International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 04 Issue: 02 | Feb -2017 www.irjet.net p-ISSN: 2395-0072

EFFECT OF MARBLE SLURRY ON ENVIRONMENT AND HIGHWAY USERS

Er. Dharma Prakash Sharma [1], Dr.D.K.Singal [2]

[1] *Research Scholar Bhagwat University Ajmer*
[2] *Executive Engineer RSAMB*

Abstract - *Marble industry is one of the most environmentally unfriendly industries, cutting the stones produces heat, slurry, rock fragments and dust. Although marble waste, in generally, includes non- radioactive by-products and thus it does not induce climate changes .It destroys plant life. The dust particles usually contains $CaCo_3$ resulting in visual pollution Therefore very harmful to the road users. In this way it is very necessary to understand the behavior of marble slurry and dust and to use in this way that it becomes a useful thing for environment and highway users.*

***Key Words*: Marble dust, non- radioactive, $CaCo_3$ (calcium carbonate), visual pollution.**

1.INTRODUCTION

Due to continuous increasing demands of housing for increasing population, there is need for constructional material increases. Similarly for housing we need connectivity through public roads and transport. In our country India, in every city there is very fast development of roads and highways and new colonies in the outer areas of all the cities .There is also liking of the new materials. Now a day's granite and marble is very popular for the flooring and in other building constructions. Materials obtained by conventional method is not sufficient to cope up with the demands of the society. In addition with the cuttings marble slurry and wastes is also developing and creating problems to the public and nuisance for the road user's .Now although improved version of machineries is being used but lot of waste material is being collected either in the fields or on road sides. Creating lot of problems to the highway users or spoiling the agricultural lands. Every year a large quantities of recycling materials is disposed of in landfills or arbitrarily discharged to the environment.

1.1 Marble slurry and their impacts on environment

Solid wastes has been increased due to rise in living standards, technical innovations, industrial and mining wastes. Globally the estimated quantity of wastes generation was 12 billion tons in the year 2002 which 11 billion tons were industrial wastes and 1.6 which 11 billion tons were industrial wastes and 1.6 billion tons were municipal solid wastes (MSW). About 19 billion tons of solid wastes are expected to be generated annually by the year 2025 [4]. Annually, Asia alone generates _4.4 billion tons of solid wastes and MSW comprise 790 million tones (MT) of which about 48(_6%) MT are generated in India [4, 5]. By the year 2047, MSW generation in India, is expected to reach 300 MT and land requirement for disposal of this waste would be 169.6km^2 as against which only 20.2km^2 were occupied in 1997 for management of 48MT [5]. Fig. 1 shows the details on current status of solid waste (non-hazardous and hazardous waste) generation from different sources in India [2, 6]. As can be seen from Fig. 1 that apart from municipal wastes, the organic wastes from agricultural alone contribute more than 350 MT per year However, it is reported that about 600 MT of wastes have been generated in India from agricultural sources alone [7].

The major quantity of wastes generated from agricultural sources are sugarcane baggage, paddy and wheat straw and husk, wastes of vegetables, food products, tea, oil production jute fiber, groundnut shell, wooden mill waste, coconut husk, cotton stalk etc., [2,6,8]. The major industrial non-hazardous inorganic solid wastes are coal combustion residues, bauxite red mud, tailings from aluminum, iron, copper and zinc primary extraction processes. Generation of all these inorganic industrial wastes in India is estimated to be _290 MT per annum [6, 9]. In India, _4.5 MT of hazardous wastes are being generated annually during different industrial process like electroplating, various metal extraction processes, galvanizing, refinery, petrochemical industries, pharmaceutical and pesticide industries [7,10]. However, it is envisaged that the total solid wastes from municipal, agricultural, nonhazardous and hazardous wastes generated from different industrial processes in India seem to be even higher than the reported data. Already accumulated solid wastes and their increasing annual production are a major source of pollution. Due to environmental degradation, energy

consumption and financial constraints, various organizations in India and abroad, apart from the regulatory frame work of United States Environmental Protection Agency (USEPA), have recommended various qualitative guidelines for generation, treatment, transport, handling, disposal and recycling of non-hazardous and hazardous wastes [10–14]. Safe management of hazardous wastes is of paramount importance. It is now a global concern, to find a socio, techno-economic, environmental friendly solution to sustain a cleaner and greener environment.

1.2 Percentage of waste Generated

The slurry generated during processing can be estimate at about 10% of the total stone quarried (20% to 25% of the block as received from the quarries) and during polishing as 5% to 7%.

Table -1: Sample Table format

Stage of marble industry	Type of Marble Waste	Nature of Marble Waste	With Mechanised Mines & Processing units using Gangsaw Cutting Machines	With Mechanised mines using blasting	With Semi – Mechanised mines using blasting
Processing (Sawing of Blocks into Slabs and Truing their Edges by Cutting)	Processing Waste	Marble Sludge & slurry comprising of small fragment & powder mixed with water.	10%	15%	18%
Grinding & Polishing	Polishing Waste	Marble Slurry Comprising of fines of marble mixed with grinding & polishing material in water.	5%	5%	5%

Valuable treasure in the form of environment and keeping it safe is the responsibility of the present civilization. Five element, air water, fire earth sky are built in the environmentThese are considered pious. They balance with the human and other living things giving the basis of existence.

It is therefore; necessary to feel and function with respect to the protection of the environment which is being attacked from all fronts including those due to damaging dumping of marble slurry .Fire said elements are the vehicle of life line and all circumstances they have to be saved from existing and ongoing destructive forces. Pollution has to be combated in order to keep the elements and environment safe .Awareness of the present and future generation is necessary to know and practice the due services for the dace of environment. Only then it would be safe for today and tomorrow.

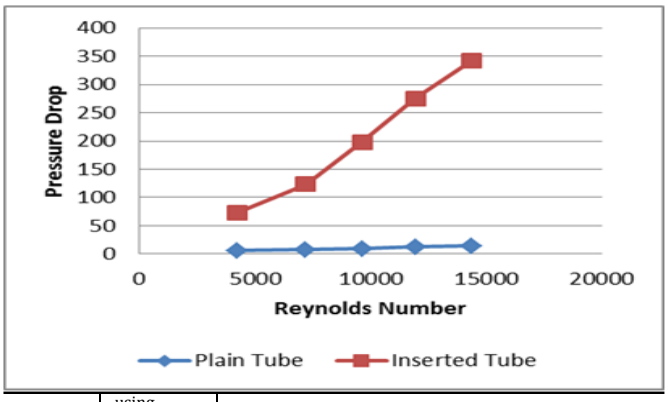

Chart -1: Name of the chart

2. Impact of environment

1. The waste in the water does not completely sink into the ground and much of it remains on the surface. As the water evaporates the liquid wastes solidify. Subsequently wet marble wastes subjected to rain will carry seepage down into the ground.
2. Generally waste are dumped on the roads outside city and the dust is airborne by the wind and scrap.
3. The fine particles can cause more pollution than other form of marble waste unless stored properly in sedimentation tanks and further utilized.
4. The white dust particles usually contains $CaCo_3$ and can cause visual pollution.
5. The marble slurry in the long run could lead into water clogging of the soil, to increase soil alkalinity and to disruption of photosynthesis and transportation. The net effect is a soil fertility and plant productivity.
6. Many animal species are exclusively herbivores. Again if plants did not out, their internal chemistry will have been altered and their nutritional value poisoned by gases emitted by the industries.

7. It should also be emphasized that animal health like human health, can be adversely affected by inferior environment quality.

3. MATERIALS AND METHODS

The soil samples and marble dust were collected from nearby area Jaipur district

Before starting mixing all different materials were sieved through 2.36 mm sieve. The marble dust and soil samples were prepared for various tests for characterizations soil-dust mixes using various proportions. The dry samples were prepared as per IS: 2720 part 1. We have made the sample on the basis of experiment such as

1 soil 60%+ MD 40%
2 Soil 50%+ MD 50%
3 Soil 40%+ MD 60%
4 Soil 30%+ MD 70%
5 Soil 100%

Test program:-

Hydrometer test, Procter compaction test ,Altenburg limit and specific gravity test, California bearing ratio (CBR) , liquid limit and plastic limit test were performed according to IS : 2720. Clay and silt percentage were found from grain size distribution from hydrometer test. Mostly material were passing through 0.01 to 0.04 mm grain size sieve. Average OMC was found 13.91 and MDD was 1.855.Aversge CBR found 4.15. Average sp. gr. came 2.595.Avrage PL 18.56, LL 29.81 and PI 11.25.

4. CONCLUSIONS

It is concluded that by addition of 25% 30% marble dust can reduce swelling percentage of the clay contents of the soil. The addition of marble dust reduces the clay contents and increase in the percentage of coarser particles, reduces the LL, raices the SL and decrease of PI of soil and thus swelling potential. Activity of the soil reduces by the addition of marble dust. It is also revealed that industrial waste like marble dust has a potential to modify the characteristics of expansive clay.

REFERENCES

1. Ashokan Pappu Research paper on “Solid waste generation in India and their recycling potential in building materials”.
2. IS:2720-1985 (PART 4)”Method of test of soil :grain size analysis”,(BIS.New Delhi)1985
3. Shekhar AV. Tanaka M. Recycling of solid waste in some asian countries. In: Gaballah. Mishar B, Solozabal R, Tanaka M. editors. Recycling waste treatement and clean technology. Spain; TMS mineral. Metals and Materials publishers; 2004. P. 1553-63 (1).
4. Central pollution control board (CPCB). Report in management 0f municipal solid wastes, Delhi. India. 2000.
5. Viswakarma Amit and Rajput Rakesh Singh Utilization of Marble slurry to enhance Soil property and protect environment. In J. Environ. Res, Develop Vol. 7 No. 4A, April-June 2013.