INVESTIGATION ON LIGHTWEIGHT SELF-COMPACTING CONCRETE

RESEARCH PROPOSAL

Concrete occupies unique position among the modern construction materials, Concrete is a material used in building construction, consisting of a hard, chemically inert particulate substance, known as a aggregate (usually made for different types of sand and gravel), that is bond by cement and water. Self-Compacting Concrete (SCC) is a high-performance concrete that can flow under its own weight to completely fill the form work and self consolidates without any mechanical vibration. Such concrete accelerate the placement, reduce the labor requirements needed for consolidation, finishing and eliminate environmental pollution. The so called first generation SCC is used mainly for repair application and for casting concrete in restricted areas, including sections that present limited access to vibrate. Such value added construction material has been used in applications justifying the higher material and quality control cost when considering the simplified placement and handling requirements of the concrete. The successful production of Self-Compacting Concrete (SCC) for use, is depended on arriving at an appropriate balance between the yield stress and the viscosity of the paste. Specially formulated high range water reducers are used to reduce the yield stress to point to allow the designed free flowing characteristics of the concrete. However, this alone may result in segregation if the viscosity of the paste is not sufficient to support the aggregate particles in suspension. The process of selecting suitable ingredients of concrete and determining their relative amounts with an objective of producing a concrete of required strength, durability, and workability as economically as possible is termed as concrete mix design.

The current review aimed to provide a detailed study of lightweight self-compacting concrete containing several types of natural and sustainable lightweight aggregates. As a primary constituent of lightweight self-compacting concrete, lightweight aggregates are mainly responsible for variation in strength and bulk density of concrete. The impact of different types of lightweight aggregate and other influential factors on workability, strength, and durability have been carefully discussed in this study which shows it is possible to develop lightweight self-compacting concrete with low density. In addition, lightweight self-compacting concrete shows excellent frost resistance. This research study is a novel initiative to accumulate findings of lightweight self-compacting concrete for its broad acceptance, and future scope of work.