All Sciences Proceedings
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AS-ABSTRACTS
https://as-proceeding.com/index.php/as-abstracts
ISSN: 2980-1834

All Sciences Abstracts,
Volume 1, pp 13, 5, 2023

Evaluation of self-compacting concretes (SCC) made with brick powder using non-destructive and destructive tests

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Abstract – The main goal of this study is to see if it is possible to test the physico-mechanical behavior of self-compacting concrete (SCC) with brick powder as a partial replacement for cement using non-destructive and destructive methods. In fact, there were seven different levels of brick powder substitution in this work, namely 5, 10, 15, 20, 25, 30, and 35% by weight, with 3% superplasticizer. The properties in the fresh state and the physico-mechanical properties in the hardened state were studied. In addition, a non-destructive ultrasonic pulse velocity test method evaluated the compressive strength of SCC. Similarly, the relationship between ultrasonic velocity and concrete compressive strength was also estimated after 7, 14, 28, 90, and 180 days of curing. The results of the study indicated that the values of compressive strength and ultrasonic pulse velocity were very low for all levels of substitution at the beginning of treatment, and over the long term the values increased; the highest values were obtained at the value of 20% of the substitution. In the end, a linear relationship was found between the speed of the ultrasound pulse and the compressive strength for all the SCCs that had different amounts of brick powder instead of cement.

Keywords – Self-Compacting Concretes, Brick Powder, Non-Destructive And Destructive Tests, Physico-Mechanical Properties.