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Ultimate Failure Resistance of Concrete with Partial Replacements of Sand by Waste Plastic of Vehicles under Impact Load

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The worldwide demand for new concrete buildings is increasing at a rapid pace to keep up with urban development. On the other hand, plastic waste of vehicle causes serious health and environmental problems all over the world. The reuse of wastes is important from different points of view. It helps to save and sustain resources that are not replenished. As a possible solution to the problem of plastic waste of vehicle, an experimental study was conducted to examine the potential of using it as sand replacement in the concrete buildings. This paper examines ultimate failure resistance of concrete with 5%, 10% and 15 % of sand replacements by waste plastic of vehicles under impact. For each amount, six cubes of 100 mm × 100 mm × 100mm were subjected to 4.5 kg hammer from 480mm height. The number of blows of the hammer required to induce the ultimate failure of the cubes were recorded. The results are presented in terms of impact energy required for the ultimate failure. The concrete mixtures exhibited ability to absorb a large amount of impact energy. The plastic waste of vehicle increased the impact energy for the ultimate failure with sand replacement by plastic waste of vehicle.

Keywords: Plastic waste of vehicle; Cement concrete; Ultimate failure; Impact energy; Sand replacements; The Hammer; Environmental.

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