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OPTIMUM UTILIZATION OF WASTE PRODUCED IN GARANTIE MINES

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Abstract – The investigations presented in this project, primarily, pertain to utilization of solid waste produced in granite mines. The present work was done in BVL ROCKS & MINERALS, MALLAYAPALEM (POST) 523274, Praksam (Dt), AP, India.

Marble and granite industry has grown significantly in the last decades with the privatization trend in the early 1990s, and the flourishing construction industry. Stone waste is generally a highly polluting waste due to both its highly alkaline nature, and its manufacturing and processing techniques, which impose a health threat to the surroundings. The general methods of operation implemented in Granites industry are Crushing, Polishing, Re-cycling of Solid Waste. In this project only utilization of solid waste produced in granite mines were studied. It was observed that the waste obtained is used in construction works, road laying works, asphalt-based road surface paving. The dust waste obtained during processing is used as bi-product in manufacturing cement bricks. The important issues on disposal of solid wastes from mines are to choose the right varieties for the comprehensive utilization of mining waste and to control contamination from waste rocks and tailings. Environment- friendly disposal of solid wastes from mines is the key pathway and some comprehensive utilization methods and proposes new ideas on the disposal and comprehensive utilization of solid waste from mines, Solid waste management is aimed to extract the maximum practical benefits from waste products and to generate the minimum amount of waste to comply with Environmental legislation and regulations and the economics of disposal in the present scenario. The objective of this paper is to utilize marble and granite waste of different sizes in the manufacturing and to achieve this goal and for maintaining a sustainable development in solid waste management.

Key Words:: POLISHING, RECYCLING, CRUSHING, PROCESSING TECHNIQUES, POLLUTION

1. INTRODUCTION

Any materials which are thrown away because of no value are called solid waste. Most of the solid waste is disposed in India by land filling and this is most common and important mode of disposal. Solid waste is defined as the material arising from human and animal activities and is being discarded as useless stuff. The processing involves mainly reuse, recycling or disposal. There are many kinds of solid waste like municipal, industrial, agricultural, industrial hazardous and biochemical waste. The specific challenges for waste management for municipal and industrial wastes are both similar, and yet uniquely different. Compositions of wastes within each category vary enormously, but as a general rule, industrial waste streams contain a wider variety and more concentrated forms of hazardous minerals and therefore require special technologies and handling procedures. Disposal and treatment technologies require major long term investments in capital equipment and have ongoing costs. But in addition, the waste and pollution that are treated and disposed off still persist, posing continuous and future threats to the public and environment.

Solid wastes are today one of the worst problems in the world, mainly because of the increase in volume and the high capacity of environmental contamination. The aim of this work is to use the over burden waste and processing waste in preparation of granite chips which are obtained by crushing the obtained waste rock by using crushers. Those obtained chips are used in construction works, road works and molding works.

Waste is obtained in two ways

a) Over burden waste

b) Processing waste

1.1 SCENARIO OF MINING INDUSTRY:

Mining is a major industrial activity that is conducted in locations throughout the world. It involves a full "life cycle" of industrial activities, all conducted in accordance with a range of engineering, legal, regulatory, economic, social, scientific and environmental protocols and practices. Mining activities date back to 2600 B C with the Egyptian expedition in the Sinai Peninsula. Mining operations occur in every continent except Antarctica. They occur within virtually all of the world's major biomes, across a broad range of environmental conditions, from the Arctic, to the deserts and rain forests of the tropical belt.

Mines are also widely distributed across a wide range of geologic conditions and surface relief. They are often located in mountainous and difficult terrains, where they may be subject to a variety of geologic hazards such as earthquakes, avalanches and landslides.

They occur within permafrost areas where frozen ground conditions create particular difficulties for mining infrastructures. Mining operations are frequently located in very remote areas. Since a mine location is largely constrained by the location of the deposit being mined, there is little flexibility for avoidance of hazards and remoteness, which must be dealt with in the overall design of the mine and its associated structures, including transportation and communications connections.

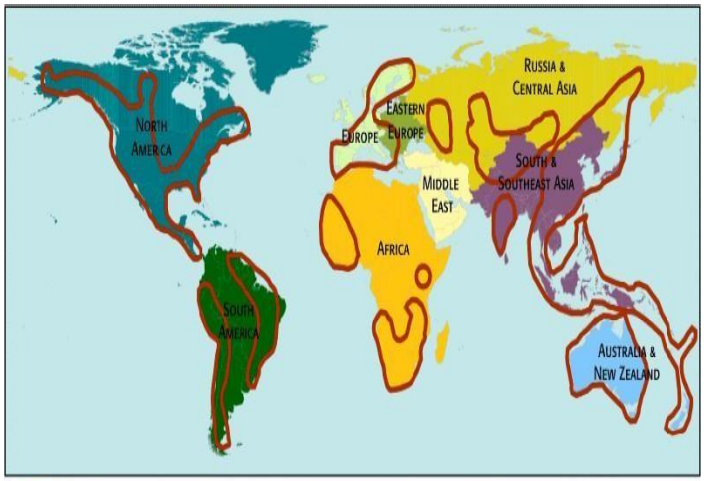
1.2 OBJECTIVES OF THE PROJECT

1. To study the utilization of solid waste produced in granite mines.
2. The objective of Optimum utilization is to use the solid waste disposed off on land by recovery of materials and energy from the disposed waste.
3. Reusing the waste from granite industries for preparation of different useful materials.
4. Using the waste like powder dust in production of cement bricks, cement preparation of cement and more this in turn results in lesser requirement of raw material and energy as inputs for technological processes.

Environmentally sustainable, which means it must reduce, as much as possible, the environmental impacts of waste management and to reuse it effectively

2. METHODOLOGY

The basic principle was to identify the waste and define it in qualitative and quantitative terms. An inventory of mining sites per country was essential to assess the quantities of mining waste generated since the start of the mining activities. These inventories supplied information on the substances mined, the typology of the ore deposits, the operating systems and processes. They also included information and data on the quantities of ores extracted and processed, the quantities of marketable products generated, and the quantities of residual waste.



ASOLID WASTE DUMPING

2.1. Dust Waste

Emissions of dust can produce a significant environmental impact of the mining industry during all operations related to surface mining, mineral processing, and waste dumping. The contemporary approach to dust emission management in mines includes an understanding of source types, utilization of efficient and contemporary mitigation measures, and application of experiences and best practice in dust management for the reduction of emission. Dust waste is obtained in cutting, drilling and polishing operations of granite. During cutting, drilling and polishing the granite a white dust is obtained which is collected and stored in dumping area. The collected white dust is used as bi-product in manufacturing of cement bricks.

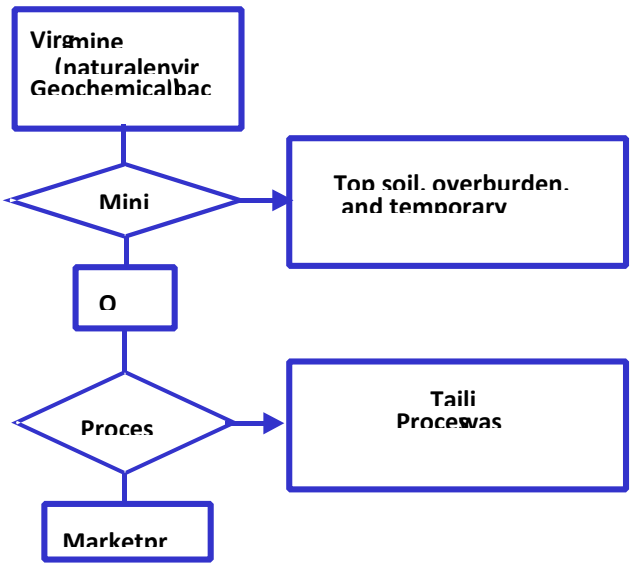
DUST WASTE DUMPING

2.2. Domestic Waste:

The domestic waste water is only of 0.8 m^3/day disposed to septic tank followed by soak pit. So this domestic waste is not considered as recyclable product. The entire waste which is obtained from all the processes is collected and stored in dumping yard. Later the local owners will buy the waste and test the material for which it is suitable. If the rock have high strength it is used as fencing pillars in farms and if the rock have low strength it is transported to crushers by using tippers and there the rock is crushed into small fines of required sizes. In same way the powder waste is collected and it is used as bi product in manufacturing of cement bricks. And the dust is used as sanitary landfills. If the waste rock is in good quality, then it is used in shaping of architecture designs

Operation/Activity	Units	Emission Factor	
		TSP	PM_{10}
Drilling	kg/hole	0.59	0.31
Shovels	kg/t	0.025	0.012
Bulldozers	kg/h	17.0	4.1
Graders	kg/VKT	0.19	0.085
Wheel generated dust from unpaved roads	kg/VKT	4.23	1.25
Trucks dumping	kg/t	0.012	0.0043
Primary crushing	kg/t	0.01	0.004
Miscellaneous transfer points (conveying)	kg/t/trans point	0.00032	0.00015

Table 1. Dust Emission Factors for Various Operations at Mines



Flowchart representing the process of how the waste is obtained

At each stage of mining operations, management measures are generally taken for the generated waste. These can differ according to the mining operation, and in particular due to the different parameters such as geographic, geological, hydro geological and climatologically disparities.

In the process of removing the granite blocks a huge waste is produced and later that is recycled and used in many works. After all the drilling operations a fine granite block is obtained at the same ime some amount of rock waste is also obtained.

CRUSHER

DATA COLLECTION:

Weight of the jackhammer is 25kg, It has been used' Tungsten Carbide' bit is used for drilling holes in the rock. It worked with pneumatic air compressor. It worked both Rotary and Compressive drilling. It was manually worked with two persons. No of stokes per minute is 22000. When jackhammer is working air from top of the cylinder exhausts into the atmosphere. The air also keeps drill bit cool. Consumption of air pressure of nearly 6kgf/sq.cm of free air. Length of rods are 2.5,5,8 feet are used. Diameter of rods are 28mm.

3. CONCLUSIONS

- Granite quarry wastes represent, therefore, an important alternative (integrating) source, as a substitute to the exploitation of "virgin" material from the primary quartz and feldspar mines.
- As already mentioned, the exploitation of the quarry waste often ensures a correct environment recovery and the safety of slopes affected by the dumps.
- In order to fully exploit the granite resource from the dumps it is still essential to conduct a complete investigation in order to estimate the volumes, size distribution and chemical

and mineralogical characteristics of the material.

- The research should involve both a field investigation like mineral-chemical characterization of the raw material as such and of the products obtained from the treatment, ore enrichment plant, etc.
- The total waste obtained is utilized in many ways by crushing the waste into small chips.
- The crushed chips are used for construction works, road laying works, asphalt-based road surface paving.
- The dust waste obtained during processing is used as bi-product in manufacturing cement bricks.
- To backfill the mined-out area, subsidence area and other area needed to be filled

REFERENCES

Lokeswari M: Procedia Environmental Sciences 35 (2016) 618 – 623 International Conference on Solid Waste Management, 5IconSWM.

K.S Jagadish: Procedia Environmental Sciences 35 (2016) 618 – 623 International Conference on Solid Waste Management, 5IconSWM.

Ankit Nilesh Chandra Patel: Effective Replacement Of Cement For Establishing Green Concrete, Inter. J. Innovative Tech. and Exploring Engineering, **2**(5), 24-27, **(2013).**

Venkata Sairam Kumar: Experimental study on partial replacement of Cement with quarry dust, Inter. J. Advanced Engineering Res. and Studies, **2**(3), 136-137, **(2013).**

Jayesh kumar: Experimental investigations on partial replacement of cement with fly ash in design mix concrete, Inter. J. of Advanced Engineering Tech., **3**(4), 126-129, **(2012).**

Md Moinul Islam: Strength Behavior of Mortar Using Fly Ash as Partial Replacement of Cement, Concrete Research Letters, **1**(3), 98-106, **(2010).**

Y. Yaswanth Kumar: Journal of Engineering Research and applications. ISSN: 2248- 9622, vol. 5, Issue 4, (part 6)April 2015, pp. 25-31.

A.Anitha: Journal of Engineering Research and applications. ISSN: 2248- 9622, vol. 5, Issue 4, (part 6)April 2015, pp. 25-31.

Rania A. Hamza: International journal of Bio-science, Bio-chemistry and Bioinformatics, Vol 1,