

INDIAN CEMENT REVIEW®

INDIA'S FIRST & ONLY BUSINESS MAGAZINE FOR INDIAN CEMENT INDUSTRY

VOLUME 36 • February 2022 • NO 7



MINING IN INDIA: MOVING TOWARDS A SUSTAINABLE FUTURE

Analysing the impact of mining on the environment, human health and biodiversity and working towards creating sustainable mining processes with the help of technology and automation.

Feature | Interview

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“We practice zero waste mining as part of our sustainable process.”

Sushil Kumar Tiwari, Director Technical, Heidelberg Cement India, gives us an in-depth understanding of the limestone mining process and takes us through the innovations in technology, efforts taken to minimise environmental impact and enhance productivity in an exclusive interview.

How often does your organisation conduct mining and how often the material is sent for clinker production? Tell us about the mining and clinker production process at Heidelberg Cement.

The cement industry is a continuous process industry and we need limestone for manufacturing of clinker that produces cement. More than 95 per cent of raw material for clinker manufacturing is limestone so limestone mining goes on around the year. This operation includes the development of the mines, drilling, blasting, excavation and finally crushing and transportation of limestone to the plant. Sometimes we make some extra stock of the crushed and uncrushed limestones at mines pit head which can be used in case of emergency.

What is the impact of limestone mining on the environment and the areas surrounding it?

Limestone mining is one of the cleanest mining. It doesn't generate any harmful chemicals that can contaminate the environment. When there is a movement of dumpers, movement of equipment there is some dust generation on haul road, however we keep sprinkling water to suppresses the dust emissions. We also do water injection during drilling operation and mist generation while dumping hopper in crusher which ensures minimum impact on environment.

We practice zero waste mining as part of our sustainable process. The waste generated during the mining (removing of the soft soil, or hard rocks) is being used for the backfilling of the pits which has been exhausted by mining of mineral and do plantation in the reclaimed land.

We have also developed water reservoirs in our pits for rainwater harvesting. Harvested water is being used by the communities which also helps us



Sushil Kumar Tiwari, Director Technical, Heidelberg Cement India

in achieving clean and green ecosystem around mining pits. Continuous plantation in reclaimed areas and water harvesting in mine pits improves biodiversity and over all aesthetics of the area. We have put a concerted effort to develop green cover which has resulted in dense plantations in our plants & mines and this helps in taking care for the environment. These dense plantations in the vicinity of our plants have helped us in achieving 1.7-degree Celsius lower ambient temperature in our plants than that prevailing a Km away.

Tell us about the equipment used for mining and where is it sourced from?

We use heavy earth moving equipment, like drill machines, excavators, dumpers, Dozers etc. These

are purchased from Indian suppliers like TATA Hitachi, caterpillar etc.

What is the technology behind mining of limestone for cement making process?

Primarily, we mine with open cast method. Typically, limestone is overlaid with waste rock and soft topsoil. Mining is done in a mechanised way with the help of heavy earth moving equipment. First, we remove the topsoil, and then we remove the hard waste rock and after due removal of waste rock, limestone is exposed. Exposed limestone is extracted by drilling & blasting and carried out to the crusher by dump trucks. The extracted limestone rocks are of big sizes, around 1.5 to 2 meters which cannot be transported easily to the plant. We have installed crushers at the mine space where we crush the limestone, reduce it to smaller size of 75 mm and transport it to clinkerisation plant through 21 KM long over land belt conveyor.

How can the productivity be enhanced?

The limestone deposit is very heterogeneous deposit, it is not uniform. The challenge is to maintain the quality and utilise low grade limestone. In the cement process, when the fuel changes, the total raw mix changes, which means that we have to accordingly change the limestone quality also. Thus, maintaining the quality is a major challenge.

For this we use Surpac software that helps us in planning. Then we carry out the drilling & blasting. Post that we analyse samples and accordingly blend various types of deposits of the limestone to get the desired quality and maximise use of low grade limestone. This is where we optimise and enhance life of mines. This prevents wastage of the natural resource as well.

What are the efforts taken by the organisation to make limestone mining a sustainable process?

Our organisation is a firm believer of sustainable operations. As mentioned earlier, we practice zero waste discharge mining. Whatever waste we generate, we use for back filling the pits ensuring there is no waste. We also ensure zero discharge water, because we use our pits for harvesting water, and this water is used by the community, and for our own plantations. Pit refilling is very useful. Sometimes when we take the farmers land for mining, then we refill it and when we return to the farmers. These lands are then used to crop fields and farmers have also told us that they have seen an increase in the

yield as compared to previous times.

On the machinery side, we hold proper maintenance. We use efficient machines and systems ensuring no generation of harmful emission. We have also installed pollution control equipment's in crusher, if there is a slide generation of dust these pollution control equipment takes care of it.

How does your organisation address the issue of noise pollution while mining and grinding limestone?

Noise pollution majorly happens when we do blasting or crushing. During blasting, we use non-electrical detonator, which has very low noise & vibration and also, we use seismometer to monitor the noise and vibration to control it. During crushing, we have enclosures so there is less noise in the external environment. For operators near the equipment we also provide personal protective equipment (PPE) like earplugs. There is a slight noise when the drill is operated on hard rocks. For this, we provide soundproof cabins to the operators, so they are not exposed to the noise pollution. All heavy earth moving equipments are fitted with proper exhaust/silencers.

What are the technological innovations the industry must incorporate to make the mining process more efficient and less harmful for the environment?

In mines, all equipments are hauling at certain distances and operators have to travel 3 or 4 km to carry out the processes. Latest an on-board monitoring system can be installed in the moving equipment which can give all the required details of parameters and can be centralised interface with the communication monitor. This will help the operators carry out their processes more efficiently. Similarly, latest drill machine should be provided with efficient water-dust separation system. And for reducing noise pollution, non-electrical detonator should be used.

Apart from that the online quality monitoring system like x-ray analyser, online belt analyser or cross-belt analyser, etc. should be installed which instantly give an analysis on the quality of limestone. This can help the operators to get information online and then they can shift machines to right place for blending the limestone properly to get the desired quality. Such things can make mining process more efficient and productive.



- KANIKA MATHUR