

Sth Asian Mining congress & exhibition

Green Mining: The Way Forward

HIGHLIGHTS & RECOMMENDATIONS

November 6-9, 2019 • Kolkata • India

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THE MINING, GEOLOGICAL & METALLURGICAL INSTITUTE OF INDIA (MGMI) GN - 38/4, Salt Lake, Sector V, Kolkata 700 091, INDIA, T +91 33 2357 3482 / 3987 / 6518, +91 33 4000 5168, F +91 33 2357 3482 E - 8AMC@mgmiidia.in / secretary@mgmiidia.in / office@mgmiidia.in / mgmihonysecretary@gmail.com / mgmisecretary@gmail.com W - https://mgmiindia.in / https://8thamc.mgmiindia.in

MGMI PROMOTES THE CAUSE OF MINERAL INDUSTRY SINCE 1906

8th Asian Mining

Snapshots of 8th AMC & IME 2019

















Organiser MGMI

The Mining Geological and Metallurgical Institute of India (MGMI), which marked a century of its existence in 2006, is the oldest professional institute of its kind in Asia. Since its inception the MGMI has been **Promoting the cause of Mineral Industry** through multidisciplinary interactions among the scientists, technologists, engineers, industrialists, academicians and the policy makers in the government and private agencies. MGMI fulfils its objective of encouraging, assisting and extending knowledge and information connected with the earth sciences and associated disciplines through organising Lectures, Seminars, Publications, Training programmes and Technical services to the industry. The Institute, headquartered in Kolkata, presently has more than 2800 members in its 18 branches



all over the country. In addition, there are also members from abroad. MGMI regularly organises National and International Conferences and brings out publications on topical subjects for the advancement of the mineral industry.

Background and Objective

The Asian Mining Congress (AMC) and International Mining Exhibition (IME), held concurrently, are flagship international events organized by MGMI biennially, that commenced in 2006 to commemorate the Centenary of the Institute. The Asian region is a significant producer of metal and metallic ores, production of some major commodities account for more than half of world's total. More than 65% of global coal comes from this region.

Recent trend indicates that economic growth of Asian countries will gain momentum in the near future. To enable such growth the mineral industry is also required to gear up and accelerate its own pace of development. This is of utmost importance in the backdrop of increased demand of raw materials, including those for the 'sunrise' sector, to boost the economy in this region. The Congress provides a forum for the miners, planners, policy makers, regulators, scientists, academicians and equipment manufacturers to discuss the various issues affecting the mining industry in the Asian region in particular, and the rest of the world in general. The Congress, along with the International Mining Exhibition, held concurrently in Kolkata provides an unrivalled opportunity for the manufacturers of mining machinery in the world to showcase their products and do business.

Theme

'Ensuring sustainable and equitable use of resources without degrading the environment' is the demand of the day. It was especially appropriate and timely to organize the 8th Asian Mining Congress on a topical subject as its theme: Green Mining:

The Way Forward.

Highlights

The 8th Asian Mining Congress (AMC) was held at The Hotel Westin Rajarhat, Kolkata, India, during 6th to 8th November, 2019. Simultaneously with the Congress, the 8th International Mining Exhibition (IME 2019) was also organized in collaboration with M/s Tafcon Projects India Pvt Ltd at nearby Eco Park, Rajarhat, Kolkata, during 6th to 9th November, 2019. The Congress was attended by more than 300 delegates, guests and participants from India including some from countries like Australia, Czech Republic, Canada, Malaysia, France, Germany, Poland, South Africa, Sweden and others. A total of 53 papers on varied topics covering exploration, policies, mine planning, safety and surveillance, processing of minerals, sustainable green mining and oil and gas sectors were presented and discussed in Business Leaders' Forum, two Plenary, and nine Technical sessions. There were presentations from companies on their products, activities and proficiencies. The Congress Proceedings Volume, Souvenir and soft copy of the papers were provided with the delegates in their kit.



Inaugural Session

On the morning of **6th November 2019**, the opening of the **8th Asian Mining Congress (8AMC)** was marked by the ceremonial lighting of lamps by the Chief Guest and Guests of Honour.

The Congress was inaugurated by **Shri Pralhad Joshi**, Hon'ble Minister of Coal, Mines & Parliamentary Affairs, Govt. of India and Chief Guest of the event. The Guests of Honour on the dais were:

- Mr Andrew Ford, Australian Consul General
- **HE Mr Milan Hovorka**, Ambassador, Embassy of Czech Republic, Special Guest, Following officials from MGMI were present:
- Shri Anil Kumar Jha, President, MGMI & Chairman, Coal India Limited
- Shri R K Saha, Chairman, Conference (8AMC), Past President, MGMI & Former CMD, CCL
- Dr Amalendu Sinha, Chairman, Technical Committee (8AMC) & Former Director, CIMFR
- Shri Rajiw Lochan, , Hony Secretary, MGMI & GM, CMPDI

The session proceedings were conducted by **Shri Rajiw Lochan**, Hony Secretary, MGMI & GM, CMPDI welcomed the guests on the dais, who were honoured with flower bouquets. After the lighting of lamp, guests were invited to speak on the occasion:

Shri Anil Kumar Jha, President, MGMI welcomed the foreign and Indian guests, delegates and participants on behalf of MGMI to the **City of Joy**. He complimented all members who contributed to the organization of the 8th AMC. He said that for India to become a 5 trillion dollar economy, mining and mineral industries had to play a vital role. Coal is a very important commodity in India for its energy security. Thermal power accounted for 73% of electricity in India. India imported 235 MT of thermal coal and 50 MT coking coal. To reduce this import Coal India Limited is planning to increase its production from 600 MT to 1 BT by 2023-24. Shri Jha advocated the theme of AMC and hoped a number of meaningful recommendations for sustainable green mining would come out of the deliberations during the three days of the Congress. He again extended a warm welcome to one and all and expressed special thanks to the Hon'ble Minister, Shri Pralhad Joshi, the Chief Guest, HE Mr Milan Hovorka and Mr Andrew Ford, Guests of Honour.

Shri R K Saha, Chairman, Conference (8AMC) presented a brief history of the AMC and IME and introduced the theme of the Congress pointing out that Asia is the largest continent with all minerals and there is huge scope of mining and other mineral related activities. He informed that 53 technical papers are selected to be presented in the Congress in addition to 14 Keynote papers and hoped that deliberations would provide with some meaningful pathfinders towards green mining.

Dr Amalendu Sinha, Chairman, Technical Committee (8AMC) elaborated the background of the theme of 8th AMC, pointing out that mining is becoming increasingly challenging day-by-day with greater public awareness on environment protection. Green mining is the need of the day. He announced that a number of educative presentations would be made by the Keynote speakers and listed the major heads under which the technical papers would be deliberated. Dr Sinha thanked the reviewers for helping to finalize the papers to be presented in the Congress.



Opening speech by Shri Rajiw Lochan



Lighting of Lamp by Dignitaries



Inaugural Session



Welcome Address by Shri Anil Kr Jha



Address by Mr RK Saha

Highlights & Recommendations

Mr Andrew Ford, Australian Consul General said 'Australia is happy to participate' in 8th AMC and IME 2019. Australia is the global leader in production of many minerals and is number one exporter of iron ore and metallic coal. He gave a brief account of minerals produced in Australia and its exports. He expressed his thanks to the organizers for inviting him and wished the event a grand success.

His Excellency **Mr Milan Hovorka**, Ambassador, Czech Republic expressed gratitude to MGMI for the invitation to address the august gathering. According to him Kolkata is also the **city of culture** as well as the **centre of mining** with institutes and companies around it. He said that the theme is very pertinent. Three - four decades back mining had been destroying the environment. But 21st century mining is no longer like that because of advancement in technologies. Mining companies are becoming environment conscious. Mining of minerals is a necessity and the major issue is to extract minerals without harming the environment. He pointed out that this type of conferences enhanced knowledge, quality of high level professionalism and create partnerships between countries. He also mentioned about the close relationship between Czech Republic and India.

In his address to the Congress, **Shri Pralhad Joshi**, Hon'ble Minister of Coal, Mines & Parliamentary Affairs, Govt of India expressed his pleasure to inaugurate the 8th Asian Mining Congress and congratulated the organizers for the theme. He advocated for 'safe earth', acknowledging that mining is important for development. He spoke about the Paris Agreement in which India is a signatory. Shri Joshi said coal is the backbone of energy in our country and its production would have to increase, but with minimum damage to the environment. Government of India has taken steps to ease out formalities like grant of lease, etc, for the business sector. He appreciated the initiatives taken by CIL to maintain ecology by reclamation of land and planting 15 million plants. He referred to the need for adoption of clean coal technology and utilization of CBM, UCG and coal gasification. He highlighted the importance of **Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY)** launched by Government of India.

Shri Joshi expected the recommendations from the Congress would benefit the mining sector and the society at large and wished the event a great success.

The Souvenir and Proceedings volume of the 8th Asian Mining Congress were released by the dignitaries on the dais. The guests were then presented with mementoes.

The inaugural session concluded with a Vote of Thanks by Shri Rajiw Lochan who assured smooth functioning of the event.



Release of Congress Proceedings Volume



Address by Dr Amalendu Sinha



Address by Dr Andrew Ford



Address by HE Mr Milan Hovorka



Inaugural Address by Shri Pralhad Joshi



Shri Pralhad Joshi being felicitated by Shri AK Jha

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Business Leaders' Forum



The session was chaired by **Shri U Kumar**, Past President, MGMI and Former CMD, SECL and **Shri Smarajit Chakrabarti**, Former CMD, ECL coordinated the proceedings of the session.

In opening remarks, Shri Kumar appreciated the inclusion of this session which would help business leaders' interaction and global interdependence. He suggested that as India is bestowed with huge resources of coal, its utilization for various purposes other than for thermal power generation and of its byproducts from coal gasification should be given due importance. He also underscored the fact that the country was not self-sufficient in many of the minerals needed and most of the coal blocks allocated by the government are yet to start production.



Dr Michael S Blinderman, Director Operations, Ergo Exergy Technologies Inc., deliberated on **'Underground Coal Gasification – A New Life for Coal in Asia**'. According to him UCG is the future for coal in Asia. He mentioned problems in coal mining – transportation, preparation, processing, ash storage, air pollution, high cost etc. He said clean coal technology is expensive, but is the ultimate solution. He discussed UCG technology developed and implemented by Ergo Exergy (∑UCG[™]) in Canada, citing the example of a methanol plant, and outlined the implementation programme at Jamadoba colliery of Tata Steel in Jharia coalfield.

He opined that India with large coal resources has a promising future for application of UCG.



Shri Prem Sagar Mishra, CMD, ECL, during his discourse on *'Environmental Law & Corporate Social Responsibility'*, explained sustainable development and protection of nature quoting from the Vedas. He presented a brief history of environmental laws and posed a number of questions. Based on a brief case study with reference to coal mining industry in India, he summarized the impact of coal mining activities on ecology, environment and society. Describing the measures undertaken by ECL, he concluded that the journey of Corporate Social Responsibility (CSR) in Indian coal industry has been satisfactory, but suggested that all

organizations might have a post of Director, Ecology.



Dr Rabi Bastia, Padmasree, President – E&P, Oilmax Energy Pvt Ltd, spoke on '*The Relation between Geologic Setting and Petroleum Provinces: A Paradigm Shift*'. He briefed about global oil and gas reserves. He explained the evolutionary concepts of petroleum occurrence since the initial days of hydrocarbon seeps to the potential biogenic corridor that is present today. Dr Bastia discussed technological advancements in the fields of seismic data acquisition and interpretation, airborne hydrocarbon sensing and big data and analytics that have helped the industry to integrate large volumes of data for better imaging and precise prediction of oil & gas

accumulations. He concluded that the world is poised to witness many new giant hydrocarbon discoveries in the unexplored frontiers.



Shri D V Pichamuthu, Director, FIMI, discussed *'Policy Matters and Mining Legislation'*. He traced the history of mining laws, National Mineral Policies (NMP) and MMDR acts, starting from 1939 when certain key minerals were controlled. He discussed current import export policy, taxation policy and the ground realities. According to him the current position led one to the inescapable conclusion that the milieu for the mining industry is not attractive to investors. He suggested some actions for the way forward.

Queries from Shri R P Ritolia, Dr Ajay Kr Singh, Shri S K Choudhuri and Dr Ajay Kr Moitra were answered by the speakers. The session concluded with summing up by Shri Smarajit Chakrabarti and presentation of mementoes.



Shri S K Choudhuri, Former Controller General, Indian Bureau of Mines (IBM) chaired the session and Shri Subrata Chakravarty, Former CMD, ECL, coordinated the proceedings of the session.



Prof S P Banerjee, Past President MGMI and Former Director-in-Charge, IIT (ISM) Dhanbad, during his discourse on 'A Review of the Paris Agreement on Climate Change and the Initiatives taken by the Mining Industry as a part of the Wider Global Response to the Climate Change Challenge', discussed the Paris Climate Accord of 2015, its main features and implications. The mining industry world over has supported the call of the environmental groups to reduce GHG emissions from the 1990s itself. The quest for energy efficiency in mining operations has been an integral part for a long time. The need for reducing GHG emissions to combat climate change has given an added impetus to this task. According to him, the Indian mining industry has

been active in the field of energy audit and energy conservation for many years and of late also in the area of renewable energy development and its application.



The Keynote address of Dr K Rajeswara Rao, IAS, Additional Secretary, IBM presented by Pankaj Kulshrestha, Controller of Mines (NZ) on 'Conservation of Mineral Resources for sustainable Growth' (coauthored by Sri Gaurav Kumar Sharma, Sri Mithelesh Purohit). He spoke on sustainable mining policies and star rating system followed by IBM. He described the need for conservation of mineral with a view to utilizing existing resources efficiently, discovering new deposits, finding substitutes and recycling. The focus for the conservation of minerals must be on extraction practices of the mineral resource itself. The role of State/regulator is significant for optimizing mine life and implementation of royalty regime that incentivizes the user of low

grade minerals. He emphasized about conservation of minerals for achieving sustainable growth as this will significantly shape the development of mining in the future while minimizing impact on environment.



The paper on 'Importance of R&D in Implementation of Green Mining Technologies' by Dr P K Singh, Director, CIMFR was presented by Dr C N Ghosh, who talked on essential elements of green mining technology. The Green Mining concept was developed as a major tool to make India the forerunner in sustainable mining. It promotes material, water and energy efficiency to reduce the environmental footprint of mineral-based product life cycles. Green mining technologies allow the recovery of all useful minerals and minimize mining waste. An important goal of green mining is to minimize adverse environmental and social impacts in all stages of the operations, and to maximize local benefits. After mine closure, green mining helps to restore

the mining areas to make them safe and preferably to allow other types of land use.



The paper on **'Innovative Technologies in Sustainable Mining'** by **Prof Rajiv Shekhar**, Director, IIT (ISM) was presented by **Dr S S Rai**. He elaborated stages of mining cycle from exploration to mine closure. According to him, operations in all the stages should be sustainable so as to achieve green mining. He broadly discussed about the innovative technologies.



Dr Simit Raval, Programme Director, UG Mining Degree, School of Minerals and Energy Resources Engineering, University of New South Wales, Australia spoke on *'Smart Sensing Technologies for a Digital Mine'*. He discussed about a system that could integrate data from different sensors mounted on various platforms to detect changes in sensitive ecosystem within active and post mining landscapes as it will be key sustainability criteria for a green mining. According to him the futuristic vision for a mine site is to have a number of smart sensors making automated observations that feed into an integrated system to predict areas of concern and mitigate against them leading to a zero harm mining.

Dr Ajay Kr Singh and Dr Ajoy Kr Moitra interacted with the speakers. Shri Subrata Chakravarty summed up the proceedings. The session ended with presentation of mementoes.



Prof S P Banerjee, Past President, MGMI & Former Director-in-Charge, IIT (ISM) chaired the session and Dr Anupendu Gupta, Former DDG, Geological Survey of India coordinated the proceedings of the session.



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Prof D C Panigrahi, IIT (ISM) in his presentation on '*Design, Development and Successful Installation of Air Cooling System for a Continuous Miner Panel in a Deep Underground Coal Mine of the Singareni Collieries Company Limited*' talked on handling a fiery coal seam. He discussed in details about the problems faced in the process of installing Continuous Miner (CM) and the R&D studies conducted to solve the ventilation problems.



Dr V M Tiwari, Director, NGRI deliberated on **'Geophysical Exploration of Deep Seated Volcanic Massive Sulfide Mineralisation'** (paper coauthored by Nimisha Vedanti). He talked about Volcanic Massive Sulfide (VMS) deposits and traditional geophysical methods of its exploration. Recent numerical modeling studies carried on sulfides have demonstrated that these deposits have a unique reflection character that depends on the deposit's shape, size, and composition and hence can be less ambiguously detected in seismic reflection data. Thus the present day attention of seismic investigations is shifted from mapping contacts to using seismic amplitudes to map and interpret the VMS ore bodies themselves. The sophisticated techniques like

high resolution shallow seismic reflection methods have been a proven technique in hydrocarbon exploration also. He discussed a theoretical framework of using geophysical techniques in the exploration of near surface, shallow subsurface and deep seated VMS deposits along with a few successful case histories from Canada and Scandinavia.



Prof Suddhasatwa Basu, Director, Institute of Minerals and Materials Technology (IMMT), talked on '*Recovery* of Alumina and Silica Values from Indian Fly Ash'. He explained about metallurgical processing of Indian fly ash for its complete utilization. Researches are going on for extraction of alumina, the most valuable material present in fly ash, which, however, is one of the most challenging tasks in the field of metallurgy. He narrated about the fly ash treatment process developed by IMMT for extraction of alumina and silica values, while simultaneously disposing the fly ash generated. The viability and sustainability of the process comes from breaking down the entire constituents of fly ash and producing separate value added products.



'Recent Technological Advancements in Hydrocarbon Exploration and Production' was the topic of discourse of **Dr Satyabrata Nayak**, Geoscientist, Petronas Carigali, Kuala Lumpur, Malaysia. According to him recent technological advances are playing crucial role in hydrocarbon exploration and production (E&P) and changing the E&P landscape. Integration of all available geological and geophysical data having micro to macro scale, from minute mineralogical assemblages to regional gravity surveys can be useful to get insight into the complex geological setting in any basin. Artificial Intelligence and Robotics, in the recent times, are being used extensively in E&P activities.

Dr Narendra Kr Nanda, Immediate Past President, MGMI deliberated on 'Intelligent Enterprise with Industry 4.0 for Mining Industry'. Mining industry is under transformation with digital and automated technologies. Industry 4.0 technologies provide deeper understanding of resource base, optimization of material and equipment flow, improved anticipation of failure, increased automation such as automated surveying using drones 3D laser technology, drills, mobile fleets using fleet management system, plants. It also helps in monitoring real time performance versus planning and safety of men and machineries. By using Internet of Things (IoT), Big Data, Machine to Machine (M2M), data analytics, intelligent sensors, robotics, drone, the smart mining can be upgraded with industry 4.0 in mining activities such as surveying, drilling, blasting, excavation, haulage, processing and transportation.

Queries from Shri D V Pichamuthu and Dr Anupendu Gupta were answered by the speakers. Dr Gupta summed up the proceedings. The session ended with presentation of mementoes.

Technical Sessions

There were altogether 9 Technical Sessions, besides the ones mentioned earlier, on various topics. In all 53 papers were selected for presentation in the 9 sessions, out of which 51 were presented by scientists, technologists and academicians from India and abroad. The sessions with lead topics, chairpersons, coordinators and the papers presented by authors / speakers are listed below. Name of speakers who presented the papers are marked bold.

Technical Session I

POLICY MATTERS AND INVESTMENT ISSUES

10-44

Chairpersons:

Dr Narendra Kr Nanda, Immediate Past President, MGMI Mr V K Arora, Chief Mentor, KCT (Coal Sales)

- Shri T N Venugopal, Former Addl. Director of Mines & Geology, Legislation Governing Minor Minerals
- Prof Jayanta Bhattacharya, Indian Institute of Technology Kharagpur, Checklists for the Project Managers Seeking Investment Finance for Mining Projects
- Dr Suvendu Bose, Executive Director (Mining & Metals), KPMG Advisory Services Pvt Ltd, Innovative Investment Channels
 in Indian Mining Sector
- Prof Jayanta Bhattacharya, Indian Institute of Technology Kharagpur, Emerging Domination of Business Practices in
 Mining Engineering: The Academic Response
- Dr Kaushik Dey, Asst Professor and Prof Jayanta Bhattacharya, Indian Institute of Technology Kharagpur, Does Outsourcing
 of Mining Operation Give a Sustainable Growth

Technical Session II

CHALLENGES IN EXPLORATION AND CARBON SEQUESTRATION



Chairperson: Prof BB Bhattacharya, Former Director, ISM Dhanbad

- Prof Bhabesh C Sarkar, IIT (ISM) Dhanbad : Mineral Exploration Outlook Gloom or Boom
- Shri Bhaskar Bhattacharyya, ECL, A Very Probable Scope of CO₂ Sequestration in Barren Measure and Underlying Shales of Raniganj Coalfield Basin, India
- Shri Dipankar Ray, Shri Rahul Kumar Singh and Prof Bhabesh C Sarkar, IIT (ISM), Dhanbad, An Al Approach to Modelling
 of an Iron Ore Deposit
- Shri G Pradeep, Prof R Prathyusha, Prof P Mahesh, Dr M Ramulu and Dr PB Choudhury, CSIR-CIMFR & TKR : College of Eng & Tech, BIGDATA, A Technology to Unlock the Mineral Bodies

Technical Session III

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INNOVATIVE PLANNING AND DESIGN (UG MINES)



Chairperson:

Shri A N Sahay, Past President, MGMI and Former CMD, MCL

- Dr Prabhat Kumar Mandal, Senior Principal Scientist, A J Das, S Tewari, R Bhattacharjee, Dr S K Singh, CSIR Central Institute
 of Mining and Fuel Research, Geomining Issues for Underground Extraction of Coal by Continuous Miner in India
- Dr B H Vijay Sekar, Dr Praveena Das, Dr J Sripad and Dr R Naik, National Institute of Rock Mechanics, A Comparative Study of Different Numerical Modelling Tools used for Stability Studies in Underground Mines
- Dr Ranjan Kumar, Principal Scientist, Dr Prabhat K Mandal, Awanindra P Singh, Dr Lalan Kumar, Dr Satyendra K Singh, CSIR-Central Institute of Mining and Fuel Research, Extraction of Deep-Seated Coal Deposits using Emerging Underground Mining Methods
- Dr C N Ghosh, S K Behera, Prashant, CSIR-CIMFR, D P Mishra, IIT(ISM), K Mishra, Phanil K Mandal, CSIR-CIMFR, Design of Lead-Zinc Mill Tailings Paste with Fly Ash for Filling the Stopes in Underground Metal Mines
- Prof R M Bhattacharjee, L S Vinay, Research Scholar, Indian Institute of Technology (ISM), Application of Different Pillar Extraction Methods using Continuous Miner in Indian Underground Coal Mines
- Dr Satyendra K Singh, Chief Scientist, CIMFR, Prof R K Sinha, IIT (ISM), K Nageswara Rao and Rana Bhattacharjee, CIMFR, Does the Strength of a Pillar reach a Plateau with Increasing Effective w/h Ratio ? – Coal Mining Perspective at Greater Depths
- Dr Sahendra Ram, Sr. Technical Officer, Ashok Kumar, Dr Arun Kumar Singh, Dr Rakesh Kumar, CSIR-CIMFR, Strata Control and Monitoring Plan for Pillar Extraction with Stowing
- Shri Ashok Kumar, CIMFR, Dheeraj Kumar, IIT (ISM), Arun Kumar Singha, Dr Sahendra Ram, Dr Rakesh Kumar, Amit Kumar Singh, CIMFR, Anurag Sarthi, Sidheswar Majhi, IIT (BHU), Strength Estimation of Irregular Shaped Heightened Rib/Snook for Mechanised Depillaring

Technical Session IV



Chairpersons:

Shri PR Mandal, Former Advisor, MoC Shri TK Mazumdar, Former DDG, DGMS

- Shri Kunal Das and Shri Anandji Prasad, CMPDI, An Approach to Tackle the Excessive Methane (CH₄) in Mine and Minimize Downtime of Production by Change of Ventilation System A Case Study
- Shri Rajneesh Kumar and Shri Ajay Kumar Singh, CMPDI, CMSMS (Coal Mine Surveillance and Management System), An Initiative of Ministry of Coal (MoC) For Prevention of Illegal Coal Mining
- Shri Rajneesh Kumar and Mohit Rastogi, CMPDI, Benchmarking of UAV Based Sensors Based on Pilot Studies
- Shri Aditya Pandey, Shri Anmaya Naik, Shri Asif Ahmad, Shri Srivatsan JSA Sastry, IIT Kharagpur, Comparative Study of Wet-Kata Cooling Power to some Selected Heat Stress Indices
- Shri Shankhajit Mitra, Prof Dheeraj Kumar, Prof Chiranjeev Kumar and Dr SK Chaulya, CSIR-CIMFR & IIT (ISM), Web Based
 Real Time Environmental Monitoring System for Underground Coal Mines using Wireless Sensor Network with WIFI
 ZIGBEE Technology
- Shri Debashish Mishra, Dr NK Mohalik, Dr SK Ray, Dr NK Varma, and Dr JK Pandey, CSIR-CIMFR, Application of Booster Fan to Improve Workplace Environment of Deep Underground Coal Mines with Multi-Seam Working : A Case Study

Technical Session V

ENVIRONMENTAL ISSUES, SUSTAINABLE GREEN MINING AND CSR



Chairpersons: Shri B R Reddy, Former CMD, SECL Shri T K Mukherjee, GM Envn., CIL

- Shri Rakesh Ranjan, Sr. Manager and Anindita Biswas, CMPDI, Environmental Monitoring in Coal Mining Areas using Geospatial Technology
- Dr Manoj Kumar, Manager, Pravin K Singh, Central Coalfields Limited, Issues and Challenges in Forestry Clearance of
 Opencast Coal Mines
- Shri Alok Kumar Singh, Chief Manager, Central Coalfields Limited, Green Coal Mining : A Road Map for CIL
- Shri Himanshu Kumar, Vijay Singh, Research Scholar, Prof N C Karmakar, IIT (BHU), Environmental Impact Assessment of a Limestone Mine applying Rapid Impact Assessment Matrix
- Shri D K Khanda, S Roy Choudhury, M R Mahananda, Mahanadi Coalfields Limited, Application of Life Cycle Assessment (LCA) in Coal Mines of MCL for Sustainable Mining – A Case Study
- Dr Manoj Kumar, Sangeeta, K S Gaiwal, Central Coalfields Limited, Corporate Social Responsibility Practices vis-à-vis
 Sustainable Development Goals-2030 and their Alignment in Coal Mining Complexes of Jharkhand

Technical Session VI

INNOVATIVE PLANNING AND DESIGN (OPENCAST MINES)



Chairperson:

Shri TK Nag, Former CMD, NCL

- Prof Ashis Bhattacherjee, IIT Kharagpur, Assessment of Whole-Body Vibration Exposure of Dumper Operators in Indian Iron Ore Mines
- Shri Devendra Pratap Singh and Shri Arun Kumar Bal, CMPDI, Opencast Mining : Issues and Challenges Application of Steep Angle Conveyor in Deep Opencast Coal Mine (A Case Study)
- Dr AY Bharath Kumar, Dr GD Raju and Dr A Rajan Babu, NIRM, Design and Stability Assessment of Steep Slope Geometry and UPS of an Iron Ore Mine
- Dr T Amrith Renaldy, Dr BH Vijay Sekar and Dr Sripad R Naik, NIRM, Assessment of Stability Analysis of Waste Dumps Slopes for an Iron Ore Mine
- Dr Rabi Bhusan, NIRM, Geological and Geotechnical Study for Pit Slopes Stability at Basantnagar Limestone Mine of Ramagundam, Andhra Pradesh
- Dr Indrajit Roy, BIT Mesra, Development of Guidelines to Predict Distance between Toe of the Shovel Dumper Dump and Dragline Dump

Technical Session VII

ADVANCEMENTS IN BLASTING AND ROCK FRAGMANTATION



Chairpersons:

Dr NK Nanda, Immediate Past President, MGMI Shri Manish Sinha, CEO, Indian Explosive

- Mohd Shahid, Manoj Kumar Jha and Ashok Kumar Das, CMPDI, A Paired T-Test Analysis to Investigate and Quantify the Percentage Variation in Vibration at same Scaled Distance by Considering NONEL & ED Initiation Systems
- Dr G Pradeep, G Budi, M Ramulu, CIMFR, V M S R Murthy, IIT (ISM) and P B Choudhury, CIMFR, Effect of Rock Properties on Blast Induced Ground Vibration
- Dr G Gopinath, Dr R Balachander and Dr H S Venkatesh, National Institute of Rock Mechanics, Impact of Ground Vibrations due to Blasting in Adjacent Mines on an Ancient Temple
- Dr M Ramulu, Dr P B Choudhury, Dr G Pradeep and Dr P K Singh, CSIR-CIMFR, Electronic Delay Initiation System: Need of the Hour for Blasting Safety and Productivity in Opencast Mines

Technical Session VIII

COAL AND MINERAL BENEFICIATION AND VALUE ADDITION



Chairpersons:

Shri NC Jha, Past President, MGMI & Former Chairman, CIL Shri MK Singh, GM / TS to Chairman, CIL

- Dr US Chattopadhyay, Dr Thonangi Gouri Charan, Dr KMK Sinha, Dr Pradeep Kumar Singh and Dr Amalendu Sinha, CSIR-CIMFR, Washability Characteristics Low Volatile Coking Coals of Eastern and Western Jharia Coalfields
- Prof Sumantra Bhattacharya, IIT (ISM), Performance Measures of Coal Cleaning Operations: Probable Error in Separation and Organic Efficiency – Is There A Dichotomy?

- Shri Munipala Manohar and Dr NC Karmakar, IIT (BHU), Bottom Ash Mixed With Plastic Waste as Stowing Material in Underground Coal Mines : A Feasibility Study
- Shri Shantanu Banerjee and Shri Gurudas Mustafi, HAZEMAG Group, Today's Crushing Solution to Indian Coal Industry

Presentation on Mineral Policies by Dr R N Praharaj, Director, Odisha Mining Corporation Limited

Technical Session IX

OIL AND GAS : TECHNOLOGICAL ADVANCEMENTS

requirement.



Chairpersons:

Shri Peeyush Kumar, Director (Technical), Ministry of Coal, Govt. of India Shri T K Mukherjee, MD, Essel Mining & Industries Limited

- Shri Raj Kumar Meena, Anubhav Verma and Rajiw Lochan, CMPDI, CBM Prospect and Development in CIL Command
 Areas
- The paper by Ravi Shankar Yadav and Rajiw Lochan on **Prospects of CMM Drainage in India and its Utilization** was presented by **Shri Anubhav Verma**
- Shri Shyamal Bhattacharya, Former Director, ONGC Videsh & Adjunct Professor, IIT (ISM), Technological Advancements
 Create New Opportunities in Oil & Gas Field Development
- K K Chandan and Prof G P Karmakar, IIT Kharagpur, Rheological Properties of Bentonite-Based Drilling Fluids
- Dr Ajay Kumar Singh, Dr Debadutta Mohanty and Dr Amalendu Sinha, CSIR-CIMFR, Recent Trends of Fugitive Methane Emission from Coal Mining and Handling Activities in India vis-à-vis the Role of Coal Mine Methane (CMM) Recovery in Long Term Mitigation Path Ways
- Dr Debadutta Mohanty, Dr Ajay Kumar Singh, Sujan Saha, Dr Rajendra Singh and Dr Amalendu Sinha, A Scoping Out
 Investigation on UCG : Indian Context

Company Presentation by Hexagon



12 THE MINING, GEOLOGICAL & METALLURGICAL INSTITUTE OF INDIA (MGMI)

A Highlights & Recommendations

Panel Discussions



Chairpersons:

Shri R P Ritolia, Past President, MGMI & Former CMD, CCL Dr Ajay Kr Singh, Former Scientist, CSIR - CIMFR

The following Panelists were on the dais -

- Shri N C Jha, Past President, MGMI & Former Chairman, CIL
- Shri P R Mandal, Former Advisor, Ministry of Coal, Govt. of India
- Shri D V Pichamuthu, Director, FIMI
- Prof Sumantra Bhattacharya, IIT (ISM)
- Shri J P Goenka, Vice President, MGMI & MD, NMC
- Dr Asesh Lahiri, Forest Expert (Retd.), FAO, UN





In his opening remarks, **Shri R P Ritolia** said mining, though damaging, needs to be undertaken in ecofriendly way. Also the activities in user industries, like thermal power, needed to be eco-friendly. He then called upon panelists to speak on topics specified.

Shri N C Jha spoke on what the coal industry would be like 20 years down the line. He said though demand of coal is now on the rise, it would gradually decrease with more production

of renewable energy. However, renewable energy could not cater to round the clock need of the country. So demand of coal in energy scenario would continue. He also said green is the process to minimize the mining nuisance by optimizing maximum production with minimum GHG with restoration of original land configuration and afforestation.



Shri D V Pichamuthu talked on why the question of green mining is not raised in metal mining. He apprehended that mining in non-coal sector might not continue at all. The mining policies and laws, including taxation policy, are back-breaking and taxes added up to almost 60% at present. Most of the minor minerals were being imported.



Shri P R Mandal was asked to comment on how the left over coal would be used. According

to him, coal and iron ores left over in mined-out areas would remain as such. He could not foresee any technology to mine these resources. Also he did not foresee much development of underground mines in our country because of geological complexities, like frequent occurrence of faults. CBM and UCG are some probable alternatives, though he was not very sure of their bright future. He told carbon fibers were produced from coal as an alternate use in the USA.



To the question whether all coals should be washed, **Prof Sumantra Bhattacharya** replied that there could not be green mining without washing the coal. There should be comprehensive cleaning, frozen cleaning of thermal coal. In India 2.3 tons of water is used for cleaning of 1 ton of coal, while in South Africa, 0.25 tons of water is used. Water conservation is also a part of green mining. He also suggested processing of overburden.



Shri J P Goenka spoke on the present status of underground mining in the country. In CIL command areas, 7% of mining is underground, mostly by BCCL, ECL. In SCCL area, 13% mining is underground. He did not feel that underground mining would increase in near future.

In the **Open Forum**, **Prof S P Banerjee** opined that coal being the best source for power, its mining might continue for long, provided environmental issues are addressed. **Shri A K Chatterjee**, asked to comment on continued use of oil and gas in India, pleaded to avoid wastage and to expand exploration activities by encouraging private investment. According to him, in other countries exploration is not a job of the Government. **Dr B C Sarkar**, a member of National Mineral Exploration Trust (NMET), pointed out that fund for mineral exploration had been recently enhanced by 18%. **Shri Bhim Ray** from MECL said exploration for strategic minerals had been planned and taken up. **Shri R K Saha**, **Shri U Kumar** and **Shri T K Nag**, Advisor (Mining), WBPDCL interacted on this issue.

Valedictory Session

The concluding session of the 8th AMC commenced with the following guests and office-bearers on the dais.

- Shri S N Meshram, Director General, GSI, Chief Guest
- Shri Aboobacker Siddique, IAS, Secretary cum Commissioner (Mines & Geology), Govt. of Jharkhand, Guest of Honour
- Shri P K Sinha, Vice-President, MGMI & CMD, NCL
- Shri R K Saha, Chairman, Conference (8AMC) and Past President, MGMI & Former CMD, CCL
- Dr Amalendu Sinha, Chairman, Technical Committee & Former Director, CIMFR
- Shri Peeyush Kumar, Director (Technical), Ministry of Coal, Govt. of India
- Shri I P Wadhwa, Director, Tafcon Projects India Pvt Ltd
- Shri Prasanta Roy, Convenor, 8th Asian Mining Congress
- Shri Rajiw Lochan, Hony Secretary, MGMI & Principal Coordinator, 8AMC



Shri R K Saha welcomed the guests in the session and thanked the participants for taking active interest at the Congress. He said 53 technical papers were presented which would help in formulation of some guidelines for green mining. He especially thanked the foreign delegates.

Dr Amalendu Sinha briefed about the Congress, admitting that full justice could not be done to the speakers due to shortage of time and sought apology for the same. He thanked all

speakers, especially the 13 keynote and special invitee speakers. He presented in short the main points of recommendations that emerged from the 3 days of deliberations and interactions concerning creation of forests, mineral development strategy, 3D exploration, use of artificial intelligence, CO2 sequestration, slope stability studies, more underground mining, coal gasification, CBM and CMM.





Shri IP Wadhwa talked about the IME 2019 being held at Eco Park, Rajarhat, Kolkata, concurrently with the 8th AMC. He said there had been a very good and encouraging response from the participants. He said that 7 countries had participated in IME 2019. There were 167 foreign delegates, 25 from Australia alone.

Shri Peeyush Kumar spoke about guidelines on utilization of coal. He wished that the deliberations in the Congress would benefit the mining industry and society.



Shri P K Sinha expressed hope that important and fruitful recommendations would come out from the Congress.

Shri Aboobacker Siddique thanked MGMI for inviting him at the 8th AMC. He also expected that the deliberations have contributed a lot. He liked the IME and felt it would help the investors. He said Jharkhand is the centre of mining in India that contributed 40% of Indian

minerals. He presented a short account of minerals of Jharkhand and invited investors to the state.





Mineral Development Corporation (NMDC), made a presentation on his company's achievements. NMDC is the largest iron ore producer in India, 10th in the world. It is also involved in the exploitation of a wide range of minerals.

On 07/11/2019 after Technical Session – VII, Dr R N Praharaj, Director, Odisha Mining

Corporation Limited, made a presentation on his company, which was the fastest growing company in metal sector. The major minerals mined by OMC were chrome, bauxite, iron and manganese ore which catered to the requirement of mineral based industries such as steel, sponge iron, pig iron, ferro-manganese, ferrochrome, etc. both in India as well as overseas.

On 08/11/2019 at the end of Technical Session – IX, Shri A K Chatterjee, from the USA delivered a short talk on global oil industry – pipelines to take oil to market.

> On 08/11/2019 after the Plenary Session - I before lunch - Mr Marc Barmettler from Hexagon Mining, a global company. He talked on the products and capabilities of the company, highlighting the customers and some important mining solutions like monitoring of slopes etc.

On 08/11/2019 at the beginning of Panel Discussions, Dr Asesh Lahiri, made a presentation on Sustainable Mining. He talked on development and maintenance of forests in mining areas, maintenance of ecology and afforestation. He mentioned the afforestation drive by CIL in which 3700 sq km of forests were restored.

A cultural programme was organized in the evening of 7th November 2019. A dance troupe Sangeetam Dance Troupe entertained the guests, delegates and participants at the 8th AMC with their performance.

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The session and the 8th Asian Mining Congress came to an end with Vote of Thanks by the Convenor, Shri Prasanta Roy.

Company / Miscellaneous Presentations

The following presentations were made in the different sessions of the Congress.

increasing public awareness, mining and associated steps needed to be green.

On 07/11/2019 before Technical Session – I, Shri Debashis Raut, Director, IGC, Geological Survey of India made a brief presentation on the ensuing 36th International Geological Congress. India, with the scientific support of Bangladesh, Nepal, Pakistan and Sri Lanka. It is scheduled to be held in Delhi during 2-8 March 2020 at the India Expo Centre & Mart, Greater Noida.

On 07/11/2019 after Technical Session – I, Shri Amitava Mukherji, Director, Finance, National













ighlights & Recommendations

Recommendations

The **8th Asian Mining Congress**, organized by the **Mining Geological and Metallurgical Institute of India (MGMI)** with the theme **"Green Mining – The Way Forward"**, was held from **6th- 8th November**, **2019** in **Kolkata**. Based on the comments of Chairmen, Co-Chairmen and presentations by the authors and deliberations during different sessions, the Technical Committee constituted for the Congress framed the following recommendations:

Green Mining and Sustainability

- With the increasing concern for environmental degradation, it is felt that the mining industry must accelerate its progress towards "Green Mining". Sustainability principles are applicable in all stages of mine life cycle –exploration, mine planning, construction, mineral extraction, mine closure and post-closure reclamation and rehabilitation. Regulations and Guidelines framed by the government as well as self-regulation and ethical conduct on the part of mining enterprises are most crucial for the achievement of sustainable mineral development.
- Sustainable development framework and Star Rating Scheme, as developed by the Indian Bureau of Mines, are novel steps
 toward sustainability of mineral industry. Detailed awareness and implementation programmes in this direction are very
 much required for transformation of the image of mining industry.
- Efforts need to be made to integrate Climate Change issues as part of the business model of mineral industries. For better alignment of Corporate Social Responsibility (CSR) projects towards United Nations' (UN) Sustainable Development Goals (SDGs) of 2030, it is essential to enhance awareness about these goals amongst CSR managers and top management.
- Geospatial tools such as Remote Sensing, GIS, GPS, Digital Photogrammetry, etc., have proved very useful for spatial data integration, analysis, modeling and map production for monitoring and impact assessment of any mining operation.

Investments and Policies

- Zero waste Mining (conservation and mineral development) and sustainable development in mining sector, as envisioned in the National Mineral Policy 2019, must be adhered to. Moreover, formation of District Mineral Foundation (DMF) has to be geared up as it will facilitate inclusive and equitable development of project affected persons and areas as per the provisions of the Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY).
- There needs to be instantaneous visibility of Smart Mining on production, quality, cycle times, machine status, and other variables in order to achieve optimum operations by adopting intelligent enterprise with Industry 4.0 concept.
- A uniform procedure for Minor Mineral Concession Rules should be formulated by the Central Government to be followed by all the State Governments to help the entrepreneurs carry out business in different States without hassles and confusion.
- Seamless transition from Reconnaissance Permit to Prospecting License to Mining Lease should be ensured to attract investors. Delay in processing mineral concession applications both at the State and Central levels should be minimized.
- Separate policies should be evolved urgently for exploration and mining of minerals of economic and strategic importance like Gold, Platinum group of minerals, Nickel, Lithium, Cobalt, rare earth elements etc.
- The outsourcing processes need to be reviewed to attract large established Mine Developer and Operators (MDOs) in the mining sector so that the mining industry can adopt the best practices available worldwide.

Exploration Technology

- Joint use of 3D geophysical inversion and 3D geological models should be employed for locating potential mineral deposits, with special reference to concealed and buried deposits at greater depths.
- Use of Geostatistics, Big Data, Artificial Intelligence and Machine Learning with special emphasis on Deep Learning is the need of hour for Smart Exploration. These need to be emphasized for thorough understanding of various 'Minerals Systems'.
- Recent discoveries in hydrocarbons sector in diverse geological settings, tough and inaccessible terrains together with
 advancements in exploration technology have added new dimensions in hydrocarbons exploration. Concepts of Geostatistics,
 Big Data, Artificial Intelligence and Machine Learning need to be emphasized for understanding of various 'Petroleum
 Systems'.
- Shale horizons of Barren Measures and Barakar Formation occurring below the upper Permian in Raniganj coalfield at depths greater than 700m are recommended for further investigation for possible CO₂ sequestration owing to sufficient hydrostatic pressure and high Total Organic Carbon (TOC). Pilot scale project(s) on CCS in this regard is recommended with special reference to Raniganj and Jharia coalfields.

Planning and Design of Mines

• Unmanned aerial vehicle (UAV) sensors, which are now in pilot scale, can prove useful in future for mine surveying and mapping.

- Systematic pit and dump slope stability studies, using state-of-the-art instruments and techniques, should be made mandatory for medium to large opencast mines to enhance safety.
- Underground coal mining needs large-scale mechanization to increase production and productivity. Continuous miner (CM) based mechanization can revive underground coal mining to certain extent.
- For extraction of coal reserves from greater depth, more R&D is required to address various issues related to design, operation and safety.
- Longwall technology should be customized with innovative layout to address pillar stability at greater depths and in greenfield areas.

Safety and Surveillance

- All machines in opencast mines must be tested for whole-body vibration exposure of operators so that prescribed limits
 as per the ISO standards are not exceeded. Further, machine parameters and occupation factors should be explored through
 ergonomic process of assessment to reduce the vibration exposure within safe limits.
- Trial of Web based real-time environmental monitoring for UG coal mines using wireless sensors (Wi-Fi system) can prove to be useful in future.
- Underground mining at deeper horizons require suitable R&D studies in the areas of air cooling systems, installation of booster fans and also changing of exhaust system to forcing system of ventilation to control excessive methane emission from goaf area. Mass production from underground mines would necessarily require greater thrust on effective ventilation.

Blasting and Rock Fragmentation

- Green blasting technologies like (a) Non detonating explosives, (b) Rock breakage using liquid CO₂ (c) Rock breakage using penetrating cone fracture and (d) Plasma blasting should be increasingly used in mines wherever applicable.
- It is required to develop model for prediction of peak particle velocity of ground vibration based on static and dynamic properties of rock mass for safe blasting at critical and sensitive structures.
- Keeping in view the superiority of Electronic Detonators over Pyrotechnic Detonators, Indian mines should switch over to the former as far as possible for not only to address safety issues but also to improve productivity.

Coal and Mineral Processing and Value Addition

- Judicious end-use of low volatile coking coal across the coalfields should be promoted and put into rigorous practice by
 three-product cleaning. End-products would be clean coal for iron & steel industry, middling as power plant coal and finally
 rejects as feedstock to fluidized bed combustors in stand- alone mode or in co-firing mode with bio-mass. The Government
 should formulate a policy in this direction and direct coking coal producers to implement this policy in a defined timeframe.
- The option of utilizing coal ash in opencast mines can produce a quantum jump for enhancing its bulk utilization from meagre 5.85% by the mining sector. Also, the scope of use of bottom ash-plastic mixture as stowing material in underground coal mines should be further explored.
- Backfilling with mass production technology in non-coal mines using mill tailing pastes with fly ash should undergo
 extensive trials in mines.
- R&D and field trials should be undertaken to extract various value-added products from fly ash such as alumina (for metallurgical application and of chemical grade), impure quartz (for glass applications), calcium silicate (for insulating boards, fire retardants and chemicals) and iron hydroxide (for red oxide and pigment) and rare earth elements.

Oil and Gas

- Field trials of Underground Coal Gasification (UCG) should be undertaken as one of the top priority areas to tap energy
 from un-mineable or difficult to mine coal seams. As it is not an economically established technology and has not been
 tried in India it is recommended to take up this technology in a virgin mining area and establish both its technical and
 economic viability.
- Extraction and utilization of Coalbed Methane (CBM), Coal Mine Methane (CMM), Abandoned Mine Methane (AMM) and Ventilation Air Methane (VAM) should be taken up in suitable economically viable areas in order to harness energy from this relatively clean energy resource and also to mitigate methane emission into the atmosphere.
- In the areas of oil and natural gas most profound technical developments have been in the field of reservoir imaging (3D seismic) drilling and completions, including horizontal drilling, multi laterals and hydraulic fracturing and enhanced oil recovery techniques. These technologies need to be increasingly adopted by the coal mining industry specially in the areas of UCG, CBM, CMM etc.
- In oil sector, for arresting production decline in mature fields induction of new technologies with bold investment decisions are required.

International Mining Exhibition (IME 2019)

SUPPORTED BY



Ministry of Mines Ministry of Steel Ministry of Power Ministry of Petroleum & Natural Gas Ministry of Micro, Small & Medium Enterprises Department of Heavy Industry Government of India

coal India Limited (A Maharatna Company)





The recently concluded Eighth edition of IME, "International Mining, Equipment, Mineral & Metals Exhibition" (concurrent with 8th Asian Mining Congress), organized by TAFCON along with MGMI, during November 6-9, 2019, was a grand success, as informed by VVIPs, Delegates, Exhibitors and Visitors.

IME 2019 – A Business Breakthrough Exhibition – aims to upgrade the future of mining and allied industries in India. This institutionalized event has been envisaged as a catalyst for the development of Mining, Mineral, Metal and allied sectors in India. This prestigious biennial international event of the sector is one of the largest shows of its kind in this part of the world. It is an ideal platform for the global Mining, Mineral and Metal Producers, Decision makers, Bureaucrats, Investors, Industry leaders and other key stakeholders of the industry to congregate, display products, exchange technologies, new initiatives negotiate for mutual business development and forge meaningful partnerships.

The event was inaugurated by Hon'ble Shri Pralhad Joshi, Union Minister of Coal, Mines & Parliamentary Affairs, Government of India on November 6, 2019. Other eminent dignitaries present on the occasion were, HE Shri Milan Hovorka, Ambassador of Czech Republic to India; HE Shri Andrew Ford, Consul – General, Australia Consulate – General Kolkata; Hon'ble Shri Anil Kumar Jha, Chairman Managing Director, Coal India Ltd & President, MGMI; Hon'ble Shri Sanjiv Chopra, IAS, Chairman, Odisha Mining Corporation; Shri Rajiw Lochan, Honorary Secretary, MGMI; Shri J P Goenka, Shri V K Arora, Co- Convenors and Shri I P Wadhwa, Managing Worker, Tafcon.

High level Trade Delegations and Country Level Group Participation from Australia, China, Czech Republic, Poland, Russia, South Africa, UK, USA and many other countries were a part of this important event. The Exhibition was participated by more than 225 exhibitors from Mining, Equipment, Mineral, Metals and other allied sectors for displaying their equipment, products, technologies, innovative applications and research & development along with large participation from mineral rich states of India such as Chhattisgarh, Jharkhand, Odisha, Rajasthan and West Bengal.

Concurrently, "Buyer Seller Meet" was organized on the second day the event, which witnessed presentations from key stakeholders such as, Coal India, NMDC, Essel Mining, etc. It received an enthusiastic response from India and overseas.

On the third day of the event, Exhibitors Award Function was also organized, wherein Dr Aboobacker Siqqique P. (IAS), Secretary cum Commissioner, Directorate of Mines, Government of Jharkhand; Shri Upendra Kumar, Former President, MGMI & Advisor (Coal), Essel Mining & Industries Ltd.; Shri Peeyush Kumar, Director (Technical), Ministry of Coal, Government of India and Shri I P Wadhwa, Managing Worker, Tafcon, presented awards to Exhibitors in different categories like International Pavilions, Machinery Display, Innovative Stall Design and Presentation, Large Participation and Outdoor Machinery Display, etc.



Previous Asian Mining Congresses (AMC) & International Mining Exhibitions (IME)

The **1st AMC** was organized in **2006** as the culminating function of year-long eventful centenary programmes. It was inaugurated on **16th January 2006**, the **101st foundation day** of **MGMI**. Concurrently, **IME 2006** was also arranged. Since then, the subsequent AMCs and IMEs are being held biennially. The salient features of the AMCs are listed below.

1st Asian Mining Congress & IME 2006

Theme	:	Asian Mining – Towards a New Resurgence
Dates	:	16th - 18th January 2006
Venue of AMC	:	Hotel The Oberoi Grand, Kolkata
Venue of IME	:	Netaji Indoor Stadium, Kolkata

Inaugurated by

Dr. Desari Narayan Rao, Hon'ble Minister of Coal & Mines, Govt of India, Chief Guest

Papers presented - 84

Foreign Participation from – China, Iran, Mongolia, Nepal, Oman, Pakistan, Russia, Thailand, Turkey, Australia, Germany, South Africa, Sweden, UK, USA

2nd Asian Mining Congress & IME 2008

Theme	:	Mineral Resources in Asian Countries: Innovative Solutions for Exploitation
Dates	:	16th - 19th January 2008
Venue of AMC	:	Hotel The Oberoi Grand, Kolkata
Venue of IME	:	Netaji Indoor Stadium, Kolkata

Inaugurated by

Shri H. C. Gupta, Secretary, Ministry of Coal, Govt of India, Chief Guest

Papers presented - 73

Foreign Participation from – China (partner country), USA (focus country), Australia, Belarus, Canada, Germany, Iran, Japan, Poland, Russia, Sweden, UK

3rd Asian Mining Congress & IME 2010

Theme	:	Resurgence of Mining in Asia: Prospects & Challenges
Dates	:	22nd - 25th January 2010
Venue of AMC	:	Hotel Taj Bengal, Kolkata
Venue of IME	:	Netaii Indoor Stadium, Kolkata

Inaugurated by

Mr. Sriprakash Jaiswal, Hon'ble Minister of State for Coal and Statistics & Programme Implementation, Govt of India, Chief Guest Papers presented – 73

Foreign Participation from – China, Iran, Pakistan, Russia, Australia, Germany, Netherlands, Poland, Switzerland, UK, USA

4th Asian Mining Congress & IME 2012

:	Sustainable Mining in Asia - Challenges and Opportunities
:	29th – 31st January 2012
:	Hotel Hyatt Regency, Kolkata
:	Salt Lake Stadium, Kolkata
	: : :

Inaugurated by

Mr. NC Jha, Chairman, Coal India Ltd, Chief Guest

Papers presented - 50

Foreign Participation from – USA (partner country), Australia (focus country), Austria, Belarus, Belgium, Canada, China, Czeck Republic, Denmark, France, Germany, Indonesia, Iran, Itali, Japan, Norway, Poland, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, Ukraine, UAE, UK

The 5th Asian Mining Congress & IME 2014

Theme	:	Scenario of Mining in Asia and Investment
		Opportunities

- : 13th 16th February 2014
- Venue of AMC : Hotel Hyatt Regency, Kolkata Venue of IME : Salt Lake Stadium, Kolkata

Inaugurated by

Dates

Mr. Shriprakash Jaiswal, Hon'ble Minister of Coal, Govt of India, Chief Guest

Guests of Honour

Ms. Katarzyna Kacperczyk, Hon'ble Dy. Min., Foreign Affairs, Republic of Poland

Dr. Jerzy Witold Pietrewicz, Hon'ble Dy. Min. of Economy, Republic of Poland

Prof Piotr Klodkowski, His Excellency Ambassador, Republic of Poland

Dr. A.K. Dubey, IAS, Addl. Secretary, Ministry of Coal, GOI

Mr. S. Narsing Rao, IAS, Chairman, Coal India Limited

Papers presented - 53

Foreign Participation from – Poland (partner country), Czeck Republic (focus country), China, Germany, USA, Iran, Australia, Egypt, Ethiopia, Singapore, Ukraine

The 6th Asian Mining Congress & IME 2016

Theme	:	Resurgence of Mineral Industry in Asia
Dates	:	23rd – 27th February 2016
Venue of AMC	:	Hotel Hyatt Regency, Kolkata
Venue of IME	:	Eco Park, Rajarhat, Kolkata

Inaugurated by

Mr. Anil Swarup, IAS, Secretary, Ministry of Coal, Govt of India, Chief Guest

Guests of Honour

Mr. Sutirtha Bhattacharya, Chairman, Coal India Limited **Mr. Radoslaw Domagalski Labedzki**, Hon'ble Deputy Minister of Development, Republic of Poland

Mr. Tim Martin, Trade Commissioner, Australian High Commission Papers presented – 66

Foreign Participation from – Australia, Belarus, Belgium, China, Czeck Republic, Finland, Germany, Indonesia, Iran, Israel, Italy, Japan, Poland, Russia, South Africa, Spain, Sweden, Switzerland, USA, United Kingdom.

7th Asian Mining Congress & IME 2017

Theme	:	International Cooperation in Innovative Technology for Growth of Mineral Industry
Date	:	8th to 10th November, 2017
Venue of AMC	:	The Hotel, Westin Kolkata Rajarhat
Venue of IME	:	Eco Park, Rajarhat, Kolkata

Inaugurated by

Mr. Susheel Kumar, IAS, Secretary, Ministry of Coal, Govt. of India, Chief Guest

Guests of Honour

HE Milan Hovorka, Ambassador, Embassy of Czech Republic

Mr Gopal Singh, Chairman, Coal India Ltd

Papers presented – 55

Foreign Participation from – Australia, China, Czeck Republic, Germany, Iran, Japan, USA.



Organiging Committee

Principal Coordinators

Shri Anil Kumar Jha

President, MGMI & Chairman, Coal India Limited

Shri Rajiw Lochan

Honorary Secretary, MGMI & General Manager (CBM), CMPDI

Organising Committee

Chairman, Conference

Shri R K Saha

Past President, MGMI & Former CMD, CCL

Co-Chairman, Conference

Shri Binay Dayal

Director (Technical), CIL **Chairman, Technical Committee**

Dr Amalendu Sinha

Former Director, CSIR-CIMFR

Convenor, Conference

Shri Prasanta Roy

Sr. Manager (Geol/CV), CIL

Co-Convenor, Conference

Shri Ranajit Talapatra Sr. Manager (CP), CIL

Shri Anil Kumar Karmakar

Former GM (Administration), CIL

Advisors

Shri N C Jha Past President, MGMI & Former Chairman, CIL

> **Shri LK Bose** Former Executive Director, CIL

Dr N K Nanda Past President, MGMI & Director (Technical), NMDC

Members, Technical Committee

Shri Smarajit Chakrabarti Former CMD, ECL

Shri Subrata Chakravarty

Former CMD, ECL

Prof Ashis Bhattacharjee

Professor, IIT Kharagpur

Dr Anupendu Gupta Former DDG, GSI

Prof Bhabesh Chandra Sarkar

Professor, IIT-ISM, Dhanbad

Shri Ranjit Datta

Former Director, GSI

Prof Subir Mukhopadhyay Former Professor, IIT Kharagpur

Dr Ajay Kr Singh

Former Scientist, CSIR-CIMFR

A Highlights & Recommendations

Speakers at Congress Sessions

















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Address for Communication :

8 Congress & exhibition



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