

Mechanical properties, impact resistance and bond strength of green concrete incorporating waste glass powder and waste fine plastic aggregate

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Abstract This research aims to reuse glass and plastic wastes by combining them in concrete to protect the environment and obtain green concrete with acceptable properties. A 15% of waste glass powder was used as a partial substitute for cement, and (10 and 20%) of crushed waste plastic was used as a partial substitute for fine aggregates. From the results, it was found that adding glass alone to concrete improved its properties such as compressive strength, splitting tensile strength, flexural strength, elastic modulus, energy capacity, and bond strength by 3.36%, 14.12%, 1.7%, 6.01%, 52.63%, and 57.32%, respectively compared to reference one. On the other hand, replacing sand with plastic for concrete with 15% glass powder led to some properties of concrete affected in a downwards especially for a 20% replacement like compressive strength, splitting tensile strength, flexural strength, elastic modulus, and bond strength by 38.44%, 5.61%, 22.22%, 18.26%, and 15.6%, respectively. Otherwise, the capability of energy absorption under impact load has been proved by 431.57% for 20% plastic aggregate.