

Evaluation of shear behavior of ferrocement using direct shear specimen and beam specimen

El-Sayed Abdel-Aleem Mousselhy

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Abstract

The research studied the direct and flexural shear behavior of FC. The experimental program consisted of casting and testing 54 direct shear specimens and 36 beam specimens for the investigation of direct and flexural shear behaviors, respectively. The direct shear behavior was studied with the following parameters: water cement ratio; number of reinforcing wire mesh layers; and type of mesh. The parameters for beam specimens were as follows: number of wire mesh layers in web; existence vs. absence of Wire mesh in flange; and shear span to depth ratio (a/d).

The direct shear specimens were tested under axial loading to produce pure shear at the shear plane, while the beam specimens were tested using a two-point of loading system. The study included: cracking and ultimate loads, yielding and ultimate displacements and deflections, stiffness during elastic and ultimate stages, and toughness.

In this study, some specimens failed in shear and others failed in a combination of shear-flexure failure depending on the studied parameters (a/d ratio, number of wire mesh layers, ...etc.). The load-deflection curves for FC specimens failing in flexure exhibit three stages of behavior i.e. uncracked, cracked and ultimate stage. While for specimens that failed in shear or in shear-flexure, the third stage was partially or fully absent which had led to sudden failure in most of these cases.