

A Study on Marble Based Geopolymer Mortar / Concrete

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Abstract : The purpose of this study is trying to use marble wastes as the raw material to fabricate geopolymer green mortar / concrete. Experiment results show that using marble to make geopolymer mortar and concrete, the compressive strength after 28 days curing can reach 35 MPa and 25 MPa, respectively. The characteristics of marble-based geopolymer green mortar and concrete will keep testing for a long term in order to understand the effect parameters. The study is based on resource recovery and recycling. Its basic characteristics are low consumption, low carbon dioxide emission and high efficiency that meet the international tendency 'Circular Economy.' By comparing with Portland cement mortar and concrete, production 1 ton of marble-based geopolymer mortar and concrete, they can be saved around 50.3% and 49.6% carbon dioxide emission, respectively. Production 1 m³ of marble-based geopolymer concrete costs about 62 USD that cheaper than that of traditional Portland concrete. It is proved that the marble-based geopolymer concrete has great potential for further engineering development.

Keywords : marble, geopolymer, geopolymer concrete, CO₂ emission

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