

Effect of Crumb Tires Rubber on Some Properties of Foamed Concrete

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Abstract

During the last years, several researches have been studying the final disposal of tyres wastes, due to the great volume generated worldwide, as well as the difficulty for discarding the disposal sites which become a serious environmental problem. In spite of this, recycling appears as the best solution for disposing tyres residues, due to its economical and ecological advantages. This research carried out to assess the feasibility of using crumb rubber (the product of shredding used rubber tyres) as a partial sand replacement in foamed concrete, and investigates the effect of it on some properties of foamed concrete such as, density, water absorption, compressive strength, tensile strength, flexural strength and impact resistance. Crumb rubber of tyres ranging from (0.7 to 5mm) in size was used in this research. Three proportioned mixes were designed in this research, have the same cement content, water-cement ratio, and foam content. The first mix represents a typical reference formulation of foamed concrete without crumb rubber (FC). In the others mixes (FCR-1 and FCR-2), respectively, 20 and 30% of volume of sand were replaced by crumb tyres rubber waste. Tests carried out to assess the behaviour of final product. The results obtained were demonstrated decreasing in foamed concrete strength (compressive, tensile, flexural, and impact) with the increasing of crumb tyres rubber content in the mixture and rubberized foamed concrete specimens (FCR-1 and FCR-2) show a cohesive behaviour than the specimens of reference mix (FC), especially in tensile strength. Comparing with the reference mix (FC), at an age of (28 days), the decreasing of compressive strength was (20.85%) for (FCR-1) and it for (FCR-2) was (37.76%).

Keywords

Foamed concrete, Tire rubber, Waste management, Mechanical properties, Impact resistance.

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