



CRUSHING & QUARRYING WORLD

India's Premier Business Magazine for the Aggregate Industry

What's in store for the CE industry?

What's brewing in Portugal?

Pressure is mounting on the country and the continent to open new mines for raw materials needed for green transport and energy

Quarrying towards Sustainability Rajpath Infracon

Rajpath Infracon Pvt. Ltd., Pune, a Guinness World Record holder company has recently been awarded a greenfield project by the NHAI on HAM Mode under Bharatmala Pariyojana Phase-1 in Andhra Pradesh

Choosing the right rig



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What's in store for the CE industry? Sanjay Pendharkar, a veteran professional and a renowned business consultant in construction, earthmoving, material handling and sales management writes exclusively for Crushing & Quarrying World about the construction equipment industry

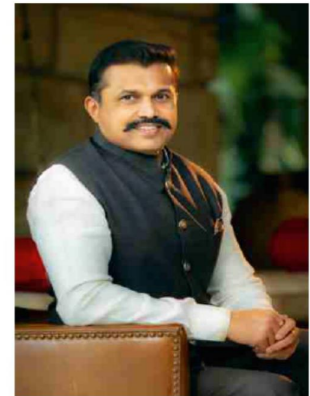


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What's brewing in Portugal?



Role of quarrying in infrastructure development

Experts from Rajpath Infracon Pvt Ltd share insights about the industry and also about their latest Greenfield project on HAM Mode under Bharatmala Pariyojana

India has a network of over 6,331,791 kilometers of roads (as of 31 December 2022). This is the second-largest road network in the world, after the United States. But to construct this length of roads, one of the main ingredients is the aggregates, that comes from quarrying. While infrastructure development and its maintenance is the foundation for any Nation to develop and boost its economy, there is a flip side of maintaining the delicate sustainability balance.

That is a challenge we are all willing to talk about, but feel it is too rigorous to meet the compliances that will ensure it. A common answer given by the economists to the question regarding why Indian economy cannot grow at double digit rate is that the country, as of now, does not have enough infrastructure to support a double-digit growth rate. And it is obvious that the

new aspiration is to run this race as soon as possible. For any road construction project, apart from the other major activities the following two are most significant.

- * Quarrying
- * Crushing

The phenomenal amount of development in infrastructure in India cannot take place without mining of building stone or the basic construction material, which is commonly known as construction aggregates and they come in 2 forms- coarse and fine.

Depths of Stone Quarrying

The most common purpose of quarries is to extract stone. The quarrying technique involves the process of drilling, blasting of the rock strata and fragmentation of the boulders. A large number of drilled holes

charged with explosives, called charges, are fired at one time to get tons of broken stones in one blast. Needless to mention the requisite permissions and licenses for blasting are expected to be in place before the mine goes live.

The quarry is on the earth's surface and exposed to sight, unlike mines which are situated underground and at greater depth. When the loose soil and soft rock (over burden) present on the surface of a quarry are removed, the required material of the hard and durable rocks is exposed from underneath.

Generally, when selecting a site for a quarry crushing production line, the choice of the location should be close to the origin of the material to facilitate transportation and save unnecessary expenses. At the same time, it is also important

In-depth

to consider the landfills or managing the quarry once the required quantum of stone is excavated from the point of view of environmental responsibility and compliance.

Along with this, the critical selection criteria for deciding a quarry site are overburden thickness, slope of the quarry's rock face, accessibility to the location, the rock type and the degree of weathering. It is also important to understand if the identified quarry site will be able to yield the required quantum and quality of stone. NABL laboratories can assist for core testing to ascertain before hand if the stone will fulfil the quality specifications. It also gives information about the overburden thickness. This helps to estimate the work required to reach the rock strata.

After the site is selected, the topography of the quarry becomes a significant

aspect. Responsible quarry operators will not begin the quarrying work without EC (environmental clearances). The norms abided to, are maintaining a distance of atleast 1 km from the nearest settlement, ancient or archeological structures, state or national highways and forest zones for the location of the quarry.

Operation and closure

During the operation, regular drone surveys are held to estimate and assess if the permissible limits for excavation is being followed. It is hence advisable to stick to the sanctioned limits for extraction of the stone. Similarly, royalty fees are to be remitted to the Government authorities for extraction o boulders as per the regulations of the State, on a regular basis.

The quarry cannot be discarded as an open pit, there are regulations to be

complied with, when the quarrying is done. There are mandates like erecting a fencing preferably with a Sign board, and plantations are to be done along the periphery of the abandoned quarry to prevent soil erosion.

The Code of Crushing

It is important to consider factors like distance from settlements when finalizing the location of a crusher plant. It is neither desirable for the dust generated nor the noise to disturb the local settlements. At the same time proximity to the quarry cannot be overlooked. The boulders that are obtained after blasting need to be crushed to the requisite size as per the demand of its application.

The process of the crushing is critical as the particle size plays an important role in the ultimate quality of the application it is used for. The





crushing process uses a string of equipments like the Feeder or a Jaw Crusher followed by an Impact crusher and a Vibrating feeder and/or a Screen to sieve the required aggregate or dust size of the particles and a sand washing machine in some instances.

Conveyors can then be connected between the machines for material conveying from one point to the other or Stockpiles, if required.

The proper size of the feed is important while operating the crusher, and this is ensured at the quarry's end when the boulders from the quarry come to the crusher feeder hopper. A 3 - stage crusher is most popular to obtain the aggregate for road construction projects and comprises of the 3 parts as under

- ★ Jaw crushers- is used for

- primary crushing
- ★ Cone crushers- is where the secondary crushing takes place
- ★ VSI units – crush and remove the sharp edges giving the stone aggregate a rounded even shape.

Besides this we also have options of choosing between

- ★ A Stationary Crusher- which is normally a 3-Stage unit and needs proper foundation and erection

OR

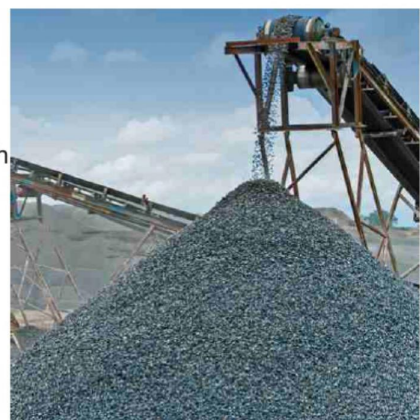
- ★ A Mobile Crushers- which is usually a 2-Stage unit (without the VSI), that can be shifted from one location to the other and does not need a foundation or any erection procedure.

The crushing process

involves a high degree of automation to produce adjustable particle size with the high breaking rate and some energy saving large output can be produced. If the excavated stone has fair range of size and shape, it is considered suitable for construction of highway bridges and roads. Besides this, crushed sand can be produced by re-crushing the output from the crusher to the Sand plant.

The crushing process mainly banks on the Hammer crusher to break the stone boulders. As the boulders are fed to the Crusher, the impact of the high-speed rotary hammer breaks them down. The broken stone feed passes through the crusher parts getting sieved at the same time. The desired size of the aggregate is obtained once the cycle is complete. It is to be noted that the average life of crusher components depends upon rock hardness/abrasiveness.

As the quality norms for highway construction are getting upscaled and



stringent the quality, proportion and classification of stone material used has also become more specific and has increased compared as compared to the past. These operating Crusher production sites need to pay attention to these few pointers for optimizing production and avoiding losses.

- Ensure that the proportion of various levels of production is balanced to prevent large amount of stone materials to be piled up,
- This will also prevent the dust pollution of the environment. Normally, sprinklers can be put to use to suppress the airborne high volume of dust and the conveyors can be covered with hoods to prevent dust from become air-borne during conveying.
- Ensure that the Crusher and it allied equipment is properly maintained to avoid outages and production losses.
- This will also assure optimized utilization of power without having to depend on both DG sets as well as electricity consumption.



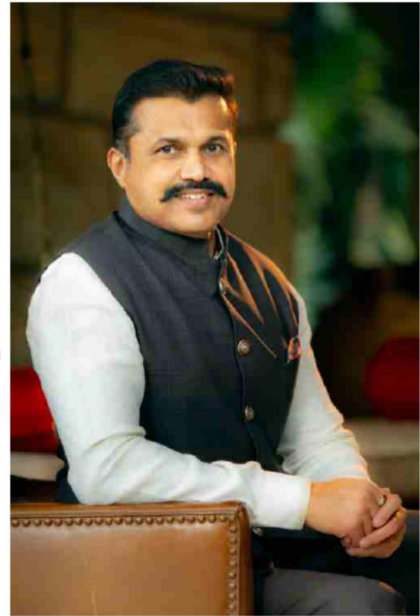
The quality of the production site and the environment will affect the layout of the production process of the crushing production line as well as the performance of the various equipments employed. Hence it makes sense to plan and erect production lines in land zones with natural slopes to enhance productivity and optimize power consumption of crusher operations.

A new Road Project to make a difference

Rajpath Infracon Pvt. Ltd., Pune, a Guinness World Holder Company has recently been awarded a greenfield project by the NHAI on HAM Mode under Bharatmala Pariyojana Phase-1 in the State of Andhra Pradesh. The latest project in road construction for the NHAI are the 2 Packages with flexible pavement for the National Highway development of six-lane access controlled greenfield highway from Vanavolu to Vankarakunta and Vankarakunta to Odulapalle.

This is to be executed on the NH 544G Bengaluru –

Vijayawada Economic Corridor on HAM Mode under Bharatmala Pariyojana Phase-1 in the State of Andhra Pradesh and is planned to



be completed in a period of 24 months. The preparatory site work is already in full swing. The required plant and machinery, and teams of experts and workmen will be deployed as per the planning schedules.

A total length of 47.7 kms will be paved in this project that includes structures and heavy blasting and excavation work. With teams having vast experience in all the aspects of project management as well as highway construction of bituminous concrete flexible pavement, all know-how shall be pooled in together to achieve seamless construction with high quality roads with better road design and infrastructure, high quality crushed aggregates, quality binding agents, latest technology crushers and all the required safety standards.

Jagdish Kadam is the techno-savvy CMD of Rajpath Infracon Pvt. Ltd., a 35 years young infrastructure organisation that proudly boasts of an India Book of records in 2021, followed by a Guinness World record in 2022.

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He has been a speaker on the globally acclaimed TEDx platform and a recipient of the multiple prestigious honours and special Excellence Awards by Ministry of Road Transport and Highways (MoRTH) and NHAI on various occasions, recognized and honored by the ET, CNBC, Asia one as the Best Brand and Best Leader in Dubai, and has been felicitated by the COEP Alumni with the Abhiman Award.

Besides this, he also shoulders the responsibility as the Chief Trustee of the Raja Shivchhatrapati Prathisthan, Pune, of the famed Shivshrusti Project, Trustee of Deccan Education Society, President of the Rajshree Kadam Prathisthan and the Executive Board member of the FLAME

University, Pune. With a civil engineering degree from COEP, Pune and a wealth of experience up his sleeve, Kadam is passionate about driving innovative ideas and implementing them. For this insightful vision and sharp evaluation in this regard, he has been nominated to the Board of the CII for propelling the agenda of Sustainability in the road construction sector.

On the importance of Infrastructure, Kadam says, "Infrastructure is more than what we see. It goes beyond buildings, bridges, roads, airports, dams and many other landmarks that make us marvel at how things are progressing and developing around us. In reality, infrastructure connects people, generates employment, shapes lives, enriches families, creates opportunities, achieves possibilities, impacts growth, empowers the future and nurtures hope. It is all this put together that builds a Nation as great as ours. And infrastructure is the heart of all this!"

Applications in Road Maintenance

Road maintenance forms part of the works carried out to provide adequate transport infrastructure. From a technical point of view, there is no shortage of technical guidance on how the works should be carried out. The challenge seems to be more related to how maintenance should be organized and

when it should be carried out. At Rajpath Infracon have managed to establish a fairly well functioning maintenance system for the constructed roads. Our technical team is on the progressive track of improving the maintenance standards by using enhanced technology of Micro-surfacing and Potholes machineries and high-quality aggregates and emulsions.

Afterword

The task of building a lasting road with great riding quality, is not an easy one. We know well of the factors that keep making such projects not just efficient but effective as well in terms of technology, management and post construction maintenance.

Engaging experts & dedicated champions in the respective fields, combined with the drive of enhanced technology and machineries make this a fail-proof solution.

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Stone aggregates are one of the most important construction materials obtained through

conventional quarrying and crushing of boulder stones. The rapidly declining stone deposits is becoming a cause of serious concern.

We may soon run out of quality stone deposits to support our aspiring infrastructure development plans. This article aims to create awareness on the importance of stone quarrying and crushing in supporting our initiative to propel infrastructure development for our Nation. At Rajpath we believe in sharing our practical knowledge to elicit a positive response that will not just bear in mind the underlying tone of respect towards the environment but at the same time, surge ahead with innovative and smart solutions towards further development.

About the authors



Radhye Sham Boyal

His rich experience of 35 years in Mining & Infrastructure Companies including 15 years from working in the Gulf Countries makes him very passionate about the subject matter. His on-field passion contributes to many strategically and

technically beneficial decisions that are in compliance with the norms as well as come with an awareness to protect the environment.

Besides this he is also keenly focused on upskilling programs for the site plant and machinery personnel and takes initiative in regularly holding training and practical sessions. He currently leads the Plant & Machinery Department at Rajpath Infracon and resides in Pune where he devotes his time focusing on optimizing resources and deriving technosavvy and cost-effective innovative solutions for Rajpath Infracon Pvt. Ltd.



Prashant Chavan

With an extensive experience of 20+ years of surveys, evaluation, design and inspection as per standards of structures, he also carries exceptional planning and execution expertise in National Highways, State Highways, Dams and Airport Projects. He is a Contracts specialist, with an unmatched eye for details and compliances. His exhaustive technical proficiency includes not just

quality standards and procedures but also a deep commitment to environmental protection, which is a huge advantage in every aspect right from the pre-tendering to final handover of the project. Prashant currently leads the Engineering Department as General Manager and spends most of his time on roads and in-between various sites of Rajpath Infracon.

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Crushing & Quarrying World magazine covers the Indian aggregate industry. It serves as the leading equipment and technology media source for the crushed stone and aggregate manufacturing industry offering readers relevant information and the latest industry news.

Crushing & Quarrying World's editorial content is based on extensive research. The editorial staff covers the industry like no other. Crushing & Quarrying World is a business-to-business magazine and a valuable reference tool positioned as a must-read for Quarry owners, Quarry managers, MSand manufacturers, Aggregate manufacturers, Crushing units, EPC Companies, Original Equipment Manufacturers, recyclers and members of the Aggregate industries.