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SPECIAL ISSUE
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No. 4

MONTHLY

November - 2021



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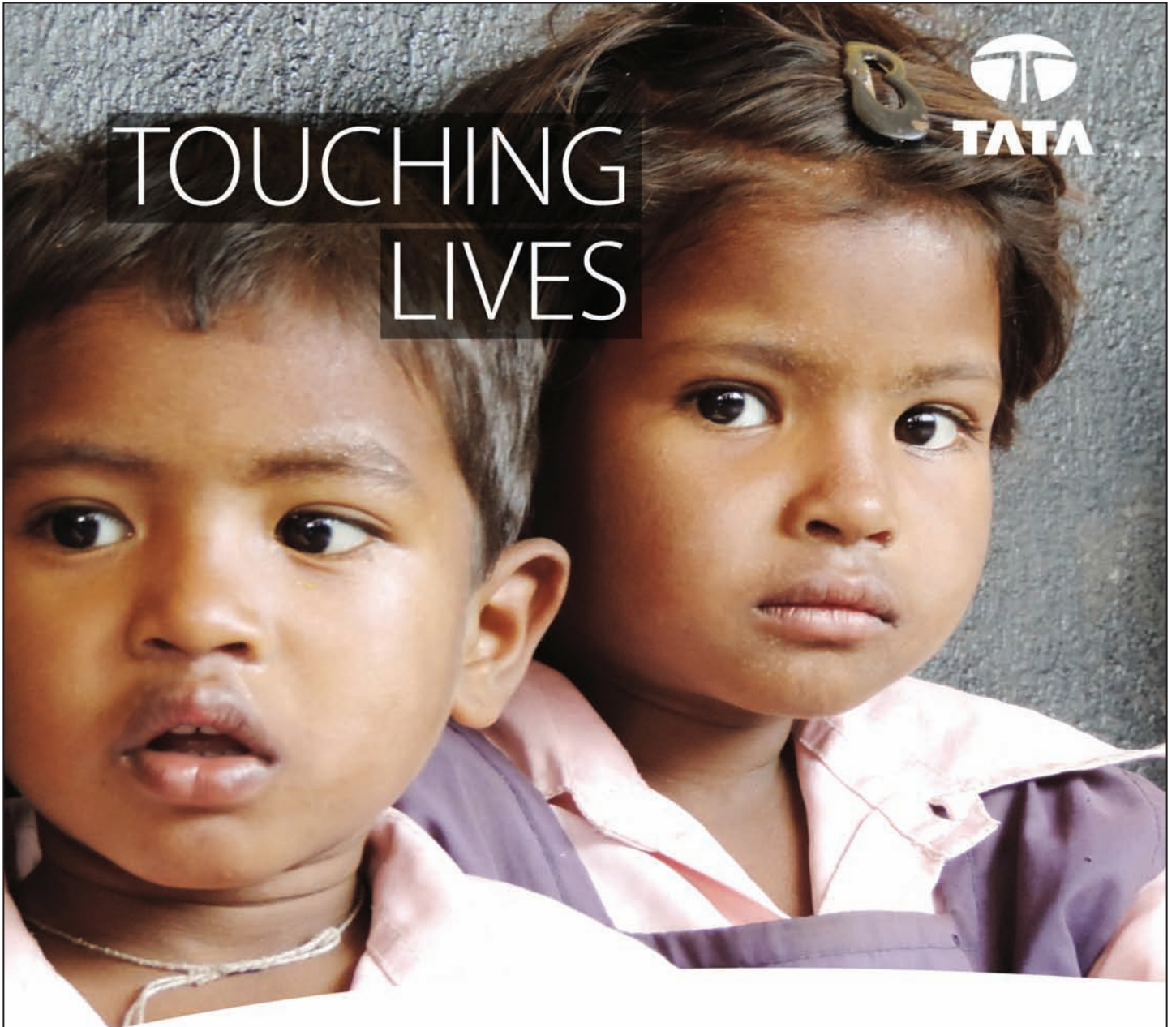
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President's Message.....

Dear Members,

I wish to put forth my views and the activities undertaken during October 2021.

I attended and participated in a Cricket Tournament organized by the Bellary-Hospet Chapter at Sandur on the occasion of the Gandhi Jayanthi on 2nd October 2021. Many of our young MEAI members participated and enjoyed the event, which also became a platform for social networking with Senior Members of the Chapter.

I attended an online webinar conducted by Veraval-Porbandar Chapter, AGM of the Rajasthan Chapter-Udaipur and revival meeting & selection of Executive Committee of the Jabalpur Chapter, which could be done with great efforts and support of Shri Pukhraj Nenival, Regional Controller of Mines of Indian Bureau of Mines, Jabalpur.

It is a proud movement for MEAI to conduct an Online Quiz at National level. The initial rounds of **MEAI National Quiz-2021** was conducted on 23-10-21 and the Final round has been scheduled for 1-11-2021 in view of Indian Mining Day Celebrations with the enthusiastic efforts by the Quiz Master and Council Member Sri. Deepak Vidyarthi of the Bangalore Chapter. I appreciate the zeal of all participants from 21 Chapters who took part in the Quiz program.

An INDUCTION CUM INTERACTIVE SESSION with our entire Chapters' Chairmen, Vice Chairmen and Secretaries, and our National Council members was conducted on 25-10-2021 to establish and enhance cordial relationship among the Chapters and to discuss the activities that are being undertaken by our Chapters and the National Council members.

Myself and Dr PV Rao, the representatives of India on CRIRSCO, participated in the CRIRSCO virtual Annual General Meeting 2021 for 6 days held on 11th to 16th October 2021. Four NACRI members that were nominated by NACRI as its observers also attended the Open Sessions of the CRIRSCO AGM.

Observance of Indian Mining Day with the theme "ESG Strategy for Mining Industry" has been planned for 1st November 2021. All our Chapters will hold a variety of activities and hope that they will involve the majority of Members in the celebration.

I would like to request all our Chapters, Council members to plan and execute the same by involving maximum members. Schedule activities -Monthly, quarterly, yearly and Conduct online /offline workshops/ seminars

Notification and Notice Inviting Tenders (NIT) were released for auctioning of mineral blocks, which is a good sign for the growth of the Indian Mining Industry.

With regards,

K. MADHUSUDHANA
President



Mining Engineers' Association of India

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EDITOR'S DESK



Dr. P.V. Rao
Editor, MEJ

I feel it pertinent to apprise you on the CRIRSCO update since the last virtual Annual General Meeting (AGM) 2020. The AGM 2021 was held on October 11-16, 2021 under the leadership of its Chairperson Mr Ken Lomberg (South Africa) wherein all the 14-member countries partaken. The MEAI President Mr K Madhusudhana and NACRI Co-Chair Dr PV Rao, the Indian Representatives of CRIRSCO, attended the AGM on all the six days during 5:30 pm to 8:30 pm (IST). Four of our NACRI founding members viz. Dr Abani Samal, Mr TR Rajasekar, Dr AK Sarangi and Mr Shameek Chattopadhyay attended the AGM open sessions and technical sessions as observers.

All the NROs (National Reporting Organisations) presented their Annual reports in alphabetical order. Dr Rao presented the Annual Report of NACRI on October 11, 2021. The highlights of the Indian report were the successful registration of 9 MEAI Life members as IMIC (Indian Mineral Industry Code) Competent Persons (CP), recognition of 20 of its founding members as Founding CPs, establishment of reciprocity between SME (USA) and NACRI, organising a webinar with the NITI Aayog Member Dr VK Saraswat, successful launching of NACRI Logo and roll out of IMIC training program.

On 12 October 2021, in the members' only meeting, matters related to incorporating guidance on Brines and tailings reporting in the Template, creating secretariat for CRIRSCO and Legal advice were the discussion points. Mr Ken Lomberg presented the Chairperson's report. While Mr Stuart Masters (JORC) made an enlightening presentation on the future of minerals reporting, Mr Neil Wells (PERC) made a thought provoking presentation on the strategic direction for CRIRSCO. Mr Ken Lomberg and Mr Roger Dixon (South Africa) presented on the CRIRSCO's public face and communications, website and branding review.

On 13 October 2021, in another members' only meeting, CRIRSCO Treasurer Mr Peter Stoker (JORC) presented the Accounts for 2020-21 and the budget update and funding for 2021-22. Mr Ken Lomberg apprised the members about the functioning of the standing committees and putting them to best use. Mr Roger Dixon, Mr Neil Wells and Mr Ken Lomberg presented on the ongoing developments on external relationships with UNFC, IASB, and ISA respectively. Ms Nicky Black of ICMM (International Council on Mining & Metals) spoke at length on the enduring ICMM strategic relationship with CRIRSCO and confirmed ICMM's willingness to sustain and further expand this association. In the CRIRSCO succession planning session, the members were unanimous in their support to Mr Edson Ribeiro (Brazil) as the Chairperson, Mr Garth Kirkham (Canada) as the Deputy Chair, and Mr Wilfredo Lopez (Columbia) as the Secretary while Mr Peter Stoker (Australasia) will continue as the Treasurer. The members appreciated the contribution of the outgoing Executives Mr Ken Lomberg (South Africa), Mr Neil Wells (Europe) and Mr Sergio Vicencio (Chile). In the end, the outgoing and incoming Chairpersons presented the management process followed in admitting the prospective members.

On 14 October 2021, the members deliberated on the necessity to review the standard definitions in the Template at regular time intervals. After an all-encompassing discussion, a snap poll was conducted on the ESG (Environment, Social, and Governance) presentation made in the AGM 2020. An overwhelming 72% of the members voiced that the ESG discussion was valuable. 85%, 82% and 59% respectively ranked the importance of E, S, G in the decreasing order. 71% of the members felt that the ESG factors should be treated at par with the other modifying factors recognized in the Template. In response to another question, 56% members felt that ESG practitioners should be accredited/ registered professionals while 16% felt accreditation not required and the rest 28% were unsure.

On 15-16 October 2021, prospective members presented progress of their cases for admission. The prospective members included China, Philippines, Kyrgyzstan, Azerbaijan, Malaysia, West Africa, Ecuador, Peru, Mexico, and Argentina. Mr Ken informed that CRIRSCO has constituted country wise working groups to evaluate and process the applications.

The members unanimously approved to restore the annual membership fee to USD 2000 from the current USD 500 (for virtual meeting) to facilitate holding the physical meeting next year. The CRIRSCO Chairperson will communicate the venue and the dates soon.

- Editor

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NEWS FROM THE MINING WORLD

➤ **Technology to transform bauxite red mud into fertile soil nearly a reality**

Red mud near Stade, Germany. (Image by Ra Boe, Wikimedia Commons).

A new technology that could transform the bauxite residue known as ‘red mud’ into a soil-like material capable of hosting plant life is entering full-scale trials at alumina refineries in Queensland, Australia.

According to the researchers working on the new system, there are more than four billion tonnes of red mud stored in dams around the world, with Australia being the second-largest producer of mineral waste. Within this context, the eco-engineering solution is being developed by researchers at The University of Queensland’s Sustainable Minerals Institute in partnership with Rio Tinto and Queensland Alumina Limited.

In an email to MINING.COM, lead researcher Longbin Huang said the technology is a process to utilize functional and cost-effective engineering inputs, either organic or minerals, to accelerate in situ microbial bioweathering of minerals and soil pedological and ecological processes in the amended wastes, towards the formation of functional growth soil, that is compatible with ecological attributes of native/exotic plant species and communities.

The process, however, is not simple as the salinity and alkalinity associated with the minerals in red mud make any rehabilitation effort challenging. “The in situ eco-engineering of mineral wastes into soil largely offsets the need for excavating and transporting large volumes of natural soil resources from non-mined landscapes, thus achieving a great financial advantage while improving environmental quality expected,” Huang said. “This game-changing technology is expected to enable mining operators to commence progressive rehabilitation of tailings and mineral wastes, without the reliance on expensive and hard-to-come soil resources excavated from offsites.”

Traditional methods to manage red mud require companies to excavate and transport metres of topsoil from other locations to cover thousands of hectares of waste landscapes. By avoiding this reliance on external inputs, the process created by Huang and his group is considered a more sustainable and cost-effective way of managing red mud compared to traditional methods.

Huang pointed out that scalability is also one of the key features of the system. “The technology developed so far is field-operable at large scale and transferable and adaptable across sites, based on the specific mineralogy of tailings, the availability of local economic and renewable resource, and climatic conditions,” the researcher said. To reach the final stage of development, the UQ team secured over \$3 million in funding from Rio Tinto and QAL, which is aimed at trialling the technology at an operational scale at two red mud sites. Yet, the tripartite partnership has been active for eight years as the three entities have been working together from proof of concept to full-field trials.

Valentina Ruiz Leotaud, Mining.com | October 6, 2021

➤ **Nickel: the mined commodity most exposed to biodiversity risks — report**

Nickel is the mined commodity most exposed to biodiversity risks, a recent report by Verisk Maplecroft shows. According to the consultancy firm, the battery metal’s exposure to such risks is mainly due to the fact that some of the largest nickel operations on the planet are located in biodiverse areas such as Indonesia, New Caledonia and the Philippines.

“Our data show Indonesia has the highest risk of all major producers. The country is the world’s largest producer of nickel ore and home to one of the world’s biggest copper-gold mines,” the report reads. “Meanwhile, Brazil — another high-risk nation — is the world’s second-largest producer of iron ore. Along with Papua New Guinea, these countries are all rich in globally important biodiversity, but safeguards for those valuable species and ecosystems are under threat.”

The review also points out that Zambia, Mexico, the Democratic Republic of Congo and Ghana fall in the middle in terms of risk because each boasts significant biodiversity that will need to be protected if mining operations in those countries continue to expand. On the other side of the spectrum are — at least for now — well-established major producers such as Australia, Chile, the US, China and South Africa, where the risk is far lower due to mining taking place in areas with lower value biodiversity and greater protections for nature.

“However, as these markets develop, in part due to skyrocketing global demand for battery materials like nickel, we can expect biodiversity risk to increase in tandem,” the report reads. Looking at the other

(Continued on page 32)



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MINERAL EXPLORATION AND MINING LEASES IN TELANGANA STATE- CURRENT SCENARIO DURING PANDEMIC AND APPROACH FOR THE FUTURE

Dr. P. Ramesh Chandra Phani

Abstract

The state of Telangana is endowed with a variety of metallic, non-metallic and industrial mineral resources. Despite possessing promising geological milieu that can host multiple commodities in the state, current mining activity is limited to very few commodities. The hidden mineral wealth of the state indeed requires systematic investigations to generate factual data for making policy and future plans, to attract major investments from public and private sectors. Currently ~112 mining leases are in force in the state, which is negligible when viewed from a geological perspective. The COVID-19 pandemic has impacted the mineral sector adversely. The industry needs to implement latest technologies to recoup. This paper presents a synthesis to encapsulate the status of reconnaissance, prospecting and exploration licenses along with active mining permits in the state with an approach for the future in this pandemic era.

Keywords: Mineral wealth, Prospecting, Exploration, Mining leases, Quarry leases, Telangana.

1. Introduction

The state of Telangana, covering about 112 Sq.Km., is situated in the Eastern Dharwar Craton (EDC) which is bestowed with a range of premier mineral occurrences. Geotectonically, the state comprises various rock types belonging to Archean to Quaternary age. Major part of coal-bearing Pranhita-Godavari Gondwana sedimentary sequence is distributed in this state and the rest is occupied by hard rock terrain of igneous-metamorphic origin (Fig.1). The state has witnessed about thirty varieties of mineral commodities to date and has the geological environment for many others (Phani, 2014). Even though the state has favorability to discover many hidden mineral deposits, the exploration and mining are limited to only visible deposits.

Currently various exploration/ mining organisations of both public and private sector are engaged in the ground activities across the state. Few international companies have been granted reconnaissance permits recently, otherwise exploration by government organisations was limited to reporting only occurrences but no large scale investments on commercial exploration were made in the state to date. Although no active reconnaissance permits in the state are in force, some conventional geological mapping programmes and some coal exploration are being conducted by the Geological Survey of India (GSI). A dozen of prospecting licences (PL), covering an area of 3200 Ha, which is four times increased than PLs (767 Ha) in 2014-2015, are currently in force in the state (IBM, 2017a). The prospecting ground is granted for exploration of limestone,

manganese and quartz commodities spreading 1760, 1435 and 1.5 Hectares respectively. As per the Indian Bureau of Mines (IBM) reports, 486 mining leases exist in 2013 in the state covering an area of 22527 Ha for various commodities. About eleven mining plans are under processing at the IBM in parts of Adilabad, Karimnagar, Nalgonda, Warangal districts covering 1780 Ha. for various commodities like limestone, manganese, laterite, and iron ore (IBM, 21017b).

The state occupies second position in the country in having largest resources of barytes which is estimated to be 2.7 million tons in Khammam district. The major part of Obvious Geological Mineral Potential (OGP) defined by the GSI covers a minimal part (21151 Sq.Km) in the state which deserves to be extended owing to the geological diversity of the state and several proven mineral occurrences. Even though the state has geological formations ranging from Archaean to Recent, suitable for many economic mineral deposits, unfortunately only few of the occurrences are exploitable at present, either because of poor exploration, or lack of detailed information, or unfeasibility for economical extraction or illegal mining. The uranium deposit of Lambapur-Peddagattu belt of Nalgonda district is the only notable recent discovery in the state. Even though more than sixty kimberlites/lamproites were discovered, none is reported to be diamondiferous; however they deserve detailed evaluation with better investments.

Hence, a keen eye on developing mineral and mining industry in this mineral rich state is immensely required. In this paper, an attempt has been made to present the current

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situation on the status of reconnaissance, exploration and mining permits in the state with reference to the literature published by the state and central governments in the current pandemic situation.

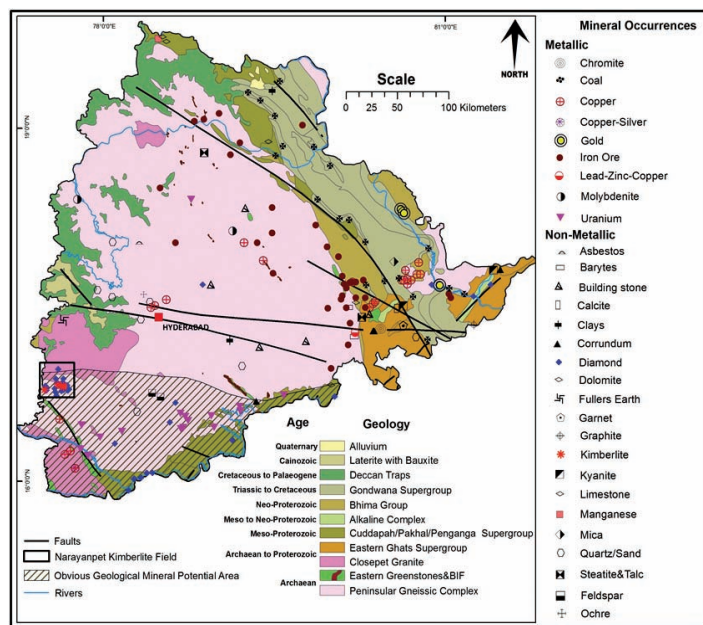


Figure 1. Simplified geological map of Telangana showing various mineral occurrences (Phani, 2014).

2. Status of Prospecting Licenses and Exploration Activities

In India, mineral explorations licenses are basically of two types, (i) reconnaissance permit (RP) and (ii) prospecting license (PL); the mining stage arrives after these two. The RP includes green-field exploration and first-hand information on a mineral deposit is gathered whereas the PL comprises activities of advanced stage involving detailed sampling, drilling, deposit delineation and feasibility studies. These three stages are not strictly obeyed by the companies; many minor minerals are just excavated based on the GSI reports or published literature. However, other than coal and limestone, the mining activities in the state focus on minerals like quartz, feldspar, building stones etc., which are generally pushed towards mining stage without a detailed geoscientific assessment. It is observed that many of the mining plan reports submitted to the Indian Bureau of Mines (IBM) or state Department of Mines & Geology (DMG) contain vague, manipulated and stereo-type information.

At national level, the state-wise PLs granted are Rajasthan (19,630.03 ha), Arunachal Pradesh (6,122 ha), Madhya Pradesh (1385.39 ha), Telangana (767.83 ha), Tamil Nadu (249.97 ha), Chhattisgarh (56.64 ha) Jharkhand and Uttarakhand (21.75 ha each) (IBM, 2017a). When compared to other states, Telangana occupies 4th position (2.7%) in possessing PLs in 2014-2015 (Fig. 2).

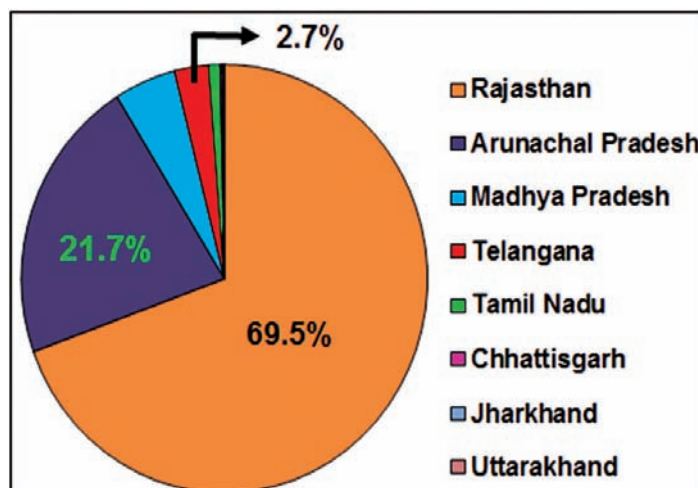


Figure 2. Pie-chart showing area granted for prospecting licences in Telangana in comparison with other states (Data source: IBM, 2017a).

A special mention of diamond exploration in the state is necessary. The GSI, is carrying out rigorous prospecting in Telangana in search of new kimberlite/lamproite occurrences. Exploration (G4 stage) was taken up in Rangareddy, Mahbubnagar and Hyderabad districts. Eight blocks have been identified in structurally interpreted lineament map. A total of 515 sq km area has been covered by taking traverses. A suspected N-S trending lamprophyre dyke has been discovered near Raghavapuram, and an approximately 1 km long E-W trending lamproite dyke was discovered at Chintalapalli, Nalgonda district. Detailed G4 stage investigation was taken up in Somasila area, Mahbubnagar and Kurnool districts which led to the discovery of two new lamproite clusters for first time in this area of Mahabubnagar district, at the NW margin of the Cuddapah basin (IBM, 2017b). Majority of kimberlite, lamproites and lamprophyres discovered in the state of late, have culminated in publishing research papers by the geoscientists than foraying for critical and systematic assessment of their diamond potentiality.

Exploration (G4 stage) conducted in five sub-blocks namely Gurakonda, Koilsagar, Chinnamungalchedu, Manikonda and Komreddipalli of Mahbubnagar and Kurnool districts and numerous calcrete zones were observed and examined for their kimberlite affinity. The calcrete chemistry of Gorakonda sub-block matches with Wajrakarur calcretes (Chigicherla cluster) which were identified for further exploration involving pitting/auger drilling (IBM, 2017b).

In Telangana, exploration has been carried out by the GSI for coal in Sirpur- Kagaznagar blocks, Rudrakshapalli Ganugalapalli area, Pagaderu (East) section, Bayyaramcherla area and Mangrude village, Bela Mandal located in the main basin of Pranahita- Godavari Valley Coalfield in Adilabad district, covered by the rocks of Upper and Lower Gondwana formations (IBM, 2017b).

Exploration (G4 stage) has been carried out to search for iron ore at Yerraballi, Karimnagar district by the GSI. Large scale Mapping helped in delineation of a NW-SE trending banded magnetite/ haematite quartzite band over a strike length of 4.5 km with width varying from 50 m to 70 m. Another band trending NNW to SSE over a strike length of 2 km length with a width of 30 m was recorded to the east of the above band. Fe₂O₃ values within the banded magnetite/ haematite quartzite ranges from 30.94 to 80.22% (IBM, 2017b). A total of 3547 million tonnes of mineable coal resources were established together in Mand-Raigarh Coalfield, Chhattisgarh; Godavari Valley Coalfield, Telangana and Singrauli Coalfield, Madhya Pradesh (IBM, 2017d). However, no information on coal resources established specific to Telangana are yet to be published. A summary of available resources various mineral commodities in Telangana is shown in Table 1. It is noteworthy to mention that Telangana occupies first position in the mining and production of laterite (IBM, 2017d).

Table 1. Mineral resources of Telangana state as on 01.04.2010 (IBM, 2017d).

Mineral Commodity	No. of Mines	Reserves	Resources	Total Resources
Barytes	1	1831125	858055	2689180
China Clay	1	240	11775	12015**
Chromite			186	186**
Coal			21211.35	21211.35*
Corrundum			77113	77113
Felspar	26 (33)	1657214	9303388	10960602
Fire clay		760	9650	10410
Fuller's Earth			25523983	25523983
Garnet			1907060	1907060
Granite				
Graphite			219455	219455
Iron Ore (Haematite)	3 (1)	183	25760	25942**
Iron Ore (Magnetite)			71514	71514**
Kyanite			48350000	48350000
Laterite		32685	10299	42985
Limestone		1795984	15437488	17233472**
Manganese	5	362	1256	1618**
Marble			3	3
Soapstone			20	20
Quartz	57 (20)	11904	54973	66877

Figures in parenthesis are no. of mines with associated minerals.

*million tonnes, ** thousand tonnes and rest in tonnes

A promising uranium deposit at Lambapur- Peddagattu, Chitral, Kuppunur and RV Tanda of Nalgonda district, Telangana has been discovered by the Atomic Minerals Directorate for Exploration and Research (AMD) in the undivided State of Andhra Pradesh through extensive exploration work. The U₃O₈ (wt%) is 0.02 in this new discovery, which is very much promising and viable for mining with tentative reserves of 1600 tons (Sinha et al., 1994).

3. Status of Mining Plans and Leases

Approximately 486 mining leases exist in the state covering an area of 22516.88 Hectares of area (IBM, 2017a). About 13 mining plans are approved, 4 were with drawn and 3 mining plans were rejected in the state for various commodities (IBM, 2017c). The district-wise details are shown in Table 2. Of late, the government of Telangana has reconstituted the districts from 10 to 33.

Table 2. Details of status of mining plans in the state (IBM, 2017c). District names as per old structure.

District (old)*	Mineral Commodity	Approved	Area (Ha)	Withdrawn	Area (Ha)	Rejected	Area (Ha)
Adilabad	Limestone	1	7.28				
						1	80.44
		1	6.072				
	Manganese	1	122.57				
						1	93.17
Nalgonda	Limestone	1	417.95				
		1	558.71				
		1	770.23				
		1	33.993				
				1	42.83		
						1	141.7
		1	42.83				
		1	130.37				
Khammam	Iron Ore			1	6.879		
						1	8
						1	9
Ranga Reddy	Limestone	1	613.587				
Warangal	Laterite and Iron ore	1	50.198				
Karimnagar	Limestone	1	360.25				

A list of all mining leases in the united Andhra Pradesh state was published by the Government of Andhra Pradesh, from which it was noted that approximately 105 mining leases exist in the Telangana state covering 28991 Hectares of area for a variety of mineral commodities (Table 3) (A.P. Government Report, 2013). As per recent report of the IBM, it can be noted that there is a tremendous decrease in the mining leases (Table 4).

Table 3. Approximate number and area coverage of mines with respect to various mineral commodities in Telangana state (A.P. Government Report, 2013).

Mineral Commodity	No. of Mines	Area (Ha)
Amethyst & Feldspar	1	0.8
Amethyst & Quartz	1	4.00 Ha.
Ball Clay	2	7.98
Barytes	1	22.267
Clay	1	2.02
Coal	14	26606
Corrundum	2	2.458
Dolomite	2	15.13
Dolomite & Barytes	1	
Felspar	1	23.298
Laterite	15	75.05
Laterite & Clay	2	5.49
Limestone	9	1441.59
Limestone & Clay	1	4.76
Manganese	3	533.81
Quartz	23	148.9
Quartz & Felspar	26	101.48
Total	105	28991.033

Table 4. Status of mining leases in Telangana state (IBM, 2019).

2014-2015		2015-2016		2016-2017	
No. of Mines	Area (Ha.)	No. of Mines	Area (Ha.)	No. of Mines	Area (Ha.)
486	22516.88	113	10990.12	112	10944.57

The state government has recently announced the District Mineral Foundation Trust Rules (DMF) with effect from January, 2016 implementing in all the districts of the state, to streamline the mining activities, leading towards environmentally friendly mining and welfare to the affected people in the mining areas (Susheel Kumar, 2019). To regulate the mining activities on a periodical basis, the state DMG has taken initiative to introduce unmanned aviation

vehicles (UAV) technology in mine lease areas for sand and other minerals commodities to build an enterprising solution for the future (The Hindu, 2017; The New Indian Express, 2018). One of the significant development after the formation of separate Telangana state, is an increase in the revenue achievements from the mineral industry from Rs. 1200 to 1600 Millions, which stands as an encouraging factor.

4. Impact of COVID-19 pandemic

In the year 2020, the COVID-19 pandemic has impacted the mineral exploration and mining sector (Banerjee, 2020). The hardships are still continuing during the second wave in the year 2021 also. Mining operations and sales impacted during this pandemic, employment position of labour, migrated workers were bad. The situation is not good unless some permanent solution for combating the crisis is established by effective treatment. The current situation will impact on GDP and possibility of recession is likely to continue for some more years, The revenue from mineral sector in 2018-2019 is INR 4849 Crores while in the year 2019-2020 it was INR 3716 Crores (DMG, 2020). The exploration works which are in advanced stage have suddenly entered a hiatus and still are in the state of restarting and recouping. The impact of pandemic is clearly visible on the state mineral industry like other parts of the country. The impact is likely to be a great deal of variation from commodity to commodity. The Singareni Collieries Co. Ltd. (SCCL) has halted its coal operations from April and the company estimated the loss to be more than Rs.5000 Crores (The Hindu, 2020). Soon after the initial lock down and closure of the mines, many governments opined and realized the need of keeping the mining active to avoid job losses and sustain the economy. The Government of India while promulgating the national lockdown law on the March 24th, 2020 allowed operation of industries for manufacture of essential commodities with prior permissions. With the norms of unlock stages, some private sector mines were restarted in the second unlocking phase, with minimum staff to keep the exploration activities alive. Nevertheless, the 2020 has been a bitter year for the state mineral industry. With the onset of vaccines at present, the year 2021 opens new rays of hope that the mining companies will reopen and function in full-fledged way under the new normal. It is to be agreed that the mining companies have to take in to account the additional future capital costs of copiously re-opening the mines. This may involve introduction and implementation of modern digital technologies such as artificial intelligence and machine learning (AI & ML), Internet of things (IoT) etc.

5. Concluding remarks

Even though the state of Telangana possesses congenial geological environment for several types of mineral deposits, exploration has not seen its grandeur in the state, other than coal and limestone. Recently, few multinational companies have conducted detailed exploration for diamond

and allied mineral deposits and relinquished their permit areas, otherwise exploration by government organisations was meagre and limited to reporting the occurrences. Nevertheless, no large scale investments on commercial exploration were made. Organisations of both public and private sector are carrying out surveys strenuously to explore new mineral deposits in the state. However, investments from the public sector organisations need to be increased multi-fold in light of increased cost of modern exploration technology. The GSI has identified an area of 131662.46 Sq.Km. as an OGP zone in undivided Andhra Pradesh but only 21151 Sq.Km. occupies in Telangana despite its geological favourability. The remaining area in the state needs to be assessed thoroughly and the OGP boundary needs to be revised. While Government agencies continue to conduct the traditional geological mapping, regional geochemical mapping exploration and survey in their way, investment by private sector is inevitable. While a private organisation aims to find a profitably mineable mineral deposit with unrestrained investment, the government organisation is allocated with limited financial budget on yearly basis. Moreover, adopting latest technology in Indian government organisations is too slow to cope up with the world. Therefore, the private mining sector is now the main source of investment in reconnaissance and exploration with modern technologies, for which the state government should liberally invite the world class investors. This is also supported by the IBM reports which state that about 93% of mining lease area is held by private sector (IBM, 2019).

Currently in Telangana state, 6 prospecting licenses and ~112 mining leases are in force and several applications still to be scrutinised. It should be noted that the information available on the websites of Indian Bureau of Mines and state Departments of Mines & Geology do not match each other. There exists a difference between the numerical figures pertaining to reserves, resources and even number of mines and mining permits. Hence, a sterilized, standardized and centralized system and prompt governance of exploration and mining leases with the aid of modern information technology is of immense need so as to invite sustainable investment and eco-friendly mining which in turn streamlines growth of the mineral-based industry in the state. Significant to note is an increase in the revenue achievements from mineral sector after the formation of separate state. The COVID19 pandemic has impacted mineral production sector in the state. The revenue from mineral sector has seen a drastic reduction in 2020 and 2021 years. However, the proactive initiatives, though slow, by the government are providing a helping hand to recoup the mineral industry. The mineral industry needs to expedite rigorous safe operating procedures, more faster digitalization and implementation of remote management of exploration and mining activities to avoid physical contacts *vis-à-vis* latest technologies

Acknowledgements

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TATA STEEL: CSR AND SUSTAINABILITY ACTIVITIES

MESSAGE



I am glad to know that Mining Engineers' Association of India (MEAI) is taking steps to promote sustainability and innovation in the mining sector by covering stories on sustainability and innovation initiatives of various mining companies in the Mining Engineers' Journal (MEJ). We are happy to be a part of this meaningful initiative and

contribute our perspective for the benefit of the mining industry.

With the rapid changes in external environment and ever-evolving needs of the communities, CSR and innovation is seen to be forming the basic foundation of business sustainability.

Sustainable mining demands the judicious use of technology at each stage of the mine's life. Technology and innovation can benefit the environment and people around by minimizing the impact of operations. The mining industry's current focus should be on digitalization and smart solutions aimed at creating sustainable future for our stakeholders.

At Tata Steel, our journey to make ourselves structurally and culturally stronger and future-ready, continues. We are impassioned to become more knowledgeable and an innovation and technology-intensive organisation not only in our operations but also in our services to the communities.

Our digital journey was well underway when COVID-19 struck. FY21 was an unprecedented year of anxiety and duress. However, it also brought an opportunity for the Company to reaffirm its commitment to communities through some innovative measures by making most of the CSR initiatives IT enabled and digitally connecting with the communities around our areas of operations. While on one hand, we adapted ourselves to the new dimensions of transformation happening around us, we continued to invest in our future while remaining committed to the long-term sustainability of our mining operations.

The innovative solutions for CSR brought in by the mining industry during COVID-19 can have the long-lasting impact on the communities. I am sure that strategic CSR driven by innovation will help develop a strong bond with the communities and will change the negative perception of the mining industry.

D B Sundara Ramam

Vice President (Raw Materials), Tata Steel

CSR activities of 2020-2021

Story 1

Co-creating solutions for community well-being in mining locations during the pandemic

Tata Steel Foundation combats COVID-19

Tata Steel Foundation (TSF), at the time of unprecedented duress brought on by the novel coronavirus outbreak, emphasized spending time with communities it works with in its mining locations including Jamadoba, Noamundi, West Bokaro and Joda. The absence of coherent information, propagation of misinformation, reverse migration, loss of income, food insecurity, stress and the need to boost public health systems were issues which would clearly play out in varying degrees of intensity in these operational locations.

Basis the assessment, the collective ability of our teams and deep sense of responsibility towards our relationships with our communities, a number of initiatives were taken up from March, 2020 to address information lacunae, to meet key deficits and to create robust systems that last beyond the lockdown period. In FY'21, the Foundation focused on interventions that would help communities hold their ground during the pandemic. Through various interventions under the #CombatCovid19 banner, the Foundation ran several programmes to cater the needs of community during the trying times reaching out to more than 1,12,000 lives.

During the initial period of the outbreak of the virus, the Foundation focused on mass awareness campaign and digital outreach. The digital campaign was a concerted effort to inform people on critical issues including lockdown, its requirement, dos and don'ts and precautionary steps, thereby helping prevent panic within the communities. This was actioned through a series of identified questions to the communities that brought to the table a set of queries, expectations and anticipation. All of this was collated and looped back to the district administration to ensure that there was a seamless flow of communication from the district to the grassroots. More than 64, 000 people were reached out through the #DigitalBridges initiative of the Foundation.

With an objective to support the vulnerable communities in the leasehold areas with food security, cooked food distribution was done. For over a month, around 5000 warm meals were provided on a daily basis across the mining locations. Also, ration was provided to households of migrant labourers.

Involving individuals and groups in an array of income generation activities like kitchen garden, wall writing, paper bag making etc was taken up with an aim for immediate income generation. As many as 1750 households were reached out in the mining locations. Distributed local capacity was built to make three-ply cloth masks to reach fraternities

like frontline health workers who were the most exposed and in need of PPE. Many were also engaged in plantation drives and manual farm bunding.



Income generation through mask making by members

To ensure that access to healthcare services continued undeterred, a number of interventions were taken up in collaboration with Tata Steel Hospitals. Amidst lockdown, doorstep delivery medicine was also done. While the primary healthcare service centres were inaccessible during the lockdown period, the deficit was capped through Mobile Medical Units (MMU) run by the Foundation. Also, telephonic consultations were provided by doctors from hospitals run by Tata Steel.

During the time when quarantine centres were being setup during April to June, youngsters under the RISHTA project of the Foundation joined hands with the district administration to assist the government administration in cleaning and sanitization work. To augment the fight against COVID-19, face shields and masks were distributed among communities and workers across various sectors. Also, support was provided for essential infrastructure at COVID-19 centres including repair and renovation work.

During the last one year, the Foundation has engaged in catalysing interventions which lead to enhancement of farm-based livelihoods engendering positive changes vis-a-vis the modern methods of agriculture to generate employment among communities and enhance their livelihoods. Providing input support to the farmers in terms of seeds like paddy, wheat, and vegetables apart from organizing farmers' exposure visits and on field learning programmes in presence of experts from government line departments like Krishi Vigyan Kendra, district agriculture and allied department have been the major focus. Also, promoting modern methods of agriculture like system of root intensification (SRI) in paddy for increased yield were

also taken up. The agri-allied sector was also focused upon where promotion of pisciculture in ponds and through bio-floc were also taken up.



Sanitisation work in progress

In the non-farm sector, skill building of youth was done to enhance their employability skills. Youth from the communities were linked to short term training programs like spoken English, basic computer and IT skills, soft skills development in government polytechnic, provide coaching for entry into forces (uniformed services) to make them future ready.

Recalibrating efforts to adapt to the 'new normal'

The Foundation received early signs of vaccine paranoia from communities in the mining locations and launched #ApnoKiSuno with the start of FY'22, a collaborative movement designed to weave a network of informal, localized, and trust-based conversations to encourage people to register for and receive vaccines. Subsequently, vaccination drives have been launched across locations. In its efforts to combat COVID-19 and be future ready, the Foundation has also commissioned state-of-the-art Pressure Swing Adsorption (PSA) Oxygen Plant at all the mining locations. These plants are a step ahead in the direction of ensuring that there is no shortage of medical oxygen for patients and this has also significantly increased the number of oxygen-supported beds in every hospital. Hospitals run by Tata Steel across mining have managed a large number of COVID-19 patients during the first and second waves as designated as COVID-19 dedicated centres, and have provided advanced medical care to community members. Efforts are also being taken towards income generation, skilling of youth and education of children.



Community Vaccination



PSA Oxygen Plant

Story 2

Kitchen gardens show the way for sustainable living during lockdown

While most parts of the country were facing difficulties stocking up their ingredient inventory during the Coronavirus pandemic, the kitchen gardens came as a blessing. In a number of households across the operational areas of Tata Steel, kitchen gardens came as a boon for sustainable living. During the lockdown, not only did it boost the household's access to fresh food while keeping one at home, but also ensured a healthy diet that contains adequate amounts of essential nutrients by producing diverse kind of vegetables.

Tata Steel Foundation has facilitated setting up of more than 1500 such gardens in the proximate villages of its mining operations in the last one year. The nutritional garden model that is promoted by the Foundation can be implemented in a limited area and is completely organic. 21-year-old Suman Marandi, residing in the quaint Bhelatand area of Dhanbad, has become a popular face in her village. A number of people in the nearby households have come up to her for help while setting up their kitchen gardens. "My neighbours faced so much difficulty travelling to the markets fetching vegetables but we were relieved. When they noticed the same, they came up to me to help them setup their kitchen gardens.

While it is never too late to start something productive, it will take some time for their gardens to show results," she says.

Generally, the local communities here consume two to three types of vegetables in their diet. After introducing these nutritional gardens, they have started to grow and consume 12 types of vegetables including okra, leafy vegetables, pumpkin, tomatoes and radish among others.



Kitchen Garden

Story 3

Ensuring access to healthcare for expectant mothers

Fear and anxiety are casting a cloud over expectant mothers facing the outbreak of COVID-19 in the rural areas.

Tata Steel Foundation came up with a model to provide support to expectant mothers in the mining locations. With the help of the ASHA workers, a database of the expectant mothers was created to ensure that the community receives the help it requires and that issues both before and after delivery are identified and taken care of. Expectant mothers and their problems received full attention in the action plan that was drawn up by the CSR team and the data was tracked so that there were no fallouts. Apart from creating awareness and addressing misinformation, steps were also taken to improve communication between health providers and pregnant women thereby increasing the likelihood of positive pregnancy outcomes. Daily follow-ups with ASHA workers, along with the expectant mothers are being carried out by the health team.



Health check-up of expectant mothers

This apart, video and home calls are also being arranged for regular interaction with doctors. In-house doctors are coordinating with the government health centre doctors on phone and sharing their history of the patients to ensure that proper treatment and care are taken. Also, post birth regular interactions were done to ensure that the babies are vaccinated on time.

Stories on sustainability

Story 1

Agility in mining through Highwall Mining Initiative to double Highwall coal reserves

Highwall Mining technology extracts coal by underground means but no person works in humid, tiring, dusty working conditions. Highwall Operators sits in air-conditioned cabin in a surface coal mine. (Safe, economic, environment friendly).

Highwall miner extracts left out coal in Mine boundaries (earlier considered non-mineable coal), extracting coal without depleting the future coal reserves, increasing life of mine (Sustainable).

Quarry South Eastern (QSE) is an opencast coal mine of West Bokaro Division, Raw Materials, situated in Ramgarh district of Jharkhand (200 KM South East from Jamshedpur). QSE has been the first in India in introducing many breakthrough concepts and technologies, Highwall mining was the new major addition in this series.

Highwall mining method was a widely popular mining method in US coal mines but a new mining method for Indian Coal Mines. West Bokaro division geared up for the technological change and conducted the feasibility study in collaboration with scientific organization CIMFR. Highwall Mining operation was commenced at Q-SE in 2016.



Highwall Mining

Highwall Miner at QSE has set the international benchmark of producing 5.27 LT of raw coal in a year, national benchmark of producing 80 KT of raw coal in a month, working in low to medium coal seam height. QSE, Highwall miner has established national benchmark of driving longest single heading underground gallery of 284m.

With the successful and agile implementation of this technology, Tata Steel is now aiming to be the first among the world to start paste filling of the void created by Highwall mining. Once the voids are packed, the left coal in pillars of Highwall galleries will be mined out. This will double the Highwall coal reserves, a significant addition to the coal reserve baseline. This project is started in collaboration with Raw Material Technology Group and a Chinese company XCUMT. Tata Steel will be the first Company in the world to develop and implement this backfilling technology in Highwall.

Story 2

Connecting to new networks

Tata Steel makes path-breaking steps in digitalization

The global mining sector is reinventing itself, with the worldwide emphasis on cleaner, safer and more efficient mining processes. This has brought about fundamental shifts in the mining value chain as mining companies and miners are increasingly adopting digitalisation and data analytics to improve their cost competitiveness, operational excellence and risk management. The disruption due to COVID-19 has only accelerated this transformation.

Besides competitive pressures, a major factor driving digitalisation has been that the aging workforce and the challenges faced by companies it is hiring and retaining young talent, which is largely disinterested in working in the mining industry.

The use of high-end technology will allow miners to remote-control operations in the mines, which can be monitored from centralized locations for safer and more sustainable mining operations. Consequently, while managerial skills will continue to have their relevance, software and analytical skills would become important capabilities in new talent.

Mining companies are leveraging automation, robotics and operational hardware to achieve their objectives, especially because applications of automation and robotics in mining make mining operations safer and less hazardous. These applications include robotic dozing, excavation, hauling, robotic drilling, handling of explosives as well as robotic mapping and surveying.

Tata Steel has undertaken wide -ranging initiatives to automate and digitalise its mines, beneficiation plants as well as logistics.



Centralised Control Room

Important initiatives by Tata Steel to automate and digitise its mines:

- Improved bandwidth of LAN/WAN for digital communication and data transfer
- Digital data capturing and Integrated online reports for safety, production, quality and supply chain
- Automation/ sensorisation of plant equipment and mining equipment for automatic capturing of data using IOT or digital data transmission using OFC
- Remote controlled operations of equipment like conveyors and pumps
- Centralised monitoring of operations of plant and mine, Suraksha Card, video analytics, online safety management system, online safety management plan, and digital mine mapping using drone survey and GIS-based technologies

Story 3

Innovation in mining

Tata Steel installs Solar Snake Repellent devices to keep them at bay

Tata Steel has installed Solar Snake Repellent devices at various Raw Material locations to prevent snakes from venturing into workplaces in the mines. The device was recently installed at Khondbond. The Snake Repellent device produces strong, powerful yet discreet vibrations via ultrasonic waves beneath the installed areas to signal danger. Snakes have very poor eyesight and they cannot hear sonic waves transmitted by the air. However, they sense danger via vibrations transmitted from the ground with their jowls. Thus, using the vibrating sound is a practical, and effective way to scare snakes away from a certain area.

The Snake Repellent generates unique and random vibrations and its strikes penetrate far underground, with snakes sensing them as signals of danger. This forewarns the snakes of possible danger and frightens them away. Each device covers an area of 650 sq metres and therefore devices are placed at intervals of 30 metres.



Snake Repellent Device

Advantages

- No maintenance & easy installation
- Works day & night constantly
- Easy to use
- Safe & Humane
- Solar powered

Story 4

Setting a standard for responsible mining

Tata Steel embarks on Geo Green Blanket initiative

Tata Steel has embarked on Geo Green Blanket initiative at West Bokaro Division. The Geo Green Blanket supports the seeds to grow in slope at mining area. As a first step site preparation was done and unwanted materials removed. Levelling dressing making slopes to work safely. After completion of first step, the team made bunds and garland trench on top of slope stabilisation area for anchoring the Geo coir mates and proper drainage system.



Geo Coir Matting - Before



Geo Coir Matting - After

Approx. 400 mm cushioning ensured with required media including top soil, manure, nutrient, pesticide. Benching of slope was also done to hold cushioning materials on slopes and coco fibre mat installed on slope. Now the slope is ready for plantation of suitable trees/Shrubs/Ground covers for complete vegetation/green cover development as per the recommendation of Ministry of Environment and Forest and Central Pollution Control Board. Out of total area, the team did the trial in 7000 square meters and is waiting for favourable conditions to go for plantation activities.

West Bokaro was operating three Quarries. The coal production from the Quarry E started in 1992 and continued till FY12. As per mine closure plan, reclamation of mined-out areas was initiated at Quarry E (Pundi site). The team conducted feasibility study and found that vegetation on slope needs special technology to survive and zeroed on Geo Green Blanket.

Story 5

Breaking the glass ceiling

Tata Steel recruits heavy machinery operators in its mines

Promoting diversity and inclusion as a way of life to ensure fair and equal opportunity for all employees, Tata Steel's West Bokaro collieries recently onboarded 16 women Heavy Earth Moving Machinery (HEMM) operators in all shifts.

Tata Steel's Women@Mines initiative intends to provide a wider career choice for women who wish to be a part of Tata Steel's growth story. The successful deployment of the first batch of 22 women at Noamundi iron mine in 2019 gave Tata Steel immense confidence to push for greater women participation in a sector that has been hitherto considered a male domain.



Women@Mines

These candidates are undergoing intensive training to hone their skills as HEMM operators. Post successful completion of their training, these women will be deployed

as Operations Assistant to operate HEMM at Quarry SE, which includes dumper, dozer, shovel, excavator and drill. The 16-membered HEMM operators are also going through the industrial training at Larsen & Toubro (L&T) Construction & Mining Machinery at Central Training Centre (CTC), Kanchipuram, Tamil Nadu.



Women@Mines

Tata Steel has always provided career opportunities to the talented youth from the community. Focused on industry-wide efforts to foster a diverse and inclusive culture, Tata Steel is making sure it provides a safe and an enabling environment to its workforce. Taking forward its Diversity and Inclusion (D&I) Policy, Tata Steel's West Bokaro Division is all geared up to recruit transgenders as HEMM operators. This landmark initiative not only aims to break the glass ceiling but also targets to mainstream transgenders in the society.

From formation of MOSAIC (D&I initiative of Tata Steel) in 2015 to participation in RISE – the largest job fair for LGBTQ+ in Asia, Tata Steel has not only evolved as a global torchbearer but has also encouraged others to be inclusive and accepting with the change in time.

Story 6

3 MW Solar Power Plant at Tata Steel's Noamundi Iron Mine helping reduce carbon footprint

1st Solar PV Solar Power Plant in the iron ore mine in the country

With due consideration towards reducing carbon footprint, a 3 MW Solar Photovoltaic (PV) Power Plant was commissioned by Tata Steel at its Noamundi Iron Mine in the year 2017. This is the 1st Solar Power Plant in any iron ore mine in the country. The project, executed by Tata Power Solar is helping reduce CO₂ emission by about 3000 tonnes per annum.

The Solar Power Plant is spread over 19 acres of land at an elevated reclaimed mining hill with ample undulations and a very rocky terrain. Solar lights have been used for boundary and area lighting around the solar plant. The selected site has a potential of 4.5 MW solar power generation.



Solar Power Plant at Noamundi

Set up at a cost of Rs 35 crore, the initiative is aimed at addressing climate change issues and other demands on natural resources for the Company's captive use around its mining locations. Synergy between three Tata companies, namely, Tata Steel, Tata Power Solar and Tata Power Trading Company was instrumental in shaping the project into reality. With Tata Steel as the sole buyer of all electricity at a contracted tariff, this partnership demonstrates Tata Steel's commitment to climate action and voice support for supporting a strong outcome at the UN Climate Change Conference Paris 2015 (COP 21). Solar modules convert the solar radiation into electricity which is converted through inverters to AC power at suitable voltage and then fed to the utility grid with net metering facility for accounting of the solar electricity. In case of complete outage of grid, the solar plant has the capability to synchronize with existing DG bus at processing plant Noamundi and continue operation.

Story 7

Towards a Sustainable Tomorrow

Tata Steel conserving rainwater through Rainwater Harvesting Parks and Reservoirs at its mines

In the recent years, rainwater harvesting has emerged as one of the most sustainable ways to conserve rainwater that otherwise gets wasted by getting drained off. Installation of rainwater harvesting structure helps in channelizing precious rainwater to percolate down and replenish underground water table. As part of its commitment to environmental sustainability, Tata Steel has always given special emphasis to create such rain water harvesting structures in all its mining operations.

The rainwater harvesting parks and reservoirs created across raw material locations including Joda, Noamundi, Jharia and West Bokaro across Odisha and Jharkhand have the potential to store a total of 12.38 million cubic meters of water. Installation of these rainwater harvesting structures have helped in channelizing precious rainwater to percolate down and replenish underground water table.

A healthy aquatic life is an indicator of good water quality. In terms of biodiversity, the focus usually has been on terrestrial animals. Improving biodiversity in aquatic life through integrating rain water harvesting structure has also helped in contributing towards sustainable development goals.



Water Reservoir for Rainwater Conservation

OBITUARY

Shri M. S. Rahman

(25/11/1933 – 14/09/2021)



Shri Rahman was born in Davanagere in Chitradurga district on 25th November 1933. He completed B.Sc. (Hons) from Central College, Bengaluru and joined Department of Mines and Geology, Government of

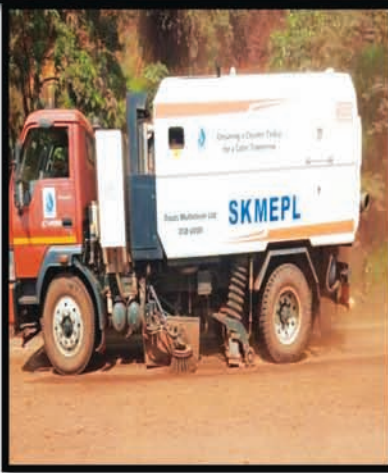
Karnataka as Assistant Geologist and rose the level of Deputy Director. He worked in mineral and ground water investigations. He served as Technical Assistant to the Director for 2 years and established a beautiful rock garden. He also worked as Officer on Special Duty in Mines Section, Commerce and Industries Department. He has been rendering advice and consultancy services to the mine owners after his retirement.

Mr. Rahman was one of the founder members of Bengaluru Chapter (LM/0086/BAN). He served on the executive committee during the formative years. He is also a Fellow of the Geological Society of India and life member of Indian Society of Remote Sensing.

He was an active member of Scouts and Sports. He was also the President of the welfare association of his locality. He is survived by his wife, 2 daughters and a son. The Members of the Association deeply mourn his sad demise on 14th September 2021 and pray for his soul to rest in peace and extend heartfelt condolences to his bereaved family.



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WATER INFLOW UNDERGROUND IN INDIAN GEO-MINING CONDITION

Abhay Kumar Soni¹, Vinay Kumar Singh², Nagesh Shenoy³ and Ravindra Ghattuwar⁴

Abstract

In underground workings of mines and other excavations such as tunnels, ventilation shaft, stopes, mining faces, roadways, cross-cuts, galleries etc. water inflow occurs, which is none other than a form of seepage visible at the work faces. Water inflow is one of the most significant issues in mining projects as it impedes the smooth functioning of workplaces and mining operation. Theoretical and practical aspects of inflow, such as causes of inflow, how to track it and quantify it, parameters affecting its assessment and measurement has been described and discussed in this paper? With the help of a case study of South Ventilation Shaft (SVS) at Malanjkhand Copper Project (MCP), India water-inflow underground in an ongoing shaft sinking excavation has been explained and analysed.

Keywords: Inflow, seepages, water underground, mine workings, the effect of season

Introduction

Water is nature's precious gift but not a free commodity in the present time. It has both dimensions, 'boon or blessing' as well as 'problem or hindrance'. The water challenges, when managed properly, provide better productivity and safety. When uncontrolled water-inflow occurs underground, its management becomes a risky task. Therefore, inflow quantity, its place of occurrence and the way it is managed need to be researched and understood at length. The inflows challenges, as they occur, can be either 'new' or 'old' (recurring) or a combination of both at some site. The magnitude of water inflow may vary from small to medium to large and very large, could be seasonal as well. Following combinations may exist: (a) New inflows when excavation is advanced (b) An old and persistent inflow since excavation made and (c) Large increases in old inflows.

Inflow in a leaky area is not developed suddenly but occurs in a sequential pattern, first, it is dry then drips occur and then either constant or intermittent inflow conditions has been developed. Presence of surface water sources, with connections from below ground workings, impacts the inflow of mines and their ore /mineral extraction workings, underground. New or old inflow occurs when continuity of water is established or a connection is developed between the aquifer and the underground workings. The inflows could be short survived or long-term, depending on the encountered geological conditions and connectivity with 'Connate water' (see explanation given in next section

below). Start of inflows or increase in inflow is sometimes a function of climatic variability too because such inflows (underground) are influenced with the season.

Water underground

Water inflow is one of the most significant issues in mining projects. Not only mining excavations, civil excavations namely tunnelling (Gong et al,2018), underground caverns (Pal et al.,2015) etc. also experiences water inflow problems. To deal with them an in-depth study on groundwater discharge, geology and rock mechanics study based on rock classification system /modelling etc. is needed. Water inflow assessment account is incomplete without knowing the effect of seepage on stability (Lee et al, 2003) and reviewing similar case records, the reason being typicality and intricacies, each case have. Therefore, to know when such inflow will occur or what will be its magnitude and can we predict it in advance, it would be fruitful to look at the problem from multiple angles considering site specificities. The ground support system, either permanent or temporary, such as grouting, for each inflow underground is also different from another. Therefore, mine galleries, working faces of mine and tunnels, roadways, cross-cuts, stopes, raises & winzes, shaft workings, old workings and void areas needs to be physically examined as they may face water inflow or seepage problem at any time. Some of them are inaccessible too e.g. goaf and abandoned areas, which needs examination through the remote approach.

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O. Sammarco studied and did back analysis of the records of in Italian underground mines inrushes together with parameters and characteristics of individual inflows (Sammarco, 1986). The geological structure of most Polish mining regions is rich in groundwater, making shaft sinking difficult. In recent years, more than a dozen shafts, some almost 700 m deep, have faced such problem of inflow. Handling of water hazards during mine shaft sinking is a good experience for Polish engineers (Piotr Czaja, 2020).

Zhang (2004) discussed the potential of water inrushes in a coal mine. He conducted underground borehole water injection tests to study the impact of mining on permeability and reported a substantial increase in injection rate from close to zero before mining up to 6 litres per minute after mining.

In another old paper, authors have considered the interaction of groundwater flow characteristics, aquifer parameters and mining geometry to estimate mine water inflows. The groundwater flow conditions include both steady and unsteady state flow in infinite and finite aquifers to an imaginary pumping out well. Both linear and nonlinear flow equations are discussed. The application of various techniques outlined enables a more realistic estimate of water inflow to be made, which can be conducive to planning the mine dewatering systems. Concerning economics and safety limitations of inflow, estimation and simulation have also been discussed (Singh and Atkins, 1984).

Today, new tools of computer modelling (Geo-Slope; MODFLOW etc.) and Industry 4.0 perspective (Thomas, 2017) have come up greatly in the industry, thereby reshaping the inflow estimation and monitoring procedure. e.g. a finite difference based numerical groundwater flow model (FDM) is developed for the Singareni Collieries Company Ltd (SCCL) which is exploiting coal in the Godavari valley coal fields spread over 5.33 km² in Andhra Pradesh, India. The results of the study were used to estimate inflow and plan optimal groundwater pumping and the possible locations to dewater the groundwater for safe mining at different mine development stages (Surinaidu et. al., 2014).

In an underground working, up-to-date information is critical such as the reason for occurrence (causes), the effect of seasonality, time, depth and distance factors etc. hence, theoretical aspects should not be ignored and be studied and known. These are described in the next sub-section.

Theoretical aspects of inflow: Causes and measurements methods

Mining projects, which encounters a large number of inflow / seepage associated problems can have a significant impact on groundwater (GW) and surface water resources, and their associated values (GOWA, 2013). Inflow's initiation

(start/decrease/increase) and its movement underground as a whole, is not a function of many variables but works on fundamental principles and science of groundwater flows (Darcy's law and the conservation of mass) largely. Before we further analyse water inflow underground and seasonality, let us understand what are the causes/reasons for inflow.

Causes of inflow: Several reasons can be assigned for the underground mines inflows and they are, Rain events (high precipitation), wet season, snowmelt, accidental connectivity with abandoned or other adjacent water body, connectivity with a stagnant or flowing water source on the surface, porous geological formations and its connectivity with an underground or surface water source (s).

Principally, there are two main inflow categories, namely 'continuous in flow' or 'intermittent inflow', which may be 'new' or 'old'. To better understand the mechanism of inflow in the underground mines, knowledge about the aquifer, connate water and climatic seasonality should be known and understood thoroughly. These are explained below in short -

a) Aquifer types:

Unconfined aquifers cause conditional inflow meaning that it may occur or may not because the aquifer is under the water table conditions. However, confined aquifers which are under pressurised conditions always, inflow occurs most of the times and automatically. Semi-confined aquifers too have conditional behaviour similar to the unconfined ones in underground workings.

Connate water (Fossil water): Connate water is the water trapped in the interstices of sedimentary rocks (subsequently buried by younger sediments) or igneous rocks when it was deposited. Connate water occurs as a film of water around each grain of sand in the rocks, is chemically or physically bound to the lithosphere (soil and rocks), and has existed since the rocks formed. Although connate water resides in the rocks (interstitial or interstratal), a part of the groundwater system affects underground inflows conditionally but does not play a role in the hydrologic cycle. Depending on the rocks / geological formations its contribution is noticed.

b) Effect of seasons (Climatic seasonality):

Seasons are since directly linked with precipitation, a taller graph of the inflow is likely to be observed in the wet season. The amplitude of the wet period generally seems to be for three months. What seasonal variables could act as the trigger for these inflows underground is a matter of site-specific detailed analysis. Besides this, the frequency of the season (climatic variability) is equally important and must be taken into account for knowing the causes of inflow.

The seasonal variations, big or small, has linkages and correlation with other factors too, namely (a) defects in the earth or ground (in mining operation, blasting is a unit operation and cracks /stresses into the rocks are caused because of blasting) (b) ground content/material which acts as water transmitting media. The effect of seasons (climatic seasonality) could also be gauged from the running time of pumps deployed for the purpose e.g. in summer season no pump might run and in monsoon or winter season, maximum available pumps are running to tackle the water inflow underground.

d) RL differences of underground workings:

It is a well-known fact that water flows from the upper level to lower. Therefore in underground workings also the elevation difference (or reduced level or RL i.e. level with reference to a fixed datum) matters for flow to occur. Here, head of water (barometric swing/loading) plays an important role in the progressive build-up of inflow with place and time.

c) Time, distance and depth factors:

It is generally observed that in deeper mines a longer time delay occurs in inflow as the ground-water table is resting at shallow depth. According to the global pattern of the groundwater table study, it was revealed that overall, shallow groundwater influences 22 to 32% of global land area, including nearly 15% as groundwater-fed surface water features and 7 to 17% with the water table or its capillary fringe within plant rooting depth (Fan et al.,2013). Hence, the time delay depends on the overlying strata and its porosity and hydraulic character and may vary from hours to weeks or months. One can't deny that even at depths of 1000 m, the inflow may be observed, but its pattern is filtered with a longer time lag.

Apart from time and depth (Paul Tammetta, 2013), distance from the occurrence source, in the immediate vicinity or at a far distance, mainly matters for the occurrence of inflow. The encountered inflows, wherever they are, maybe spontaneous or gradual and may disappear with time. Thus, deeper the mine workings or lower the hydraulic conductivity lower will be the seasonal fluctuation.

Assessment and measurement: Assessment and measurement of inflow particularly quantifying inflows is a very difficult task for underground regions. Topography, aquifer heterogeneity, complex geology i.e. cracks, fractures their continuity and flow paths etc are vital. Since underground workings are such that very accurate and precise measurements are not feasible at all places, an approximate estimation is preferred and suffice the purpose also.

In general, basic scientific methods of measurements have been applied for monitoring inflows. Inflow in the field is

generally measured manually, known volume and time to fill, and totalled. Underground workings are such that very accurate and precise measurements are not feasible at all places. However, smart-water monitoring may be applied as a tool. Smart 'water flow meter' for industrial and commercial applications are available that have remote monitoring too through IOT. Water flow measurement is a field of instrumentation knowledge with a growing interest in the industry and ample of tailor-made solutions are available to measure the variations and changes in water quantity easily with accuracy (<https://www.sciencedirect.com/journal/flow-measurement-and-instrumentation>). Having measured the inflow, through field monitoring approach, 'Statistical methods: Multivariate statistics' may be applied for the inflow analysis.

Underground inflows could be single or multiple in an area, flowing at the rate of litres per minute or litres per second. For a given time, inflow generally occurs at a consistent rate. New-inflows are developed where the flow was not occurring previously and are recorded with time as they appear.

As said above, quantifying inflow is difficult and varies from site to site. To know how researchers had looked at the inflow problems, it is significant to note that as a rule of thumb, the average inflow (seepage) pressure acting on the wall / working faces is proportional to the hydrostatic pressure at the same elevation, and the magnitude is about 22% of the hydrostatic pressure for those underground workings which are well-drained and about 28% for the permanent lined underground tunnel or underground workings (Lee et al 2013).

A guideline for estimating the inflow mine water quantity in an operational underground mine for

Indian geo-mining condition has been developed (Soni, 2020). Using basic scientific principles, water quantity estimation can be done for underground mines. According to Soni, water estimation in underground mine areas has linkages with the volume of void space created underground. Inflow underground, most often and in general, consists of groundwater with a very less or negligible contribution of surface water depending on the field conditions encountered. Seepage inflow estimation by modelling approach is quite useful tools for inflow measurements in modern time. Computer software packages namely, GEOSTUDIO -SEEP/W (Geo-slope, 2007) MODFLOW, FLAC3D and RocSCIENCE etc. are some of them. There are two fundamental types of finite element seepage analysis viz 'steady-state' and 'transient state'. Depending on the area to be evaluated and availability of input data required for the modelling the inflow quantity or seepage quantity (flux) of water may be estimated at a cross-section (CSIR- CIMFR, 2013).

A CASE RECORD

This case study of water inflow at South ventilation shaft (SVS) of Malanjkhand copper project (MCP) in India depicts the Indian geo-mining conditions, that accompanies a typical field situation, with a fully developed open-pit mine and a developing underground mine in the immediate vicinity. Details about the project and the problem is described below.

About the project: The Malanjkhand copper project (MCP) is a large operative open-pit mechanized mine with 2 million ton per annum planned production of copper (Cu) ore, mainly *Chalcopyrite*. MCP is owned by public sector organization namely Hindustan Copper Limited (HCL) and is located at Malanjkhand, Taluka: Baihar, District: Balaghat in the state of Madhya Pradesh (M.P.), India. The mine is located at about 90 Km from the district town of Balaghat and connected with important towns of M.P. namely *Jabalpur, Balaghat, Baihar, Lanji, Katangi* and *Seoni*. The geographical location of MCP can be traced on Survey of India Topo sheet 64 B/12,64B/16, 64C/9, and 64C/13 and it lies in between the 21° 56 to 22° 05 N (latitude) and 80° 39 to 80° 46 E (longitude) (**Fig. 1**). The MCP project has a mining lease area of 479.9 ha (valid up to 2023) and falls within the catchment boundaries of the Banjar River, which fulfils the water requirement for this mine.

Currently, Malanjkhand Copper Project (MCP) is in the expansion mode. It will augment the ore production capacity from present 2.0 MTPA to 5.0 MTPA by developing an underground mine adjacent and below the existing open pit whose life is almost completed. The development of *underground mine* was started in 2015 and some key structures, required for underground mine are being excavated progressively, such as approach (incline/decline), ventilation shaft, production shaft etc. Important details of these underground structures are as given hereunder in **Table 1**.



Fig. 1: MCP project as seen on Google map

Table 1: Important underground structures under development at MCP

Sl. No.	Milestones	Planned depth / length (m)	Completed (m)	Status (as on 16.11.2020)
1	Service Shaft	665	665	Sinking completed
2	Production Shaft	694	694	Sinking completed
3	North Ventilation Shaft (NVS)	633	415	Under progress
4	South Ventilation Shaft (SVS)	645	550	Under progress
5	North Decline	4,610	3,030	Under progress
6	South Decline	3,860	2,265	Under progress

Source: HCL Annual Report - 2019-20.

Progressive construction work of infrastructure development for an underground mine at MCP is continuing along with the Cu ore production, being obtained from the fully developed open pit currently. It is expected that commercial production of copper ore from underground mine will commence in 2021.

The MCP open-pit mine with a capacity of 2 million TPA of ore is stretched over 2.6 km strike length and the RL's of pit bottom at Northside is 376m, at mine centre, it is 340m RL and at Southside, it is 400m (CSIR- CIMFR, 2018). The South Ventilation shaft (SVS) at the studied site is being constructed and will be acting as one of the main exhaust shafts of the mine, the other being NVS. Thus, at one end open pit mining for copper ore extraction will cease and underground mining of Cu ore will start. In this way conversion of MCP open pit mine into an underground mine is going on and taking shape at this site.

The Problem: To develop an underground mine at MCP, sinking of South Ventilation shaft (SVS) is in progress and during its excavation, the inflow water problem is encountered. The shaft under excavation is frequently encountering loose strata and bad rocks along with heavy water seepage from shaft wall. The cement concrete lining (PCC) is getting washed out due to the heavy water inflow (percolation). Salient features of the SVS site wherein the problem occurred are as given below-

- Dimension and shape of SVS: 6.5m diameter, Circular shape [Shaft outer diameter, unfinished: 7.1m]
- Location coordinates (Lat /Long) : 22° 02'45"E and 80 ° 42' 24"N

- Total depth of ventilation shaft from ground level: 645m
- Depth of shaft from the surface at which water problem encountered: 186.30m
- RL of SVS at which water problem encountered: 397.70m (Note: RL of shaft bottom keeps on changing as excavation continues)
- Average water flow rate at face (May, 2018) : 20 m³/hr (5.5 litre /second)
- Seepage intensity (Intensity of flow): Medium to High; not concentrated at a single point, all around the shaft periphery
- Water column height at the shaft bottom: 1 to 1.5 inches
- Supports on shaft wall :
 - (a) PCC Lining, 300mm thickness in normal condition and
 - (b) RCC of 500mm thickness in bad rock condition.
- Cycle Time: Drilling & Blasting time – 16hrs; Mucking time - 16 hrs.; concrete shutter alignment and fixing - 5 to 6 hrs.
- Time lag between excavation and support: 18 to 20 hrs.

The support system adopted at the excavation site in bad rock conditions with watery faces has been given in **Fig. 2**. To manage the water at SVS site the pumping arrangement has been done. Two numbers of pumps of 60 HP (40 cubic m /hr capacity) with 270 m head were deployed and their average pumping time was 12 hrs/day. One extra pump is always kept standby for an emergency. MCP has estimated the cost of pumping as Rs 45 per cubic meter and incurred expenditure towards pumping was Rs. 6.5 lakh per month (**Fig. 3**).

To tackle inflow in SVS underground workings, site-specific solutions were searched that can meet the practical challenges which are taking place at the site in actual. Accordingly, the field survey was done and analysis has been made. Its details are described in the following paragraphs.

Material and Methods: The input data that has been cited and analysed here is based on the field inspection done by the principal author with mine officials during pre-monsoon and post-monsoon seasons of the year 2018. Data regarding inflow water quantity, water flow rate, rock types, rock strength and prevailing geological conditions (shear zone) have been collected. The excavation methodology and underground stresses at actual shaft face were understood through the field inspection, which forms apart of survey and monitoring programme. Other salient facts about the SVS

excavation, the open-pit mining operation, decline /incline progress and digging of other shafts which is continuing in the vicinity were collected and verified from the ground truth.

Observations: The field inspection pointed that water, ore body, host rocks and prevailing geological conditions (shear zone) together with the strength of wall rocks including underground excavation methodology constituted a complex dynamic system causing heavy water inflow. Other excavations, such as surface mining in the vicinity, nearby other shafts and declines are contributing to the inflow problem at the SVS excavation site marginally. Field monitoring and recorded observations revealed the followings -

- (a) Using a conventional measurement approach, the water flow rate at the shaft face is estimated as 20 m³/hr or 5.5 litres/second. This average water inflow rate was recorded in May 2018, which is a dry season. To check the effect of seasonality on inflow, more observations were taken later, in July and August months and the flow rate of 30m³/hr and 28 m³/hr respectively have been recorded. In October 2018 approximately 17-18 m³/hr inflow of water was recorded. During this period the shaft excavation face (inflow spot) has been advanced further by about 10 m in the similar rock types.

In May 2018, the occurred rainfall was of the order of 14.7 mm only, whereas, in June, July and August months, rainfall magnitude was accelerated to 148.7mm; 554.3mm and 289.1 mm respectively at the MCP site. Since June to August happens to be the rainy season period (wet months) such rise in rainfall has been considered normal.

- (b) Water inflow is continuous and heavy in the wet season i.e. in July- August months for the reasons as the aquifers are fully water charged in July-August. During post-monsoon months i.e. after the middle of September and till the last of the October month, a decline in the water flow rate and quantity both have been observed.
- (c) Cracks and fractures of rocks and other surfaces are wide and open because of the presence of water.
- (d) Normal stress conditions were noticed as the site is not very deep and the area is free from seismic or tectonic influences.

Analysis and Discussions: On studying the local and regional geology of the MCP study area it was found that the 10 km radius area (CZ and BZ area) contains Archaean rocks (granite, conglomerate, arkosic grit and quartz with pelitic intercalations) and basement rocks (gneisses, schist and granitoids). The local geological succession of the site is as follows.

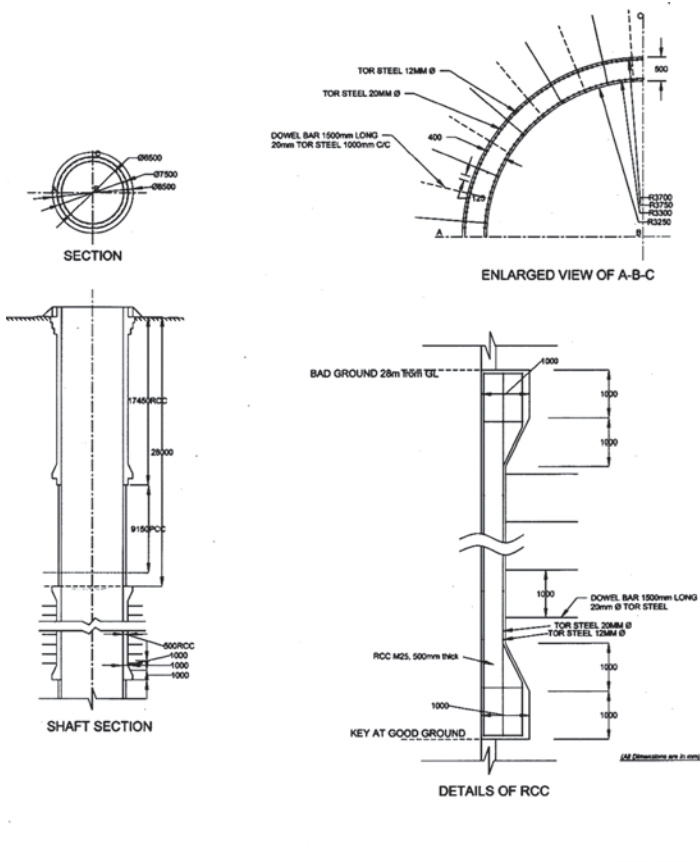


Fig. 2: RCC support details of SVS in bad ground and watery condition (Source: MCP)



Fig. 3: Pumping arrangement (underground) at SVS site

Fully developed cracks, as evident from the outcrops of the Archaean and basement rocks, together with the presence of sandstone (unconsolidated) in the upper horizon is a cause of water inflow. These cracks are developed at the formation stage of the rock itself. Therefore, these natural geological features of the MCP site are playing a significant role in the inflow at SVS shaft site.

		Quartz Veins
		Shales / Phyllite
UPPER	Chilpi Ghat Series	Sandstone/Quartzite
	PROTEROZOIC	Arkosic grit/Arkose
		Conglomerate

----- Unconformity -----

		Basic rocks
MIDDLE	Basement Complex	Aplite
	PROTEROZOIC	Quartz Reef/Veins
		Granitoids

In the study area and its surrounding areas, the aquifer is in the water table condition. Two types of aquifers are present at MCP viz. - (a) Shallow aquifer: Unconfined to Semi-confined (Deccan trap rock areas) and (b) Deep aquifer: Semi confined (granitic and archaic formations). The unconfined aquifer at shallow depth lies in immediate contact with irregular pit geometry. This shallow aquifer is extended in the open pit area as well shall excavation area and has continuity up to the shaft walls. It is assessed that continuity of fissures and cracks between open pit (open mine) excavation and underground workplaces are prominent, causing inflow to occur and visible at the SVS shaft walls. At places, the gougey material of rock intercalation has been washed out due to heavy flow of water resulting in more acute seepages.

Groundwater (GW) of the study region, is contained in granitic rocks/gneisses and alluvium. Another significant point that is emerged out of the inflow analysis is that the realignment of groundwater, due to multiple underground excavations (Table 1) and MCP's operating open-pit in very close proximity (Fig.1), are occurring at the studied site. Such realignment of groundwater forces, including its flow, is the leading cause of water fluctuation as well as an increase in the water quantity at the actual working areas which we commonly refer as ' work faces'. As far as the water flow rate at the site is concerned, in May month of the studied year (summer season of 2018) the observed inflow was less compared to that in July-August months (Rainy season). This is indicative of the seasonal effect (climatic seasonality). Hence, the fluctuations in water quantity due to seasonality is observable at this site.

To examine and evaluate the problem in totality, water-related important surface features were also examined. It is observed that MCP is located in the catchment boundaries of Banjar River (a tributary of a major river- the Narmada).

The Banjar river is flowing away from the studied site and is located at a road distance of 6-8 km, hence not a cause of concern for inflow at SVS. Because of agro-based irrigation of the area, surface water, as a whole, has very less contribution in inflow underground.

As such, no important water body lies in the area except 'Karamsara Pond' - An irrigation pond. Karamsara pond is an earthen dam, a stagnant water reservoir of dimension 732 m length x 8.85 m max height with a gross water storage capacity of 1.66 MCM and catchment area of 15.35 Sq. Km. Small ponds and tailings impoundment, scattered at various locations, do exist in the MCP study area but their topographical location is such that all these small water structures are acting as recharge structures only and not a reason for influence on the SVS inflow.

The field study also indicated that whole area and SVS site is principally a hard rock formation and inflow is basically groundwater only. Pit depressions, topography (RL differences) and extent of cracks and fractures developed as a result of mining are playing an important role in the occurrence and movement of water. The main contributory factors responsible for inflow to occur at SVS are – aquifer and pit water present in the site vicinity.

In MCP study area, an average rainfall of 1150.9 mm /year with normal climatic conditions as prevalent in Central India has been observed (CSIR-CIMFR, 2018). More monthly rainfall in June, July and August months as observed at the site align with the normal conditions. Fluctuating pattern of pumping in summer, winter and monsoon months also shows the inflow trend occurring at the SVS site. This has confirmed that the seasonal effects on inflow, both flow rate and water quantity available for pumping at the site, is taking place.

Inflow management. It is apparent that the water inflow occurring at SVS is mainly the seeped out groundwater. The flow rate of the order of 5.5 litres/second (average) at the shaft face is feasible and the flow intensity is varying. The water quantity of this magnitude is manageable through the adequate pumping arrangement.

Rock fractures, acting as the water transmitting media for SVS inflow, should be plugged tightly using pressure to avoid seepages. *Grouting* is a cost-effective quick and spontaneous solution for the underground inflow (Tsuji et al., 2017).

Conclusions

The real-life problem of the SVS case study has enriched our experiences about inflow. It is concluded that geo-mining conditions that include geology, rock types (water transmitting media), mining /excavation methodology

are the crucial factors responsible for the inflow at the underground workplaces. An inflow has a dependence on the seasonality too. Deeper the underground workings or the lower the hydraulic conductivity, the lower will be the seasonal fluctuation. Inflow water quantity of 5.5 litres/second (average), a representative of the Indian geo-mining conditions, could be easily manageable at the studied MCP site where inflow occurred.

Acknowledgements

The ensuing article is an outcome of industry-institution interaction and field studies, for which authors would like to deeply acknowledge the help and support of their respective organization. Permission given by the concerned authorities to publish this paper and all those who helped directly or indirectly is thankfully acknowledged.

Conflict of Interest

It is declared that all authors of this article including the corresponding author have no conflict of interest.

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(Continued from page 9)

commodities, Verisk Maplecroft puts the spotlight on thermal coal and notes that large-scale production of the fossil fuel in Indonesian Borneo accounts for the bulk of its extreme risks score.

Risks for copper, on the other hand, are spread across multiple geographies including Indonesia’s Papua Province, Panama, Brazil, Botswana and Turkey. Iron ore’s biodiversity risk is primarily a result of mines in Brazil. On a positive note, the UK-based analyst highlights the fact that most of the commodities scrutinized, well over half of the production is located in low-risk areas for biodiversity.

How to deal with biodiversity risks

In Verisk Maplecroft’s view, given the growing demand

OBITUARY



Shri G L VYAS
(LM.NO- 1614/Jodhpur)

Expired on 19th September 2021.

The members of MEAI condole his sad demise and convey their profound condolences to his wife and other members of his family.

for nickel and other battery metals, operators will need to get ahead of investor and regulatory demands. “A first step is to recognize that biodiversity risk is no longer a local matter, but part of a global trend that is making waves among a much wider audience. Operators need to work out a way of measuring biodiversity risk across their portfolios and calculate their exposure to the threats of natural capital depletion in a way that satisfies investors,” the dossier reads. “By participating in the Taskforce for Nature-related Financial Disclosures, known as the TNFD, they can help shape what the global disclosure benchmark will look like.”

The TNFD is an initiative launched in 2020 by four nonprofit organizations: Global Canopy, UNDP, UNEP FI, and WWF, to work with investors to develop a framework for measuring the risks, impacts, and benefits of economic activities related to biodiversity. The project is financed by governments, the UN and philanthropic foundations and, at present, hosts 75 organizations from the private and public sectors, including heavyweight financial institutions such as Citi and Credit Suisse.

Besides joining such a platform, Verisk Maplecroft suggests that operators need to factor the results of portfolio risk analysis into investment and strategic decisions, just as they have with climate-related risks. Doing so is considered a helpful way to mitigate the investment and regulatory dangers of operating in high biodiversity areas and potentially identify opportunities to enhance resilience, business models and social licence to operate.

“Companies are now being asked to measure and mitigate activities damaging ecosystems, but will soon be required to dedicate time and resources to show how much corporate operations and strategies rely on elements like clean water or natural materials used for building – often defined as natural capital services,” the review reads.

Valentina Ruiz Leotaud | October 7, 2021

MEAI NEWS

AHMEDABAD CHAPTER

Report on Web Meet “B.K Antia Memorial lecture”

A virtual Lecture was organized by the Ahmedabad Chapter on 26th June 2021 in memory of Chapter's Founder Chairman (Late) Shri. B. K. Antia. Senior members of the Chapter from various organizations attended the virtual programs and made the web meet successful. Shri. S.N. Mathur, VP-2 MEAI delivered the Welcome address. He reflected the history of Ahmedabad Chapter, reminding that the Chapter is entering in its Silver Jubilee Year. He congratulated the members for their active contribution to make it possible. In his address, he also explained how the “B.K Antia Memorial lecture” series was introduced in the year 2014.

The “B.K Antia Memorial lecture” was delivered by Shri. R. C Kachhara, Former DGM, Govt. of Gujarat, and the Former Vice Chairman of the Founder Executive Committee of the Chapter. It was a wonderful lecture delivered by him, narrating his long and varied experience in Mineral Geology of Gujarat.

Chapter Chairman Shri. A.K. Garg (Former Sr. General Manager Technical GMDC Ltd.) expressed his words of gratitude to all the attendees, speakers of the event and wished for the success of Ahmedabad Chapter.

Annual General Meeting

The Memorial lecture was followed by the Annual General Meeting of Chapter (AGM). At the outset, two-minute silence was observed to pay homage to the following members of Chapter who left for heavenly abode during past one year:

1. Shri. K A Makrani
2. Shri. N M Mehta
3. Shri. Sujoy Roy,
4. Shri. R D Desai
5. Shri. J V Bhatt
6. Shri. C R Patel
7. Shri. Vjjay Gohil

Shri. A.K Garg then delivered the Welcome Address expressing happiness over the consistent efforts made by Chapter throughout the year, in spite of Covid-19 pandemic. He praised the members' efforts in maintaining the flow of knowledge by organizing webinars periodically and made special reference to brilliant efforts made by all Local centers.

The Minutes of Last virtual AGM held on 14.06.2020 along with the action taken report were presented by the Secretary Dr. D. A. Pancholi and were approved by the House. The VP II Shri. Mathur raised a query about the suggestion he

made during the last AGM, regarding recognizing services of the senior active members of the Chapter who had earlier left us for heavenly abode during the recent past, by naming some events or awards in their names. A sub-committee was constituted which was expected to submit its recommendations to the Chairman for further action. He was informed that the action is still pending and some suitable action will be taken soon.

Secretary's Annual Report for the year 2020-21 was then presented by Dr. D.A. Pancholi narrating the various activities conducted by the Chapter. In the absence of the Treasurer Shri. Kiran Bera, who was granted leave of absence, the Annual Audited Accounts of Year 2020-21 were also presented by Dr. Pancholi and the same was approved by the house.

Chapter's Annual Awards were then announced by Shri. S. N. Mathur as under-

- i) The Best Local Centre Award was presented to Kutch Local Centre
- ii) Late Shri Paresh Samantray Best Member of the Chapter's award was presented to Shri. Anand Vijay

As the present Executive Committee of the Chapter had successfully completed its two years' term, Elections to constitute a new Executive Committee were conducted in the month of April 2021 by appointing Shri. S.C. Jhagrawat (a Life Member & the DGM Mines GMDC Ltd. Bhavnagar) as Returning Officer. Since he was indisposed and was not present in the meeting, the results for the elections were then presented by Shri. Sanjay Mathur (a senior Life Member & the DGM Mines GMDC Ltd Bhavnagar) on his behalf. Following members were elected:

Chairman Shri. H K Joshi
 Vice Chairman I Shri. A K Makadia
 Vice Chairman II Shri. Dhananjay Kumar
 Secretary Mrs. Gunjan Pande
 Jt. Secretary Shri. N K Chauhan
 Treasure Shri. G C Darji

The outgoing Chapter Chairman Shri. A.K .Garg thanked Shri Jhagrawat for the brilliant efforts made by him in conducting elections fairly. He also thanked the officials & members of the going committee and congratulated the newly elected Committee.

The Newly elected Executive Committee was then installed by Shri. Mathur. While addressing the meeting Shri. H. K. Joshi assured that the consistent efforts will be continued with more zeal and zest and an activity calendar for the year

will be chalked out for celebrating the Silver Jubilee year of the chapter.

Sh. S.N. Mathur then addressed the AGM. He congratulated the new Committee and desired that they should organize more events in the ensuing year to mark Silver jubilee Celebration of the Chapter with Celebration of the Silver Jubilee Anniversary on 14.06.2022 in grand manner. He also suggested that the Chapter should be mentally prepared and take initiative to organize the MEAI AGM after two years sometime in June 2023 with installation of the new Council with the new President, the first ever to be from the Chapter.

The Program concluded with vote of Thanks by Ms. Gunjan Pande with words of gratitude to all the participants for their valuable support.



From Left to Right: Top row: Shri. Anil Mathur, Shri. A K Garg, Shri. H K Joshi; Second row: Dr D A Pancholi, Ms Gunjan Pande, Shri. S N Mathur; Bottom Row: Shri. Dhananjay Kumar, Shri. A K Makadia, Shri. R K Das



Shri. R. C Kachhara, Former DGM, Govt. of Gujarat delivering the memorial lecture

Online Workshop on “Mining Plan Format 2021”

Earlier the Chapter organized a physical-cum-virtual workshop on “New Format of Mining Plan / Review of Mining Plan / Modified Mining Plan and Star Rating” through its Kutch Local Centre on 24th June 2021 at Gadhsisa in association with Gandhinagar Regional Office of the Indian Bureau of Mines. Shri. P.N. Sharma Chief Controller of Mines, IBM delivered the Keynote Address. He highlighted that the

Mining Plan will be Techno Legal Document and IBM will act as facilitator instead of inspector only. He also expressed his concern for the smaller mines. Shri Pushpendra Gaur, Regional Controller of Mines, Gandhinagar, in his address briefed about the major changes made in the system. He also appreciated the initiative taken by Ahmedabad Chapter in organizing such a workshop on the latest topic.

Shri. G Ram, Sr. ACOM IBM then made a detailed presentation on the topic, explaining contents of each chapter of the new format, giving emphasis upon the sustainable mining and review of the proposal. He opined that Sustainable development and Star rating would improve the work efficiency of the mine.

Shri. S.N. Mathur has also expressed his opinion over the new format and appreciated the efforts made by the team of the Local Centre in organizing the event with short notice.

Around 60-70 Delegates, from various industries and organizations dealing with mining such as Sanghi Industries, Ultra-Tech cement & GMDC participated online & offline in the workshop.

Shri. B K Mahato, Convener, Local Kutch Centre summarized the proceedings and Shri. B L Kumawat, the Secretary proposed the Vote of thanks.

**BELLARY-HOSPET CHAPTER
Cricket Tournament 2.10.2021**

Due to the pandemic, it was difficult for the people to come out and lead a normal and social life. The safety norms have made people life more difficult. It was also thought initially, the concept of work from home will bring revolution in the system, however it is proved wrong and it is learnt that the people are going under depression for the continuous work and lack of physical and social gatherings.

In this regard, Chairman of the Bellary Hospet chapter proposed to conduct sport events for their members especially for the young aspirants and fresher. In this regard, it was discussed with members and decided to conduct a cricket tournament. The objective of this tournament was to encourage the new members to develop good network, understand each other and to participate in the association events to keep association more active. In addition to this, it was also thought to engage seniors in the sector to participate in the tournament to ensure diversion from their busy schedules and also to guide the juniors.

The event was planned to conduct on 2nd October, 2021 at a beautiful ground of Sandur Residential School spread over 25 acres land in the outskirts of Sandur. The registration link was shared amongst members and also circulated in the association groups. The event received very good response

and around 46 aspirants registered online and few members registered on the event day. Four teams under the captainship of Sri. Madhusudhana, President – MEAI, Sri. Sreenivas Rao Paleti, Sri. Mallikarjuna SHM & Sri. Bharath Kumar was made on the event day. The team members were selected in front of the captains to ensure fairness and transparency in the game.

The event was inaugurated by Sri. Madhusudhana who was also the chief guest for the event. We also had Guest of honor Sri. Ekambar M Ghorpade, Director- LIPL. The MEAI President in his inaugural speech expressed the importance of these events which will help to know each other and also helps us to keep fit. He also reminded participants to be careful while playing and not to take things so seriously. Our Guest of Honor Sri. Ekambar M Ghorpade also expressed the importance of sports especially for the mining candidates who will spend most of the time in field. Our guest of honor inaugurated event by playing cricket. He faced the bowling of President, MEAI & Secretary BH Chapter.

The event was sponsored by SMIORE, Zeenath Transport Company (ZTC), Sri Kumarswamy Mineral Private Limited (SKMPL) & P Balasubba Shetty & Sons. Around 180 students of SRS along with their staff watched the match and supported players.

We had our Past chairman Sri. Yallappa, Director –SSSPL as the Chief guest for the prize distribution and Valedictory function. Addressing the gathering, Sri. Yallappa expressed that this kind of events not only help people to connect but also help to overcome the stress that the people have undergone during this pandemic. He also appreciated the initiative of organizing cricket tournament by the Chapter. The Vote of thanks was proposed by Sri. Mallikarjuna.



Plantation & Nature Walk

Plantation & Nature Walk was organised at Jambunatha Temple, Jambunatha Halli, Hosapete by the Ballary-Hospet Chapter to improve green cover in the area and maintain the overall Health among the Members of the Chapter and the other Engineers of the Association, TMAE Society Polytechnic students & few Family Members.

Over 100 Life Members, including other persons have participated in the event at 7.00 am on Sunday, 26.09.2021. Plantation programme was carried out in the compound of Adarsha School, Jambunatha Halli area and planted around 25 samplings. After plantation all the Participants started the walk from Adarsh School to hill top of the Jumbunatha Temple.

Sri. K. Madhusudhana, President, MEAI and Chairman of the Chapter Sri. Prabhakara Reddy, Secretary Sri. Mallikarjuna S.H.M., and other Office bearers along with the Executive Body and Development body members took part in the walk. Sri. Madhusudhana appreciated the gathering and conveyed his gratitude to R.B.S.S.N. Pvt. Ltd., Kariganur, Hosapete for sponsoring Breakfast and Tea for all the participants.

Sri K. Prabhakara Reddy has appreciated all the Participants, Organizer and the Sponsors for coming forward in making the event successful. He also extended thanks to the Team involved in the Event.

All the participants enjoyed the Nature walk and appreciated the Organizers and Sponsor of the event for making wonderful arrangements.

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Plant samplings caaried out by President MEAI



Group of members at Top Hill of Jambunatha Temple

HUTTI- KULBURGI CHAPTER

The members of Hutti-Kalburgi Chapter elected new Team for the period 2021-23 under Chairman ship Sri. Prakash, Executive Director, HGML, in the AGM.



HYDERABAD CHAPTER



Dr. MS Venkataramaiah addressing the gathering

At the Executive meeting held on September 7, 2021 it was decided that the Chapter should conduct a monthly review on the third Saturday of every month.



Mr. Kaushik Sarkar, Director (Occupational Health), Directorate of Mines Safety (DGMS) speaking on the occasion

Mr. Kaushik Sarkar, Director (Occupational Health), Directorate of Mines Safety (DGMS) was the chief guest. He spoke on Occupational Health and Safety in Mines. He said that the personnel working in the mining industry have set up the 'National Occupational Safety and Health System' to take measures for overall health and safety and it is the responsibility of everyone to strictly enforce these guidelines. The development of industries is possible only if the employees are healthy, so every employer needs to pay special attention to the health of the employees. He appreciated the efforts of the Hyderabad Chapter in raising awareness among mining students and young engineers. He also promised to support the proposal to set up a first aid center under the auspices of the Mining Engineers' Association.



Presentation of Memento to Dr. Sarkar by the members of MEAI

JABALPUR CHAPTER

Minutes of Virtual Meeting

The meeting was held 9/10/2021.

At the outset Shri Pukhraj Nenival, RCOM, IBM Jabalpur addressed the members and briefed about the MEAI and the immediate requirement of revival of the Jabalpur Chapter. He has also mentioned about the importance of mining industry for the development of the country and initiative taken for sustainable mining. Shri. Nenival proposed the following working committee members for the Jabalpur Chapter

Mr. S.K. Jain, NMDC will be the new Chairman

Mr Subhas Nigam, UltraTech Dhar Cement Works will be the Vice Chairman

Mr. Pratyendra Upadhyay, Maihar Cement works will be the Secretary

Mr. Rajesh K Chaubey, MP Birla Cement Works will be the Jt. Secretary

Mr. Rajesh Bhattacharya, Moil will be the Treasurer

Executive Committee Members are:

Shri PD Bohra, M/s HCL

Shri Manoj Shankar Singh, ACC

Shri Gaurav Taluja, Heidelberg Cement

Shri Akhilesh Singh, M/s MP Birla, Maihar

Shri KP Nigam, M/s KJS Cement, Maihar

Shri Dinesh Dixit, M/s Dalmia, Satna

He has also mentioned that Shri SK Jain and Shri PK Upadhyay will be the authorized signatories for operating the Bank account of MEAI Jabalpur Chapter in this new regime.

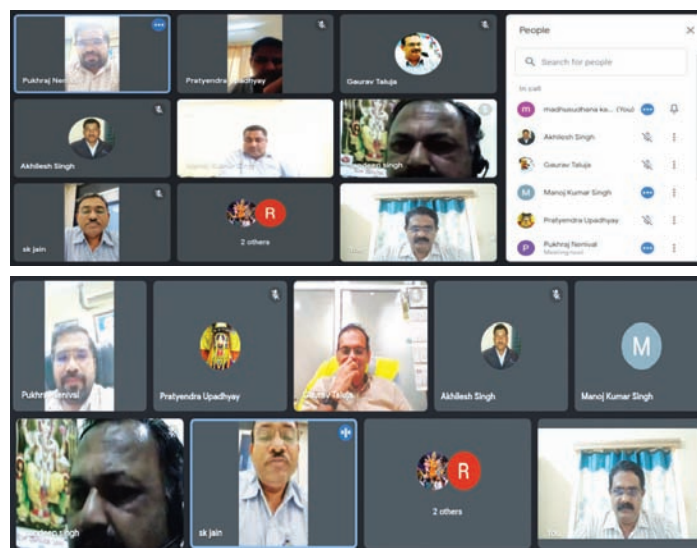
Shri SK Jain, Shri Upadhyay & Shri Chaubey will ensure the active participation of the members and will work on increasing the Members strength by introducing new young members through membership drive.

Shri Madhusudhana, congratulated the new Executive Committee and briefly mentioned that the aim of the MEAI is connecting the members with others regions, sharing the best practices and enhance the different industry knowledge. He also emphasized upon revival of the Chapter from its current dormant state.

At the end of the meeting, Shri. Pratyendra Upadhyay thanked to all Members for their active participation and expressed his desire that the committee to work in a cohesive manner and gave special thanks to Shri Nenival and Shri Madhusudhana for taking the initiative and extending support for the revival of the Jabalpur Chapter.

Action Plan:

- Increase the number of members
- Revival of Bank account
- Holding frequent meetings of the Executive Committee
- To hold a seminar during the month of December 2021



RAJASTHAN CHAPTER- UDAIPUR

Report of 23rd Annual General Body Meeting

The 23rd Annual General Body Meeting of the Rajasthan Chapter-Udaipur was held on 3rd October, 2021 (Sunday) 11:00AM at Shree Krishna Vatika, Near R.K. Circle, Udaipur (Raj) through Google Meet App Video Conferencing and physical presence of the members.

Meeting was jointly chaired by Sh YC Gupta, Chairman of the Chapter through online, Sh K Madhusudhana, President MEAI, through online, Sh A.K. Kothari, Former National President, Sh RP Gupta, Former National President, Sh Akhilesh Joshi, Board of Director-HZL, Sh DS Maru, Retd.

Director, DMG, Sh NK Kothari, ADM DMG, Sh Praveen Sharma, COO (Mines) HZL, and Sh MS Paliwal, Secretary.



(L-R) Dr SK Vashisth, Sh DS Maru, Sh AK Kothari, Sh Akhilesh Joshi, Sh RP Gupta, Sh Praveen Sharma, Sh NK Kothari, Sh MS Paliwal.

Apart from the above, 35 members were physically present and 17 members joined meeting through Google Meet App (Online).



Members participating in AGM (video Conferencing) through Google Meet App

At the outset, Sh YC Gupta, Chapter Chairman welcomed all the members participating in the 23rd AGM. He said it is immense pleasure that we would be celebrating silver jubilee after 2 years. Last 1.5 yrs has been difficult period for all of us. We lost some members; some lost their near & dear ones. Some became ill during pandemic. He expressed heartfelt sympathy to all of them. He expressed gratitude to Sh K Madhusudhana, National President for joining AGM virtually. During pandemic chapter could not do much activities so efficiently but still managed some technical talks, technical visit of the mines and plantation programme. We shall celebrate Mining Engineers Day on 1st November, 2021 through conducting seminars/technical talk.

Sh M.S. Paliwal, Secretary of the chapter, welcomed Sh Akhilesh Joshi, Sh YC Gupta, Sh AK Kothari, Sh RP Gupta, Sh DS Maru, Sh NK Kothari, Sh Praveen Sharma and all the members who joined physically and virtually. He presented detailed report as under:

- Technical Talk visit to Sindesar Khurd Mines of HZL on 16th January, 2021. By Sh RP Dashora, COO, Hindustan Zinc Ltd. and his team.

- Technical Talk on Occupational Safety Health and Work Conditions Code- 2020 by Sh AK Porwal, Retd. Director, Mines Safety and Sh RP Dashora, COO, Technical, Hindustan Zinc Ltd.
- Virtual Visit to Gamsberg Mine of Vedanta Zinc (South Africa) on 17th June, 2021 by Sh LS Shekhawat, Head of Business, Vedanta Zinc.
Felicitation of HZL Women Mining Engineer Working in Rajasthan Mines on 17th June, 2021.
- Celebrated Indian Mining Day on 1st November, 2020 with the theme “Net Zero Mining” by Sh Rajandra Bora, RK Marble and Sh RC Purohit, Ex. AVP Mines, M/S JK Cement.
- Plantation and Brain Storming to impart Training on Sectoral Skilling of Mines on 23rd August, 2021 at Rabcha Mines of M/S Khetan Business Corporation, Nathudwara.

He also brought to the knowledge of members that five executive committee meeting were held on during the year 2020-21.

Sh MS Paliwal expressed his happiness to receive following awards by the Chapter members from National Council.

- MEAI Active Chapter Awards-2020
- Sh Arun Kothari- National level award “LIFE INSTITUTIONAL MEMBER”-2020.
- Dr SK Vashisth MEAI-Service Excellence Award & selected as National Council member 2021-23.
- Sh LS Shekhawat received MEAI Award of Eminent Mining Engineer-2020 .
- Dr SS Rathore elected as National Council member 2021-23.

Apart from the above the Udaipur Chapter suggested/sent comments to the Governments on relaxations of first aid certificate, occupational health and safety and mining waste utilizations etc.



Report Present by FY-2020-21 MS Paliwal, Secretary

Sh MS Paliwal brought to the knowledge of house that website of this chapter is being developed and almost in the finalize stage.

Sh MK Mehta, Treasurer presented an Audited accounts for the financial year 2020-21, highlighted Income & Expenditure and the balance sheet as on 31st March, 2021. The house unanimously approved the accounts by raising hands.



Presentation of Audited account by Sh. MK Mehta for the year 2020-21

Honor of the members for their outstanding contributions at national level:

- Sh RP Gupta, Former National President, presented National level award "LIFE INSTITUTIONAL MEMBER"-2020. to Sh Arun Kothari.
- Sh Akhilesh Joshi Board of Director-HZL and Former Chairman MEAI Chapter-Udaipur. presented National Level Award MEAI-Service Excellence Award & selected as National Council member 2021-23 to Dr SK Vashisth.
- Dr SK Vashisth received award on behalf of Sh LS Shekhawat Eminent Mining Engineer-2020.
- Dr SC Jain received award on behalf of Dr SS Rathore elected as National Council member 2021-23.
- Sh Satish Chandra Arya presented Active Chapter Awards-2020 of MEAI to Udaipur Chapter and received by Sh MS Paliwal, Secretary, Sh MK Mehta, Dr SC Jain and team.
- Sh AK Kothari, Former, President MEAI felicitated to Sh NK Kavdia for obtaining Registered Competent Person CRISCO Approved for IMIC.



Sh Sh AK Kothari, Former President, MEAI was felicitated by Sh RP Gupta, Former President, MEAI

While addressing the house Sh. A.K. Kothari, Former President MEAI expressed his satisfaction on different

activity of this chapter and brought to knowledge of the house that this year the chapter has received ACTIVE CHAPTER AWARD. He told that this chapter has infrastructure and funds to carry out activities.



Dr SK Vashisth, Council Member, MEAI was felicitated by Sh RP Gupta, Former President, MEAI, Sh AK Kothari, Former President, MEAI & Sh Akhilesh Joshi, Boar of Director, HZL.



Secretary Sh MS Paliwal, Sh MK Mehta, Dr SC Jain and his team was felicitated by Sh Satish Chandra Arya



Sh NK Kavdia, Executive Member was felicitated by Sh AK Kothari, Former President, MEAI



Address by past NP-MEAI Sh AK Kothari

While addressing Sh. Akhilesh Joshi, Patron, Board of Director-HZL said that this chapter is efficiently working since last 23 years and soon we shall celebrate Silver Jubilee of the Chapter. He was of the opinion that mining engineer must upgrade his knowledge and do best for the society so that the society respect mining engineer. His motto should be to prevent natural resources, minimum damage to nature and safety so that stock holder shall respect mining engineer. Our aim should be such that the government policy maker should call us for technical up gradations in mining. He expressed good wishes for the success of the chapter.



Address by patron Sh Akhilesh Joshi

While addressing Sh K Madhusudhana, President MEAI thanked the chapter for inviting him to attend 23rd AGM. He also expressed thanks for the hospitality extended to him during his stay at Udaipur a couple of years back. He was happy to announce that Udaipur chapter is best active chapter in the India. He requested all the chapters to increase the membership and requested stock holder for the growth of mining engineer. His desired from the chapter to publish the work done by the chapter in papers and highlighted through website also. He assured Udaipur chapter for full cooperation and support from the Head Quarter.

Apart from above, Sh DS Maru, Retd. Director, DMG, Sh NK Kothari, ADM, DMG, Sh Praveen Sharma, COO (Mines) HZL, Sh RP Gupta, Former President, MEAI and Dr SS Rathore, Ex-Chairman, MEAI-Udaipur Chapter addressed the house.

For best contribution to Udaipur chapter following were felicitated.

- Sh HK Vyas honored Sh ML Paliwal from ASD Company for best hospitality by providing shawl and uparna.
- Sh AK Nalwaya honored Sh Nimish Singhvi for arrangements of venue by providing shawl and uparna.
- Sh Rajeev Verma honored Sh SN Joshi, Office Assistant for the best dedication service by providing shawl and uparna.

The entire Program was nicely hosted by Dr SK Vashisth. Meeting ended by vote of thanks by Dr SC Jain, Jt.-Secretary, MEAI-Udaipur.

SINGARENI CHAPTER

First General Body meeting of the Singareni Chapter was held on 3-10-2021 at 4.00 PM in the Conference Hall , Kothagudem Area, Rudrampur, Kothagudem under the chairmanship of Sri S. Chandrasekhar, Chairman and the meeting proceeded as per the agenda circulated,

Agenda 1: Secretary, of the Chapter welcomed the members for first general body meeting. In his address, he stressed up on the activities to be taken up during the coming days. He also requested the members to encourage the professionals to take MEAI membership as a part of the membership drive. He highlighted the Impact of Covid-19 due to which no workshop/ seminar could be organized. He stressed upon the need to hold workshops/ seminars in the coming days, as the situation of covid-19 is getting better but reiterated to adhere to Covid appropriate behavior.

Agenda Point 2: Election of candidates for the Vacant posts of Vice Chairman, Secretary, and Joint secretary cum Treasurer and Four Committee members.

The following Candidates were elected unanimously.

- Vice Chairman – Sri. Ch. Narasimha Rao
- Secretary – Sri. ALSV Sunil Verma
- Joint Secretary cum Treasurer – Sri. T. Hari Prasad

Executive committee members

1. Sri. Budagam Rama Krishna
2. Sri. Mukthar Ahmad
3. Sri U. Shiv Shankar
4. Sri Venne Mukhesh

Agenda Point 3: It was proposed that the Singareni Chapter must do Planning of the future activities. Further, it was decided to hold a workshop.

It was decide to hold workshop on theme 'ESG Strategy for Indian Mining industry' on 1.11.2021 coinciding the occasion of Indian Mining Day. It was resolved to make the Singareni Chapter the most active Chapter and to help in dissemination of technological improvements/ advancements among the mining fraternity.

Agenda Point 4: It was proposed to take the Membership drive for life members & Student members intensively. Initially, the arget for the Life Members was kept at 100.

Agenda Point 5: Singareni Chapter was having the saving account in Andhra Bank, Vidyanagar, Godavari khani, with A/C number :015710100055849. The account was lying dormant for the past few months and in view of new Executive Committee having been elected, the account shall be transferred to Kothagudem, Union Bank of India, in

the names of Chairman, Secretary and Joint secretary cum treasurer.

Secretary of the Chapter thanked the authorities of Kothgudem area for providing the required facilities to conduct the General body Meeting.



TAMILNADU CHAPTER

The 19th Annual General Meeting of the Chapter was held on 18.06.2021 at 2:30 pm at Hotel Breez Residency, Trichy.

The following points were discussed in the meeting:

1. Mr. S. Magesh, Vice Chairman (2019-2021) has welcomed the members and special invitees.
2. Mr. K. Sendil Kumar, Secretary (2019-2021) has reviewed the activities carried out by the Chapter during the last two years (2019-2021).
3. Mr. M.M. Ramesh, Treasurer (2020-2021) has presented the statement of accounts for the year 2019-2021, which was approved in the General body.
4. It was decided in AGM the land of the Chapter should be provided with a compound wall.
5. The members present have unanimously elected the following members as new office bearers and executive committee members of the Chapter for the term 2021 – 2023.

Office Bearers

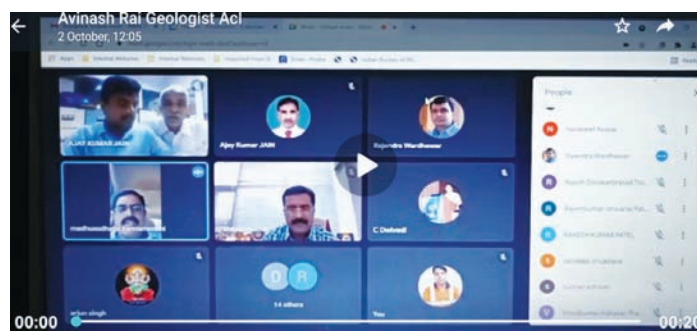
1. Mr. M. Ifthikhar Ahmed, Chairman
2. Mr. S. Ramesh, Vice – Chairman
3. Mr. S. Venugopal, Secretary
4. Mr. G. Magesh, Treasurer
5. Mr. R. S. Anand Kumar, Joint Secretary

VERAVAL- PORBANDAR CHAPTER

The Chapter organised a virtual meeting on 2nd October 2021 through google meet. The meeting highlights are given below:

- Celebrated Shri Gandhi Jyanti and Lal Bahadur Shastri Jyanti with full enthusiasm.
- Audited Account for 2020-21 was presented by Chapter Chairman AK Jain.
- Election of Signing authorities finalised. From now Mr Manish Kumar Yadav and Mr Deepak Dhurde will be responsible after the vacancy of executive member Mr Harendra Dayal . Mr AK Jain who is already an existing signing authority will continue.
- Mr Jain delivered a welcome speech and highlights of the Chapter. The Chapter is working in full swing for the benefit of the mining fraternity in the region. Initiatives include plantation drive, statutory certificates examination guidance; take away from sustainable mining, online mining plan preparation and submission guidance, e- mineral auction etc. WhatsApp group is running since last three years among all the members for sharing of knowledge and mining news.
- Quarterly e-newsletter will be continued and Mr Amol Dhomne is taking efforts for internal circulation through WhatsApp group.
- Membership drive: Target is set for at least one member from each big mines. Total 10 members target was decided for the year.
- Indian Mining Day Theme “ESG Strategy for mining industry” was discussed among the members and decided to celebrate it through virtual platform on 1st Novovember, 2021.
- Technical Session was conducted by Mr Surendra Mishra, Founder & CEO and Mr Rajendra Wardhewar, Positron Software Technologies Pvt Ltd. They shared a good information about comprehensive, cost effective and easy scalable through software.

Around 28 members attended the programme . Mr K Madhusudhana, President of the Association was the Chief guest and Mr Prateek Kumar, Mines Head, ACL was the Guest of honour for the event. Chapter Chairman AK Jain, Vice Chairman Mr Manish Yadav and Secretary Mr CM Dwivedi graced the programme. Mr Vennapusa Umesh Reddy anchored the programme nicely. The programme ended with the vote of thanks proposed by Mr CM Dwivedi.



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

3-4 Nov 2021: International Conference on Mineral and Mining Engineering ICMME 2021. Cape Town, Cape Town, South Africa

8-10 Nov 2021: Iron Ore Conference 2021. Online conference organized by AusIMM Perth, Australia

8-9 Nov 2021: ICEGGP 2021 - International Conference on Environmental Geology and Geological Problems in Istanbul, Turkey. For more details, please visit: <https://waset.org/environmental-geology-and-geological-problems-conference-in-november-2021-in-istanbul>

17-18 Nov 2021: Cement Business & Industry Africa (CBI Africa). Leading cement conference & exhibition. Johannesburg, South Africa. Venue to be announced.

18-19 Nov 2021: International Conference on Mining Geology, Exploration and Mining ICMGEM in Singapore, Singapore. Website URL: <https://waset.org/mining-geology-exploration-and-mining-conference-in-november-2021-in-singapore>; Contact URL: <https://waset.org>

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>

6-8 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 March 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>

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TATA STEEL

 WeAlsoMakeTomorrow



#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
our mining locations.

**Data as on October 2021*

PLANTING DOUBLE THE TREES FOR A BETTER TOMORROW

BOTANICAL PARK, NOAMUNDI

We are ensuring that the natural ecosystem in our mining locations is preserved. We have progressively implemented Biodiversity Management Plans at all our raw material locations in order to ensure no net loss in biodiversity.

Sure, we make steel.

But #WeAlsoMakeTomorrow.



HINDUSTAN ZINC
Zinc & Silver of India



Featured in
Sustainability Year Book 2020

Member of
FTSE4Good Emerging Index

Certified
Water Positive company

'Good Cultural Foundation'
in Great Place to Work Survey

Top 15 CSR spenders in India,
impacting 5,00,000 lives annually

Ranked 1st in
Asia-Pacific and globally 5th by Dow Jones Sustainability Index
in 2019 amongst Mining & Metal companies

World's leading integrated Zinc-Lead Producer | Among World's Top 10 integrated Silver Producer

Hindustan Zinc Limited

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