

## Flexural Ductility, Stiffness, and Toughness of New Voided Reinforced Concrete One-Way Slab Using Waste Plastic Bottles

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### Abstract:

The enhancement of concrete structures' performance can easily be achieved. However, the main challenge is how to achieve this performance with respect to the economy and sustainability. The aim of this research is to examine the flexural strength, ductility, stiffness, and toughness of RC hollow one-way slabs that are voided by plastic bottles. A new technique of hollowing has been used in this work, where a steel mesh tube was prepared previously and filled manually with blank waste plastic bottles to form a light tube. This technique has some advantages including ease of installation and adequate bonding for the main steel reinforcements. Five RC one-way slabs were cast and tested in the lab to investigate some variables: the presence of hollow, the ratio of reinforcement, and slab thickness. Briefly, a new technique for voids enhances the flexural behavior with less concrete and weight. The ductility is increased by about 100% for the voided specimens for the same section's thickness. Also, the rotation in supports had been reduced by about 30% when the thickness of voided slab was increased by about 15%