

MODULUS OF ELASTICITY AND ULTRASONIC PULSE VELOCITY OF CONCRETE CONTAINING POLYETHYLENE TEREPHTHALATE (PET) WASTE HEATED TO HIGH TEMPERATURE

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The inclusion of plastic wastes in concrete to improve the properties of hardened concrete and overcome the brittleness problem has attracted much research interest. The residues of mineral water plastic bottles and beverage containers made from polyethylene terephthalate (PET) are a considerable source of solid wastes. A potential method of managing these PET residues is by using them as concrete components under normal temperatures. However, the use of PET-containing concretes exposed to high temperature needs further investigation. In this study, varying percentages (i.e., 0.25%, 0.75%, 1.25% and 1.75%) of rectangular-shaped PET crumbs were used as partial replacements of coarse aggregates. PET-containing concretes were subjected to different temperatures of 26 °C, 100 °C, 300 °C, 400 °C and 700 °C. The Ultrasonic Pulse Velocity (UPV) and Modulus of Elasticity (MOE) tests were performed on the specimens before and after being subjected to varying temperatures. Results proved that PET at certain percentages can exert either a positive or negative effect on the produced concrete. The effects of PET percentages on the MOE, UPV, dynamic modulus of elasticity (E_d) and weight loss, as well as the effects of high temperature on the PET form inside the concrete, were discussed. The addition of 0.75% of PET was determined as the optimum percentage that enhanced the MOE and UPV of the produced concrete