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this issue contains...

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President's Message.....

Dear Members,

Greetings…

I wish to share with you the activities undertaken by our Association in the preceding month.

It was a very happy moment to attend ***National Mining Conclave-2022*** on 12 & 13th August 2022 at the Indian Institute of Science, Bengaluru organized by Mines Safety Association of Karnataka(MSAK) and MEAI. Around 700 delegates participated from all parts of India and it was a grand show of mine technology & educational and enlightening Technical papers. We are thankful to DGMS, DMG GOK, Sponsors and Participants for making this Conclave a grand success.

It is my pleasure to share with you that during my Official visit to our Association Headquarters on 20.08.22, we had a MEAI Constitution Amendment Committee meeting. Sri. V.S. Rao, Sri. Md. Fasihuddin, Dr. P.V. Rao, Prof. Venkat Ramaiah attended in person while other members participated virtually. I also had an official meeting with the Secretary General and Joint Secretary cum Treasurer of our Association.

As a part of our MEAI TECH SERIES (MTS) program, "***Drone Technology***" by Mr Cyriac Joseph was conducted on 20th August 2022. The presentation was well received with good participation and interactions. This will be a continuous program held every month. Request all the mineral industry professionals to utilise this opportunity.

I am very happy to share that our Rajasthan Chapter - Udaipur and the Hindustan Zinc Ltd., Udaipur have jointly organized a ***National Seminar and Exhibition on The Role of Innovation and Technology in Turnaround of Mining Industry*** on 26-28 August 2022 and it was grand success with a good attendance. Exhibition was arranged and it has provided lots of innovative ideas and machines for visitors.

The 5th Council meeting and the EGM was held at Orbit Resorts, Udaipur. All the Council members were welcomed in a traditional way by the Udaipur Team and it was an euphoric moment to all members.

I am happy to note that the Council approved the proposal of New Chapter MEAI -Vijayawada-Ongole to serve our members in coastal parts of Andhra Pradesh.

It is also my pleasure to share with you that 141 new Life Members were enrolled during 5 th Council meeting at Udaipur which is the highest figure approved in a single Council meeting in recent years. I Congratulate Ahmadabad Chapter, Hutti-Kalaburagi Chapter, New Chapter of MEAI-Vijayawada-Ongole and others for their efforts. I feel this is a great initiative and appreciate the efforts by all the Chapters to enrol new Life Members, which will offer long-term positive results for MEAI and the Mineral Industry.

I Congratulate the Rajasthan-Udaipur Chapter and Bengaluru Chapter for their Continuous activities. Such activities will create awareness on Technical updates and help to attain the objectives of MEAI and encourage other Chapters to improve themselves and create new benchmarks.

I request our members to participate in our programs in large numbers and make them a grand success.

Regards,

K. MADHUSUDHANA
President

Mining Engineers' Association of India

Regd. Office : Rungta House, Barbil (Odisha)

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EDITOR'S DESK

Dr. P.V. Rao
Editor, MEJ

An e-mail (private) from Mr. Charles Devenish, Chairman, Australian Indian Resources Ltd (AIR) on 23-8-2022 articulating his anguish on the mineral exploration focus in India, stirred me to share the same with our members. I quote:

"I had trouble sleeping last night with a continual churning in my mind as to what is really happening in India in terms of mineral exploration and why. If I go back to circa 1963 when I started my business in Perth, there was zero understanding by the Government of the day or the people about the enormous mineral wealth that lay hidden in West Australia. This ignorance continued until about 1969, the Poseidon Nickel boom. This tended to be the Clarion Call and then of course the major Nickel discovery at Kambalda, only a few kilometers from Kalgoorlie. Early seventies saw the iron ore boom starting in the Pilbara and by the mid-seventies, gold took off. The rest is now history. If you look at Canada, the mining boom there did not start until about the late eighties and that was mainly for diamonds.

Are you aware that India has vast potential of both gold and diamonds sleeping in the ground?

If I now look at the Indian public that I meet daily on my routine dog walks, I always get these two inquisitive questions asked viz. where from you are and what do you do. When I start explaining that mineral exploration is my business, I get a sort of dumb look on the face of the inquisitor. Then when I explain how only 2 hours' drive away from where we are at present standing is the Kolar Gold Field and that there are at least 5 to 10 new gold mines that are waiting to be developed, they are dumb founded. The response is always the same "I thought: there is no gold left and that the British had taken it all".

You will find this mindset exists all over India and presumably, it permeates through all levels of Government as well. No different from Australia Circa 1963 or Canada. The veil has to be somehow first of all removed and that really only comes when for Instance the story of the first gold discovery that has been made in the past 2000 years is told to the public and it will all depend on how and when that story is told. Dr Vasudev, a gold explorer, should talk about how he and his team made this great discovery. Let us talk about our achievements and how we have explored India from the North East to the Southern Tip. We need to focus more on the evidence of what has been achieved in terms of discovery. A slide of the Kolar Greenstone Belt and how a trench at Maningatta produced an 81g result and how geophysics and trenching show evidence of at least a 2 km stretch of gold mineralization etc. Statistically, anywhere in the world where you have a Greenstone Belt, which had a mine that produced 800 tonnes of gold like Kolar, you will discover more mines along strike. How can you auction something until you know if an ore body actually exists?

India has potential for a Witwatersrand sedimentary basin that could possibly host a world-class gold deposit. The concept is already being explored in the Pilbara of West Australia. The person that has been leading that exploration team has told me first hand that India has even better prospects than the Pilbara.

Many years ago, I was traveling overnight on a train. I was explaining to a fellow passenger what my occupation was etc. A week later, he called me to say that he had purchased $50,000 worth of shares in Deccan Gold Mines Ltd. He made one provision only though and that was, that he purchased the shares in his wife's name, in case the investment failed. Deccan Gold Mines 25,000 Indian shareholders and their incredible support through thick and thin and in spite of every possible Government obstruction is a real tribute to India's faith in Gold.

The removal of 10A(2)(b) from the MMDR Act 2015 is a massive Act of Bad faith towards both Indian and International investors. Restoration of this Section is essential to restore the image of India as a destination for mineral exploration similar to what West Australia offers to the World.

Back to the start though and I believe the real problem is the total lack of awareness."

I think randomly for self, we should start to ask people the nascent question: Are you aware that India has vast potential of both gold and diamonds sleeping in the ground?

- Editor

NEWS FROM THE MINING WORLD

17 mineral mines taken back from states over non-production: Pralhad Joshi

In March, Lok Sabha passed the Mines and Minerals (Development and Regulation) Amendment Bill, 2021

The Centre has taken back mineral mines from states, due to non-production, Pralhad Joshi, Union minister for coal and mines, said, adding that the 17 blocks will be put up for auction. "Big PSUs were sitting with big mines for the past 10, 15, 20 years without any production. While NMDC has done well, there were many PSUs sitting idle with mines, which was a national resource. So, we have decided that if a mine does not start production in five to six years, we will take them back and auction them," said Joshi.

He said states were approached to surrender these non-producing mines but they had concerns over confiscation of bank guarantee. "So, we said that it (bank guarantee) won't be taken, just give us back the mines," Joshi said. In March, Lok Sabha passed the Mines and Minerals (Development and Regulation) Amendment Bill, 2021, which proposed to remove curbs of end-use for future auctions of mineral mining rights, allowing operators of existing captive mines to sell up to 50 per cent of minerals extracted in a year.

Joshi said similar relaxation of removing end use restrictions for captive coal mines has improved their production and is slated to touch 140 million tonnes by the end of this fiscal year. He said this had also increased the revenue in the sector.

Karthik Jerome, BS | August 24, 2022

190 major mineral blocks auctioned in seven years, says Pralhad Joshi

"Mineral exploration will be carried out without adverse environmental impact through enhanced use of drones and other latest technologies," he said.

Coal and Mines Minister Pralhad Joshi said on Tuesday that due to several innovative initiatives taken by the Central government, including amendments in mining legislations, 190 major mineral blocks have been auctioned in the last seven years, adding that commercial mining has been a great success in the country.

In his inaugural address at the two-day conference on Indian Minerals and Metals Industry, Joshi said the Centre is making efforts to attract more private entrepreneurs into mineral exploration. "Mineral exploration will be carried out without adverse environmental impact through enhanced use of drones and other latest technologies," he said.

Referring to the fact that many PSUs hold on to coal blocks for several years, the minister urged them to start production from such blocks at the earliest and if they can't, they should surrender the reserves to the ministry for re-auctioning.

Joshi said that through commercial coal mines auctions, an amount of Rs 25,000 crore in terms of additional revenue had been generated last year and Odisha stood first in revenue generation.

The minister also informed that coal production from captive mines is expected to touch 140 million tonnes this year, compared to 89 million tonnes recorded in the last fiscal. Total coal production during this financial year is likely to touch 900 million tonnes, the minister added.

IANS, BS, New Delhi | August 23, 2022

Govt plans to auction 17 non-operational mines surrendered by PSUs: Joshi

Speaking during a conference on the Indian minerals and metals industry organised by NMDC and FICCI, the minister said many PSUs in the country in sectors like coal were sitting on big mines.

The government plans to put on auction 17 mines surrendered by public sector undertakings which could not put the blocks into operation, Coal and Mines Minister Pralhad Joshi said on Tuesday. The statement comes in the wake of the government making efforts to ramp up domestic coal production to ensure adequate availability of dry fuel to different sectors.

"Just the-day-before yesterday (Sunday) I got 17 blocks back and they are very good blocks and I am putting them for auction now," Joshi said.

Speaking during a conference on the Indian minerals and metals industry organised by NMDC and FICCI, the minister said many PSUs in the country in sectors like coal were sitting on big mines. The government decided to take away all those mines from the public sector undertakings which do not get into operation even after the lapse of five to six years and put them on sale.

"I talked to the chief ministers and ministers of a few states and asked them the reasons for sitting on mines.

These mines could not get into operation even after 10 to 15 years," Joshi said. Joshi also said that his ministry was in deliberations with the Ministry of Environment and Forest on how the exploration of mines can happen without cutting down trees. Through an amendment to MMDR Act in 2021, private exploration agencies which have been accredited are allowed to carry out exploration without prospecting licence upon their notification and so far nine private exploration agencies have been notified for this purpose.

In 2021-22, the total revenue accrued from auctioned mines is more than Rs 25,170 crore.

To be future-ready, the mines ministry, he said, is also exploring sources of minerals like lithium, cobalt, nickel, rare-earth elements, lead, zinc and others. "With this view, I visited Australia last month to secure critical minerals that will help the country transition to clean sources of energy," he added.

Press Trust of India, New Delhi | August 23, 2022

Centre may sell 13 block gold mines in Uttar Pradesh, Andhra this month

Amid Centre's efforts to give a boost to the mining sector's contribution to country's gross domestic product, government plans to put on sale the block 13 gold mines in the states of Andhra and UP.

The government plans to put on the block 13 gold mines in the states of Andhra Pradesh and Uttar Pradesh in the ongoing month amid its efforts to give a boost to the mining sector's contribution to the country's gross domestic product.

Of the 10 blocks in Andhra Pradesh, the auction of five blocks may take place on August 26, while the remaining five are likely to be put on the block on August 29, according to latest data of the government. The gold mines in Andhra Pradesh include Ramagiri North Block, Boksampalli North Block, Boksampalli South Block, Javakula-A Block, Javakula-B Block, Javakula-C Block, Javakula-D Block, Javakula-E Block, Javakula-F Block. The notices inviting tender for these gold mines were floated in March. In the case of remaining three gold mines in Uttar Pradesh, the auction will happen this month. But no specific dates have been given. Of the three mines in the state, two gold mines -- Sonapahari Block and Dhurva-Biadand Block-- are in Sonbhadra.

The notices inviting tender of these three gold mines in Uttar Pradesh were floated on May 21. The government had in May said the auction of mineral blocks has stabilised in the country. The states have auctioned 199 mineral blocks as on August 4. The allocation of mineral blocks through auction route kicked off after amendment in the Mining Act in 2015.

In the last financial year, 45 mineral blocks were put on sale. The state governments, the Centre had said, are getting a very good share of revenue from the auctions and had stressed that those states which were early birds in the race were really happy. The mines ministry had earlier said the amendment in mineral auction rules will encourage competition that will ensure more participation in sale of blocks.

The Ministry of Mines had notified the Minerals (Evidence of Mineral Contents) Second Amendment Rules, 2021, and the Mineral (Auction) Fourth Amendment Rules, 2021 to amend the Minerals (Evidence of Mineral Contents) Rules, 2015 (MEMC Rules) and the Mineral (Auction) Rules, 2015 (Auction Rules), respectively.

The amendment rules have been framed after extensive consultations with the states, industry associations, miners, other stakeholders and general public.

Press Trust of India, New Delhi | August 15, 2022

Six merchant bankers in fray for HZL stake sale; presentation on Friday

As many as six merchant bankers are vying to handle and manage the sale of the government's 29.53 per cent residual stake in Hindustan Zinc Ltd (HZL), according to an official notice.

As many as six merchant bankers are vying to handle and manage the sale of the government's 29.53 per cent residual stake in Hindustan Zinc Ltd (HZL), according to an official notice.

ICICI Securities, SBI Capital Markets, HDFC Bank, IIFL Securities, Axis Capital and Citigroup Global Markets will make their presentations via video conferencing before the government officials on Friday, highlighting their plans in managing the offer for sale.

The bankers to manage the sale process would be finalised after the presentation and opening of financial bids on August 12, as per the notice. The Department of Investment and Public Asset Management (DIPAM) had in early July invited bids from merchant bankers for managing HZL residual stake and set July 28 as the deadline for placing bids.

The selected merchant bankers assist the government on the timing of the divestment, get investor feedback, and hold investor road shows, besides seeking regulatory approvals. HZL was a Central Public Sector Enterprise (CPSE) under the administrative control of the Mines Ministry and was privatised in 2002.

Currently, Vedanta Ltd holds 64.92 per cent in HZL, while the government holds 29.53 per cent. Only a 5.5 per cent stake is with the public.

The Union Cabinet in May approved the sale of 124.9 crore shares or 29.53 per cent stake the government holds in zinc producer HZL, which was sold to mining mogul Anil Agarwal's Sterlite Industries in 2002. The government disinvested 26 per cent of its equity holding in HZL along with a transfer of control to Sterlite Opportunities and Ventures Ltd (SOVL) on March 28, 2002.

Subsequently, as per provisions of the shareholding agreement, the strategic partner exercised its call option and the government transferred 18.92 pet cent to SOVL, which is part of Agarwal's Vedanta group. Shares of HZL rose 0.79 per cent to Rs 274.95 on the BSE on Thursday. At the current market price, the sale of 124.9 crore shares would fetch about Rs 34,000 crore to the exchequer. The government has budgeted to raise Rs 65,000 crore through CPSE disinvestment in the current fiscal. So far this fiscal, it has realised Rs 24,544 crore.

Press Trust of India, New Delhi | August 11, 2022

Former Union Coal Secretary H C Gupta convicted in coal scam case

Former Coal Secretary HC Gupta, former Joint Secretary, KS Kropha, Grace Industries Limited, and its director Mukesh Gupta were convicted by court in a coal scam case in Maharashtra.

A Special CBI Court here on Friday convicted former Coal Secretary HC Gupta, former Joint Secretary, KS Kropha, Nagpur based firm Grace Industries Limited and its director Mukesh Gupta after finding irregularities in the allocation of a coal block in Maharashtra.

The Court of a special judge Arun Bhardwaj convicted HC Gupta and others under various sections of the Prevention of Corruption Act. The case relates to the allocation of the Lohara East Coal block in Maharashtra. The court will now hear the arguments on the point of sentence on August 4, 2022. Earlier, the CBI had registered a case in the matter on September 20, 2012 under section - 120B r/w 420 IPC r/w 13(2) r/w 13(1)(d) of the Prevention of Corruption Act, 1988. On completion of the investigation, a chargesheet was filed by the CBI against Grace Industries Limited and Mukesh Gupta, director of the company in the court on October 28, 2014.

The special judge while discussing the role of public servants at the Centre and the state ordered further investigation into the matter with a direction that the evidence collected during further investigation, may be placed before the competent authority for the consideration of the providing sanction to prosecute public servants namely KS Kropha, the then Joint Secretary, Ministry of Coal and VS Sawakhande, the then Director, Directorate of Geology and Mining, Nagpur, Government of Maharashtra under section - 19 of the P.C. Act, 1988.

The Court on August 10, 2015 took cognizance of the offences punishable under section - 120B r/w 409/420 IPC r/w 13(2) r/w 13(1)(c) and (d) of the PC Act, 1988 and substantive offences. Accordingly, summons were issued to the accused persons for their appearance before the Court. During the course of trial, a total of 34 witnesses had been examined by the prosecution/ CBI to prove its case.

According to the CBI, allegations against the convicts M/s Grace Industries Ltd. and Mukesh Gupta during the period between the year 2005 to 2011 at New Delhi, Maharashtra and other places, in furtherance of the common object of the criminal conspiracy hatched with other co-accused persons i.e. HC Gupta, KS Kropha and cheated by Ministry of Coal, Government of India by dishonestly and fraudulently inducing the Ministry of Coal to allocate "Lohara East Coal Block" situated in the state of Maharashtra in favour of M/s GIL on the basis of false information about net worth, capacity, equipments and status of procurement and installation of plant.

CBI also stated that the said, company in its application claimed its net worth as Rs.120 Crores whereas its own networth was Rs 3.3 crores only company falsified its existing capacity as 1,20,000 Third Party Administrator (TPA) against 30,000 TPA. In a order dated August 25, 2014 the Supreme Court of India had cancelled the entire allocations of Coal Blocks. Vide order dated: Januay 19, 2015, Special Judge of trial court had observed that the working of the officers of the Prime Minister's office also does not appear to be above Board.

ANI General News | July 29, 2022

Expedite coal auctions to ease prices

Power project developers have sought expediting exclusive coal auctions for 13 Gw of plants that neither get coal supplies from.

Developers said operationalisation of the plants can help ease prices in power exchanges that are currently hovering near the ceiling rate of ₹12 per unit in peak hours. The average price on the exchanges is ₹4-5 a unit. A senior coal ministry official said Coal India was

giving coal to all projects in contract with the company. "The power ministry has to suggest about these projects which do not have power and coal contracts," he said.

The exclusive auctions under clause B(viii)(a) of the coal supply policy (Shakti) were announced by the coal ministry in March this year, when the Cabinet Committee on Economic Affairs (CCEA) approved a single spot e-auction window by coal companies for all consumers. The unified auctions were approved subject to coal companies meeting full requirements of all power sector consumers, making the fuel available in future to the power sector and auctioning coal for the power sector each month under a separate window.

ET Bureau | Aug 03, 2022

Railways shelves plan to move imported coal from ports

The Indian Railways has put in abeyance the logistics plan drawn up to transport imported coal from ports during the peak demand months, even as the dry fuel's stock improved at power plants. The decision came after the power ministry asked coal-fired electricity generation companies to halve the blending percentage of imported coal in their total mix to 5%. "The decision to put the logistics plan in abeyance is being taken on account of improved coal stock at power plants," an official told ET, adding that further deployment would be on a demand basis. This could also result in fewer rakes being dedicated for moving imported coal from ports to power plants, allowing for railway infrastructure to be freed up and used for serving demand from other sectors.

This logistics plan was drawn up in April after a surge in power demand prompted the power ministry to direct gencos to import 10% of coal requirement for the blending purpose. As the availability of coal improved at power plants, it was decided that state government-owned gencos and independent power plants may decide the blending percentage after assessing the availability of domestic coal supplies. In another advisory on August 1, the power ministry asked NTPC and Damodar Valley Corporation to bring down the blending percentage to 5% at their generation units and keep monitoring the situation closely.

Twesh Mishra, ET Bureau | Aug 17, 2022

China's role in supplying critical minerals for the global energy transition: What could the future hold?

The world faces major challenges in responsibly sourcing large quantities of minerals that are critical for the transition to low-carbon energy sources. Consumption of these critical minerals—most notably nickel, copper, lithium, and cobalt—is projected to rise, largely driven by their use in the renewable energy sector. Demand is expected to quadruple by 2040 under the International Energy Agency's Sustainable Development Scenario, in which global action would limit the global temperature rise to well below 2°C, and it is projected to rise by six times under a net-zero scenario. Many governments, including the United States, European Union members, and China, seem to share the goal of increasing the supply and rate of production of the raw materials needed for the energy transition to address the challenge of global climate change. However, meeting this demand will be difficult—and producing these minerals in strict adherence to robust environmental, social, and governance criteria will be even more so.

China is the dominant player in global mineral processing. This report analyzes how its strategic position in regard to critical minerals may evolve, to shed light on current and emerging challenges for the energy transition, given the country's high level of engagement in global mineral supply chains.

Two major factors are likely to influence dynamics around responsible sourcing of critical minerals for the energy transition. This first factor is China's level of dominance across critical minerals supply chains. There is growing concern that a high level of dependence on China for these minerals and their derivative products may create energy security risks. Other governments, notably in the U.S. and Europe, have moved to build out their own critical minerals supply chains, creating uncertainty about whether China will maintain its dominant position. The second factor is the level of enforcement of due diligence requirements in China's mineral sector and midstream and downstream industries (e.g., refiners or original equipment manufacturers) to make these supply chains "cleaner" and "greener." Comprehensive, globally aligned due diligence requirements are needed to ensure that the sourcing of minerals needed for the energy transition does not cause or contribute to adverse social and environmental impacts. These two factors will likely shape the future of critical minerals supply chains.

Rodrigo Castillo and Caitlin Purdy | August 1, 2022

Globally more is being spent on coal than copper mining

New data from Industrial Info Resources show 4,790 metals and minerals capital projects (including mining, processing and refining) with a combined investment value of $443 billion are currently under construction around the world. A further 10,586 projects are under active planning and engineering – for a combined total of $1.11 trillion.

Joe Govreau, VP of Research at Industrial Info Resources, says that is an 8% increase from the preceding period as projects delayed by the pandemic are being restarted. Mining projects – from early exploration through to construction – make up half the global total. The top seven miners have now upped capital outlays by more than 50% from the depths of the industry downturn in 2017. Govreau sees "no reason why expenditures won't continue to be elevated for the next several years or more as companies look to increase production to meet expected demand growth from the energy transition."

Red metal goes green

The decarbonisation revolution is not off to a great start though, not if you compare investments in the worst of the fossil fuels in terms of emissions – coal – with that of copper, without which there simply is no green energy transition.

Copper's metal intensity – kilograms required per MW produced – of renewable energy sources like solar and wind is nowhere near that of coal or gas. To generate 1MW of offshore wind energy around 8.2 tonnes of copper have to be installed. The same figure for coal is 882kg.

TOP COPPER CAPEX COUNTRIES

	Country	Capex ($m) ▾	No of projects
1.	Chile	18,269	123
2.	China	13,014	119
3.	Russia	12,724	24
4.	Indonesia	6,528	35
5.	US	3,805	91
6.	DRC	2,895	8
7.	Mongolia	2,231	8
8.	Australia	1,416	48
9.	Ecuador	1,033	5
10.	Mexico	672	8
11.	Peru	602	21
12.	Iran	545	8
13.	Vietnam	498	4
14.	Canada	484	17
15.	Kazakhstan	436	12

Source: Industrial Info Resources
Medium/high probability projects with planned construction kickoff 2022/2023

According to one study, in order to reach net-zero by 2050, 19 million tonnes of additional copper need to be delivered. That implies a new La Escondida – the world's largest copper operation by a wide margin – must be discovered and enter production every year for the next 20 years.

IIR tracks 708 active copper projects with construction kickoff in 2022/2023 around the globe. The combined value of these projects, which includes mining, processing and smelting, is $68.5 billion.

Unsurprisingly, Chile, the world's largest copper producer and reserves holder, leads the way with 123 projects worth $18.3 billion followed by China boasting 119 projects with a combined value of $13 billion and Russia which is spending $12.7 billion on 24 new copper projects.

In contrast, the US is spending $3.8 billion while Canadian spending on new copper ventures is a paltry $484 million, behind Iran and Vietnam. Govreau also points to Peru, the world's number two producer, which is spending only $602 million after pandemic lockdowns and social unrest brought development to a standstill.

Back in black

In contrast to copper, coal has a pipeline of 1,863 projects around the globe with a value of $80.8 billion. Govreau says coal consumption and production jumped over the past year on the back of increased demand for power generation and steelmaking. Consumption of metallurgical coal is expected to be strong again this year.

The Chinese ban on Australian coal is a boost for swing suppliers – US coal exports were up 26% last year, says Govreau. Asian nations are also upping investment in coal mining, and in contrast to Europe and the US, more coal-fired plants are being built than are being retired.

China derives 65% of its electricity from coal, has vast amounts of reserves and is heavily investing in consolidating and automating its coal mines to supply its massive power generation fleet. Coal mining is also attracting investment in the near term because soaring gas prices makes it a cheaper alternative for electricity generation.

Frik Els, Mining.com | August 1, 2022

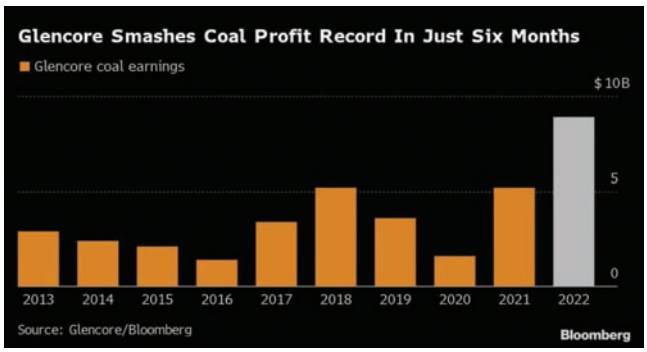
Coal giants are making mega profits as climate crisis grips the world

The globe is in the grips of a climate crisis as temperatures soar and rivers run dry, and yet it's never been a better time to make money by digging up coal.

The energy market shockwaves from Russia's invasion of Ukraine mean the world is only getting more dependent on the most-polluting fuel. And as demand expands and prices surge to all-time highs, that means blockbuster profits for the biggest coal producers.

Commodities giant Glencore Plc reported core earnings from its coal unit surged almost 900% to $8.9 billion in the first half — more than Starbucks Corp. or Nike Inc. made in an entire year. No. 1 producer Coal India Ltd.'s profit nearly tripled, also to a record, while the Chinese companies that produce more than half the world's coal saw first-half earnings more than double to a combined $80 billion.

The massive profits are yielding big pay days for investors. But they will make it even harder for the world to kick the habit of burning coal for fuel, as producers work to squeeze out extra tons and boost investment in new mines. If more coal is mined and burned, that would make the likelihood of keeping global warming to less than 1.5 degrees Celsius even more remote.



It's a remarkable turnaround for an industry that spent years mired in an existential crisis as the world tries to shift to cleaner fuels to slow global warming. Banks have been pledging to end financing, companies divested mines and power plants, and last November world leaders came close to a deal to eventually end its use.

Ironically, those efforts have helped fuel coal producers' success, as a lack of investment has constrained supply. And demand is higher than ever as Europe tries to wean itself off Russian imports by importing more seaborne coal and liquefied natural gas, leaving less fuel for other nations to fight over. Prices at Australia's Newcastle port, the Asian benchmark, surged to a record in July.

The impact on profits for the coal miners has been stunning and investors are now cashing in. Glencore's bumper earnings allowed the company to increase returns to shareholders by another $4.5 billion this year, with the promise of more to come. Gautam Adani, Asia's richest person, capitalized on a rush in India to secure import cargoes amid a squeeze on local supply. Revenue generated by his Adani Enterprises Ltd. jumped more than 200% in the three months to June 30, propelled by higher coal prices.

US producers are also reaping bumper profits, and the biggest miners Arch Resources Inc. and Peabody Energy Corp. say demand is so strong at European power plants that some customers are buying the high-quality fuel typically used to make steel to generate electricity instead.

The wild profits threaten to become a political lightning rod as a handful of coal companies cash in while consumers pay the price. Electricity costs in Europe are at record highs and people in developing nations are suffering daily blackouts because their utilities can't afford to import fuel. Earlier this month, United Nations Secretary-General Antonio Guterres lashed out at energy companies, saying their profits were immoral and calling for windfall taxes.

Coal's advocates say the fuel remains the best way to provide cheap and reliable baseload power, especially in developing countries. Despite the huge renewable rollout, burning coal remains the world's favorite way to make power, accounting for 35% of all electricity.

While western producers cash in on the record prices — with companies such as Glencore committed to running mines to closure over the next 30 years — top coal consumers India and China still have growth on the agenda.

The Chinese government has tasked its industry with boosting production capacity by 300 million tons this year, and the nation's top state-owned producer said it would boost development investment by more than half on the back of record profits.

Coal India is also likely to pour a large chunk of its earnings back into developing new mines, under government pressure to do more to keep pace with demand from power plants and heavy industry. China and India worked together at a UN conference in Glasgow last year to water down language in a global

(Continued on Page 24)

ADOPTING SMART MINING SYSTEM THROUGH DIGITAL TWINING FOR SUSTAINABLE AND SAFE MINE OPERATION

SURYANSHU CHOUDHURY

Abstract

Today's Mining Industry is in the process of digital transformation into all its activities as compared to the traditional age-old approaches. With the onset of concept Industry 4.0, modern industrialization breathed new life of Digital twin which has driven us to explore lot of potential benefits at different stages of the manufacturing process starting from mining up to marketing. The benefits of digital twin technologies are numerous and their potential role in supporting a circular economy is significant. They enable reduced product development lifecycle times, improved manufacturing quality control system, more efficient use and recovery of resources across the lifecycle. Over the last decade there have been significant applications of Digital twin into mining operations of leading mining companies across the globe. Present paper addresses concepts and benefits of digital twin implementation in the mining industry.

***Key words**: Digital Twining, sustainable, Smart mining.*

1. INTRODUCTION

The rise of Manufacturing Execution Systems on the factory floor has resulted in a wealth of data collected and maintained on the production and form of physical products. The convergence of the circular economy and Industry 4.0 is impacting all industries across the globe which is going to bring a plethora of improvements when it comes to safety, productivity, and efficiency growth. The continuous objective of improving equipment, systemized processes, and means of transportation has become more crucial than ever due to the competitive nature of the mining industry. In order to stay competitive and keep thriving in business, mining companies and ore extraction businesses must embrace the newest technology trends like digital twin which will soon become the single most impactful piece of technology. Digital products are rich representations of products that are digitally indistinguishable from their physical counterparts. In addition, it has progressed from being manually collected and paper based to being digital and being collected by a wide variety of physical non-destructive sensing technologies, including sensors and gauges, Coordinate Measuring Machines, lasers, vision systems, and white light scanning.

A digital twin is a representative model of physical asset and its process behavior digitally where thousands of different operational variables can be analyzed digitally in a way not possible with physical assets in order to determine the optimal working parameters for the mine. The digital twin assists in implementing smart mining systems through experiments on mining resources and reserves, mine designs, fixed plant operations, production schedules and more. In general, digital twin systems can be used to optimize the operation and maintenance of physical assets, systems and processes in real-time, massively improving mining productivity. They can leverage analytics and draw from historical data to experiment, and they can embark on this digital logistics network, including transport, warehouse operations.

2. WHAT IS A DIGITAL TWIN

A digital twin is a real-time digital representation of a product, platform or ecosystem that can be used to model, visualize, predict and provide feedback on properties and performance of existing operating systems. Digital twin technologies provide an untapped opportunity to reduce operational costs and drive sustainable, circular, end-to-end disruption in value chains. In 2020, the global digital twin market is estimated at just over USD $5.4 Billion, and it is projected to grow at a CAGR of 36% over the next five years. However, its current reach is limited, and the market has only achieved 10% adoption globally as this technology is currently not fully mature and underutilized across many industries. Digital twins enable reduced product development lifecycle times, improved manufacturing quality and control and more efficient use and recovery of resources across the lifecycle. But adoption has been limited due to several key barriers. The latter is the interconnected network of process and digital capabilities that create, communicate and transact product information throughout the product lifecycle. This allows the digital model to be continuously updated across the lifecycle of the physical asset, with additional data gathered from real-world interactions through Internet of Things (IoT) sensors (figure-1). The central pillar of the digital twin is data. Gaining access to

Dy.GM (Mining Planning), Adani Enterprises Ltd., Ahmedabad

these data across industries is a complicated process. This hurdle can be solved if organizations properly manage their data. A holistic approach to store and manage data should be followed, but this is often easier said than done. The base or start of a digital twin is mining data. The mining of data from the system is done to monitor performance.

A digital twin gets feedback from the real environment through IoT sensors which can be used to modify real-life assets. This creates more data which helps improve the digital twin, so you are in a virtuous cycle of improvement from an existing system.

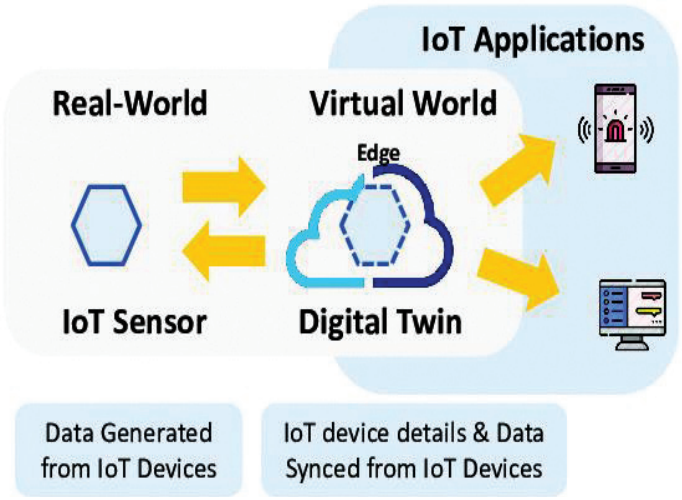


Figure- I

Though at present scenario 100% of the world's top EV manufacturers, and 90% of the top drug and healthcare laboratories, use digital twin solutions. Vast majority of private and public organizations globally are yet to pilot and scale such solutions. The digital twin assists in visualizing the workflow, designing and simulating the way it should work based upon which the process can be scaled back or reassigned the workforce. With the digital twin, changes are propagated to all key stakeholders automatically and instantaneously. The digital twin also secures the physical Environment. On the digital side, we have improved the amount of information we have available. We have added numerous behavioral characteristics so that we can not only visualize the product, but we can test it for performance capabilities. Focusing on the connection between the physical product and the digital product enables us to conceptualize, compare, and collaborate. We can conceptualize visually the actual manufacturing processes. We can compare the formation of the physical product to the digital product in order to ensure that what we are producing is what we wanted to produce. Finally we can collaborate with others in our organization and even throughout the supply chain to have up-to-the-minute knowledge of the products that we are producing.

3. BENEFITS OF DIGITAL TWIN IN MINING INDUSTRY

Over the last decade, there have been dramatic advancements in the capabilities and technologies of both the data collection of the physical product and the creation and representation of the digital product. The amount and quality of information about the digital and physical product have progressed rapidly. Mining industry is associated with a lot of unsafe activities to deal with by virtue of its nature of work. The advanced analytical tools along with the intelligent algorithms available at present forecast a lot of valuable information through digital twins how far practical mining operations are concerned. There are many potential benefits unlocked after the implementation of the digital twin system into the mining operations.

The benefits are broadly classified into following three categories

- An analytical decision-making tool using intelligent algorithms
- Test different scenarios to quantify throughput
- Identify bottlenecks within the process

3.1 Ensure safe mining practices

The digital twin system is increasingly being applied as part of smart mining system operations to ensure safe mining operation. But very few sites have applied them to safety applications as on date. Miners incorporate a mine's control and safety system functionality into the digital model, to observe in an immersive 3D environment which happens with the actual machine (Figure-2).

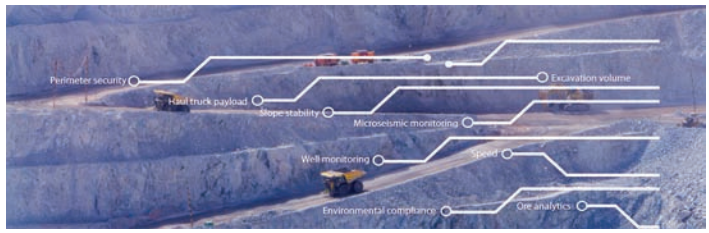


Figure-2

Based on the existing layout and operational practice, a digital model is created based upon which the mine planner/ operators issuers can use the digital model in several ways to improve safety. This digital model will be instrumental to ensure safety in complex operational conditions by quickly and accurately locating the right equipment in such environments can be a significant challenge for people unfamiliar about certain dangerous mining operations. But these benefits are not only limited to the smaller processing units but more complex and much larger units. A suitable 3D model can also help workers get to the worksite more efficiently and safely when the work takes place over a large dispersed area, such as found in larger mines or power generation installations. The overall system of planning

work becomes more intuitive, more informative and more engaging to users.

3.2 Improving mine productivity

Mining operators have traditionally found it difficult to manage engineering and asset information throughout the asset lifecycle. Digital twin will assist through digital replicas of physical assets, processes, and systems, which provide a representation of both the core elements and the dynamics of IoT devices used within the space or system depicted. Digital twins use AI (artificial intelligence), machine-learning (a subset of artificial intelligence) and software analytics with data to render real-time (otherwise known as "living") digital simulation models that are continually updated as their real, physical counterparts, or "twins" change. It allows mining operators to assess the type of haul road, condition of loading and unloading points (Figure-3).

Figure-3

Globally, many leading mining companies have years of historical data ranging from weather conditions to productivity, machine performance, drill and blast which can be used to build a simulation using machine learning and further reflected through a digital twin system.

3.3 Improves stakeholder communication

Mining industry deals with many stakeholders and it is equally important to align all stakeholders through transparent facts and figures with timely communications. Improving stakeholder communication comes in the form of combining all the processes in a visual manner. Many stakeholders will have a different idea of how the process should be run. However, a process digital twin shows a mirror image of the actual process, aligning understanding among stakeholders. Through the implementation of digital model systems, mining environments can successfully be optimised through effective planning and by restricting unforeseen downtimes. It enables the mine to be aligned with actual mine operations along with stockpile management, ore feeding at plant, manpower assigned to individual activities etc (Figure-4).

Figure-4

3.4 Avoid poor process changes

The process of mining is associated with a lot of risky activities to deal with. In this regard mining companies adopt only proven technologies and in general new technologies are not adopted quickly unlike other manufacturing sectors. In mining, poor process changes can have disastrous results in terms of loss of throughput, increase in unplanned downtime or even potential injuries. A process digital twin allows the mining company to test different initiatives without risk to the operations. For example, a simulation model can test significant process changes (building of a new silo, stockpile or even a new mining facility). It can also simulate these changes and the results visualized for key stakeholders.

3.5 Improve mining machinery productivity

The heavy equipments deployed in mines are highly capital intensive. Mine management always concentrates on the productivity of these equipments through continuously monitoring its performance and planning of right capacity equipments. Digital twin systems will prove themselves to be extremely useful when planning equipment schedules and operations. By simulating the work environment, the equipment, machinery, and the entire work process, on-site workers will be able to test new methodologies on their most crucial work processes in a very cost-effective manner because no capital will be required to accurately find out type of equipment along with their capacity etc. Every test will be executed in a digital simulation, using the same exact machinery and equipment (Figure-5).

Figure-5

Due to the inefficiencies of identifying many sub-standard operating practices (ex. haul truck operators taking sub-optimal routes, unskilled operators) mining companies are currently losing millions of dollars each year.

3.6 Improved Transparency Operations

During the process of mining, it is to be ensured that many compliance systems are set to be in place as per jurisdictions of respective places. With the right compliance management capabilities, compliance managers can implement a well-defined process for requesting, reviewing and approving materials compliance. Global mining and metals operations can utilize an effective and efficient quality management system that spans the entire enterprise to enforce common quality processes, support global and local regulatory requirements and manage all quality events, such as corrective and preventive actions, product nonconformance and audits. The digital twin system delivers advanced visualization capabilities such as multidisciplinary dashboards and systems simulation, which are invaluable in helping the business to report on priority areas, demonstrating where they have achieved the improvements that investors demand. When mining and metals companies leverage three-dimensional communication, for example, by sharing 3D models of their operations with local communities, people will better understand the lifecycle of a mine site from its inception to its eventual return to the natural environment when it is decommissioned. Three-dimensional communication helps inform communities about what mining and metals companies are doing to make the operation safe and sustainable.

3.7 Sustainable Mining Practices

Sustainability in mining does not mean an individual mine should be operated eternally, but how the industry can contribute to sustainable development. Focused on the efforts to maximize the benefits of mining projects while at the same time to improve the environmental and social sustainability (Figure-6).

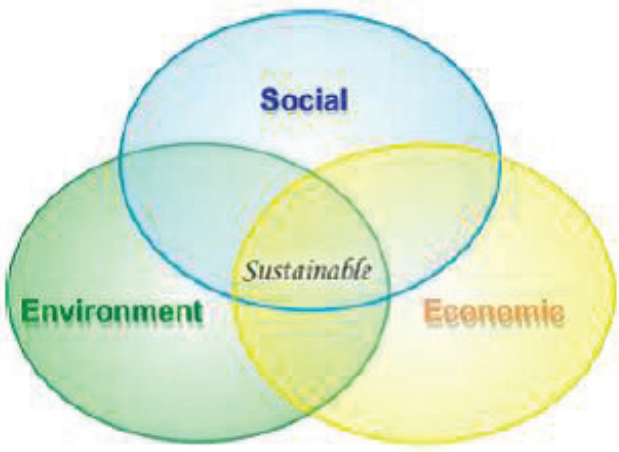


Figure-6

As organizations adopt digital transformation strategies, environmental sustainability practices also need to be considered for evolving business models and creating compelling impacts.

The digital twin allows companies to experiment on mining resources and reserves, mine designs, fixed plant operations, production schedules and more. The digital twin delivers this for mining and metals companies because it is an executable digital model of a physical system which is a digital copy of your entire operations.

8 CONCLUSION

The digital twin being part of this smart mining system not only includes optimizing business processes to reduce costs and save time, but its accuracy helps mining and metals companies reduce operational errors. Focusing on the connection between the physical product and the digital product enables us to conceptualize, compare, and collaborate. We can conceptualize visually the actual manufacturing processes. We can compare the formation of the physical product to the digital product in order to ensure that what we are producing is what we wanted to produce. The digital twin also plays a vital role in safety, enabling workers to experience how to maintain different aspects of their operations before doing it in the real world. Because they have an accurate three-dimensional representation of a mine, such as haul roads, dump locations, mine faces etc. By uniting value-adding data and making it accessible, everyone can benefit from it. The future of mining is digital. Realizing value from digital technologies for a mining company requires a step-change in the current thinking and a structured plan to execute. Implementing the right technologies at the right place to adopt over the existing conventional systems can accelerate value realization from digital technologies in the future of mining.

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(Continued on Page 24)

GMDC: A JOURNEY TOWARDS SUSTAINABLE TOMORROW

MESSAGE

Gujarat Mineral Development Corporation Ltd. (GMDC), founded in 1963, is a major mining and mineral processing company owned by Govt. of Gujarat. It is a public listed entity (BSE & NSE) and has consistently ranked among the top PSUs in the country. GMDC always believes in responsible business with sustainable development.

With the vision to provide a robust framework for CSR initiatives in line with The Companies Act, 2013 and The Companies (CSR Policy) Amendment Rules 2021, GMDC has a visionary CSR Policy to ensure its increased commitment towards economically viable business in socially and environmentally sustainable manner with due recognition to the interest of its all stakeholders. The Policy also addresses the innovative partnership/ programmes, strategic collaborations and stakeholders' engagement to promote inclusive development of the community and thus, enabling GMDC as a responsible Corporate Leader through Sustainable CSR initiatives.

To execute the CSR Policy, GMDC has established Gramya Vikas Trust (GVT) to adopt dynamic approach while addressing the complex and longstanding social issues.

In GVT, we work together to bring tangible socio-economic development, thereby improving the local community's well-being through discretionary business practices and contribution of corporate resources. Currently we have the geographical coverage of more than 400 villages under the CSR activities. With the focus on Children, Youths, Women, Rural Households, Climate Action & Environment Sustainability; GMDC GVT believes to bring a better change in the Society.

Swagat Ray
General Manager (CSR): GMDC &
CEO: GMDC GVT.

Gujarat Mineral Development Corporation Ltd. (GMDC) is one of India's leading mining and mineral processing companies. For the last six decades, GMDC has been developing ample mineral resources for the nation. GMDC is also committed to the community and local government system where it operates business.

GMDC is carefully cultivating a culture of building good relations with the community. It constantly strives to address the needs of the communities in and around its areas of operations, many of which are situated in the remotest regions of Gujarat. Over the years, GMDC is working on programs in Education, Healthcare, Drinking Water& Sanitation, and Rural Development for improving the quality of life of surrounding communities.

Believing and practicing the culture of accountable governance, GMDC established Gramya Vikas Trust on 7th January 1991 as Public Trust with Section 12A and 80G, registered under The Income Tax Act, 1961 for various developmental activities. GMDC-Gramya Vikas Trust (GMDC-GVT) works with the vision to enhance the quality of life of communities living in the GMDC active regions through innovative partnerships/ programs, strategic collaborations, and stakeholder engagement. The GMDC-GVT activities have extensive geographical coverage, and its functional area spans villages in Bharuch, Bhavnagar, Chhotaudepur, Devbhumi Dwarka, Kutch, Panchmahals, and Surat district.

GMDC-GVT operates in a complex ecosystem to implement various social development projects under different thematic areas of the list prescribed under Schedule VII of The Companies Act, 2013. GMDC-GVT has developed, tested, and replicated innovative solutions to address longstanding social issues prevalent in the remote locations where GMDC is operational. To improve the well-being of the local community, GMDC-GVT has the following focus area;

- Skill Based Ecosystem- Focused Transformation;
- Promotion Of Quality &Inclusive Education;
- Health facilities- Addressing gaps through Access & Availability;
- Drinking Water Including Integrated Water Shed Development & Sanitation;
- Ensuring Climate Action & Environment Sustainability;
- Cultural & Heritage Preservation;

and design and implement tailor-made solutions to address their issues.

GMDC- GVT's approach would be to develop and test innovative solutions to address complex social problems and leverage partnerships to scale up the impact. Its approach would to:

- Address gender diversity and inclusion of marginalized & vulnerable communities.
- Collaboration with Industry Partners and financial Institutions esp. NABARD
- Implementation through local organizations including NGOs after due diligence & GMDC guidelines
- Ethical, transparent, accountable, and sound governance practices with Result Based Monitoring Mechanism & visibility practices.

Education

GMDC believes in providing Quality & Inclusive Education to all. GMDC CSR's various educational programs foster the youth by providing access to quality education using a sustainable and holistic approach. The replicability and scalability of these educational programs ensure that more children can benefit from various initiatives and pave their way toward a bright future.

Learning by Doing: Activity Rooms & Science Laboratory

Learning by doing is one of the key theories of education. With an objective to make classroom education a successful journey, activity rooms have been created in primary schools across various project locations of GMDC under its CSR.

GMDC has supported the Village Primary Schools and has constructed activity rooms for more interactive learning. It is proven that students must interact with their environment in order to adapt and learn quickly. The activity room is an approach to aid curious minds and give wings to their imagination

Science lab equipment enables students to interact directly with the information gathered. They get a first-hand learning experience by performing various tasks and experiments independently. With an aim to improve the learning experience of High School students, GMDC has established a well-equipped science laboratory.

Enabling Education through Library:

A library inculcates curiosity, innovation, and critical thinking and endorses desirable study habits. It plays an integral part in a young student's learning process. GMDC supports the Village Library at Panchayat Office and has helped the youths build a career of their dream. Books of various competitive exams with a comfortable seating arrangement are provided under the project. More than 100 youths are benefitted from this initiative.

The GMDC-GVT has provided library resources and illustrated children's books worth over Rs. 73 lakh in project areas in its commitment to making youth future-ready.

Encouraging Girls' Education through Financial Support

Since 2012, GMDC has been running a financial assistance scheme for girls studying in higher secondary government schools in its operational mining areas. The key objective of this scheme is to mitigate the drop-out ratio of girl students from schools. The scheme is applied for Class 8 to Class 12, and funds are transferred directly into the bank accounts of the girls. As students clear each progressive grade, financial assistance increases, and those from vulnerable and backward categories are given higher assistance. Each beneficiary student receives annual assistance in the range of Rs. 4000 - Rs. 7000, depending on the standard and her socioeconomic status.

Transferring funds for financial assistance directly into the bank accounts of girls is a step towards laying the foundation for creating financial awareness and preparing them to be able to provide for their future.

Healthcare

E-clinic: Arogya Tapas Van

A mobile e-clinic facilitates access to public health care, particularly for people living in remote, challenging, under-served, and unreached areas. In an endeavor to provide access to public health care, GMDC started a mobile e-clinic in 2017.

E-clinic Arogya Tapas Vans under the GMDC CSR benefits the people of Kutch, Bhavnagar, Bharuch, and Surat districts across Gujarat. During the year 2021-22, more than 68,000 people from 76 villages around the Project Locations have benefited from the facility of the e-Clinic: Health Checkup Van.

The e-clinic model has benefited the community members, especially the elderly patients, many of whose children have migrated to other places. It provides easy initial access to medical help and also refers them to appropriate healthcare facilities for specialist needs. The e-clinic has helped communities to manage their follow-up visits, chronic conditions, and medication regime at their doorstep. It provides them with weekly screening facilities for monitoring basic parameters such as haemoglobin, blood sugar, and blood pressure.

GMDC Hospitals

GMDC cares for its employees' health and the local community near its Sites. GMDC Hospitals at Panandhro and ATPS in Kutch district provide medical facilities to all the people of nearby villages free of charge.

This ensures that better medical facilities are available to the people of the surrounding area. Well qualified Doctors and Medical staff of GMDC play a significant role in providing enhanced access to medical amenities in the Kutch region.

Integrated Water Resource Management

The importance of watershed development as sustainable agriculture and holistic rural development strategy in rain-fed areas has been identified in India for the past several decades. In recent years it has grown exponentially. As a responsible corporate, GMDC understands the importance of water and strongly believes in developing sustainable water resources surrounding its mining areas.

Pond and Check dam Deepening

Intending to increase the water sufficiency of the village, GMDC has accomplished pond deepening work at several

villages near its project locations. This will not only cater to the village water demand but will also help raise the region's groundwater table.

Check dams can strengthen the groundwater recharge, control the water velocity, and reduce the soil erosion of the surrounding area. To increase water conservation of the surrounding area, GMDC regularly undertakes Check dam deepening work.

Rural Infrastructure Development

Rural infrastructure is essential for agriculture and the overall economic development of rural areas. It also provides basic amenities that improve the quality of life. Infrastructure assets such as rural roads, High Mast Towers, Street Lights, Small bridges and culverts, etc., are needed in rural areas for the local population to fulfill their basic needs and live a productive social and economic life.

Various Rural Infrastructure Development works like high mast tower, street light, RCC road, paver block, check dam, culvert (bridge), lake deepening etc have been undertaken under GMDC CSR for overall development of rural areas near project locations.

During 2021-22, Rural Infrastructure Development Work worth Rs 2.57 crore has been undertaken under GMDC CSR.

Environment Preservation

Plantation activities near Mines Site

Green cover surrounding the mining area helps in reducing pollution level, improves the ecological conditions and prevent soil erosion to a great extent. With an aim for a better environment in the surrounding area, intensive plantation activities have been carried out near the mine area with the help of local communities under the GMDC CSR activities.

Being an organization which follows sustainable mining practices, GMDC always implements the sustainable development framework in its Mines.

Art, Culture, and Heritage

Art and Culture are significant for the development of any nation. It represents a set of shared attitudes, values, goals and practices. To preserve the rich culture and heritage of our country GMDC has undertaken the responsibility of operation and maintenance activities of the Shyamji Krishna Varma Memorial (SKVM) under its CSR.

The Shyamji Krishna Varma Memorial provides a glimpse of Late Shyamji Krishna Varma's life and his contribution to India's freedom struggle, which continues to inspire the present and future generations. He was one of the foremost freedom fighters in the history of India's freedom movement, with a high sense of patriotism and selfless service for the nation. He had organized a revolutionary center in "India House" in London and propagated the cause of India's independence through his writings in his journal "The Indian Sociologist."

GMDC feels the privilege to support the operational activities of SKVM. The Memorial was developed by Government of Gujarat with an objective to pay tribute to the contribution of Shyamji Krishna Varma and to educate the young generation about the sacrifices made by Freedom fighters.

GMDC works as an integral part of society and is sensitive to its social obligations. The GMDC-GVT activities interweave all the development indicators and work towards sustainable development in alignment with Gujarat state vision and national priorities. GMDC though GVT, has always strived to emerge as a responsible corporate leader in sustainable CSR initiatives and works inclusively with all stakeholders to achieve Sustainable Development Goals.

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climate statement to call for a "phase down" of coal use instead of a "phase out."

At the time, few would have predicted just how expensive the fuel would become. Just a year ago, the biggest international mining companies — excluding Glencore — were in a full retreat from coal, deciding the paltry returns were not worth the increasing pressure from investors and climate activists.

When Anglo American Plc spun off its coal business and handed it over to existing shareholders, one short seller, Boatman Capital, said the new business was worth nothing. Instead the stock — known as Thungela Resources Ltd. — skyrocketed, gaining more than 1,000% since its June 2021 listing, with first-half earnings per share up about 20-fold.

Glencore itself snapped up a Colombian mine from former partners Anglo and BHP Group. The nature of the deal, and rising coal prices, meant Glencore essentially got the mine for free by the end of last year. In the first six months of this year, it made $2 billion in profit from that one mine, more than double its entire coal businesses earnings in the same period last year.

The earnings look set to keep rolling in, as analysts and coal executives say the market will remain tight. "As we stand today, we don't see this energy crisis going going away for some time," Glencore Chief Executive Officer Gary Nagle said.

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MINING OF GRANITIC PEGMATITE-HOSTED CRITICAL AND INDUSTRIAL MINERAL DEPOSITS IN INDIA

Yamuna Singh

Abstract

The granitic pegmatites are known to carry abundant groups of Nb-Ta, Sn, Li, Cs, Rb, REE, U, Th, Be and mica minerals. Critical minerals occur distributed in various zones of the pegmatites. A brief account of methods adopted for mining of various critical and industrial mineral deposits hosted in granitic pegmatites of India is presented. It is noted that, generally, a combination of various mining techniques in the realm of surface mining methods are adopted in India to optimise exploitation of pegmatite-hosted mineral deposits. Adopting these methods, considerable quantity of the critical and industrial minerals from pegmatites of Bihar-Jharkhand, Chhattisgarh-Odisha, Karnataka, Rajasthan and Nellore mica belt (Andhra Pradesh) have been mined. Underground mining methods have also been adopted in few pegmatites which revealed presence of mineable ore reserves at deeper levels, e.g., pegmatites of the Bhunas area in Rajasthan and Kasipatnam area in Visakhapatnam district, A.P. The practice of artisanal and small-scale mining (ASM) of pegmatite deposits is also prevalent in India especially in those pegmatites which fall in remote areas and forest villages. However, it is imperative to regulate mining activities including ASM, by proper monitoring involving GPS-enabled, drone-based technology solutions and through digital transformation for optimum utilisation of resources, sustained developments and reclaiming degraded lands.

Keywords: *Granitic pegmatites, surface and underground mining, artisanal and small-scale mine, Critical and industrial minerals, India.*

1. Introduction

Critical metals like lithium and tantalum, among others, constitute essential components of new technologies. In this regard, granitic pegmatites form amongst the most significant sources (Linnen et al. 2012; Sukumaran and Anupama, 2022). Furthermore, the granitic pegmatites are also considered storehouses for many industrial minerals like mica, feldspar, quartz and kaolin (Glover et al. 2012). Although, rare-element granites and pegmatites commonly form volumetrically small bodies, yet they always remained attractive sources for various critical and industrial minerals. For commercial mining purposes, the pegmatites are broadly categorised either as mica pegmatites, gemstone pegmatites or rare-element pegmatites based on the dominance of mica, gemstone or rare-elements minerals. In this paper a brief account is provided on methods adopted for mining of critical mineral deposits hosted in the granitic pegmatites of India.

2. Pegmatites

The term 'pegmatite' was first introduced by Abbe Hauy (Brogniart, 1813) for graphic granites in the early nineteenth century. In 1850, very-coarse-grained rocks of granitic composition were referred to as pegmatites by Haidinger (1845), Delesee (1849) and Naumann (1854). The meaning of the term has been further broadened and today abnormally coarse-grained rocks that range from the most felsic granites to the most mafic gabbros are included among the pegmatites. However, mafic pegmatites are rare, and bulk of the available literature comes from the granitic pegmatites. In recent years, published literature shows a defined trend directed towards generalizations and efforts to understand nuances of pegmatites through their hosting of strategic and energy critical mineral resources, petrological, mineralogical and geochemical studies, considering the presence and behaviour of associated radioactive minerals and rare-earth elements (Cerny, 1991; Tikoo et al., 2008, 2010; London, 2014; Singh and Viswanathan, 2015; Viswanathan et al., 2015; Singh et al., 2015, 2017a, b, c; Singh, 2022).

2.1 Classification

The granitic pegmatites display distinct zonation amongst major rock-forming minerals, and, thus, are classified into un-zoned and zoned types. Furthermore, based on the geochemical and petrogenetic considerations, the pegmatites are also classified into two types (Cerny and Ercit, 2005), namely:

(i) Lithium-Caesium-Tantalum (LCT) and

(ii) Niobium-Yttrium-Fluorine (NYF)

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Each type is characterised by distinguishable geochemical: and mineralogical association and petrogenetic history.

2.2 Mode of occurrence of pegmatite-hosted deposits

The pegmatite dykes may be lenticular, tabular, elongated, stock- or pod-shaped, tear-shaped, ramifying and branching bodies of variable dimensions. They may also occur as isolated veins and dykes, and groups of three - four pegmatites forming criss-cross veination. Topographically, pegmatite may express themselves as high linear ridges or mounds, with sub-vertical to vertical dips. At times, a few pegmatites may be nearly uniform from wall to wall, resembling coarse-grained granite. Such pegmatites, commonly occupy less volume within their parent granitic bodies, are un-zoned, generally do not contain concentration of economic minerals, except occasional localised mineral concentrations in some cases. The zoned pegmatites often reveal swelling and pinching nature with distinct internal units. In most zoned pegmatites, one or more zones occur as pods, straight or curving layers or as irregular bodies. Zonal arrangements in pegmatites can be seen clearly in exploration and mining pits/trenches (Fig. 1). Such metasomatized zones, show profuse development of albite, cleavelandite, sugary albite, greenish and/or silvery aggregates of fine-grained hydrated muscovite, and carry abundant groups of Nb-Ta, Sn, Li, Cs, Rb, REE, U, Th and Be minerals (Fig. 1). Some of the critical minerals associated with the granitic pegmatites are columbite-tantalite, beryl, lepidolite, amblygonite, spodumene, monazite, allanite, uraninite, cassiterite, pollucite, apatite, triplite, samarskite, fergusonite, brannerite, zircon and molybdenite. Large beryl crystals of different dimensions may occur in various pegmatite zones. Most of the Indian pegmatite-hosted deposits occur either on the surface or close to surface (Figs. 1, 2). In some cases, mineralisation continues in much deeper parts, e.g., pegmatites of Bhunas in Rajasthan and Kasipatnam in Visakhapatnam, A.P.

Singh et al. (1991) reported the occurrence of Li-bearing pegmatites in the Bastar craton, Chhattisgarh, where some 500 pegmatites had been reported earlier (Babu, 1989) of which only 19 are Li-bearing, LCT type. Preliminary estimates suggested that over 50,000 tonnes of lepidolite (1.0-1.5% Li) and an equal quantity of amblygonite (2.7-4.06% Li) of commercial grade may be available for exploitation. Besides, Li mineralisation has also been reported in the Sewariya granite pluton of Rajasthan. Mineral phases containing lithium phosphates were reported from leucogranites within the pluton with an average Li content of 135 ppm in biotite granite and 65 ppm in leucogranite of the pluton (Sukumaran and Anupama, 2022). About 30,300 tonnes of Li_2O is estimated over an area of about 0.5 km x 5 km in Mandya area, Karnataka (Business Today, 2020). Furthermore, about 60,000 tonnes of Li-pegmatite ore (av. grade 2.42% Li_2O) is also estimated from Li-pegmatites of the Amareshwar area, Raichur district, Karnataka (Devaraju et al. 1990). Additionally, lepidolite resource of 10,000 tonnes was estimated from Bihar-Jharkhand during early 1970s (Bhola, 1971). Realising the foreign acquisition needs, Government company, Khanij Bidesh India Limited (KABIL), entered into an agreement with the Australia's Critical Mineral Facilitation Office (CMFO) to explore cobalt and lithium mines in Australia (Swarajya Staff, 2022), with interest also on China and Bolivia (Sasi, 2021).

Fig. 1. *Open trench mining of mineralised pegmatite (white body), intruding a meta-basic rock (brown-coloured). The depth of the trench is about 3.5 metres vertically below the surface. Note black crystals of columbite-tantalite and green mica in trench floor. Location. Bastar pegmatite belt, Chhattisgarh.*

3 Discussions

Society's progress and living standards depend on the exploitation of raw materials. Exploitation of mineral resources had kept pace with humanity's demand for centuries. Lithium for instance is a critical element, essential to the development of green technologies, to decarbonization process, and for our day-to-day appliances of use. Similarly, Columbite-tantalite — coltan for short — is a dull metallic ore found in major quantities in the pegmatites. When refined, coltan becomes metallic tantalum, a heat-resistant powder that can hold a high electrical charge. The tantalum metal extracted from tantalite is used in alloys for strength and higher melting points, in glass to increase the index of refraction, and in surgical steel, as it is non-reactive and non-irritating to body tissues. Beryllium finds applications in aircraft, aerospace programmes, X-ray windows and as a newtron source. A variety of gemstones mined from the pegmatites form backbone for gem industry, whereas use of mica as electric insulator is well known. However, their mining was associated with human rights violations such as child labour, exposure to toxic chemicals and other hazards as a result of lax environmental protection, and inadequate implementation of general safety laws and health related regulations.

3.1 Mining methods for optimum recovery

Appropriate mining methods are adopted depending on the mode of occurrence and configuration of mineral deposit. The depth of its continuity is another deciding factor. As

much of the Indian pegmatite-hosted deposits occur close to the surface, surface mining methods involving open pits and trenches are employed in mining (Figs. 1, 2). Gravels and weathered products derived from mineralised pegmatite bodies occur as carpets and fillings in depressions of variable thickness. This mode of occurrence rendered them favourable for surface mining. In case of primary ore mining, initially controlled-blasting was done, followed by ore excavation and finally transportation of ore to processing site. Often combination of various mining techniques in the realm of surface methods are adopted to optimise exploitation of critical and industrial minerals hosted in pegmatites. Adopting these methods, considerable quantity of the critical and industrial minerals from pegmatites of Bihar-Jharkhand, Bastar (Chhattisgarh)-Odisha, Karnataka, Rajasthan and Nellore mica (Andhra Pradesh) belt have been commercially mined (Mahadevan and Dhana Raju, 1999). As for example, in Govindpal pegmatite in Bastar pegmatite belt in Chhattisgarh-Odisha, exploratory-cum-mining trenches and pits were sunk across the length of pegmatites up to a depth of 4 to 6 metres from the surface. This revealed the presence of a group of parallel pegmatites having maximum width of 4 to 8 metres, and yielded besides lepidolite, considerable quantity of cassiterite from the pegmatites and associated eluvial deposit (Deshpande, 1976). Innumerable pegmatites and associated gravels of this region have been mined for critical minerals by adopting open pitting and trenching methods (Fig. 2). The rare-element pegmatite of Beku in West Bengal has been mined by open-pit quarrying methods.

Fig. 2. *Completely mined-out pegmatite by surface mining methods. Note remnants of unmined in-situ, elongated quartz core and discarded quartz gravel dumps forming degraded landscape. Locality: Bastar pegmatite belt, Chhattisgarh.*

Underground mining methods have been adopted in those pegmatites which revealed presence of mineable critical and industrial minerals in depth. Bhunas pegmatite in Rajasthan was mined by underground methods in the past mainly for uranium ore and associated beryl (Bhola, 1977). Mining operations were done for two years leading to recovery of a few tonnes of uranium concentrate, besides beryl, from the first and third levels. Due to pinching out of green mica zone, uranium concentration depleted below the sixth level at 50 metres vertically below the surface rendering the mining operations uneconomical (Bhola, 1977). Another pegmatite mined for uranium and associated ore minerals is the Picchli pegmatite in Jharkhand. Furthermore, in Gurabanda area of East Singhbhum district of Jharkhand, where gemstone occurs mainly at the contact of pegmatites and biotite schist, ancient open-pit mining, rat-hole mining has been carried out for extraction of emerald (Singh and Minz, 2022). In this area, several bamboos and ladders are used to descend deep into the pit, whereas underground tunnels are excavated in the pit wall for mining of gemstone (Singh and Minz, 2022). In the Kasipatnam area of Visakhapatnam district, Andhra Pradesh, pegmatites are also mined by underground methods, mainly for phosphate ore for its use in fertiliser industry, due to depth continuity of phosphate ore minerals in the host pegmatites.

3.2 Artisanal and small-scale mining

The artisanal and small-scale mining (ASM) is a livelihood strategy by local community, which is considered a potential income opportunity in rural areas (Bansah et al., 2017; Hruschka, 2002). The ASM occurs around the world (Bansah et al. 2017). The practice of ASM is prevalent in India also, including in those pegmatites which fall in remote areas and forest villages. In this context, pegmatites fields of Bastar (Chhattisgarh) and Odisha stand testimony, where tin and associated metals are mined using picks, shovels, chisels and hammer by impoverished local people. These miners adopt various locally convenient mining techniques, namely, surface and underground irregular pits, trenches and rathole-type openings, including semi-consolidated to unconsolidated gravel mining (Fig. 3). In mica belts of Bihar-Jharkhand, Rajasthan and Nellore (AP) also ASM is done by random quarrying for extracting mica, gemstones, feldspar, quartz and associated minerals of commercial interest. In this unscientific, selective mining (Fig. 3) not only lot of ore is wasted, but also arable lands, forests and water resources are adversely affected. After mining, often pit-scarred fields are abandoned without any measure for land reclamation. The ASM may pose safety problems (Fig.3) and occupational health hazards particularly for women workers due to various reasons, namely, lack of proper regulations and guidelines, opening of hazardous pits either randomly or within the abandoned open mine pits, and transportation of mined material in head pans (Arthur-Holmes and Busia, 2022). Despite these short comings, ASM is still considered popular alternative for livelihood (Celeste, 2022).

3.3 Recovery and mineral beneficiation

Bigger crystals of commercial minerals of interest are hand-picked and sorting done during pegmatite mining and also from the stacked mined ore during manual handling. Mica sheets are extracted directly during mining and stacked separately for further processing. In primary mining of pegmatite, after mining ore is pulverised and ground-up

to liberation size of minerals of interest. Subsequently, ground ore is treated in beneficiation plant. In the case of weathered gravel derived from the mineralised pegmatites, after surface mining the gravel is sequentially passed through screens of (i) +12 mm, (ii) -12+3 mm and (iii) -3mm. From +12 mm size-fraction minerals of interest are manually segregated, whereas -12+3 mm size-fraction is treated in a zig for recovering heavy mineral concentrates containing critical minerals. On the other hand, -3 mm size-fraction is investigated for possible recovery of fine-size ore minerals by wet tabling and pulsating zig, followed by magnetic and electromagnetic separations. Mineral concentrates so obtained are dried and stocked for further purification and supply for metallurgical processing. The process for recovering Li from hard rock ore from Lithium-Caesium-Tantalum (LCT) type of pegmatite entails mining of the mineral material from the targeted location followed by heating and pulverizing it. The crushed mineral powder is combined with chemical reactants, such as sulphuric acid, and then the slurry is heated slowly, filtered and concentrated through an evaporation process to form saleable marketable Li_2CO_3 (Sukumaran and Anupama, 2022).

3.4 Monitoring and future outlook

Adverse effects of mining activities on land, water, environment and ecology are well recognised all over the world. These effects are equally applicable to mining of pegmatite-hosted ore deposits in pegmatite terrains of India depending on the magnitude and intensity of mining activities. However, adverse effects of mining are minimised by systematic planning and scientific execution of mining activities. In areas where ASM is practiced, problems are not addressed adequately. It is estimated that ASM is the second largest employer after agriculture and employs 10 times more miners than the large-scale mining sector. ASM has gained more prominence as a source of livelihood over time. In this context, some pegmatite fields of Bastar (Chhattisgarh) and Odisha stand testimony, where tin and associated metals are mined by adopting various locally convenient mining techniques, namely, digging surface and underground irregular pits, trenches and openings, including selective mining of rich-pegmatites and gravels (Fig. 3). In this unscientific, selective mining (ASM) not only lot of ore is wasted, but also arable lands, forests and water resources are adversely affected. After mining, fields are abandoned uncared for consequential environmental issues and land reclamation. It is therefore imperative to regulate all mining activities in pegmatite-hosted deposits by proper monitoring involving GPS-enabled, drone-based technology solutions using various sensors (cf. Kalbende and Annavarapu, 2022; Akpah et al. 2022). Investigations should also be directed to understand magnitude, type and characteristics, including geospatial distribution of mining activities (Baddianaah et al. 2022). The need of the time is also to integrate circular economy model by local and national government. Circular economy in ASM represents a decoupling of economic growth from resource consumption. For downstream industries, it means conserving materials, extending a product's lifetime through repair and reuse, and ultimately recycling, reducing material consumption and cutting greenhouse gas emissions. It also includes improving utilization through new business models, such as those that offer products as a service and sharing economy platforms. As more and more mining industry and businesses embrace circular business models, the benefits to society will multiply. In fact, there is a need to revamp future operations through digital transformation (Choudhury, 2020). These measures would help not only in sustained developments, but also in progressive growth of mining industry, regulating artisanal and small-scale mining and random quarrying activities, environmental issues related with mining, proper resource utilisation, stimulate state revenue and reclaiming degraded lands.

Fig. 3. *Small-scale mine (ASM), linear pit in semi-consolidated, pegmatite gravel mining for recovering cassiterite by hand panning. Such underground opening is about 4 metres inside. Locality: Bastar pegmatite belt, Chhattisgarh.*

4. Conclusions

A brief account of methods adopted for mining of ore minerals associated with the granitic pegmatites of India is presented. A combination of various mining techniques mostly in the realm of surface methods are adopted to optimise exploitation of critical and industrial minerals hosted in Indian pegmatites. Underground mining methods have been adopted in a few pegmatites which revealed continuity of mineable critical and industrial minerals in deeper levels.

The practice of artisanal and small-scale mining (ASM) is also prevalent in Indian pegmatite mining. Therefore, understanding what motivates such miners or prohibits them from becoming formal small-scale miners is a step towards addressing the adverse consequences of artisanal mining. ASM affords higher income than agriculture, often provides employment in depressed agricultural areas, and slows down rural-urban migration.

However, considering the hazards and risks involved in of such unscientific activities, it is necessary to regulate all

such mining activities by proper monitoring involving GPS-enabled, drone-based technology solutions using various sensors. It is also required to integrate circular economy model by local and national government for sustainable development and proper utilisation of pegmatite-hosted critical and industrial mineral resources.

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MEJ RIDDLES

Dear Readers of MEJ,

In order to increase the readership of MEJ, which has been felt essential in the interest of our ardent members, the mineral industry professionals as well as the mining sector, the Editorial Board of MEJ has decided to hold a monthly QUIZ. The monthly QUIZ will be designed and printed in MEJ based on the content published in the previous month's MEJ. The MEJ readers will be given five objective questions with multiple choices to choose; and expect them to respond with their correct answer by email to the Editor at **editormejmeai@gmail.com** by 20th of the current month. If more than three members responded with the correct answers, then the three winners will be decided by draw. Each winner will be issued a certificate of merit and a nominal cash prize of Rs 500.

Encourage the EMJ readers to participate in the QUIZ in large numbers and benefit from the enhanced knowledge by reading the Journal from the first to last page.

Questions based on MEJ August 2022 issue

1. Who is the MEAI MPDP Course Coordinator at present?

(a) Dr B.C. Sarkar
(b) Mr Vijay Singh
(c) Mr Dhananjay G. Reddy
(d) Mr Deepak Vidyarthi

2. Which Chapter received the MEAI Best Chapter Award for 2021?

(a) Bellary-Hospet Chapter
(b) Rajasthan Chapter-Udaipur
(c) Rajasthan Chapter-Jaipur
(d) Rajasthan Chapter-Jodhpur

3. Which NGO initially supported starting the Night Schools at Kattanbhavi?

(a) Govind Dham Shikshan Sadhna Trust
(b) Jana Jagran
(c) Rozgar Yojana
(d) Gram Aranya Saunrakshan Samity

4. Which PSU is not part of the proposed mining conglomerate by HCL?

(a) MOIL
(b) KIOCL
(c) EIL
(d) NMDC

5. Which country called for global moratorium of all deep-sea mining activities?

(a) France
(b) Australia
(c) Brazil
(d) Fiji

WINNERS OF RIDDLES PUBLISHED IN THE MEJ AUGUST 2022 ISSUE

Congratulations to proud winners

Mr S.K. Agrawal
Mining Engineer
E-mail: satish.ag47@gmail.com

Dr Ashok Kumar
Scientist, CSIR-CIMFR, Dhanbad
E-mail: ashok.bhu.min09@gmail.com

Mr K S Parameswaraiah
Retd. SMG, IBM, Bengaluru
E-mail: paramks@gmail.com

To receive the cash prize of Rs 500, the winners may please contact the Secretary General, MEAI on email at **meai1957@gmail.com** or Mob. 9177045204.

MEAI NEWS

AHMEDABAD CHAPTER

1st Meeting of the Executive Committee

A Meeting of Executive Committee of the Chapter was held on 06.08.2022 4:00 pm at GMDC Office, Khanij Bhavan, 132 Ft Ring Road, Vastrapur Ahmedabad. The Chairman welcomed all the members of the Executive Committee. The following members attended the meeting:

Office bearers

Shri. H.K Joshi, Chairman Ahmedabad Chapter
Shri. S.N. Mathur, Vice President-I MEAI
Shri. A.K. Garg, Council Member MEAI
Shri. A.K. Makadia Vice Chairman-I
Ms. Gunjan Pande, Secretary
Shri. G C Darji, Treasurer

Executive Members

Shri. Swagat Ray
Shri. R.K. Das
Shri. A.K Srivastava, Secretary South Gujarat LC
Shri. N. Pareek

The members deliberated on the planning of Chapter's activities for the year 2022-23. Two Seminars were proposed to be organized by the Chapter including one International seminar along with the Chapter's Foundation Day & AGM, tentatively in June 2023. Further, a Calendar of activities will be prepared by the Chapter's Local Centers.

The Chairman has informed the members that GMDC is sponsoring 50% MEAI membership fee for its employees. The Chapter is taking a membership drive and process of collection of forms is in progress. It was proposed to approach the other Government Departments for MEAI membership such as CGM, IBM, GSI etc. The point of Revival of Students Chapter was also discussed and it was decided to approach to GEC, Polytechnic at Bhuj & Geology Dept. of Kutch University. To encourage the membership drive, a proposal was made for sponsoring 50% Membership Fee for students by the Chapter.

A series of monthly Technical talks by the Chapter was proposed. A tentative calendar of Lectures & Speakers will be prepared. The Treasurer presented the Accounts (income and expenditure) for conducting the Seminar & AGM held on 14.06.2022 and the same were duly approved by the Committee.

The Committee members were requested to encourage all members of the Chapter to submit applications for MEAI National awards, monthly Quiz and submission of Articles for MEJ. A request was made to enroll as Fellow member and Contribute towards Senior Citizen Welfare Fund. The Chapter's awards were also conferred to winners by VP-I and the Chairman. The meeting ended with Vote of thanks to Chair and all the EC members.

Executive Members attending the meeting

Sh. S N Mathur VP-I presenting the Active Chapter award to Sh. H K Joshi Chairman, Ahmedabad Chapter

Sh. S N Mathur VP-I presenting the Service Excellence award to Ms. Gunjan Pande Secretary, Ahmedabad Chapter

BARAJAMDA CHAPTER

Barajamda Vhapter has organized a friendly cricket Match at Tata Steel Noamundi Sports Complex on dated 21st May 2022. Four teams were participants in Cricket Match – Tata Steel MEAI Members, Tata Steel Union Officials, DMS Eleven and SAIL MEAI Members.

Everyone was excited for friendly Match and took part enthusiastically

DMS Chaibasa Mr. Altaf Hussain inaugurated Cricket Match, He appreciated the efforts of the Barajamda Chapter and stated that last 2 years were very tough for everyone in terms of physical health as well as mental health. So we must engage ourselves in physical activity by any means like sports ,Yoga & Walking and he emphasized of sports for better health and for happiness of employees. He said that this type of activity among other mines also help for better co-ordination among mines during tough times and he also expect that all mines not only engage in only mines activities but also engage in sports & cultural activities, so that life in mines area is more lively.

Players having fun and creating unforgettable memories

DMS Eleven Won the Final Match and DMS Mr. Altaf Hussain has secured Man of the Match Award.

Barajamda Chapter in collaboration with Metso Outotec organizing a symposium on "Latest Technologies in Crushing & Screening Plant" on 2nd July 2022

Symposium has been attended by mines from across Barajamda Chapter and around 100 persons from different mines like Tata Steel, Sail, OMC, Rungta group of Mines, JSW, JSPL, Arcelon Mittal & MG Mohanty attended the Seminar.

DMS Chaibasa Mr. Altaf Hussain address the gathering and gave emphasized on more environment friendly technique & Automation in hazards job in mines and Plant area.

DMS Chaibasa Mr. Altaf Hussain along with Barajamda Chapter Chairman Mr. Atul Bhatnagar and Secretary Mr. Shirish Shekhar visiting Metso stall.

Barajamda Chapter Secretary Mr. Shirish Shekhar addressed the gathering and stated that all should focus on techniques which are environmental friendly, zero discharge of water, minimum slime loss and utilization of low-grade material for mineral conservation. He also emphasized on automation in critical areas for reduction in Man-Machine interference. He concluded his speech by saying that we must work for better tomorrow for our next generation.

BELLARY-HOSPET CHAPTER

General body meeting held on 29th July 2022.
The meeting commenced 6.00 pm. The following were present.

Executive Committee Members:

1. President, MEAI: Sri. K. Madhusudhana
2. Chairman: Sri. K. Prabhakar Reddy
3. Vice Chairman: Sri. Jagadeeshwar S.M.
4. Secretary: Sri. S. H. M. Mallikarjuna
5. Joint Secretary: Sri. Sri. Bharat M C Kumar
6. Executive Member: Sri. Nanda M C Kumar.H. M
7. Executive Member: Sri. Y.V.R. Krishna Reddy
8. Executive Member: Sri. M M Rakesh

Others:

9. Life Members: 90
10. Past National Council Member: Sri. P. Sreenivasa Rao
11. Sri. K A K A Mahaveer, Deputy Director, R&D Cell, Bengaluru, Dept. of Mines & Geology
12. Sri. M C Kumar, Deputy Director, Vijayanagara, Dept. of Mines & Geology
13. Sri. Chandrashekar Hiremani, Senior Geologist, Bellary, Dept. of Mines & Geology
14. Sri Sridhar Hegade, HOD – Mines, SMIORE

General Meeting was held at Sandur Vocational Training Centre. All the members of the Ballary-Hospet Chapter were invited to this event. The purpose of the GM was to exhibit the Awards received by the Chapter at 49th Annual General Meeting held at Bengaluru on 25th June 2022 and to facilitate the Deputy Director Shri. K A K A Mahaveer & Shri.M C Kumar.

All the dignitaries were welcomed by Shri. Chandrashekar Halli. The program was started by watering the plant. In the welcome speech, Shri. Chandrashekar Halli introduced all the guests on the Dias to the audience. In his speech, Mr. S H M Mallikarjuna briefed about the events conducted by the Chapter and also the list of Awards received by it in the recently held national award ceremony of MEAI at Bengaluru. He also thanked all the members for the support & encouragement received in attaining this great accomplishment.

Shri. K Madhusudhana, President of MEAI distributed lifetime membership certificates to the new members. The facilitation program was followed by the certificate distribution. All the members on the Dias facilitated Shri K A Mahaveer & Shri M C Kumar on the occasion.

Shri.K Prabhakara Reddy expressed his gratitude to all the members for their support and encouragement. He informed the members about the starting of first aid training classes by MEAI in association with NMDC. It was being carried out successfully and 160 members were awarded first aid certificates. He also thanked the first aid committee members and NMDC for their support and dedication in organizing the batches, classes and examinations successfully. He also requested all the members to encourage their subordinates, colleagues and friends to become members of the organization. He also assured that, BH Chapter will be organizing the training session for mate & foreman aspirants to help them prepare for the DGMS examinations. He also informed the audience about the national conclave to be held at Bengaluru on the 12 & 13 August and requested to participate in large numbers representing BH Chapter.

In his address, Shri. K Madhusudhana congratulated the Chairman, Secretary & all the members of the BH Chapter for getting the Best Chapter award among the 26 Chapters across India. He also informed the audience that BH Chapter has received the most number of awards and wished the same trend would continue in future. He also referred to the MEAI initiatives like the MEAI Professional Development Program (MPDP) & MEAI Tech Series (MTS) & their objective. He also informed the audience that the MPDP program is highly informative covering all the aspects of mining considering the requirement of the sector. The experts in various fields from India & globally are selected for effective sessions. He also expressed about MTS, which will be conducted once in a month (every third Saturday) by different field experts who will be giving the lecture on their area of expertise. He asked the audience to avail these programs to enrich their knowledge and also to keep themselves abreast with the current market trends. He also stated about the contributions of Deputy Director Shri. K A Mahaveer to mining sector in very crucial time and his role in channelizing the matters. He also expressed his thanks to Sri. K A Mahaveer for his support to MEAI and its activities. He welcomed Mr. M C Kumar and expressed his support in any aspects that will benefit the sector.

In his speech, Sri Paleti Sreenivas Rao congratulated the Chairman, Secretary and all the members of the BH Chapter for getting the awards. He also ensured that the BH chapter will continue to do the best things in the future and ensured that BKG Mining private limited will always support the Association. He shared many incidents with the audience on the best qualities of Shri. K A Mahaveer and his administrative skills. In his speech, he mentioned that Shri. K A Mahaveer always supported the industry and guided people in the right direction to get things done at right time within the legal framework. He also requested Sri. K A Mahaveer to support and guide in future too for carrying out things in a right way. Talking about Mr. M C Kumar, he appreciated his vast knowledge about Minor Minerals and also told him that the complete sector will support him to ensure the smooth functioning of the activities.

Mr. Hegade in his speech expressed that, he is very fortunate to be a part of this program. He also congratulated all

the members on the great accomplishment. In his speech, he mentioned about the support the industry has received during the tenure of Sri. K A Mahaveer. He also told that Sri K A Mahaveer was always available for discussion and guided the industry in the right way. He also wished Sri. M C Kumar all the best for his tenure and assured of all the support from his organization.

Sri.K A Mahaveer in his speech expressed his sincere thanks for the support he has received during his tenure. He also congratulated the members of the BH Chapter for the wonderful achievement and taking things in the right way. He also mentioned that he would have not done things without the support of the industry. In his speech, he mentioned that responses were very quick whenever needed with respect to any clarifications or feedback. Sri. M C Kumar in his speech thanked all the members for their support, which will prove to be a great strength for him to carry things in a positive way. He assured of his support the industry if things are carried out within the legal framework.

Sri. Chandrashekar hiremani also shared his experience of working with both Sri. K A Mahaveer & Sri.M C Kumar.

Sri. S H M Mallikarjun proposed a vote of thanks while Sri. Chandrashekar Halli hosted the event. The event was followed by dinner, which was sponsored by GVTC, Sandur. More than 100 members witnessed the program.

Watering plant by the dignitaries

View of audience

Felicitation to Sri. K A Mahaveer, DD, DMG

Felicitation to Sri. M C Kumar, DD, DMG

HUTTI –KALABURGI CHAPTER

A workshop was conducted on "SAFE TRANSPORTATION OF MEN & MATERIAL IN UNDERGROUND MINE & IT'S SAFETY STANDARDS" Under the aegis of Sri Vijay Kumar. K, Director of Mines (Mech) Southern Zone Bangalore, and Sri, Dilip Kumar Dy. Director of Mines Southern Zone Bangalore.

Sri. Prakash, Chairman H-K chapter welcomed the gathering and expressed the safe practices in underground mine are being Followed & practiced under the guidance of DGMS with an aim to achieve Zero harm & Zero accidents. Health & safety of employees is our motto. He further expressed the following safety tips:

1. Don't ignore the danger
2. Dangerous Task Requires Planning and Communication
3. Get Professional Training
4. Always wear PPE's
5. Supervise your Team
6. Document your Safety Procedures
7. Follow the Latest Safety Standards

The workshop presentation was done by Sri Vijay Kumar. K, Director of Mines (Mech.) Southern Zone Bangalore. Conducting workshops /seminars /presentations was basi-

cally aimed at bringing in safety awareness and educate the mine employees & engineers. He presented a PPT on safe Transportation of Men material in underground & its Safety standards.

Such presentations are powerful tools of education and also a means of creating safety awareness. among the mine workers and officials. It provides a forum for review and interaction on safety matters by the experts in the field of mining. Safe practices, safe conditions and reduction of risks are very important to reduce the accidents.

RAJASTHAN CHAPTER-UDAIPUR

24th Annual General Meeting report

The 24th Annual General Body Meeting of the Chapter and family get-together was held on 24th July 2022 (Sunday) 10:00AM at Labh Garh Palace Resort, Nathdwara Road, Udaipur.

(L to R) Shri MK Mehta, Treasurer, Shri OP Soni, Vice-Chairman, Shri Akhilesh Joshi, Board of Director, HZL, Prof SS Rathor, Ex-Chairman & Shri MS Paliwal, Secretary of the Chapter

The meeting was chaired by Prof SS Rathore, former Chairman the Chapter. Chief Guest, Shri Akhilesh Joshi, Ex CEO, HZL, Shri OP Soni, Chapter Vice-chairman, Shri MS Paliwal, Chapter Secretary and Shri MK Mehta, Chapter Treasurer were on dais. At the outset Prof SS Rathore welcomed all the members and expressed his happiness for the record attendance of the members along with their families. This is a great get-together in the history of the Udaipur Chapter. He congratulated to Shri MS Paliwal and his team for receiving recognition as best Chapter. Family members had enjoyed different games, housie etc.

Presentation of report by Shri MS Paliwal

He welcomed all the dignitaries and members and expressed his thanks for the co-operation rendered during last two years. He said that 2021-22 was a tough period due to Covid but still with the cooperation of members, we could manage the activities of the Chapter. He further told that during his tenure the following activities were conducted :

- A virtual visit of Gemsberg Mine was arranged and presentation was given by Shri Laxman Shekhawat
- Presentation on Application of Drone was given by Shri Hitanshu Kaushal
- Celebration of Indian Mining Day on the theme "ESG Strategy of Indian Mining Industry"
- National Technology Day celebration
- Brainstorming session for imparting need based training
- Three days training program for the candidate appearing Blaster and Mining Mate Exam,
- Felicitation of two women mining engineers
- plantation program
- A visit of Piplantri Village turned in to oasis by Padam Shree Shyam Sunder Paliwal.

He told that five Executive Committee meetings were held during 2021-22. The publication of Newsletters, which was discontinued due to covid pandemic, was resumed. He further told that MEAI Excellence Award was received by Dr

SK Vashisth and MEAI Active Chapter Award was given to Udaipur Chapter.

Presentation of Audited Accounts

Shri MK Mehta presented the audited accounts and briefed the receipt and payments. The house unanimously approved the accounts.

Declaration of Executive Committee

Shri AK Kothari, former National President, MEAI was appointed returning officer for the year 2022-24. The election was conducted through online voting and 65 members have participated in the voting for election of Office bearers and Executive committee. He declared the election results for the year of 2022-24.

Office Bearers:

Chairman	Shri MS Paliwal
Vice Chairman	Shri Praveen Sharma
Secretary	Shri Asif Mohmmed Ansari
Jt. Secretary	Dr SK Vashisth
Treasurer	Shri MK Mehta

Executive Committee Members:

1. Shri D P Gaur
2. Shri R C Purohit
3. Shri S C Suthar
4. Shri S N Mali
5. Shri Hitanshu Kaushal

Installation of Executive Committee for the term 2022-24

Shri RP Gupta, former National President, MEAI installed the new Executive committee for the year 2022-24 and pledged them for fulfilling the objects of the Association and uphold it code of ethics, activities to promote progress of mineral industry and prosperity of the nation. He further told that the new team is a combination of youngsters and experienced members and hope that this committee will definitely work hard to promote this Chapter among the best in the nation.

(L to R) Shri MK Mehta, Treasurer, Shri Praveen Sharma, Vice-Chairman, Shri AK Kothari, Former President, MEAI, Shri RP Gupta, Former President, MEAI, Shri MS Paliwal, Chairman, Shri AM Ansari, Secretary

The newly elected Chairman Shri MS Paliwal expressed thanks to Srih AK Kothari, Shri RP Gupta, Shri Akhilesh Joshi, Prof SS Rathore and all the members for shouldering the responsibility of the Chairman of the Chapter and assured that they will plan and execute the activities in a précised manner. As usual, cooperation of all the member was solicited.

Sh Praveen Sharma . Vice-Chairman had highlighted the activities to be undertaken in coming two years and expressed his thanks to all the members for giving him responsibility of Vice-Chairman. He told that during their tenure they will plan to organize national/ international seminar in a professional manner and also planning to visit national or international mines, participation in national conclave being organized by IBM, virtual technical talk with international experts. Strong focus will be made on ESG, extensive plantation and industrial interaction.

Sh AK Kothari, Former, President MEAI brought to the knowledge that national seminar will be organized on 26-28 August in Udaipur and requested all the members to take active participation for the success of seminar. He further told that the newly elected team is full of energy and enthusiasm which will propel the Chapter to new heights.

Shri AM Ansari, newly elected Secretary expressed his thanks for giving him the responsibility of Secretary of the Chapter and assured to work under the guidance of seniors and implement the activities of the Chapter to the best of his knowledge and efforts. He thanked to all the members for their valuable contribution to the Chapter.

View of members in the Annual General Meeting

Felicitation

1. Rajasthan Chapter-Udaipur felicitated Department of Mines and Geology, Rajasthan who bagged the "National Mineral Development Award" (Rs. 3.8 Crore) from the Ministry of Mines, GoI. On behalf of Shri Mahesh Mathur, Additional Director, Shri DP Gaur and Shri AK Khimesra were honored by presenting a shawl by Shri AK Kothari.
2. Felicitation of members for their excellent contribution to the Chapter during year 2021-22. Shri Praveen Sharma, Shri Hitanshu Kaushal, Shri RC Purohit, Shri SC Suthar, Shri SM Ahmed, Shri RP Mali, Shri MK Mehta, Shri KS Dangi and Office Assistant, Shri Satya Narayan Joshi.

76 Members and 145 family members participated in the Annual General Meeting. Shri AM Ansari proposed vote of thanks and Shri RC Purohit conducted the program.

CONFERENCES, SEMINARS, WORKSHOPS ETC.

ABROAD

14-15 Sep 2022: **Lithium Battery and Energy Metals Conference 2022**. Perth, Australia and Online. Contact AusIMM. T: 1800 657 985 or +61 3 9658 6100 (if overseas)

19-20 Sep 2022: **Global Conference on Geology and Earth Science**. Paris, France. Presentation: Hybrid. Contact: Website L: https://geology.magnusconferences.com/; Contact E-mail: geology@magnusconference.com

10-12 Oct 2022: **Australian Mine Ventilation Conference 2022**. Gold Coast, Australia and online. Contact AusIMM. T: 1800 657 985 or +61 3 9658 6100 (if overseas)

17-19 Oct 2022: **International Mining and Resources Conference. IMARC 2022**. Melbourne, Victoria, Australia and online. Contact: connect@imarcglobal.com; Australia: +61 (0) 3 9008 5946

21-22 Oct 2022: **International Conference on Mineral Processing and Mining ICMPM**. London, United Kingdom. Website URL: https://waset.org/mineral-processing-and-mining-conference-in-october-2022-in-london; Contact URL: https://waset.org

08-09 Nov 2022: **International Conference on Underground Mining Methods and Technologies ICUMMT**. Istanbul, Turkey. Website URL: https://waset.org/underground-mining-methods-and-technologies-conference-in-november-2022-in-istanbul

18-19 Nov 2022: **International Conference on Underground Mining Methods and Applications (ICUMMA)**. Singapore. Website URL: https://waset.org/underground-mining-methods-and-applications-conference-in-november-2022-in-singapore. Program URL: https://waset.org/conferences-in-november-2022-in-singapore/program.

29 Nov - 1 Dec 2022: **AusRock Conference 2022**. Melbourne, Australia and Online. Contact AusIMM. T: 1800 657 985 or +61 3 9658 6100 (if overseas)

20-21 Dec 2022: **International Conference on Design Methods in Underground Mining (ICDMUM 2022)**. Istanbul, Turkey. Website URL: https://waset.org/design-methods-in-underground-mining-conference-in-december-2022-in-istanbul; Contact URL: https://waset.org

27-28 Dec 2022: **International Conference on Coal Resources and Coal Mining ICCRCM**. Vienna, Austria. Website URL: https://waset.org/coal-resources-and-coal-mining-conference-in-december-2022-in-vienna

11-12 Jan 2023: **International Conference on Land Reclamation in Mining Areas ICLRMA**. Singapore. Website URL: https://waset.org/land-reclamation-in-mining-areas-conference-in-january-2023-in-singapore

21-22 Jan 2023: **International Conference on Mineral Deposits and Mining Methods (ICMDMM 2023)**. Amsterdam, Netherlands. Website URL: https://waset.org/mineral-deposits-and-mining-methods-conference-in-january-2023-in-amsterdam; Contact URL: https://waset.org

18-19 Feb 2023: **International Conference on Bauxite Mining and Alumina Refining ICBMAR**. Jeddah, Saudi Arabia. Website URL: https://waset.org/bauxite-mining-and-alumina-refining-conference-in-february-2023-in-jeddah

4-5 Mar 2023: **International Conference on Mining and Refining of Metals ICMRM**. Rome, Italy. Website URL: https://waset.org/mining-and-refining-of-metals-conference-in-march-2023-in-rome

4-5 Mar 2023: **International Conference on Mining Intelligence (ICMI 2023)**. Rio de Janeiro, Brazil. Website URL: https://waset.org/mining-intelligence-conference-in-march-2023-in-rio-de-janeiro; Contact URL: https://waset.org

22-23 Apr 2023: **International Conference on Recent Developments in Mining Technologies ICRDMT**. London, United Kingdom. Website URL: https://waset.org/recent-developments-in-mining-technologies-conference-in-april-2023-in-london

22-23 Apr 2023: **International Conference on Mining and Mineral Technologies (ICMMT 2023)**, Tokyo, Japan. Website URL: https://waset.org/mining-and-mineral-technologies-conference-in-april-2023-in-tokyo; Contact URL: https://waset.org

3-4 May 2023: **International Conference on Mining Technologies and Sustainable Systems ICMTSS**. Rome, Italy. Website URL: https://waset.org/mining-technologies-and-sustainable-systems-conference-in-may-2023-in-rome

29-31 May 2023: **MetPlant Conference 2023**. Perth, Australia and online. Contact AusIMM. T: 1800 657 985 or +61 3 9658 6100 (if overseas)

15-16 Jun 2023: **International Conference on Mining and Metallurgical Technologies (ICMMT 2023)**. Toronto, Canada. Website URL: https://waset.org/mining-and-metallurgical-technologies-conference-in-june-2023-in-toronto; Contact URL: https://waset.org

26-29 Jun 2023: **26th World Mining Congress**. Resourcing Tomorrow-Creating Value for Society. Brisbane, Queensland, Australia. Contact: Kristina Liska, Event and Registration Coordinator at registration@wmc2023.org

16-17 Aug 2023: **International Conference on Mine Mechanization and Mining Policies (ICMMMP 2023)**. Tokyo, Japan. Website URL: https://waset.org/mine-mechanization-and-mining-policies-conference-in-august-2023-in-tokyo; Contact URL: https://waset.org

8-9 Feb 2024: **International Conference on Web Mining, Information and Knowledge Extraction (ICWMIKE 2024)**. Lisbon, Portugal. Website URL: https://waset.org/web-mining-information-and-knowledge-extraction-conference-in-february-2024-in-lisbon; Contact URL: https://waset.org

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TATA STEEL

#WeAlsoMakeTomorrow

TATA

#SteelFact

Globally, extensive

afforestation

programmes are converting mines into habitats for local wildlife

Source: World Steel Association

*Currently, an area of 563 hectares is covered via afforestation in our mining locations.

Data as on October 2021

We are ensuring that the natural ecosystem in our mining locations is preserved. We have progressively implemented Biodiversity Management Plans at all our raw material locations in order to ensure no net loss in biodiversity.
Sure, we make steel.
But #WeAlsoMakeTomorrow.

www.wealsomaketomorrow.com | | www.tatasteel.com

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