for economic feasibility studies, with the aim of establishing first platinum production mine.

To achieve this goal, India must strategically reorganize its national mineral and mining policies. Encouraging Indian entrepreneurs to venture into platinum mining and extraction could position the country among the league of platinum-producing nations. With concerted efforts, the dream of India's first platinum-producing mine may soon become a reality.

***Key words**: Platinum, world production, Indian prosects, mineral policies, first mine.*

1. RICH MAN GOLD

Platinum, Palladium, Ruthenium, Rhodium, Osmium, and Iridium—the six metals form a closely related family known as the Platinum Group of Elements (PGE) or PGM-Platinum Group of Metals or as Platinoids. (Table No. 1 and Fig.1). Unlike gold, which is more widely spread out, these PGEs are relatively rare and their products sometimes command higher prices. As a result, some people refer these as the "rich man's white gold."

Table No. 1 Six platinum group of metals with symbols, atomic numbers and weights.

Platinum Metals	Symbol	Atomic Number	Atomic weight
Platinum	Pt	78	195.09
Palladium	Pd	46	106.7
Ruthenium	Ru	44	101.7
Rhodium	Rh	45	102.9
Osmium	Os	76	190.8
Iridium	Ir	77	193.1

2. TWO SUB GROUPS

Based on the specific gravity, atomic numbers, atomic weights and other characters platinum group of metals could be divided into two subgroups with three metals having higher specific gravity than gold and the other three metals with lower specific gravity than gold as shown in table No. 2 and positioned in Periodic Table shown in table No. 3.

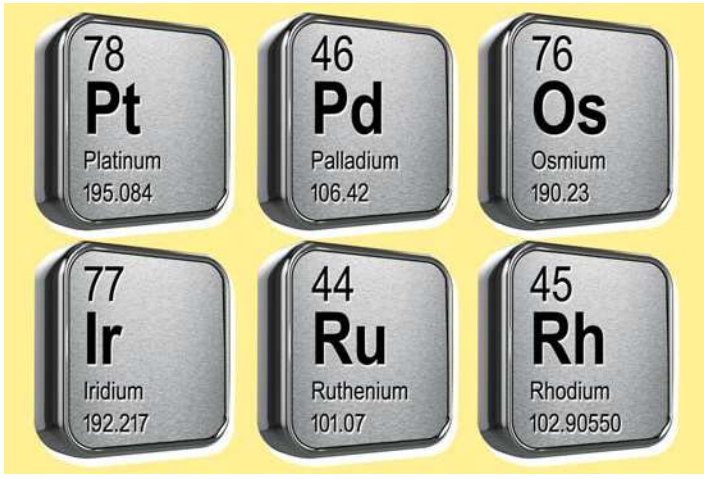

***Fig. 1** Platinum Group of Elements (PGE) the 6 metals family showing atomic numbers, symbols and atomic weights.*

Plati-irido-osmium: This trio—**platinum, iridium, and osmium**—exhibits higher specific gravity than gold. Their dense atomic arrangement contributes to their weightiness. Osmium, in particular, stands out with its bluish-white color, highest specific gravity and remarkable hardness.

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Palla-rho-ruthenium: Palladium, Rhodium and Ruthenium, three metals have specific gravities lower than gold. Despite their lighter weight, they play essential roles as catalysts in various chemical reactions. Rhodium, for instance, is known for its brilliant white appearance and resistance to corrosion.

Table No. 2 Two sub-groups of platinum metals based on specific gravity and other properties with respect to gold.

Two Sub Groups	PGE	Specific Gravity
Plati-iridi-osmium (Specific Gravity > Gold)	Platinum	21.45
	Iridium	22.56
	Osmium	22.59
GOLD		19.32
Palla-rho-ruthenium (Specific Gravity < Gold)	Palladium	12.02
	Rhodium	12.41
	Ruthenium	12.37

3. USES

Platinum group of precious metals have certain unique properties like high melting points, corrosion resistance, and catalytic qualities, making them indispensable in many scientific, medical and industrial applications. In automobile exhaust system Platinum Catalytic Converters change harmful vehicle emissions like carbon monoxide, nitrogen oxides and hydrocarbons into less harmful gasses (Fig.2). Its excellent conductivity makes it ideal for electrical contacts, electrodes and used in spark plugs, sensors and fuel cells. Platinum resistance thermometers provide accurate temperature measurement in various applications. Its lustrous appearance makes it a sought-after metal for crafting fine jewelry and used in engagement rings, necklaces and bracelets. Used in medical devices such as pace makers, stents, catheters and many biocompatibilities medical applications. Platinum based drugs like cisplatin used in cancer treatment. Historically used to mint coins in Russia and now as valuable investment metal traded as bullion. Palladium used in telecommunication industry, Ruthenium in fiber glass and expensive mirrors, Rhodium is deployed in laser beams, jet engines, sharp surgical scalpels, jewelry, Osmium in electron microscopy and iridium in electronic gadget manufacturing. In summary, the platinum group metals showcase intriguing paradoxes: make them indispensable in various applications across science and industry not known to people in general.

Table No. 3. Status of PGE in Periodic Table as per atomic numbers sequence in Group 8, 9 and 10, Periods: 5 and 6.

Ruthenium Ru At. No. **44**	**Rhodium** Rh At. No. **45**	**Palladium** Pd At. No. **46**	**Silver** Ag At. No. **47**
Osmium Os At. No. **76**	**Iridium** Ir At. No. **77**	**Platinum** Pt At No. **78**	**Gold** Au At. No. **79**

4. PLATINUM IN THE WORLD

Platinum in the world occurs in the rocks which were associated with ultramafic magmatism where in igneous intrusions and extrusions taken place in specific geological conditions. Gold is reported in more than hundred countries in the world. But there are only just about 20 countries in the world wherein in platinum deposits are found now. Significant platinum group of metal deposits and mines are shown in the table No. 4 and fig No. 3. World Gold production is more than 3000 tonnes every year. But platinum production is less than 200 tonnes per year. Top ten platinum producing countries in the world are shown in table No. 4. Of different countries South Africa dominates the world producing more than 70% of total world production whereas all other countries contribute less than 30%. Russia is next predominant platinum-palladium producer.

5. INDIAN OCCURRENCES

More than five decades ago, Geological Survey of India reported presence of platinum incidences in India in 1966 in several locations. In 2011, more than a decade back 64 potential locations of platinum group of metals have been published by Geological Society of India in the book Platinum in India. Platinum prospects have been projected right from Himalayan Mountain ranges in the north to Southern states of Indian peninsula and even beyond in Andaman Nicobar Islands. Now more than a hundred possible-potential target areas are listed based on favorable geological set up and preliminary investigation by GSI, State government geology departments and various other organizations. These target areas could stand as possible starting points to take up detailed assessment to work out the economic viability and start platinum production mines in the country.

Fig. 2. Platinum metals are used as catalytic converters in automobile industry, electronics, jewelry and as coins for trade and investment.

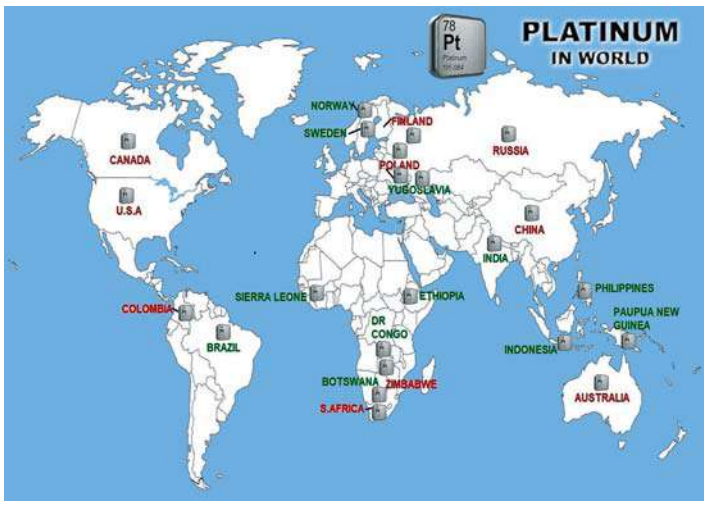

***Fig.3** Platinum bearing countries in the world. Main producers are in red color and other nations with prospects are in green.*

Of all platinum occurrences pointed out in India, certain targets have higher priorities and some are of secondary and lower possibilities. Baula-Nuasahi mineralised belt stretching about 3 km long located about 170 km northeast of Bhubaneswar in Orissa is regarded as one of the high platinum bearing areas in the country explored for several years by state and central government organizations. In ultramafic complex zones in Himalayan Mountain ranges in north India from Kashmir to Arunachal Pradesh and from Himachal Pradesh to Manipur concentration of platinum and palladium metals were reported. In south Indian State in Karnataka a few potential zones found to contain platinum metals and minerals. Recently in 2022, even in Hutti underground gold mines near Mallappa shaft area is found to contain platinum, palladium metals and minerals. However, no serious follow up feasibility studies were taken up to start the first platinum producing mine in India. The list of platinum prospects in India is furnished in table No. 6.

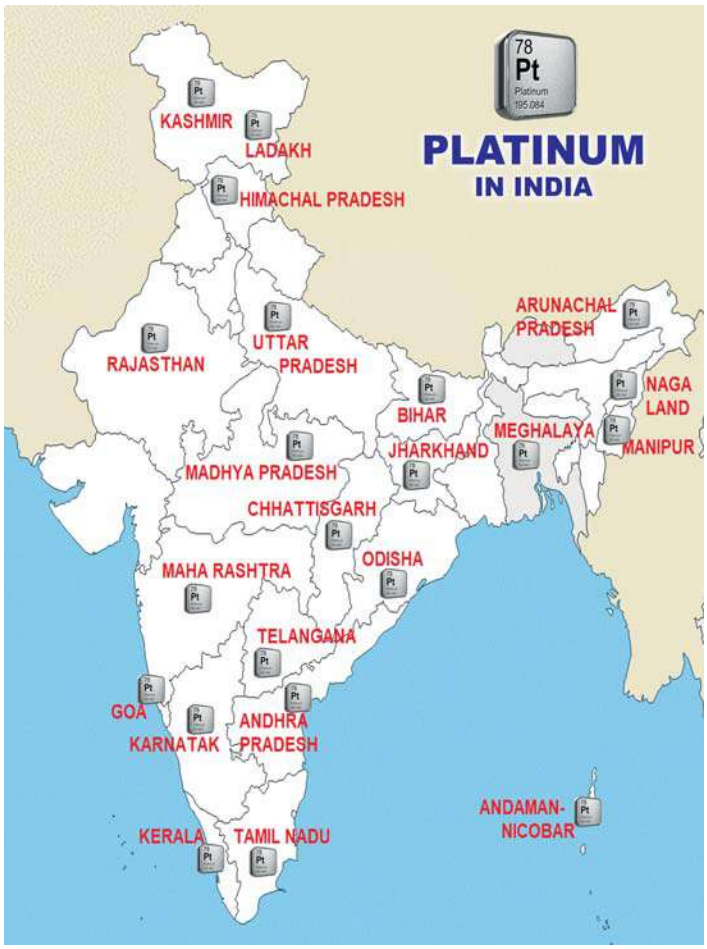

***Fig. 4**. Platinum bearing and potential states in India. Location details furnished in table No. 6*

6. FORWARD ACTION PLAN

To travel thousand miles, a person has to make the first one forward step. However, that just one good step is not enough to reach the destination. Creation of an exclusive and accountable Platinum department or division in government

Table No.4 Country wise Platinum mines, deposits and prospects in the world.

Sl	Country	Provinces, mines, deposits and prospects
1	South Africa	Bushveld complex:Merensky reef, UG-2, Platireef, Anglo Platinum (Amplants), Impala mine(Implats), Lonmin Platinum (Lonplats), Aquarius platinum, Northam Platinum, Atok mine, Insiswa, Uitkomst, Messina, Phalaborwa
2	Russia	Ural mountain mines, Siberia-Noril'sk, Kola Peninsula, Gusevogorsky, Monchegorsk
3	Zimbabwe	Hunters Road deposits, Shangani mine, Damba, Trojan mine, Epoch mine, Selukwe mine, Empress mine, Madziwa mine
4	Canada	Sudbury, Lac de Iles, Axel, Talameen, Manitoba, Marathon, Thunder bay, Raglan, Great Lakes Nickel, Ungava Dt, Shebandowan mine, Texmont, Redstone, Moak Lake mine, Mystery Lake, Bucko mine, Brichtree mine, Pipe No. 1 mine, Soab North & South mines, Thompson mine, Pipe No.2 Open pit center
5	USA	Still water mine at Nye, Montana, East boulder mine near Big Timber Montana, Le Perouse-Brady Glacier, Duluth complex, Ely Spruce, Minnamax, Salt Chuck, Snettisham, Union Bay, Yakobi Island-Bohemia basin, New Rambler, Salmon River-Goodnews Bay district, California-Sierran placers, California-Klamath placers, Porphyry Copper deposits in Western United States
6	China	Jinchuan mine, West China Ophiolite-chromite.
7	Finland	Kotalathti, Vammala mine, Hitura mine, Kontijarvi, Kuohunki, Penikat Layered intrusion
8	Columbia	Novita in Western and Central ranges of Andes, Buritica in Antioquia, Choco province
9	Australia	Macquarie and Turon rivers, Fifield deep, Munni Munii cplx, Wannaway, Carnilaya Hill mine, Agnew mine, Kambalda-St Ives, Trmways Dist, Windarra Dist
10	Poland	Zechstein basin-Kupferschiefer (part of Germany)
11	Botswana	Pikwe Dt, Phoenix, Selebi Dt, Selkirk
12	Brazil	Sierra Pelada
13	Ethiopia	Yubdo
14	Indonesia	Goenoegn-Lawack (Borneo)
15	Papua New Guinea	Yudda Rivers, Gira Rivers
16	Phillipines	Acoje mine
17	Norway	Bruvann-Rana-Espedalen
18	Sweden	Lappvatlnet, Risiden, Mjoedvattnet
19	Yugosolavia	Bor District
20	DR Congo	Copper belt-Kolwezi District, Musoni Rwe, Shinkolobwe
21	Sierra Leone	Orugu River tributaries, Free town layered complex

Table No. 5 Top ten platinum producing countries in the world based on business ranker.com

No.	Country	Production in tonnes
1	South Africa	130
2	Russia	22
3	Zimbabwe	15
4	Canada	7.4
5	USA	4.2
6	China	2.5
7	Finland	1.5
8	Colombia	0.8
9	Australia	0.2
10	Poland	0.025
	World Production	< 200

is basic step to move forward to start platinum production mines in the country. After India gained independence, some progress was made in understanding the geological set up, mineral exploration for certain minerals. Some proved to be right in producing iron and steel, building materials, lime stone and coal. But in some others sectors like production of precious, rare and strategic metals no break throughs were achieved. Now it is time to review and reorient in right direction with right policies and persons.

On 22nd January, 2024 Geological Survey of India in 63rd Central Programing Board meeting declared that it has formulated about 1055 scientific programs for the year 2024-25, which includes 392 Mineral Development projects that has many platinum exploration programs in the country. Hopefully several more platinum incidences and occurrences will be discovered. But identification of platinum prospects as

Table No.6 Potential platinum bearing prospects in India (For details -Geological Society of India book Platinum in India published in 2011).

No	Platinum Prospects	Locations
1	**Orissa**	6
1) Baula-Nuasahi-Keonjhar Dt, 2) Sukinda-Kaliapani, Katpal- Dhenkanal-Cuttack Dt, 3) Amjori sill-Keojhar district, 4) Simplipal-Mayurbhanj Dt, 5) Bastar craton-Western Orissa, 6) Eastern Ghat granulite-ultramafic cplx-Southern Orissa		
2	**Karnataka**	12
1) Channagiri: Shimoga Dt, 2) Himmalpur-Shimoga basin-Chikmagalur and Shimoga Dts. 3) Taverekere:Shimoga-Chikmagalur Dts, 4) Rangapura, Shivani:Shimoga-Chikmagalur Dts. 5) Tunga-Bhadra, 6) Shankargatta near Bhadravati, 7) Nuggihalli schist belt-Hassan Dt, Holenarasipur:Near Channarayapatna-Hassan Dt, 8) Sinduvalli, 9) Talur-Dodkatur:Mysore, 10) Thiruvanur: East Chitradurga, 11) Konkanhundi-Nanjungund taluk-Mysore Dt, 12) Hutti underground gold mine- Raichur Dt		
3	**Tamil Nadu**	16
1) Sitampundi: Salem Dt. 2) Bhavani:Coimbatore and Erode, 3) Mettuppalaiyam:Periyar Dt, 4) Torappadi:Tiruvannamali Dt, 5) Kadavur: Madurai Dt, 6) Oddanchatram: Palani hills, Dindigul Dt, 7) Chinnadharapur: Trichirapalli Dt, 8) Mamandur: South Arcot Dt, 9) Kanjanur: Dharmapuri Dt, 10) Sirapalli: Salem Dt, 11) Manmalai: South Arcot, 12) Thenmudiyanur:South Arcot, 13)Chalk hills: Salem Dt. 14) Hogenakal-Pyroxenite cplx, 15) Vellaturu, 16) Ipuru-Nakerikallu complex.		
4	**Kashmir**	3
1) Kudi valley, West Sumjam 2) Paddar-Kishtwar, 3) Suru valley-Kargil tehsil,		
5	**Ladakh**	2
1) Dras arc complex, 2) Nidar Ophiolite-Southeast Ladakh		
6	**Arunachal Pradesh**	2
1) Tidding Ultramafics-Lohit Dist., 2) Khetabari-Ranga valley-Dibang valley		
7	**Himachal Pradesh**	3
1) Larji-Rampur window-Shimla, 2) Tara Devi, 3) Tons valley-Sirmur		
8	**Nagaland**	3
1) Naga ophiolites in Naga hills 2) Satuza-Zipu, 3) Mokie-Phokhungri		
9	**Manipur**	7
1) Manipur ophiolite belt, 2) Kwatha-Chandel Dt, 3) Phangrai-Ukhrul Dt 4) Luntching-copper hill, 5) Nampisha-Ukhrul Dt, 6) Morcha, 7) Pushing village ultramafics.		
10	**Meghalaya**	1
1) Sung valley		
11	**Jharkhand**	5
1) Roroburu, Johohatu, Chitungbhuru near Chaibasa, Singhbhum Dt, 2) Dhipsai in Tiring-Rajnagar sector: East Singhbhum area, 3) Hotang hills: Ranchi Dt, 4) Baida Chauk: Bhagalpur Dt, 5) Rakha mines, Mosabani, Sunrgi: Mayurbhanj Dt.		
12	**Rajasthan**	7
1) Jharol ultramafics-Sandmata complex, Pipalkhant-Panuda: Ajmer-Udaipur-Dungarpur Dt, 2) Sendra Phulad, Chitrasani belt: Pali Dt. 3) Mafic cplx in Nagaur Dts, 4) Pindwara-Watera, 5) Mundwara igneous complex, Sirohi district. 6) Massive sulphide deposits in Ambaji, 7) Deri: South Delhi fold belt.		
13	**Uttar Pradesh**	3
1) Ikauna area, Madaura complex: Lalitpur Dt, 2) Sonai-Tori: Lalitpur Dt, 3) Son valley, Guladih-Gurpahar: Sonbhadra Dt.		

14	**Madhya Pradesh**	18
1) Mahakoshal:Siddi-Sonbhadra Dt, 2) Imalia-Bhula-Nawalia: Jabalpur, 3) Sonaghati, 4) Bhopali, 5) Golighat, 6) Chincholi, 7) Padhar, 8) Jangaldehri 9) Mordongari of Betul belt, 10) Padhar ultra mafic complex, 11) Gurhar Pahar, 12) Chakaria, 13) Sonkorwa, 14) Guladih, 15) Bihawa, 16) Sona-Pahari, 17) Goindari, 18) Karhiya ultramafics		
15	**Bihar**	2
1) Bisoi-Jojohatu, 2) Gurumahishini belt		
16	**Chattisgarh**	2
1) Abhujmar-Narainpur: Bastar, 2) South Bastar mafic-ultramafic bodies: Dantewada		
17	**Maharashtra**	7
1) Heti prospect-Gondpipri complex, 2) Chionda-Kanhargaon area: 3) Dabha-Chakbapur area: Chandrapur, 4) Bhimsen-kilapahar: Bhandara Dt, 5) Pullar-Parsori 6) Kitari: Nagpur Dt, 7) Kankauli-Vagda and North of Pauni		
18	**Andhra Pradesh**	13
1) Chimakurti-Prakasam Dt, 2) Inukurti:Nellore Dt, 3) Kondapalli:Krishna Dt, 4) Pasupugallu: Prakasam Dt, 5) Kandra complex: Nellore Dt, 6) Kanigiri-Prakasam Dt. 7) Podili-Prakasham Dt, 8) Kondapalle layered complex, 9) Rapuru in Nellore Schist belt, 10) Gurramkonda-ophiolites nappe cplx, 11) Errakonda-Uppalapadu plutons, 12) Elchuru-Prakasam magmatic cplx,		
19	**Telangana**	2
1) Batampudi ultrabasic cplx, 2) Chimalpad Layered cplx, Khammam district		
20	**Goa**	1
1) Usgao ultramafics: South Goa		
21	**Kerala**	1
1) Vattalakki:Palaghat Dt.		
22	**Andaman-Nicobar islands**	6
1) Andaman ophiolite complex: 2) Sewel Rise ferro-manganese nodules in Andaman sea, 3) Chain stream, 4) Mitha streams, 5) Rutland island, 6) West Sewell Ridge		
TOTAL		**122**

initial step is not good enough. The next crucial follow ups like determining the extractabilities, economic viability to initiate mining and production have to be done. In some areas like in Hutti platinum is reportedly associated with gold. In some other areas there is scope to extract chromium and nickel along with platinum to make the occurrence economically viable for mining.

At present as mentioned above, there is no single dedicated department or wing or person in government of India to look after all aspects of platinum right from exploration, economic evaluation, mining, value addition, trade and marketing. Gold, platinum and other precious rare metals mining and production were looked after along with other metals and industrial mineral commodities. There is need to create one exclusive department or division to move forward about this untapped hidden much ignored precious metal.

7. CONCLUSION

The main objective of this article is to put India in the platinum map of world, as a producing country. India has favorable geological landscape, and its diverse terrain revealed presence of several occurrences of platinum across various states and territories. From the majestic Himalayan peaks in the north to the serene Andaman and Nicobar Islands in the south, platinum presence identified in 20 states and territories. A comprehensive compilation lists 122 occurrences and targets. These findings serve as valuable markers for further exploration and development. Despite these discoveries, India has yet to start its first platinum-producing mine. The challenge lies in transforming these occurrences into economically viable ventures. To unlock the potential of these platinum deposits, rigorous detailed investigations are essential. Leveraging cutting-edge technology and state-of-the-art methodologies will be crucial.

India is fortunate to have a network of national industrial and regional research laboratories equipped with advanced infrastructure and skilled manpower. Collaborations with experts and organizations can accelerate progress. In certain domains, India may need to acquire technology from abroad to efficiently extract and process platinum. This openness to external expertise is a strategic move toward success. The future holds promise. As we continue our scientific endeavors, there is ample scope for India to emerge as a significant player in the global platinum industry. Let's remain hopeful that the first platinum mine on Indian soil will soon become a reality!

8. ACKNOWLEDGMENTS

I sincerely thank to Dr. P.V. Rao for his encouragement to write this article with a comprehensive list of platinum occurrences in India. Hope India could reorient and reorganize the precious metals mining policy to start the first platinum mine in India in foreseeable future.

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(Continued from Page 12)

➤ Govt asks major steel players to use iron ore fines also for steel making

The Ministry of Steel has instructed integrated steel producers to use iron ore fines in steel making after beneficiation and consider acquiring coking coal mines abroad to secure competitive raw materials, stressing the preservation of limited domestic iron reserves and the importance of low-grade ore usage.

To increase the usage of available raw materials, the Ministry of Steel has directed integrated steel players to make use of iron ore fines in steel making after its beneficiation. As per sources, the ministry has also suggested that players look at options like acquiring coking coal mines abroad.

This is aimed at increasing the availability of raw materials at competitive prices, they said. "It has been conveyed to them that iron reserves are limited in the country and to preserve that, players must also use low grade ore through beneficiation process. They can also look for coking coal mines outside India," the sources said.

Iron ore and coking coal are the two key raw materials used for manufacturing steel through blast furnace route. While iron ore is available in abundance, for coking coal, India remains heavily dependent on imports.

Major players use only high-grade ore (lumps), with 65 per cent and above iron content, to make steel through BF (blast furnace). Fines are low grade ore having iron content or 64 per cent or less.

PTI / Oct 06, 2024

CRIRSCO AGM 2024 & MRMR CONFERENCE

Held at Hotel Hyatt Regency, Vancouver, Canada

The CRIRSCO Annual General Meeting (AGM) 2024 took place in Hotel Hyatt Regency, Vancouver, Canada, marking an important event for the global mining industry. This gathering brought together representatives from CRIRSCO's 15 National Reporting Organizations (NROs) to discuss and advance international standards for mineral resource and reserve reporting. representatives from the 15 member countries/regions of CRIRSCO presented during the open sessions. These countries/regions include Australasia, Brazil, Canada, Chile, Colombia, Europe, India, Indonesia, Kazakhstan, Mongolia, Philippines, Russia, South Africa, Turkey, and the USA. NACRI (India) has been represented by two of its representatives on CRIRSCO viz. Mr DB Sundara ramam, President Elect MEAI & VP (Raw Materials), Tata Steel and Dr PV Rao, Co-Chair NACRI in the AGM.

(R-L): Mr DB Sundara ramam and Dr PV Rao

They made a PPT presentation on 15th October 2024 on NACRI's activities in India during the year 2023-24 and the challenges ahead in India in implementing IMIC.

Dr PV Rao making a PPT presentation in the AGM

The topics covered in the NACRI presentation included:

- Holding NACRI members meetings,
- NACRI meetings with Ministry of Mines (MoM),
- Registration of RCPs,
- Publication of an article in Indian Express on IMIC implementation in India,
- Nomination of Dr CH Rao as a expert member on Dimensional Stones & Construction Materials (DS&CM) committee of CRIRSCO headed by Dr. Atiye TU RUL of Turkiye,
- Organizing a National Seminar by MEAI Hyderabad Chapter on "Advanced Iron Ore Beneficiation & Sustainable Low Grade Iron Ore Utilization" at Hyderabad,
- Holding a meeting of MEAI with MGMI President and Officer bearers in Kolkata,
- presenting a paper on "Exploration Trends: India vs The World" in a Workshop held on "Technological Advancements in the Indian Mining Industry" at Jabalpur, and
- Conducting IMIC-V training program on May 6-10, 2024 at Hyderabad.

NRO members participating in the CRIRSCO AGM 2024

A detailed discussion on "Reciprocity", an Agenda point proposed by India, has been held by the General Body and concluded that the interested NROs may take up this matter mutually with the other NROs to enable the RCPs prepare their Mineral Resources & Mineral Reserves (MRMR)

reports, since there could be issues specific to each NRO in recognising other CPs/ QPs. However, NROs such as USA (SME) and Kazakhstan (KAZRC) recognised India's RCPs as CPs and MEAI as a foreign Recognised Professional Organisation (RPO) while Australasia (JORC) and Turkiye (UMREK) forwarded NACRI applications to their respective review committees for delivering a favourable decision. KCMI (Indonesia) and Canadian Securities Administrators (CSA), Canada declined to recognise India's RCPs due to specific rules approved by their respective Regulators whereas our application for reciprocity is pending with Europe (PERC), Mongolia (MRC), and Philippines (PMRCC) for the final decision.

The CRIRSCO AGM was held from October 14 to 16, 2024, with the following agenda.

- **Monday, October 14**: Full-day closed sessions exclusively for CRIRSCO members. The topics discussed in seven sessions included:

  Session 1- Opening: Welcome and Opening Remarks, CIM Welcome, Approval of Minutes from 2023 AGM, Chairperson's Report

  Session 2- Incorporation and Governance: Incorporation Details and Path Forward, Governance

  Session 3- Working Groups: ESG Guidelines, Aggregates and Dimensions Stones, Lithium Brines

  Session 4- Beyond Inferred: Beyond Inferred

  Session 5- NRO Updates: NRO Code Updates, New NRO Update, NRO Succession

  Session 6- Mobility and Reciprocity: Reciprocity Discussion

  Session 7- Administrative: CRIRSCO budget update & forecast; funding for 2025 and beyond, and wrap up and Action Plan
- **Tuesday, October 15**: Open sessions featuring presentations from each NRO on their progress and challenges, welcome and opening Remarks, ICMM, UNECE and CIM.

  Session 8- NRO Reports: Philippines, Mongolia, China, Indonesia, Kazakhstan, India, Kyrgyzstan, Turkiye, Europe, South Africa, West Africa, Saudi Arabia, Australia, Brazil, Canada, USA, Colombia, Chile, Ecuador, and Peru

  Session 9- Stakeholder and External Relationships: ICMM, UNECE (UNFC), ISA, and CIM President's Address
- **Wednesday, October 16 (morning)**: Wrap-up discussions and regulatory learning.

  Session 10- Resource Classification and Risk Assessment, Q&A wrap-up, Workshop jointly held by UNECE and CRIRSCO reps. And Resource classification from a public reporting perspective

MRMR 2024 Conference

In conjunction with the AGM, CRIRSCO and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) jointly organized the inaugural Mineral Resources and Mineral Reserves (MRMR) 2024 Conference.

This conference, scheduled from October 16 to 18, 2024, provided a platform for industry professionals to share information and experiences related to the assessment and reporting of mineral resources and reserves. The conference program included:

- **Wednesday, October 16 (afternoon) to Friday, October 18**: MRMR Symposium featuring conference presentations
- **Saturday, October 19:** Short courses

Significance of the Event

The 2024 AGM and MRMR Conference in Vancouver represent a significant milestone for CRIRSCO and the mining industry as a whole. CRIRSCO, which now comprises 15 member organizations representing countries and regions worldwide, plays a crucial role in promoting high standards for reporting mineral deposit estimates and exploration results. The event addressed several key topics:

- Harmonization of reporting standards: Discussions on further aligning national and regional reporting codes with the CRIRSCO International Reporting Template
- Environmental, Social, and Governance (ESG) considerations: Exploring ways to incorporate ESG factors into mineral reporting standards to address growing investor concerns
- Competency requirements: Deliberations on enhancing the definition and enforcement of competency standards for professionals involved in mineral resource estimation and reporting
- Technological advancements: Examining the impact of new technologies on mineral exploration, estimation, and reporting practices.
- International collaboration: Strengthening partnerships between NROs and fostering knowledge exchange to improve global reporting practices
- The strategic partnership with ICMM enables CRIRSCO to more effectively fulfil its mission of promoting high standards in public reporting of mineral deposit estimates and exploration progress, ultimately benefiting its members and the broader mining industry.

The CRIRSCO AGM 2024 and the accompanying MRMR Conference in Vancouver represented a significant opportunity for the global mining community to come together, share insights, and shape the future of mineral resource and reserve reporting. By fostering collaboration and promoting best practices, these events contributed to maintaining investor trust and supporting sustainable development in the mining sector.

MEAI NEWS

AHMEDABAD CHAPTER

The Ahmedabad Chapter recently organized a DGMS approved Competency certificate training program on First Aid for mining engineering students and young mining professionals.

The 10-day training program was inaugurated by President MEAI Sh. S N Mathur with the gracious presence of Council Member Sh. A K Garg, Chapter Chairman Sh. Swagat Ray, and Secretary Ms. Gunjan Pande.

Workplace safety is a paramount concern, and First Aid-CPR training is an essential component of it. Timely and effective response to medical emergencies can significantly reduce morbidity and mortality rates. The comprehensive First Aid-CPR training session aimed to equip participants with critical life-saving skills, emphasizing the importance of workplace safety in the mining industry.

The training program was conducted at iCEM (International Center of Excellence in Mining Safety & Automation). iCEM is an autonomous institution established by the Government of Gujarat under the aegis of the Gujarat Mineral Development Corporation with a vision to become India's leading institute for enabling sustainable mining from societal, environmental and commercial standpoints.

Ahmedabad Chapter sponsored the training for students and provided logistic support for the candidates belonging to the far-flung areas of Kutch. The training sessions were conducted by Dr. Shailesh Jepiwala (Occupational Health Service – Ahmedabad). With his 25 years of experience, he provided hands-on training and insightful guidance, empowering participants to respond confidently in medical emergencies. The session covered essential topics, including Heart Attack & Cardiac Arrest Management, Artificial Respiration, Snake bites, Bleeding Control, Drowning, Burns and many more Medical Emergencies.

Inaugural Speech by President MEAI, Sh. S N Mathur

The Mining Engineering Association of India is committed to prioritizing safety and well-being in the mining sector. This training initiative demonstrates its dedication to enhancing the knowledge and skills of members, ensuring a safer working environment. 25 candidates benefited and were issued with the DGMS competency certificates on First Aid, with this program.

Demonstration in Inaugural Program

Classroom Training

Presentation of Competency certificates by Sh. Swagat Ray, Chairman Ahmedabad Chapter

Felicitation of Training Batch

BARAJAMDA CHAPTER

Seminar held at Noamundi Officers' club

Barajamda Chapter, in collaboration with Tata steel limited, organized a seminar on 25.09.2024 at Noamundi Officer's Club, at Noamundi.

Two presentations on (1) "DMS TECHNOLOGY FOR BENEFICIATION OF LOW-GRADE IRON ORE & COAL" by Shri C. Vineet Rao, Senior Vice President and Mr. Gerhard Hoffmann MD of M/s Exagogi Consulting Engineering Pvt. Limited and (2) "Driver Fatigue Monitoring System" by Shri Rishav Kumar, Macindia Limited were presented.

On this Occasion Shri A.K. Bhatnagar, Chairman, Barajamda Chapter shared his views for sustainable mining practices.

Shri A.K. Bhatnagar addressing the delegates

Other representatives from SAIL, Rungta group of mines, JSW, OMC, BRPL, AMNS, JSPL and MECON India were present. More than 90 Members, Invitees and Special Guests participated in the Seminar. Both the presentations were highly interactive and received appreciation for excellent coverage of the latest developments in the mining industry.

BELLARY-HOSPET CHAPTER

EXECUTIVE & DEVELOPMENT COMMITTEE MEETING

Held at Donimalai Complex, NMDC on 1st October 2024

FOLLOWING MEMBERS ATTENDED THE MEETING:

Office Bearers: Sri S H M Mallikarjuna (Chairman), Sri P Venkateswara Rao (Secretary), Sri J. Srikanth (Treasurer)

Ex-officio and Council Members: Sri K Madhusudhana (Past President), Sri K Prabhakar Reddy

Executive Committee Members: Sri T Jitender Reddy, Sri Vinay Kumar, Sri. Shivanand Reddy

Development Committee Members: Sri T L Yogananda, Sri. Bharat Kumar, Sri. YVR Krishna Reddy, Sri. T. Ramesh, Sri. Chandrashekar Halli

First-Aid Committee Members: Sri MM Rakesh, Sri K Krishnudu, Sri S Ravindra

Special Invitees: Sri S B Singh, Sri K P Singh

AGENDA FOR MEETING:

1. Welcome address.
2. Approval of Previous Meeting Minutes.
3. IMD-2024 Celebrations Planning.
4. Other matters with the permission of the Chair.
5. Financial position as on Date.
6. Next meeting Plan.
7. Vote of Thanks.

Executive Committee Meeting in progress

Sri Vinay Kumar, the Executive Member has delivered a warm welcome address at the Executive Committee meeting of the Chapter. Sri Vinay Kumar extended a hearty welcome to two esteemed guests, Sri K. Madhusudhana, the CEO of MSPL Limited, and Sri S. B. Singh, Project Head of NMDC. He presented the achievements of Bellary-Hospet Chapter during the recent past and about First Aid training.

Sri K. Madhusudhan, Sri S. B. Singh, and Sri K. Prabhakara Reddy on the dais

Sri. S. B. Singh, the Project Head of NMDC, delivered an impactful address that resonated with all attendees. In his remarks, Sri S B Singh expressed his enthusiasm for the grand success of the meeting, acknowledging the collaborative spirit and dedication of the members present. He emphasized the importance of such gatherings in fostering innovation and addressing the challenges faced by the mining sector. Sri Singh also extended his unwavering support to the BH Chapter, recognizing its vital role in promoting best practices and knowledge sharing within the industry.

Sri Mallikarjuna, the Chairman initiated discussion on the agenda points and discussed previous meeting minutes. The minutes of the meeting are approved unanimously.

Sri. Mallikarjuna welcomed all the members for the meeting. He highlighted the various activities conducted by the BH Chapter over the past year, showcasing the Chapter's commitment to promoting the interests of mining engineers and enhancing professional development. He urged the M/s NMDC Ltd, JSW Ltd, BKG Ltd, MSPL Ltd and other companies to promote fellow memberships in their organizations, emphasizing the benefits of joining MEAI for professional growth and networking.

The Chapter Chairman shared details about the recent purchase of a new site, which is expected to serve as a hub for future activities and gatherings. This development reflects the Chapter's growth and long-term vision. He thanked the First Aid team for the support made to complete maximum batches in Year.

Sri. Madhusudhana announced the upcoming one-day Surveyors' Meet scheduled for February 15, 2024. He emphasized the importance of the event in fostering collaboration, and knowledge sharing among professionals in the field of Surveying. He suggested the Chapter Secretary submit a formal letter to the headquarters of MEAI for approval, and make an announcement under the Conferences column in the Mining Engineers Journal.

He appreciated the dedicated efforts of the EC & DC Members in conducting various activities and initiatives within the association. He expressed the forum about the First Aid Training achievement, and the efforts of the Committee, Doctors and the NMDC Staff for the achievement of a large number of trainees during the past year.

Sri. Madhusudhana provided an update on the construction of a new building at the recently purchased site. This development aims to create a dedicated space for meetings, training, and other activities that will benefit the members. He stressed on the significance of membership development, noting that financial contributions are not the sole focus of the Association. Instead, he encouraged a culture of collaboration and active participation to enhance the value of MEAI for all members.

He also informed the VTC Managers of Hosapete & Sandur to impart coaching to the Field Candidates appearing for the Mate & Foreman Competency Examinations with the support of BH Chapter. He asked for the support of specialists in the field of Coaching.

Sri. Madhusudhana agreed to the request made by Sri. K. Krihnudu, Manager of VTC Hosapete, to extend support of BH Chapter for conducting the coaching classes to the candidates appearing for the Mining Mate competency examination to be conducted this year at VTC Hosapete.

Sri. K. Prabhakar Reddy highlighted the need for imparting the Computer-Based Training (CBT) for field candidates appearing for the Mining Mate and Mine Foreman competency examination. He asked the companies in the sector to donate computers to provide training to the field candidates appearing for the CBT examinations.

He recollected the valuable contribution of Sri. Gangadhar M/s MSPL Staff, who passed away, in all the events of the Chapter. The forum agreed to extend financial support to his family. He advised the Chairman & Secretary to formulate different committees to organize various activities, including sports, examinations, and surveyors' meetings. He also mentioned the planning of an upcoming national seminar, which is expected to be a pivotal event for MEAI.

Following Points Were discussed and finalized: Chief Guest Finalization, Blood Donation Camp, Plantation Programme, Cricket Match Programme, Flag Hoisting Arrangements, Prize Distribution.

Sri. Vinay Kumar, M/s NMDC Ltd., thanked all the Members present for attending the Meeting and also Thanked M/s NMDC Ltd., for arranging the meeting in their premises.

Sri. Mallikarjuna also expressed thanks to the M/s NMDC Ltd., for accommodating the EC Meeting at NMDC Complex in a grand manner.

BHUBANESWAR CHAPTER

Knowledge Sharing Session conducted on 3rd October'24

Theme: "Digital interventions in Mine Water Management"

The Bhubaneshwar Chapter had organized a "Knowledge Sharing Session" on 03rd October 2024 at Chrome Valley Club, Sukinda Chromite Mine of Tata Steel Limited in physical as well as hybrid mode. Shri. Shambhu Nath Jha, Chapter Secretary and other senior members of the Chapter had graced the occasion. The event was attended by representatives from major mining companies in the Sukinda region, including Tata Steel, Vedanta, IMFA, Balasore Alloys, and Odisha Mining Corporation. These companies, pivotal to the region's industrial growth, actively participated in the discussions and exchanged ideas on implementing digital solutions to mitigate water-related challenges in mining operations.

The ceremony began with the dignitaries lighting auspicious lamps. The Secretary, Shri. Shambhu Nath Jha, then gave a welcoming speech in which he extended his greetings to all the attendees, both in person and virtually. He expressed gratitude to the speakers for lending their technical know-how on this occasion.

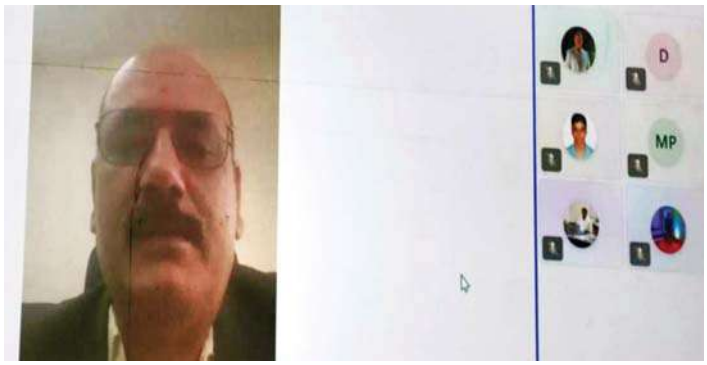
Technical presentations were presented by officials from FluxGen:

- Shri. Anand Vijayakumar - Solution Specialist -(6+ years FluxGen Sustainable Technologies Private limited), Masters in AI
- Satyajit Chakraborty - 38 years of experience in Tata, Ex Chief Manager O&M Water Management Department - JUSCO – TSL

Welcome Address by Shri. Shambhu Nath Jha

Address by Shri. Pankaj Kumar Satija

He emphasized the importance of digital innovation in addressing critical issues like water conservation and management in mines. In his address, he stated, "Water is one of the most precious resources, and with the advancement of digital technologies, we now have the means to manage this resource more effectively. Digital solutions can significantly enhance operational efficiency, reduce water waste, and ensure the sustainability of mining activities as water requirements of communities in and around its area of operation".



Address by Shri. Pankaj Kumar Satija, Chapter Chairman

Presenter 1: Shri. Anand Vijayakumar- Solution Specialist (6+ years FluxGen Sustainable Technologies Private limited), Masters in AI

He had talked about the challenges of managing industrial water resources and the ways that the water crisis hurts business. He discussed several laws dealing with water and energy conservation. To solve the water management issue, he makes use of an AI-based system created by FluxGen Technology. Additionally, he introduced a data-centric and AI-based water treatment plan management system. He said, "let's build a water positive future together," to wrap up his remarks.

Presentation by Shri. Anand Vijayakumar

Presenter 2: Shri. Satyajit Chakraborty - 38 years of experience in Tata, Ex Chief Manager O&M Water Management Department - JUSCO – TSL

He talked about how understanding water is essential to effectively manage water use. He gave a case study wherein the water problem was solved by meticulously detecting and correcting leaks and keeping a watch on both unauthorized and illegal water use. As he wrapped off his remarks, he declared, "You have no right to steal or to pollute.

Presentation by Shri. Satyajit Chakraborty

Deliberations were held on use of IOT based systems and Artificial Intelligence in water management system. With a focus on sustainability and operational efficiency, the session drew widespread appreciation from the attending companies, and discussions are set to continue to implement these technologies across Sukinda' s mining sector.

The event ended with the vote of thanks proposed by Shri Naveen Shrivastava, Head Mining, Saruabil & Kamarda, M/s Tata Steel Limited.

Presentation by Shri. Naveen Shrivastava (Head Mining, Saruabil & Kamarda)

NAGPUR CHAPTER

Technical Meet/Paper Presentation session on

(1) "Unraveling the Secrets of Manganese Deposits of Sausar Group" and (2) "Manganese Ore-Global and Indian Perspective"

(Left to Right): Shri P. Karaiya, Executive Director (Tech), Shri M.M. Abdulla, Director, M/S MOIL Limited, Dr. Y.G. Kale, Controller of Mines & Hon. Secretary, MEAI, Nagpur Chapter, Shri P.N. Sharma, Chief Controller of Mines & Chairman, MEAI, Nagpur Chapter, Shri C.S. Gundewar, Former Controller General, IBM, Shri R.C. Sanodia, Vice-Chairman, MEAI, Nagpur Chapter, Dr. S.K. Sarkar, DGM (Geology) and Shri R. Bhattacharya, Joint General Manager, M/S MOIL Limited

Nagpur chapter organized a Technical Meet/Paper Presentation on 23rd September 2024 at Hotel Centre Point, Nagpur. Two Technical lectures on (1) Unraveling the Secrets of Manganese Deposits of Sausar Group by Dr. S.K. Sarkar, DGM (Geology), M/S MOIL Limited and (2) Manganese Ore-Global and Indian Perspective by Shri R. Bhattacharya, Joint General Manager, M/S MOIL Limited were presented. On the occasion Shri P.N. Sharma, Chief Controller of Mines, Indian Bureau of Mines and Chairman, Nagpur Chapter, Shri R. C. Sanodia, Vice Chairman, Nagpur Chapter, Shri C. S. Gundewar, Former Controller General, Indian Bureau of Mines, and Dr. Yogesh Kale, Controller of Mines and Secretary, Nagpur Chapter were present. Apart from them, Shri M. M. Abdulla, Director, M/S MOIL Limited and Shri P. Karaiya, Executive Director (Technical), M/S MOIL Limited were also present on the dais. Shri Arun S. Chachane, Assistant Controller of Mines and Joint Secretary, Nagpur Chapter conducted the programme. Overwhelming response was received for the event and more than 100 members, invitees and special guests participated in the

meet. Both the lectures received a very good appreciation for excellent coverage of the technical data.

Shri Rudra Narayan Mishra, Regional Mining Geologist presented a Vote of Thanks.

Dr. Y.G. Kale welcoming the delegates

Dignitaries present during the Technical Papers Presentation

Felicitation of Dr. S. K. Sarkar by Shri P.N. Sharma

Felicitation of Shri R. Bhattacharya by Shri P.N. Sharma

Vote of Thanks by Shri Rudra Narayan Mishra, Regional Mining Geologist

RAJASTHAN CHAPTER-JAIPUR

Training program

The MEAI Rajasthan, Jaipur Chapter recently concluded a 5 days training program on 3-D geological modelling, resource estimation and open pit designing using SURPAC software. The event took place from 23rd to 27th September 2024.

Sh. Mahesh Mathur, Additional Director Mines, Department of Mines and Geology, CDOS, Jaipur, graced the occasion as the Chief Guest and offered invaluable guidance and encouragement. He also emphasized on use of the latest technologies in small scale mining operations as well. Sh. Akshaydeep Mathur, Sec. FMAR was invited as a special guest who shared his valuable insights and practical experience of the benefits of using technologies in the mining industry. Jaipur chapter, collaborated with Dassault Systems for conducting this training. Mr. Subhajit Banerjee from Dassault Systems visited Jaipur to conduct the training program.

The felicitation session was organized on the last day (27th Sep) of the program. Shri Gopal ji Sharma, Honorable MLA, Civil Lines, Jaipur was invited to grace the occasion as the Chief Guests of the program. Shri Gopal ji Sharma stated the importance of the mineral industry and its associated stakeholders in the Nation's economy.

Over 45 participants from across India registered for the program, demonstrating significant interest. The training received overwhelmingly positive feedback, with 100% of participants recommending it to their peers.

Several distinguished members of MEAI presented during the sessions and graced the occasion.

RAJASTHAN CHAPTER-UDAIPUR

Annual Plantation Programme held on 6.9.2024

Annual Plantation Programme was organized by the Udaipur Chapter, in collaboration with Khetan Business Corporation Pvt. Ltd., Nathdwara, and the Department of Mines and Geology, Rajsamand on 6.9.2024. The event took place at Dhanlaxmi Soapstone and Dolomite Mines in Rabcha, with the prime objectives of promoting environmental conservation, enhancing greenery, and raising environmental awareness in mining areas.

The objectives of the program were Promoting environmental conservation and green cover in mining zones, Raising awareness of responsible mining practices and Strengthening the commitment of the mining industry toward sustainable development.

Highlights of the Programme

1. Tree Plantation Drive: 1800 saplings, including fruit-bearing and shade-providing species, were successfully planted at the mining dump yards and surrounding areas. The event aligns with the ongoing commitment of Khetan Business Corporation Pvt. Ltd., which has planted over 1.5 lakh trees to date as part of their environmental initiatives.
2. Distinguished Guests: The plantation programme was graced by several esteemed guests, including Vishwaraj Singh Mewar, MLA, Nathdwara; Bhagwati Prasad Kalal, Director,Mines & Geology, Govt. of Rajasthan; Mrs. Ratni Devi Jat, Jila Pramukh, Rajsamand; Man Singh Barhath, BJP District President, Rajsamand; P.R. Ameta, Additional Director (Vigilance), DMG;

D.P. Gaur, Technical Assistant, DMG; Madhu Sudhan Paliwal, Chairman, Udaipur Chapter; Several senior members of the MEAI and other distinguished guests were also present.

The presence of the above dignitaries underscored the importance of the programme and its contribution to environmental conservation.

3. Environmental Impact: The initiative emphasized MEAI's commitment for raising awareness about environmental sustainability in the mining sector. The planted saplings are expected to contribute significantly to improve local ecosystems, enhancing biodiversity, and providing long-term environmental benefits. The inspection of 2500 previously planted fruit-bearing trees demonstrated the success of the company's earlier efforts, with many trees flourishing and bearing fruit, further emphasizing the positive impact of such initiatives.
4. Future Commitment: The plantation programme is an essential step toward creating a greener and cleaner environment for future generations. The company's commitment to environmental preservation has been widely appreciated by all attendees and is seen as a milestone in the direction of sustainable mining.

The Annual Plantation Programme organized by Udaipur Chapter, in partnership with Khetan Business Corporation Pvt. Ltd. and the Department of Mines and Geology, was a grand success. The initiative not only contributed to environmental conservation but also sets an example of responsible mining practices. MEAI remains dedicated to promoting such activities that foster environmental awareness and encourage a sustainable future in the mining industry.

We are confident that this effort will significantly impact the local environment and continue to serve as an inspiration for future projects. We look forward to more such initiatives in alignment with MEAI's environmental goals.

Report of 26th Annual General Body Meeting

26th Annual General Body Meeting of Rajasthan Chapter-Udaipur and family get-together was held on 24th September, 2024 (Sunday) 10:00AM at Udaipur Chamber of Commerce & Industry, Chamber Bhawan, Mewar Industrial Area, Madri, Udaipur-313003.

(L to R): Sh Asif M Ansari, Secretary, Sh MS Paliwal, Chairman, Sh RP Gupta, Former President MEAI, Sh Arun Kumar Kothar, Former President MEAI, Sh Praveen Sharma, Vice-Chairman & Sh MK Mehta, Treasurer

Meeting was chaired by *Sh MS Paliwal*, Ex- Chairman of Udaipur. Chief Guests on the dais were *Sh RP Gupta*, Former National President & Sh Arun Kumar Kothari, Former President, MEAI, Chapter *Sh Praveen Sharma*, Vice-chairman, Sh Asif M Ansari, Chapter Secretary and *Sh*

MK Mehta, Chapter Treasurer were on dais . At the outset Sh MS Paliwal welcomed all the members and expressed his happiness for the record attendance of the members along with their family members.

Sh Paliwal made a PowerPoint presentation on salient activities of the Chapter 2022-2024 viz. increase 151 Members including 15 female members, as such that total member of Udaipur Chapter becomes 506 including three student's chapters. He emphasised on Silver Jubilee Function, National Seminar, Technical Talks, Celebrations of Indian Mining Day, Training and Awareness Programs, Mine Visits & Plantation Programs conducted during the last year.

Presentation of report by Secretary, Sh Asif M Ansari: Welcomed all the dignitaries and members and expressed his thanks for the cooperation rendered during last two years. He highlighted the activities conducted last year including the Silver Jubilee Celebration, Technical Talks, Contribution of the chapter to build the state mining policy by giving suggestions, training program of surpac mining software and sokkia total station for mining members and students.

Presentation of Audited Accounts: Sh MK Mehta, Treasurer presented an audited account among the house and briefed the receipt and payments. The house unanimously approved the account.

Rajasthan Chapter-Udaipur felicitated the following members for their excellent contribution for the year 2023-24 at MEAI National Level.

1. Sh A K Kothari – Lifetime Achievement Award-2022
2. Sh I S Surana- Service Excellence Award-2022
3. Dr S S Rathore – Lifetime Achievement Award-2023
4. Sh M S Paliwal – Service Excellence Award-2022 & 23 and Enrolling Maximum Life Member Awards, 2023
5. Sh Asif M Ansari – Service Excellence Award-2022&23 and Enrolling Maximum Life Member Awards-2023
6. Sh Kuldeep Singh Solanki - Service Excellence Award-2023
7. Sh Rajendra R Harlalka – Smt Bala Tandon Award-2023
8. Sh R C Purohit– MEAI SIMMINDS Award- 2023
9. Sh Praveen Sharma – National MGMI Award of Excellence for Non Coal Mining -2022-23

The Rajasthan Chapter- Udaipur has also recognized the following members for their excellent contributions in the Mining Fields.

10. Sh Pushkar Raj Ameta, ADM (Vig)- For Prevention of Illegal Mining in Rajasthan
11. Dr Anupam Bhatnagar – For Appointment of DEAN, CTAE & Member of SEAC
12. Dr SK Vashishth- Nomination of "Member of TCC-II of NMET Committee"
13. Dr Hitanshu Kaushal –for Obtaining "International Patent" of South Africa
14. Sh Arif Mohemmed Sheikh – For participation in "World Sports Transplant Championship" in Bangkok
15. Sh Narendra Kumar Kavadia - "Excellent Services in Publication of Newsletter of MEAI, Rajasthan Chapter-Udaipur

Declaration of Executive Committee

Sh AK Kothari, Former National President was appointed as Returning Officer for the year 2024-26. The election was conducted through an online voting system. He declared the election results as the following members elected for the year of 2024-26.

Office Bearers

Chairman	Sh Praveen Sharma (LM No.- 2153)
Vice Chairman	Sh DP Gaur (LM No.- 2116)
Secretary	Sh Asif Mohammed Ansari (LM No.- 2418)
Jt. Secretary	Dr Hitanshu Kaushal (LM No.- 3392)
Treasurer	Sh RC Purohit (LM No.- 3311)

Executive Committee Members

1. Sh Syed Maqbool Ahmed (LM No.- 1670)
2. Sh Ram Prakash Mali (LM No.- 5658)
3. Sh DD Shripat (LM No.- 5352)
4. Sh Kishor Kumar (LM No.- 2675)
5. Sh UP Pahadia (LM No.- 1599)

Installation of Executive Committee for the term 2024-26

Sh Arun Kumar Kothari, Former National President, MEAI installed the new committee for the year 2024-26 and pledged them for fulfilment of the objects of the Association and uphold its code of ethics, activities to promote progress of mineral industry and prosperity of the country man and the nation. He further told that this team is a combination of youngsters and experienced members and hope that this committee will definitely work hard to bring this chapter among the best in the nation.

(L to R): Sh Asif M Ansari, Secretary, Sh DP Gaur, Vice-Chairman, Sh RP Gupta, Former President MEAI, Sh Arun Kuamar Kothari, Former President MEAI, Sh Praveen Sharma, Chairman & Sh RC Purohit, Treasurer

Newly elected Chairman Sh Praveen Sharma expressed thanks to all the members for giving him the opportunity to serve the Udaipur chapter as Chairman. He assured to continue the activities of this chapter and will try to set up the new milestone for this chapter.

Sh Asif M Ansari, newly elected Secretary expressed his thanks for giving him the responsibility of secretary of the chapter and assured to work with the guidance of seniors and implement the activities of chapter to the best of his knowledge and efforts. He thanked all the members for their best contribution to the Chapter.

He said that apart from the training of Mining Mate, Blaster, and Mines Foreman training programs of Second Class Manager will also be conducted in the coming years. Training Program of latest mining technology including rock cutting and overseas mine visit will be undertaken.

Felicitation of Ladies by Sh RP Gupta

79 Members and 145 family members participated in the Annual General Meeting

Vote of thanks was presented by Sh Asif M Ansari, Secretary and the program was conducted by Dr. Hitanshu Kaushal, Joint Secretary.

TAMILNADU CHAPTER

Annual General Body Meeting held on 28.9.2024

Venue: Department of Geology, CEG Campus, Anna University, Chennai - 600025.

Committee members, officials from various companies and sectors, students of Anna University assembled at the meeting hall (201) and the meeting commenced on 28.09.2024 at 3:00 pm.

Prof. Dr. T. Subramani (HOD of Geology, Anna University) and Chairman, Tamilnadu Chapter presented the welcome address. He welcomed the Office Bearers, Executive Members and students.

The Secretary of the Chapter Shri R. Kamaraj presented a report on the previous and upcoming activities, including

achievements and plans for the MEAI Students Chapter. Key points discussed during the meeting were:

- Indian Mining Day Celebrations across Tamil Nadu - Planned to celebrate on 08th November 2024 across all zones in Tamil Nadu since Diwali falls on 31st October 2024. However, based on the direction of Chairman, MEAI-HQ, it is decided to hoist the flag at the respective zones on 01st November 2024 and circulate the photos.
- Organizing National Level Mining Conference at Neyveli during the last week of November 2024 in collaboration with Institute of Engineers India, Neyveli Chapter & NLC India Limited. A separate online meeting will be organized between Office Bearers of MEAI-TN chapter & Office Bearers of IEI, Neyveli on 14th October 2024.
- Organizing one-day seminar during October 2024 at Anna University, Chennai. Topic, Date & Timing and Venue will be circulated.
- For the benefit of the Small Mines Owners association, a one-day seminar will be organized during January 2025 to February 2025 at the Dharmapuri area.
- Organising State Level programme during February 2025 in collaboration with Indian Institute of Mineral Engineers (IIME).
- Clearing the bushes and securing the MEAI Land in Trichy. In order to protect the MEAI land, it is decided to engage JCB for clearing the bushes and arrange for fencing. Members in Ariyalur and Trichy have to take up this work at the earliest.
- Student members enrolled during the membership drive have not received the membership details till date. It is decided to compile and send the list to MEAI-HQ and take up the issue with the Secretary, MEAI-HQ.

The Treasurer of the Chapter Mr. G. Magesh presented the financial report for the year 2023-24 during the AGM and proposed the budget plan for future.

About Student Chapter

Mr. Arun Bharath, outgoing Student Chapter Chairman presented an overview of the student Chapter's activity, its mission, objectives, and the role in supporting mining students' academic and professional growth. He also threw light on Student Member eligibility to join in MEAI, membership fees, applying procedure and benefits. He also highlighted the MEAI activities such as World class conferences and events, Online courses and workshops, Communities of interests, Awards, Scholarship and mentoring, Mining Engineers' Journal (MEJ) and MEAI member communications to the participants. He also presented the activities carried out by the Chapter during the year 2023-24.

New office bearers of MEAI Student Chapter-TN for the Year 2024-25 were announced during the AGM.

- Students Mentor: Mr. G.R. Senthilkumar, Registrar, Tamil Nadu Open University, Chennai
- Chairman: Mr. P. Nivesh, 4th year B. E Mining Engineering, CEG, Anna University
- Vice Chairman: Mr. U. Thamarai Selvan, 2nd year M. Sc Applied Geology, Anna University
- Secretary: Ms. D. Chandhini, 4th year B.E Mining Engineering, CEG, Anna University
- Jt. Secretary: Ms. K. B. Arshika, 2nd year M. Sc Applied Geology, CEG, Anna University
- Treasurer: Ms. M. Priyadharshini, 3rd year B.E Mining Engineering, CEG, Anna University
- Jt. Treasurer: Ms. S. Priyadharshini, 2nd year B.E Mining Engineering, CEG, Anna University

Interactive Session

MEAI office bearers answered to the questions raised by the students and the members related to the MEAI activities and other mining activities. Discussions were mostly on the benefits of joining the Mining Engineers' Association of India (MEAI) and how it can enhance their career opportunities for students.

Ms. D. Chandhini, Secretary of the Chapter proposed a vote of thanks.

Glimpses of the program

CONFERENCES, SEMINARS, WORKSHOPS ETC.

INDIA

26-28 Nov 2024: **Plate tectonics, sedimentation and metallogeny through time & Annual Convention of the Geological Society of India**. Location: SDM Coollege of Engineering & Technology, Dharwad. Contact: Dr Venkatramana S Hegde, +91 9164718435, vshegde2024intesem@gmail.com

28-29 Nov 2024: **International conference on Innovations in Engineering and Technology for Sustainable development (IETSD 2024)**: Organised by Engineering Staff College of India at Centenary Convention Centre, ESCI Campus, Hyderabad 500032, India.

21-22 Dec 2024: **National Seminar on Dynamics in Mineral Sector for Viksit Bharat 2047**. Organised by the Society of Geoscientists and Allied Technologists (SGAT) at Bhubaneswar. For details contact: Mr T. Mohanta, General Secretary, SGAT at Tel: +91 674 2557516; Email: sgatodisha@gmail.com; Website: https://sgat.in

21- 22 Dec 2024: QGIS & DNR GPS Training – Organised by MEAI, Rajasthan Chapter-Jaipur at Mining Welfare Centre, Near Parishkar College, Off Shipra Path, Mansarover, Jaipur - 302020, Rajasthan. It will be held in Hybrid mode using a meeting link (will be provided to enrolled delegates). For details contact: +91 988 7444 744 or meaijpr2010@gmail.com

15 Feb 2025: **Surveyors Meet**. Organized by Bellary-Hospet Chapter at Hosapet, Karnataka. For details please contact, Mr P Venkateswara Rao, Secretary, Bellary-Hospet Chapter at +91 9900256764

ABROAD

03-05 Nov 2024: **Resourcing Tomorrow 2024**. Business Design Centre, 52 Upper Street, Islington, London , N1 0QH, United Kingdom. Contact: enquiries@globalminingreview.com

7-8 Nov 2024: **International Conference on Geology and Geophysics ICGG**. Istanbul, Turkey. Website URL: https://waset.org/geology-and-geophysics-conference-in-november-2024-in-istanbul. Program URL: https://waset.org/conferences-in-november-2024-in-istanbul/program. Contact URL: https://waset.org

7-8 Nov 2024: **International Conference on Geological Engineering ICGE**. Tokyo, Japan. Website URL: https://waset.org/geological-engineering-conference-in-november-2024-in-tokyo. Program URL: https://waset.org/conferences-in-november-2024-in-tokyo/program. Contact URL: https://waset.org

21-23 Nov 2024: **International Professional Geology. Zaragoza**, Spain. Website URL: http://www.icog.es. Program URL: http://www.icog.es. Contact URL: http://www.icog.es

18-19 Feb 2025: **International Conference on Geology and Geophysics ICGG**. Manila, Philippines. Website URL: https://waset.org/geology-and-geophysics-conference-in-february-2025-in-manila. Program URL: https://waset.org/conferences-in-february-2025-in-manila/program. Contact URL: https://waset.org

23-26 Feb 2025: **MINEXCHANGE 2025 SME Annual Conference & Expo and CMA 127th National Western Mining Conference** co-located with World Gold 2025. Colorado Convention Center, 700 14th St., Denver, CO 80202. Contact: cs@smenet.org

09-12 Mar 2025: **EnviroTech Athens - 2025** - The Gateway to Green Cement. Greece. Contact: enquiries@globalminingreview.com

7 - 9 Apr 2025: **Underground Operators Conference 2025**. Adelaide Convention Centre, Adelaide, Australia. Contact: 1800 657 985 or +61 3 9658 6100 (if overseas)

8-9 Apr 2025: **International Conference on Geological Engineering ICGE**. Rome, Italy. Website URL: https://waset.org/geological-engineering-conference-in-april-2025-in-rome. Program URL: https://waset.org/conferences-in-april-2025-in-rome/program. Contact URL: https://waset.org

7-8 May 2025: **Mineral Resource Estimation Conference 2025**. Perth, Australia. Contact: 1800 657 985 or +61 3 9658 6100 (if overseas)

20-22 May 2025: **Global Resources Innovation Expo 2025**. Brisbane, Australia. Contact: 1800 657 985 or +61 3 9658 6100 (if overseas)

21-22 May 2025: **AUSTMINE 2025**. Brisbane Convention and Exhibition Centre. Contact: Jason Berman, Event Director, jberman@etf.com.au, +61 2 9556 7991

10 - 13 Aug 2025: **Application of Computers & Operations Research in the Mining Industry**. #APCOM2025. PCOM Conference 2025, Perth Convention and Exhibition Centre, Perth, Western Australia. AusIMM T: 1800 657 985 or +61 3 9658 6100 (if overseas). Po Box 660 Carlton, VIC 3053, Ground Floor, 204 Lygon St, Carlton VIC 3053.

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