

Behaviour of Ferrocement Slabs Containing SBR Under Impact Loads

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Abstract

The main aim of this work is to investigate the behavior of Ferrocement slabs under impact loading. A total of 48 Ferrocement slabs were constructed and tested, 36 slabs tested under low velocity impact and 12 slabs tested under high velocity impact, in addition, the main parameter considered in the present investigation was number of wire mesh layers, content of (SBR) polymer and height of falling mass (falling velocity). For low velocity impact, This test was performed in terms of the number of blows required to cause first crack and ultimate failure. The test was applied on square slabs of dimensions (500 × 500 × 50 mm) subjected to repeated impact blows by falling mass (1300 gm) dropped from three heights (2.4 m) , (1.2 m) and (0.83 m) at 56 day age. The number of required blows for the first crack and final failure was recorded. The mode of failure and the crack pattern were also observed. For high velocity impact test, a (500×500×50 mm) slabs were tested by 7.62 mm bullets fired from a distance of (15m) with a striking velocity of (720m/sec.). The spalling, scabbing and perforation were observed and discussed. The results exhibited that the number of blows which were required to make the first crack and failure, increased with increase of polymer content and number of wire mesh layers. Also for high velocity impact test, it can be noted that the area of scabbing and area of spalling decreased with the increase of polymer content and number of wire mesh layers compared with reference mixes. The compressive strength, splitting tensile strength and flexural strength increased with increase the polymer content. Based on extensive works , found that low velocity impact resistance of polymer modified Ferrocement slabs was greater than the reference mix slabs, it was found that the number of blows that needed to produce the first crack and ultimate failure increased with increase the polymer ratio of 3% to 5% and to 10%, and with increased the number of layers of reinforcing with wire mesh when comparing these results reference mix.

Keywords

ferrocement; SBR; impact loading.

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