

EFFECT OF WASTE (PET) BOTTLE FIBERS ON THE PROPERTIES OF CONCRETE

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Received: 27 Aug 2018

Accepted: 04 Sep 2018

Published: 14 Sep 2018

ABSTRACT

In this study, the effectiveness of waste PolyEthylene Terephthalate (PET) fibers in improving the properties of concrete was investigated. Recycling of waste PET bottles is a daunting task in developing countries due to inadequate recycling facilities. The addition of PET fibers in concrete has the potential of resisting the growth of minor internal cracks in the concrete, by preventing the crack width from widening under an applied load. The fibers were obtained by shredding the waste PET bottles into microfibers of 50 mm length and 5mm width, the fibers were then added to the concrete mix in fiber volume fractions of 0.5%, 1.0%, 1.5%, and 2.0%. The properties of the fresh concrete mix were measured using a slump test to evaluate the concrete workability. The hardened concrete properties were determined using a compressive strength test to determine the concrete strength at 7 and 28 days. The results of slump test showed that the use of PET fibers in concrete mixtures slightly reduce the concrete workability. The addition of PET fibers to concrete increases the compressive strength of concrete at lower fiber volume content and reduces the compressive strength of concrete at higher fiber volume content. The highest compressive strength of concrete was at 1.0% fiber volume addition, with a 15% increase in compressive strength at 28 days than the plain concrete. The study concludes that the addition of waste PET fibers to concrete serves as a means of utilizing the waste generated by PET bottles to increase the strength of concrete.

KEYWORDS: Concrete, PET Fiber, Fiber Reinforced Concrete, Compressive Strength