

ACKNOWLEDGMENTS

First of all I offer all the praise and deepest gratitude to ALLAH ALMIGHTY, the Omnipotent Who blessed me with the will, energy, courage and patience to pursue my studies, prevent bad things from occurring and helping me remain healthy to complete this thesis work.

I am very grateful to my advisor Dr. Maria Idrees for her encouraging attitude and valuable advice to accomplish this research. Her constant supervision and gratitude helped me a lot to do the research done. I humbly appreciate her invaluable efforts in making my research work successful and deep reviewing my written work. The materials used in this research are sponsored by TDF02-111 (Production of special cement by incorporating polymers....) awarded to Dr. Maria Idrees.

Thanks are due to the staff of Structural Engineering laboratory of Architectural Engineering department. I owes thanks to all the persons who helped one way or the other during this research project.

At last but not the least, I offer special thanks to my parents and siblings for their prayers and encouragement. Their inspiration, encouragement, affection and care made this research possible. I simply acknowledge I could not have done all of my work without help of above mentioned people.

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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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