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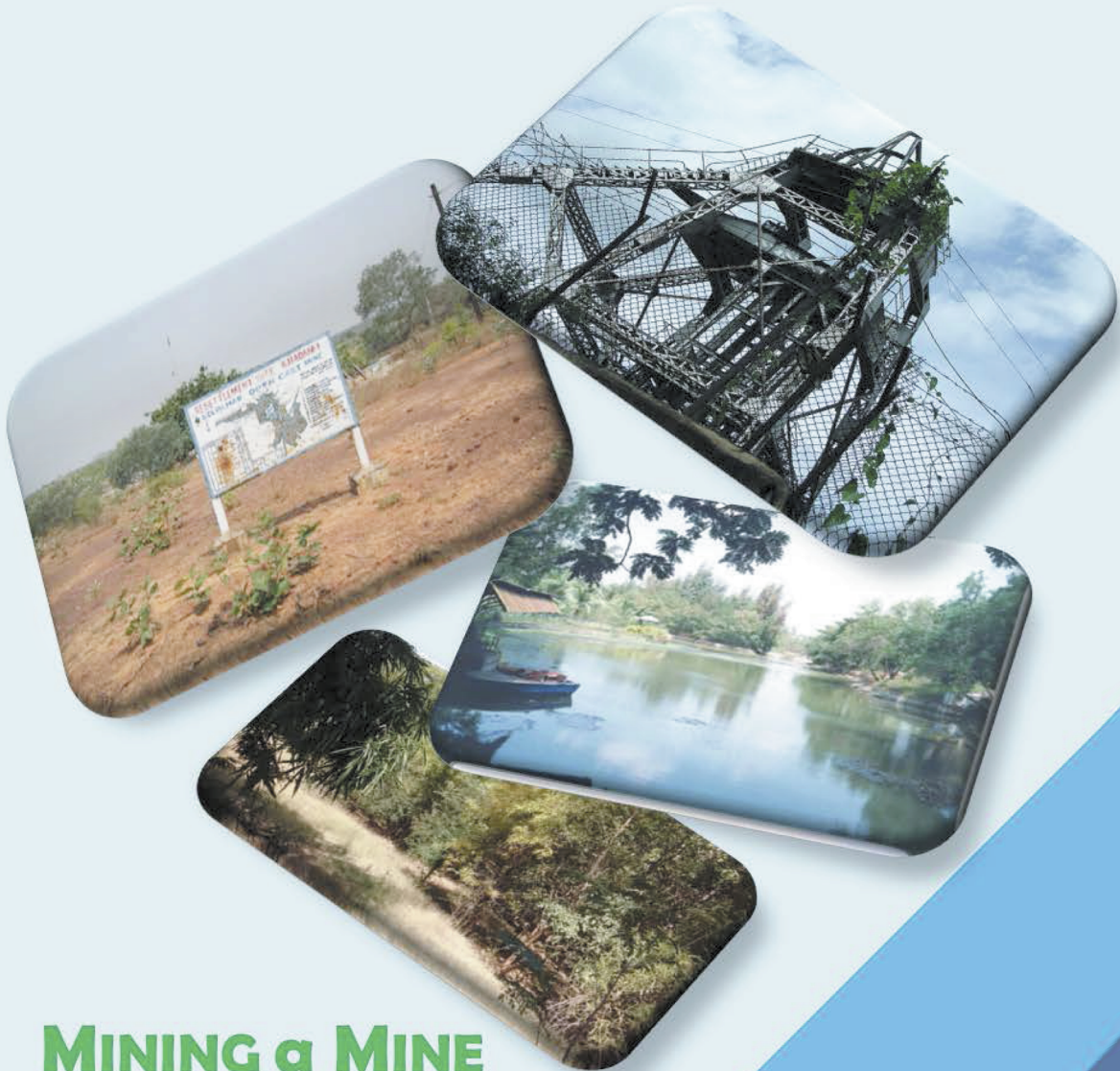
Vol 45

No. 3

Quarterly





October-December 2019

MGMI NEWS JOURNAL



**MINING a MINE
ALWAYS for
CLOSING THE MINE**

Recipients of MGMI Awards and Medals for the year 2018-19

Dr J Coggin Brown Memorial Cash Award <i>Ms. Shritama Das</i> <i>Presidency University</i>	
Pickering Medal <i>Ch Rahul Patro</i> <i>IIT (ISM), Dhanbad.</i>	
Mr Majid Hasan Tyeb <i>Mc Nally Bharat Medal</i> <i>IIT (ISM) Dhanbad</i>	
Chandrakala Medal <i>Shri Arnab Manna</i> <i>IIT Kharagpur</i>	
Smt Nirja Sahay Medal <i>Vaibhab Agarwal</i> <i>IIT Kharagpur</i>	
Kalyan Mukherjee "61 Geology" Medal <i>Ms Rajyashree Nandy</i> <i>University of Calcutta</i>	
La Touch Medal <i>Km Pragya Singh</i> <i>IIT, BHU</i>	

Prof (Dr) Mahendra Pratap Singh Memorial Coal Science Award <i>Dr Binoy K Saikia</i> <i>MGMI</i>	
Dr J Coggin Brown Memorial (Gold) Award <i>Dr Danda Srinivas Rao</i> <i>MGMI</i>	
Dr J Coggin Brown Memorial (Gold) Medal for Non-coal Mining <i>Shri Ghana Shyama Khuntia</i> <i>MGMI</i>	
H B Ghose Memorial Award <i>Shri R K Singh</i> <i>Manager of Jayant Opencast Mine of NCL</i> <i>MGMI</i>	
Engineering Gold Medal <i>Dr Karra Ram Chandar</i> <i>MGMI</i>	
D N Thakur Award <i>Dr Dipak Chandra Pal</i> <i>MGMI</i>	
MGMI Dewan Bahadur D D Thacker Coal Mining (Gold) Medal <i>Shri Tuhin Kumar Mukherjee</i>	

**CONGRATULATIONS TO ALL
THE AWARD WINNERS**

MGMI Awards and Medals for the year 2018-19

Congratulations to all the award Winners!

MGMI Chapter Membership Growth Award
MGMI New Delhi Chapter

MGMI R P Bhatnagar Award
Dr Chinthapudi Eswaraiah

MGMI R P Bhatnagar Award
Dr Swagat Satyagopal Rath

MGMI H.B. Ghose Award
Shri Prabir Kr Mandal
Manager, Jhanjra Project Colliery
for Underground Mine. ECL

SCCL Gold Medal
Shri Bavandlapal Sandeep
Kakatiya University

MGMI Lala Ramkishore Singhal Award
Dr Alok Tripathy

MGMI Indranil Award
Dr Arunansu Haldar

Yule Medal,
Shri Vivek Kishor Singh
IIT (ISM) Dhanbad

Hayden Medal
Ms Pratibha Srivastava
IIT (ISM) Dhanbad

Dr. Hari Narain Medal
Shri Avanie Jain
IIT (ISM) Dhanbad

Oil India Medal
Shri Pranay Krishna
IIT (ISM) Dhanbad

S Lal Award
Shri Subhajit Dutta
IIST, Shibpur

MGMI Chapter Activity Award
MGMI Calcutta Chapter

Indranil Award
Shri Riddhit Gupta
IIST, Shibpur

Indranil Award
Shri Siba Sundar Sahoo
IIT, Kharagpur



Needs of the time...
mine, close and restore the mine site





News Journal

The Mining, Geological, Metallurgical Institute of India

Vol. 45

No. 3

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Contents

President's Message	5
Editor's Desk	6
New Members	7
Chapter Activity – Calcutta Chapter	9
In the News	12
Kudremukh Iron Ore Mine- A Drowned Glory	16
Opencast Mining of Coal and Topsoil Management	18
Mine Closure Initiatives in CIL	20
Down the Memory Lane	27
Headquarters Activities	29
Forthcoming Mining Events	35

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President's Message



I am glad that MGMI has chosen an important topic which is an integral part of mining, 'Mine Closure', as the theme of this issue of News Journal. Mine closure is an important environmental and economic task. Proper planning is expected at the earliest stages project development itself. To obtain the approvals required to commence mining operations it is necessary to provide with adequate assurance to the regulator and key stakeholders that successful mine closure can be achieved. In recent years, regulation specifically requiring upfront planning for mine closure has increased.

MGMI's contribution towards promoting the scientific study of mining and mineral industries of the country stands out by itself. A responsible task that the Institute has been performing in a responsive manner ceaselessly over a century. The pace with which the technologies are evolving in these times is truly stunning. It becomes imperative that one stays ahead of them to adopt effectively to these technological strides. MGMI as a premier institute in mining, geological and metallurgical fields should not only adopt but also propagate these advances among related organisations.

we, as members of MGMI have to be the torch bearers in carrying forward the ideas and commitment with which MGMI came into being in that distant past. we receive valued support from many mining and mineral industries. Then it becomes our obligation to yield to the confidence reposed in us by them to deliver what is expected of us.

Anil Kumar Jha

Kolkata
14.12.2019



Mining is a temporary venture to exploit nature with potential permanent changes. Mine closure is a definite time dependent result of any mining operation. It is now established that closing a mine is a risk and opportunity based process carried out after well – considered decision making exercises. Today it is mandatory under regulatory control that

every mine must have a closure plan and the post mining financial liabilities are to be eliminated during the active life period of a mine.

This is not an easy task as the geo-mining conditions and the market environment controlling the demand and supply of minerals are dynamic in nature and are influenced by numerous parameters. Evolving a good closure plan of a mine involves number of scientific exercises and application of planning tools. These include analysis of Stakeholder Engagement, Community Development, Company/Community Interactions to Support Integrated Closure Planning. For mine closure management it is necessary to have a support group for Risk/Opportunity Assessment and Management. Based on the proper knowledge exercise, a conceptual closure plan is created through analysis of numerous contextual information.

Social goal setting is a necessity to evolve an effective mine closure plan. A mine must carry out exercise for environmental goal setting. A cost risk assessment for closure is required to carefully optimize mine closure. A mine closure plan also typically involves biodiversity management.

Mining is a truly an integrated approach. To transform the barren and broken land in an around mine will be requiring appropriate basic education and skills. Every mine must have exploration, feasibility, construction, operations, corporate and decommissioning teams.

Health, safety, social, environment, legal, governance and human resource must be considered for mine closure considerations. Once meticulously prepared, the site will be transforming as contemplated and if properly planned, the mine closure plan can yield number of benefits. Some of the benefits created by mine closure movement are highlighted by various authors as:

- *Engagement with affected and interested parties will be more consistent and transparent;*

- *Communities will participate in planning and implementing actions that underpin successful closure;*
- *Closure decisions will be better supported by stakeholders;*
- *Planning for closure will become easier to manage;*
- *The accuracy of closure cost estimates will be improved;*
- *The risk of regulatory non-compliance will be minimized;*
- *Potential problems will be identified in a timely manner;*
- *There is more likely to be adequate funding for closure;*
- *Potential liabilities will be progressively reduced; and*
- *Opportunities for lasting benefits will be recognized and planned for adequately.*

The detail closure planning steps involves exploration, pre-feasibility, feasibility, Flexibility, feasibility, construction and operation, decommissioning and closure to be followed by post closure monitoring and then relinquishment.

Though the restoration of mining site and reclamation was always a part of mine planning, only recently our mines have started planning mine closure under statutory obligation.

It is good to note that modern mining has started structured risk/opportunity assessment process for minimizing the negative consequences of closure, maximizing the positive benefits of closure. Mines must be vigilant so that the closure goals meet opportunities for lasting benefits are captured as much as possible. While operating a mine it must be navigated to closure with confidence that there is no health and safety risk, natural environment risk, social risk, reputational risk, legal risk, financial risk. Thus, mining is going to be a continuous value addition to its neighborhood so that the post mining site becomes a valuable national asset.

Let us hope our skill and competency in mining will be achieving this during the coming years.

Kharagpur
16.12.2019

Khanindra Pathak

"Though the mining sector is the third largest employment generator after agriculture and construction, closure of mines in Karnataka and Goa has resulted in the loss of 12,80,000 direct and indirect jobs since 2011-12 due to ineffective regulatory mechanism, lack of monitoring and oversight at the ground level, and the Supreme Court's interventions," Federation of Indian Minerals Industries (FIMI) President Sunil Duggal

New Members of MGMI
(As approved in Council Meeting on 19-10-2019)

As Life Member

10821-LM, Shri Rajeev Kumar, M Sc (Geol), M Sc (Mgt), Consultant, B – 604, Gakul Regency – 1, Thakur Complex, Kandvali East Mumbai, Maharashtra – 400101, Ph: 9833008535 e-mail: rajeevagrawal1104@gmail.com

10822-LM, Dr. Anal Kumar Sinha, M Sc (Appl. Geol), M Tech (Appl Geo) Ph D (Geol), Director, Tanusai Mining Solutions Pvt. Ltd, “Chanchla Smriti” Puran Vihar, Argora Bye Pass Road, Ranchi – 834002, Jharkhand. Ph: 7762923277 / 7992346367 e-mail: sinha.anal@rediffmail.com

10821-LM, Shri Prashant Kumar Nayak, B Tech (Min) M Tech (Min), 2nd Class Mines Managers Certificate, Assistant Professor, Giet (A), Rajahmundry, Department of Mining Engineering, R.K. Block, Giet (A), Rajahmundry, NH – 16, Chaitanya knowledge City, Andhra Pradesh – 533296, Ph: 7903803295 / 9938165388, email: prashantkumar@giet.ac.in, prashitrl2007@gmail.com

News about member

Shri Anil Kumar Agrawal (8289-LM) MMGI is now at E_ 916 Jal Vayu Tower, Sector 56, Gurgaon 122 011, Haryana email: akagrawal1969@gmail.com

Dr D S Rao (10671-LM) MMGI received the National Geoscience Award -2018, held on 19.9.2019 at Delhi. The Award was presented by Hon'ble Ministry of Mines (GOI) Shri Pralhad Joshi.

Dr. Yogesh Gulabrao Kale (8291-LM) MMGI is now at Flat No.001, Chandragupta Apts, Plot No. 13& 14, Mangaldham Society, TAKLI-SIM, P.O..JAITALA, NAGPUR-440036

Dr M S Venkataramayya, (5991-LM) MMGI is now at Flat No 2A, Khandala, Hill Conuty, Bachupally, Hyderabad 500 090 Ph: 9491145161 email: vr.musunuri@gmail.com

Shri K B Raisyal, (3255-LM) MMGI is now B105, Purva Fountain Square, Spice Garden Service Road, Marthahalli Fly Over, Varthur Road, Bangaluru, Karnataka 560 037 Ph: 8441954016 email: kbrai1941@gmail.com

Shri S K Singh (8950-LM) is now new email: s.singh312@gmail.com

Shri Omprakash Miglani (9497-LM) MMGI Former Director Personal WCL, 185 Nari Ring Road, Jaripatna, Nagpur 440 014 (M) 9921048886 email: om_miglani@yahoo.co.in

Dr Amit Kumar Saw, (10559-LM) MMGI is now Sr Manager (Geology), NMDC Ltd., Resource Planning Department (6th Floor), Khanij Bhavan, Masab Tank, Hyderabad 700 028 state Telangana email: amit.saw@gmail.com

Shri Kalyan Kumar Hajra, (7016-LM) MMGI is now Sr Vice President, JMS Mining Private Ltd. Dong Fang Electric Building, 3rd Floor, Premises No. 16, MAR III, AA-1A, New Town, Kolkata 700 156 (M) 9830117373, email : kalian_hajra@yahoo.co.in

Shri Ajoy Kumar Moitra (2957-LM) MMGI is now at Flat C, 3rd Floor, Purbayan Abasan, 698, Madurdaha, Kolkata 700 107

Shri Kalapala Lakshmi Srinivasa Rao (10545-LM) MMGI is now Executive Director, Steel Authority of India Ltd., Visvesvaraya Iron and Steel Plant, New Town, Bhadravathi 577 301, Dist. Shivamoga, Karnataka email: kisrao9@gmail.com

Shri Sudhakar Anandrao Vyas (4935-LM) NNGI is now Plot No Q9, Flat No 602, Silver Pump Apartment, RPTS Road, Laxminagar, Nagpur 440 022

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Shri Avijit Ghosh, MMGI is now at A604 Shahdeo Tower, P P Compound, Singhee Marg, Ranchi 834 001 email: avijitmining@gmail.com

Shri Manish Mishra (9130-LM) MMGI is now General Manager, West Bokaro, Tata Steel, PO Ghatotand, Dist. Ramgarh 825314
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Shri Y G Kale (8291-LM) MMGI is now at Flat No.001, Chandragupta Apts, Plot No 13 & 14, Mangaldham Society, Takli-Sim, PO Jaitala, Nagpur 440 036
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Shri G C Mrig (6124-LM) MMGI is now at House No 17, Sector – 14, Gurugram 122001, Haryana (M) 9899058000 email: gcmrig@gmail.com

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Shri R K Sinha (7436-LM) MMGI is now at F906, Arihant Arden, Plot No GH – 07!, Sector 1, Greater Noida West, PO Bisrkh, Ghautam Budh Nagar Pin 201306, UP

Shri D N Bhargava (2821-LM) MMGI is now at Flat No.302, Danville Park, 3rd Cross. Near Eden Club, Padavu, PO Mangaluru, Karnataka State (M) 9403658354
e-mail: deokinandanbhargava31@gmail.com

Shri Ganesh Kumar Sinha (10321 -LM)MMGI is now at D-4, Kapildhara Colony, PO Bijuri 484 440 (M) 9425533522, 7008616921
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Shri Rajan Kumar (10463-LM) MMGI is now at 110, Santos Nest, Nalanda Nagar, Street 24, Attapur,

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email: rajankr@nmhc.co.in

Shri Satyadev Jaiswal (10768-LM) MMGI is now at Flat No. 409 B Block, Murari Apartment, Giridhari Homes, Near Times School, Kismatpur Road, Bandlaguda Jagir, Hyderabad 500086 (M) 9406319002
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Sharing and Communicating

From the Editorial Board of MGMI News Journal we request all the members to kindly send any of the following to share with the esteemed members of the MGMI. In the forthcoming issues of the journal would like to highlight Safety Assurance and Safety Maturity Level in mines and plants, preparedness for enhanced safety, Mining and Mineral Policy, Legislative issues and Mining Finance. You may contribute by sending us any of the following:

- 1. Letter to editor**
- 2. Industry news**
- 3. Mining case study from India and abroad**
- 4. Short article**
- 5. Speaking photography of mine initiatives**
- 6. Research articles**
- 7. Technical note**
- 8. Incident report**
- 9. This happened with me: down the memory lane**
- 10. Historical note and photographs**

I will highly appreciate your kind cooperation.

-Editor

Chapter Activity – Calcutta Chapter

A Lecture Session on 'Role of Geoscientists & Engineers in Urban Planning – The Kolkata Story' was organized by Calcutta Chapter of The Mining, Geological, and



Poster of the Event

Metallurgical Institute of India (MGMI Calcutta) in association with The Geological Survey of India Retired Scientific Officers' Welfare Association (GSIRSOWA) and Geological Survey of India (GSI). It was held on Monday, the 25th November 2019 at the Conference Hall, GSI, Kyd Street, Kolkata. Shri S.N. Meshram, Director General, GSI graced the occasion as Chief Guest. The Guests of Honour were Dr. Bashistha Sengupta, Former Director General, Kolkata Metropolitan Development Authority (KMDA) and Dr. S.P. Sinha Ray, Former Head, Central Ground Water Board (CGWB). In addition to the esteemed speakers, named below, special invitees were Shri B.K. Maity, Former Director General, Water Supply, Kolkata Municipal Corporation (KMC), Dr. Udayan Dasgupta, Former Director, Hindustan Oil Exploration Company Ltd (HOEC), Shri Ajay Mishra, Former Scientist, CGWB, Dr. S.K. Mukhopadhyay, Prof. IIT Kharagpur. Invitation mails were sent to all members of MGMI Calcutta Chapter and GSIRSOWA. More than 70 scientists and technologists that included authorities and officers from GSI, members of MGMI,



Dr. A.K. Moitra addressing



S.N. Meshram, DG, GSI addressing. Dr. Bashistha Sengupta is sitting on his right and Dr. S.P. Sinha Ray to his left

members of GSIRSOWA, students from Calcutta and Jadavpur universities, officials from Geovale Services attended the event.



The Inaugural Session commenced with welcoming the participants and felicitation of guests with flower bouquets, followed by announcement of the lecture schedule by **Shri Bhaskar Chakrabarti**, Secretary, MGMI Calcutta & GSIRSOWA. **Dr. A.K. Moitra**, Chairman, MGMI Calcutta & Former Director, GSI welcomed the guests and speakers. While introducing the subject, he talked about the lack of planning, mass consciousness and insufficient monitoring of planning and implementation and upkeep in urban development, referring to a few disasters like Kolkata metro in Bowbazar, pune landslide massacre where geological inputs were ignored. He mentioned the importance of geotechnology in urban planning. **Dr. S.P. Sinha Ray** briefly referred to the metro tunneling calamity and highlighted the importance of understanding underground geology of the area before taking up major



Bhaskar Chakrabarti addressing

urban project. **Dr. Bashistha Sengupta** traced the history of urban planning mentioning the different stages and phases of policy changes and shared his experience of the problems faced in metropolitan development of Kolkata. Starting from the initial stage of urban planning for Kolkata in late 1950s, he spoke on Jawaharlal Nehru Urban Renewal Mission and Smart City Project. **Shri S.N. Meshram** congratulated the organizers for arranging the lecture session on a relevant and contemporary topic. He told that the concept of urban planning is not new and our ancestors were very good town planners. The modern problem is population explosion resulting in increased rate of urbanization. He highlighted the role of GSI in quaternary geological mapping and study of arsenic pollution in ground water in and around Kolkata.

There were two Technical Sessions followed by Panel Discussions. Summarized deliberations are as follows.

Shri Gautam Ghosh, Chairman, GSIRSOWA, Member MGMI and Former Director, GSI presented a brief history of the work on urban geology around Kolkata by GSI. He referred to the work by GSI In 1939 at the request of Chief Engineer, Calcutta Corporation to provide information of the subterranean structure below the Gangetic delta which resulted in

publication of a memoir 'Geology and underground water supply of Calcutta' by Dr. A.L. Coulson in 1940, which recorded the findings from 7 boreholes drilled in 1929 by East Indian Railway along the proposed tube rail route from Sealdah to Howrah. After Coulson's work GSI took up groundwater investigations by sinking exploratory tube wells and the findings are recorded in a bulletin 'Geology and groundwater resources of greater Calcutta industrial area' published in 1961. GSI took up a programme on environmental geoscientific issues of Calcutta Metropolitan Area (CMA) in 1982 when landform maps, land use maps were prepared with suggestions for future development areas.

Dr. P.K. Sikdar, Professor, Indian Institute of Social Welfare & Business Management (IISWBM) and Calcutta University, delivered a talk on '*Impact on Urbanisation on Hydrogeology of Kolkata with special emphasis on Land Subsidence*'. He described in detail the geological and hydrogeological setting of South Bengal Basin vis-à-vis Kolkata, discussing sea level changes and sedimentation pattern during Pleistocene and Holocene periods. Dr. Sikdar iterated the lowering of peizometric surface due to over-pumping since 1956 and land subsidence due to pumping of ground water.



Shri P. Sengupta, Former Hydrogeologist, State Water Investigation Directorate (SWID) presented '*Hydrogeological Atlas of Kolkata*'. With the help of modern software he prepared Digital Elevation Model (DEM) of Kolkata from Shuttle Radar Topography Mission (SRTM)

data. He displayed thematic maps, water table maps, chemical conductivity maps. He found Kolkata drainage, with southeasterly slope, is subdivided into three basins – Bagjola khal, Town water channel and Adi Ganga. The subsurface map of Kolkata he presented shows two aquifers over major area.

Shri Amlyan Jyoti Kar, Regional Head, Eastern Region, CGWB talked on '*Ground Water Condition in Kolkata*'. In Kolkata groundwater is in a confined condition. In north Kolkata fresh water overlies saline water, while in south, beyond Behala upto Bay of Bengal the condition is reverse. With increased and uncontrolled pumping piezometric surface is going down which became acute in late 1990s and still continues. Shri Kar briefly mentioned the areas in Kolkata where groundwater is arsenic affected.



Dr. Bashistha Sengupta detailed '*Urban Drainage with special reference to Kolkata*'. Referring to centripetal type slope, he mentioned the elevation of Kolkata is below the



water level of river Hooghly. Also rapid urbanization and development has and is blocking the natural drainage flow, like southeastern extension of Kolkata in Jadavpur - Garia area has blocked Tolly's

nala, pillars of N-S metro have obstructed its flow, Chringrihata flyover and metro pillars are obstructing flow of eastern canal. At present all water from heavy rain in entire Kolkata metropolis needs to be siphoned out. Respite from water logging, especially from the 19 vulnerable points in Kolkata, is a far cry. He placed a few suggestions for controlling flooding of Kolkata. He dwelt on urban flood disaster, short time risk mitigation, Kolkata drainage in detail.

Shri Saikat Behari, Project-in-Charge of the East-West



Metro, Kolkata Metro Rail Corporation (KMRC), shared his experience of '*Tunneling in E-W metro*'. He described in detail the equipment, modern low depth tunneling process and safety measures adopted during tunneling. Special precautions were taken

at the curves along the route. Prior to tunneling boreholes were drilled to comprehend underground geology. In reply to a query, he told that the ideal spacing of boreholes is 50 metres, but this could not always be maintained due to non-availability of land in congested areas. The contemporary topic of the metro project generated much interest among the audience.

Shri Monu Govil, Dy Project Manager, AFCONS spoke on



'*TBM Tunneling below River Hooghly*'. Tunneling work under a flowing river is unique in India and not very many across the globe. Shri Govil described the construction of Howrah Maidan – Howrah – Mahakaran portion (3.8 km) stretch of the E-W metro project. He detailed the pre-construction

investigations carried out, the planning, procedure, precautions followed during construction, especially of the 520 metre portion of metro tunnel running 30m below river Hooghly. He proudly announced that the tunneling of the stretch below the river was completed in 67 days against the target of 120 days for which the company earned accolades from the Railways.

Shri Sudipta Pal, SDGM, RITES talked on '*Critical Issues in Urban Planning for old and congested city like Kolkata*'. He emphasized on traffic engineering, i.e., road transportation, road infrastructure and related issues.



Urban transport space is utilized by vehicle traffic, non-motorized traffic, pedestrians, shopkeepers, hawkers, vendors, overground & underground utilities. Different urban transport modes are discussed. In old and congested city the ideal 4-lane highway with service road and pedestrian facility is hardly possible due to paucity and non-availability of space. Shri Pal discussed ways to counter traffic congestion and advocated for building up urban repository with all information that will help future planning and development.

Shri A.K. Debnath, Former CMD, Central Mine Planning & Design Institute (CMPDI) deliberated on '*Characteristic of Kolkata Soil and Strength Parameters in Support Design for Tunneling*'. According to him major problem in underground tunneling is the soil condition of Kolkata, which undergoes liquefaction. Two factors



he thought are responsible for the loss of strength of soil are -- its nearness (60-70 km) to sea and it faced 3-4 earthquakes in last 100-120 years. The strength needed to be restored by piling. He displayed a video on tunneling of the Kolkata metro project and explained the process.

Dr. Soumitra Dasgupta, Geologist, GSI discussed a news item that came in papers a few days back -- '*Changes in Elevation of Kolkata*'. GSI is now monitoring elevations through GPS stations installed in different parts of India. He



Panel Discussions

explained the process of calculation, interpolation and interpretation of data generated from these stations. The data suggests that areas around Kolkata is sinking by 18.79 mm per year. The parametric model was explained by **Dr Sandip Shome**, Director who clarified that the change in elevation is not due to tectonic movement, but other factors like pumping of groundwater, loading of structures etc. and there is nothing to worry about it. He contended that Indian plate is not one but of two microplates, possibly separated by Son-Narmada lineament.

The Panel Discussion / Question – Answer Session was coordinated by **Dr. A.K. Moitra**, Chairman, MGMI Calcutta. **Shri Muktipada Das**, Former Chief of Geology, CMPDI wanted to know whether the metro disaster at Bowbazar was a mechanical failure or a geotechnical one. **Shri Saikat Behari** replied it will not be known until the TBM is brought out and examined. **Dr. S.P. Sinha Ray** commented that the subsurface geology of the affected area is nothing exceptional. Existence of subterranean creeks were known. There were lively discussions on this and allied issues. **Shri Arunabha Das**, Jt Secretary, MGMI Calcutta & GSIRSOWA, while thanking the Speakers expressed that this type of events should be arranged in a larger perspective to be participated by younger geoscientists and engineers.

The event concluded with Vote of Thanks by **Shri Bhaskar Chakraborti**, Secretary, MGMI Calcutta & GSIRSOWA. He thanked

the participants for the vibrant sessions, as also to organizers and staff members of GSI for making the event a success.



Panel Discussions

A short news clip of the discussions held during the lecture session has been published in Bengali daily *Bartamaan* on 27th November 2019.

Chapter Activity – Bhubneswar Chapter

Technical Paper Presentation

Sri G S Khuntia, Former ED(Operation)/ SAIL Director, NMDC/Currently Director, OMC Ltd, presently the Chairman, MGMI, BBSR presented a technical paper on "Environment Protection in Mining Operation with Contribution in CSR- A Case Study of Odisha Mining Corporation (OMCZ)" during the MGMI Council Meeting on 24 December 2019 at 4.30 PM in MDC at PATIA, BBSR.

The lecture covered the legislature history of Indian mining, and highlighted the New Mineral Legislation 2015. The Corporate Social Responsibility was discussed from the corporate policy point of view. The lecture presented the experiences of Odisha Mining Corporation with various examples and critical thoughts on the financial aspects were discussed. The speaker also highlighted how OMC is engaged in Industry Academic Interactions

In the News.....

Jindal Steel makes the winning bid for qualified Gare Palma IV/1

Under the move to boost Indian economy, Jindal Steel made the highest bid with Rs 230 a tonne and came out as the H1 bidder for the GARE PALMA IV/1 coal block in the Mand Raigarh Coal Field in the Raigarh district of Chattisgarh. This is against the Rs 150 per ton of the reserve price declared by the government. The bid is at Rs 230 a ton is 53.3% higher than the reserved price. The coal from Gare Palma IV/1 will be used for Jindal's Raigarh plant as well as for captive power plants which are near the mines.

The total geological reserve of the block *as per Geological Report of 2006* is as given below:

Within Block IV/1(MT)	Extended Area(MT)	Total(MT)	
OC	107.601	25.723	133.324
UG	22.923	3.197	26.120
TOTAL	130.524	28.920	159.444

Seam-wise Reserve:

Seam	Geological Reserve (MT)	Seam	Geological Reserve (MT)
Seam X	9.015	Seam VIIM	30.254
Seam XA	9.044	Seam VIIB	1.531
Seam IX	47.155	Seam IV	8.619
Seam VIII	28.780	Seam III	17.501
Seam VIIT	7.546		

In the first tranche of coal block auction in 2015, the coal ministry had rejected Jindal Power's best bids for Gare Palma IV/2&3 block and Tara block that received low bids as compared to other blocks. The two Gare Palma blocks were given to Coal India for operation and the high court later upheld the decision. JSPL emerged as the highest bidder for the block.

Coal India to switch over to mechanised coal transportation by FY'24

Indian surface coal mines are facing tremendous environmental stress due to the deployment of large numbers of 20Te trucks. The adverse effects on environment, safety and economics of use of outdated technology came to serious criticism and CIL has now taken adequate initiatives to set up Coal Handling Plants with silos having rapid loading systems, which will have benefits like crushing, sizing of coal, quicker and quality coal loading.

The system is already operational in some mines. CIL will switch over to mechanized transportation of coal through pipe belt conveyor, an advanced bulk transport technology in its larger mines by 2023-24, replacing the existing road movement of coal demanding high rate diesel consumption..

Pipe belt conveyor uses its belt to form a pipe to convey the coal as covered system, eliminating coal pilferage and improving overall performance. This system will be implemented in 35 numbers of CIL's coal projects each having production capacity of four million tonnes per annum (MTPA) and above. High capital investment in infrastructure for this advanced system will be necessary. Setting up of Coal Handling Plants (CHPs), construction of railway lines, introducing advanced loading and unloading stations and quality control system is being planned. It is expected that the safety and environmental problems created by present truck based coal evacuation system will get resolved.

CIL loaded 151 MT through silos/rapid loading system during 2018-19. Additionally, around 420 MT of coal is planned to be loaded through silos and surge bins, which will be set up at 35 projects. This will augment the advanced loading capability to 571mte by 2023-24. There will be 24 silos and 11 surge bin loading systems working in all subsidiaries of CIL by 2023-24 for the mechanized dispatch of 65% of the targeted 880 mte coal to be produced by CIL. This will also contribute to the effective utilization of the wagons of Indian Railway by minimizing the wagon idling time.

Augmentation of National Copper Production: HCL's Strategic Plan

State owned Hindustan Copper limited (HCL) is making strategic plans to reopen its closed mines, to augment production capacity to up to 20 million tonne per annum by 2024. HCL with its current annual production of 3.8 million tonne of copper ore provides only about five per cent of the domestic copper demand. The company aspires to raise this to 30 per cent. For this purpose the company is going to invest Rs 5,500 crore over the next six years to scale up its output by six times. Reopening of Rakha mines and converting Malanchkhand opencast mines to underground mine are two major current initiatives of the company. It is expected that the production capacity of Malanjkhanda project in Madhya Pradesh, which holds proven reserves of 245.66 MT and estimated resources of 331.59 MT will be mining 5 million

tonne per year and thereafter will be enhanced to 8 million tonne per year.

The company is also increasing its exploration efforts. It has applied for the necessary licenses to explore new copper deposits in Alwar, Sikar, Jhunjhunu and Chhitorgarh in Rajasthan, Balaghat in Madhya Pradesh and East Singhbhum in Jharkhand.

Compared with the global markets, India has limited copper ore reserves that constitute around 2 per cent of the world copper reserves. The ore produced by the state-owned Hindustan Copper, Hindalco, and Vedanta Industries is just about 0.2 per cent of the world's production.

There is an estimation that Indian copper industry may end up shedding 10,000 jobs by 2022

Impact of Closure of Tuticorin Smelter

Tuticorin Smelter got permanently closed, reducing India's concentrate ore refining capability. This resulted in a 44.6 percent reduction in import of copper concentrate during FY19. The domestic refined copper demand is going to increase by 7-8 per cent (including consumption of scrap) by the end of FY20.

Vedanta's copper division business reported a loss in earnings before interest, taxes, depreciation, and amortization (Ebitda) of Rs 235 crore and a revenue drop by 57 per cent to Rs 10,739 crore during 2018-19, compared to a year before, mainly due to the shutdown of its smelter at Thoothukudi (Tuticorin). In 2017-18, there was an Ebitda profit of Rs 1,055 crore for the division.

Abandoned Mine Non-Coal Mining Sites in India

IBM had identified abandoned / orphaned mines which had been left un-reclaimed prior to the promulgation of rules about the Mine Closure Plan in April, 2003. Through a special study at the national level, 297 abandoned mine sites were identified. Out of the 297 abandoned mine sites, IBM identified 106 abandoned mine sites belonging to Public Sector Undertakings, major and other private sector companies requiring reclamation / rehabilitation. Out of the above 106 sites, 24 mine sites become operational again, thus requiring reclamation and rehabilitation in respect of 82 abandoned sites only.

State wise distribution of Number of abandoned mines is given below:

Andhra Pradesh	12	Maharashtra	2
Goa	1	Odisha	4
Gujarat	1	Rajasthan	2
Karnataka	2	TN	12
MP	34	UP	1
Uttarakhand	3	Total	82

The Mineralwise number of abandoned mines in India requiring reclamation is as follows:

Barytes	1	Lime kanker	7
Bauxite	2	Limestone	2
Calcite	1	Manganese	3
Chalk	1	Mica	1
Chromite	1	Mineral	12
Dolomite	2	Ochre	1
Feldspar	1	Pb-zn-cu	4
Fireclay	9	Pyrophyllite	11
Gold	2	Qtrz/felds	4
Gypsum	2	Quartz	1
Iron Ore	2	Quartzite	2
		Rock	
Kyanite	1	Phosphate	1
Laterite	1	White earth	

National Mineral Policy 2019: will it stop premature closure of mines?

Mr Biplab Chatterjee and Aparna Roy of Obseer Research Foundation reported "The recent notification of the Ministry of Mines (MoM)'s National Mineral Policy 2019 (NMP), replacing the dated mineral legislation of 2008, is both appropriate and timely. For an entire decade, India's mining sector has grappled with multiple challenges, including illegal and unscientific mining, environmental and statutory process violations, increased cases of fatalities in mine sites and lack of investments in the sector. Mining curbs in Goa and Karnataka along with mine closures in top producing states, Odisha and Jharkhand have led to reduced employment opportunities for the mineral sector professionals and associated contract personnel; as a result, hundreds of young geology and mining graduates face a bleak future.

Furthermore, the trade deficit due to the import of commodities like gold, diamond, iron ore, coal and manganese was about INR 3 lakh crores in 2018. Even though these commodities have significant resource potential in India, yet there has been no significant mineral exploration or reported mineral discovery for almost a decade. In stark contrast, the global mineral sector has continued to witness significant growth and investment.

Against this backdrop, the NMP 2019 was expected to be an ambitious statement of intent to revitalize India's minerals sector, that can catalyze sustained economic growth."

According to their analysis "India's mining industry has faced severe indictment from the judiciary and civil society with regards to environmental and community management. The new policy should have guided performance standards and outlined mechanisms for innovative, leading practices in the areas of climate change mitigation, water security management, restoration of severely degraded land, air, water as well health and safety.

Unfortunately, NMP 2019 at best appears to be a random and ad-hoc collation of the wish list of multitudes of

representations that the committee received from various stakeholders of the industry. At best it's a lazy status quo script that has failed to serve the sector's desired objective."

India needs safe and environmentally friendly mining through deployment of advanced technology and greater social participation in resource mobilization. The NMP implementation framework must be judiciously developed though appropriate protection of the greater interests of larger stakeholders.

International Aluminium Institute (IAI) adopts principles of sustainable bauxite mining practices¹

IAI accepts that the principles of sustainable bauxite mining practices are common to the mining of other minerals and are focused on reducing impacts on biodiversity, land and water; on promoting community engagement and on integrated rehabilitation and closure activities. Developing and integrating practices across safety, environment, economy, efficiency and the community can also improve sustainability of mining operations.

Principles include:

- Ethical business practices and sound governance;
- Sustainable development considerations in decision making;
- Respect for human rights;
- Effective risk management;
- Health and safety performance;
- Environmental performance;
- Conservation of biodiversity and land use planning;
- Responsible use and supply of materials;
- Social contribution; and
- Engagement and transparent reporting.

It declares that the strategies to mitigate negative environmental and social impacts of bauxite mining may include:

- Identification of culturally and environmentally significant areas and alterations to mine plans to minimize impacts;
- Control of dust levels by watering, road maintenance and vehicle speed limits, load limits and covering of vehicles;
- Construction of settling ponds and other drainage control structures;
- Rehabilitation planning and implementation as early as possible and progressively throughout the life of the mine, including landform design, topsoil usage and revegetation outcomes;
- Biodiversity management that identifies opportunities for improvement by introducing innovative and sustainable land management practices;

¹http://www.world-aluminium.org/media/filer_public/2018/05/18/170518_sbmg_final.pdf

- Noise abatement measures such as provision of buffer zones, altered timing of operations, modification of equipment, changes to mining and blasting methods; and
- Procedures to minimize fuel (hydrocarbon) and other spillages.

Coal India to close unsafe or underground coal mines

CIL's 369 mines contribute to 84% of total coal production in India. However, many of its underground coal mines have become unprofitable and huge cost centres. At present CIL is producing less than 10% of its total production from underground mines. It has plan to streamline its operations by closing 53 of its 174 underground coal mines as many of its operations have become unsafe or unprofitable.

However, production at some of its mines has faltered in 2017-2018, underground operations produced 30 million tonnes, equal to just 5% of the company's total production for the financial year – and the company is looking

Eastern Coalfield Limited, known for producing maximum coal from underground mines and running the country's deepest underground mine — Chinakuri, shut 11 underground mines in two years. It is likely to further close down the operational underground mines and enhance production from open cast mines. Coal was excavated from a depth of 625 metres at the Chinakuri mines and CIL adopted a technology in which coal could be mined at 1,700 metres and at a rock temperature of 57 degrees centigrade. But underground mining affects productivity as well as increases under recoveries and the company wouldn't have been able to achieve 607 MT of production, had it continued to lift coal from underground mines.

However, there is a need for R&D and experimental operations for deep mining as underground mines remain the future and India will have to look for high-cost technology to meet the challenges of the near future.

NMDC Ltd reports a modest 3.36% increase in iron ore sales

NMDC Ltd, the country's largest iron ore miner, reported a modest 3.36% increase in cumulative iron ore sales to 19.99 million tonne (mt) between April-November 2019 as against a sales of 19.34 mte in the same period last year.

While NMDC's Chhattisgarh mines accounted for a bulk of the sales at 14.85 mte against 13.78 mte last year, the contribution of the company's mines in Karnataka was lower at 5.14 mte this year compared to 5.56 mt in 2018.

NMDC also posted a marginal rise in iron ore production to 18.89 million tonne between April -November 2019 as against a production of 18.75 mte upto November 2018. While NMDC's Chhattisgarh mines accounted for a production volume of 13.33 mte (against 12.24 mt last year),

its Karnataka mines contributed 5.45 mte in April-November 2019, which is over a million tonne lower compared to a production of 6.51 mt in same period last year.

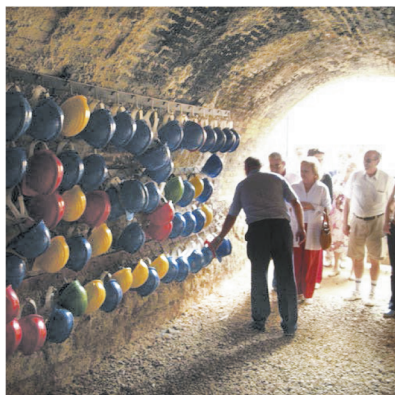
Post amendment of Mineral Rules 2015, which made renewal of mining leases of PSUs mandatory, NMDC expects a fast resolution of the Donimalai mining issue in Karnataka. With proactive production planning, iron ore volumes are estimated to touch 32 mte in FY20. Lst month, an ICICI Securities report said NMDC could be in a 'sweet spot' with "Donimalai mining expected to resume, domestic iron ore prices currently at around 40% discount to landed cost of imports at east/west coasts, and the possibility of the company benefiting from iron ore mining auctions."

MINING TOURISM AND GEOTOURISM



Investment in Mine closure and completion should be steered towards development of mining tourism and geotourism for ensuring sustainable development in mining areas. A good reference of this approach is available in the Proceedings of the 24th World Mining Congress: Sustainability in mining, Edition: 1, Publisher: IBRAM, pp.301-309, 2016. This article by Silas Samuel of Universidade Federal do Rio Grande do Norte, Brazil has highlighted MINING TOURISM AND GEOTOURISM: ALTERNATIVES SOLUTIONS TO MINE CLOSURE AND COMPLETION

Business to be developed



Sustainable Development Cell (SDC)



On December 16, 2019, The Ministry of Coal has decided to create Sustainable Development Cell (SDC) with the aim to promote coal mining in an environmentally sustainable manner in India & to address environmental concerns during the decommissioning/closure of mines.

Key Points:

- In a scenario where private players are expected to play an increasingly significant role, this move gains significance in future.

- *Terms of Reference (ToR):* The mitigation measures that are taken by the coal companies will be monitored by the cell & it will mentor the companies regarding the ways to maximize the utilization of available resources in a sustainable way.

Functioning as a ministry-level nodal point, SDC will work on beautification and creation of eco parks in the reclaimed areas that will promote tourism for recreational purposes. At present, India's coal mining areas spread over 2,550 sq kms and plans are to extend these areas further. It will also create the future policy framework for the environmental mitigation measures (water sprinkling, dust suppression methods, noise barriers etc.) including the Mine closure Fund. The cell mandates to Collect the data regarding present quantity, quality, surface runoff, drainage of mine water, future availability of water collected in UG(Underground) coal mines etc, and should analyse it on a GIS (geographic information system) based system to prepare model Coal Mine Water Management Plans (CMWMP). It is expected that functioning of this cell will bring major positive changes in the conceptual mine closure planning and design, continuous rehabilitation design, rehabilitation assessment, closure planning audits, financial assurance management for mine closure, evaluation of rehabilitation success, development and monitoring of mine closure success indicators and mine closure completion certification.

Kudremukh Iron Ore Mine- A Drowned Glory

[This is an abridged version of a long paper written by Mr. S. R. Roy, B Tech (MINING), ISM & PGDM(Ecole Supérieure Des Mines de Paris), Senior Manager & Manager Safety, KIOCL, Contoller of Mines (RETD), IBM. –Editor-in-Chief]

The Iron ore deposit in Kudremukh was one of the largest in the world. M/s National Mineral Development Corporation undertook the preliminary investigation of the surrounding areas in Kudremukh in 1960s. Government of Iran financed for the project to buy back the finished product. However Iran withdrawn from the project due to its internal problem. Later Government of India completed the project. Kudremukh Iron Ore Company Limited, under the Ministry of Steel and Mines was established on 2nd April 1976 to develop mine and plant facilities to produce Iron Ore Concentrate from low grade Magnetite ore.



The mining site at Kudremukh and the palletization plant at Mangalore port¹

The Magnetite Iron Ore concentrate mined and beneficiated at the captive mines of Kudremukh was used for pellet making for more than three decades till December 2005. KIOCL had stopped its mining operations at Kudremukh with effect from 01.01.2006 in pursuant to Hon'ble Supreme Court's Judgment, as the area was declared National Park.

It is now fourteen years since the last extension of lease granted to the Kudremukh Iron Ore Company Ltd (KIOCL) has expired (December 31, 2005). This prestigious iron ore mine and its downstream activity went by largely unnoticed and unappreciated in India. Like a bubble in a swamp, it rose and after some silent bubbling in one remote corner of India, it died down. And yet, it was India's experiment with

mining and mineral processing technology at the forefront, in its day and possibly Asia's largest mine, even today.

The project got off due to a contract with Iran and the contract fell through due to the Islamic revolution there. After the Iran Iraq war devastated the Bandar Ahwas port and steel mills under construction, the contract with Iran fell through and the Government of India financed the Rs 610 Crores needed for the project. The iron ore market went into its cyclical slump and by the time it recovered into an unprecedented boom, the project had practically exhausted its reserves. It sold its product in a buyers market.

The project's outlay has been returned handsomely in cash and kind, only because of the hard work for low pay, by the staff and workmen.

What did KIOCL do.....

The mine and rest of the project was designed on the lines of much larger low grade iron ore operations in the US and Canada, namely Mt Wright and MINNTAC Mines. These were also magnetite mines as of Kudremukh, however, they did not have the complexity of the ore found in the Kudremukh area.

The project brought a level of mechanization in India, which was highly capital intensive and established a work culture, which was not available in the best of private and government companies in India, before and since. It brought a lot of road development in the South Canara district, financial contribution in terms of royalty, employment, contribution of Rs 100 Crores to Karnataka State hydroelectric development of Sharawathy Hydel Project, in 1975. The Mangalore port which was a very minor port, was augmented in size, capability and draught, to handle the export shipping and mechanized loading terminal. Today this port handles oil imports for the Mangalore Refinery and Chemicals and supports a BASF Chemical Plant, besides other industry. The road from Mangalore to the project, a distance of 110 Kms, was a 10 foot village road which was widened, and the last 40 kms through passing through Ghat section, from Mala village, was relayed and widened and designed to carry 100T PETERBILT Trucks, to transport the heavy machinery. It also made tourism to Sringeri Shankaracharya's Math and further onwards to Kalasa Annapurna Temple, approachable from the coast.

¹ https://www.kioclltd.in/Kidsweb/kiocl_story.html

The Kudremukh Iron Ore Mine, could be implemented, because of one principal natural resource, that is water. The availability of water, in abundant quantity at the Lakhya river, originating in the nearby hills and then joining the Bhadra River downstream of the project, was what was essential for the water based beneficiation process and also the transportation as a slurry to the New Mangalore port facilities.

The company did not encourage national R&D and established a research culture to augment technology and environment that led to its closure through litigations and disputes.

The Operations.....

In 20 years the Messrs METCHEM, CANADA designed mining system of KIOCL mined its 430 MT of low grade weathered iron ore from hilltop with 1200m to 800m above mean sea level and left 250MT that were down below. The closure made the huge capital investment in machinery down the drain, the equipment were disposed at a throw away price in 2014 to a Chennai based dealer.

Machinery introduced at IOCL

Eight 14 cyd P & H 2100 BL rope shovels with a fleet of thirty WABCO 120 ton rear dump trucks with electric drive worked at KIOCL with a high technology bulk material handling system for producing 22.5 MT of ROM (7.5 MT of concentrates). Three BUCYRUS ERIE 60 R 310mm diameter drills served to drill the blast holes for large size blasting in the mine. Three 12 CYD Letourneau Marathon FELs with electric drive were introduced to feed the crushing plant with 4000 Tonnes per hour capacity Allis Chalmers gyratory crusher, made by KOBE steel served two steel cord belt conveyors of 1600mm to feed a 1800mm steel cord belt for transferring the ore to a covered stockpile facility for 350000T with blending capability.

A large fleet of advanced equipment of that time were maintained with the state-of-the art maintenance system supported by workshop and inventory stores.

The concentrator plant had the then largest Automills of 32M diameter. Concentrate slurry was transported to Managalore port palletizing plant at a distance of 110km by slurry pipeline.

The mine maintained a huge tailing dam named as Lakhya tailings dam.

A vibrant township with a good social life and modern facilities of hospital, education, communication got built up. The scenic beauty of site

attracted many film makers to the Kudremukh township.

However, the mine could not be closed by the miners with a proper mine closure plan as it was closed under environmental disputes and the court used its wisdom to close without techno-economic consideration and national resource optimization. There are always better option of closing with proper R&D and technology deployment.



An officer's quarter in the township lamenting the glorious days



The vibrant basket ball court of the past... signature of unplanned mine closure, result of blind justice!²

² <https://swarajyamag.com/ideas/a-ghost-town-in-the-western-ghats>

Unscientific OB removal destroying the valuable top soil in our coalfields is a big concern!

Sometime ago I happened to travel through the open cast coal mining area of Raniganj Coalfield. I was very sorry to see the way overburden (OB) in the mine was being removed without taking care of cutting the layer of the topsoil first with small excavators and dumping it separately away from the OB dump areas.

Topsoil is a priceless gift of nature to mankind. It is the topmost about half a meter layer of soil above the subsoil on the surface. This is the stratum containing all the organic constituents of soil formed by the process of decomposition of plants and leaves by soil bacteria. Topsoil is the primary resource for plants to grow and crops to thrive. Formation of topsoil with all its qualities is not possible to produce synthetically. According to history all the past civilisations started where there was fertile land for human race to live and flourish. In absence of topsoil humanity would perish. Therefore, it's our duty to protect this nature's gift from destruction due to impact of mining.

Subsoil is the layer of soil below the topsoil on the surface of the ground. Like topsoil, it is composed of a variable mixture of small particles such as sand, silt and clay, but with a much lower percentage of organic matter and humus. The sterile subsoil is relatively barren in terms of soil organisms compared to humus-rich topsoil and unsuitable for plant growth. Below the subsoil is the substratum of residual bedrock, sedimentary deposits. As it is lacking in dark humus, subsoil is usually paler in colour than the overlying topsoil. It may contain the deeper roots of some plants, such as trees, but a majority of roots of plants lie within the topsoil.

Main two parameters of topsoil are Carbon (C) and Nitrogen (N). The Carbon provides energy and Nitrogen is a tissue builder. Plants require both of these in a range of ratios to enable suitable growth. An optimum figure for Topsoil is a ratio of less than 20:1. This ensures that the soil has a suitable energy reserve as well as tissue building material to enable the plants to thrive. A sawdust typically has a carbonaceous base with high C:N ratio (in order of 400:1), while an Alfalfa Hay has a low carbonaceous content and can typically have a C:N ratio in order of 12:1.

Many people think new soil is created overnight. But that's not the case. Formation of topsoil is an incredibly slow process. It takes 100 years for every inch of soil formation. It is formed from weathering of rocks and then subsequent addition of organic material from decaying plants and animals. Root biomass plays biggest role in maintaining and increasing organic matter. Root

production can be increased in several ways. Scientists say, best way to improve root production is by preventing the soil from erosion by rain and enriching it by adding crops like wheat, soybean and other crops. Thus key components and primary driver of soil health and soil productivity is organic matters which enrich the soil and adds nutrients essential to support plant life.

Topsoil occurs abundantly in West Bengal and Orissa coalfields. While working in the coalfields of different States of India, it was found that in many of the Central Coalfield areas of Jharkhand, the topsoil and even the subsoil is totally absent. Thick bed rocks are exposed below which coal occurs. In those areas for the purpose of bio-reclamation of opencast mine voids topsoil is required to be brought by collecting from other areas or river beds far away from mines. Many times soil insufficient in quality and quantity proves plantation futile.

Before breaking the earth in an opencast coal mining project, after cleaning the vegetation, first and foremost job is to ascertain the quality of the topsoil in the proposed mine site. An in-depth study of soil characteristics and climatic condition of the proposed mining area help a long way for soil management. The qualitative and quantitative information on the available topsoil in the mining area helps planning bio-reclamation and early vegetation. Study should also encompass the soil profile and soil sample analysis of physical characteristics (like, particle size distribution, texture, pore space, bulk density, water holding capacity, etc), physicochemical characteristics (like, pH, cation exchange capacity, base saturation, etc), chemical characteristics (like, organic carbon, available nitrogen, phosphorous and potassium, available micronutrients, copper, zinc, iron, manganese, etc). Soil study also exposes deficiency of particular ingredients for a specific type of plant growth. Accordingly, necessary fertilisers can be prescribed for early and healthy vegetation.

Having known the quality and quantity of the topsoil available and also the duration that the soil is to be preserved before reuse for biological reclamation, cutting of the topsoil is started after cleaning the vegetation as per proposed layout of the open cast mine benches. In case of backfill system, the soil can be immediately spread over without shelving it. But in case of multi-seam working, simultaneous cutting of topsoil and spreading over the backfilled area may not be possible until all the seams are worked out. In that case the topsoil has to be excavated with the help of scrapper carefully so that it does not get contaminated with the inorganic stones of the OB and subsequently the

extracted topsoil separately has to be stored scientifically in a predetermined site.

After cutting the layer of the topsoil, it has to be stacked at a site cleaned of any loose inorganic stony material. Availability of space and quantity of topsoil would determine the overall size, shape and height of the topsoil heap. It is suggested to limit the maximum storage height to 5.0 meter with slop of 1 in 3. Texture-wise height of topsoil heap as suggested by experts should be:

<u>Texture of soil</u>	<u>Maximum height of soil heap</u>
Sandy soil	5m
Loamy soil	2m -3m
Clayey soil	1m
Intermediate Texture soil	1m - 5m

Arrangement for sufficient aeration of the soil in the heap has to be there for retention of biological properties of the soil. The soil storage area has to be protected by retaining wall all around of sufficient height to protect it from rain wash and suitably compacting the heap to prevent from blowing by wind. If possible the soil removed in suitable layers may be stored accordingly with labelling and also lifted for spreading over OB dumps accordingly. For sustenance, soil should be stored with maximum surface area and suitable slope preventing erosion, gully formation and land slide. The heap should be allowed to grow dwarf grasses and legumes to check erosion and gully formation. Shelf-life of a particular type of soil may be ascertained by soil experts to avoid loss of soil quality.

A study of shelf-life of topsoil in one large opencast coal project of Eastern Coalfields Ltd (ECL) revealed major qualitative deterioration of the topsoil was due to storage for a long period of time. Inability to preserve topsoil in proper manner is one of the basic hindrances to reclamation of mined land. Hence the best way is to utilise the topsoil excavated immediately in the backfilled area without going through storage process, of course, if study shows the topsoil available does not require any amendment for nutrients. Otherwise, the topsoil should be stockpiled, enriched of the deficiencies in C:N ratio, etc. before reuse.

During reuse topsoil should be spreaded suitably upto a maximum thickness of 45 - 50 cm to support plant growth. And before actual plantation, one rainy season may be allowed to pass to stabilize the soil on the dump. Use of soil on the terrace formed at the top of the dump or on the slopes has to be meticulously done to have maximum benefit with minimum spread of soil. To prevent erosion loss of soil from the bench terraces or graded benches, plantation of quick growing grasses,

forage crops, herbs and shrubs is suggested during the first few years after reclamation. Construction of peripheral channels, catch drains, and check dams save the land from silting due to flow of soil from OB dumps.

Apparently the activities of topsoil management may seem to be excess and cost prohibitive. But in the long run, it proves to be very helpful for successful biological reclamation. This process has been done very successfully in Piparwar Project of CCL and many of the World Bank aided mega-opencast Projects of NCL, MCL and SECL in Coal India.

For sustainability of mining industry, technological improvement is important but at the same time mitigation of environmental impacts of mining has a big role to play. Effective topsoil management for biological reclamation for bringing back the impacted landscape to its original state generates good opinion on acceptability of the industry in the minds of the local people.

West Bengal Power Development Corporation Limited (WBPDCCL) has been allotted with the Deocha-Pachami Dewanganj-Harinsingha coal block. It is world's second largest block spread over 12.28 square km area with estimated reserves of 2.10 billion tonnes of coal. The block belongs to Birbhum coalfield in West Bengal. The is going to be the largest coal mine in Asia and the newest mine in West Bengal. This would surely require huge investments and perhaps technology from outside India. It is expected to produce 30-40 million tonnes of coal a year. The State probably will have budget for selling a part of it for power production; and the rest to be used for other purposes, such as production of ammonia or urea, and consumers of other downstream industries. Birbhum Coalfield is situated almost in the central part of the Gangetic West Bengal having thick topsoil/soil cover spread over large area. Hope all actions of utilising the topsoil for proper biological reclamation of mine voids will be taken scientifically in the project.

"Closure of 166 iron ore mines in Karnataka's Bellary, Chitradurga and Tumkur districts since 2011 led to 80,000 direct lay-offs, affecting 8 lakh people indirectly. Similarly, suspension of all mining activities across Goa since 2012 for similar reasons resulted in the loss of 1 lakh direct and 3 lakh indirect jobs." -----Sunil Duggal

MINE CLOSURE INITIATIVES IN CIL

IMPLEMENTATION OF MINE CLOSURE PLAN (MCP) & ITS PRESENT STATUS IN CIL MINES

Mine closure occurs as a result of the total extraction of the resources within the physical limits or unworkability of the



Massive Plantation over the Subsided area of Saoner

deposit due to technical/economic reasons. The legacy of abandoned mines and their associated adverse environmental and safety problems have contributed to an increased emphasis on mine closure planning in recent years. Planning for mine closure is a critical component of environmental management in the mining industry. Planning for mine closure should start before mining commences and should continue throughout the life of the mine until final closure and relinquishment.

Aim & Objective of Mine Closure Plan (MCP):

The main aim of MCP is to leave a mine site in a condition which is safe and stable, limiting further environmental impact after end of the operations.

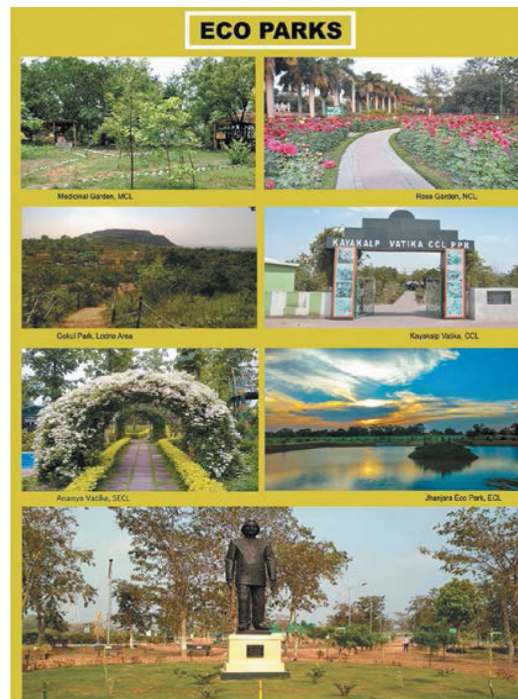
The objectives of MCP are to protect public health and safety, eliminate environmental damage, achieve a productive use of land and to the extent achievable, provide for sustainability of social and economic benefits resulting from mining operations.

Guidelines for Preparation of Mine Closure Plan in Coal Mines of India

Guidelines for Preparation of Mine Closure Plan in Coal Mines of India were issued by Ministry of Coal (MoC), vide Notification dated 27th August 2009 and the same was subsequently revised on 11th January 2012 and 7th Jan, 2013.

The guidelines stipulate the followings:

- i. Incorporation of MCP along with Mining Plan/ Project Report for a new mine.
- ii. All coal mine owners shall adopt a MCP for each of their mines
- iii. MCP should comprise of progressive closure plan and final closure plan
- iv. MCP should be duly approved by the competent authority.
- v. All coal mine owners, who are operating coal mines without the approval of any MCP are required to obtain a MCP approved as per these guidelines within a period of one or two years in advance of mine closure whichever is earlier from the day these guidelines come into effect.
- vi. All coal mine owners, who have already been accorded approval of Mining Plans/Project Reports without the MCPs as per these guidelines, are also required to prepare and obtain the approval of MCP as per these guidelines within a period of one year from the day of these guidelines coming into effect.
- vii. The total cost estimate has to be assessed based on the notified guidelines.
- viii. Escrow Account has to be opened with Scheduled Bank & Fund has to be deposited every year.



- As per issued guidelines, Rs.6.00 lakhs / hectare for OC mines and @ Rs.1.00 lakh / hectare for UG mines are to be deposited in the escrow fund (considering wholesale price index level w.r.t 2009 levels) which

will stand modified based on the whole sale price index as notified by GoI from time to time

- Annual closure cost is computed considering total leasehold area at above mentioned rates and dividing the same by the entire life of the project (for new projects) and balance life (in case of existing projects)
 - An amount equal to annual cost is to be deposited in the Escrow Account throughout the mine life compounded 5 % annually.
 - Up to 80 % of the deposited amount can be released after every 5 years after certification by third party agencies
- vii. Coal Controllers' Organization releases fund based on the progress made in implementing MCP.
 - viii. Funds generated in escrow account are basically meant as security to cover closure cost in case a mine owner fails to comply.
 - ix. Additional funds could be recovered from mine owner if deposited funds are found to be insufficient.
 - x. Mine owner shall undertake to provide the additional fund equivalent to the gap in funding before 5 years of Mine closure
 - xi. Closure / restoration shall be completed within the period specified in MCP, failing which escrow account shall be forfeited.

Certification are to be done through any third party Agencies namely, NEERI, CMPDI, ISM, Dhanbad, IIT Kharagpur, IIST, Shibpur or any institute notified by GoI for the purpose to inspect the mine closure, restoration as per MCP (2016 up-dation)

Procedure/Conditions of Withdrawal from ESCROW accounts

As per the guidelines of MoC, the withdrawal from the ESCROW accounts shall follow the following procedure

- (i) Certification of claims by an authorized third party agency approved for this purpose by MoC, Govt. of India involving physical verification of progressive/Final mine closure activities and related records.
- (ii) Acceptance of claims by CCO, Kolkata based on certified claims of authorised third party agency and further physical verification of progressive/Final mine closure activities and related records as it deems fit.

Progressive Mine Closure Plan

Closure activities are done continuously & sequentially during the entire period of mine operations. The progressive Mine closure includes phase wise mining and reclamation of mined out areas during mine operations.

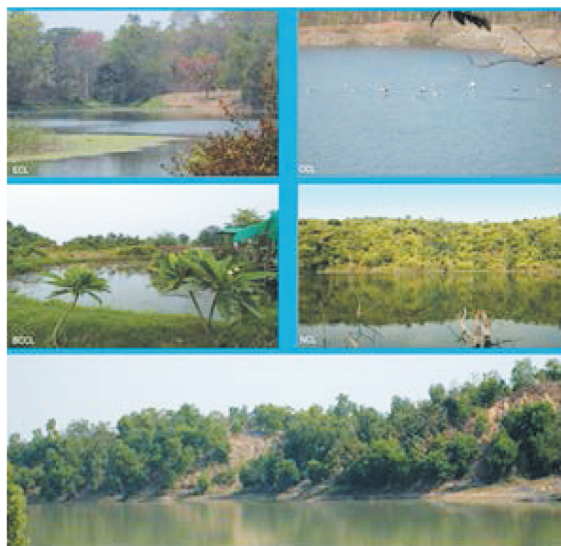
Final Closure Plan

Final mining closure activities starts towards the end of the mine life and it may continue even after the exhaustion of reserves or the mining activities are discontinued. The final closure activities are carried out till the mining area is restored to an acceptable level to the coal Controller as per Third party certification of the final closure activities to create a self-sustained eco system. Third party certification of the final closure activities are to be done through any third party Agencies amongst NEERI, CMPDI, ISM, Dhanbad, IIT Kharagpur, IIST, Shibpur or any institute notified by GoI .If the restoration activities shall not be completed within the specified period in the MCP, the amount in the escrow fund shall be forfeited.

After the final closure, the mine owner shall be required to obtain a mine closure certificate from the Coal Controller to the effect that the protective, reclamation and rehabilitation works in accordance with the approved mine closure plan/final mine closure plan have been carried out by the mine owner for surrendering the reclaimed land to the State Government concerned.

Status of MCP in CIL

Mine closure plans have been prepared and approved for all 438 identified mines of CIL. As on 31st October 2019, Rs. 719.00 Crores has been disbursed from the escrow fund for the activities performed under the Progressive Mine Closure and Rs.6782.33 Crores is lying balance in the escrow fund. CIL has developed the following closure activities in its mines:



- After winning of coal, the excavated land is used for biological reclamation, creation of water bodies, creation of eco parks and ecological restoration sites by CIL.
- It is worthwhile to mention that CIL has planted around 97.65 Million plants over an area of about 39,000 Ha.

land till 2018-19. CIL subsidiaries are also returning the forest land to the state forest departments with due afforestation after extraction of coal.

- The discharged mine water during the mining operation and water bodies created during the mining activities act as a source of water for industrial use, internal use, ground water recharging and community uses. The water filtered from the source is supplied to the community nearby. Various schemes are also under implementation for supply of drinking water to the local community by signing of MoUs with State Governments

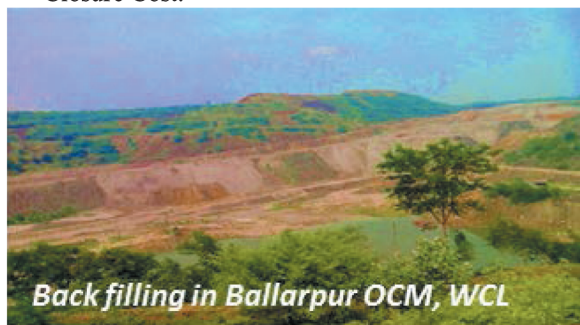
Through all its projects, CIL has reached to a total number of 7.46 Lakh beneficiaries. Also, there are 306 rainwater harvesting projects in CIL till 2018-19 which are used for the use of community.

IMPLEMENTING MINE CLOSURE PLAN AT WCL

Mine closure is an ongoing series of decisions and activities beginning in the pre-mining stage of mine and ending with a sustainable site which is ecologically and socially acceptable.

Ministry of Coal (MoC), issued a Notification vide No. 55011-01-2009-CPAM dated 27/08/2009 regarding preparation of the Mine Closure Plan as per issued guidelines and the same was revised on 7th Jan, 2013. The salient points covered are:

- Preparation of Mine Closure Plan for all existing & ongoing mines.
- Opening of escrow account for depositing Mine Closure Cost.



Back filling in Ballarpur OCM, WCL

- Reimbursement of upto 80% of the total deposited amount including interest accrued in the escrow account in the past five years against expenditure incurred on the progressive mine closure.
- For Open cast mines, corpus is estimated: @ Rs 6 Lakh per ha. of Project area as on Aug, 2009
- For Underground, corpus is estimated: @Rs 1Lakh per ha of Project area as on Aug, 2009
- Mine closure corpus to be updated as per WPI figures existing as on date.
- Mine Closure Plans of WCL were prepared by CMPDI, RI-IV after the issuance of the guidelines by MoC. Later, Mine Closure Planning is

incorporated as an integral part of Project Report.



Landscaping at Mahakali UG

- A Tripartite Escrow Agreement is carried out between WCL, a nationalized bank and Coal Controller Organization for opening of Escrow Accounts of each mine. Following information reveal WCL's progress in implementing mine closure plans:



Sealed haulage incline in Pathlakhara-II, WCL

- As on 31.03.2109, there are 87 Approved Mine Closure Plans in WCL whose Escrow accounts are active.
- In WCL, A Mine Closure Cell is formed at Subsidiary HQ Level, Area Level and Unit Level for the implementation and monitoring of Mine Closure Activities.
- As per MOC guideline no. 55011-01-2009-CPAM dated 7th Jan, 2013; it is required that after every 5 years the mine closure activities are to be certified by Third Party Auditors (TPA) like CMPDI, NEERI, IIST-Shibpur, ISM-Dhanbad, IIT-Kharagpur. Based on that the expenditure incurred in the mine closure activities, 80% of the corpus deposited in the escrow account may be reimbursed to the mine owner every 5 years.

As per the above guideline, WCL has issued the following work orders to TPA for carrying out Progressive/Final Mine Closure Activities:

WCL has issued



Large Scale Plantation over OB Dump in NCL

“Work Order for Third Party Claim Certification of Progressive and Final Mine Closure Plans for 24 mines” to the CMPDIL dt 24.08.2018.

A summary of the work carried out is detailed below:

- The Progressive/Final Mine Closure Claims were prepared from the Area/Unit Level and submitted to CL HQ for scrutiny and submission to TPA.
- CMPDIL RIV conducted the Third-Party Auditing/ Certification of 23 Mines for Progressive Mine Closure Activities and 1 Mine for Final Mine Closure activities.



- The TPA certification reports of progressive mine closure activities were submitted to CCO HQ, Kolkata and subsequently officers from the CCO Regional Office, Nagpur visited the mines for ground truthing of the mine closure activities.
- As on date CCO has released Rs 23547.71 Lakhs against Progressive Mine Closure Claims of 9 Mines and Final Mine Closure Claim of 1 mine (Pathakhera II UG)
- The Final Mine Closure of Pathakhera II UG was successfully completed as per the mine closure guidelines and upon the recommendation of CCO, the escrow account of Pathakhera II UG has been closed and the entire amount in the account has been reimbursed to WCL.
- CCO has reimbursed the Progressive Mine Closure claims of 9 mines (6 OC and 3 UG).
- As on date, Progressive Mine Closure Claim files of 14 UG mines are with CCO, Kolkata for final recommendation.

WCL has also issued a Work Order for “Auditing/Certification of Opencast Progressive Mine Closure Activities as per Approved Mine Closure Plan for 34 OC mines of WCL” and “Auditing/Certification of Final Mine Closure Activities as per approved Mine Closure Plan for 04 UG mines of WCL” to CSIR-NEERI dated 10.10.2019.

A summary of the work carried out is detailed below:

- The Progressive/Final Mine Closure Claims were prepared from Area/Unit Level and submitted to WCL HQ for scrutiny and submission to CSIR-NEERI (TPA)
- As on 26-11-2019, CSIR-NEERI conducted the third-party inspection of 16 mines and submitted the Progressive Mine Closure Certification reports for 8 mines.

- WCL submitted the 8 certification reports to CCO, Kolkata and CCO inspection of the above submitted mines to start in the month of December 2019.

Similarly WCL issued a Work Order for “Auditing/Certification of Underground Progressive Mine Closure Activities as per Approved Mine Closure Plan for 17 UG mines of WCL” to IEST-Shibpur dated 10.10.2019.

- Meeting held with TPA at the office of GM(Environment) on 24-10-2019.

- **Inspection** of the mines for Underground Progressive Mine Closure Activities likely to start in the month of December 2019.

As per clause 7 of annexure of the Guidelines for preparation of the Mine Closure Plan: No. 5501-01-2009-CPAM dated 07.01.2013, Yearly Report of Mine Closure Activities to be submitted before 1st July of every year. Accordingly WCL has been submitting the Yearly Report of Mine Closure Activities of all the mines to CCO, Kolkata every year before 1st July every year. The same for the year 2019-20 has also been submitted. A Quarterly Report on the Mine Closure activities of all the mines are also submitted to CCO, Kolkata at the end of every quarter.

IMPLEMENTATION OF MINE CLOSURE PLAN (MCP) IN MCL

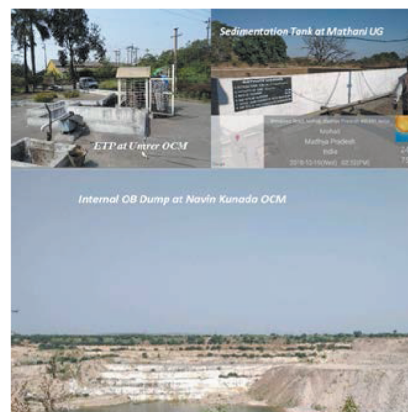
In MCL have opened 26 Escrow Accounts and Funds are deposited every year by the

Finance department as per the advice of CP & P department in line with the details as envisaged in the Mine Closure Plan of each mine.

Accordingly, MCL deposited Rs. 9229, 50,000.00 in the Escrow account on 31.03.2019 for the Year 2018-19. Fund balance in the Escrow Accounts of MCL including interest accrued as on 31.03.2019 is 97850, 93,442.00.

Objectives of Mine Closure Planning in MCL

1. To allow a productive and sustainable after use of the sites which is acceptable to the Mine Owner and the regulatory authority.
2. To protect public health and safety.
3. To alleviate or eliminate environmental damage and thereby encourage environmental sustainability.
4. To minimize adverse socio-economic impact.



Various aspects of mine closure planning in MCL are summarized as below:

The mine closure planning broadly involves the following aspects.

- 1- Technical aspects
- 2- Environmental aspects
- 3- Social aspects
- 4- Financial aspects.

Types of Mine Closure Plans.

There are two types of Mine Closure Plans.



- a) Progressive Mine Closure Plan
- b) Final Mine Closure Plan.

Different Guidelines for preparation of Mine Closure Plans in MCL

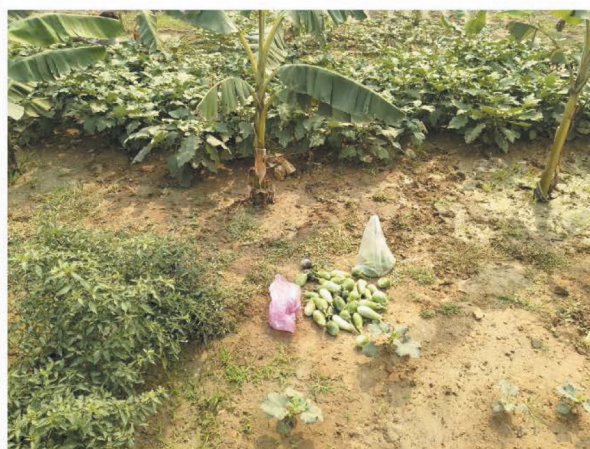
1. All coal mines have a duly approved mine closure plan
2. The competent authority to approve MCP- Board of the company in case of MCL.
3. MCP has two components- Progressive MCP & Final MCP.
4. A fixed deposit Escrow Account opening prior to obtaining mine opening permission of the Controller Organization Office, Kolkata. Yearly fund deposit per Ha of project Area in Escrow Account.
5. Reimbursement- upto 80% of the total deposited amount including interest accrued in the Escrow Account or actual expenditure incurred may be released after every five years.
6. Certain activities to be included in MCP by Govt. before closure of the mine for safety and conservation of environment of the Govt.
7. Statutory obligation.
8. After closure of the mine, the reclaimed leasehold area or any structure thereon, which is not to be utilized by the owner shall be surrendered to the state government concerned following a laid down procedure as in vogue at the point of time.
9. Yardstick, as updated by CCO, HQ. Kolkata for claiming the amount from the Escrow Account against

work done under progressive mine closures in OCP mine.

10. Yardstick, as updated by CCO, HQ, Kolkata for claiming the amount from the Escrow Account against work done under progressive mine closures in UG mine.

Mine Closure Activities Reports to CCO, HQ, Kolkata.

Mine Closure Activities Report are sent to CCO, HQ, Kolkata Annually & Quarterly in prescribed format of CCO.



Progressive Mine Closure Activities of MCL for reimbursement from Escrow Account.

The executives of Env't & Forest department, MCL HQ are visiting mines to sort-out the issues relating preparation of Mine Closure Plan reimbursement Files.

Co-ordination meetings are organised regularly in MCL HQ and Area HQs among the members of MCP Cell, Area & Project environmental Officers to streamline the process & faster progress of Mine Closure activities.

IMPLEMENTATION OF MINE CLOSURE PLAN IN SECL

SECL submitted the progressive/Final claims for the first phase (2010-11 to 2014-15) CCO, Kolkata Vide letter dated 23.09.2019 issued Guidelines for the cost distribution details of which to be followed for acceptance of Mine Closure Claims.

The certification of remaining eligible 22 Claims for tentative value of Rs.156.27 Cr is under process with third party agency (CMPDIL) and expected to be completed soon.

Sl.No	Subject	Amount in Rs. Cr
1	Total amount balance (Including interest accrued) in the ESCROW accounts after the completion of first phase.(2010-11 to 2014-15)	541.51
2.	Total maximum amount eligible for withdrawal from ESCROW accounts after the completion of first phase. (2010-11 to 2014-15) as per MoC guidelines. (@ 80% of column 3)	437.21
3.	Total maximum amount eligible for withdrawal guidelines from ESCROW accounts after the completion of first phase.(2010-11 to 2014-15) as CIL yardsticks(@ 74.18% for OC & 48.81% for UG Mines)	313.72
4.	Total amount of claims submitted by the SECL to third party agency (CMPDIL) for certification (79 Nos of Claims)	372.52
5	Total amount of claims submitted by SECL after certification by third party agency (CMPDIL) to CCO,Kolkata for acceptance (57 Nos of Claims)	216.25
6	Total amount of claims accepted by CCO,Kolkata and amount released (9 Nos of Claims)	142.73
7.	Total amount of remaining claims under the process of acceptance with CCO,Kolkata (48 Nos of claims)	73.52

Constrains/ Issues in withdrawal from ESCROW accounts:

1. Coal India Limited (CIL) appointed committee issued initial guidelines for submission of claims from ESCROW accounts in Aug,2016 which were further revised in Aug,18.This resulted in Re-submission/ recasting of claims in many cases.

2. The accepting authority for mine closure claims and issue of release order from ESCROW accounts, i.e. Coal Controller Organisation (CCO),Kolkata,MoC issued

guidelines on details of submission of claims and its acceptance on 23.09.19 only.

3. The process of withdrawal of money is a lengthy Inter and Intra departmental process involving external agencies Third party auditing agency(CMPDIL), Coal Controller Organisation and Bank, which have their own procedures, logistical and other constraints in the certification and settlement of claims.

Efforts of SECL in realisation of claims:

SECL realised amount from ESCROW accounts for its Gevra OC.

SECL is the first in Coal Industry to realise from ESCROW accounts of an UG mine (Churcha UG) on account of Mine Closure activities.

SECL so far submitted the highest number of claims in Coal Industry (57 Nos of Claim) to CCO, Kolkata for acceptance (7 OC+ 50 UG).

Mine closure initiatives undertaken by SECL.

- **Developing Pisciculture and allied activities** at Bishrampur OC . As a unique and first case of its type in the country SECL in conjunction with State government has funded Rs.1.97 Cr for development of Pisciculture and related activities in the old quarry of Bishrampur OC as work of final mine closure activity. The site has also become a recreation facility for local people by way boating and floating restaurant. This is benefitting the surrounding community specially of Kenapare, Jainagar, Kunjnagar and Bishrampur Villages. by providing sustainable income after mine closure.
- **“Ananya Vatica” in Rajnagar OC.** A beautiful garden developed in the reclaimed old queries of Rajnagar OC with an artificial pond developed which is has become home to variety of migratory birds.
- **Kotma West UG.** A beautiful park and shopping complex developed over the surface Area of Closed inclines of Kotma West UG.



Progressive Mine Closure at Piparwar OC of CCL.

Piparwar OCP of CCL which was awarded in 2016 2nd prize for “Pollution Control and for complying with Rules & Regulations for conservation of Environment” by the Jharkhand State Pollution Control Board, Ranchi operates with a project/lease area of 1120 Ha. This consists of forest land, Government land and tenancy land.

As a part of progressive mine closure plantation is being done as per the norms and guidelines of forest department.

This helps in enriching the flora and fauna of project area. the density of plantations undertaken is 2500 plants per Ha.

As per the post mining land use plan of Piparwar OCP, 589.26 Ha has been proposed to be covered with plantation and remaining 8.80 Ha of mine void will be converted into water body. 267 Ha of mined out area has been reclaimed with plantation until August 2017 as a progressive mine closure activity. Besides this, a Kayakalp Vatika/Eco park has been developed over the backfilled area so as to develop the Bio-diversity of this area.

Apart from above, two water bodies have been developed within the mine void to serve as a water reserve and to replenish the ground water level of this area.

Natural beauty, mining heritage sites, museums, and architectural features are the most attractive resources found in a post-mining city by visitors.



Mining tourism

Mining tourism is a form of tourism enough separated, that does not present participants with special tour's definitional problems. German sociologist Christoph Henning lists the following "theories of tourism". They can also be transposed into an exploration of the underworld, in particular, the discovery of antique mines. For tourists visiting the mines, from a sociological point of view, mine visits can have different dimensions. Mines are not only objects typical of mining, but also have a sacred, cultural character, and may also be emotionally associated with active tourism cultivation. Theories of Henning can also be transferred to the cultivation of mining tourism. Thus, this theory may be presented as follows:

1. Theories of escape - Antique mines are the perfect place where one can get away from everyday's problems, they are an opportunity to change the environment and lifestyle.
2. Theories of recreation - some "tourists mining" is in such unusual conditions can perfectly relax, regenerate physical and mental strength, improve health and fitness.
3. Theories of instincts - in the mines, there are discerning a unique place where one can realise unload of primal drives such as an itinerant or exploration urge.
4. Conformist theories, explaining tourist activity in antique mines, imitation of the popular patterns of behaviour, deference to the current fashion or consumption for the show-off.
5. Theories of pilgrimage building parallel between tourist and pilgrim. According to these theories, tourist destinations, including antique, mines open to the public can be compared to religious sites whose visit is tourist obligation (or even the duty). This manifests the sacred character of the mine itself.
6. Theories of imaginary worlds, which supporters point to the realistic experience of the world by tourists. Tourists can verify stereotypes and misconceptions about working in the mines, specific operating and safety conditions.

The analysis of mining tourism by Henning theory allows to accurately determine the possible interest of the tourists engaged in mining tourism and defines in theory and practice needs arising from visiting of historic underground objects. Many studies have been published in the field of tourism activity. Researchers are also trying to reach people who participate in mining tourism activities.

[Source: Mining tourism, sacral and other forms of tourism practiced in antique mines - Analysis of the results, by Paweł Różycki and Diana Dryglas in Acta Montanistica Slovaca 22(1):58-66 · January 2017.]

17th October- 1971: *A Nightmare in Coking Coal Collieries.*

By S. C. Agarwal

Post independence, the Government of India introduced several 5-years development plans to increase annual production of coal from 33 million tons at the end of First Five Year Plan. To increase coal production efficiency by scientific development of the coal industry, first G O I Undertaking, NCDC was established comprising collieries owned by Railways in 1956. Since 1945 SCCL was all ready operating under the control of the Government of Andhra Pradesh.

A government plan to increase production with scientific mining was not coming from privately operated mines. Unscientific mining practice by matter of private coal mine owners, poor working conditions of labor became matter of concern for the Govt. On account of this, the Central Government took a decision to nationalize the private mines. This was done in two phases, the first one with Coking coal mines in 1971-72 and then with non-coking coal mines in 1973.

It is not that all the mines run in the private sector were practicing unscientific mining or in poor labor conditions. Big mining operators such as Bengal Coal Company, Birds & Co, Turner Morrison was practicing most mechanized technology, maintaining high standards of safety and maintaining harmonious labor conditions. In spite of toughest working conditions, highly gassy, deepest even under the river, they had adopted best mining practice. All underground mining were most productive adopting state of art. I had worked for 8 years in the underground mines of the Bengal Coal Company in WB. This was the first company to install first continuous miner, Anderton Shearer in 1962-63 on a 600 ft Longwall face where I had worked for 2 years as a Post Graduate Trainee.

Yet there had been a large number of small and medium level mines operated by small mine owners all in the unorganized sector. These mines were mining mainly coking coal, employing a large number of miners. Working conditions of these mines were pitiable, adopting the unscientific practice, hazardous and unsafe. Accidents were common, many proving fatal. Coal recovery was low leading to fire. The Jharia mine fire is well known where coal has been burning for decades.

These conditions were of great concern of Government. On account of these reasons, the Central Government took the decision to nationalize the privately run coal mines, first coking coal mines and then non-coking coal mines. On 17th October 1971, Coking Coal Mines

(Emergency Provisions) Act- 1971 was promulgated for taking over in public interest of the management of coking coal mines and coke oven plants pending nationalization. In 1971, the Government of India nationalized all the 214 coking coal mines and 12 coke - ovens running in the private sector, excluding those held by TISCO and IISCO for their captive use.

This was followed by the Coking Coal Mines (Nationalization) Act, 1972 under which coking coal mines and coke oven plant other than those with the Tata Iron & Steel Company Ltd and Indian Iron Company Ltd, were nationalized on May 1, 1972 and brought under the Bharat Coking Coal Ltd (BCCL), a new Central Government Undertaking.

Night of 17th October was a nightmare for all private owners who were operating Coking coal mines and coke oven plants for many & many years. Just a fortnight before, because of threat from Naxalites, I had resigned from Poidih colliery belonging to the Bengal Coal Company in Asansol and joined Kharkhari colliery belonging to Mr B. P. Jain. This was a coking coal mine in Jharia coal field, about 10 km from Katrasgarh town. The mine was worked underground through a pair of pits/shafts.

The mine workers were mainly hired through contractors and were not paid even the minimum of Rs 5/ day. The loaders were paid on the piece rate basis. The contractors were mobilizing workers main from Eastern UP, Gorakhpur, were living in called Dhawras, hutments.

A team of officials from NCDC, headed by Mr P. R. Sinha, as Custodian, appeared at the mine office early morning of 17th to take over the management of the colliery. CISF security-personal encircled the colliery, all roads leading to colliery were blocked.

The 17th night proved to be a nightmare to the mine owners who could not sleep the whole night. It proved havoc to them. The mine owners started planning on moving the mine machines and stores to their private premise away from the mining areas. As directed by owner even I had arranged to bring out 2 coal cutting machines from the underground and arranged loading into trucks. The trucks moved out to a given destination, but apprehended on the way by CISF and returned back to the mine to be lowered down to the pits.

The Contractor started playing foul by pressuring owners and mine management to enroll their casual workers on a

permanent role through fake entries in Form- B and Form-D.

Those managers who refused to act under such pressure, had to face dire consequences from these criminal turned contractors. The case of a manager being shot dead on a chair in the office is on record. Criminal activities had started flailing and created unfriendly and non cooperative environment for those not belonging to the State.

The Custodian asked the mine owner to furnish details of all permanent assets and structures, with their area , value as per balance sheet. Having failed to satisfy the Custodian that they had built their residential building on mine premise through their own finance and not from a World Bank loan, the owner was directed to hand over vacant possession. After waiting for a few days, CISF intervened by encircling the building and announced to come out with their personal belongings. After vacating their luxurious residence, I remember when Mr B P JAIN the mine owner had said "Agarwal ji today stand bankrupt losing big business and black future" This is how destiny plays its role. This day proved to be nightmares for all owners who ruled the coking coal mines for decades.

At OKD Mining Museum in Ostrava, Czech Republic one can explore the former mining sites and the collections of tools and artefacts used to unearth the area's riches. Tourists take an underground tour to get a feel for the working conditions that miners endured. You can see equipment used in rescues and other mining technology at this historical and cultural landmark.



The Sado Gold Mine, Japan, which was run directly by the Tokugawa Shogunate in the Edo era (1603-1867), helped to keep the government financially afloat. The mine continued to operate in the modern era, finally halting production in 1989.



HEADQUARTERS ACTIVITIES

The Report of the 882nd Council Meeting of MGMI held at MGMI Bldg. GN-38/4, Sector - V, Salt Lake, Kolkata - 700 091 on 7th April, 2019 at 11.30 a.m. (Duly approved in the 883rd Council Meeting held on 27th July, 2019).

Present : Shri Anil Kumar Jha, President, MGMI in the Chair. The meeting was attended by Prof Banerjee S P, Prof. Dhar B B , S/Shri Jha N C, Saha R K, Goenka J P, Talapatra Ranajit, Ghosh Samir Kr , Prof (Dr) Pathak Khanindra, Roy Prasanta, Arora V K, Prof. Bhattacharjee Ashis, Biswas Anup, Bose L K , Chakraborti Bhaskar , Choudhury Akhilesh, Prof (Dr) Dasgupta Sajal, Prof (Dr) Dey N C, Karmakar Anil K, Prof (Dr) Sen Kalyan, Singh Anil Kumar, Dr Sinha Amalendu, I P Wadhwa and Lochan Rajiw.

ITEM No. 0 Opening of the Meeting

- 0.1 The meeting was Chaired by the President, Shri Anil Kumar Jha. President extended welcome to the Past Presidents, Council Members. President expressed his gratitude to see the presence of galaxy of the Council Members for attending the meeting. Thereafter, he requested Hony. Secretary, Shri Rajiw Lochan to take up the proceedings.

0.1.1 Leave of absence was granted to those who could not attend the meeting.

Condolence:

One minute silence was observed in the memory of late Prof Ajoy K Ghose, late B J Rao and late Sri Kumar Mitra. The formal condolence meeting was earlier convened on Saturday, 23rd March 2019 at 2.45 p.m. at MGMI (H.Q) to pay respect to the departed soul.

882.1.0 To confirm the Minutes of the 881st meeting of the Council held at the MGMI

Bldg. Kolkata - 700091 on 8th December, 2018 at 11.30 a.m.

The Minutes were circulated to all Council Members. So far, no comments were received. The Council then resolved that:

Resolution: The Minutes of the 881st(1st meeting of the 113th Session) meeting of the Council held on 8th December, 2018 at the MGMI (H.Q). Kolkata be confirmed with correction of little typographical error.

882.1.1 To consider matters arising out of the Minutes.

The Council then considered the Action Taken Report on the Minutes of the 881st Council Meeting held on 8th December, 2018 at Kolkata and were confirmed.

882.2.0 To discuss about the 8th Asian Mining Congress. (i.e. 6-9 November, 2019)

The Hony. Secretary requested to Shri R K Saha, Chairman, Organising Committee to brief on the progress. Shri Saha intimated to the Council that the announcement letter with brochure of the 8th AMC has been sent to

- i) CMDs and Directors of Mining, Mineral and Allied Industries
- ii) All Embassies in India
- iii) Different Ministries (Ministers and Secretaries)
- iv) Technical Universities, Technical Institutes and Colleges
- v) MDOs of CIL Subsidiaries

Shri Saha briefed about the Income and Expenditure details of the 7th AMC and placed the budget for the 8th AMC showing likely Income and Expenditure. He further added that the Afghanistan along with other countries are identified to approach for participation in the 8th AMC. It was confirmed that AMC venue booked in Hotel Westin and booking advance amount has also been deposited accordingly.

The Hony. Secretary requested Dr Amalendu Sinha, Chairman, Technical Committee to give a status report to the Council. Dr Sinha briefed the Council and informed that the First Call along with covering letter about the 8th AMC with request to participate in this mega event and contribute Technical Paper on any of the Lead Topics for Technical Sessions proposed has circulated. He also requested Council members to extend support in this regard for record number participation from all corner. He further added that next call to write for Country Status Paper, Keynote Address Paper from the respective eminent personalities from India and Abroad. He has also informed that Proceedings of the 8th AMC will be published in both hard and soft copy. The hard copy will be published by a renowned publisher, i.e. Oxford or Elsevier with ISBN number.

Thereafter, Shri Prasanta Roy, Convenor of the 8th AMC updated the Council that a comprehensive list of organisations have been prepared to whom request letter will be issued for different categories of sponsorship, thereafter follow-up for delegates, message and advertisement will be done vigorously to break previous records.

Shri Ranajit Talapatra, Joint Secretary, briefed the Council about the joint meetings of the Organising and Technical Committees on 8th AMC held. He also briefed about probable cultural group whom we can approach for AMC. Dr Khanindra Pathak also informed about cultural troupe of respective State.

It was agreed that special thrust will be on quality papers and more time for interaction. Keynote Paper should be by eminent persons. If needed more parallel Technical Sessions will be organized. It has been agreed that Embassies/ High Commissions will be approached for Country Status Papers.

On advice of IME Convenors, Hony. Secretary requested Shri I P Wadhwa, Managing Worker of M/s. Tafcon to update Council regarding Exhibition IME 2019. Shri Wadhwa informed that the Eco Park at Rajarhat, Kolkata has been booked for Exhibition. He also intimated that as per MoU between MGMI and M/s. Tafcon, M/s. Tafcon will contribute minimum guaranteed amount of Rs. 45.00 lakhs to MGMI, however, excess over guarantee money will be

calculated at a sum of Rs. 935/- per Sq.mt. of net booked areas of inside exhibition hall and Rs. 605/- per Sq.mt. of net exhibition open space booked outside the hall.

Shri J P Goenka and Shri V K Arora, Convenors of the Exhibition Committee suggested Sub Committees for continued follow-up to generate more surplus amount for MGMI. Mr Wadhwa assured that he will keep updating the Committee on regular basis.

882.3.0 To discuss on the following subjects for consideration

a) MGMI Innovation Award

Hony. Secretary explained to the Council that a draft paper on criteria and categories has been prepared by the committee consisting of (i) Prof. Bhabesh Chandra Sarkar, (ii) Prof. N C Dey, and (iii) Prof. Khanindra Pathak. It was circulated among the Past Presidents, Council Members and received valuable suggestions and it required to be revised for further deliberation. It has been agreed that this Committee will examine and finalize the document accordingly.

Further, the Council discussed this matter along with other existing awards and opined that MGMI is not receiving good number of nominations for these awards and in few occasions committee has not found suitable nomination to recognise even awards are open for all.

It was unanimously agreed that a Committee to constitute to review existing award categories and proposed awards. The Council constituted a Committee with the following members to recommend MGMI Awards for consideration to continue or Council may decide otherwise.

- Prof. S P Banerjee
- Prof B B Dhar
- Shri N C Jha
- Prof Khanindra Pathak
- Prof N C Dey

List of nomination received in last five years under various categories will be provided to the Committee by MGMI. The Committee will also examine and recommend awards money for identified awards for consideration of the Council, accordingly, MGMI will explore potential sponsorer for value addition of MGMI Awards.

b) Formation of an MGMI National Students Chapter in Technical Institutes / Colleges

Hony. Secretary explained to the Council that a draft paper on criteria and categories has been prepared by the Committee consisting of (i) Prof. N C Dey, (ii) Prof. Khanindra Pathak., (iii) Prof Asish Bhattacharjee and (iv) Shri Anup Biswas. It was circulated among Past Presidents, Council Members and received valued suggestions. Past Presidents Prof B B Dhar, Shri N C Jha and Council members submitted their

comments. The Committee members were requested to modify the draft document accordingly and it should be simple and comprehensive.

During the Council, Past Presidents commented that white paper on formation of Students' Chapters is very complex and it is likely to overlap with local MGMI Chapter while there is already MGMI Membership existed under the category of "Student Associate Membership" and we should promote it and for better coordination Council should recommend MGMI member as Coordinator/Advisor from respective Chapter who will have close liaison with Institutes and MGMI.

The Committee members were also requested to review the proposal considering the existing provision of membership for Student membership to make it more effective without any overlap.

882.4.0 To discuss the forthcoming events of the Institute

a) 113th Annual General Meeting

The Council discussed the matter at length and felt that in view of the 8th Asian Mining Congress 2019, it will be difficult to hold the 113th Annual General Meeting in September 2019 as many major activities will be underway and heavy work load is envisaged. So, considering circumstances, Council agreed and resolved that the 113th Annual General Meeting would be held at the afternoon of **8th November 2019**. Accordingly, it should be requested to the Office of the ROC for their consent and information.

b) 61st Holland Memorial Lecture

The Council decided that the 61st Holland Memorial Lecture will be held in Delhi. The date of the Lecture and the Speaker will be decided in consultation with MGMI Officials and MGMI Delhi Chapter, as Delhi Chapter is organizing Round Table Conference (RTC) on 24th September, 2019 at Le Meridian, Delhi.

882.5.0 To consider and appoint a Judging Committee for various Awards and Medals. (List attached)

Hony. Secretary in consultation with senior Members revised the previous list of the Judging Committee Members and placed for consideration of the Council. Council after detailed deliberation approved the List of Judging Committee Members.

882.6.0 To consider and constitute a board of Scrutineers to conduct the Election of Council Members for the year 2019-2022.

The Hon. Secretary submitted to the Council that for the year 2019-22, there will be 11 (eleven) vacancies in the Council. The retiring members are Shri Amrita Acharya, Prof. Ashis Bhattacharjee, Shri B C Bhattacharya, Shri L K Bose, Shri Bhaskar

Chakraborti, Shri J P Goenka, Prof. (Dr) G P Karmakar, Prof.(Dr) SK Mukhopadhyay, Shri Anil Kr. Singh, Dr.Amalendu Sinha and Shri Ranajit Talapatra.

The Council constituted a Board of Scrutineers to conduct the Election of Council Members for the years 2019-22. The members of the Committee are (i) Shri R K Saha as Chairman, (ii) Shri V K Arora, Member,(iii) Shri Anup Biswas, Member, (iv) Shri Anil Kr Karmakar, Member, (v) Shri Prasanta Roy, Member and Shri Rajiw Lochan, Hony Secretary as Ex-officio Member.

882.7.0 To consider applications for membership and the membership position of the Institute.

- a) The Council approved 15 Life Membership and 01 Life Donor Membership applications.
- b) The Council noted the present position of membership which is as follows:

Membership Position

(As on 07.04.2019)

	08.12.2018	Add	Trans	Loss	07.04.2019
Member	265	-	-	-	265
Life Member	2518	15	-	-	2533
Associate	40	-	-	-	40
Student Associate	06	-	-	-	06
Life Subscriber	32	-	-	-	32
Subscriber	01	-	-	-	01
Donor	02	01	-	-	03
Patron Corporate	04 08	-	-	-	04 08
	2876	16		-	2892

882.8.0 Any other matter with the permission of the Chair.

Staff Matter: The Hony. Secretary informed to the Council that earlier Council approval was to engage Shri G Ghatak and Shri Joy Chakraborty on temporary basis upto 31st March, 2019. Shri Ghatak has been serving as Executive Secretary of MGMI. Shri Joy Chakraborty was engaged for the work of the 7th AMC and subsequently extended his service

tenure. Their performances are satisfactory, therefore, their contract may please be extended for another one year.

Council approved the extension of services of Shri G Ghatak and Shri Joy Chakraborty for one more year on same terms and conditions. The Council also suggested to consider services of Shri Joy Chakraborty as permanent category staff if his performance will be satisfactorily during extended contract period.

The meeting ended with Vote of thanks to the Chair at 1.40 PM.

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The Report of the 883rd Council Meeting of MGMI held at MGMI Bldg. GN-38/4, Sector - V, Salt Lake, Kolkata - 700 091 on 27th July, 2019 at 11.30 a.m. (Duly approved in the 884th Council Meeting held on 19th October, 2019).

Present : Shri Anil Kumar Jha, President, MGMI in the Chair. The meeting was attended by Dr Nanda N K, S/Shri Ritolia R P, Jha N C, Saha R K, Mandal P R , Goenka J P, Talapatra Ranajit, Roy Prasanta, Acharya Amrita , Arora V K, Biswas Anup, Bose L K , Chakraborti Bhaskar , Choudhury Akhilesh, Prof (Dr) Dasgupta Sajal, Dayal Binay, Karmakar Anil K, Prof Karmakar G P, Prof (Dr) Mukhopadhyay Subir Kumar, Prof Sarkar Bhadesh C, Dr Sinha Amalendu, I P Wadhwa and Lochan Rajiw.

ITEM No. 0 Opening of the Meeting

- 0.1 The meeting called to order by the President, Shri Anil Kumar Jha. The President welcomed the Past Presidents Dr N K Nanda, Shri R P Ritolia, Shri N C Jha, Shri R K Saha, Shri Binay Dayal and all Council Members present in the meeting and the invitee Shri I P Wadhwa.

- 0.1.1 Leave of absence were granted to those who could not attend the meeting.

Condolence:

Two minutes silence was observed in the memory of late Samir Kumar Ghosh, one of the council members. The Hony. Secretary appraised the house about late Samir Kumar Ghosh, Hony. Treasurer who left for heavenly abode on 17th July, 2019 at about 4.00 a.m., at AMRI Hospital, Dhakuria, Kolkata after a critical illness.

Shri J P Goenka, Shri L K Bose, Shri Ranjit Talapara spoke about late Samir Kumar Ghosh to pay respect to departed soul. Shri Rajiw Lochan, Hony. Secretary submitted to the house his sincerity prove that even in illness he completed accounts of MGMI for the year 2018-19 for Audit purpose before time.

Samir Kumar Ghosh was born on 26th March 1938. Graduated in Science (Metallurgy) from Calcutta University in 1957. Initially, he worked for M/s

Indian Aluminium Company Ltd., for five and half years. He worked for 31 years for Hindustan Copper Ltd., Ghatshila in various capacities in Rolling Mill, Smelter, Flash Smelter and in Pollution Control Projects. He rose to the rank of Manager (Metallurgy) in HCL. After retirement he worked for around 4 years as Technical Consultant for a Pvt. Company, executing the modernization of Hot Strip Mill of Bokaro Steel Plant. He was trained for Flash Smelter abroad by HCL/ ICC. He was Council Member of MGMI from 1996-99. He was an active member of the Institute in all occasions held by the Institute including the biennial Asian Mining Congress and Exhibition. He was successful in organizing MGMI President's Cup Golf Tournament since 1995 as Co-convenor. He was a Life Member of The Indian Golfing Union. He was the Honorary Secretary of Indian Institute of Metals, Kolkata Chapter for the last 4 years.

Late Ghosh had a very amiable personality. He was very much approachable by one and all. He is remembered for his smiling personality. He will be deeply missed by MGMI, his family, friends. He has left behind his wife, a son and a daughter.

With heartfelt grief the MGMI Members wishes 'may his soul rest in peace in his heavenly abode'. May Almighty give strength to his surviving family members and to bear the loss.

IME 2019

Before taking up the agenda items, Hony Secretary, requested Shri I P Wadhwa, Managing Worker, Tafcon Projects India Pvt. Ltd. to brief the Council about the present status of the IME 2019 (Exhibition in connection with 8th AMC).

Shri Wadhwa informed that 101 companies have already confirmed their participation in the Exhibition. However, target is of 350. He requested the members present to talk to various organisations in their contact to request for showcasing their equipment in the Exhibition in a bigger way. He also suggested holding a Press Conference at Kolkata. It was proposed to hold a Committee Meeting and Press Conference preferably on Saturday, the 17th August, 2019 at Kolkata. President agreed for the date and desired that all members of Exhibition Committee should participate on scheduled date. He also advised to make a list of all invitees and ensure that all of them should be informed well in advance.

883.1.0 To confirm the Minutes of the 882nd Meeting of the Council held at MGMI Building, Kolkata – 700091 on 7th April, 2019 at 11.30 a.m.

The Minutes were circulated to all the Council Members. So far, no comments were received. The Council resolved that the Minutes of the 882nd (2nd meeting of the 113th Session) Meeting

of the Council, held on April 7, 2019 at MGMI (H.Q). Kolkata be confirmed.

883.1.1 To consider matters arising out of the Minutes.

The Council considered the Action Taken Report in respect of the Minutes of the 882nd Council Meeting held on 7th April, 2019 at Kolkata and noted the report.

883.2.0 To Discuss on the progress of the 8th AMC & IME – 2019 (Conference & Exhibition).

Dr Amalendu Sinha was requested to brief about the status of Technical Sessions of the 8th AMC. Dr Sinha informed that so far 13 eminent persons have agreed to deliver Keynote Addresses. In this connection, Dr Sinha requested the house to speak to the people of their contact for their conformation who have been approached by MGMI to deliver Keynote Address but have not given their consent as yet. The President then immediately spoke from the chair to the Chairman, ONGC and MOIL and both of them have instantly gave their consent. President expressed that the quality of technical papers should be of good standard and he asked for the list of dignitaries who agreed to deliver Keynote Address. In this connection, Shri R P Ritolia mentioned that so far, we have received the consent from Research Organisations and Academic Institutes only. More dignitaries from Industry sector should be invited to deliver the Keynote Addresses.

883.3.0 To Discuss on Recommendations of the Committee for MGMI Awards and Medals

The report of the Award Review Committee was circulated to all Council Members. However,

Shri N C Jha summarized the report and highlighted the main recommendations of the Committee that all the existing Awards may be consolidated to four MGMI Awards namely as follows:

- MGMI Award for Coal Mining - for outstanding contribution in Coal Mining industry.
1. MGMI Award for Non-Coal Mining - for outstanding contribution in Non-Coal Mining Industry
2. MGMI Earth Sciences Award - for outstanding contribution in any Branch of Earth Science and Mineral Engineering and
3. Best Technical paper published in MGMI Transactions for every Calendar Year.

It was proposed that all the four mentioned awards will carry a monetary reward of Rs. 50,000/- or more with a Citation and the expenses will have to be met by MGMI. It was also proposed that the existing sponsors for the various awards should be requested to sponsor their respective sponsored amount in favour of MGMI Consolidated Awards Fund. All the sponsors will be duly acknowledged during award ceremony.

The procedure for selecting the awardees for the three prestigious MGMI Awards will have to be drawn and can adopt the model followed by Indian Institute of Metals for the Metallurgist Award or by the Ministry of the Mines for the National Geoscience for similar distinguished awards.

Students Award Scheme will maintain the status quo except for one change. The names of Student Awardees will be notified in the AGM of MGMI and in MGMI News Journal. The Student Awards will be given at the Foundation Day celebration function of MGMI.

The Council discussed on the recommendations of the Award Review Committee at length and finally accepted the recommendations and it will take in effect from the coming year, 2019-20.

Shri L K Bose, donor of Prof. S K Bose Memorial Award was present in the meeting and he was requested for his opinion about Prof. S K Bose Memorial Award. Shri Bose mentioned that one award should be kept for the Professors. President desired that MGMI should improve the standard of the Awards and Dr Amalendu Sinha added that the Awards must carry some weight. To increase the value of the Award it was unanimously decided that name of MGMI will be pre-fixed with all the Awards to be given for 2018-19.

883.4.0 To Authorize Council to approve the recommendations of the Judging Committees for various MGMI Awards & Medals for the year 2018 -19.

The Recommendations made by different Judging Committees for various Awards and Medals have been accepted by the Council. Since there were no nominations received for Prof. S K Bose Memorial Award, the Committee decided that the said award will not be awarded with the consent of the Donor representative, Shri L K Bose.

883.5.0 To review and consider the proposed Budget for the year 2019-20

The draft budget was circulated to the Council Members and also placed in the meeting. The Council discussed on the proposed budget and approved the budget for the year 2019-20 after some clarification.

883.6.0 To Elect/Nominate Treasurer for the balance term

Due to sudden demise of the Hony. Treasurer, Samir Kr Ghosh on 17th July 2019, the Council of MGMI nominated Shri Anil Kumar Karmakar, Council Member as the Hony. Treasurer till the election of new office bearers.

883.7.0 To consider applications for membership and the membership position of the Institute. The Council approved 04 (four) Life Membership applications.

- c) The Council noted the present position of membership as follows:

Membership Position (As on 27.07.2019)

	07.04.2019	Add	Trans	Loss	27.07.2019
Member	265	-	-	-	265
Life Member	2533	04	-	01	2536
Associate	40	-	-	-	40
Student Associate	06	-	-	-	06
Life Subscriber	32	-	-	-	32
Subscriber	01	-	-	-	01
Donor	03	-	-	-	03
Patron	04	-	-	-	04
Corporate	08	-	-	-	08
	2892	04	-	01	2895

883.8.0 Any other matter with the permission of the Chair.

a) To approve the Auditor's Report and Audited Accounts for the Financial Year ended 31st March 2019

The Auditor's Report and Audited Accounts for the Financial Year ended 31st March 2019, were placed before the Council for consideration. The Council gone through the Auditor's report, Balance Sheet for 2018-19 and approved after some clarification & adopted it for further needful.

b) To appoint the Institutes Auditors for the year 2019-20 with their remuneration

Council considered the proposal of M/s. Jha & Jha Chartered Accountants Company vide letter dated 24th July 2019 submitted offer to accept appointment as the Auditors of MGMI for the year 2019-20. Previous Auditor has also given his consent for it. Accordingly, Council approved the appointment of M/s. Jha & Jha Chartered Accountants Company as Auditors of MGMI for the FY 2019-20 at a remuneration of Rs. 12,000/- for execution of all assignments of Audit, ROC, Annual Filling, IT Returns, GST Returns etc.

c) Authorisation for financial operation

The matter regarding incurring of statutory and other expenses that are of recurring in nature after the

AGM, till the formation of the new Executive Committee and intimation to the Banks on change of signatory was deliberated in the Council meeting. It was requested to the Council to authorise the outgoing Executive Committee to continue till election of the new Executive Committee is constituted, to operate the bank accounts, for smooth functioning of MGMI activities.

The Council considered the operational problems faced every year and authorised outgoing office bearers to operate bank accounts till formation of the new Executive Committee and approved the modalities accordingly.

Proposal for Technical Committee

Past President Shri R K Saha suggested that MGMI should also be involve in more and more Technical Activities, likely consultancy job, as we have pool of experienced learned members who are willing to provide their services through MGMI. He suggested that MGMI should approach State Government, Central Government and Private Organisations for the same. Council very gladly acknowledged and accepted the proposal. In this connection, President advised to constitute a Committee comprising of 5-6 personnel for taking necessary initiative. Council approved the Committee consisting of members namely (1) Shri N C Jha, (2) Shri R K Saha (3) Dr Amalendu Sinha (4) Shri P R Mandal and (5) Shri Bhaskar Chakraborti.

Proposal for New Award

A proposal dated July 21, 2019 has been received from Dr Yoginder P Chugh, Professor Emeritus and Visiting Professor, Mining and Mineral Resources Engineering, Southern Illinois University, Carbondale, Illinois, USA, for initiating an Annual Award for Indian Professionals through MGMI. The Council accepted to consider the proposal under the approved four categories. Accordingly, endowment amount will be communicated to him for sponsoring MGMI Award.

President on his concluding remarks mentioned that we must make MGMI financially independent, so that the day to day activities can be run smoothly in befitting manner. He also added that in order to achieve this we may also engage honorary professional personnel to make MGMI more vibrant and visible, to keep its image for which MGMI is known.

ANNUAL GET-TOGETHER 2020 CALCUTTA BRANCH

MGMI Calcutta Branch will be organizing a get-together for its members and their families (in the new year -2020-) on 19th January 2020 (Sunday) at NIRALA RESORT, DEOLTI, HOWRAH West Bengal (2Km from the house of the Great Bengali Novelist Sarat Chandra Chattapadhyay) , to celebrate its 28th Annual Get-together.

Interested members may contact the MGMI office (2357-3482/3987) or the Coordinators / Organizing members, listed below, for paying the subscription amount and enrolment of names.

Dr .A.K. Moitra (9433971346)

Ajoy Kr. Das (9830058914)

Bhaskar Chakraborti (9477345036)

Atanu Roy (9432266793)

Aminul Islam (8013556146)

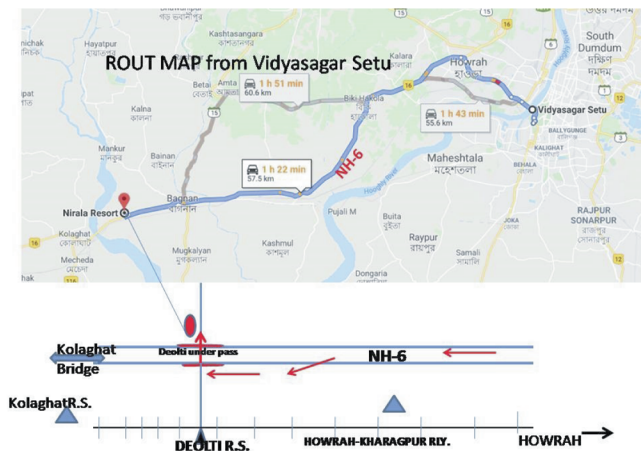
Snehangsu Chakraborty (9831997118)

Sajalendu Ray(9051979600)

Smt Tanushree Dutta (9748743062)

Ranjit Kr. Datta (9432340320)

Sambhu Chakraborty (9088293557)



***Location Map of Nirala Resort,
Deolti, Howrah District, West
Bengal***

Forthcoming Mining Events

<https://www.globalminingreview.com>

[WEBINAR] How to succeed in Digital Transformation in Mining and Materials

10 February 2020 - 10 February 2020, United Kingdom

During this webinar, OSIsoft will explain their successful path to Digital Transformation, including Predictive Maintenance 4.0 from an asset reliability perspective, Health, Safety & Environment improvement opportunities, and Autonomous Operations for process optimisation.

MineXchange 2020 SME Annual Conference & Expo

23 February 2020 - 26 February 2020

Phoenix Convention Center

100 N 3rd St, Phoenix, Arizona, 85004, United States

MineXchange SME Annual Conference & Expo connects mining's professional in vibrant exchange of information, ideas and products. This premier event for the mining and mineral industry features over 120 technical sessions, short courses and symposiums, and an expansive Expo with more than 550 vendors.

Robotics & Automation in Mining

26 February 2020 - 27 February 2020

The Westin

480 Hay Street, Perth 6000, Perth, WA, Australia

Robotics & Automation in Mining will enable stakeholders to undertake a significant digital review of their business and identify areas in which automation and robotics will add most value.

Metal & Industrial Mineral Processing Exhibition & Conference

09 March 2020 - 11 March 2020

PO Box 1659, Al Athaiba P.C. 130, Sultanate of Oman, Oman

The Oman Metals & Industrial Minerals Congress 2020 will bring together influential decision-makers, industry analysts, mining & minerals operators, mineral processors, automation providers, construction software specialists, engineering consultants, EPC contractors, OEMs and investors, all on one platform.

Future of Mining Australia 2020

23 March 2020 - 23 March 2020

Sofitel Sydney Wentworth

61-101 Phillip St., Sydney, New South Wales, 2000, Australia

The third edition of the Future of Mining Australia covers a vast range of content spanning the entire mining life cycle,

focusing on the innovations and technologies driving the industry forward with senior representation from mining companies, service providers, government, finance and research organisations.

MiningWorld Russia 2020

21 April 2020 - 23 April 2020

Crocus Expo, IEC

65-66 km Moscow City Ring (MKAD), Moscow, 143 401, Russia

24th International exhibition of machines and equipment for mining, processing and transportation of minerals

12th International Comminution Symposium (Comminution '20)

27 April 2020 - 30 April 2020

Cape Town, South Africa

This, the 12th International Comminution Symposium (Comminution '20) is organised by MEI in consultation with Prof. Aubrey Mainza and is sponsored by King's Ceramics & Chemicals, Russell Mineral Equipment, Keramos, Starkey & Associates, Grinding Solutions, Glencore Technology, ME Elecmetal and Derrick Corp.. Media sponsors are International Mining, and the Coalition for Eco-Efficient Comminution (CEEC) are industry advocates.

10th International Symposium on Biomining (Biomining '20)

08 June 2020 - 09 June 2020, Falmouth, Cornwall, United Kingdom

This, the 10th International Symposium on Biomining* (Biomining '20), is organised by MEI with Prof Sue Harrison and Dr Chris Bryan.

Euro Mine Expo 2020

09 June 2020 - 11 June 2020

Skellefteå Kraft Arena, Skellefteå

Mossgatan 27, SE-931 70, Skellefteå, Sweden

Euro Mine Expo in the north of Sweden is an international trade fair and conference for the mining industry and associated industries.

6th International Symposium on Sustainable Minerals (Sustainable Minerals '20)

10 June 2020 - 11 June 2020

Falmouth, Cornwall, Falmouth, United Kingdom

Report on the 8th Asian Mining Congress

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 theme of the conference was 'Ensuring sustainable and equitable use of resources without degrading the environment' is the demand of the day. The 8th Asian Mining Congress on '**Green Mining: The Way Forward**' 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 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
 - **H.E. 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

There were nine technical sessions and one panel discussions with eminent persons. The Exhibition was held with 225 exhibitors from different allied sector and the buyers-sellers meet conducted parallel was well participated by different stakeholders.

The recommendations of the conference are as follows:

RECOMMENDATIONS FROM THE CONGRESS (8TH AMC 2019)

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, 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 are 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 (WiFi 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 biomass. 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.

Forthcoming Conference

International Conference on Safe Mining and Advanced Resources Technology-2020 (SMART-2020)

December, 16-18, 2020 at Kolkata, West Bengal, India
(Organized by Department of Mining Engg, IIT Kharagpur,
West Bengal, India)
(<http://www.smart2020.co.in>)

Conference Themes

- Mining process optimization and improvement of productivity
- Data Analytics, IOT and machine learning in mining: Industry 4.0
- Geo-mechanics and smart devices for ground monitoring and improvement
- Safety, health and environment: Sustainable practices
- Novel mining system and disruptive technologies
- Mines to Mill: Technology towards zero waste generation
- Resource evaluation, finance and trading
- Mining machinery and mechanization
- Mine automation and instrumentation
- Society and mining: policy, law and governance

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Abstract Submission Guidelines

Abstract of the paper should clearly state the background and objective of the research, brief methodology, preliminary results and highlights. The abstract must be limited to 500 words. **Important Dates & Deadlines**

Dates of conference: 16– 18 December 2020

Last date of receipt of abstract: 30 June 2020

Decision of acceptance of abstract: 15 July 2020

Last date of submission for full paper: 30 September 2020

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