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Assessment of Concrete Compressive Strength by Adding Fiberglass and Shredded Plastic

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Abstract: *Wall panels are flat and rectangular in shape and are precast construction materials used as exterior and interior walls in fast-paced constructions because of their time and labor efficiency. This research determined the desired concrete mix of cement, sand fiberglass, and shredded plastic for a lightweight wall panel that conforms to the required strength and physical properties. Quantities of sand, fiberglass and shredded plastic were varied in six designed concrete mixtures. Control mixture 1 and mixture 2 were both classed as normal-weight concrete; however, mixtures 3, 4, 5, and 6 were designated as lightweight concrete. Mix Design 3 was chosen as the best mix design, with a density of 15.79 kN/m3 and the best compression, splitting tensile, and flexure results of 15.446 MPa, 2.304 MPa, and 3.424 MPa, respectively. The density of the wall panel using mixture C was determined to be 1610.113 kg/m^{3}and the compressive strength between 15.446 and 13.204 MPa passed the standard requirement and was way better than the conventional wall using hollow concrete blocks.*

Keywords: Fiber Reinforced Concrete, Fiberglass**,** Shredded Plastic, Wall Panel

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[10] Improved Workability: The inclusion of shredded plastic in concrete can enhance its workability and make it easier to handle and place during construction (Nagaratnam & Sanjayan, 2006).
[11] Reduced Cracking: The use of shredded plastic can help reduce the occurrence of shrinkage cracks in concrete, leading to improved durability and longevity (Wee & Basri, 2007).
[12] Increased Flexural Strength: The addition of shredded plastic fibers can enhance the flexural strength of concrete, making it more resistant to bending and cracking under loads (Li, Zhao, & Zhang, 2019).
[13] Enhanced Impact Resistance: Concrete containing shredded plastic exhibits improved impact resistance, making it suitable for applications where impact loads are a concern (Nazari & Riahi, 2014).

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[20] Decreased Water Absorption: Shredded plastic in concrete can lead to reduced water absorption, which helps in improving the concrete's resistance to moisture-related issues (Xu & Xing, 2018).
[21] Environmental Benefits: Utilizing shredded plastic waste as a concrete additive contributes to the recycling and sustainable use of plastic materials, reducing environmental pollution (Siddique, Khatib, & Kaur, 2008).
[22] Cost-Effectiveness: Incorporating shredded plastic waste in concrete can be cost-effective, as it provides an alternative to traditional concrete additives while recycling waste materials (Siddique & Naik, 2004)