

## **RE-USE OF MARBLE WASTE: AN OPTION FOR SUSTAINABLE UTILIZATION OF THE NATURAL RESOURCE**

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### **Abstract**

In the SUN-R (2014) two of my students presented data comparing modern versus traditional mining techniques and concluding that the present traditional mining is wasting the precious resource to the tune of 73%. This is a conservative estimate and climbs quickly to 85% if the wastage for the entire chain, from mining to finished product, is considered. Several other studies have also pointed out more or less the same amount of losses. Ironically everybody pin points the obvious problem but fails to provide plausible mechanism(s) for mitigation or redress. This paper attempts to highlight some of the available technologies to re-use the marble waste material as an option to alleviate the resource loss problem.

Khyber Pakhtunkhwa and FATA regions are home to some of the finest and purest marble, slate and granite in the world. Although no exact figure for the marble reserves is available various estimates by Directorate General of Mines & Minerals, Khyber Pakhtunkhwa, Pakistan Stone Development Company and multiple student theses estimate that there are about 297 billion ton reserves of marble and granite in Pakistan. Of these reserves, deposits in KP and FATA account for about 85% production. The traditional mining methodology wastes the resource to the tune of 73%, the wire saw technique results in 40% loss of the resource and the chemical-based technique produces 20-25% of marble waste. It is a fact that the wastage of resource is unavoidable no matter what technique is used. This necessitates the need to develop technologies that would make use of the marble waste to achieve the goal of sustainable utilization of the natural resources.

The marble waste includes boulders, pebbles, marble dust, marble powder, marble cuttings etc. Recent technological advancements have shown several ways to re-use the marble waste for many different purposes. The industry that can utilize this waste material include, construction (cement, brick, mortar, plaster), ceramic (tiles, mosaics, pottery), paint (filler, pigment), agriculture (water-treatment, soil-treatment, acid neutralizers, milk-enhancers), medicine (filler, antacids, food supplements), paper, and CO<sub>2</sub> capture.

A conservative estimate suggests that about 70-80% of the marble waste can be re-used if these technologies are adopted. Except for the few industrial uses, technical know-how for most of the above listed industries is common and already practiced in Pakistan. In the context of sustainable use of natural resources, there is a dire need for wider awareness campaigns, provision of dedicated platform of information and technical help and streamlining of the efforts.