

High Early Strength Gain Low-carbon Concrete: A Microstructure Study

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Low carbon cement binders are of significant interest due to the global drive for sustainable and eco-friendly construction. Producing cement is an energy intensive process which results in substantial carbon dioxide (CO₂) emissions. Replacing a part of cement with supplementary cementitious materials (SCMs) therefore reduces CO₂ emissions associated with cement production. High slag substitutions however may compromise early age strength which is necessary for most commercial applications. Boral's ENVISIA[®], which uses a high slag binder, meets the early age requirements and has been shown to demonstrate equivalent or better durability properties than equivalent high SCM concrete. This study investigates the microstructure of young and mature ENVISIA[®] concretes to explain better durability performance. Microstructure of plain OPC concrete and high SCM concrete were also investigated for comparison.