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Scientific Disposal system of Marble Slurry for Clean and Green Environment

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Abstracts

There are about 4000 Marble mines and 1100 Gang saws (cutting units) in Rajasthan. Around 90% marble production out of the world's marble production quarried from India and approximately 85% marble production of the India's total marble production is quarried from Rajasthan. There is a considerable waste generated during mining and processing besides main product of marble. Ingredients of 70% Marble waste generated during quarrying or mining and tiling of marble blocks are irregular boulders, under sized stone pieces along with Marble slurry.

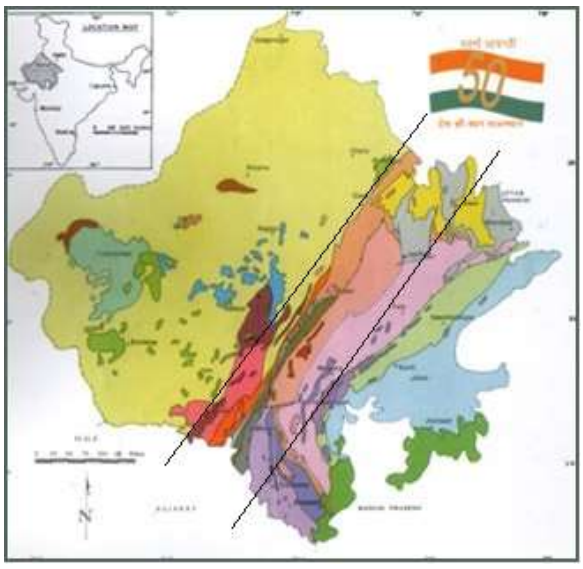
This is most important to efficiently handling of marble wastes i.e. scientific dumping. As we know that Marble slurry is mixed in water. A huge quantity of water is applied in cutting of stone pieces. So proper dewatering in filter press and disposal is essential. 5000,000 tons slurry is generated annually which contains 4000,000 tons of water. Hence an effort should be made to get the maximum possible water out of it for recycling and slurry be converted in the form of cakes. These Marble slurry Cakes can far more easily be disposed filling the wasteland readily available in future as construction site. This will help in reduction of water demand by reutilization of water, proper disposal of slurry and lowering the damage to eco-system.

Keywords: Marble slurry, Eco-system, filter press, water demand, Slurry cakes, Disposal and scientific dumping..

Introduction

Marble is Natural gift to Rajasthan State in India. It is quarried in many places of many countries in the world. Quarrying of Marble stone is not much ancient in world as in Rajasthan. Rajasthan Produces approx 85% Marble of India's productions. India produces approximate 90% Marble of the world's production of marble. Almost all mining and processing activities are concentrated around Nagaur and Kishan-garh, where the proposed study is planned to undertake. There are more than 4000 marble mines and More than 1100 marble gang saws (Cutting and Tiling units). Ajmer, Nagaur, Alwar, Rajsamand, Udaipur, Chittorgarh, Sirohi, Refer (no.2 Siddharth Pareek Consultant – Gainful Utilisation of Marble Waste or Scientific disposal of the slurry.)

Rajasthan mineral map



Banswara, Jaipur etc are well known for Production of marble. It proceeded to development of many cutting and Tiling units in respective areas. These two activities i.e. quarrying and Tiling in Rajasthan have been developed in 20-25 years and have charged the economy of Rajasthan. Availing to majority of people direct and

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indirect employment. Therefore also raising their living standard.

The industry involves mining, cutting and Tiling units for the production of Slabs, tiles and strips for floors and articles. The waste is produced at each and every step. The marble industry is totally different from other industries.

Because of the real fact that the marble is a "Dimensional Stone", it means that the Marble stone is sold by the size not by the weight.

Or in other words it is sold by the per sqm rates not by per ton rate. So the selling price increases with the size of the slabs. All the operations included mining and processing are targeted to get slabs as bigger size as possible.

Marble slurry a bye product:-

Marble Slurry is fine particles generated in process of cutting, grinding and polishing process dissolved in water. This suspension of marble fines in water, generated during processing and polishing because water is used as a cooling agent to the cutting blades.

Marble waste an Environmental Hazard:-

This is becoming a major threat to the Environment in the state of Rajasthan. In the mining and processing activities near about one thousand Gang saws and thousands of cutters are creating 1.5-2.0 million tons of marble waste i.e. marble slurry. This Marble waste is indestructible waste and harmful to common man, Animals and also to the Vegetation creating aesthetic problems. Some bad effects of the marble slurry on Environment may be listed as under: -

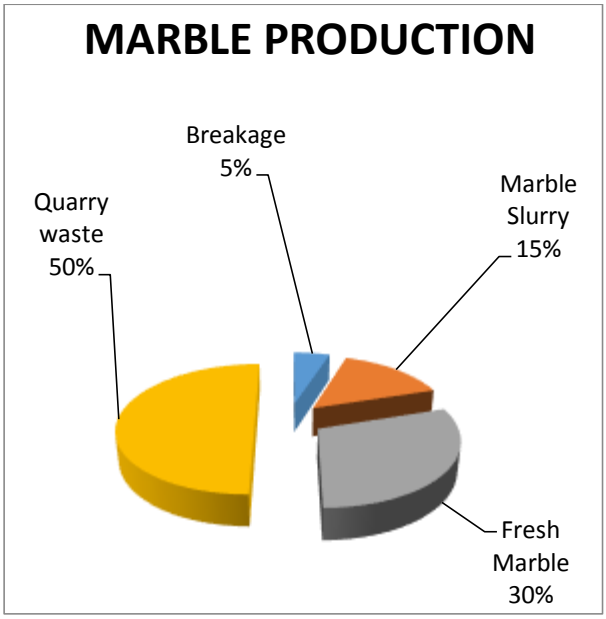
1. The waste cannot be destroyed.
2. The sites which are dumping grounds are limited and distort the overall scene of the Area.
3. The top fertile soil becomes UN fertile due to Marble Dust.
4. The marble slurry flows with rain water into the rivers and other water bodies polluting them.
5. Polluted water affecting irrigation and drinking water resources.
6. Pollution of air.

These all the factors may give a thunder shock to the growth of the marble industry. It is therefore a scientific and engineering responsibility of government and industry to solve the problem.

As per Rajasthan High Court Petition No.2150/2004, it is violation of the provision of water prevention and control of pollution act 1974.

Refer No.1 (**Rajasthan High Court Petition No.2150/2004**)

Total marble production in rajasthan



However, the development of country is only possible by sustainable balanced industrialization.

(a) Natural Resources Conservation.

This marble waste can change the entire scenario of the industry. If the marble slurry is utilized the valuable Natural resource i.e. Sand can be saved.

(b) Air pollution.

This is the Sevier hazard of the marble industry. It is clear that slurry is produced at each and every activity as Mining and Processing. When the slurry gets dry, it creates air pollution and related problems.

(c) Water pollution.

1. Like any other industry, the marble industry needs water in its different operations for cutting, cooling and flushing. In these operations water gets contaminated by marble slurry.
2. In rainy season marble slurry flows with water and reaches in rivers and water bodies polluting other sources of fresh water.

(d) Sight scenario.

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Dumping sites, unoperated mines, and deposition of dried slurry over almost every structure in surrounding areas gives a very bad and dirty look creating Sevier loss of vegetation.

(e) Unscientific dumping Causing Accident Hazards.

1. Due to dumping of marble waste slurry on road side causing dusty air blows polluting air and reducing the visibility on road. Due to less visibility on the road number of accidents takes place.
2. In rains due to marble slurry flowing on roads becomes slippery and many accidents take place.

(f) Loss to flora & fauna

Already grown trees and bushes are dried out. Due to deposition of marble slurry on leafs of plants and vegetation. Animals also suffer for green fodder and shelter.

Aims and objectives

Scientific disposal of marble slurry on a properly selected dumping sight may be better solution of the problem. For this purpose the most useful steps can be Safe and scientific Disposal at dumping sites.

Solid waste disposal system:-

(1) Out right dumping:-

(2) Processed solid waste disposal system:-

(1) Out right dumping:-

As it is dumping of marble slurry after drying at the production site like municipal or domestic waste. This is UN scientific unsystematic so **t**his causes different type of Pollution as Air, Water and Soil Contamination and hazards of flora fauna and health. It gives a very bad and dirty repulsive look also. So the outright dumping should be avoided.

(2) Processed solid waste disposal system:-

Proper compression and disposal is essential. 5000,000 tons slurry is generated annually which contains 4000,000 tons of water. Hence an effort should be made to get the maximum possible water out of it for recycling and slurry be converted in the form of cakes. This can far more easily be disposed. This will help in minimization of water consumption and proper disposal of slurry and lowering the damage to eco-system.

(i) Natural process: - Naturally separating water from marble slurry by settlement process and drying in different settling and drying tanks.

Multilevel field Ponding

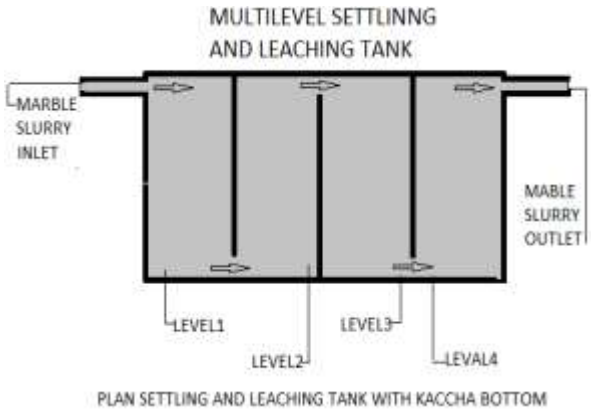

Figure-1

Field Settling tank for marble slurry

Flowing slurry with water settles down in these kwacha floor leaching tanks and water flows to next lower level as shown in figure above. When all four segments are full by marble slurry then inlet in this tank is stopped and inlet of other tank is opened. Slurry will harden in a day then the cakes of marble slurry can be taken out by the help of digging tool. Cakes are dried then and dry cakes may be disposed off easily

(ii) Mechanical process: - In this process by a mechanical filter press water is

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separated and cakes of slurry are formed and dried in air.

(iii)

Procedure: - My suggestion in this regard to use a rectangular permanent structure as shown in figure no. 1 for more than one gang saw and conical settling tank a metallic manufactured tank for a single gang saw which primarily separate water from marble slurry and secondly remaining water may be separated by the filter press.

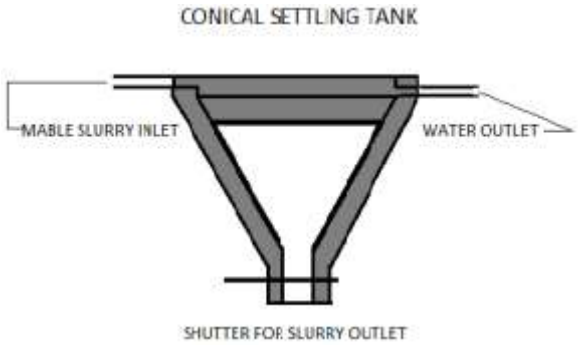

Figure-2

When one cone is filled out then inlet is closed and slurry inlet into another cone is opened. From the first cone slurry is taken out by opening bottom shutter for compression in the Hydraulic press preparing Marble slurry cakes.

Press for compressing marble slurry

Thus the dried slurry is disposed in scientific manner after making cakes keeping in mind that the site may be supposed for construction in future.

Unscientific Dumping of Marble Slurry.

Conclusion

As the water is separated out of marble slurry it's a great saving of natural resource and after preparing cakes the marble slurry can be disposed far more easily. Even the dumping site may be supposed for construction in future.

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