A Review: Self Compacting Concrete

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Abstract**—***Concrete which is made by the use of Super Plasticizers and Viscosity Modifying Agents (VMA) and does not needs compaction, removes air voids itself is known as self-compacting concrete (SCC). Due to well-controlled conditions, the initiation of SCC in the precast concrete is successful. But on the field, the growth is slower, as the product is more sensitive. In this paper the properties of SCC in comparison to normal concrete has been discussed.*

Keywords—Self Compacting Concrete, Fiber, Super-Plasticizers, Admixture

I. INTRODUCTION

Self- consolidating, or "self- compacting" concrete (SCC) was firstly developed in Japan in 1986. Substantial research has been carried out with regard to the properties of SCC.

It is a type of concrete that is capable to flow and fill every division of the corner of the formwork (In shuttering), even when the dense reinforcement is present, purely by means of its own weight and exclusive of any vibration or other type of voids removal process.

Use of recycled or waste materials for the construction of civil structures is a matter of great significance in this century. Use of waste materials in construction industry reduces the utilization of Portland cement per unit volume of concrete. Numerous researches have been listed on the global growth of SCC and its micro-social system and strength aspects. Instead of various researches and construction systems conducted widespread, the Bureau of Indian Standards (BIS) has not fixed out a standard mix method to get proper mix design trials and self-compact capacity testing methods. The behavior of Self Compacting Concrete is same as that of conventional concrete comprises of binder, fine aggregate, coarse aggregates, water, fines and admixtures.

Important reasons behind the increased use of supplementary materials in cement concrete are

- To reduce the consumption of cement though replacing the cement with materials having cementitious properties.
- To improve the properties of fresh and hardened concrete. Recently, several researchers produced high performance concrete by reducing water/cement ratio through the application of super-plasticizers and ultrafine mineral admixtures.

II. OBJECTIVE OF STUDY

The main purpose of this study is to explore the possibility of utilizing waste products in concrete production and to compare the properties of SCC to normal concrete.

III. LITERATURE REVIEW

Later on many researchers worked on SCC to enhance the quality and strength of concrete.

Mishra and Panda (2015) used rubber particles as aggregates in concrete manufacture to remove poor deformation capacity, lower tensile strength and to get better energy absorption capacity. It has been concluded that aggregate rubber particles improves deformation and energy absorption abilities as they reduced workability and mechanical characteristics.

A comparative experimental study on different types of steel fibres with different aspect ratios has been done by Gite.al. (2014) and observed that there is a reduction in strength with decrease in aspect ratio of same fibre and also noticed that straight fibre gives lower strength compared to hooked end and crimped type fibres.

The mechanical properties of self-compacting concrete with low, medium and high-fiber contents of macro polyolefin fibers has been studied by Alberti. et al (2014). Their fracture behavior is kept side by side with a self-compacting concrete without fibre and self-compacting concrete with steel fiber.

Balakrishnan and Paulose(2013) substituted cement by different amount of fly ash (12.5%, 18.75%, 25%, and 37.5%) and found that the use of fly ash in SCC raises the workability, decreases the chance of bleeding, segregation and boosts the filling ability and passing capability of concrete.

A numerical model has been developed by Cunha et al. (2011) for the ductile behavior of SFRSCC. With the help of 3-D smeared crack model, the nonlinear material behavior of self-compacting concrete is established. A good relationship with experimental values has been presented by the mathematical model.

Vijayanand et al (2010) studied the flexural behavior of SCC beams with steel fibers. An investigational program has been carried in which three plain SCC beams and six SCC beams with steel fibers have been casted with different percent of fiber content (0%, 0.5% and 1.0 %) and the tensile steel ratio (0.99%, 1.77% and 2.51%).

IV. DISCUSSIONS & CONCLUSIONS

From the papers reviewed following points of conclusion can be drawn-

- Instead of its short history, SCC has confirmed itself as a innovative step forward in concrete technology.
- It can be observed by cost analysis that SCC in precast concrete plants is more economically than conventional concretes. Cost comparisons should always be made on the basis of integral costs.
- There is a significant future for self-compacting fiber reinforced concretes. The most vital task for research is to improve SCC's with reduced sensitivity to variations in constituents and environmental influences.

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