ISSN 2277 – 5528
Impact Factor- 4.015

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES &MANAGEMENT

ENVIRONMENT& MINING IMPACT ASSESSMENT OF STONE MINING :A CASE STUDY

Dr. Ganesh Prasad*[1] & Subodh Kumar[2]
*[1]Govt. Polytechnic, Gaya-823001
[2]Govt. Polytechnic Koderma-825410

ABSTRACT

Mines are now in focus as a major source of corruption in the Jharkhand, the state government has woken up to it and made note of stones dug from quarries already. Hopefully, it will take similar action against the sand mafia with its real estate linkages. The committee would frame laws in accordance with the guidelines laid down by the Supreme Court, Indian Mine Bureau (IMB) and central forest and environment ministry.

I. INTRODUCTION

Stone (dolerite/quartz) mine in koderma area, jharkhand.

A dolerite is the medium-grained equivalent of basalt - a basic rock dominated by plagioclase and pyroxeneDolerites also often include olivine or quartz and can be alkali basalts, olivine tholeiites or quartz tholeiites. They can contain a wide range of accessory minerals including hornblende and biotitic.

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II. GEOLOGY

Regional Geology: In Koderma District of Jharkhand, the litho-structural environment is distinctly separated. North of it, occur a group of metamorphosed rocks while the southern part is conspicuous by the presence of un-metamorphosed rocks which are underlain by the older metamorphic. The Whole sequence of rocks in this area and also in the eastern part is traversed by younger igneous bodies of ultra basic, basic and acidic compositions.

Local geology: The geology of the rock types of Stone Mine follows the Regional stratigraphy of this region. The dolerite boulders exposed throughout the area on the upper part of the hillocks as well as in the base of hillocks. On the basis of geological field study, a geological map has been prepared with a contour interval of 1m showing all rock types. The local geological succession of rocks in the area as observed during field study is as Dolerite- stone deposit and Quartz.

III. MINING

Proposed method of mining:
After fulfilment of all the statutory clearance and execution of the mining lease deed, the mining operation in this area shall be carried out by open caste other than fully mechanized / semi mechanized method by using HEMM for excavation, production and removal of waste with a combination of dumper.

This mine is planned to develop with the maximum production capacity of annum Keeping in view of production target the method of mining adopted shall be by opencast (OTFM) method on a single shift basis where the stone boulder (of different sizes) will be excavated. In the initial stage, large sized boulders will be excavated using hydraulic rock breakers & Excavators. Drilling and blasting shall be carried out by engaging authorized explosive agency under competent supervision. However, regular blasting is not envisaged at this stage. Secondary rock breaking will be done – using hydraulic rock breaking to produce boulders of required size (of around 8") for the crushing plant. The excavated material from the mine shall then be sent to propose crushing & screening unit, shall be installed adjacent to the applied area from where final product will be produced with sizes of 5mm, 5-10mm, 10-20 mm and 20-40mm as per requirement. The development of the faces shall be carried out in slicing and benching method keeping the bench height at 6m and width not less than 10m for easy plying of HEMM. The individual slope of benches would be kept 45º from vertical at ultimate limit.

IV. BLASTING

For fragmentation and dislodging the hard, massive stone (dolerite) bed and rock, blasting is required. For this, shallow hole drilling and blasting method is proposed to be adopted in the mine. The shallow hole drilling shall be made by Jackhammer rock drills driven by air compressors. The depth of hole ranges from 800mm to 1200mm. All the holes shall be blasted by safety fuse firing system. No definite sequence of blasting can be adhered to for

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shallow hole blasting. But attempt shall be made to blast the holes in such a way that blasting in the earlier holes result in free faces for the subsequent holes. Not more than 10 holes shall be fired in one round. Blasting in the area shall be done on contract basis to conduct blasting work. Besides Jack-hammer drill, it is proposed to engage rock drill to reduce the boulder size.

Specification of Jack-hammer Drill

*	Weight of the jack hammer	-	25kg
*	Diameter of the drill rod	-	34 mm
*	Consumption of compressed air	-	2-2.5 cum/min
*	Pressure supplied up to	-	6 kgf/sq.m

Drilling Parameters: Occasionally spacing & burden is required here because the drilling shall be done in big boulders to reduce the size.

Holes Required per Day: Requirement of hole per day cannot be estimated as the drilling by Jack-hammer shall be carried out where large size boulders are encountered.

Requirement of drills: About 2 numbers of Jack-hammer with Compressors and one rock drill is proposed to use for the drilling and blasting purpose.

Type of explosive used/to be used: Blasting in the area shall be done on contract basis by an agreement with the license holder agency, to conduct blasting work.

Exploration programme: No exploration has been chalked out at as all the hills within the area are covered with Stone.

Ultimate pit boundary: Based on the mineralized zone of entire area, ultimate pit limit has been calculated by cross sectional method. The ultimate pit limit is earmarked both in plan and sections.

V. MINERAL PROCESSING

Stone is used in raw form in road, railway and building construction. As such, no beneficiation is required. On the other hand, the stone boulders after breaking at site shall be taken to the Lessee's own proposed crusher and screening unit, shall be installed adjacent to the applied lease area. As stated in earlier chapter, all the production of stone shall be utilized in Lessee's own Construction Company. The crushing/screening unit is a dry process.

Flow sheet of proposed crushing & screening unit of **200TPH** capacity is given below:

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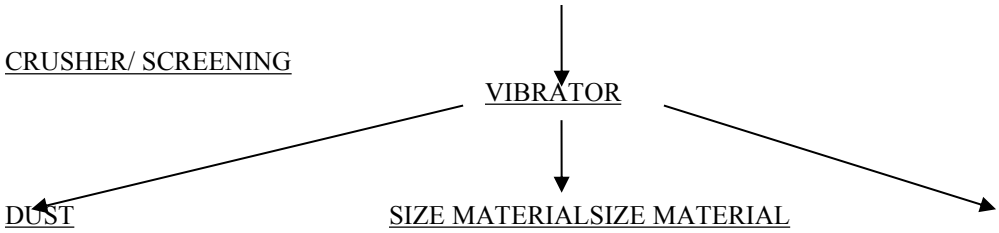
Flow Chart

Rom Feeder Bin



Disposal of waste rocks and in saleable mineral:
Waste dump: It is proposed that all waste to be generated during this plan, shall be utilized for making and maintaining the approach road, mine road and village road. As per life of the mine plan. So, However at ultimate stage, generation of waste will be same as plan. So as per situation requirement of waste dumping.

VI. ENVIRONMENTMANAGEMENTPLAN

Rain Water: The StoneMine is located in Koderma district of Jharkhand and the area in general, receives appreciable amount of rainfall, which is in the range of 1200mm to 1400mm per year. Most of the precipitation goes on surface run off and finally discharges into the Sakri River which controls the overall drainage system /pattern of the area. Since the area is virgin and there is no any excavation, no accumulation of water occurred in the area.

Ground Water: During the rainy season, some of the rainwater goes below the sub-surface in the applied area. The rainwater, which goes into the sub surface in the hill range, finds its way through cracks, joints and fissures and finally reaches to valley or plain land. During the field study of the area, the surrounding wells and tube wells of the area are also studied and it was observed that the ground water body is found at about 20m below the surface.
Flora & Fauna: There is no flora and fauna of national importance. This applied area is free from vegetation and also out of forest area. The area is devoid of any agriculture land, but outside the area, some agriculture land is there & onetime crop is being cultivated. Because of lack of forest cover around and close to the applied area, there is no wild animal of any significance has been reported. Only domestic animals like cow, goat, buffalo, cat, dog etc are observed / found near the area.

Quality of Air, ambient noise level and water: Mining operation in the area has not yet started. As such, the Ambient Air Quality (AAQ) of the area is not affected. Noise due to drilling blasting and movements of dumpers is negligible. It is proposed that the mining operation in the area shall be carried out by opencast (OTFM) method by using excavator in combination of number of Dumpers, Jack-hammer etc. The source of noise in the area will be due to drilling, compressor operation and Dumper movement. During the plan period, there will be generation of noise due to use of HEMM. There is no water regime passing through the applied area. Since mining will be restricted in the hilly region and slopes away from the nala, there is very little chance of polluting water. Water quality of surface as well as ground water shall not be affected due to mining activities.

Climatic Condition:The climate of the area is sub tropical. May is the hottest month whereas December and January are comparatively colder months. The area faces extreme temperatures variations between the maximum of 45^0C during the summer and the minimum of 5^0C during winter. Annual rainfall averages 600mm & most of it is precipitating between mid June to early October. The rest of the period is practically dry. Humidity is generally about 16%-24% with a maximum of 60% during monsoon, the general wind direction is easterly averaging 20 km/hr with no intense industrial activity, the air is quite clean & the environment in healthy.

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Impact on Air Quality: The Ambient Air Quality (AAQ) of the area is not affected as no mining activity has been started as yet. It is proposed that during this plan period, mining operation in the area shall be carried out by opencast (OTFM) method by using excavator in combination of number of dumpers, Jack-hammer, etc. This may cause impact on air quality. The dust will be generated due to movements of heavy vehicles, dumpers etc. So, after the commencement of mining operation, Ambient Air Quality of the area shall be monitored to know the quality of air.

Impact on Dust Fall: There is no dust fall in the area, as the mining operation in the applied area has not started as yet. However, when mining start, there will be some dust fall due to use of dumper, HEMM etc.

Impact on Noise Characteristics: The main source of noise in the project area is due to use of Dumper, HEMM etc. As the mining operation in the applied area has not started as yet, impact on noise due to this mine is negligible. However, when the mining operation will start, there will be some noise pollution due to movement of Dumper, HEMM etc.

Socio-economics: The Stone mining is situated in Koderma district and is located where general living condition of the people is below poverty line. Agriculture has not been developed in the region to the extent it should have been. People, therefore, depend mostly on this type of mines or other local work for their livelihood. This has got a positive impact on the living condition of the local inhabitants. At least, these people have been assured of their daily bread.

Besides the direct employment in the mines, indirect engagement may be two to three times. Mining activity in the area has brought some positive effect like better employment potentiality, better health care, better living, better sanitation conditions, better education facilities etc.

Measures for minimizing adverse effects on water regime:
As stated earlier, surface water and ground water sources are not affected.Since mining will be restricted in the hilly region and slopes away from the nala, there is very little chance of polluting water. Water quality of surface as well as ground water is not affected due to mining activities. There will be no quarry discharge water from the mine. But during rainy season there may be a chance of surface water pollution due to contamination of suspended and dissolved solids those are mostly expected from the outer slopes during monsoon. For this, following measures are being proposed to control water pollution during rainy season, if any:-

- A drain around proposed quarry, to arrest flow of loose sediments before discharge into the drainage system of region through settling tanks.
- Construction of drain to guide the rain water from higher to lower contour. Drain to be cleaned up periodically.
- Strengthening of small / rock barriers across the drains at intervals to check the water current and to arrest the solid particles.

Protective measures for ground vibrations/air blast caused by blasting:
The following measures are proposed to be adopted for the abatement of excessive noise/vibration caused by blasting.

- Suitable choice of machinery and equipment, which generate low level of vibrations.
- Proper padding and mounting of equipment and ventilation system to absorb and reduce the noise / vibration levels.
- Adopting improved blasting technology to minimize noise level & vibration.

Socio economic benefits arising out of mining:
Considering the proposed scale of operation and assessing the base line data on physical environment, the possible environmental impact due to proposed mining activities, will not be adverse rather mining activity in the area has brought some positive effect like better employment potentiality, better health care, better living, better sanitation conditions etc.

ISSN 2277 – 5528
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How we will save our earth system in Environment Impact.

VII.SAVE OUR EARTH OR PLANET

Now a days, world is facing the global challenges, we must be ready to face every challenges. According to the opinion of some experts, one of the problems faced by all the states in the world, instead of our country India is global warming. And now, global warming becomes the world problem. Global warming always connected by greenhouse effect that is a process increase the mean body temperature of the earth's surface.

The changing global climate and natural disaster that happened lately wake up our awareness about natural warning. We can see how those things cause sufferings upon mankind. Many people have to sustain a loss, homeless, died and become refugee because of flood. This condition is worsened by disposal of waste and pollution which had caused environment problems. The usage of pesticide and fertilizer in large amount by farmers has also brought about unknown diseases. That problem becomes a very big Challenge, well known with global warming. Is it a price that we should pay for our carelessness?

Because of that, all the states in the world together search solution by this problem, Technologies exist today that can cut emissions of heat-trapping gases and make a real difference in the health of our planet, but the great solutions is if we want get started today to save our earth from global warming. As the society we must have sense of caring, sense of belonging, and sense of responsibility for keeping the ocean pure, clean, and saved.

It is obvious that our earth and the next generation live depend on us. We can learn from what happened in the world. Natural disaster example flood, drought, and landslide happened because of global warming. This miserable occurrence should open up our eyes and mind.

Save whole earth (do not destruct our earth)

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The question now is that what should we do, as young generation to reduce this condition and save our earth from global warming?
As the teenagers we can:

- Take care of our earth by illegal logging.
- Second throw the rubbish into the dustbin.
- Finally make our home, school and classroom always keep clean.

Don't destruct our earth!
Procrastination is not an option. Scientists agree that if we wait 10, 20, or 50 years, the problem will be much more difficult to address and the consequences for us will be that much more serious. Now is the time to change the world!
Have we been ready for that? The answer is on you and me as responsible people. May this practice can be useful.

VIII. CONCLUSION

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the Stone Mine.The mining and minerals industry provides an important support to the economy and is of strategic importance to every country. Industrial potential of any area depends mainly on certain factors such as availability of natural resources, density of population, their literacy rate, income, standard of living etc. which generate sufficient demand for products. Availability of infrastructural facilities, incentives and concessions offered by the Government, Institutional support, etc. are some of the other factors governing the industrial potential of the region.

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