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Marble Powder's Effect on Permeability and Mechanical Properties of Concrete

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Abstract : Marble industry contributes its fair share in environmental deterioration, producing voluminous amounts of mud and other excess residues obtained from marble and granite processing, polluting soil, water and air. Reusing these products in other products will not just prevent our environment from polluting but also help with economy. In this research, an attempt has been made to study the expediency of waste Marble Powder (MP) in concrete production. Various laboratory tests were performed to investigate permeability, physical and mechanical properties, such as slump, compressive strength, split tensile test, etc. Concrete test samples were fabricated with varying MP content (replacing 5-30% cement), furnished from two different sources. 5% replacement of marble dust caused 6% and 12% decrease in compressive and tensile strength respectively. These parameters gradually decreased with increasing MP content up to 30%. Most optimum results were obtained with 10% replacement. Improvement in consistency and permeability were noticed. The permeability was improved with increasing MP proportion up to 10% without substantial decrease in compressive strength. Obtained results revealed that MP as an alternative to cement in concrete production is a viable option considering its economic and environment friendly implications.

Keywords : marble powder, strength, permeability, consistency, environment
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