A VIRTUAL CONFERENCE

# ENERGY AND WATER EFFICIENCY IN MINING

Best Practices, Emerging Technologies, Challenges and Outlook

June 1, 2021


A VIRTUAL CONFERENCE

# DIGITAL TECHNOLOGIES FOR MINING

Challenges, Advancements, Best Practices and Outlook

June 2, 2021

*Organiser:*

Indian Infrastructure

# Energy and Water Efficiency in Mining

## Mission

- Mining is an energy intensive sector. The choice of mining equipment, processes and operating practices has a significant bearing on energy consumption in mining.
- Energy consumption contributes to operational costs and occurs at all stages of the ore recovery process, including blasting, excavation, crushing, transport and grinding. Energy consumption, most particularly, is large during grinding. Together, grinding and crushing account for nearly half of the energy consumption at a mining site.
- It has been seen that energy efficiency is low in grinding processes, and a significant amount of energy is dissipated. Improvements in resource characterisation, ore sorting and waste removal can lift productivity and reduce energy consumption in grinding.
- Mining companies are increasingly adopting smart blasting, which uses geo-metallurgical data to target relatively high ore concentration sections. It improves the grade of the ore being fed to the crusher and the grinding mill, thereby lowering the energy consumed in these processes.
- For onsite movement of material including overburden, ore and waste, mining companies are transitioning to conveyor belt systems, which are far more energy efficient than haul trucks. There is also growing traction in the adoption of in-pit crushing conveyor systems, which are the most energy-efficient systems for hauling ore, overburden and waste from open-cast mines. However, these systems entail significantly larger upfront costs than haul trucks.
- The use of energy-efficient ancillary equipment such as motors (in dumpers and excavators), pumps, fans, lighting and air compressor systems is also being undertaken for greater energy saving.
- Apart from this, energy consumption is influenced by mine design, as well as day-to-day operating practices. The site layout, in terms of the location of haul roads, processing plant, dumps and transportation assets (such as conveyors), impacts energy consumption and productivity in mining.
- Another focus area for modern mining is on-site water use management. Recycling the water used for processing reduces the volume of water required, driving cost savings and efficiencies across the board. Besides this, zero liquid discharge (ZLD) solutions are being implemented in mining systems to ensure that no effluent leaves the premises and to cut down the use of fresh water.
- **The mission of this one-day virtual conference is to highlight the key energy and water efficient practices in the mining sector, discuss the issues and challenges, and showcase the new and emerging technologies and equipment.**

## Target Audience

The event is expected to draw participation from executives, managers and decision-makers from:

- Coal producing/mining companies
- Iron-ore producing/mining companies
- Other metallic-ore producers
- Mineral development corporations
- MDOs
- Energy and water efficiency firms
- OEMs
- Engineering consultants
- Water management consultants
- Mining engineers and geologists
- Equipment manufacturers
- Technology providers
- Slurry and water pump manufacturers
- R&D organisations, etc.

# AGENDA/STRUCTURE

## KEY TRENDS AND OUTLOOK

- What is the current state of the mining sector in India?
- What are some of the notable energy-efficient mining practices?
- What are the key issues and challenges? What is the outlook?

## INDUSTRY PERSPECTIVE

- What has been the experience of mining companies in the deployment of energy and water efficient technologies?
- What are some of the noteworthy initiatives and best practices?
- What are the issues and challenges? What is the outlook?

## FOCUS ON COAL MINING

- What are the most prevalent energy-efficient practices in coal mining?
- What are some of the measures for optimising water use?
- What are the key issues and challenges? What are the future needs and requirements?

## FOCUS ON DRILLING AND BLASTING

- What are some of the key energy-efficient drilling and blasting practices?
- What are the key benefits of selective blasting? What has been the experience so far?
- What are the key issues and challenges?
- What are the global advancements? What can be learnt from them?

## FOCUS ON CRUSHING AND GRINDING

- What are the key energy-efficient crushing and grinding practices?
- What has been the experience so far? What are the key issues and challenges?
- What are the global advancements that have been made?

## ENERGY EFFICIENCY OF ANCILLARY EQUIPMENT (MOTORS, PUMPS AND FANS)

- What are some of the noteworthy energy-efficient solutions for ancillary equipment (motors, pumps and fans)?
- What are the global best practices/advancements?
- What are the issues and challenges? What is the outlook?

## SPOTLIGHT ON IN-PIT CRUSHING CONVEYOR SYSTEMS

- What has been the industry experience with regard to in-pit crushing and conveyor systems?
- What has been the experience globally? What are the lessons for India?
- What are the issues and challenges? What is the outlook?

## ENERGY EFFICIENT MINE DESIGN

- What are the key mine design and planning considerations for energy-efficient operations?
- What are the issues and challenges? What is the future outlook?
- What has been the experience globally? What are the lessons for India?

## ON-SITE MATERIAL MOVEMENT

- What are the energy-efficient solutions for on-site material movement?
- What are the global advancements? What are the lessons for India?
- What is the future outlook? What are the key challenges?

## EFFICIENT WATER MANAGEMENT IN MINING

- What are the best practises for efficient water management in mining?
- What are the key issues and challenges?
- What is the outlook?

## WASTEWATER TREATMENT AND ACHIEVING ZLD

- What are the current wastewater treatment practices in the mining sector?
- What are the new and emerging technology options for achieving zero liquid discharge?
- What has been the uptake of such solutions so far?

## TECHNOLOGY AND EQUIPMENT SHOWCASE

- What are the noteworthy technologies for energy-efficient mining?
- What are some of the recent advancements?
- What are the key benefits?

# Digital Technologies for Mining

## Mission

- The deployment of digital technologies is revolutionising the entire mining value chain. Mining companies are leveraging digital tools and capabilities to increase productivity, promote sustainable resource use, lower fixed costs, and enhance workforce safety. Besides, data-driven insights are driving improved planning and decision-making.
- These digital technologies enable uninterrupted operations during typical downtime events and allow remote operations without exposure to hazardous mining environments. Besides, the Covid-19 outbreak has certainly increased the adoption of technology-based solutions in the mining segment.
- Internet of things (IoT) is increasingly becoming an integral part of the mining industry, and advances in IoT technology are enabling access to real-time mining data. A digital twin, wherein a digital model of the physical environment is updated continuously with data from sensors and location-aware mobile devices, enables users to better understand the operation and undertake productivity improvements.
- The mining companies are also using geospatial tools such as remote sensing, geographic information system (GIS) and GPS for targeted mineral exploration, preparation of mine plans and access to real-time updates on mining operations. Notably, CMPDI has been at the forefront of deploying these technologies for mine exploration purposes. Apart from this, the deployment of GPS and RFID-based traffic control systems is gaining traction to streamline vehicular movement.
- For geological and structural analysis purposes, the mining companies are increasingly deploying unmanned aerial vehicles (UAVs) and drones. These technologies are being used for data collection, inspection, stock control, condition and safety monitoring.
- Apart from this, the mining companies are adopting new-age technologies such as artificial intelligence (AI) and machine learning. AI-powered robotic devices are being used to perform core activities such as drilling, blasting, loading and hauling. Other new digital solutions are also impacting several areas of mining, with leading companies exploring technologies such as remote sensing, 3-D printing, simulations and augmented reality to improve productivity. Besides, blockchain can be used in the areas of supply chain traceability and contract management.
- Overall, at the enterprise level, integrating mining processes across locations is useful for project and asset management. Enterprise resource planning enhances transport and logistics efficiency, improves resource allocation, provides a real-time view of financials, and plays a key role in informed decision-making.
- That said, the adoption of digital solutions in the mining segment is hampered by a number of issues and challenges including high upfront costs, lack of skilled manpower, and the small scale of mining operations. Besides, with the growing interconnectedness of various mining equipment and processes, there is a need for data privacy and stringent cybersecurity measures.
- **The mission of the one-day virtual conference is to showcase the new and emerging digital technologies being deployed by the mining sector, deliberate on the issues and challenges faced in the deployment of digital technologies, and discuss the global best practices and lessons for India.**

## Target Audience

The event is expected to draw participation from executives, managers and decision-makers from:

- Coal producing/mining companies
- Iron-ore producing/mining companies
- MDOs
- Other metallic-ore producers
- Mineral development corporations
- Digital technology providers
- Automation companies
- AI, ML, Blockchain, IOT, Robotics technology providers
- ERP solution providers
- Cybersecurity firms
- Drones/UMV manufacturers
- Other Equipment manufacturers
- Consultants
- Etc.

# AGENDA/STRUCTURE

## KEY TRENDS AND OUTLOOK

- What is the current level of digital transformation in the mining sector in India?
- What are the recent trends and developments with regard to digital technologies for mining?
- What are the key issues and challenges? What is the outlook?

## FOCUS ON AUTOMATION AND REMOTE OPERATIONS

- What are the kinds of automation and remote operation solutions being deployed by the mining companies?
- What are the issues and challenges? What are the emerging needs and requirements?
- What are the global best practices/advancements?

## SPOTLIGHT ON DIGITAL TWINS

- What are some of the use cases of a digital twin in the mining segment?
- What are the issues and challenges? What is the outlook?
- What has been the experience globally? What are the lessons for India?

## IoT-BASED SOLUTIONS

- What are the use cases of IoT-based solutions in the mining segment?
- What are the global best practices/advancements?
- What are the issues and challenges? What is the outlook?

## REMOTE SENSING AND GIS

- What has been the industry experience in the implementation of GIS and remote sensing?
- What are their key applications for the mining segment?
- What are the issues and concerns?
- What has been the experience globally? What are the lessons for India?

## DRONES AND UNMANNED AERIAL VEHICLES

- What are the key applications of drones and UAVs in the mining sector?
- What are the issues and challenges?
- What has been the experience globally? What are the lessons for India?

## AI, ML AND ROBOTICS

- What has been the industry experience in the implementation of AI, ML and robotics? What are their key applications in the mining industry?
- What are the issues and concerns?
- What has been the experience globally? What are the lessons for India?

## PROMISE OF BLOCKCHAIN

- What is the potential of blockchain technologies in the mining segment?
- How has been the global experience?
- What are the key issues? What is the outlook?

## FOCUS ON ERP

- What are the emerging ERP requirements of the mining industry?
- What are the key issues and challenges?
- What are the global advancements? What lessons can be learnt?

## FOCUS ON CYBERSECURITY AND DATA PRIVACY

- What are the issues and concerns associated with data security and protection?
- What are the new and emerging solutions for managing cybersecurity risks?
- What are the global advancements in cybersecurity? What lessons can be learnt?

## What differentiates our conferences?

- The **agenda** is developed by our researchers, who track the sector round the year. It is thus **relevant** and **topical**. It is not driven by a particular organisation and does not have a particular slant.
- The **speakers** are **professionals** and **experts** involved in the sector, not a mix of ambassadors, ministers, celebrities and business owners.
- The conferences do not just comprise panels and speeches; they provide a good mix of **expert presentations** and **case histories**, and of course **panel discussions**.
- We have **representation** from **across the country**, as is the case at our physical conferences too.
- Each **stakeholder group** – **policymakers**, **developers**, **financiers**, **consultants** and **relevant NGOs** – is represented at our conferences.
- The moderators merely ask the questions. The **stars** are the **speakers** themselves.
- The **sessions begin and end on time**.
- There is adequate time for a **Q&A session** with **each speaker**. These are not "hit and run" speeches.
- The **delegates** are **professionals** who are vested in the sector, and are not just assembled through social media.

## Previous Participants

The organisations that have participated in our previous conferences on "**Mining Technology in India**" include AAC Mining,ABB, ACB, ACC, Adani Mining, Aditya Birla, AECOM,Aggreko,Altair, APMDC, Andritz, Ashok Leyland, Atlas Copco, Australian Trade Commission, Bajaj Reinforcement LLP,Balasore Alloys,BALCO, BASF, BEML, Bentley Systems, Bharat Forge, Bray Controls India,Brunel India, CAEZEN Technologies, Capstone Geoconsultants, Castrol, Caterpillar, Central Institute of Mining & Fuel Research, Central Mine Planning & Design Institute, Central Pollution Control Board, CK Birla Group,CLP Power, Coal India, Coronation Infrastructure, CMPDI, Cummins India, Deloitte, Dextra, DSP Merill Lynch, DuPont, Eastern CoalFields, EDF, EDS Technolgies, EICL, Eimco Elecon, Elecon EPC, Elliot Geophysics, Engineers India Limited, Epiroc Mining,ERM Consultants, Ernst & Young, Essel Mining, Exxon Mobil Lubricants, FL Smidth, Fugro Geotech, Gates India,GE MINING, GE Transportation, Geo Constech, Gmmco Limited, Geomine Envirotech Consultancy,Government of Western Australia Trade and Investment Office, GSECL, Hargreeves Mining India, Hazemag, High Commission of Canada, Hindalco Industries, Hindustan Copper, Hindustan Zinc, Hitachi, Hyundai Construction Equipment India, ICRA ,IIT-ISM Dhanbad,IBI Group, ILF Asia Pacific and Emerging Markets, IMFA, Indian Rare Earths, Indu Projects, Infotech Enterprises, Inspectorate Griffith, Institute of Minerals & Materials Technology, Jaypee Group, JCB India , Jenissi Management Consultants, Jindal Steel & Power, JK Tyre, Keltech Energies, Kennametal India, Kirloskar Brothers, Kreate Commodity Trading, KSB,KSK Minerals, Lanco Infratech, Larsen & Toubro, Lucky Investment & Advisors, Maaden, Maccaferri, Maco Corporation,Magnum Minerals, MAN Trucks, Marsh India, Metso Minerals, Megaplast India Pvt. Ltd,Mineral Exploration Corporation Limited, Ministry of Coal, Ministry of Mines Geological Survey of India, Modular Mining System, Monnet Ispat & Energy, Nalco, National Council for Cement and Building Materials, NCL, NEERI, Neyveli Lignite Corporation, Nina Concrete, NMDC, Normet Underground Solutions, North East Coal Corporation, Northern Coalfields, NTPC, Oriental Rubber, Polycab Wires, PRD Rigs, PricewaterhouseCoopers Pvt. Ltd., Prism Cement, PTC, Putzmeister Solid Pumps GmbH, PWC, Queensland, Government Australia, Raj Mahal Coal Mining, Rashtriya Ispat, Rio Tinto,Ringspann, Roto Pumps, Safire Capital Advisors, Sagta,Sandvik, Sasan Power Limited –Reliance, Shree Cement, Siemens, Singareni Collieries, South Eastern Coalfields, SRG Metals & Minerals, Strategic Decisions Group, TAM Construction Chemicals, Tata Steel, Tata Hitachi Construction Machinery,Technip, Tenova Delkor, THDC, Thiess India, Thriveni Earthmovers, ThyssenKrupp Industries, TIL, TIQ, Trade & Investment, TMEIC, Tractors India, Trafalgar EPC, Utkal Alumina International, VE Commercial Vehicles, Vedanta, Vermeer Equipment, Virginia Mining Resources, Volvo India, Weir Minerals, Western Coalfields, Wipro, Xylem Water Solutions, etc.

# REGISTRATION FORM

☐ I would like to register for the "**ENERGY AND WATER EFFICIENCY IN MINING**" conference **(June 1, 2021)**

☐ I would like to register for the "**DIGITAL TECHNOLOGIES FOR MINING**" conference **(June 2, 2021)**

☐ I would like to register for **both the conferences**

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## Registration Fee

### Both conferences

| | INR | GST@18% | Total INR | Total USD |
|---|---|---|---|---|
| 1 Login | 12,000 | 2,160 | 14,160 | 200 |
| 2 - 3 Logins | 18,000 | 3,240 | 21,240 | 350 |
| 4 - 5 Logins | 24,000 | 4,320 | 28,320 | 500 |
| 6 - 9 Logins | 30,000 | 5,400 | 35,400 | 650 |
| 10 - 20 Logins | 36000 | 6,480 | 42,480 | 800 |

### Any one conference

| | INR | GST@18% | Total INR | Total USD |
|---|---|---|---|---|
| 1 Login | 7,000 | 1,260 | 8,260 | 125 |
| 2 - 3 Logins | 12,000 | 2,160 | 14,160 | 225 |
| 4 - 5 Logins | 17,000 | 3,060 | 20,060 | 325 |
| 6 - 9 Logins | 22,000 | 3,960 | 25,960 | 425 |
| 10 - 20 Logins | 27,000 | 4,860 | 31,860 | 525 |

- GST @18 per cent is applicable on the registration fee.
- Registration will be confirmed on receipt of the payment.

Payment Policy:

- Full payment must be received prior to the conference.
- Payments for "early bird" registrations should come in before the last date of discount. Discount offers cannot be combined with any other offer.
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