THE EFFECTS OF ADDING WASTE PLASTIC FIBERS ON SOME MECHANICAL PROPERTIES OF GAP-GRADED CONCRETE CURING BY DRAINAGE WATER AND SEWAGE WATER

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Developing countries like Iraq suffered from high quantities of solid waste such as empty beverage plastic bottles. This type of waste plastic formed one of the serious environmental pollution resources. In this study an attempt to benefit from non-biodegradable solid waste represented by beverage plastic bottles as useful material. This operation boils in enhancing some properties of concrete exposed to sewage water and drainage water by adding waste plastic resulting from cut plastic beverage Polyethylene Terephthalate (PET) bottles by electrical shredder machine (which is used to cutting paper) as fibers used to reinforce gap-graded concrete. Waste Plastic Fibers (WPF) were added with different volume ratios of fibers to concrete curing by drainage water or sewage water, which brings from different region in ANBAR district. These percentages were (0.5%, 1.0% and 1.5%). Reference mixtures were for a comparative reason.The following tests were made at room temperature to investigate the effects of adding WPF on the concrete properties as follows: compressive strength, tensile strength and density. All these tests conducted at ages of 28, 56 and 90 days. The plan of this research consist of two lines, the first includes the effects of adding WPF on concrete exposed to drainage water. The other line was, the study of concrete properties containing WPF in contact with sewage water.

Results proved that, the addition of waste plastic fibers leads to decrease in dry density of all mixtures curing by drainage water or sewage water according to references mixtures at all curing ages. For compressive strength there was an increasing in compressive strength comparing with reference mixtures up to waste plastic fiber percentage by volume of concrete equal to 1% , whereas the splitting tensile strength increased slightly with the increase in fiber volume of all ages for different types of concrete mixtures which cured by either drainage water or sewage water. One of the important results of this study is the possibility of using drainage water or gray water to curing of gap-graded concrete reinforced with WPF.