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Abreeza Amin

ABSTRACT

SBR latex modified mortars and concretes are known for the excellent mechanical and durability properties, but the compressive strength, which is one of the most important properties, is reduced. Hence, the potential of using SBR in concrete is reduced. This research is carried out to enhance the compressive strength of cement-based materials by using various means e.g., different forms of Styrene-butadiene rubber (SBR) i.e., latex and powder, nanomaterials (nano-silica, nano-titanium) and Zinc stearate as the partial replacement of cement. This research evaluated the compressive strength of both, styrene-butadiene rubber (SBR) Powder and styrene-butadiene rubber (SBR) latex at different percentages i.e. 0% (control), 1%, 2%, 3%, 4%, 5%, 6%, 7%, 8%, 9% and 10%. To improve the compressive strength of mortar, nano-particles 2% (nano-silica and nano-titanium) and zinc stearate at 0.5% along SBR powder and latex were used. Workability, density, water absorption, and compressive strength for 28 and 56 days were determined. The results show that the compressive strength of SBR Latex modified mortar cubes decreases at higher SBR Latex percentages while the compressive strength of SBR Powder modified mortar cubes increases (up to 43%) with the increase of SBR Powder content. The compressive strength is enhanced noticeably by adding nano-silica and nano-titanium (up to 85% and 96% respectively), and Zinc stearate (64%) in SBR powder modified mortars. The workability of the modified mortar increases with the increase of polymer content. By increasing the percentage of SBR, the density of fresh mortar decreases in all mixes. Whereas, the water absorption of modified mortar cubes decreases (up to 82%) with the increase of polymer content, nanoparticles, and Zinc stearate.

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