

Behavior of Polymer Modified Concrete Slabs under Impact

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This research includes the study of improving impact resistance of concrete using styrene butadiene rubber (SBR) with different weight ratios of polymer to cement 3%, 5% and 10%. Two series of polymer modified concrete (PMC) were produced the first level I with moderate compressive strength and the other level II with higher compressive strength. Cubes, prisms and panels were made as follows: Results showed an improvement in impact resistance of polymer modified concrete (PMC) over reference concrete in low-velocity and high-velocity impact properties. In conducting low-velocity impact tests, method of repeated falling mass was used: 1300gm steel ball falling freely from three heights 2400mm, 1200mm and 830mm. In high-velocity impact tests, shooting of 7.62mm bullets was applied to slab specimens from distance of 15m. The improvements were significant in low velocity impact resistance. The maximum increases were (33.33%, 75% and 83.33%) at ultimate failure for falling mass heights 2400mm, 1200mm and 830mm respectively. In high-velocity impact strength tests, maximum reductions recorded in spalling area were (18.5% and 27%) for polymer modified concrete (level I) with moderate compressive strength and polymer modified concrete (level II) with higher compressive strength.

Maximum reductions recorded in scabbing area were (11.42% and 35.6%) for polymer modified concrete (level I) with moderate compressive strength and polymer modified concrete (level II) with higher compressive strength, respectively.