



9th Asian Mining CONGRESS & EXHIBITION

April 04-07, 2022 • Kolkata, India

BISWA BANGLA CONVENTION CENTRE
ECO Park, New Town, Kolkata (W.B), India

**HIGHLIGHTS
&
RECOMMENDATIONS**

Technological Advancements in Mining Industry: Status and Challenges



Organised by :



THE MINING, GEOLOGICAL & METALLURGICAL INSTITUTE OF INDIA (MGMI)
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Snapshots of 9th AMC & IME 2022





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: **Technological Advancements in Mining Industry: Status and Challenges**.

Highlights

The **9th Asian Mining Congress (9th AMC)** organized by the **Mining, Geological and Metallurgical Institute of India (MGMI)** at the **Biswa Bangla Convention Centre, New Town, Kolkata** on **4th and 5th April 2022** was the latest milestone in a series of biennial events of **Asian Mining Congress (AMC) and International Mining Exhibition (IME) since 2006**. Central theme of the Congress was **"Technological Advances in Mining Industry: Status and Challenges"**. The Congress witnessed a participation of nearly 400 registered delegates including executives, practising engineers, planners, policymakers, equipment manufacturers, regulators, scientists, researchers and other professionals from various organizations from India and abroad, who shared expertise and broad experience, through lively and dynamic presentations and discussions. To encourage students' participation in the congress, students were supported to attend through subsidized registration costs. In spite of being organized at the Asia level, it owes to its credit keynote lectures from Norway and the United States of America. The congress created a lot of excitement in the research fraternity, which was reflected in the form of over **75 abstracts** and **50 full-length research papers** received from all over the world. During the two-day conference, there were **8 sessions** and **52 papers** were presented. The event was supported by funding from:

Coal India Limited (CIL) • Steel Authority of India Limited (SAIL) • Bharat Earth Movers Limited (BEM) • Oil and Natural Gas Corporation Limited (ONGC) • Singareni Collieries Company Limited (SCCL) • NTPC Limited (NTPC) • NMDC Limited.

The congress took place over two days and featured the inaugural session and two plenary sessions on 4th April 2022 and 6 technical sessions, a panel discussion and the valedictory session on 5th April 2022. It also included networking coffee spaces. This congress was designed to provoke as much debate as possible and to obtain as many critical and constructive views from stakeholders. Each Plenary and Technical session consisted of a Session Chair, a Rapporteur and a few speakers. The papers presented by the speakers were made available ahead of the congress.



Inaugural Session



The Hon'ble Chief Guest **Dr. Anil Kumar Jain**, IAS, Secretary, Ministry of Coal, Government of India inaugurated the congress on 4th April 2022 at 10:00 AM. In his address, Dr. Jain raised many important issues being faced by the mining industry. He emphasized on better quality of minerals being produced and highlighted the emerging market of rating companies that assess environmental, social, and governance (ESG) risks and opportunities of investments globally.



The President MGMI, **Shri P. M. Prasad**, CMD, CCL, Ranchi in his welcome address dealt with the need for organizing the congress.

The theme of the 9th IME was introduced by **Shri Bhola Singh**, Chairman, 9th IME and CMD, NCL.



It was followed by the address of the Guest of Honour **Shri M. Nagaraju**, IAS, Additional Secretary, Ministry of Coal, Government of India.

Shri Pramod Agarwal, IAS, Guest of Honour and Chairman, Coal India Limited addressed the gathering of experts from the Industry, R&D Institutions and Academia.



The Souvenir and Abstract of the congress were released by the dignitaries and a vote of thanks was proposed by **Shri Ranajit Talapatra**, Honorary Secretary, MGMI. Luminaries and young professionals from the world of mining industries, research institutions, academics and business graced the event.



Plenary Session



Plenary Session – I

Session Chair : **Shri N. C. Jha**, Past President MGMI

Five keynote lectures were delivered in Plenary Session



The first keynote lecture was delivered by **Prof S. P. Banerjee**, Former Director In-charge, Indian School of Mines (ISM), Dhanbad, India. Prof. Banerjee Spoke on the availability of minerals needed for a green energy transition in the world and the Indian context. The demand and availability of selected critical metals for green energy transition, both from the world and Indian context were discussed.



Padmshri Dr. Rabi Narayan Bastia, presented the incredible journey of seismic from petroleum to coal and to minerals. He summarized that now, since, the exploration for coal and mineral deposits is moving to greater depths, the application of seismic tools and techniques have to be used for deep and expensive exploration and borehole drilling.



A keynote lecture on the processing of bauxite residue for the recovery of metal values was given by **Prof. Siddhasatwa Basu**, Director, CSIR-IIMT, Bhubaneswar and CSIR-CIMFR, Dhanbad. The R&D efforts of CSIR-IMMT, Bhubaneswar on the processing and utilization of bauxite residue were deliberated.



Mr. Roopwant Singh, IAS, MD, GMDC, Gujarat highlighted the present activities of GMDC and discussed about upcoming lignite blocks, opportunities for capital partners for limestone and Silica sand, exploration agencies to unearth the vast multi-metal and REEs, EPC contractors for value addition and processing and lignite beneficiation, technology partners, O&M operators for their thermal Power plants and customers for our vast Bauxite, Bentonite and Silica Sand reserves.



Dr. N. K. Nanda, Past President of MGMI, made a presentation on start-ups in the mineral and mining ecosystem in India. It was summarized that start-ups in the mining and mineral sectors can be the growth engine for the sector. Adoption of new technology, digitalisation of the mining process and outsourcing non-core activities to start-ups in large mines improve productivity and enhance the viability of new projects to meet the future mineral demand of the country.



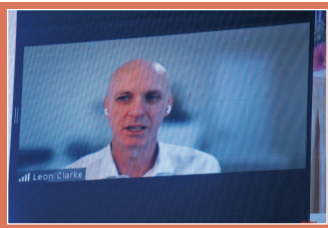
Plenary Session – II

Session Chairs : **Dr. Amalendu Sinha**

Former Director, CSIR-CIMFR and

Shri M. K. Singh

Executive Director (Coordination), Coal India Limited



Dr. Leon Clarke, Director of Decarbonization Pathways at the Bezos Earth Fund, USA threw some light on key characteristics of net zero energy systems in his keynote lecture and **Dr. Sukanta Roy**, Advisor, Ministry of Earth Sciences, Government of India presented the challenges, results and perspectives geophysical exploration of the Koyana (India) intraplate seismogenic zone through scientific deep drilling to 3 km depth. The last keynote lecture on tunnels, caverns and slopes in discontinua – a critical assessment of continuum analyses, GSI, Hoek-Brown and Mohr-Coulomb,



with a focus on discontinuum analyses and geology was of **Dr. Nick Barton**, Norway, who summarized that joint and rock mass characterization for discontinuum models are needed if we are to return closer to reality.



Report on Capacity Assessment Seminar



- During the meeting on the directions of the Hon'ble Prime Minister, chaired by the Secretary (Coal) on 27th September 2021, Coal India Limited (CIL) has been advised to organise a seminar on Capacity Assessment inviting all coal companies, CMPDI, and private sector for stakeholder consultations.
- Subsequently, the Ministry of Coal, vide file no. A-60/12/2021-ESTABLISHMENT dated 2nd November 2021 requested CMD, CIL to organise this Seminar during the 9th International Mining Exhibition (IME), organised by the Mining Geological and Metallurgical Institute of India (MGMI).
- Accordingly, CIL, in collaboration with MGMI, organised this event to assess stakeholders' capacity and preparedness required to meet the future coal demand, on 4th April 2022 from 3:00 PM at Biswa Bangla Convention Centre, Kolkata, by dedicating an entire session during the 9th Asian Mining Congress.
- The seminar was chaired by Shri M. Nagaraju, Additional Secretary to the Govt. of India, Ministry of Coal, and graced by Shri Anil Kumar Jain, Secretary, Govt. of India, Ministry of Coal – the Chief Guest of the seminar, in the august presence of Shri Pramod Agarwal, Chairman, CIL, Shri B. Veera Reddy, Director (Technical), CIL, Shri P.M. Prasad, Chairman-cum-Managing Director, CCL/President, MGMI and other dignitaries from reputed organizations. The seminar was coordinated by Shri Achyut Ghatak, GM (Corporate Planning), CIL.
- Altogether eight senior officials from pan-Indian reputed organizations expressed their valuable views and shared innovative ideas to enhance overall preparedness, with the objective of catering to the requirements of achieving a 1 BT coal production target, with special emphasis on wherewithal, equipment and roadmap to 1.5 BT production for the country as a whole.
- The enriching ideas also threw light on the wide gamut of elements of capacity, that definition-wise is the comprehensive ability of assets & resources to perform and enhancement of which leads to larger output, better economics and greater shock absorbing ability.
- The details of presenting organizations and the dignitaries are as follows: -
 - o NCL : Shri Bhola Singh, CMD
 - o CMPDI : Shri R.N. Jha, Director (RD&T)
 - o DVC : Shri Ram Naresh Singh, Chairman
 - o SCCL : Shri S. Chandrashekhar, Director (O)
 - o BEML : Shri M. V. Rajshekhar, Director (Mining & Construction)
 - o NLC : Shri Suresh Chandra Suman, ED (Mining)
 - o SAIL : Shri Bijendra Pratap Singh, ED (Works), DSP
 - o GMMCO : Shri Anuj Keolia, Vice President
- NCL expressed that coal shall continue to remain the primary player in the energy mix of the country in coming years due to major drivers like Make in India, 24X7 power for all, the Rise of e-mobility, rural electrification & sustained economic growth. With large capacity equipment (Draglines, Shovels & Dumper), efficient dispatch (through MGR, CHPs and Silos) and evacuation (mostly through MGR & Rail mode), NCL contributes a significant share of the overall production of CIL, with consistent growth. Well-planned mechanization, standardization and capacity building with matching geo-mining condition has enabled NCL to achieve planned coal targets, improvement in production, productivity & safety,





better environment management, flexibility in the production system for quick response to the dynamic market scenario, and further strengthened the foundation for future plans towards optimum extraction of coal resources.

- CMPDI projected Skill Development of human resources as a necessary tool for achieving 1 BT production by 2024-25, by enhancing human resource capabilities in the overall management of a project, contracts, supply chains, operations and statutory clearances & compliances, through reskilling & upscaling of human resources. For smooth implementation of skill development, a structured approach was proposed in the form of a Talent Management Policy, which harnesses the leadership abilities of potential executives & readiness to assume critical responsibilities. Towards capacity enhancement, need-based training of existing & newly recruited executives is required with a focus on future thrust areas like IT application, enhanced production from UG mining, mass production technology, indigenization of technology, digitization & techno-managerial leadership improvement, so as to analyse, identify and redress likely impediments & constraints in enhancing coal production. CMPDI has taken up some reskilling/upskilling activities like training in the latest software, training of geologists in other areas, thrusts on diversification initiatives etc. IICM can be upgraded to spearhead a skill development initiative, by remodelling it into a dynamic centre of excellence. Skill development of both upper & lower levels of the workforce would lead to cope with the automation and mechanization being planned in mining operations and maintenance activities.
- In their pursuit towards capacity enhancement, DVC has taken up diversification in a large way into solar power and coal mining to fulfil the needs of its assets.
- BEML stressed more & more R&D activities as a successful tool for capacity enhancement, which has aptly delivered India's largest indigenous mining trucks - 150 Te and 205 Te payload carrier Electric Drive Dump Trucks. High capacity Rope shovels & backhoes, hydraulic excavators, walking draglines, dozers, tyre handlers etc. are being manufactured for the coal sector. The launching of 240 Te Electric Drive Dump Trucks is in pipeline. AI & IoT projects like Vehicle Health Monitoring Systems, AI-based predictive maintenance through data analytics & telematics, AI-based 360° surrounding view monitoring systems, Drivers Fatigue Monitoring Systems, Payload Monitoring Systems etc. are being introduced in equipment for better safety & health management and greater productivity improvement.
- SCCL showcased its pioneering initiatives in the implementation of ERP-SAP system, commissioning the largest capacity longwall project, production of thermal power & solar power and adopting sand processing plant using OB. With limited reserves amenable for OC mining, SCCL has converted several UG mines to OC for augmenting production. SCCL deploys Shovel Dumper combination, In-Pit crushing & conveying, Surface Miner in the OC mines and Longwalls, Continuous Miners and LHDs & SDLs in the UG mines. Future plans of SCCL towards capacity expansion include new mining projects within &



outside Telangana state, upcoming CHPs, new railway infrastructure construction and Diversification initiatives like existing Thermal power plant (installed capacity 2X600 MW), Solar power plants (300 MW by '22), Floating Solar power plants (250 MW by '22-'23), capacity expansion of explosive manufacturing plants and processed OB plants.

- NLCIL, the largest OC lignite mining CPSE in Asia and nodal agency for lignite mining in India, emphasized on strong in-house capabilities in its core business of diversified & integrated lignite mining, coal mining, power generation and power trading, leading to doubling of mining capacity & 50% increase in power generation capacity in last 3 years. As a part of Vision 2030, NLC has envisaged to enhance both its coal and lignite mining capacity and expansion of power generation capacity, both in thermal & renewables like solar & wind. In its constant endeavour towards capacity enhancement, NLC intends to foray into areas of potential business opportunities like allied areas in the power sector, EV charging infrastructure, application of AI, commercial coal mining, lignite blending and diversification initiatives like solar wafer manufacture, lignite to methanol, lignite to diesel, lignite to hydrogen and waste to wealth efforts like OB to sand & minor minerals.
- SAIL highlighted the fact that the dearth of indigenous coking coal has led to the major import of the same & resultant blending. In its bid to enhance its capacity to 50 Mty by 2029-30, the projected Prime coking coal requirement is also likely to be considerably higher to about 100 Mty. Accordingly, the projected import of high-quality low ash coking coal shall increase steeply. The option of blending with indigenous coal may also be thought of.
- To keep pace with the need of the industry and facilitate the coal sector to achieve a 1.5 BT aspirational target, GMMCO provided details of various manufacturing capacities and capacity expansion programs. It was remarked that currently GMMCO has a major export market and can look inwards if demand arises.
- The seminar was followed by an informative Q&A session & concluded with a vote of thanks to the Chair.
- The seminar was successful in that it brought out some extremely innovative thoughts & ideas for overall improvement in Capacity Assessment and Enhancement through R&D, better industry interface and more investments for 'Make in India' for achieving the aspirational target of 1.5 BT coal production nationwide, thereby contributing to the energy security of the nation and making the country 'Atmanirbhar' in the days to come.





Technical Session



Sessions I : Challenges in underground and opencast mining and rock excavation

Session Chairs : **Shri B. Veera Reddy**, Director (Technical) of Coal India Limited (CIL) and **Shri Manoj Kumar**, CMD, WCL, Nagpur

Co-ordinator : **Shri Chandra Shekar Singh**, DGM (M)/TS to D(T), Coal India Limited (CIL)

Prediction of heat stress in underground coal mines by multi-variate regression analysis (MVRA) and 3D simulation modelling authored by Siddhartha Roy, Hemant Agrawal, D.P. Mishra, Manoj Kumar, Chiranjeeb Patra and Rakesh Pradhan;

Long-term mining sequence optimization under uncertainty in open-pit mines using an effective metaheuristic-based framework authored by Kamyar Tolouei and Ehsan Moosavi;

Precautions against premature blasting during lightning and thunderstorm- suggestive guidelines authored by Pijush Pal Roy and Amalendu Sinha;

Numerical simulation and mathematical modelling based approach for predicting blast induced ground vibration for a greenfield mining project authored by Vivek K Himanshu, Ashish K Vishwakarma, R. S. Yadav, M. P. Roy and P. K. Singh;

Review of continuous highwall miner performance in Indian mines authored by Chandrani Prasad Verma, John Loui Porathur, Sheikh Amir Sajjad and Pijush Pal Roy;

Numerical modelling and monitoring of slope movements vis-à-vis development of trigger action response plan for opencast coal mines authored by S. Jayanthu, Pritiranjana Singh, Sridhar K and Gokul Satheesh;

Critical investigation of pit and dump slope stability in a specialized real-time situation authored by A. K. Verma and Piyush Rai;

Ground control study on bulking factor and caving angle for Indian coalfields authored by Ashok Kumar, Sahendra Ram, Arun Kumar Singh, Dheeraj Kumar, Rakesh Kumar and Amit Kumar Singh; and

Design and application of a comprehensive support system for drifts to cross faults under fragile (Motur) formations authored by Sonu Kumar, B. S. Chaudhary, Amalendu Sinha and Rajendra Singh.





Session II : Exploration and investigation in geoscience, coal and mineral beneficiation

Session Chair : **Shri Samiran Dutta**, CMD, BCCL, Dhanbad

Rapporteur : **Dr. Anupendu Gupta**, Former Dy. Director General, GSI

Eight papers were presented in Technical Session – II:

Economic modelling of exploration projects authored by B C Sarkar and P P Kala;

Significance of paleoclimatic condition on organo-inorganic matter preservation and hydrocarbon generation in coal/shale of Talcher Basin India authored by Shashanka Pandey, Vinod Atmaram Mendhe, Srikanta Murthy and Priyanka Shukla;

Optimizing coal beneficiation of Indian LVMC and non coking coal by utilizing in-pit dry de-shaling followed by wet jigging/heavy media process at washery authored by K S Ashvani, Mustafi Gurudas and Chiranjib Banerjee;

Digital optimization technologies that continue to enhance productivity, increase asset availability and drive sustainability for minerals processing industry authored by Nuser Bilal and Rizwan Sabjan;

Increasing usage of Indigenous coking coals by adopting Pre-carbonization Techniques and Optimizing Battery Operation authored by B Chakraborty, B Ghosh and P Banerjee;

Utilizing curved conveyor technology for efficient long-distance material transport authored by Kilian Neubert and Andrea Prevedello;



Digitalization and innovation in mineral beneficiation process and dry tailing management to enhance mining operation authored by Subhasis Das; and

Use of x-ray transmission technology for real-time analysis of GCV in Indian coal in running conveyor authored by G.V. Ramana, Lingaraj Sahu, Biswajit Dutta and Sourav Chakraborty.

Sessions III : Challenges in underground and opencast mining and rock excavation

Session Chair : **Shri Manoj Kumar**, CMD, WCL, Nagpur

Co-Chair : **Dr. Anindya Sinha**, Director (Technical), NCL, Singarauli

Rapporteur : **Shri A. K. Roy**, GM(PMD), Coal India Limited (CIL)





The following papers were presented and discussed:

Strata control considerations to ensure safety of underground workplaces during extraction of inclined coal seam authored by Prabhat Kumar Mandal, Arka Jyoti Das, Ranjan Kumar, Subhashish Tewari and Rana Bhattacharjee;

Mitigation of environmental and safety hazards in blasting process: a case study of Jagannath OCP, MCL authored by Sunil Guduru, Debashis Mandal and Manish Sinha;

Optimum combination of long and short tendons for stable roadways intersections in coal mines authored by Ranjan Kumar, Prabhat K. Mandal, Arka J. Das, Jagapthal V. Kumar, Kumar Gaurav, Rana Bhattacharjee and Subhashish Tewari;

Excavation of large underground surge shaft of Their-Pump Storage project, India authored by Prakhar Ghosh, Harsh Kr Verma, Ashok Kr Singh and Rajeev Prasad;

Geotechnical considerations and numerical modelling approach for preparation of strata control and monitoring plan (SCAMP) of highly stressed depillaring panel in underground coal mines – A case study authored by Rana Bhattacharjee, Subhashish Tewari, Arka Jyoti Das, Awanindra Pratap Singh and Prabhat Kumar Mandal;

Geotechnical considerations in design of Crown Pillar during transition from open pit to underground mining authored by Chandrani Prasad Verma, Amir Sheikh and Tushar Kawale;

Optimization of operational parameters of a raise borer machine for rock excavation in an underground metalliferous mine authored by Ashish Kumar Vishwakarma, Vemavarapu Mallika Sita Ramachandra Murthy, Vivek Kumar Himanshu and Murari Prasad Roy;

Paste backfilling for underground mines: Present scenario in India and future perspective authored by Santosh Kumar Behera, Prashant Singh, Sujit K. Mandal, K. Mishra, Phanil K. Mandal and C. N. Ghosh; and

Assessment of loading characteristics of resin grouted rock bolts under different confinement pressure through laboratory and numerical modelling studies authored by Kolichalam Rajashekhar, Sahendra Ram, Ashok Kumar, Petr Wacławick, Malothu Naresh.

Session IV : Management of environment, carbon footprint, energy transition and miners' health

Session Chair : **Shri Vinay Ranjan**, Director (Personnel & IR), Coal India Limited

Rapporteur : **Shri Shankar C Subramanian**, GM (Environment), Coal India Limited (CIL)





The following papers were presented in Session IV:

Association of occupational risk factors with safety performance of workers and prioritization of interventions using Axiomatic principle authored by Ashish Kumar, Amrites Senapati and Ashis Bhattacharjee;

Reclamation index on managed land for coal mining complexes authored by Manoj Kumar and Kumar Ranjeev;

An account of possible energy transitions in India in the context of climate change negotiations authored by Debadutta Mohanty and Sudipta Mukherjee;

Postural risk assessment of heavy earthmoving machinery operators in opencast coal mines authored by Khane Jithendar Singh, Sanjay Kumar Palei and Netai Chandra Karmakar;

A case study for estimating carbon content stored in different tree species and elaboration of existential equations authored by Manoj Kumar, K S Gaiwal; and

Impact of NPV revision on cost benefit ratio under forest clearance process for opencast coal mine in Central Jharkhand authored by Manoj Kumar, Kumar Ranjeev and Meena Kumari.

Session V : Application of AI, ML, wireless communication in smart mining and digital oilfield

Session Chair : **Shri Bhola Singh**, CMD, NCL, Singarauli

Co-Chair : **Prof. S. Jayanthu**, NIT Rourkela

The presentations and discussions included the following papers:

Application of Artificial Intelligence for prediction of mine hazards authored by Preity, M. Nadeem, J.K. Singh, S.K. Chaulya, G.M. Prasad, S.K. Mandal and G. Banerjee;

Digital oilfields: the challenges and prospects in India and abroad authored by Neeraj Kumar and G.P. Karmakar;





Wireless audio streaming system for underground mines authored by P.K. Mishra and Amit Swain;

AI/ML, Digitization and Smart Mining authored by Nishant Singh, Krishan Aggarwal, Amitava Dutta and Satish Penmetsa;

Vision enhancement system for foggy weather in opencast mines authored by Swades Kumar Chaulya, Girendra Mohan Prasad, Monika Choudhary, Naresh Kumar, Virendra Kumar, Vikash Kumar and Abhishek Chowhury; and

Modernization of Mines through Digital Transformation: NCL Perspective authored by Anindya Sinha and Shivraj Singh.

Session VI : Production and Utilization strategies of unconventional gases and clean fuels

Session Chair : **Dr. Anand Gupta**, Additional Director General (Development), DGH, New Delhi

Co-Chair : **Shri Sanjay Kumar Singh**, Director (Technical) Director P&P and OP, BCCL, Dhanbad

Rapporteur : **Shri Peeyush Kumar**, Chief Manager CIL/Formar Director (Technical), Ministry of Coal. Government of India



The following 5 papers were presented in the sixth technical session:

Abandoned mine methane: energy resource and climate mitigation potential in India authored by Ajay Kumar Singh;

Carbon dioxide (CO₂) and methane (CH₄) sorption in coal and its application in enhanced coalbed methane recovery (CO₂-ECBM) - A review authored by Jaywardhan Kumar, Vinod Atmaram Mendhe, Arun Kumar Samanta and Harendra Singh;

Study of gas generating potential of Permian shale of Raniganj coalfield, West Bengal authored by Bhaskar Bhattacharyya;

Indigenous gasification and Methanol Technology Development Program: A step towards Aatma Nirbhar Bharat Abhiyan authored by R.K. Singh, P.D. Chavan, V. Chauhan, A. Sahu, N.D. Dhaigude, G. Sahu, S. Saha and S. Datta; and

Assessing fugitive methane emissions from an underground coal mine: A case study from Jharia coalfield, India authored by Debadutta Mohanty, Nilabjendu Ghosh, Debabrata Nayak and Swadeep Sagar.

All the speakers conducted very engaging and fruitful technical sessions.



Panel Discussion



Recommendations of Panel discussion held on 5th April, 2022 at 9th AMC on SOCIAL IMPACT OF MINING-THE POSITIVE SIDE

The following Panelists were on the dais –

- **Prof. S P Banerjee**, Past President MGMI & Former Director-in-charge, IIT(ISM), Dhanbad
- **Shri T K Nag**, Former CMD, NCL
- **Shri Vinay Ranjan**, Director (Personnel & IR), Coal India Limited
- **Shri Pankaj Satija**, Managing Director, Tata Steel
- **Shri M Raghuram**, Member Technical, Damodar Valley Corporation

- During the discussion, the participants highlighted the role of Mining in India's GDP which is presently at 2% and has to grow to at least 4% if India has to reach a 5 Trillion Dollar Economy.
- Coal is the backbone of India's energy supply. It is also a key component in the production of steel and concrete; vital materials in building sustainable societies.
- Despite the fact that Mining has a negative impact on ecology it is a massive employment generator both in terms of direct and indirect employment. Coal mining has a long legacy of providing needed jobs in isolated communities. It is also associated with developing places that suffer from high poverty and weaker long-term economic growth.
- The economies of places like Ramgarh, Bermo, Talcher, Korba are totally dependent on coal. The living standard of persons living in North Karnapura of CCL has improved manifold on account of mines like Piparwar, Magadh, and Amrapali.
- The CSR money that goes directly for the benefit of society greatly helps in improving the living standard of society.
- Large-scale afforestation of mined-out areas has helped to lower the temperature of the entire Singrauli town in NCL
- WCL has used the mine water to get sold as packaged drinking water branded as COAL NEER' after treatment and purification.
- The participants were of the opinion that the DMF fund and CAMPA fund may be more judiciously used for the betterment of a mining-dependent society.





Valedictory Session



The concluding session of the 9th Asian Mining Congress (AMC) commenced with the following Guests and Office Bearers on the Dias:

- **Dr. S. Raju**, Director General, GSI, Chief Guest
- **Shri P. M. Prasad**, President MGMI & CMD, CCL
- **Shri Bhola Singh**, Chairman, Exhibition (9th IME) & CMD, NCL
- **Shri P. S. Mishra**, Chairman, Conference (9th AMC) & CMD, SECL
- **Dr. Amalendu Sinha, Chairman**, Technical Committee (9th AMC) & Former Director CSIR-CIMFR
- **Shri J. P. Goenka**, Co-Chairman (Exhibition), MD, NMC
- **Shri Prasanta Roy**, Convenor (Exhibition) & HOD (Geology) CIL
- **Shri Ranajit Talapatra**, Honorary Secretary, MGMI & DGM (WS) CIL
- **Shri Rajiw Lochan**, Convenor (9th AMC) & Former GM(CED/CBM), CMPDI
- **Shri I. P. Wadhwa**, Managing Partner, Tafcon India Ltd



Shri R Talapatra, Honorary Secretary, MGMI welcomed the Guests in the session and thanked the participants for taking an active interest in the 9th Asian Mining Congress. He said that as the world is opening up after the global pandemic, this is perhaps the first major Conference in Eastern India and prayed that the success of this Congress will show the light to more such conferences. He specially thanked the outstation delegates who attended physically overcoming the fear of Covid. He also wished all participants good health and requested all to take care of themselves and the people around them in these hard times.



Dr. Amalendu Sinha briefed about the Congress and he said 52 technical papers including Keynote addresses were presented which would help in the formulation of some guidelines for green mining. Yet, he admitted that full justice could not be done to the Speakers due to shortage of time and sought an apology for the same. He thanked all the Speakers especially the 8 Keynote Speakers and Invitee Speakers. He presented in short the main points of the recommendations that emerged from the 2 days of deliberations and interactions concerning the creation of the Mineral Development Strategy.



Shri I. P. Wadhwa talked about the IME, 2022 being held at Eco Park, Rajarhat, Kolkata, concurrently with 9th AMC. He said that there has been a very good encouragement response from the participants.



Dr. S. Raju, after thanking the organizers of the 9th AMC, said that the 9th AMC is a grand success considering the present scenario, participants in the conference are really beyond expectations and the exhibitors too. To increase awareness about mining, associated steps need to be taken.



Shri Bhola Singh thanked the participants and specially thanked the organizations who have been exhibited in the 9th IME to showcase their machinery, tools, etc. and also thanked the visitors of the exhibition stalls. He was very much hopeful that the coming IME would be having much more participation in the Exhibition.



Shri P. M. Prasad welcomed the Guests in the session and thanked the participants for taking an active part in the Congress for long 2 days keeping behind their busy schedule. He also hoped that important and fruitful recommendations would come out from Congress. He also expected that the deliberations have contributed a lot. He liked the IME and felt it would help the investors.



Shri Rajiw Lochan thanked the organizations who supported financially by sponsoring the event to make it a grand success and to the participants as delegates and the Speakers of the different technical sessions and also specially thanked the Keynote Speakers. He expressed his gratefulness and thanks to the colleagues who have been helping him for the last few months to give a good shape the Congress.

The session and the 9th AMC came to an end with a vote of thanks by the Honorary Secretary Shri Ranajit Talapatra. Thereafter Shri Talapatra, Honorary Secretary cordially invited all the participants, Guests and invitees to present in the Cultural Programme followed by Dinner at the Rang Manch, Raj Kutir by Taj, Swabhumi, Kolkata.





Social Programmes : Cultural Programme and Congress Dinner

Venue : **Rangmanch, Raajkutir by Taj, Swabhum, Kolkata on Tuesday 5th April 2022, 7:00-10:00 pm**

Congress participants and guests were invited to attend the **Congress Dinner** and **Cultural Programme** followed by a dinner hosted by MGMI. Approximately 300 participants and guests attended these social programmes.



Recommendations of the 9th Asian Mining Congress

The 9th Asian Mining Congress, organized by the Mining Geological and Metallurgical Institute (MGMI), was held from April 4 -7, 2022 in Kolkata. Based on the papers received, presentations, comments, discussion and deliberations during different sessions, the Technical Committee constituted for this congress framed the following recommendations:

Mineral exploration, processing and conveying

- A suitable economic model based on a sound exploration strategy can optimize cost estimates and mine development parameters with market factors. Further, Economic evaluation techniques could then be applied to calculate expected value and risk criteria for various levels of delineation.
- Studies of paleoclimatic and depositional conditions are often critical to understand organo-inorganic matter preservation and hydrocarbon generation in coal/shale in a sedimentary basin.
- The success of deep drilling and geophysical investigations in a 3 km deep borehole in this country and the vast experience of seismic imaging for hydrocarbons demonstrate our indigenous capability to conduct comprehensive geophysical studies for exploration and mine planning of deep-seated deposits.
- For coals with low 'Near Gravity Material (NGM)' at high specific gravity separation in-pit dry de-shaling based on washability characteristics of coal along with wet jigging and heavy media separation processes for downstream circuits have proved to be effective.
- It has been found that suitable pre-carbonisation techniques and optimizing battery operation have become critical to the success of coke making industry.
- Attempts should be made to utilize the technology developed for the valorisation of bauxite residue for the recovery of iron, alumina, titanium and rare earth elements (RREs).
- The developed AI/ML-based digital optimization technologies can increase asset availability and sustainability for mineral processing industries.
- The capabilities of conveying systems can be enhanced by using state-of-the-art curved trough conveyor technology. This can reduce operating expenses.

Contemporary mining challenges

- The auction of mining blocks has created opportunities for start-ups to take part in auctions and advice companies with finance and technical resources. As such, this is no more the domain only for established consulting companies. Start-ups need to be encouraged to try the Startup India Seed Fund Scheme (SISFS), which aims to provide financial assistance to start-ups for proof of concept, prototype development, product trials, market-entry, and commercialisation.
- The heat stress hazard is amplifying in deep underground mine environment causing increased risk to safety, health disorders and productivity. Using Multi Variate Regression Analysis and 3D Simulation Modelling, it is possible to predict the Wet Bulb Globe Temperature at the desired location in mines. This will help mine management to take the required measures to enhance the safety and productivity in the mine.



- Stability analysis of caverns, tunnels and slopes in highly jointed rock masses should be done with numerical methods considering suitable constitutive models which consider maximum attributes of jointing and geology of the formation. A more comprehensive failure criterion is required for this purpose.
- The strata control problems increase more during underground mining of dipping coal seams than that of flat coal seams due to the asymmetric failure and stress distribution in inclined rock strata. Numerical modelling exercises and considerations of different parameters with regard to the inclination of coal seams and other beds are required to comprehend the stress distribution and failure behaviour of rock mass.
- The necessity has arisen to adopt site-specific blast design optimization and controlled blasting techniques in mines, quarries and during excavation of large underground surge shafts for better blast results leading to protection of surrounding structures, control of blast-induced ground vibrations and other undesirable effects produced by blasting.
- The formation of wider galleries and intersections in mechanized underground mines requires effective roof rock reinforcement for stabilization. The optimum combinations of short and long tendons will go a long way in enhancing the stability of intersections as well as reducing the costs of bolting in underground coal mines.
- Wide-ranging inconsistency in rock competency and unfavourable disposition of rock stress requires a systematic approach to support the design and monitoring of strata behaviour for effective ground control and safety during underground mining. For every mine, a comprehensive scientific study needs to be conducted for the preparation of the Strata Control and Monitoring Plan (SCAMP) which is a statutory requirement.
- To make faster progress and create a stable raise along with enhanced workplace safety in underground metal mines, the analysis of different operational parameters of raise borer machine viz. thrust per cutter, torque to the reamer head and penetration rate need consideration.
- The application of paste backfilling in India is in a fledgling stage and it has a virtuous scope of application in most of the underground metalliferous and coal mines. It will resolve surface disposal of tailings and coal ash creating environment-related problems. The properties of backfill materials affecting the paste backfill performance, advancements made in geomechanical, and microstructural properties, the effect of alternative binders, use of alkali activators, superplasticizer, admixture and fibre reinforcement, need to be studied. Future research directions in paste backfilling in underground mines in India should be encouraged.
- Short-encapsulation pull tests of rock bolts and numerical modelling can provide significant information necessary to improve ground control in variable roof conditions. A proactive geotechnical engineering program can be an essential component of a state-of-the-art underground coal mine.
- The transition from open pit to underground mining operations necessitates sufficient thickness of crown pillar to be left as a barrier between open pit and underground workings for pit and dump slope stability and also the safety of the underground workings. The determination of the optimum size of the crown pillar becomes crucial to make it stable throughout the life of the underground mine. The influence of ultimate pit depth and stress state on account of open pit mining also needs to be considered apart from orebody/coal geometry, exposed width of pit bottom, rock mass strength, accumulation of water in the pit, geological disturbances, etc. in the design approach which can be done using suitable numerical simulation technique.
- To prevent premature blasting during lightning and thunderstorm in opencast mines, it is very important to have a refresher training programme with essential modules like electric, non-electric and electronic detonators; modes of initiation and handling of explosives and accessories, and strictly follow the regulatory guideline.

Smart Mining

- Attempts should be made for digitization of underground mines using intrinsically safe and flameproof laser scanners for the formation of accurate 3D virtual mine maps integrated with the centralized monitoring and visualization of different parameters and miners' tracking in the surface control room.
- Online monitoring of mine parameters using IoT-enabled sensors and predicting mine hazards using artificial intelligence techniques can be used for increased safety and efficient mining.
- A unified wireless communication system for seamless voice, video, and data communication between the underground mine and the surface control room will prove to be productive.
- It is suggested to apply a vision enhancement system incorporating real-time image processing techniques, radar, high precision GPS, vehicle-to-everything (V2X) communication, and 3D geo-tagged mine map for continuing opencast mining operation during foggy weather.



- The digital transformation of mines will ensure the efficient mining of coal with due care to the environment, health and safety (EHS). SAP-based ERP, OITDS, GPS tracking and digital EHS are now being implemented. With the adoption of such digital transformation, mines will be ready to adopt Smart Mining Technologies in the future with more and more state-of-the-art automation.

Management of environment and miners' health

- Empirical relations developed for calculating the Reclamation Index (RI) based on detailed field studies, data analysis and different conditions of forests can help in calculating stock in carbon sink to cater for the impacts of climate change.
- Occupational risk factors which affect the safety performance of workers need to be identified; accordingly, prevention strategies for the reduction of accidents in mines should be prioritized and implemented based on scientific principles instead of thumb rule-based approaches followed in mines.
- Assessment of work-related postures based on ergonomics approaches should be carried out in all mines as it leads to musculoskeletal disorder problems. It is an emerging field in the Indian mining scenario.

Coal Gasification, CBM and Energy Transition

- Gasification potential Mapping of Indian Coal Resource vis-à-vis utilization Strategy towards downstream applications requires systematic investigations.
- In coal gasification, it is required to integrate Hydrogen/Methanol/ Chemical generation modules with Fertilizer (Ammonia/Urea) as well as Power Modules to utilize side streams (N₂, CO₂, Heat) efficiently with minimum emissions.
- India is an energy-scarce country. The last gas/oilfield in the country was discovered more than a decade ago. It is in this context, unconventional hydrocarbon plays such as CBM, shale gas etc. can provide enhanced energy security to the nation. Modern tools for exploring these plays should be extensively used to understand the hydrocarbon potential of the basin in the light of basin architecture, kerogen type and thermal evolution.
- Mineral being a non-replenishable commodity, its judicious use is of paramount interest, especially in the context of the energy transition. Manufacturing of solar cells to windmills to storage batteries all need these rare minerals/metals. Evolving innovative processes/techniques for better recovery of metals from ores or even from plant residues will help make these critical resources available for different end uses and safe disposal of plant effluents to avoid environmental issues/soil degradation etc.
- India has the pledge to achieve net zero by 2070. Though, we as a nation, contribute to the GHG emission much less than the global average on a per capita basis, global warming and its effects on climate change is now a hard fact. Hence, there is a need to make a concerted effort for the measurement and estimation of GHG emissions from fossil fuel winning and utilization with newer and less resource-intensive techniques. Such assessments not only help in locating additional resources e.g. CMM/AMM but also help in planning appropriate mitigating measures such as geo-sequestration of CO₂.

Recommendations of Panel discussion held on 4th April 2022 at 9th AMC on SOCIAL IMPACT OF MINING-THE POSITIVE SIDE

- During the discussion, the participants highlighted the role of Mining in India's GDP which is presently at 2% and has to grow to at least 4% if India has to reach a 5 Trillion Dollar Economy.
- Coal is the backbone of India's energy supply. It is also a key component in the production of steel and concrete; vital materials in building sustainable societies.
- Despite the fact that Mining has a negative impact on ecology it is a massive employment generator both in terms of direct and indirect employment. Coal mining has a long legacy of providing needed jobs in isolated communities. It is also associated with developing places that suffer from high poverty and weaker long-term economic growth.
- The economies of places like Ramgarh, Bermo, Talcher, Korba are totally dependent on coal. The living standard of persons living in North Karnapura of CCL has improved manifold on account of mines like Piparwar, Magadh, and Amrapali.
- The CSR money that goes directly for the benefit of society greatly helps in improving the living standard of society.
- Large-scale afforestation of mined-out areas has helped to lower the temperature of the entire Singrauli town in NCL.
- WCL has used the mine water to get sold as packaged drinking water branded as COAL NEER' after treatment and purification.
- The participants were of the opinion that the DMF fund and CAMPA fund may be more judiciously used for the betterment of a mining-dependent society.



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 : Netaji 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

Theme : **Sustainable Mining in Asia - Challenges and Opportunities**
Dates : 29th – 31st January 2012
Venue of AMC : Hotel Hyatt Regency, Kolkata
Venue of IME : 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, Czech 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**
Dates : 13th – 16th February 2014
Venue of AMC : Hotel Hyatt Regency, Kolkata
Venue of IME : Salt Lake Stadium, Kolkata

Inaugurated by

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), Czech 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, Czech 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, Czech Republic, Germany, Iran, Japan, USA.

8th Asian Mining Congress & IME 2019

Theme : **Green Mining : The Way Forward**
Date : 6th to 9th November, 2019
Venue of AMC : The Hotel Westin, Rajarhat, Kolkata
Venue of IME : Eco Park, Rajarhat, Kolkata

Inaugurated by

Shri Pralhad Joshi, Hon'ble Minister of Coal, Mines & Parliamentary Affairs, Govt. of India, Chief Guest

Guests of Honour

Mr Andrew Ford, Australian Consul General
HE Mr Milan Hovorka, Ambassador, Embassy of Czech Republic
Papers presented - 53

Foreign participation from - Australia, China, Czech Republic, Poland, Russia, South Africa, UK, USA



International Mining Exhibition (IME 2022)



The recently concluded Ninth edition of IME, “International Mining, Equipment, Mineral & Metals Exhibition” (concurrent with 9th Asian Mining Congress), organized by TAFCON along with MGMI, during April 4-7, 2022, was a grand success, as informed by VVIPs, Delegates, Exhibitors and Visitors.

It aimed to upgrade the future of mining and allied industries in India. This institutionalised event has been envisaged as a catalyst for the development of Mining, Mineral, Metal and allied sectors in India. The prestigious biennial international event of the sector, is one of the largest shows of its kind in this part of the world. The event once again, proved to be an ideal platform for the global mining, mineral & 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 Chief Guest Shri Anil Kumar Jain, Secretary, Ministry of Coal, Government of India on April 4, 2022 in the presence of Guest of Honours were Smt. (Mrs.) Rowan Ainsworth, Consul General, Australian Consulate General, Kolkata, Shri M. Nagaraju, IAS; Shri Pramod Kumar Agrawal, CMD, Coal India Ltd.; the other eminent dignitaries present on the occasion were President MGMI Shri P.M. Prasad, CMD, Central Coalfields Ltd.; Shri Roopwant Singh, MD, GMDC; Shri Amit Banerjee, CMD, BEML; Shri Sumit Deb, CMD, NMDC & Shri Rajesh Nath, MD, VDMA.

High level Trade Delegations and Country Level Group Participation from Germany, Australia, Poland 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 Jharkhand, West Bengal, Rajasthan, etc.

Concurrently, “Buyer Seller Meet” was organized on the second day the event, which witnessed presentations from key stakeholders. It received an enthusiastic response from India and overseas.

On the third day of the event, Exhibitors Award Function was also organized, wherein Chief Guest Shri N. C. Jha, Former CMD, Coal India Ltd. presented awards to Exhibitors in different categories like International Pavilions, Machinery Display, Innovative Stall Design and Presentation, Large Participation and Outdoor Machinery Display, etc.

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Organising Committee



Principal Coordinators

President, MGMI

Shri P M Prasad

CMD, Central Coalfields Limited (CCL), (a subsidiary of Coal India Limited, Central Govt Undertaking, Ministry of Coal, Govt. of India)

Secretary, MGMI

Shri Ranajit Talapatra

DGM (CP), Coal India Limited (CIL)

Chairman, Conference

Shri P S Mishra

CMD, South Eastern Coalfields Limited (SECL)

Chairman, Technical Committee

Dr Amalendu Sinha

Former Director, CSIR-CIMFR

Convener Conference

Shri Rajiw Lochan

Former GM (CED/CBM), CMPDI

Members, Technical Committee

Shri T K Nag

Former CMD, NCL

Shri Subrata Chakrabarty

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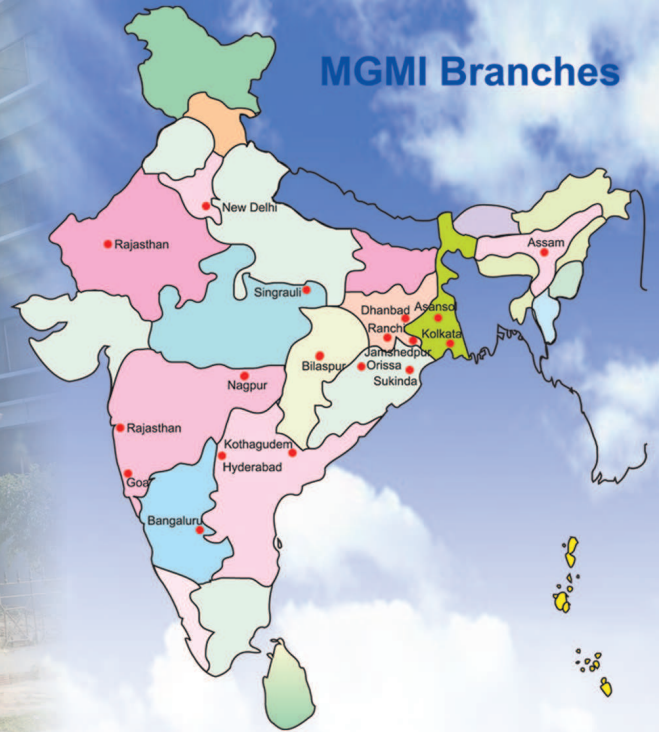
Honorary Treasurer, MGMI & Former Dy. DG, GSI

Dr P K Mandal

CSIR-CIMFR, Dhanbad

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