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ABSTRACT

Most of the current concrete research focuses on high-performance concrete, by which is meant a cost effective material that satisfies demanding performance requirements, including durability. Lightweight concrete (LWC) is very important to the construction industry due to its cost effective and highly advantageous. Structural lightweight concrete mixtures can be designed to achieve similar strengths as normal weight concrete; the same is true for other mechanical and durability performance requirements. This paper presented a Theoretical Study for Punching Behavior of Light Weight Concrete Slabs. Twelve normal weight concrete finite element models developed by "Ansys 14" divided into two stages, First stage is a models developed to simulate control specimens for verifying the used material parameters and Second stage is a models developed by using (NWC) parameters that verified from first stage to correspond the (LWC) physical model with the same properties. These models were tested to failure under concentrated punching loads through the program. The results of first stage show a good agreement between the experimental and the program results. Thus, The proposal models in first stage have sufficient accurate to use in second stage. The concrete unit weight, slab's thickness, shear reinforcement, and loaded plate area were the test parameters. A comprehensive presentation of the programmatic procedure, testes and results is undertaken in the paper. The punching shear loads were obtained from the test results for all finite element models (FEM) and then calculate the punching strength reduction factor (λ) for each case study. The main objective of this research is to find a relation between reduction strength factor (λ) and the unit weight of concrete which was developed using mathematical regression techniques and compared with the available equations in other codes.

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