PROJECT REPORT ON

"INFLUENCE OF VOLUME OF PASTE ON FRESH AND HARDENED PROPERTIES OF SELF COMPACTING CONCRETE USING RECYCLED AGGREGATES"

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ABSTRACT

The term SCC refers to a new special type of concrete mixture characterized by high resistance to segregation that can flow through intricate geometrical configuration in the presence of reinforcement under its own mass without vibration and compaction.

SCC generally possesses a high powder content which keeps the concrete cohesive with high flowability. A high substantial part of this powder could contain fillers like fly ash, crushed rock fines, silica fumes etc. Volume of coarse aggregate, paste, powder, dosage of superplastizer, mixing method plays an important role in the flowability and other requirements of SCC. SCC has been made by many research workers and others with filler like fly ash.

The use of recycled aggregate in concrete opens a whole new range of possibilities in the reuse of materials in the building industry. The utilization of recycled aggregates is a good solution to the problems of excess waste materials, provided that the desired quality of the product is reached. Recycling of rejected building materials is a very important issue for saving energy resources and environmental protection. The recycled concrete aggregates exhibits different characteristics from natural the aggregates.

The use of recycled aggregate gains importance when it is used in SCC, since the advantages of fabricating SCC and the use of recycled aggregates leads to high performance concrete along with preserving the natural resources.

In this study cement (OPC 53 grade), fly ash, commercially available poly carboxylic ether based superplastizer, natural river sand and crushed angular normal aggregates and recycled aggregates of maximum size 12.5 mm were used. The mixed design method adopted for fabricating SCC is based on absolute volume concept starting with a volume of paste. The method involves very few trials for obtaining SCC which can be advantageous for field practice.

Nine SCC mixtures were fabricated using cement content of 300 kg/m^3 , 390kg/m^3 and 450kg/m^3 with a constant water content of 190ltr/m^3. The paste content considered were 0.39, 0.41 and 0.43. The powder content varied from 517 kg/m^3 to 652 kg/m^3. The water to powder ratio by volume range from 0.79 to 0.95, by mass from 0.29 to 0.37. Cubes of 100 mm and 150 mm and cylinders of 100/200 mm were cast and tested for compressive strength at 7, 28 and 60 days. In addition, the split tensile strength was also assessed. Comparable normal concrete for all water to cement ratios were also cast and tested at 28 days.

The findings of the study indicates that the range of Vp for fabricating SCC is 0.39 to 0.43 both for crushed angular aggregates and recycled aggregates. The design method based on absolute volume is simple and reduces the number of trials for developing SCC mixes. The higher paste content makes the mix cohesive and slump flow (yield stress) increases as the Vp increases. This trend is also seen in case of compressive strength wherein the compressive strength increase as Vp increases. However, an optimal

value of 0.41 is noticed for the materials used in this study. Also the results indicate that the compressive strength of SCC with recycled aggregates has a lesser value when compare to normal crushed angular aggregates. The percentage is around 15% in this study. The results also indicate that there is increase in long term compressive strength due to pozzolanic activity of filler material (fly ash). The new method of mixing adopted in this study has resulted in good flowability.