

# **Impact Resistance of Lightweight Chopped Worn-Out Tires Concrete**

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## **Abstract**

This study summarizes results of an experimental investigation of the impact resistance of 12 lightweight concrete slabs made from incorporating chopped worn-out tires (Ch.W.T.) into the mixes as a partial replacement of the sand in mortar mixes, and as partial replacement for both sand and gravel for concrete mixes; volumetrically. The main variables were; the partial replacement ratio (PRR) and the shape of the falling mass (striker). Data were obtained pertaining to compressive strength, static and dynamic modulus of elasticity, and modulus of rupture. In addition, the crack pattern under impact loading was studied to provide insight into the internal behavior and failure mechanism of lightweight Ch.W.T. concrete slabs. Results of this work indicate that incorporating Ch.W.T. into mortar and concrete mixes succeeded in reducing its unit weight from 17.9% to 26.2% according to type of mix and partial replacement ratio. In contrast, the ultimate impact resistance, expressed in the number of blows required for complete separation of the specimen, increased from 91% to 186% for mortar mixes depending on the partial replacement ratio and the type of falling mass; and did not decreased significantly for concrete mixes.