

Mining Engineers' Journal

SPECIAL ISSUE
Vedanta's CSR & ESG activities on Sustainability



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Mining Engineers' Association of India

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No. 5

MONTHLY

December - 2021



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President's Message.....

Dear members,

I am delighted to share with you that we held our Council Meeting on 29-10-2021 at MEAI HQs auditorium, Hyderabad in hybrid mode, with both online and off-line participation of members. This was the First Council Meeting for the term 2021-2023.

Parallely the Hyderabad Chapter had Organized a National Seminar on the “**Role of Critical Minerals in the National Development**”. I appreciate and congratulate the Hyderabad Chapter for Organizing the National Seminar on such a relevant topic and also the need of the hour.

This Year we observed Indian Mining Day with the theme Environmental, Social and Governance (ESG) with zeal and enthusiasm across all the Chapters and HQs. As part of these celebrations, they conducted various events such as national quiz, essay writing competition, blood donation Camp, technical papers presentation and discussion on ESG, mine visits etc.

Mr. Deepak Vidyarthi conducted the MEAI National Quiz-2021. This created a lot of buzz among younger members of all MEAI Chapters and the participation was very high. My sincere congratulations to all the participants and the winning teams. Audience also got a chance to participate in this quiz and selected top ten winners from among them. I thank once again all the Chapters and the participants, and special thanks to Quiz Master who has put in extraordinary efforts to make the event a grand success.

I appreciate all the Chapters Chairmen and Office bearers of the MEAI for conducting befitting activities on the Indian Mining Day and look forward to enlist similar enthusiasm from all the Chapters in all other activities also.

We have started publishing “**CSR Activities, Innovations and Sustainable stories**” from the mining companies in our MEJ from November 2021, which will certainly aid in

- highlighting the best practices that are being followed by the mining organizations,
- sharing innovative practices & enhance the knowledge of mining fraternity, and
- negating the negative image created about mining from the minds of stakeholders.

I thank TATA STEEL for coming forward and sharing their details and supporting the cause.

Ministry of Mines notified the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession (Fourth Amendment) rules, 2021 and Mineral Conservation & Development (Amendment) Rules 2021, and Mineral (Auction) Third Amendment Rules, 2021. We hope that these amendments made to mineral laws will propel the mining industry towards better days.

Regards,

K. MADHUSUDHANA
President



Mining Engineers' Association of India

Regd. Office : Rungta House, Barbil (Odisha)

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EDITOR'S DESK



Dr. P.V. Rao
Editor, MEJ

The National Council of MEAI (Association) under the leadership of its youngest President K. Madhusudhana has initiated several innovative steps to revitalise its diverse activities that received overwhelming and spontaneous response from the Chapters' leadership as well as the individual members. Reviving the dormant Chapters through identification and engagement of key members from those regions, opening new student Chapters and engage the students in the Association activities, encouraging positive publicity of plentiful ESG activities undertaken by the mining sector by effectively utilising the Mining Engineers' Journal (MEJ) and celebrating the Indian Mining Day in a noticeable way across the country are only a few such noteworthy steps to mention.

The National Council felt earlier that it would be difficult to revive the Jabalpur Chapter and hence a fit case for closure. Nevertheless, pertinent efforts put in by the Association's President led to the successful revival of the Jabalpur Chapter as soon as he took over the President's responsibility. The Chapter's new leadership assured the Council to rebuild it as

an active Chapter through promotion of perpetual professional activities and amplifying its membership. This became possible just because of the genuine and coordinated efforts between the National Council and the lead members from the Chapter. Similar success has been realised with the Himalayan Chapter also, which was once a vibrant Chapter. It is imperative for the Association to retain all its Chapters fully dynamic to ensure that the policy makers care to listen and respect its voice as the trusted voice of the mineral industry.

The President of the Association also took upon himself the onus of inspiring the members to play a significant professional role at their workplaces. The Indian Mining Day was celebrated on 1st November with great pomp and show by all the Chapters that are geographically spread across the country in all the mineral producing regions, to raise confidence in the communities existing around them and also motivate the electronic and print media in the country to broadcast the message. Reports and success stories of the IMD celebrations found extensive circulation in the social media as well. The Association took part in a big way in the plantation programs in the mining areas to sustain a healthy environment and highlight the valuable contributions made by the mineral industry in Nation building.

Another great initiative chosen by the National Council is endorsing due publicity to the good deal of community development work and sustainability activities undertaken by the mining companies. As part of this effort, the Association has started carrying out special MEJ issues every month on the CSR and ESG (Environmental Social and Governance) activities undertaken by the leading mining companies in the country since November 2021. Tata Steel sponsored the inaugural special issue of MEJ and Vedanta supported the current issue. To sustain this initiative the National Council is confident that many more leading mining companies will come forward and highlight their innovative CSR and ESG work for the benefit of other mining companies and the overall interest of the mineral industry.

The MEJ, the official organ of the Association, is published every month presenting the key activities of our fraternity, mining companies and the mineral industry at large and sharing the technical knowledge through technical and review articles contributed by our members. It is an industry centric magazine, a platform created to share practical knowledge, experiences and good work practices by its members. However, the Association leadership felt an immediate need to make the MEJ more popular with the mining companies, universities and colleges offering mining and geoscience curriculum, mining related state and central government departments, and international mining associations to share the good deal of research and real-world work done by the professionals and the entrepreneurs from the Indian mineral industry. Though the MEJ is conceived as an industry centric magazine, efforts are afoot from its Editorial Board to get the Journal recognized for SCOPUS indexing to entice superior quality technical articles in more numbers from the researchers and the industry.

- Editor

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IMD CELEBRATIONS 2021

MEAI HEADQUARTERS, HYDERABAD

Indian mining day was being celebrated every year on 1st of November. This year also Indian mining day was celebrated online on 1-11-2021 at MEAI Hqs. ENVIRONMENTAL, SOCIAL AND GOVERNANCE was the theme communicated by Shri. K. Madhusudhana, President MEAI. Shri. Sharat Kumar Pallerla, Director International cooperation and climate change, MOEF, Govt. of India was the Chief Guest on this occasion. Shri. Bidyut Chakraborty, Director and partner of KPMG and Shri. B.R.V. Susheel Kumar, Director Mines and Geology, Govt. of Telangana presented papers on ESG.

Shri. M. Narsaiah, Secretary-General welcomed all participants, Chief Guests, President, Past Presidents, Council members and others. He explained the background of the Indian Mining Day. The Secretary General read out the IMD Pledge.

Shri. K. Madhusudana in his inaugural address stated that he was happy to note that all Chapters of MEAI, Mining Units, Institutions have celebrated IMD in a befitting way. All Chapters, Mining Units, Institutions have organized Work Shops, Quiz programs, Sports activities, Visit to mines with Stakeholders, Students & Family members. Some of our Chapters organized plantation work and food supply to Old age homes. He added that this year Indian Mining Day theme was Environment Social & Governance. Today all the Mining Companies being weighed by Central Govt. as how ESG compliance is being done. Hope the companies will improve the ESG activities to meet the compliances. He further added that MEAI has initiated publishing CSR activities of TATA Steel Limited in the MEJ November 2021 issue coinciding with the Indian Mining Day.

Shri. Sanjay Kumar Pattnaik, Immediate Past President congratulated all the mining professionals across the Nation celebrating Indian Mining Day. He said that economic strength of a Nation is derived from the mining activity of that country and the mining industry in India has immensely contributed to the growth of the Nation. TATA Steel is one such company following the ESG norms since long before. It is the responsibility of the mining companies to adopt sustainable mining involving the stakeholders and shall have the vision to put into practice the social responsibility. MEAI is propagating the good work that was being done by the mining industry.

Shri. Sharat Kumar Pallerla, Director International Cooperation, MOEF and Climate Change, Govt. of India and the Chief Guest at Indian Mining Day celebrations, said that selection of ESG theme for the IMD was an opt by the MEAI. The sustainable development is an important factor. We have to adhere to the obligation made by the country in the international fora on Environment and Social Governance.

He explained various laws applicable to the mining industry under Environmental, Social and Governance.

Shri. B.R.V. Susheel Kumar congratulated the MEAI President for taking up development activities in all areas. He told how the companies have performed on the environmental front. On Social front the companies shall have rotation with employees, suppliers and communities. On the Governance part, the companies shall have well laid guidelines regarding implementation of the HR laws.

Shri. Surendra Mohan, Council member stated that National resources are to be preserved for the future generations by maintaining ecological balance. We have to do away from thermal coal to alternative energy solutions. Employees' health and safety accountability of companies with respect to compliance of ESG laws.

Shri. Bidyut Chakraborty speaking on the occasion stated that ESG relates to climate change and temperature increase. Unless something is not done, we will not able to do the mining business as usual in the coming years. Companies have to concentrate on sustainable development work in mines. The subject of Environment being discussed for the last two decades. In the present scenario Environmental Social and Governance is the order of the day. ESG with respect Mining and metal companies, the ESG score is the measure how investors are looking at the company, which takes care of the important stakeholders. ESG score depends on ESG decision making, per unit Co2 emission of the company, how the ESG risks are taken care. The ESG score of the company depends on Sustainability, Adoptability and Resilience of the Company.

Shri. Deepak Vidyarthi conducted a National Quiz on this occasion, involving all the members of MEAI.

The IMD celebrations ended with a vote of thanks proposed by M. Narsaiah.



Shri. K. Madhusudhana, President, MEAI



Shri. Sanjay Kumar Pattnaik, Immediate Past President, MEAI



Shri. Sharat Kumar Pallerla, Director International Cooperation, MOEF



Shri. Bidyut Chakraborty, Director, KPMG



Shri. M. Narsaiah, Secretary General, MEAI

AHMEDABAD CHAPTER

Indian Mining day was celebrated with full zeal and zest at various Mines of Gujarat including its local centers on 1st November-2021.

Ahmedabad Headquarters

Ahmedabad Chapter Headquarters had organized a program at GMDC Corporate Office, with Shri S.N Mathur VP-I as Chief Guest & Shri Vijay Singh Council Member as Special Guest. Shri R.K Das, G.M Sales & Marketing GMDC delivered welcome Address. ESG theme and its

importance was very well narrated by G.M (Env) GMDC, Shri Chirag Shah. Ms. Sidhi Gohil (MEAI Member & Mining Engineer) also delivered a speech on the theme. Shri S.N. Mathur delivered the Keynote address. Shri V.K. Singh addressed the gathering with his valuable views on ESG and the financial repercussions of ESG, reflecting on the overall business growth. Shri Swagat Ray G.M (PP&D) GMDC presented a vote of thanks. 35 members, including students and consultants from the mining fraternity attended the program.



Shri V.K. Singh greeted by Sh S. Ray

Shri S.N Mathur delivering Keynote Address

Bhavnagar Local Center

Bhavnagar Local Center celebrated IMD at various mines of GMDC Ltd. & GHCL Ltd. Flag hoisting was done at GMDC Ltd. by the convener Shri N. Pareek (GM-P I/c). The pledge of IMD was sworn in by all members through Shri D.K Patel (DGM). Ms. Gunjan Pande (Secretary) spoke on ESG criteria and the role of Miners in conservation of minerals as well as nature. Shri N Pareek highlighted the key factors of ESG and how we can better implement it in our Industry. The program was attended by around 50 persons including members, Contractual manpower and concluded with the National Anthem.



Flag Hoisting & Address by Shri N. Pareek

Shri D.K. Patel reciting Oath

The program was followed by Group discussion on the theme of ESG. The members presented their views on the

importance of Environment, Social & Governance issues and their role in the sustainable Business models and in overall national Growth. Flag Hoisting was also done at GHCL Mines by Shri

Kutch Local Centre

Program commenced with Flag hoisting at different locations/ Projects of the Kutch region. All Members took oath in front of the flag for development of Mining Industries and contribution in national growth. Mining Day was celebrated on the theme “Environment, Social and Governance (ESG) in Mining Industries” MEAI President’s message was shared with members for the adoption of Environment, Social and Governance (ESG) principles in mining Industries. The Mining Engineering Department of Bhuj Government Engineering College organized an online Quiz Competition. An Online half day Seminar on “Value Addition of Bauxite Minerals & Scope of REE in Gujarat “was organized by Kutch Local Centre in the Second half. Session started with a welcome address and best wishes message from Chairman Ahmedabad Chapter Shri H. K. Joshi. Three technical Papers were presented viz. “Value added products from Bauxite” by Shri Jay Kapadiya, CMD, M/s Quata Solution Pvt. Ltd. Vadodara, “Vast Fluorite reserves in Amba-Dungar and high potential of REE and Nb” by Dr. Shrinivas G. Viladkar, Indian Institute of Science Education and Research Bhopal and “Geological richness of Kachchh Basin, Western India” by Dr. Gaurav D Chauhan, Asst. Professor, Kutch University. Around 40-50 Delegates, from various industries and organizations dealing with Mining and allied areas in Gujarat, special guests Shri S.N. Mathur VP-I, Shri S K Joshi Convener, Kutch Local Centre & G.M(P), Shri D S Bhayal, I/c GM (P), Sh Neeraj Pareek Mine Manager, Shri Viney Chitle, Ultra tech Cement, Sewagram , Shri Mukesh Chaubey, Sanghi Cement Industries have participated online in the Seminar. The session ended with vote of thanks by Convener, Kutch Local Centre.



Participants taking oath of IMD



Celebration of IMD

South Gujarat Local Center

(a) Tadkeshwar Lignite Mine -GMDC Ltd.

Indian mining day flag hoisting was done by G.M (P) Shri N N Mupakalwar. All MEAI members and associated persons from the mine participated in the celebration. The pledge was administered by Shri P.S Naik, It was followed by speeches of Sh N N Mupakalwar, A K Shrivastava S.O. & Sh P S Nayak, highlighting the importance of the day, Importance of mining and ESG (Environmental, social, Governance) principles and emerging trends related to it. Later in the second half, a group discussion was held to elaborate the theme of ESG and reaffirmation of commitments towards its principles.



Flag Hoisting by Shri N. Mupakalwar

Members taking oath

(b) Rajpardi Lignite Mine GMDC Ltd.

Celebration started with “INDIAN MINING DAY” Flag hoisting by I/c Project Head Shri G U Chaudhary. Shri S D Bhandari, DGM briefed about MEAI and Indian Mining Day. All the members and employees of Project took the pledge of “Indian Mining Day” followed by Group discussion.



Flag hoisting by Shri G U Chaudhary

Oath taking

(c) Vastan & Valia Lignite Mine-GIPCL

Indian mining day was celebrated with equal enthusiasm at Vastan & Valia Lignite Mine of GIPCL. Flag hoisting was done by Shri P C Goyal and Shri N K Chauhan at Vastan & Valia Lignite Mine. It was followed by an address to members and Oath taking by all members and contractor representatives. Shri N K Chauhan, DGM and Shri P C Goyal, General Manager briefed the gathering about the theme “ESG Agenda in Mining Sector”.



Flag hoisting by Shri P C Goyal & Shri N K Chauhan

BAILADILA CHAPTER

Shri Ignatius Minj, Shri Nageshwar Nandal and Shri Haldhar Patel made Presentations on the theme “ESG Strategy for Mining Industry”.



Flag hoisting by Chairman A.K. Prajapati. Pledge taking by all members



Meeting & presentation

BANGALORE CHAPTER

The Indian Mining Day was celebrated on 1st November, 2021 in the Pellet Hall, KIOCL Limited Office Complex, II Block, Koramangala, Bengaluru. More than 25 members including Industry professionals and mining engineering faculty and students from Acharya Institute of Technology (AIT), Bengaluru attended the function physically. Some members also joined virtually through Zoom Meet. The function started with an invocation by Smt. Sahana followed by lighting of lamp by the dignitaries. Mr. Dhananjaya G. Reddy, Chairman, Bangalore Chapter extended a warm welcome to the invited guests, senior members of the Bangalore Chapter, life members and participants on the occasion of the Mining Day and extended greetings on Karnataka Rajyothswa Day. He also gave brief background of the Mining Day and the theme – ESG Strategy in Mining Industry and administered the Mining Day Pledge. The mining day events included essay competition for engineering students and group discussion among the industry professional on the theme of the Mining Day.

Competitions

a) **Group Discussion:** The Group Discussion on the subject of ‘Environment, Social & Governance (ESG) in Mining Sector’ was held on 28th October 2021 in virtual mode. Eight teams of two members each from industries, academics and Government organisations participated. Mr. K. Ramani and Mr. Sabyasachi Nayak, EC members, moderated the event. Each team was provided five minutes time to present their views on

the ESG in Mining Sector. This was followed by Group discussion by all the teams on the story line provided by the moderators. Participants discussed on how ESG plays an important role for green future in mining industries, various CSR activities, incorporate ESG on EIA, Corporate Governance, ESG action Plan, case studies and Thematic Research. The discussion brought out that many organisations are already practicing ESG and stressed its importance in green mining and the need to practice it along with CSR activities. Mr. Deepak Vidyarthi and Mr. T. R. Rajasekar assessed the team’s performance based on the content of the individual presentations, relevance, time and their participation in the Group discussion. A summary of the event was presented and Mr. K. Ramani announced the winners. The following teams were presented with mementos and Certificates based on their recommendations by the Chief Guest of the event.

1st Prize: Ms. Sanjana Anchan and

Mr. Bartholomew De Souza of M/s. Vedanta limited, Chitradurga.

2nd Prize: Dr. Subhash Mali and

Mr. Manzoor Ali Shariff of M/s. JSW Steels Limited, Toranagallu.

3rd Prize: Mr. Bharath Kumar A.Y of National Institute of Rock Mechanics(NIRM), Bengaluru.

b) **Essay:** Essay competition on the theme of the Mining Day – ‘ESG Strategy for Mining Industry’ was organised during October. A total of 27 students from Acharya Institute of Technology, Bengaluru and Dr. T. Thimmaiah Institute of Technology, KGF participated. The essays were evaluated by Mr. Cyriac Joseph, and Mr. Bharath Kumar, Executive Committee members Bengaluru Chapter. Mr. Bharath Kumar presented the criteria used for evaluation of the essays and announced the results. Mr. S. N. Varuna won the 1st prize, Mr. Vishal G and Somashekhar Sogali tied for the second position and Mr. Siddesh B won the third prize. The prizes include certificate and cash award of Rs. 3000, Rs. 2000 & Rs. 1000 for 1st, 2nd & 3rd prizes respectively.

c) **Felicitation:** Executive Committee of the Bangalore Chapter took a decision to felicitate the senior members of the Chapter who are ninety years and above on the occasion of Indian Mining Day. The following senior members were felicitated on the occasion by the Guests and the Chairman, Bangalore Chapter. Mr. B. G. Channappa could not present physically due to health reasons.

1. Mr. L. M. Niranjana Murthy (LM-3017/BAN), former Deputy General Manager (Engineering Services),

BGML; Citations presented by Mr. Mallikarjuna S, EC Member.

2. Mr. R. R. T. Lavi (LM-1375/BAN), former Chief Mine Surveyor, BGML. The Citation was presented by Mr. K. R. Krishnamurthy, former Secretary, MEAI BC.
3. Mr. B. G. Channappa (LM-4430/BAN), former Additional Director, Department of Mines and Geology, Govt. of Karnataka. The Citation was presented by Dr T.N. Venugopal, former Chairman, MEAI BC and National Council Member.
4. Mr. D. N. Bhargava (LM-3744/GEN), former Controller General, IBM, residing at Mangaluru. The Citation was presented by Mr. N. Rajendran, Secretary

Mr. T. Saminathan, Chairman cum Managing Director, KIOCL Limited graced the occasion as the Chief Guest and addressed the gathering on the theme of the Mining Day. He stressed the importance of mining for both development of the country and for the local employment. He also emphasised the need to protect the environment and the mother Earth, which can be achieved not only the rules and but by the ethical values imbibed by the children from their family. Mr. K. V. Bhaskar Reddy, Director (Production & Projects), KIOCL Limited and Mr. V. Jayakrishna Babu, Regional Controller of Mines, IBM, Bengaluru graced the occasion as Guests of honour and shared their views on the ESG in Mining Sector. Mr. Bhaskar Reddy gave a brief account of the recent developments in the mineral sector and stressed the importance technological upgrading of the mining engineers in not only in the technical and managerial skills but also the need to understand the issues related to the environmental and societal issues. Mr. Jayakrishna highlighted the importance of updating the knowledge of the mining engineers in the latest techniques in mining, metallurgy etc, apart from the various rules and regulations. Dr T. N. Venugopal, former Chairman and National Council Member presented Mementos to the Guests and Mr. K. R. Krishnamurthy, former Secretary, Bangalore Chapter presented the mementos to the senior guests



Lighting of lamp by dignitaries: Mr. Dhananjaya G. Reddy, Mr. V. Jayakrishna Babu, Mr. T. Saminathan and Mr. K. V. Bhaskar Reddy

Mr. R. H. Sawkar, former Chairman, Banagalore Chapter presented the concluding remarks and summed up the proceedings of the day.

The event concluded with vote of thanks proposed by Mr. N. Rajendran, Secretary of the Chapter.



Welcome address by Mr. Dhananjaya G. Reddy



Honouring the Plus 90 seniors Mr. L.M. Niranjana Murthy (top left), Mr. R. R. T. Lavi (bottom Left), Mr. D. N. Bhargava (top right) and address by Mr. D.N. Bhargava (bottom right)



A view of the audience

BELLARY-HOSPET CHAPTER

Ballary-Hospet Chapter organized 9th consecutive year the celebrations of “INDIAN MINING DAY & KARNATAKA RAJYOSTAVA ON 01.11.2021” at GVTC Sandur with the valuable guidance and participation of Sri. Umesh M. Sarwarkar, DMS, Chief Guest, Sri. K. Gyanaswar, DDMS, Ballari and Sri. K. Madhusudhana-President of MEAI as Guests of Honor, Sri. K. Prabhakara Reddy, Chairman of the Chapter, Sri. S.H.M Mallikarjuna, Secretary of the Chapter and Sri. P. Sreenivasa Rao, Secretary of GVTC, Sandur.

The Chief guest Sri. Umesh M. Sarwarkar has hoisted the National flag and all the participants took pledge on the occasion. Chief Guest and Guests of Honor planted Saplings in the premises of GVTC, Sandur on the day.

The programme started with the lighting of the lamp by the dignitaries on the dais. The forum has maintained silence to the famous kannada film actor Late Sri. Punit Rajkumar. The Chief Guest delivered the speech on reduction of pollution due to mining activities. Diploma students spoke on the ESG Strategy. Sri. K. Madhuudhana, Sri. K. Prabhakara Reddy, Sri. S.H.M. Mallikarjuna and Sri. T. L. Yoganada spoke at the celebration of IMD & Kannada Rajyostava.

The Prizes winners of Essay Writing & Quiz competitions were honored with prizes during the celebrations. Lapels of MEAI were presented to the newly enrolled life members in the Chapter.

BLOOD DONATION CAMP was organised at the same venue by Mining Engineers’ Association of India, supported by Indian Red Cross Society, Koppal.

Life Members of the Chapter, managers, employees and other representatives from mines of the region along with the Polytechnic students participated in the celebrations. M/s JSW Pvt. Ltd., team has sung Kannada songs on the occasion.

Sri. Rakesh, M/s JSW Pvt. Ltd., has proposed a vote of thanks to Blood Bank and the Guests at the end of the programme. Lunch was arranged by the Chapter at the GVTC, Sandur.



Flag hoisting is by Sri. Umesh M. Sarwarkar, DMS



Indian Mining Day Pledge by members of MEAI BH Chapter



Plantation by Sri. Umesh M. Sarwarkar, DMS, Sri. K Madhusudhan, President, MEAI, K Prabhakara Reddy & S H M Mallikarjuna of BH Chapter Present on the occasion



Opening of Blood Donation Camp by Sri. Umesh M. Sarwarkar, DMS, Sri. K. Gyanaswar, DDMS, Sri. K Madhusudhan, President, MEAI, K Prabhakara Reddy & S.H.M. Mallikarjuna.



Lighting Lamp by dignitaries on view on IMD



Gathering at GVTC Sanduru on occasion of IMD

GOA CHAPTER

The Goa Chapter celebrated the Indian Mining Day on 01/11/21 at Conference Hall, GMOEA, Panaji. The offline event was attended by senior MEAI members. The programme started with the welcome address by the Chairman Shri. Cletus Dsouza. He highlighted the importance of the Indian Mining Day and its celebration across all the Chapters of MEAI in the country. All the members took pledge on the occasion which emphasis to uphold and follow the best practices in the mining/ mineral sector.

A technical talk on the theme “ESG strategy for Indian Mining Industry” was delivered by Executive member of MEAI Shri. A N Joshi. He mentioned that though the social and environmental aspects largely are taken care by the reputed mining companies in India as well as Goa, the Governance issue is one area, which has become an important factor in investment decisions of the Investors. He opined that the ethics, codes, and the way they are integrated in the business will decide the future growth of the companies. The session was very interactive and the theme was addressed in the Goan context.

A technical talk on “Recent developments in Environment Clearance” was delivered by Prof. Gurdeep Singh, Professor, IIT (ISM) Dhandad on a virtual mode. He informed about the latest discussions happening at the decision making levels and highlighted the issues in Goa, which might come up in the near future. He stressed that the MEAI members should keep abreast of the latest developments such that they can be incorporated in future Environment Clearance issues.



Shri. Glenn Kalavampara, Secretary, GMOEA on whose invite Prof. Gurdeep Singh delivered the talk thanked him on

behalf of MEAI for his informative talk. Shri. T Victor, former President of MEAI thanked Mr. A N Joshi and Prof. Gurdeep Singh for delivering enterprising talks. He also thanked Shri. Glenn Kalavampara for sharing the GMOEA premises and all facilities to conduct the programme in GMOEA following all COVID protocols.

HYDERABAD CHAPTER

Hyderabad Chapter commemorated the Indian Mining Day on 1st November 2021 at the MEAI Auditorium. In the celebrations, several past Presidents, Senior members and other members of MEAI and students from Malla Reddy Engineering College were present.

Shri. Susheel Kumar presented a paper on the theme subject “Environmental, Social and Governance”. He explained how ESG is going to play a vital role for Sustainable mining in future. Shri. Venkatrammaya, Vice Chairman of the Chapter also spoke on the subject.

Shri. V.S. Rao and Shri. M. Fasihuddin, Past Presidents explained how the environment and climate change is going to effect the mining industry and advised all the stakeholders to be involved while carrying out the mining.



L-R: Shri. M.S. Venkatarammaya, Shri. B.R.V. Susheel Kumar, Dr. V.D. Rajagopal, Shri V.S. Rao, Shri. M. Fasihuddin, and Shri. M. Narsaiah



Pledge by the students of Malla Reddy Engineering College

Malla Reddy Engineering College

In association with the Hyderabad Chapter, Department of Mining Engineering organized celebrations at Mini Auditorium of Malla Reddy Engineering College in view of the being declared since 2017 as Indian Mining Day.

■ IMD Celebrations

On the eve of celebrations an essay writing competition was organised for II, III and IV year Mining Engineering students on the subject of Impact of Mining on Environment.



The program started by hoisting the Indian Mining Day special flag and taking oath by all the students, faculty and guests led by Director MREC (A), Dr. A. Ramaswamy Reddy.

Later the program was inaugurated in Mini Auditorium in which Dr. A. ramaswamy Reddy was president, Dr V. D. Rajagopal, Ex. DMG was the Chief guest, Sri. V. Laxminaraya, Retired, DDG, DGMS, Sri KS Rao, Retired Ex Chief Manager, BGML, Sri. K. Narappa, Retired Additional General Manager in Singareni Collieries, and Dr. K. Srinivas HOD Mining Engineering Department, were Guests of honor. The program started with the lighting of lamp, prayer song and dance.



Dignitaries inaugurating program by lighting lamp



Dr A Ramaswamy Reddy addressing participants; L-R: Dr. MSVramayya, Dr. Narappa, Dr VD Rajagopal, Sri KS Rao and Dr K Srinivas

Dr Ramaswamy Reddy enumerated the efforts by MREC(A) in offering quality of education and improving the employability of its students through various initiatives. He showed the proof of the activities in job placement and the very best

emolument packages being received. He also highlighted the importance of keeping interaction with the various senior professionals and industry experts in improving the professional life and opportunities in the carrier.



Dr VD Rajagopal addressing the participants

Dr VD Rajagopal, highlighted the changing scenario in the mining industry where less emphasis was given to the government jobs and more on private mining entrepreneurship. He advised students to take up projects to practice the preparation of mining plans. He advised the management of the college to include mine plan preparation in the curriculum.



Dr V Narappa explained on how to be careful in making geological interpretation of the raw data and correlation of the coal seams. He talked about the positive synergy that can be generated with proper coordination between mining engineers and geologists.



Dr. K. Srinivas explained to the participants the reason for coining the 1st November of every year as Indian Mining Day since 2017 and explained the items in the Logo which was created by them explaining the important points a mining engineer needs to remember to enhance professional life.

Sri V Laxminarayana explained to the participants the importance of mining in general as a contributor to the general well being of humans.

The Chief guest and the Guests of honor were felicitated by the Director of the Institution. About 170 students of Mining Engineering, faculties of other disciplines and all the 10 faculty of mining engineering department attended the function.

Sri NSR Krishna Prasad proposed the vote of thanks.

Guest Lecture on OBSERVATIONAL SKILLS

In view of the Indian Mining Day a guest lecture was organized. Sri V. Laxminarayana, retired Deputy Director General of Mines Safety lectured the students of IV year and II year totaling about 120 students.

Sri V. Laxminarayana lectured on the faults an untrained person makes in observing the situation and his lack of ability to make a report. The ways and means and the principles of how to keenly observe, remember random activities, facts and incidents can enhance the experience and can improve the competence in professional life.

He also spoke about the importance of improving the power of observation and benefits that it can bring into every walk of life.

The Guest lecture was organised in an interactive way and prizes were given away after small tests to successful students that participated. This was done to encourage them to inculcate the habit of building the power of observation.

He later advised students on how to fix a goal, which should mean their truly felt aspirations. He said that the goal should be SMART and continue to strive to improve on the prospects. If one works with determination and enough devotion, there is nothing that cannot be achieved. The students were motivated by his speech.

The feedback from the students was very good. They felt that instead of only teaching the academic subjects, the topics that are useful in professional and academic life should be incorporated more and more into classroom activity.

NAGPUR CHAPTER

The Indian Mining Day 2021 has been celebrated by the Nagpur chapter on 1st November 2021 at the premises of Indian Bureau of Mines, Nagpur. On this occasion to commemorate the Indian Mining Day, Second technical paper meet, in the series of activities of the Chapter, was organized on 1st November 2021 at Conference Hall, 3rd Floor, Indira Bhawan, Indian Bureau of Mines, Nagpur under

the Chairmanship of Shri P.N. Sharma, Chairman of Nagpur Chapter.

As we know, the whole country has recently faced many challenges during the pandemic of Covid -19 and post Covid care. The Association has therefore thought it proper to organize a paper meeting on the health issues. Therefore, the Indian Mining Day has been celebrated with a lecture as well as powerpoint presentation on "Covid 19 and miner's lung". Dr. Deepak Muthreja, Consultant Interventional Pulmonologist and presently associated with Viveka Hospital, Nagpur was invited to deliver the lecture on the topic. All the members of the Nagpur Chapter, representatives of various mining industries, officers from local government agencies and IBM officials were invited. Large number of audiences amongst the MEAI members have attended the technical paper meet. Considering the recent pandemic of Covid 19, the lecture was quite interesting and interactive with a question answer session.

The dignitaries on the dais were Shri P.N. Sharma, Chief Guest; Shri Pankaj Kulshrestha, the Guest of Honour; and Dr. Deepak Muthreja, the guest speaker. Dr. Y.G. Kale, Honorary Secretary, Nagpur Chapter compered the programme. At the outset Dr. Y.G. Kale welcomed all the members and dignitaries present and delivered the welcome address of the paper meet. Shri P.N. Sharma also addressed the gathering and focused on the topic of discussion.



L-R: Dr. Y.G. Kale, Dr. Deepak Muthreja, Shri P.N. Sharma, and Shri Pankaj Kulshrestha



L-R: Shri Arun Chachane, Shri Abhay Agrawal, Dr. Y.G. Kale, Shri P.N. Sharma, Dr. Deepak Muthreja, Dr. I. L. Muthreja, Shri Arun Deoras, and Shri Pankaj Kulshrestha

While delivering a lecture, Dr. Muthreja mainly focused on the pulmonary diseases, which have caused lung effects to the miners, suggested some precautionary measures and further highlighted a few successful case studies. The topic

was quite informative in view of health issues. Shri Arun Chachane, Hon. Joint Secretary, Shri A.D. Gupta, Treasurer worked hard in making the programme successful. The programme ended with a vote of thanks proposed by Shri Parag Tadlimbekar, Executive Member of the Chapter. Proper precautions have also been taken during the programme by maintaining the Covid protocol as per instant instructions of the local authorities.



Dr. Deepak Muthreja, Speaking on the topic



Dignitaries present during the Technical Paper Meet

RAJASTHAN CHAPTER- JODHPUR

Mining Engineers' Association of India observing Mining Day on 1st November every year by organizing awareness program highlighting the importance of Mining & Mineral Industry and its role in the economic development of the country. This year also the Indian Mining Day was celebrated in a grand manner by the Rajasthan Chapter- Jodhpur on 1st November, 2021 on theme "ESG (Environmental, Social & Governance) Strategy in Mining Industry" at newly constructed Conference Hall, FAGMIL Corporate office, Institutional area, Vivek Vihar Yojana, Sector 8, Kudi Bhagtasni Housing Board, Jodhpur.

Program started with Saraswati puja followed by hoisting of IMD flag and pledge received from HQ by all attendees. Shri A. K. Jaiswal, Chapter Chairman welcomed the Chief Guest, presiding Guest, dignitaries and all the attendees and taking oath of pledge with all attendees for betterment of society through mining fraternity. Keynote addresses were given by Er H.S. Rathore, Unit head, Ambuja Cement Ltd, Marwar Mundwa, Nagaur and Er Maheem Kachhawah, Former Sr. Vice President (Mines), Prism Cement Ltd and advisor JK cement Ltd on the national theme ESG strategy in mining industry with their practical implementation under their own leadership in their respective units. Presiding Guest Brigadier A.S. Rathore, CMD, FAGMIL, Jodhpur also presented his insight on Environmental, Social and Governance strategy.

Er Rohit Rawal, Assistant Professor announced the result of Essay and Quiz competition arranged for the mining engineering students. Prof. S. K. Parihar and Er R. S. Rathore, National council member distributed prizes to top three prize winning students in each event with Rs. 2500, 1500 and 1000 each respectively. Consolation prize was also given to all participating students. On this occasion mementos to Chief Guest, Presiding Guest and speakers were presented by Prof. D.M. Surana, Dr. P. C. Purohit and Prof. Virendra Singh respectively. Er. Pankaj Goyal (ME student) also presented his field observations on track tracking system studies at Sonu mines of RSMML on governance topic. Dr. R. P. Choudhary, Chapter Secretary presented vote of thanks. Program ended with national anthem. Each authorities are of the opinion that ESG, which is advance version of CSR, now needed for clearing mining projects and leading uninterrupted mining activities.



Welcome address by Shri. A. K. Jaiswal. Sitting on the Dais are Prof S. K. Parihar, Brigedier A.S. Rathore, Er. H.S. Rathore, Er. R. S. Rathore and Dr. R. P. Choudhary



Keynote address by Er. H.S. Rathore

Over 100 members and students participated in the IMD celebration. Prof. S. Bhandari, Prof. D.M. Surana, Prof. D. V. Singh, Er. V.S. Mathur, Dr. P.C. Purohit, Er. P.R. Dave, Er P. R. Prajapat, Er. G. K. Jangid (RCOM), Er Rajeev Choudhary, Dr. P.K. Rajmeny, Er. M.C. Tater, Er. R.S. Bora, Er. N.S. Choudhary (Vedanta), Er K. R. Choudhary, Er. Rakesh Purohit, Dr. S. L. Borana, Dr. S. Yadav, Er. A. K. Jain and other distinguish members of MEAI, MBM college students and executives of PSUs RSMML, FAGMIL etc were present in the event. Program was anchored by Er. Rohit Rawal. Lunch was arranged by the host FAGMIL, Jodhpur. Support from FAGMIL for organizing it in their premises was welcomed by each one and the Chapter.



Members taking IMD Pledge

RAJASTHAN CHAPTER-UDAIPUR CHAPTER

The Indian Mining Day was celebrated on 1st November, 2021 by the Rajasthan Chapter-Udaipur in association with Vedanta~ HZL's at Zawar location with great enthusiasm and zeal. MEAI invited all the stakeholders including eminent mining engineers, mine owners, stock-holders of the region to witness the occasion. The theme of the year was "ESG Strategy for Indian Mining Industry" to acquaint with mining industry for the accountability of environmental, social sustainability and governance. The celebration was at National Level in which about 5000 members, 70 Institutional Members and 26 Regional Chapters have participated.



L-R: S/Shri Kishor Kumar S, Rajneesh Purohit, MS Paliwal, Praveen Sharma, AK Kothari, Akhilesh Joshi, and BL Kotriwala

The program was started with the lighting of lamp before lord of Maa Durga by Sh Akhilesh Joshi, Board of Director, HZL, Shri BL Kotriwala, RCOM-IBM, Ajmer, Shri Rajneesh Purohit, RCOM-Udaipur, Shri AK Kothari, former NP-MEAI, Shri YC Gupta, Chairman, MEAI-Udaipur, Shri Praveen Sharma, COO (Mines) HZL, Shri MS Paliwal, Secretary, MEAI-Udaipur. Everyone present in the hall took pledge to adopt Best Scientific Methods & Practices, to prospect, Produce and Preserve the one-time crop from mother earth in the form of valuable mineral resources for the Probity and Prosperity of our nation which was administered by Shri AK Kothari, Former President, MEAI.



Pledge administered by Shri AK Kothari, Former President, MEAI



Shri YC Gupta, Chairman, MEAI-Udaipur welcomed all the dignitaries, speakers, mining engineers, students and ladies on this occasion. He said that minerals are important constituents of every product used from morning to evening by us. However, society does not recognise it, as such have perception that it is environment damaging. Chapter's experience of Udaipur media until year 2000 was that the mineral industries are anti-environment. Nevertheless, MEAI started projecting the image in holistic way, which helped to change general perception. Private entrepreneurs also helped. He said now such news is rare in Udaipur media. He further said that the focus on ESG was very well understood by this chapter and other chapters of west zone. First seminar was organized at Udaipur in association with Ahmedabad & VP Chapters in year 2001 on the topic "Mining, Environment & Society". Also organized a four-day photo gallery in the Govt. information centre at Udaipur and exhibited photos to dilute the adverse image of mining in year 2006 and published small m/c booklet which was distributed free to all the visitors. Good number of school students did visit the gallery. He requested the mining fraternity to project and publish good work done and the society is well informed. He congratulated all on this occasion.



Shri Kishor Kumar, Location Head of Zawar presented Growth Journey of Zawar said Ancient Mining in Zawar dates back to 2000 years, Zinc retort distillation metallurgical process played key role in industrial revolution. In recent time, mining started in year 1945 by MCI. Later Govt. of India nationalized MCI and HZL came into existence in 1966. Since then Zawar mined and milled >55 Mt of Lead-Zinc ore. After privatization, mining in these years transformed from conventional to world-class mining technology. He said the Key Drivers in Growth of Journey are Technology,

Mechanization, and Digitalization. He discussed journey of UG mining through exploration. Technical advance in safety & training, advance blasting, large equipment. In addition to above advance technology, wireless communication system, drone based survey, vision for real time process monitoring, advance control in mill and advance mines software for vehicle tracking.



Shri Praveen Sharma, COO (Mines)-HZL highlighted ESG practices across Hindustan Zinc Ltd. He started his presentation with safety & LSR; explained sustainable journey of production from Opencast to UG. He stated use of Atlas Copco mine equipment dump truck from 30t to 65t, LHD 10-21t, use of electro hydraulic power drill, Motor Grader, Mobile Carrier Rig, V30 Drill Rigs. Adopted modern mining technology i.e. mine planning, operation, remote production drill, remote LHD operations, training in simulator for real time skill assessment. Further, he covered sustainability vision, zero harm, zero discharge/ zero waste. He further explained GHG emission saving by investment in wind power (274 mw) and solar energy (40-42 mw). He discussed various goals of HZL 25% fresh water conservation, Reduction initiatives for GW discharge >8.5mcma, protect and enhance biodiversity, intensive plantation. He informed that HZL has first UG Ambulance and First Aid Station. Positively impacting lives through social economic and environmental outcomes.



Shri B Kotriwala, RCOM-Ajmer explained the importance of ESG and stakeholders and role of IBM. He explained NMP-2019 for protection of environment. He explained socially responsible Mining, DMFT, PMKKKY, welfare of community, Mine closer plan, PMCP/FMCP. He elaborated Rule 35 of MCDR for protection of environment, self-assessment, star rating and the role of IBM in approval of mining plan and control of illegal mining. He brought to knowledge new mining plan format.

Virtual Address of Chief Guest Shri Arun Misra, CEO, HZL stated "HZL is honoured to host MEAI Rajasthan-Udaipur

Chapter at our mine. At HZL, we are dedicated to implementing the best mining practices & ensuring environmental sustainability. This year's subject was especially intriguing, as it highlights the importance of focusing on ESG. At the helm of transition towards sustainability, companies should keep key focus on ESG standards and framework which will enhance their operations, performance & investment".

On the theme, "ESG Strategy for Indian Mining Industry" Essay Competition was organized among mining engineering Students of various ambient institutes namely College of Technology and Engineering (CTAE), Pacific Polytechnic College, Singhania University, SS Engineering College and Sangam University, Bhilwara. The first prize of Rs. 3100 and a certificate of merit was given to Mr. Kunal Derashri, CTAE College, 2nd prize Rs. 2100 and certificate given to Mr. Swapnil Sanadhya CTAE College and 3rd prize Rs. 1100 and certificate was given to Ms Saloni Jagetia, SS Eng College and Mr. Digvijay Gohil, SS Eng College & Appreciation prize Rs. 500 and certificate was given to Mr. Alok Ranjan, Sangam University, Ms Khushi Gandhi, Singhania University & Mr Roshan Meena, Pacific Polytechnic College. The participation certificate was also given to 42 students from 5 mining institutions.



Speaking on the occasion, Shri AK Kothari said in the mining sector ESG has to become the corner-stone of operations & sustainability has to be incorporated. I am happy that big companies like Hindustan Zinc are stepping up and bringing sustainability at the core of all their operations.



Shri Akhilesh Joshi, Director on HZL board, congratulated audience and told that need do something good for environment and society. He appealed for helping the mining industry, mentor the students, be transparent and committed towards environment. He congratulated the Rajasthan Chapter-Udaipur for celebrating with great enthusiasm.



A view of Audience present in Indian Mining Day Celebration

On this occasion sizeable plantation program was also carried out in a befitting manner by all the dignitaries near HZL new executive club with state-of-the-art recreation facility.

The entire Program was eloquently anchored & hosted by Dr SK Vashisth-HZL & National Council Member. In the end, vote of thanks was proposed by Shri Sandeep B. Narade, AGM Mines.

SINGARENI CHAPTER



The IMD was celebrated with the students of Mining Engineering Discipline (University of College of Engineering), Kakatiya University, Kothagudem formerly known as KSM (Kothagudem School of Mines) on 1st November 2021. Programme started with the hoisting of IMD flag at 4.00 pm and pledge was administered to all students of Mining Engg in UCE (University of College of Engineering).

Vice Chairman Sri Ch. Narasimha Rao has highlighted the significance of the role of various minerals in providing a plethora of conveniences and comforts to human life and contribution towards the economic growth of the nation.

Secretary Sri ALSV Sunil Varma spoke about a host of minerals, which are in mother India's lap, and global positioning of various minerals as far as their estimated resources and production in India are concerned. Further,

the mining of all the required minerals has to be done by the mining engineers. It is a proud moment for any mining engineer to be in the achievement of such fabulous feats.

A Quiz was conducted to the Final and third year students of Mining Engg. with 4 rounds of questions prepared on the subject of mining engineering, general knowledge and current affairs. Sri M. Sandeep & Sri G. Sriram bagged the first prize and Sri T. Bharat Reddy & Sri CH. Robin won the 2nd prize in the Quiz competition.

Prizes and Certificates of merit were presented to the winners & runners up on behalf of the MEAI, Singareni chapter and also consolation prizes were given away to all the participants. Two prizes were given to winners among the audience in the audience round.

Principal, UCE, KU expressed his satisfaction about the interest the industry has shown towards motivating the mining students. The programme ended with the vote of thanks proposed by Jt. Secretary Sri T. Hari Prasad.



L-R: Pledge by the faculty. Sri Ravi Kumar, Sri T. Hari Prasad, Sri Muktar Ahmad, Sri ALSV Sunil Varma and Principal Dr. Ramana



Pledge by the students of Mining Engg. UCE, KU



Students participating in the Quiz Competition



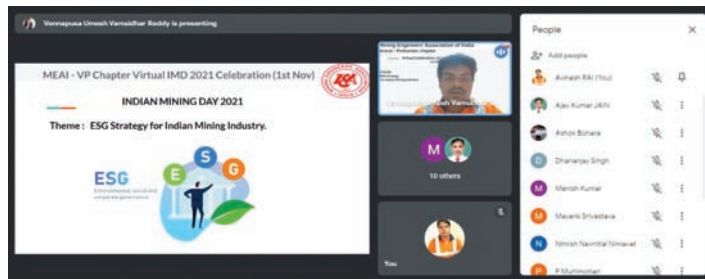
Presentation of prizes and MEAI certificates to winners of the Quiz Sri M. Sandeep and Sri G. Sriram

VERAVAL-PORBANDAR CHAPTER

The Veraval-Porbandar Chapter celebrated the Indian Mining Day virtually on 1st November 2021 on Google Meet following the theme “ESG strategy for the Indian Mining Industry”. The Chapter’s Chairman Mr. Ajay Kumar Jain welcomed the spectators. He started with the IMD Pledge and then briefed about the journey of the Chapter and the importance of celebrating the Indian Mining Day.

Mr. Vennapusa Umesh Vamsidhar Reddy, Mining Engineer, Ambuja Cement made a technical paper presentation on “ESG strategy and its need in Indian Mining Industry”. Mr. Reddy said that ESG (Environmental, Social and Governance) is playing a vital role in all the industries globally out of which mining is one such industry, for ensuring the sustainable future. Mr. Reddy added that ESG strategy should be implemented from the exploration stage itself and should be continued till the Mine closure.

Mr. Manish Kumar Yadav, Vice-chairman of the Chapter and Mines Head, GHCL shared his views on the existing practices in the mining industry and the critical areas to be focused for achieving a sustainable future in a reliable manner. His special thrust was on the importance of Mine Closure and its use for the society.



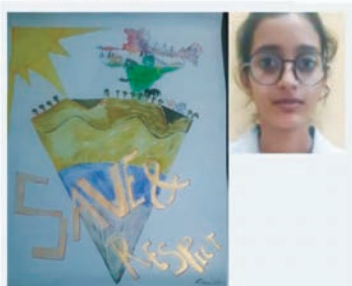
The Chapter organized a few competitions to encourage the children of the members. Ms. Lavini Jain and Ms. Anjali Bohara have shown their competitive spirit. Mr Manish Kumar Yadav declared the prizes during the virtual celebration.

An open talk was also invited by Mr. Jain to seek the views of the participants. The celebration was made successful with the participation of enthusiastic professionals from various organisations.

Selfie by Anjali Bohara



Poster by Lavini Jain



MEJ RIDDLES

Dear Readers of MEJ,

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

Request the members to take part in the maiden QUIZ in large numbers and benefit from the enhanced knowledge by reading the Journal from end to end.

November 2021

Q1. Where is the first solar plant commissioned in an Iron Ore mine in the Country?

Ans: (a) Donimalai Iron Ore Mine (b) Kudremukh Iron Ore Mine
(c) Noamundi Iron Ore Mine (d) Alampara Iron Ore Mine

Q2. Currently, how many mining leases exist in the state of Telangana?

Ans: (a) 301 (b) 112 (c) 231 (d) 119

Q3. Which Blanket supports the seeds to grow in slope at mining area?

Ans: (a) Geo green Blanket (b) Erosion Control Blanket
(c) Geo Blue Blanket (d) Geo Red Green Fleece Throw Blanket

Q4. What was the cost of pumping estimated by MCP?

Ans: (a) Rs 55 per cu m (b) Rs 50 per cu m
(c) Rs 65 per cu m (d) Rs 45 per cu m

Q5. Who is the Chairperson of CRIRSCO?

Ans: (a) Mr Stuart Masters (b) Mr Garth Kirkham
(c) Mr Ken Lomberg (d) Dr Abani Samal

Dr PV Rao
Editor MEJ

MEAI HEADQUARTERS, HYDERABAD

a) 1st Council Meeting held on 29-10-2021



Shri. K. Madhusudhana, President addressing Council at MEAI Auditorium, Hyderabad. Sitting on either side: Shri. S.N. Mathur, Vice President-I and Shri. M. Narsaiah, Secretary General.



Shri. V.S. Rao, Shri. Deepak Gupta & Shri. A.K. Garg and others attending First Council meeting



Council Members attending the First Council meeting

b) MEAI Service Excellence Awards Presentation on 29-10-2021



Presentation of Service Excellence Award to Shri. P.K. Satpathy by Shri. K. Madhusudhana, President and Shri. S.N. Mathur, Vice President- I during First Council meeting.



Dr. P.V. Rao felicitated with Service Excellence Award by Shri. K. Madhusudhana, President, Shri. Sanjay Kumar Pattnaik, Immediate Past President and Shri S.N. Mathur, Vice President-I during the First Council meeting.



Presentation of Service Excellence Award to Shri. B.R.V. Susheel Kumar by Shri. K. Madhusudhana, President and Shri. Sanjay Kumar Pattnaik, Immediate Past President during First Council meeting.

c) MEAI Lifetime Achievement Award



Presentation of Life Time Achievement Award to Shri. P.R. Tripathi at his residence by Shri. K. Madhusudhana, President on 30-10-2021. Shri. M. Narsaiah, Secretary General and Shri. Pradeep Sinha, DGM, NMDC were also present on the occasion.

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LEADING THE WAY FOR DIVERSE AND INCLUSIVE WORKFORCE



As an industry leader, we are ambitiously taking bolder actions to create a long-lasting inclusive and diverse culture across our organisation as well as the sector. In line with our commitment to having robust gender parity within the company, especially at the leadership level, we are making focussed efforts to recruit women leaders for the open roles”.

“At Hindustan Zinc Limited, we believe fostering an environment of diversity and inclusion is the right thing to do. We are committed to providing equal opportunities for employment, recognition and development to all our people. Workforce diversity and inclusion is a business imperative and we strive to ensure that our workforce has a healthy balance of resources from a cross-section of society..



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VEDANTA : CSR AND SUSTAINABILITY ACTIVITIES

MESSAGE



Tackling climate change and targeting net-zero emissions is no longer a deliberation, it's a necessity. With the world marching into the 'decade of action', nations are accelerating the design and implementation of sustainable solutions to the world's biggest challenges - ranging from poverty to climate change. It is important for all of us to work together to have long-term strategic vision towards not just the business

objectives but also the collective good of everyone involved in the process.

Consistent with our core values, we at Hindustan Zinc are committed to deliver on our environmental, social and governance (ESG) framework for the long-term benefit of everyone around us.

Sustainability is part of every decision, action, and conversation we do at Hindustan Zinc. It is ingrained in all processes and systems which is inspired by the global best practices. We emphasize on judicious use of natural resources, lowering our carbon footprint, maintaining safe operations, and utilising renewable energy sources to strengthen our growth trajectory of our Sustainability journey.

As a responsible enterprise of India and being a global leader, we at Hindustan Zinc are aligned to achieve Net Zero emission and are committed to the Science Based Targets Initiative - Business Ambition for 1.5 C campaign and are committed to shift into 100% Electrical Underground vehicles with the investment of \$1 Billion by 2025. Our climate change risk assessment is aligned with Taskforce on Climate-related Financial Disclosures guidelines. We at Hindustan Zinc are currently working towards developing alternative sources of fresh water to reduce our dependencies on freshwater and achieving our sustainability goal of becoming 5 times water positive company by 2025. Further, protecting and enhancing biodiversity throughout the life cycle is an integral part of our commitment towards the Sustainable Development Goals 2025 at Hindustan Zinc.

Our Sustainability goals 2025 are the lighthouse around which we are progressing in the direction of achieving reduction in Carbon emission, reducing the impact on biodiversity and freshwater resources, achieving three times more gainful utilization of smelting process waste to promote principles of circular economy, carbon sequestration through 1 million plantation and social and economic upliftment of the community, suppliers, and employees.

The consequences occurring globally due to climate change demonstrate that our Earth is very vulnerable to global warming. In the past, we together have demonstrated our shared ability to deliver the extraordinary and I believe that we can again build a secured and greener future for generations to come.

Mr Arun Misra
Chief Executive Officer, Hindustan Zinc Limited

ESG BASED INNOVATIONS

Hindustan Zinc is taking bold steps to mitigate climate risks and build a carbon neutral organization. Sustainability, at Hindustan Zinc, is an integral part of the business and of all business decisions. At Hindustan Zinc, it is our endeavour to drive long-term business growth and value creation for our stakeholders with a firm focus on safe operations, minimal environmental impact across the lifecycle, respect for human rights and sharing the benefits with our communities.

Driven by the Sustainability vision of 'ZERO HARM, ZERO DISCHARGE, ZERO WASTE', Hindustan Zinc has embarked on an ambitious Sustainability journey, led by the Sustainability Goals 2025. The organization believes in building a better, safer, and greener future, and these key commitments will rightly help in achieving the ambitious goal of Sustainable Development Goals 2025

Sustainable Development Goal (SDG) 2025



Hindustan Zinc's aim is towards 0.5 mn tCO₂e GHG emission savings as part of our climate risk mitigation efforts

Race to Net Zero



Hindustan Zinc has committed to the 'Business Ambition for 1.5°C' campaign to set a net-zero target in line with a 1.5°C future, which is led by the Science Based Targets initiative (SBTi)

Refuge Chamber for Health & Safety Management



Hindustan Zinc always endeavors to support the occupational health and safety of employees working underground. Therefore, as a safety initiative for underground mines, HZL installed a Refuge chamber which provides a place of safe refuge (protection) and fresh air, in case of emergency situations like fire, rock fall and blockage of escape routes etc. Refuge chamber can accommodate up to 20 persons and has a life support back up of 36 hours.

COP26 Business Leader and CDP (Carbon Disclosure Project) A List, 2020

Hindustan Zinc is a COP26 Business Leader among the only two metal & mining companies globally and among only four Indian companies to be a part of the coveted CDP (Carbon Disclosure Project) 'A List' 2020.

\$1 billion investment over 6 years to go green



Committed to responsibly move from diesel operated vehicle to Electrical vehicle and have a lower carbon footprint.

CSR ACTIVITIES

As a socially conscious organization, Hindustan Zinc remains consistently focused on fostering close relationships with the communities around which it operates. Hindustan Zinc is continuously striving to facilitate the holistic growth of stakeholders through sustained initiatives and strategic investments to further their growth and on ground development. The highlight few of the flagship projects:

Women Empowerment

Hindustan Zinc's flagship project "Sakhi" is geared towards mobilizing rural women into Self-Help Groups (SHGs), and

developing their capacities in the areas of leadership, skill development and entrepreneurship. There are 7 registered Federations spread across 6 districts in states of Rajasthan and Uttarakhand. Through the development of Federations.



Hindustan Zinc's flagship intervention, Project Sakhi, empowers over 27306 women from rural and tribal areas surrounding its operational sites. 11 Micro-enterprises have been successfully established to groom Sakhi's to become rural entrepreneurs, in the sphere of spices, pulses pickle and garment and textile based micro-enterprises through e-commerce and offline presence in 780 outlets across states.

Sustainable Livelihoods



Providing sustainable livelihood opportunities through focused skill development initiatives for various target groups is a key component of Hindustan Zinc's CSR intervention.



Hindustan Zinc through this flagship initiative for farm based sustainable livelihood, has reached out to 30000 farming families through agriculture and livestock interventions to date.

Education



Hindustan Zinc is cognizant of the importance of education to the inclusive growth of children and remain focused on facilitating the same among the communities in our command areas. Our interventions in this sphere represents the entire education lifecycle. Through Hindustan Zinc's educational interventions, the company touches the lives of more than 1.8 lacs children and thereby enable them to have a brighter future. Our recent endeavours have been to extend second chance to our Sakhi's to complete their education. This deepens by our resolve to ensure functional literacy across all our Sakhi's by 2025.

HINDUSTAN ZINC'S GREEN ACHIEVEMENTS

- Ranked #5 Globally in Metal and Mining sector
- Ranked #1 in Asia Pacific with top scores across 3 dimensions in Metal and Mining Sector
- Ranked #1 Globally in Environment dimension in Metal and Mining Sector
- The Dow Jones Sustainability Index 2021

Certified 2.41 times Water Positive company

Selected as Member of FTSE4Good Emerging Index



POTENTIAL ECOTOURISM AROUND RECLAIMED MINED OUT SPOTS - A CASE STUDY IN SAURASHTRA, GUJARAT, INDIA

K. S. Yadav

Abstract

Development of ecotourism around the reclaimed mines can be instructive activity for mineral conservation, environment protection and mine closure aspects through scientific and sustainable mining operation. Mine closure and environmental restoration with involvement of stake-holders and local communities for post mining gainful land use and conservation of natural heritage. Aspects of mining of limestone and related reclamation efforts that resulted in restoration and greening of environment has created potential eco-tourism sites and sustainable growth with involvement of local community in this part of Saurashtra, Gujarat in western India.

Introduction

The most popular and comprehensive definition of ecotourism has been stated as Responsible travel to natural areas that conserves the environment and improves the well-being of local people (Honey, 2008). Ecotourism is about uniting conservation, communities, and sustainable travel. This means that those who implement, participate in and market ecotourism activities should adopt the following ecotourism principles: minimize physical, social, behavioral, and psychological impacts. Therefore, as per the 'Quebec Declaration on Ecotourism', Canada (2002), ecotourism demands a more holistic approach to travel, one in which participants strive to respect, learn about, and benefit both the environment and local communities.

However, the ecotourism around the reclaimed mines can be defined as, a curious visit to mining field & natural areas to observe realistic sustainable mining operation, mineral conservation, environment protection and mine closure aspects. It may reflect and promote positive perception of mining impact and learning about the best practices of mining through systematic and optimum development of mineral deposit coupled with considerations for mine closure aspects. It is about uniting mineral conservation, mine closure and restoration with involvement of local communities for post mining gainful land use. It is remarkable that the Governments around the world are increasingly concerned about the environmental impact of the mining industry and impose severe environmental constraints on mining activities (Nurmi, 2017; Wadhawan, 2020). In this context, the emergent and modern green mining practices involve a composite package of mineral exploration, sustainable zero-waste mining and very well designed mine closure plans for successive land uses for restoration of environment and alternate uses (Wadhawan, 2021). Therefore, it is imperative to promote Eco-mine tourism which is also meant for those who are keen and curious about Nature's treasure

and natural heritage. It will reveal the creative attitude of mining industry towards the adversity for transforming into gainful post mining scenario and sustainable development of the region. This paper elaborates on aspects of mining of limestone and related reclamation efforts that resulted in restoration and greening of environment. It has created potential ecotourism sites and sustainable growth with involvement of local community in this part of Saurashtra, Gujarat in western India.

Geology and Mining of Limestone Resources

Gujarat is the western-most state occupying the northern extremity of the western sea-board of India, bounded by Pakistan on the NW; Rajasthan on the N, bordering with Madhya Pradesh on the E and Maharashtra on the S. The Union Territories of Daman, Diu, Dadra and Nagar Haveli adjoins the SW Gujarat. The state is also bounded by the Arabian Sea in the west and the south-west, the Great Rann of Kachchh in North-west and Aravalli Hill ranges in North-eastern side. The Tropic of Cancer also passes through the northern border of Gujarat, causing extreme hot climatic condition in summer. However, the Arabian Sea, Gulf of Cambay (Khambhat) and the wooded hills in the east somewhat subjugates the climatic extremes.

Natural landscape of the State of Gujarat is represented by six broad physiographic units viz., (i) Southern Aravalli hills on the north and northwest (ii) Deccan Plateau (iii) Central Plains (iv) Saurashtra Peninsula (v) Kachchh Peninsula (vi) Rann of Kachchh.

Saurashtra Peninsula comprises dissected Deccan Trap lava plateau, flat top hills and coastal erosional plains. The Barad hills, the Alech hills, Girnar hills and Gir ranges are the conspicuous geomorphic features. General climate of the Saurashtra is sub-tropical and characterized by three well-defined seasons, i.e., summer - from April to June, mon-

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soon - from July to September, and winter - from October to March. The mean maximum and daily temperatures range from 29 to 34°C and mean minimum daily temperatures from 14 to 27 °C. April and May are the hottest months when the temperatures may exceed 33°C. The winters are generally pleasant with minimum temperatures around 13.7°C. Long term normal rainfall (1943-80) for the Coastal Saurashtra is about 639.9 mm.

The rocks of Late Tertiary age are exposed in isolated outcrops along the coastal areas overlying the Cretaceous Deccan traps. Successive formations are the Bhatia Formation (laterite clay), Gaj (variegated clay, marl & impure limestone) and Dwarka Formation (gyseous clay, foraminifera limestone). Extensive deposition of Milliolite limestone belonging to the Porbandar & Chhaya Formations of Quaternary age are seen in coastal tract around the villages of Adityana, Bhakharla, Bharwada, Bokhira, Boricha, Degam, Gosa, Ishwariya, Kajawadri, Kentela, Kharsa, Khera, Lati, Maraj, Palakhada, Parachi, Rakhej, Rampura, Ranavav, Samadhiala, Saroswa, Sliantipura, Simar, Supsi, Sutpara, Umba, Vavdi and Veraval, etc. This limestone is mined and catered to the nearby Soda Ash and Cement manufacturing plants (Fig.1, GSI, 2012).



Fig. 1: Geological map and generalized lithological succession of limestone bearing coastal Saurashtra in Gujarat (Source: GSI, 2012)

Generalized lithological succession of limestone bearing coastal Saurashtra is given below: -

Soil cover - 0 to 0.5 m

Limestone - 1 to 8 m (max.) [CaO content of upper 1 to 3 m is > 50% and suitable for soda ash manufacturing process and underlying limestone suitable for cement plants]

Calcareous clay - 0 to 1 m Chalk/marl/ Gaj clay

Deccan Traps --- Volcanic rocks. Underlying horizon after clay beds

Although from Dwarka to Una, the coastal belt is bestowed with regular and extensive limestone occurrences, yet its thickness is limited, i.e., 1 to 8 m maximum, followed down-depth by clay and trap rocks. Hence excavation pits formed due to mining are of shallow nature (1 to 8 m deep), but relatively large in lateral extent. No mine waste is accrued

while the limestone excavation is done on areas that are devoid of overburden.

Adequate statutory provisions are made in respect of (i) Abandonment of Mine & Mine Closure (ii) Sustainable Mining under rule 21 to 23 and rule 35 to 44 respectively in Mineral Conservation & Development Rules (2017), framed by Government of India, (2017) [by virtue of Section 18 of Mineral (Development & Regulation) Act 1957]. The feasible mode of restoration and rehabilitation of mined out pits/voids are: -

- (a) Water Reservoir with pit periphery Plantation
- (b) Pit floor cultivation
- (c) Development of Pasture land
- (d) Pit floor cultivation

Above aspects are invariably addressed in Mining Plan & Mine Closure Plans. Some of the mines are exhibiting the its continuous exemplary work towards systematic mining right from inception to conclusion stage. Fortunately, these mines are located close to the existing pilgrimage/ tourist circuit of Dwarka-Harshad Mata-Porbandar-Somnath Temple-Diu covering places of religious & historical importance (Fig. 2). It is imperative for mining fraternity to link the identified limestone mines; showing exemplary science and art of mining and mineral conservation, restoration and rehabilitation of mined out areas, i.e., realistic approach of mine closure stages.



Fig. 2: Existing Pilgrimage/ tourist circuit connecting Dwarka to Diu is shown in above location sketch map along with identified Mine Eco-tourism spots.

Various Ecotourism and Mining Sites are described in the following sections.

1. Gop Nath Temple & Gop Limestone Mine of Shri Digvijay Cement Co. Ltd.

Pilgrims/Tourist heading from Dwarka to Somnath/Diu can have mid-way pleasant stay at Porbandar (place of Birth of Mahatama Gandhi & Historic Sudama Temple). Gop Mines is at a distance of 70 Kms from Porbandar and approachable

by road as well as train. Mines is located in the foot hills of famous Gop Nath Ridge (Fig. 3; 342 mRL known for Lord Shiva Temple Gop Nath). Gopnath Mahadev which is mentioned in historical texts and Puranas. According to history, there is a village called Jinavari next to Gopnath where a demon kept 16 thousand gopis, the village girls and exploited them. When Lord Krishna came to know about this, he came here and freed the gop girls and killed the demon. An ancient Sun Temple of 6th Century CE also exists there (Fig. 4 & 5).

It is excellent example of mining of marginal grade limestone bed and onward dispatch to 80 kms away cement plant. It is lean, thickness of 3-4 m deposit, devoid of overburden. Continued mining caused depression of 3-4 m in the foot hills of drought prone terrain with water scarcity phenomenon. The mined-out voids have effectively converted in to water reserve by tapping the rain water draining away from the hill slope. It has remarkably improved the aesthetic sense and landscape of the area.



Fig.3: Google Image Location and panoramic view of the of Gop Nath Hill And Water Reservoir in Mined out void of Gop Limstone Mine



Fig.4: Landscape of flat top hill supporting Gop Nath Temple with rainwater harvesting pond at the base in mined out void/ depression



Fig. 5: The 6th Century old Sun Temple in Zinavari Village close to the Gop mines

2. Jamvanti Caves & Adityana Limestone Mine of Saurashtra Cement Ltd.

It is a captive limestone mine of one of the oldest cement plants of Gujarat in operation since last 60 years. The mine is located on the eastern side of Barada Century and Jamavanti cave of archaeological & religious importance (Figs. 6 & 7). This cave was the resting place of the warrior Jamvant of Ramayana epic. It is believed that Lord Krishna and Jamvant fought for the Syamantaka jewel for 28 days at this place. It is also the place of wedding of Lord Krishna with Jamvanti Princess (daughter of Jamvant). The Jamvanti cave exhibits over 50 Shivalingas formed naturally (speleothems & stalagmites).

The mine represents the state of art technology of working in close vicinity of ESZ & places of archaeological importance by adopting non-conventional eco-friendly mining culture (Fig.8). A garden of endangered endemic species has also been developed over mined out void. Existing available large voids are used for rain-water harvesting & water storage reservoir.



Figs. 6 & 7: View of Barada sanctuary, Jamvanti Cave & Adityana Limestone Mine



Fig. 8: Eco-friendly Non-conventional Mining at Adityana Limestone Mine of SCL and Groundwater recharging and rain water storage

3. Final Mine Closure Activity at Ajotha, Meghpur & Sutrapada Limestone Mine of M/s Gujarat Heavy Chemicals

As per existing trend; after site-seeing of Porbandar & its surroundings, Pilgrims/Tourist are likely to proceed to Verava-Patan for Blessing of Lord Shiva (The Somnath Jyotirlinga), Bhalka Thirth (Place of Heavenly departure of Lord Krishna) and the Gir Wild Life sanctuary. The Milliolute limestone occurring in this area are of > 52% CaO with 2-3 m thickness, suitable for soda ash manufacturing. Void so formed after limestone extraction, are reclaimed by the soil and made suitable for cultivation & coconut mango fruit plantation. It is an excellent example of Final mine closure

scenario. Altogether about 70 ha mined out voids have been reclaimed & rehabilitated by extensive plantation & cultivation. It is an excellent example of Mine Closure, the post-mining land use scenario (Fig. 9).



Fig. 9: Reclamation & rehabilitation of mined-out voids by cultivation & fruit bearing tree plantations Ajotha, Meghpur & Sutrapada Limestone Mine of M/s Gujarat Heavy Chemicals

4. Final Mine Closure of Solaj Limestone Mine of M/s Ambuja Cements Ltd.

After visiting the holy places around Veraval, Gir forest and final mine closure of Scenario of GHCL mines, anticipated onward movement of the tourist shall be towards Diu. As part of eco-mines tourism, attempt is to be made to attract the tourists on the way for visiting the Final Closure Scenario of Solaj Limestone Mine of Ambuja Cements Ltd located at a distance of 35 Kms from Veraval.



Fig. 10: Final mine closure of Solaj Limestone Mine of M/s Ambuja Cements Ltd. with water reservoir with peripheral plantations

Mining of limestone & marl were carried out by non-conventional eco-friendly mining over 107 ha. Its final mine closure plan was approved in 2018. Water reservoir over 19.4 ha. area with peripheral dense plantation and protective measure by stone wall fencing have been developed (Fig. 10 & 11). Pasture land has also been developed over remaining mined out void. The mined-out area has also become camping ground of migratory birds. It is an excellent example of Mine Closure post-mining land use scenario.

There an ancient temple with deities of Mool Dwarka in the vicinity (Fig. 12). A toy train can be laid along the pit periphery for making amusement park.



Fig. 11: Reclaimed mining sites of Solaj Limestone Mine of M/s Ambuja Cements Ltd. Showing the Camping grounds of migratory birds



Fig. 12: Ancient Temple Mool Dwarka in vicinity of Solaj Limestone Mine

Conclusions

Long term impact of Mine Eco-tourism can be visualized as:-

- Improve negative impression about mining activities and minimize physical, social, behavioral, and psychological impacts towards mining
- Build environmental and cultural awareness and respect for biodiversity.
- Provide positive and memorable interpretative experiences for both visitors and hosts that help raise sensitivity to environmental restoration and social climates
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.

- Design, construct and operate low-impact facilities for easy maintenance.
- Recognize and respect the rights and spiritual beliefs of the Indigenous People in our community and work in partnership with them to create empowerment.

Further recommendations for Tour Operation Mode

- Association & Institute like MEAI, FIMI, GUMIN & MEMC need to carry out inspection of the identified sites for verification as well as review for improvement. After having satisfied with the field observations, associations as well mine management may prepare publicity brochure about the sites.
- Associations as well as company may write a letter to Education Institute of Mining, Geology and Environment Studies to include the identified sites in their forthcoming educational field tour.
- Similar approach is also to be adopted by writing letter & sending brochures to Tourism Department & Tour Operators to include the identified sites in the existing tourist circuit.
- Care is also to be taken in safety, security of tourists and provide essential civic facilities.
- Utmost precaution is also to be taken that proposed Mine Eco-tourism should not cause detrimental impact on existing eco-system.

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I place on record my sincere gratitude for Dr. Sudesh K. Wadhawan for his critical review and constructive suggestions that improved the manuscript.

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OBITUARY



Shri M.H.R. Rao
(20/08/1925 – 09/10/2021)

Shri. MHR Rao was born on 20th August 1925 and had his early schooling in Kolar Gold Fields. Having graduated from the Central College, Bangalore, Shri Rao had started his career as a mining probationer in 1949 and climbing the ladder of success rung by rung by dint of his immense energy, untiring efforts and dedication to work to become Manager, Mysore Mine, in 1974; as Manager (Planning) in 1978; as General Manager / Agent in August 1979 and finally as Director (Technical) in January 1982. Shri M.H.R. Rao, retired from service on the 31st of August, 1983, after a long and distinguished career in the Bharat Gold Mines Limited, spanning 34 years.

His contribution as member in the professional bodies such as Mining Engineers' Association of India (LM-1812/BAN), Geological Society of India, and Mining, Geological and Metallurgical Institute of India (MGMI) was acclaimed and appreciated. He was always actively associated with the mining industry as a consultant and adviser until his last breath. Shri Rao was a highly sociable and eminently "clubbable" person who endeared himself to all those who came in contact with him. With his stimulating company and a ready turn of wit and abundant humour, he had a large circle of friends.

Besides being a competent mining engineer, Shri Rao had also won the distinction of being the recipient of the Presidential Award of "Jeevan Raksha Padhak" for excellence in rescue work in mines. He was awarded MGMI Gold medal for year 2015-16 for his paper on 'Status of Mineral Exploitation in the Country with particular reference to Gold and Gold Mining'. Shri Rao was felicitated by the Bangalore Chapter on 1st November 2016 on the Indian Mining Day for his contribution to the mining industry.

The Members of the Association deeply mourn his sad demise on 9th November 2021 and pray for his soul to rest in peace and extend heartfelt condolences to his bereaved family.



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BI-MODAL MINERALIZATION INCLUDING HYDROTHERMAL AND SEDEX TYPE OF DEPOSIT AT RAJPURA - DARIBA BELT OF BHILWARA SUPERGROUP IN RAJASTHAN, INDIA

P. K. Yadav

Abstract

Since centuries, the Indian states of Rajasthan and Gujarat have been known for the mining of zinc and lead. The important mining centers had been at Zawar, Dariba, Ambaji and Agucha. At several other ancient mine-workings sites, heaps of excavation debris and metallurgical slags indicate a flourishing mining activity and mineral processing in the past. Based on extensive geological/geophysical investigations undertaken in the Rajpura-Dariba Sulphide Mineralization belt and in Sindesar Khurd in particular, a bi-modal sulphide mineralization pattern has been inferred. This concept of bimodal occurrence is duly complemented by an integrated geophysical/geochronological and other allied geoscientific studies that may form a formidable exploration tool to be applied to locate many more hitherto undiscovered massive sulphide ore bodies in the region.

Introduction

Traditionally the search for mineral deposits has followed the known signatures of the ancient mining sites, old-workings coupled with exploration of extensive surficial gossan zones that served as guides for locating the zinc and lead sulphide mineralization. Ore search also depended either on occurrence of favourable indicators as gossans over the host rocks like graphite-mica schist/ calc-silicates/ marble or integration of geophysical anomalies and integration and syntheses of geological and geochemical data that served as ore guide.

Rajasthan holds more than 90% of known, economically viable Pb-Zn resources of the country. During last 50 years at different places, Geological Survey of India (GSI) has established lead-zinc mineralization in Rajpura-Dariba belt of Bhilwara Supergroup (**Table-1**); Sindesar Khurd (**Fig. 1**) is one of them. Rocks of Bhilwara Supergroup are endowed with some of the best zinc resources of country. India has a glorious history of mining and smelting of base metals. India was trading metals and exporting precious stones from sea ports on Gujarat coast. Since centuries, the Indian states of Rajasthan and Gujarat have been known for the mining of zinc and lead. The important mining centers had been at Zawar, Dariba, Ambaji and Agucha. Several other places show ancient mine workings, heaps of mine debris and slag that indicate a flourishing mining activity in the past. The Rajpura-Dariba and Sindesar Khurd mines lie in Dariba-Bethumbi-Surawas Pb-Zn belt, that hosts a huge potential (350 million tonnes) with Pb+Zn content varying from 2.28 % to 8.36% and fall broadly under SEDEX type deposit (Sharma and Dasgupta, 2016; Golani, 2021).

Volcanogenic Massive Sulphide (VMS) deposits also known as the volcanic-sedimentary rocks hosted or associated deposits of base metals are significant sources of Zn, Cu, Pb, Ag and Au. These VMS deposits also host associated trace metals such as Co, Sn, Se, Mn, Cd, In, Bi, Te, Ga and Ge. These are typically polymetallic massive sulphide deposits that form at or near the seafloor in submarine volcanic environments and extensional tectonic settings. These massive sulphide deposits also grade to include the Sedimentary Exhalative (SEDEX) deposits. Considering the dominance of Pb, Zn and Cu metals, these are classified accordingly as the Pb-Zn, Cu-Zn and Zn-Pb-Cu groups. The characteristic basin architecture of most SEDEX deposits is continental rift basin with large, 2 to 5 km, of syn-rift coarse grained, permeable clastics and related volcanic rocks that get overlain by shales or carbonate rock assemblages, for instance that of the Selwyn Basin in Canada (Goodfellow, 2004; Golani, 2021).

The general understanding about mineralization in the area has been that fine-grained sulphide ore occurs disseminated in banded form within the mica schist, tuffaceous mica schist and carbonaceous schist as volcano-sedimentary SEDEX type and the coarse-grained sulphide ore occurs in calc-silicate rocks and marble as remobilized mineralization during high-grade metamorphism and deformation in the area (Ameta and Sharma, 2008; Sharma and Dasgupta, 2016). In this contribution a case is made out for bimodal Pb-Zn ore-genesis with distinctive geological field features/signatures and structures and the laboratory textures, geochemistry and characteristic geophysical indicators.

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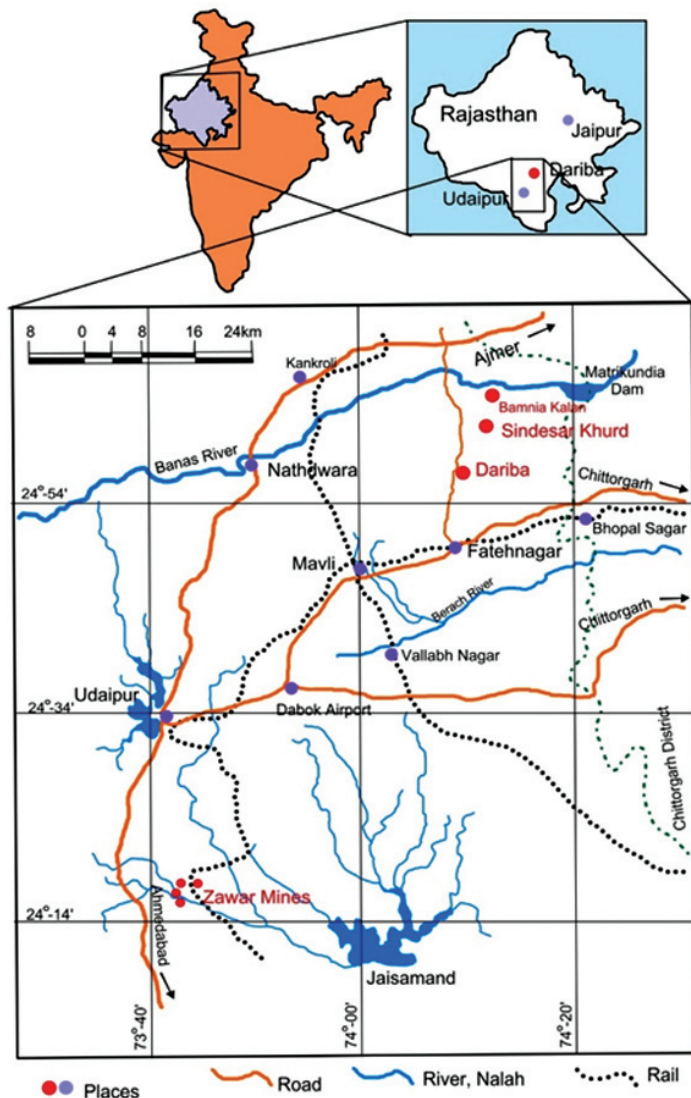


Fig.1: Location map of Pb-Zn Dariba and Sindesar Khurd mines, Rajpura-Dariba belt, Rajsamand district, and Zawar mines in Udaipur district, Rajasthan

1. Lead Zinc Resource in Rajpura-Dariba Belt, Rajasthan

The Lead - Zinc mineralization in Rajpura-Dariba Belt is hosted by carbonaceous schist, tuffaceous mica schist, calcareous mica schist and calc- silicate marble/ dolomite. Main ore minerals are sphalerite, galena, pyrrhotite, pyrite and chalcopryrite with subordinate arsenopyrite. The relative dominance of major minerals varies in different host rocks as well as across the individual ore bodies. The generalized geological set-up in the area is give in **Table-1**. The general succession of rocks mapped in the area are shown in **Fig. 2 & 3** and include: the migmatite and feldspathic gneisses with mica schist at the base and classified as the Archaean Mangalwar Complex of the Bhilwara Supergroup. Overlying Lower Proterozoic succession of rocks classified here as the Rajpura-Dariba Group, began with impersistent

conglomerate horizon and the dolomitic marble with bands of amphibolite that occur above the migmatite gneisses of the Mangalwar Complex with an unconformity. Carbonaceous schist, tuffaceous mica schist and calc-silicate occur over these and host the primary base metal mineralization. Meta-marl, calcareous mica schist, meta-chert interlayered with mica schist (tuffaceous at places) +/- graphite are intruded by the quartz veins Pb-Zn mineralized stringers/ zones and pegmatite, aplite and granite. The overlying gossans and ferruginous soils are the weathering products.

Table-1: The stratigraphic succession of the Sindesar Khurd area, Dariba – Bethunmi Belt (modified after Yadav et al. 1992)

Weathering products	8. Gossan and ferruginous soils
Intrusive	7. Quartz vein and Pb-Zn mineralized stringers/ zones, pegmatite, aplite and granite
Lower Proterozoic (Rajpura-Dariba Group)	6. Meta-chert interlayered with mica schist (tuffaceous at places) +/- graphite, garnet, staurolite, kyanite
	5. Calcareous mica schist
	4. Calc-silicate marble/Dolomitic marble (with Pb-Zn mineralization)
	3. Meta-marl
	2. Carbonaceous schist
Archaean	1. Dolomitic marble with bands of amphibolite and Impersistent Conglomerate horizon ----- Unconformity -----
	Feldspathic gneisses with migmatite and mica schist. Migmatite gneisses (Mangalwar Complex)

The present studies in the Sindesar Khurd area have suggested a bi-modal-hydrothermal and SEDEX (volcano-sedimentary) type deposit. Here the Rajpura-Dariba deposits display bi-phase mineralization including (i) syn-sedimentary stratiform banded Lead- Zinc ore and (ii) post-metamorphic massive ore, independently and epi-genetically introduced later on as hydrothermal ore fluids. Salient features such as massive ores, veins, occurrence of pods, segregated veins or open space fillings traversing across the banded ores, absence of deformation and recrystallization textures indicate that these mineralized veins are due to post-metamorphic event and could have formed from a different source of hydrothermal ore fluid subsequently and mostly by replacement, i.e., by solution and reprecipitation or by open space fillings. Such cavity and pore-space filling nature of vein ore and their occurrence along irregular shear planes thus, suggest their environment of ore formation

was secondary nature and different, i.e., by hydrothermal emplacement.

of geophysical surveys. Some more evidences supporting bimodal concept are structural, mineralization, fluid inclusion studies. Geochronological observations, aero-magnetic data, ground geophysics, geomorphology and integration of all these features and data sets can serve to prognosticate at new ore horizons, possibly additional massive ore deposits.

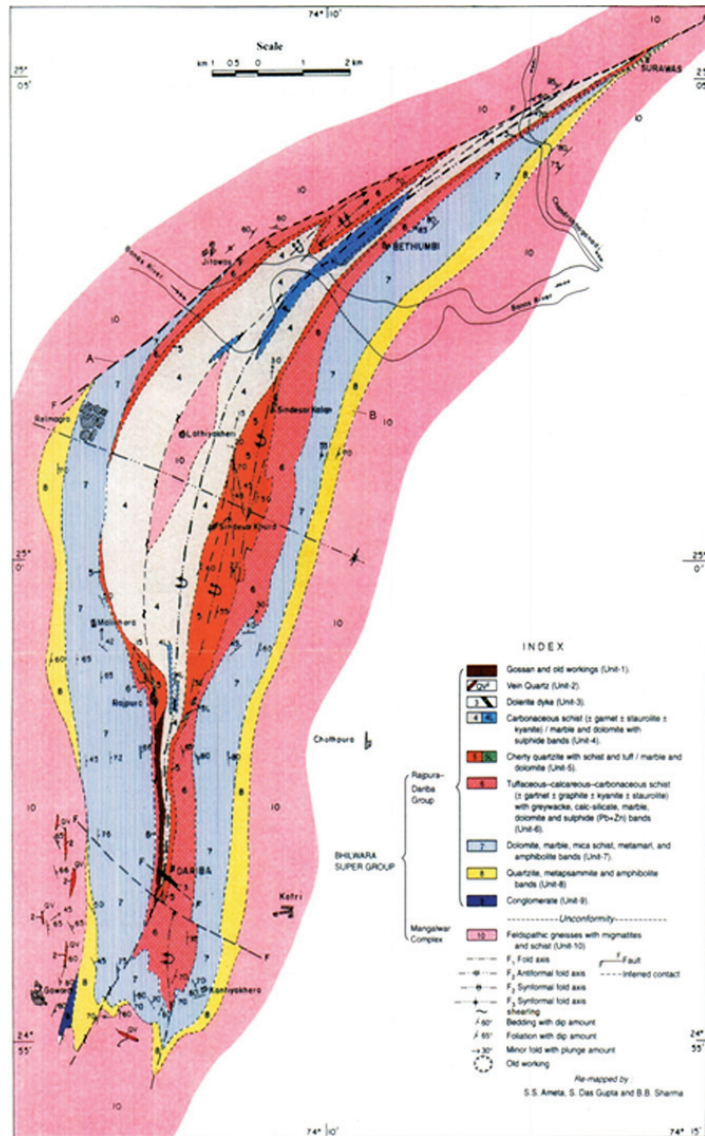


Fig. 2: Generalized Geological map of Dariba-Bethumbi-Surawas belt, Rajasamand district, Rajasthan (Ameta and Sharma, 2008)

Imprints of metamorphism in banded ores the host rocks show green-schist facies low temperature metamorphic rocks. Fluid inclusion studies on quartz and sphalerite of Rajpura-Dariba area also indicate low temperatures less than 400°C of formation. Whereas the sphalerite's melting temperature is 400°C, which cannot be attained in green schist facies rocks hence question of remobilization of sulphide ores is improbable. Source of this ore-bearing hydrothermal fluid could be intrusive quartz veins, granite which has been located during present studies, but not the remobilization because of metamorphism and deformation. It is further emphasized that this finding can lead to discover many more massive ore deposits in Dariba using aero-magnetic maps

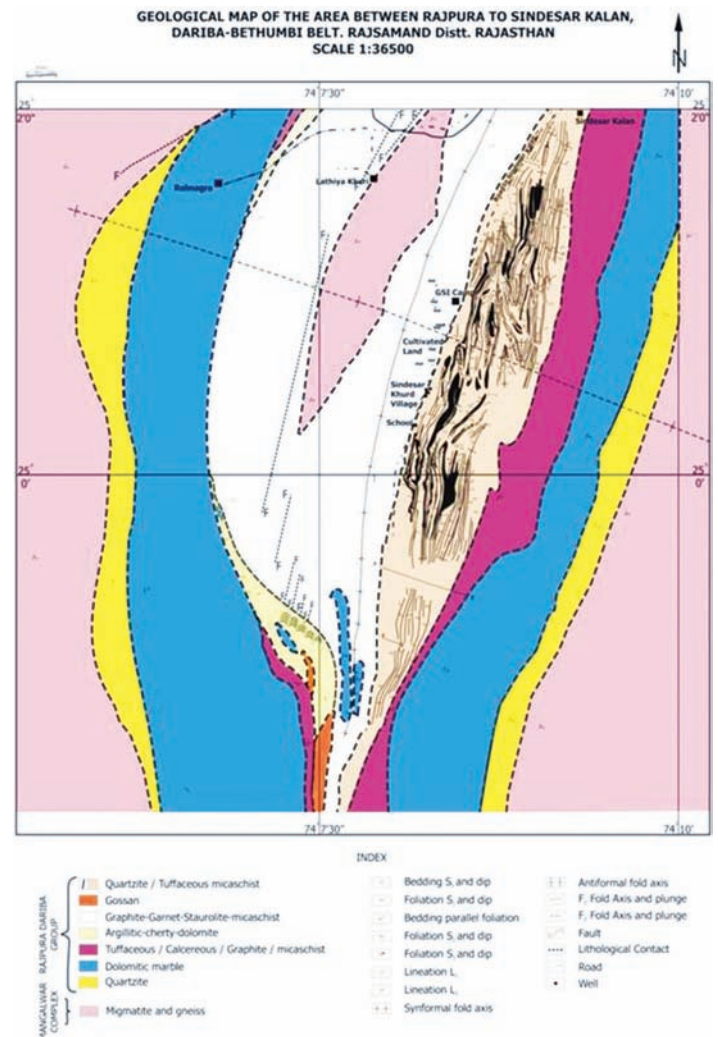


Fig. 3: Geological map of area between Rajpura and Sindesar Kalan, Dariba-Bethumbi- Belt, Rajasamand district, Rajasthan

Structural features indicate that in the westernmost part, the massive ore body intersected in (Fig. 4 & 5) is having 30m width and more than 150m in length. It constitutes ore facies occurring in shear zone. Whereas syn-sedimentary base metal deposit in this area is less than 10m average thickness. Massive ore is rich in sphalerite and galena (15 to 24% Pb+Zn) and pyrite is minor. This ore body has 65° dip towards west and east also. Host rock comprises rounded to angular fragments of blocky marble and calcareous tuffaceous schist indicating a fault zone filled by sulfides. Further with an objective of sharing more evidences for hydrothermal ore occurring along tectonic discontinuities

such as faults and shear zones which are loci for massive ore in volcanoclastic rocks (Fig. 4 & 5) and wide hydrothermal alteration zones in the most promising host rock like calc-silicate marble has been attempted. This exercise may also help in searching new massive ore bodies.

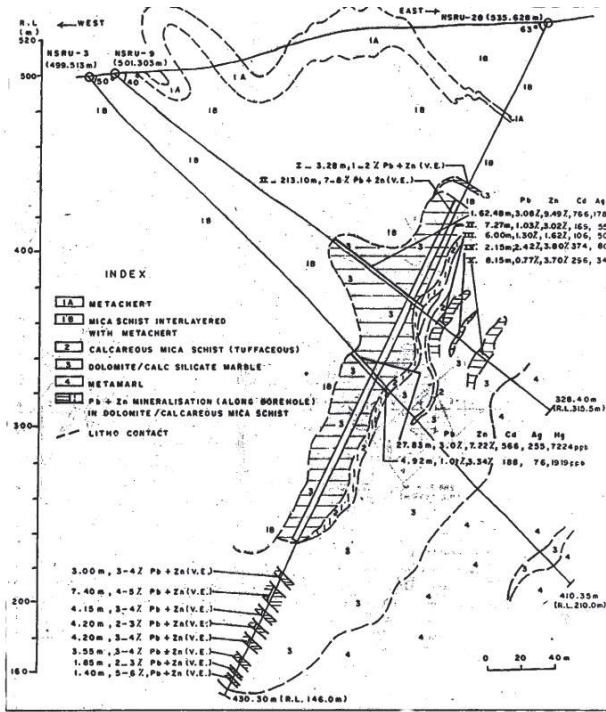


Fig. 37. Geological cross-section along boreholes NSRU-3, 9, and 28 in the North Sindesar Ridge (South) block, Dariba-Bethunmi belt, Udaipur district, Rajasthan. (Data of NSRU-3, and 9 pertain to F.S. 1967 to 69).

Plate 3

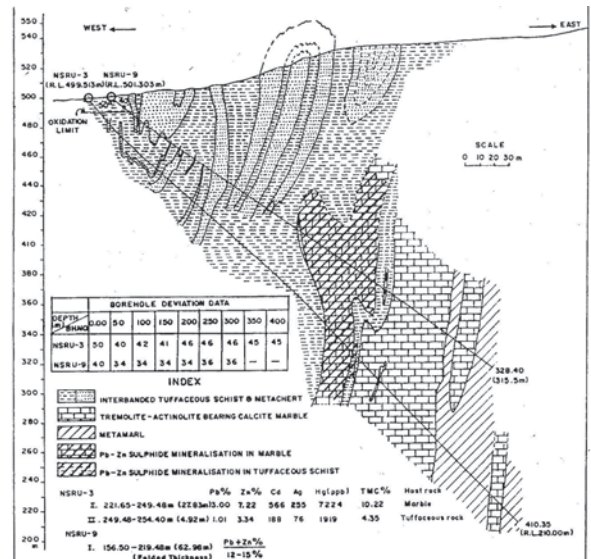


Fig. 51. Geological cross sections along Boreholes NSRU-3 & 9 North Sindesar Ridge Block, Dariba-Bethunmi belt, Udaipur District, Rajasthan

Plate 4

Fig. 4 & 5: geological cross-sections along bore-holes in the North Sindesar Ridge, Dariba-Bethunmi Belt, Rajsamand district [formerly part of Udaipur district], Rajasthan

2. Metallogeny: Bi-Modal Ore-Genesis

The most conspicuous characteristics of stratiform banded lead zinc ore (SEDEX type ore) are that it occurs as lamination and bands parallel to primary bedding and foliation, and is generally fine grained. The banded ores and the host rocks show green-schist facies of low temperature metamorphism. It is further noted that sphalerite melting temperature is 400°C which could not have been attained in green-schist facies metamorphism. Besides, the fluid inclusion studies on quartz and sphalerite of Rajpura-Dariba area also indicate low temperature regime- less than 400°C. Therefore, remobilization of Pb-Zn sulphide ores is not feasible during such metamorphic deformation phenomena.

Salient and distinctive features of post-metamorphic and epigenetic hydrothermal ore include: - massive nature of ores, occurrences as veins and pods, segregated veins or open space fillings traversing across the banded stratiform sulphide ores, absence of deformation and recrystallization textures. These features are clear indicators that this type of ore-mineralization is post-metamorphic event and could have formed from a distinctly separate hydrothermal ore fluid migration processes associated with intrusive igneous events in the area. The litho-structural contrasts were used for identification of several faults, fractures and lineaments. Presence of faults have been further confirmed using magnetic breaks from the ground geomorphology and aeromagnetic maps, lineaments from imageries and lithological discontinuity on the ground (Fig. 3) based on aeromagnetic anomalies (Yadav et al.1992; Yadav and Avadich, 2010).

The average Sulphur isotopic values also show different values of ³⁴S 1.1 to 6.37 permil and ³⁴S 6.3 to 21.21 permil in fine and coarse grained respectively in ores of Sindesar Khurd-Lathiyakheri area. This indicates two different phases and environments of sulphide mineralization (Sharma and Dasgupta, 2016).

2.1 Selective occurrences of alteration zones around locales of massive ore bodies

Around massive ore bodies in volcano-clastic rocks, 30-40m wide alteration zones are noticed. Presence of chlorite, sericite (Fig. 6) and altered clasts of feldspars have been observed in such altered zones. It will be interesting to mention that such alteration zones are conspicuously absent in areas characterized by the occurrences of SEDEX type of deposits in the area.

Alteration zones occur over wide area covering 50m, around pipe like massive ore bodies. Alteration zones occur mostly in the volcanic rocks. Fine grained matrix of volcanic rocks and clasts both show development of chlorite, sericite, carbonates and quartz. These secondary alteration minerals have either been a completely altered matrix and clasts of

volcanics or may appear in the form of rim around mineral or rock fragments of meta- volcano-sedimentary rocks. In the alteration zones, clasts of basic volcanic are found altered, twisted and broken in the matrix of acid volcanics (**Fig. 6**). Sericite and muscovite also occur as a rim intergrown

with quartz around fragments of brecciated volcanic rocks in the alteration zones. Such acid and basic volcanic rocks in the alteration zones, development of chlorite, sericite, carbonates and silicification indicate post ore deposition alteration.

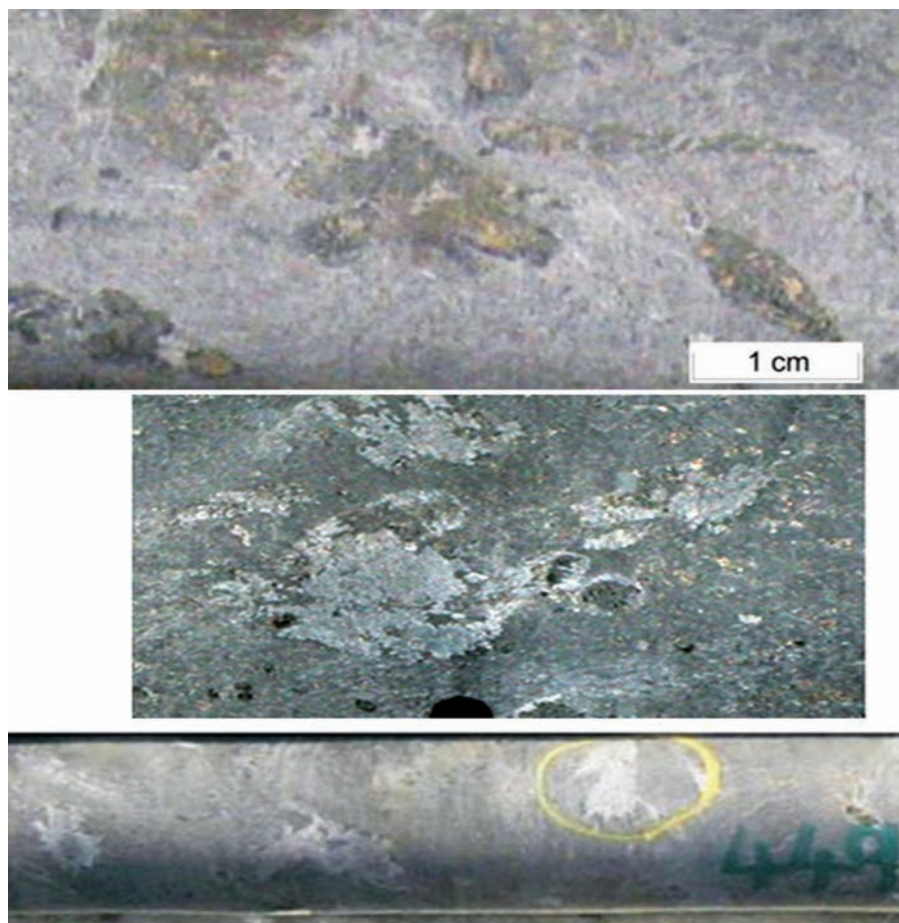


Fig. 6: Photographs showing alteration features around sulphide ore zones

Massive ores have 60-65° dip in west or east whereas the primary banded ores are dipping due 40° towards only east. Massive ores are at oblique (**Fig. 4 & 5**) angle showing sharp contact with bedded rocks. Effects of remobilization are not observed on the host rocks also. Brecciated and blocky nature of host rocks suggest explosive volcanism which has played a major role in fracturing the pile and opening up channel ways (Large et al., 2004) for ascent of ore-fluids. Thus, explosive acid volcanism seemed to have a major role in fracturing the rocks and creating open channel ways for ascent of ore fluids. Such process of ore emplacement has been named as Vent Complex by Large et al. (2004).

2.2 Distinctive geochronological imprints in two genetically different types of orebodies

Geochronological data indicate depositional age of galena as 1808 Ma by Pb^{207}/Pb^{206} and Dariba tuffaceous host rocks

as 2366 Ma (Deb and Thorpe, 2004). This data indicates that formation of galena is much younger than the tuff. It also supports the bi-modal concept.

3. Geophysical Exploration: Residual Gravity and Other Characteristics

Geophysical data elucidates basin structure and distribution of rock types below the cover. In poorly exposed and deeply weathered terrain It may be difficult to interpret faults which are parallel to litho-units with the use of airborne geophysical and imagery data. Such features can be however, interpreted using ground magnetic geophysical data. The faults which are oblique to regional structures can be interpreted by aerial photographs. The data could then be integrated for narrowing down target area. High resolution and high sensitivity aeromagnetic surveys are especially capable of detecting patterns in the distribution of opaque

oxide minerals in a region in which geology is favorable for occurrence of certain kinds of ores.

The residual gravity map (Reddi and Ramakrishna, 1981; 1997) depicted a very prominent lineament with sharp gradient. The maps with sharp contrast mark a N-S lineament coinciding with aeromagnetic discontinuities and coincide with extensive shear zones. The average density of meta-sediments in the area varies from 2.6-2.7 gm /cc while the mineralized zone has about 4.0 gm/cc A positive gravity zone (with 8-10milligals), is noticed over Rajpura-Dariba-Sindesar Khurd area especially in Bethumbi and it sharply abuts against a gravity low located over the Mangalwars. The Gravity data looks like a structural “horst between a western and eastern low. These features depict ideal locale for sulphide ore mineralization. The gravity axis also depicts structural trends. Further narrow gravity high over lower amplitude represents “rift sites” of deposition of cover rocks.

Seismic soundings with hammer seismograph could detect thickness of the overburden resistivity values of different lithounits of present area overlap with the exception of graphitic mica schist. Graphitic mica schist is marked by self-potential lows 100-250 and it can be distinguished from other rocks based on resistivity profiling geophysical survey.

Graphitic mica schist shows resistivity values of the order of 2–10-ohm m against high values 200–500-ohm m on other adjoining rocks and over graphitic mica schist magnetic response is flat. Quartz mica schist is characterized by flat magnetic response whereas amphibolite shows high magnetic response. Quartz mica schist is characterized by highly fluctuating resistivity values (300-500), while quartzite gives (200-500) ohm m resistivity (Ram Gopal and Agarwal, 1993; Ram Gopal, 2004).

3.1 Use of Aero-Magnetics in Interpretation and Mineral Targeting

There are evidences of existence of relationship between magnetic minerals and depositional environments. There are many geological events other than ore forming processes which affect magnetite and these will tend to overprint ore forming environment premised on magnetic signatures. However, the pitfalls and ambiguities that beset the interpretation of magnetic data are numerous. SEDEX deposits of present area under study are having pyrite and pyrrhotite as minor sulphide. The magnetic anomalies caused by the pyrrhotite tend to be extremely weak and erratic. In the present area, behavior of ore texture, morphology, mineralogical association of constituent minerals and their ratio and geological setting are different in volcanic vent proximal and vent distal deposits thus, interpretation of

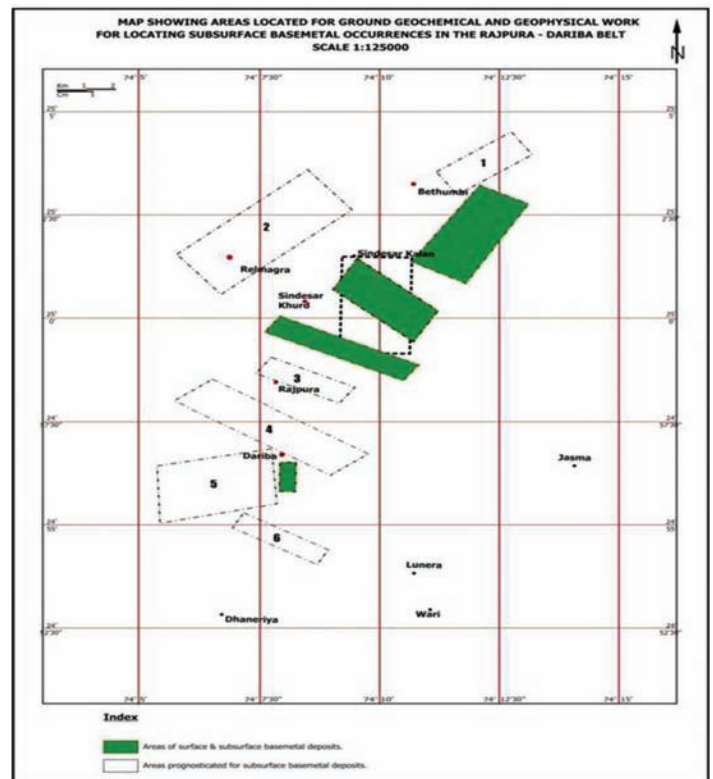
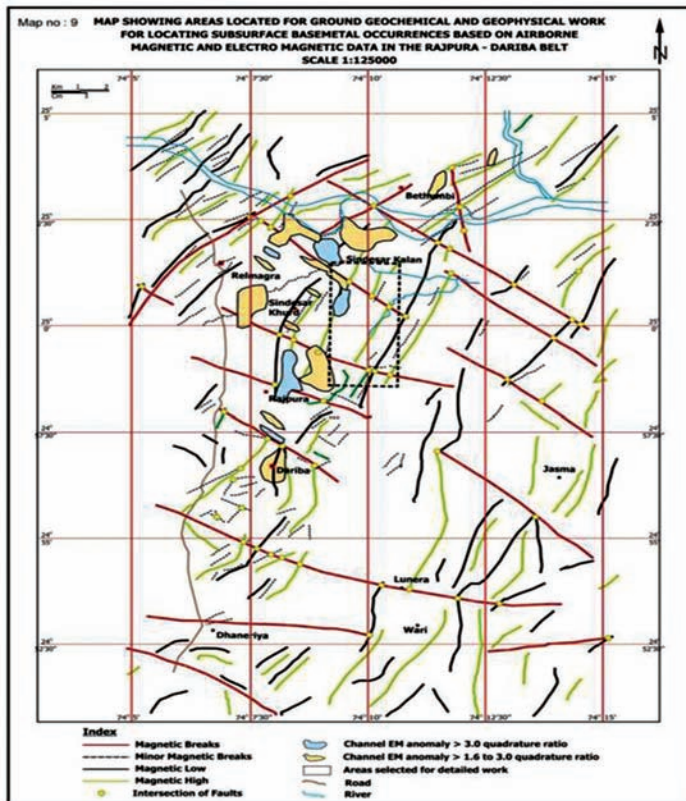


Fig. 7A & B: Mineral prognosticated and potential target areas delineated from airborne geophysical surveys for detailed geochemical and ground geophysical exploration for Pb-Zn / polymetallic deposits

magnetic data becomes more challenging. The areas having surface outcrops could be surveyed geochemically also. Integration of geological, aeromagnetic and electromagnetic data could be done by transferring and integrating all the different layers on one scale. The geological layers imply lithological variations including gossans and host rocks. The structural layers to reflect (a) faults, (b) fractures / lineaments, (c) shear zones, (d) fold axis and (e) trendlines.

The airborne electromagnetic data, ground geophysical data acquired by GSI/ RP holders may provide important input as they indicate conductivity of the rock formations and associated sulphide orebodies. Magnetic high and low axes and discontinuities can be used as inputs for identification of faults/ lineaments and the data could be used to differentiate faults using geomorphology. These data sets could be integrated to further narrowing down potential target area for detailed ground exploration (**Fig. 7A & B**; Yadav and Avadich, 2010).

Conclusions

The host rocks for base metal mineralization in Rajpura-Dariba and Sindesar Khurd area are schist (carbonaceous and tuffaceous), calcareous schist and calc-silicate marble. However, economical grade of Pb + Zn with Cd and Ag occur only in calcareous schist and calc-silicate marble. The main sulphide ore minerals are sphalerite and galena with minor amount of chalcopyrite and others including pyrite and pyrrhotite. The primary mineralization is strata-bound SEDEX type and occurs in the form of layers of dissemination and thin bands of fine-grained ore and coarse-grained veins, stringers/ pods and replacements along structural weak planes/ shears developed across the host rocks. Distinct petrographic features near the contact, grade and mineralogical characteristics of two types of ore deposits and their typical response to varied types of explorations, as observed in the present study does permit consideration of the existence of a bimodal type sulphide mineralization pattern in Sindesar Khurd forming part of the Rajpura Dariba Sulphide mineral belt.

The distinctive mode of occurrence, critical study of the characteristically favoured structural for framework of mineralized zones and the response of this distinct mineralized bodies to specific geophysical, geochronological probes in an integrated manner, may form a potent exploration approach capable of identifying several new hitherto unidentified massive sulphide ore bodies along the belt

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MEAI NEWS

AHMEDABAD CHAPTER

A half-day seminar along with a Mine visit was organized by Bhavnagar Local Center, Ahmedabad Chapter on "Value addition of Minerals Available at Lignite Mines in Bhavnagar" on 23.10.2021, in collaboration with the Gujarat Heavy Chemicals Ltd, Gujarat Mineral Development Corporation Ltd and Gujarat Power Corporation Ltd at VTC, Khadsaliya Lignite Mine Bhavnagar. Around 50 Delegates from GHCL, GMDC and GPCL participated in the seminar.

Post Lunch, the inaugural session started with the auspicious lamp-lighting by the Dias Dignitaries. Welcome address was presented by Shri Neeraj Pareek, Convener Bhavnagar Local Center & Mines Manager GMDC, in which he focused his views on the role of value addition of minerals available at Bhavnagar, its importance for mining industry and for the overall growth of the Nation. Shri Dhananjay Kumar, Vice Chairman-II Ahmedabad Chapter & Sr. General Manager/Agent, GHCL Ltd, in his address noted the importance of minerals we mine out and how value addition of minerals can generate good revenues. He narrated that the minerals are the first stakeholder of mining industry and we should have to exploit it in a judicious manner. Shri Satyanarayan Rao, SO GPCL (Mines) also briefed on the subject matter.

Three technical papers were presented on Beneficiation of Pyrite & Bentonite minerals which are available in consortium with Lignite, by Shri Anil Wandkar, Secretary Bhavnagar Local center & Sr. Manager, GHCL, Shri Sanjay Mathur, Dy GM, GMDC Ltd, and Shri Vijay Yadav, Geologist, GPCL. The speakers highlighted various beneficiation methodologies for these minerals including cost analysis.



Lamp Lightening by the Dignitaries

After the technical session, an introductory program was arranged for newly joined mining engineers of GPCL and new MEAI members. The program was coordinated by Ms. Gunjan Pande, Secretary Ahmedabad Chapter. Seminar concluded with a vote of thanks by Shri Sanjeev K. Pandey Sr. Manager, GHCL Ltd. followed by a visit to GHCL

Khadsaliya Mine. The best Mining practices & Progressive closure activities undertaken by GHCL were showcased to participants.



Welcome Address by Shri N Pareek



Keynote Address by Shri D. Kumar



View of Participants in the Field Visit of GHCL Mines

BAILADILA CHAPTER

The Bailadila Chapter has conducted an offline meeting on 01/11/2021 to elect the new Chairman in view of transfer of Shri. A.K. Prajapathy.

In the meeting, Sri. R Govindarajan, ED was elected as the new Chairman and Shri, P.K. Mazumdar as Vice Chairman of the Bailadila Chapter.

BHUBANESWAR CHAPTER

Emergency General Body (EGM) meeting was organized for Bhubaneswar Chapter on 13.11.2021 as subsisting Chairman & Secretary Mr. M C Thomas and Mr. Dipak Behera are moving out of Bhubaneswar due to organization changes and it was imperative to select the new incumbents for the smooth functioning of the Chapter.

Mr. D.B. Sundara Ramam, VP-III MEAI and Vice President (Raw Materials) Tata Steel Limited graced the occasion as Chief Guest and presided over the meeting. Mr. Sanjay Kumar Pattnaik, Immediate Past President, MEAI also joined the meeting as Guest of Honor. Mr. M Narsaiah, Secretary General, MEAI also joined the meeting including the Executive Committee Members, Life Members of Bhubaneswar.

Mr. Dipak Behera, Secretary MEAI Bhubaneswar Chapter welcomed all the guests and also emphasized the good work done by Bhubaneswar Chapter. He also told that Bhubaneswar Chapter was recognized at the AGM of of the Association for enrolling the maximum number of Life Members (17) in year 2020-21.

Mr. M C Thomas, Chairman MEAI Bhubaneswar Chapter in his speech told the importance of MEAI and the strategy we need to adopt to maximize membership, do advocacy for mining related issues, create awareness among the members on technology and digitalization through conducting seminars and webinars. He wished the new team very best.

Mr. D.B. Sundara Ramam told the reason for holding the EGM for smooth running of the Chapter. He also told the past achievements of Bhubaneswar Chapter and the pivotal role Bhubaneswar Chapter played in the Association activities. He also informed that coming AGMs of the Association need to be hosted by the Eastern Region and most probably by Bhubaneswar Chapter. He then requested the house to propose the names for the posts of both Chairman and Secretary. Mr. R S Raghuvanshi, Joint Secretary & Treasurer, Bhubaneswar Chapter proposed the name of Mr. Pankaj Kumar Satija as Chairman, which Mr. Dipak Behera seconded. Mr. Pankaj Satija, the new Chairman was requested to give his views.

Mr. Pankaj Kumar Satija, Past Chairman of New Delhi Chapter who has now joined Tata Steel Mining Limited as Managing Director told that he has worked in past in MEAI Bhubaneswar Chapter and organized many events. The new team will try its level best to make the Bhubaneswar Chapter vibrant. Mr. Satija proposed the name of Mr. Sambhu Nath Jha, AGM Mines, Sukinda Chromite Mine as the Secretary because it would help to balance the activities both at Bhubaneswar and the mine site. Mr. Sushanta Kumar Mishra, Sr. GM (Mines), Sukinda seconded the proposal.

Mr. D.B. Sundara Ramam requested Mr. Sanjay Kumar Pattnaik to share his thoughts on the occasion. Mr. Pattnaik mentioned the initiatives like association with Global Associations, Senior Citizen Welfare trust which MEAI has taken and also praised the steps taken by Bhubaneswar Chapter. He also wished the new team very best. Mr. D.B. Sundara Ramam in his speech wished good luck to the new team. Mr. R.S. Raghuvanshi proposed a formal vote of thanks.

13.11.2021

Mining Engineer's Association of India Bhubaneswar- Sukinda Chapter

Cordially Invites you to Join
Virtual Meeting for

Emergency Annual General Body Meeting- 2021

On 13th November' 2021
At 4.00pm

Emergency Annual General Body Meeting-2021

Chief Guest
Mr. D B Sundara Ramam
Vice President - III, MEAI
Vice President Raw Materials, TSL

Guest of Honour
Mr. Sanjay Kumar Pattnaik
Past President, MEAI

Chairperson, MEAI, Bhubaneswar
Mr. M C Thomas
MD, Tata Steel Mining Limited

Office Bearer
Mr. Sudhanshu Patni
Vice Chairperson

Mr. Dipak Behera
Secretary

Mr. R S Raghuvanshi
Joint Secretary cum Treasurer

Schedule

4.00 pm	Welcome Note	Mr. Dipak Behera
4.10 pm	Speech of Chairman	Mr. M C Thomas
4.20 pm	Selection of Chairman/ Secy	
4.30 pm	Speech of New Chairman	
4.40 pm	Speech of the Guest of Honour	Mr. Sanjay Kumar Pattnaik
4.50 pm	Speech of the Chief Guest	Mr. D B Sundara Ramam
5.00 pm	Vote of Thanks	Mr. R S Raghuvanshi

Mr. Dipak Behera
Secretary
AGM (External Affairs & Sustainability), TSML

Mr. M C Thomas
Chairperson
MD, Tata Steel Mining Limited

HIMALAYAN CHAPTER

General body Meeting of the Himalayan Chapter was held on 30th October 2021 in virtual mode and the following office bearers were elected unanimously.

1. Chairman—Shri Rajendra Tewari, General Manager / Agent M/S Jai Singh Thakur & Sons, Paonta Sahib, Distt. Sirmour
2. Vice-Chairman –Shri Amit Dubey, Vice President, UltraTech Cement
3. Secretary- Dr. S.S. Randhawa, Principal Scientific Officer, HIMCOSTE, Shimla
4. Jt. Secretary –Shri Sanjeev Sharma, Geologist, Deptt. of Industries Udyog Bhawan Shimla.
5. Treasurer-Shri R.R. Prasad , Mining Head, Gujarat Ambuja Cement Company

Executive body Members

1. Shri Subhash Sharma, Ex.Chairman, Himalayan Chapter
2. Shri Arun Sharma, Retd. State Geologist
3. Dr. Naval Kishor, Prof. Department of Geology (Retd.) Punjab University Chandigarh
4. Dr. H R Dandi, Ex Senior Geologist, H.P.
5. Shri Ashok Sharma, Ex. Mining Officer, Distt.Kangra
6. Shri Khumba Ram Chaudhary, Dy Manager Mines CCI Rajban

JABALPUR CHAPTER

Date : 13.11.2021

Meeting Location: Narmada Jacksons (Jabalpur)

Mentor: Mr. Pukhraj Naniwal
(RCOM,IBM -Jabalpur Region)

Chairman: Mr. S K Jain (NMDC Panna)

Secretary: Mr. Pratyendra Upadhyay
(UTCL- Maihar Cement Works)

Joint Secretary: Mr. Rajesh Chaubey
(M P Birla Group)

Attendees: Executive Members of MEAI
(Jabalpur Region)

- Welcome Address by Mr. S K Jain
- Introduction of all members of MEAI.
- Role of MEAI/ Changes in Rules, Regulations & Acts, to attract Ministry whenever facing problem.
- To include more Mining Engineers, Managers, Geologists, to bring before youth generation along with Owners/Agents to pace up participation in MEAI Jabalpur Region
- One-time voluntary contribution to be made by all senior members (of 10,000) for developing up fund and to facilitate more seminars and technical sessions frequently.
- WhatsApp group not to be used for informal sharing and instead be used for sharing of Technical Innovations and knowledge for the monthly publication.
- New members to be added- Mining Engineers/ Geologists and try to incorporate young mining engineers/geologists and try to inspire them and enlighten them by sharing the immense knowledge and experience we have.

Presentation on Sustainable Mining in NMDC Panna (Diamond Mining Project –Majhgawan by Mr. Sunil Goyal

- NMDC Panna (Diamond Mining Project –Majhgawan)
- NMDC Exploration Timeline
- Terminologies like 4C (Carat, Cut, Clarity & Colour) factor which determine the price of diamond, CPHT

(Carats Per Hundred Tonne), 3 colors of diamond they mine, carat to gram conversions

- Glimpses of CSR activities taken up by NMDC like incentives they provide to workers, medical cards to 3500 workers, afforestation & reclamation of backfilled land.

Presentation on recent MCDR Amendment (2021) by Mr. Nitya Dixit & Mr. Anup Patidar

- Ministry of Mines notified the Mineral Conservation & Development (Amendment) Rules 2021 on 3rd November 2021.
- All plans and sections related to mine shall be prepared by Digital Global Positioning System (DGPS) or Total Station or by Drone survey to certain or all leases as may be specified by IBM, submission of digital images, Drone survey as per Rule 34A, power of taking action against incomplete/wrong/false information in monthly/ annual returns given to IBM, in addition to State Government.
- Penalty provisions were explained: Major Violations, Minor Violations Minor Violations include fine max up to 5 Lakh max and violations were explained
- Interactive session with chairman Mr. Pukhraj Naniwal RCOM, IBM Jabalpur. All doubts regarding MCDR Amendment were cleared by him.

Address by Mentor Mr. Pukhraj Naniwal (RCOM, IBM -Jabalpur Region)

- Jabalpur region has been one of the best regions following rules, regulations and no violations. He also acknowledged the rich experience the members of MEAI (Jabalpur Region) possess and wish to make this the best region in India.
- 3-4 activities to be made compulsory by MEAI in a year.
- Experiences to be shared with fellow members.
- Support will be extended from his side to any problem faced regarding regulations at any time. Asked to complete formalities before time to avoid any violations or to pay any penalty.
- Wished all the best and active participation, contribution to the mining fraternity from all.

Vote of Thanks by Mr. Pratyendra Upadhyay

- Special Vote of thanks to Mr. Pukhraj Naniwal and other delegates.
- End of a very successful event acknowledging special efforts by Mr. Naniwal for making this event possible in a very short span of time.



Address by Mr. S K Jain



Glimpse of Presentation by Mr. Sunil Goyal



Glimpse of Presentation by Mr. Nitya Dixit & Mr. Anup Patidar



Address by Mr. Pukhraj Naniwal (RCOM, IBM -Jabalpur Region)



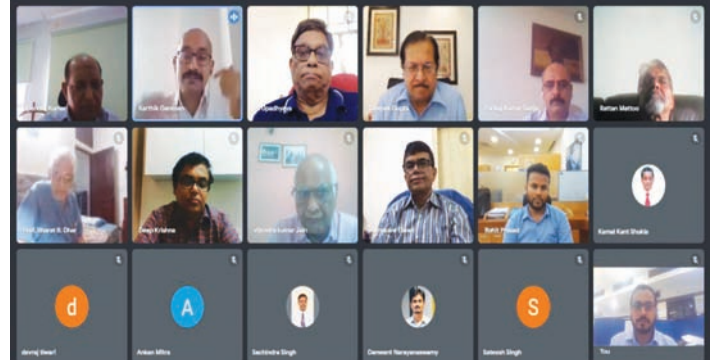
Vote of Thanks by Mr. Pratyendra Upadhyay

NEW DELHI CHAPTER
Webinar on Coal Trilemma

A webinar titled 'Coal Trilemma' was organized by the Delhi Chapter on 8th October 2021. Shri Karthik Ganesan, Research Analyst from CEEW (Council on Energy, Environment and Water) was invited as the speaker for the webinar. Shri Devraj Tiwari, Treasurer, Delhi Chapter gave welcome address and the context setting for the webinar was done by Shri Pankaj Satija, Chairman New Delhi Chapter.

Shri Karthik reviewed the entire thermal set-up in India explaining how the older plants contributing towards a disproportionate share of electricity and, unsurprisingly, private sector plants endures the most of underutilization challenge the sector is facing. He also critically reviewed the parametric regression of important variables, age and efficiency of thermal plants and their plight in Indian context.

The webinar ended with a vote of thanks by Shri Deep Krishna, Secretary, Delhi Chapter.



RAJASTHAN CHAPTER-JODHPUR

One-Day lecture cum practical training on Application of Drone technology in Mining industry

The Rajasthan chapter- Jodhpur arranged a one-day lecture cum practical training for students and MEAI members in the Department of Mining Engineering, MBM Engineering College, Jodhpur on 12th November, 2021 with the Mine Excellence. Mr. Bodhisattwa Sanghapriya and two members from IC Drones, Ahmedabad delivered the lecture on principles of drone working and use of drone technology in the mining industry. He also informed that drone survey is essentially required in preparing a mining plan in some specific conditions in the mining industry. They also showed the practical working of drones in college grounds. In this program over 50 students, Prof S. Bhandari, Er. P.P. Mathur, Dr. R. P. Choudhary, Er. Sanjay Purohit, Er. Rohit Rawal, Shir S. K. Soni, Er. Pramod Dabi were present.



Mr. Bodhisattwa Sanghapriya delivering the Lecture

AUTHOR GUIDELINES FOR PUBLISHING ARTICLES IN MEJ

(As on 15-11-2021)

The text ought to be in English and primed by the ensuing outlines:

Title: Title should be transitory, exact and enlightening in Bold.

Biographers: Name(s) of author(s) to be given with affiliation along with corresponding author contact details/ email.

Abstract: It should be in Italics. Abstract should include practical knowledge in three portions (Background/ Approaches/ Conclusion). The Abstract should be enlightening and entirely understandable by a brief of the theme and asserting the experiments' scope to represent significant records and point out significant discoveries with conclusions. The Abstract should be limited to a maximum of 200 words. Abbreviations should be avoided by using standard terminology, and no literature should be cited.

Keywords: Subsequent the abstract, keywords not more than six that will provide indexing references should be listed and in alphabetical order in italic.

Introduction: This should be brief, and the literature review should be pertinent to the paper's theme. A complete review and unnecessary elements of former work should be avoided.

Methods: The manuscript is expected to provide details of the techniques/ methods used in the current study. However, if well-known approaches have been implemented, proper citation should be used as per prescribed format as shown in these guidelines. It should include the experimental project methods with details of the geographical region, time of the experiments conducted and details of the collaborating institutions, where applicable. In case of review articles, extensive citations and references are expected. The purpose of the review and focus areas of review should be clearly stated.

Results and Discussion: It must be combined to avoid duplication. The outcomes should not be repetitive in both tables and figures. The conversation should relate to the importance of the observations.

Conclusions: It should conclude the results and significance of the observations in brief by point wise consistent with the results. Author may finish the manuscript with either results and discussions, or conclusions or recommendations, or a combination of these sub-headings.

Acknowledgments: Authors can acknowledge in a separate section after the conclusions before the reference section. The authors can also list the organizations that provided the funding for research and provided experimental setups. Authors should acknowledge properly the help and cooperation received from agencies/ institutions/ individuals, whichever applicable.

Table and figures: The title of the table should follow the table numbers. Line drawings/ photographs should contain figure numbers and explanation thereof. The similar numeral(s) of Tables, Figures, etc. should be quoted in the text.

Equations: Equations should be in a typed format, not in the image. Use the equation editor or MathType for equations.

Citations and References: The Authors should use the author-date format for citations and references (e.g. Hebbar et al. (2006); Subba Rao (2001)). A List of all the references quoted should be provided at the end of the paper. It should be prepared alphabetically with all the authors' surnames followed by initials and publication year in brackets. The titles of the articles should be mentioned. Full journal names should be used and be typed in italics. Volume numbers need to be in bold type and pagination in standard type.

Journal Articles

Vishal, V., and Singh, T. N. (2015) "A laboratory investigation of permeability of coal to supercritical CO₂", *Geotechnical and Geological Engineering*, 33 (4), 1009-1016.

Conference Articles

Van Oort, E., and Vargo, R. (2007) "Improving Formation Strength Tests and Their Interpretation." SPE/IADC Drilling Conference, Amsterdam, the Netherlands, 20-22.

Book Chapters

Bernt, S., Aadnoy, Iain Cooper, Stefan, Miska, Z., Robert F. Mitchell, Michael L. Payne, (2009) "Advanced drilling and Well Technology." *Society of Petroleum Engineers*, Ch. 5., 301-441.

Dissertations

Yao Fu, (2014) "Leak-Off Test (LOT) Models," M.Sc. in Engineering Dissertation, The University of Texas at Austin, pp. 2-8.

Patents

Eaton, D.I., "Porous glass support material," US Patent No. 3904422, 1975

Web references

Environmental Report, (2016), "The ICAO Environmental Report 2016", (Date of Access: 10th Oct. 2020)

Article by DOI: Slifka MK, Whitton JL (2000) Clinical implications of dysregulated cytokine production. *J Mol Med.* <https://doi.org/10.1007/s001090000086>

Book: South J, Blass B (2001) *The future of modern genomics.* Blackwell, London

Page/ Line Number: Authors are requested to mention the Page number in the manuscript for easy and quick review. Text

Alignment, line spacing, word count, figures, tables, etc. must be as per format.

Formatting

1. The manuscript in MSWORD format.
2. Every font should be in Times New Roman.
3. Running text should be in a single column
4. Abbreviations should be defined at the first mention and used consistently thereafter.
5. Heading should be in capital with 14-font size in bold. Subsequent sub-headings should be with 12-font size by bold in Sentence case. Sub titles should be in lower case as shown below. Please use no more than three levels of displayed headings.
 1. **Introduction**
 2. **Literature Review**
 - 2.1 **Influence of burden on blast performance**
 - 2.2 **Influence of spacing on blast performance**
 - 2.2.1 **Blast Furnace**
 3. **Experimental Procedure**
 - 3.1 **Selection of site**
 - 3.1.1 **Site access**
6. Font size on tables should be the same as text font size.
7. The total length of the manuscript, including figures, photographs and tables, not to exceed 4500 words or 10 A4-size pages in 1.5 line spacing. Clarity of photographs and figures and font size is important.
8. Maps should include a scale and North arrow.
9. Source of figures/ tables should be mentioned, if required.
10. Keywords should not be part of the paper title

Submission

1. The work described has not been published before (except in the form of an abstract or as a component of a published lecture, review, or thesis).
2. It is not under consideration for publication elsewhere.
3. Its publication has been approved by all co-authors, if any, as well as by the responsible ascendant entities at the institute where the work has been carried out.
4. If and when the manuscript is accepted for publication, the authors accede to automatic transfer of the copyright to the publisher.
5. The manuscript will not be published elsewhere in any language without the consent of the copyright holders.
6. The authors obtain indicated sanction of the copyright holder for material used from other copyrighted sources.
7. The Author(s) may submit the names of maximum of three reviewers that are conversant with the subject matter to facilitate faster processing of the article for publication.

Dr PV Rao, F AusIMM
Editor MEJ

MEAI HEADQUARTERS

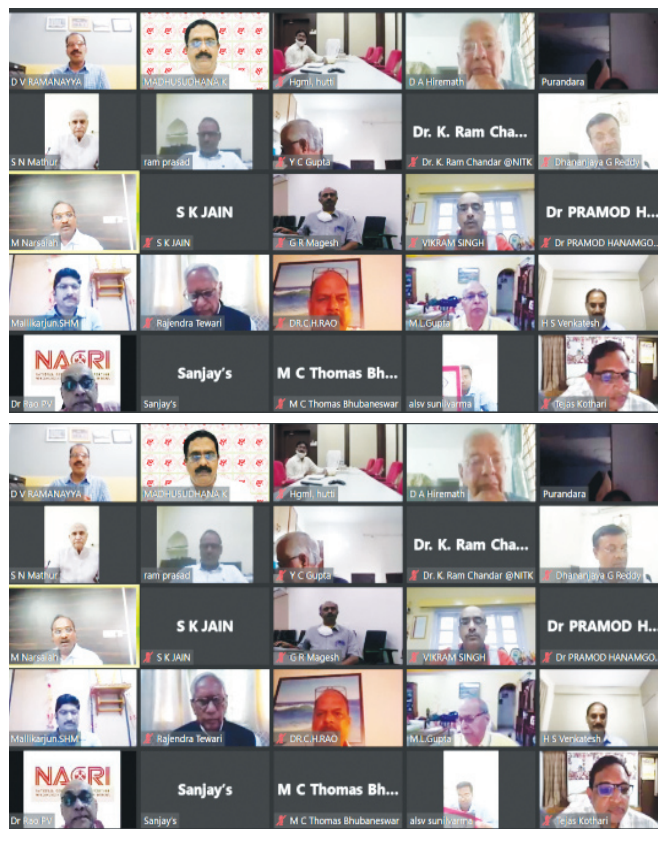
Meeting of Chapters Chairmen & Secretaries

A virtual meeting was organized on 25-10-2021 to introduce all Chapters Chairmen, Vice Chairmen and Secretaries wherein Shri, K.Madhusudhana, President MEAI interacted with all of them. Some Council members of MEAI also participated in the meeting.

Initially Dr. P.V. Rao, Editor MEJ explained about how the publication of Mining Engineers' Journal (MEJ) was being done regularly every month from the MEAI headquarters. Shri. A.R. Vijay Singh, Council member explained in some detail about the MEAI bylaws and how the Chapters have to act in line with the bylaws in vogue.

On the request of the MEAI President Shri. K. Madhusudhana, Chairman of each Chapter presented in brief on all the activities that were being planned and executed. The activities presented included the workshops/ Seminars, membership drive, conducting of welfare activities etc.

The Council praised the President for conducting such a useful event that would further strengthen the MEAI.



MEAI COMMITTEES CONSTITUTED FOR 2021-2023

(Approved by the National Council on 29-10-2021 in the 1st Council meeting)

- 1) Govt. Policies Review & Recommendation Committee**
Mr. B.R.V. Susheel Kumar, Council member, Chairperson
Dr. V.D. Rajagopal, Past President
Dr. T.N. Venugopal, Council Member
Shri. P.N. Sharma, CCOM, Nagpur
Shri. Shailendra Kumar, RCOM, Hyderabad
Shri. D.B. Sundara Ramam, VP-III
Shri. Pankaj Kumar Satija, Chairman Delhi Chapter
Shri. Bidyut Chakraborty
Dr. P.V. Rao, Editor MEJ
Shri. Ashis Dash
- 2) International Affairs Committee**
Dr. Abani Ranjan Samal, Council Member, Chairperson
Shri. Ravindra Sharma, BMRC Director
Shri. T. Victor, Past President
Shri. Arun Kumar Kothari, Past President
Shri. Damodar Reddy, Singareni Chapter
Shri. C. Lakshmi Narayana
Dr. P.V. Rao, Editor MEJ
- 3) Resource Mobilization Committee**
Mr. Arun Kumar Kothari, Past President, Chairperson
Shri. Sumit Deb, Chairman Hyderabad Chapter
Shri. Sanjay Kumar Pattnaik, Immediate Past President
Shri. S.N. Mathur, VP-I
Shri. O. P. Gupta, VP-II
Shri. D.B. Sundar Ramam, VP-III
Shri. B.R.V. Susheel Kumar, Council Member
Shri. Praveen COO, HZL
Shri. Ravindra Sharma, Director BMRC
Shri. T.N. Gunaseelan, Council member
- 4) Training Development & Program Committee**
Shri. Deepak Vidyarthi, Council Member, Chairperson
Dr. N.K. Nanda, Council Member
Shri. V. Lakshminarayana, Council member
Prof. Bhabesh Sarkar
Shri. K.J. Amarnath
Dr. A. Srikanth
Prof. B.B. Dhar, Council member
- 5) Membership Committee**
Shri. Pukhraj Nenival, Council member, Chairperson
Shri. B. Sahoo, Hyderabad Chapter
Shri. Surendra Mohan
Shri. A.K. Garg, Council member
Shri. Dhananjay Reddy, Chairman Bangalore Chapter
Shri. .M.C. Thomas, Chairman Bhubaneswar Chapter
Dr. S.K. Vashisth, Council member
Shri. P. Balamadeswaran
- 6) Legal Issues Resolution Committee**
Shri. A.R. Vijay Singh, Council member, Chairperson
Shri. Arun Kumar Kothari, Past President
Shri. D.A. Hiremath, Council member
Shri. P.C. Bakliwal, Council Member
Shri. Deepak Gupta, Council member
Dr. P. V. Rao, Editor MEJ
- 7) Website Facelift Committee**
Shri. Deepak Gupta, Council Member, Chairperson
Shri. N. Rajendran
- 8) Constitution Amendment Committee**
Shri .V.S. Rao, Past President, Chairperson
Shri. Arun Kumar Kothari, Past President
Shri. T. Victor, Past President
Shri. T.V. Chowdary, Past President
Shri. Md. Fasihuddin, Past President
Dr. P.V. Rao, Editor MEJ
Shri. A.R. Vijay Singh, Council member
- 9) Editorial Board of MEJ**
Shri. K. Madhusudhana- Chairperson
Dr. P.V. Rao, Editor MEJ
Shri M. Narsaiah, Publisher MEJ
Dr. Abani Ranjan Samal
Dr. A. Srikanth
Dr. Sudesh K. Wadhawan
Prof. Biswajit Samanta
Dr. V.N. Vasudev
Shri. Deepak Vidyarthi
Dr. K. Ram Chandar
- 10) Election Committee**
Shri. D. A. Hiremath, Council Member, Chairperson
Shri. Anil Mathur
Shri. S.N. Mathur, VP-I
Shri. O. P. Gupta, VP-II
Shri. D.B. Sundar Ramam, VP-III
- 11) Minor Mineral Committee**
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Dr. Prabhakar Sangurmath
Shri. Rajesh Jha
Shri. D. A. Hiremath
Dr. Ifthikhar Ahmed
Dr. Y.G. Kale, RCOM
Shri. Deepak Tanwar
- 12) Apprentice Committee**
Shri. Subramanyan, Chairperson
Shri. G. Vijaykumar
Shri. Pankaj Kumar Satija
Dr. M.S. Venkataramaiah
Shri. Anil Mathur
Shri. Sabyasachi Nayak
- 13) Conference Committee**
Shri. Sumit Deb, Chairman Hyderabad Chapter, Chairperson
Shri. B.R.V. Susheel Kumar
Dr. Meda Venkataiah
Shri. P.C. Bakliwal
Shri. S. N. Mathur
Shri. K. Prabhakar Reddy
Shri. Dhananjaya Reddy
Shri. D.B. Sundara Ramam
Shri. O.P. Gupta
Shri. Sanjay Kumar Pattnaik
Shri. B. Mahesh

MEAI NATIONAL QUIZ -2021

(Conducted by Quiz Master Mr Deepak Vidyarthi)

“The only true wisdom is in knowing that you know nothing!” (~Socrates)

“Millions saw the apple fall, but **Newton** was the one who asked **why?**”

(~Bernard M. Baruch)

This was at the National Quiz of MEAI (Mining Engineers' Association of India) with a membership of 5700 spread over 26 chapters in the country; conducted on-line on the Indian Mining Day 2021!

The competition was in two phases – Qualifying round followed by the Final round on 1st November 2021 ~ encompassing a variety of subjects including Mining, Engineering, Geology, General Knowledge and Current Affairs!

Altogether 20 teams were in the fray. Seven made it to the finals, with ties in two places. The **Finalists** in the first round were ranked as follows:

TEAM	MEMBERS	SCORE	RANK	REMARKS
BANGALORE	Sri Deepak Cukke Anil Kumar	85/100	1	
	Sri Bharath Kumar A.Y.			
VP CHAPTER	Sri Dobariya Anil Kumar	80/100	2	Tie
	Sri Mayurkumar Galoriya			
BAILADILA	Sri Haldhar Patel	80/100	2	Tie
	Sri Pawan Kumar			
JODHPUR	Sri Mahesh Kumar Purohit	75/100	3	
	Sri Rohit Rawal			
BARAJAMDA	Sri Abhay Kumar Gupta	69/100	4	Tie
	Sri Ajay Kumar Goyal			
NAGPUR	Sri Ashish Mishra	69/100	4	Tie
	Sri Sunil Kumar Sharma			
VISAKAPATNAM	Sri D. Naga Sridhar	66/100	5	
	Sri B. Abdul Gouse			

In a keen tussle in the Qualifying round, there were two ties: for the 2nd place (between Veraval - Porbandar & Bailadila Chapters) and the 4th place (between Barajamda & Nagpur Chapters).

The Final round consisted of multiple-choice Questions. Contestants were allowed 30 seconds time to answer each question or face negative marks which made the competition really tough and challenging! There were no 'life lines' and no 'consultation/discussion' across members was permitted.

As there were seven teams in the final round, seven sets of questions were prepared and labelled as **A, B, C, D, E, F & G**. For a fair game and providing a level playing field, teams were given options to choose any set at random, starting with the team with the **First rank** (as per Qualifying round).

The following teams emerged as winners at the end of the final round:

FIRST PRIZE Sri Mahesh Prakash Purohit - **JODHPUR Chapter**
Sri Rohit Rawal

SECOND PRIZE Sri Abhay Kumar Gupta - **BARAJAMDA Chapter**
Sri Ajay Kumar Goyal

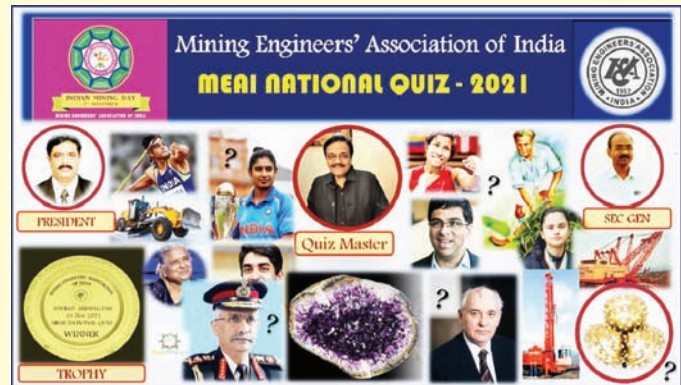
THIRD PRIZE Sri Deepak Cukke Anil Kumar- **BANGALORE Chapter**
Sri Bharat Kumar A.Y.

The audience too was entertained and allowed to test its wits in a special round, the “**Audience Round**”. The top **TEN** contestants on the **Leader board** in the audience round were:

- 1) Sri Deepak Cukke Anilkumar - **BANGALORE Chapter**
- 2) Sri Abhaya Kumar Gupta - **BARAJAMDA Chapter**
- 3) Sri Rohit Rawal - **JODHPUR Chapter**
- 4) Sri Ashish Mishra - **NAGPUR Chapter**
- 5) Sri Bharatkumar A.Y - **BANGALORE Chapter**
- 6) Sri Prasad Teli - **BELLARY-HOSEPET Chapter**
- 7) Sri M S Venkataramayya - **HYDERABAD Chapter**
- 8) Sri Mahesh Prakash Purohit - **JODHPUR Chapter**
- 9) Ms Rekha PN - **BANGALORE Chapter**
- 10) Sri Amit Sharma - **AHMEDABAD Chapter**

The National Quiz conducted by the HQ for the first time generated a lot of interest and was contested with a high competitive spirit!

Thanks to the untiring efforts of the President Sri K. Madhusudana, the rigorous follow up by the Secy. General Sri M. Narasaiah and the help and co-operation rendered by all the Chapter Chairmen & Secretaries & MineMagma without which this humble venture would not have matured!



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CONFERENCES, SEMINARS, WORKSHOPS ETC.

INDIA

2-4 Mar 2022: International Mineral Development Conference and Exhibition (Mbd-2022). Nagpur, India. For details contact: Website: <http://www.mineralinfo.net>; E-mail: mineralinfoindia@gmail.com; mbd.info2021@gmail.com; Cell No./ WhatsApp +91 9823015772

ABROAD

1-3 Dec 2021: 6th International Conference on Operational Excellence in Mining. Contact: +56 2 2652 1555, +56 2 2652 1500; gecamin.com/minexcellence

2-3 Dec 2021: ICRMGEA 2021 - International Conference on Rock Mechanics for Geotechnical Engineering Applications in Tokyo, Japan. For more details, please visit: <https://waset.org/rock-mechanics-for-geotechnical-engineering-applications-conference-in-december-2021-in-tokyo>

6-7 Dec 2021: ICCGM 2021 - International Conference on Computational Geosciences and Mathematical Modelling in Kuala Lumpur, Malaysia. For more details, please visit: <https://waset.org/computational-geosciences-and-mathematical-modelling-conference-in-december-2021-in-kuala-lumpur>

6-10 Dec 2021: International Future Mining Conference 2021. Online conference organized by AusIMM Perth, Australia

13-14 Dec 2021: ICRGGACS 2021 - International Conference on Regional Geology, Geologic Analysis and Computer Simulations in Cairo, Egypt. For more details, please visit: <https://waset.org/regional-geology-geologic-analysis-and-computer-simulations-conference-in-december-2021-in-cairo>

20-21 Dec 2021: International Conference On Geotechnical Challenges In Mining, Tunneling & Underground Structures Icgmtu – 2021. Venue: Geotropik, Universiti Teknologi Malaysia, Johor Bahru, Malaysia. Contact <https://icgmtu.icresearch-geotropik.com/>

21-22 Jan 2022: International Conference on Economic Geology, Mineralogy and Mining ICEGMM in Amsterdam, Netherlands. Website URL: <https://waset.org/economic-geology-mineralogy-and-mining-conference-in-january-2022-in-amsterdam>; Contact URL: <https://waset.org>

31 Jan - 2 Feb 2022: International Mining and Resources Conference (IMARC) 2022. Contact: Phone: +61 3 9008 5946; Email: info@imarcmelbourne.com; Website: <https://imarcglobal.com/>

11-12 Feb 2022: International Conference on Geology and Mining ICGM in Kuala Lumpur, Malaysia; Website URL: <https://waset.org/geology-and-mining-conference-in-february-2022-in-kuala-lumpur>; Contact URL: <https://waset.org>

15 -18 Feb 2022: International Mining, Equipment, Minerals and Metals Exhibition (IME 2022). Contact: The Mining, Geological & Metallurgical Institute of India (MGMI), GN-38/4, Sector-V, Salt Lake, Kolkata – 700091, West Bengal, India. Tel: +91-33-23573482 / 3987 / 6518; Fax: +91-33-23573482; Email: office@mgmiindia.in. Web: www.mgmiindia.in

4-5 Mar 2022: International Conference on Mining Geology and Resource Estimation ICMGRE. Conducted by World Academy of Science, Engineering and Technology. Rome, Italy

22-23 Mar 2022: International Mining Geology Conference 2022. Brisbane, Australia and Online. Contact: Ph. 1800 657 985 or +61 3 9658 6100

25-26 Mar 2022: International Conference on Mining Geology and Ore Treatment ICMGOT in Madrid, Spain. Website URL: <https://waset.org/mining-geology-and-ore-treatment-conference-in-march-2022-in-madrid>; Contact URL: <https://waset.org>

1-2 Apr 2022: International Conference on Sustainable Water Management (ICSWM). Cebu City, Philippines. Website URL: <http://conferencefora.org/Conference/30610/ICSWM/>

15-16 Apr 2022: International Conference on Mining Geology and Rock Excavation ICMGRE in Cape Town, South Africa. Website URL: <https://waset.org/mining-geology-and-rock-excavation-conference-in-april-2022-in-cape-town>; Contact URL: <https://waset.org>

19-20 Apr 2022: International Conference on Exploration and Mining Geology ICEMG. Paris, France. Website URL: <https://waset.org/exploration-and-mining-geology-conference-in-april-2022-in-paris>

22-23 Apr 2022: International Conference on Mining and Mineral Technologies ICMMT. Tokyo, Japan. Website URL: <https://waset.org/mining-and-mineral-technologies-conference-in-april-2022-in-tokyo>; Contact URL: <https://waset.org>

3-4 May 2022: International Conference on Mining Technologies and Sustainable Systems ICMTSS. Rome, Italy. Website URL: <https://waset.org/mining-technologies-and-sustainable-systems-conference-in-may-2022-in-rome>; Contact URL: <https://waset.org>

20-21 May 2022: International Conference on Recent Advances in Mining Technologies ICRAMT. Berlin, Germany. Website URL: <https://waset.org/recent-advances-in-mining-technologies-conference-in-may-2022-in-berlin>; Contact URL: <https://waset.org>

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#SteelFact

Globally, extensive

afforestation

programmes are converting mines
into habitats for local wildlife

Source: World Steel Association

*Currently, an area of 563 hectares
is covered via afforestation in
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**Data as on October 2021*



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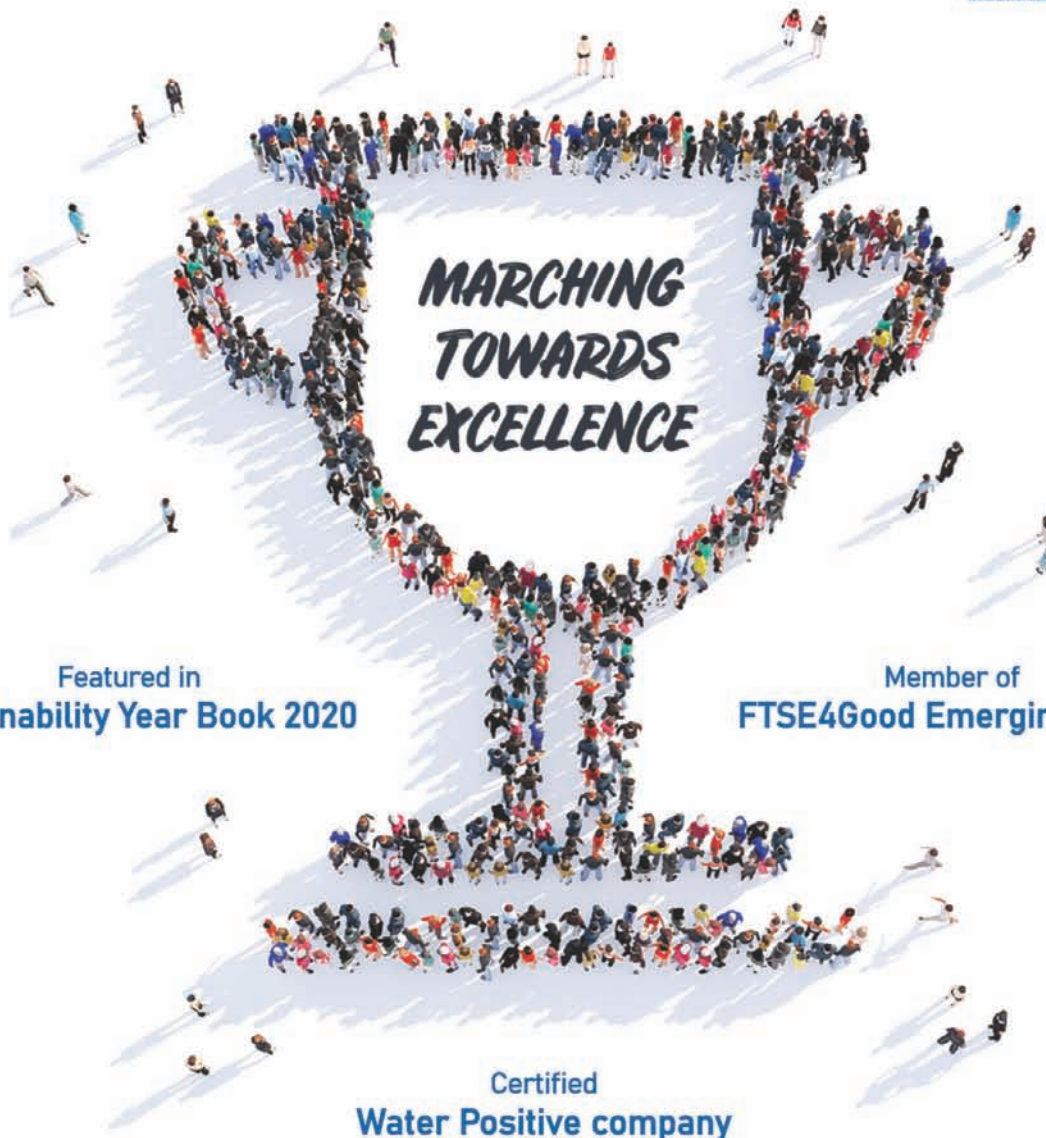
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