

The Development Of All-lightweight Scc With High Strength Incorporating Hybrid Fibers.

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The aim of this study is to develop an all-lightweight self-compacting concrete (ALWSCC) mixture that possesses a high compressive strength incorporating hybrid steel fibres. Lightweight aggregates (LWAs) stalite and scoria sand were used to achieve an oven-dry density less than 1760 kg/m³. Fly ash (FA) was used to achieve sufficient workability and meet the criteria for SCC whilst metakaolin (MK) and silica fume (SF) were used to improve the compressive strength of the specimens. Slump flow, T500, V-funnel, U-box and L-box, compressive strength, splitting and flexural strength tests were carried out to evaluate the fresh and hardened properties of ALWSCC. To estimate the durability of the concrete samples, carbonation and water sorptivity tests were conducted. The results of this study have revealed that stalite and scoria sand were very effective in creating an ALWSCC mixture with a 28-day compressive strength of 55 MPa and the oven-dry density of 1692kg/m³. The water absorption of concrete samples containing MK was higher than that of SF. This study has also shown that the hybridization of steel fibres improves the tensile and flexural strength of concrete, as well as the

flexural toughness, elastic modulus.