

Fresh and Mechanical Properties of Self-Compacting Lightweight Concrete Containing Ponza Aggregates

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The main aim of this study is to investigate the fresh and mechanical properties of self-compacting lightweight concrete SCLC in which natural aggregates replaced by natural lightweight coarse aggregate (Ponza) at different levels of 0%, 40%, 60%, 80% and 100%. For this purpose, a total of five mixes were designed (MR, M40, M60, M80, M100) and the fresh properties of these mixes were evaluated using slump flow diameter, the time required to reach 500 mm of flow (T500mm), L-box height ratio, and sieve segregation test. For mechanical properties, compressive Strength at 7 and 28 days, splitting tensile and flexural strengths and dry bulk density of the hardened concrete at 28 days were measured. The test results show that increasing the replacement level of lightweight coarse aggregate LWCA caused an increase in the filling ability and led to a decrease in T500mm time. Better performance in passing ability was recorded, although there was a slight decrease in segregation resistance as compared to the SCC with natural aggregate. However, all results were still within acceptable ranges for SCC fresh requirements. The mechanical properties of the produced SCLC reduced. However, a considerable reduction in the dry bulk density was recorded with good mechanical performance and this is extremely useful for reducing the total weight of concrete structures.