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A Review on Self-Compacting Concrete

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***Abstract-* Making concrete structures without compression is done in the past. Same as placing concrete under water using a trimie without compression. Areas that are inaccessible are embodied using such techniques. The production of such mixtures often used expensive mixtures and very large amounts of cement. However, such concrete was generally low in strength and could not be obtained. This leads to the development of self-compacting concrete (SCC). The processability of the SCC, such as filling capacity, throughability and separation resistance, is assessed using workability tests such as slump flow, Vfunnel and L-Box tests.**

***Index Terms-* Self Compacting Concrete, flowability, passing ability, resistance to segregation, fly ash, superplasticizer.**

I. INTRODUCTION

Self-compacting concrete (SCC) is a pioneering concrete that does not contain shaking for insertion and compression. Even if full support occurs, it can be completely filled in itself and can be fully compressed. The hardened concrete is dense and uniform, and has the same characteristics and durability as standard vibration concrete. Making concrete structures without compression is done in the past. Same as placing concrete under water using a termie without compression. Areas that are inaccessible are embodied using such techniques.

The production of these mixtures often used expensive admixtures and very high amounts of cement. However, such concrete was generally low in strength and could not be obtained. This leads to the development of Self Comping Concrete (SCC). His concept began in Japan in the mid 1980s. The SCC is integrated at its own weight and properly fills all voids without separation, excessive bleeding or other separation of materials without the need for mechanical consolidation. Capacity of SCC, ability to resist separation ability and ability to pass. The filling capability helps the SCC to flow through the form and fill all the space inside it. Passing ability is a property that can flow without clogging. The advantage of resistance to segregation is that the benefits of concrete are maintained to maintain uniform composition, so the paste and aggregate are joined together.

The application of SCC aims to obtain concrete with high performance, better and more reliable, improved durability, high strength and quick structure. In the case of SCC, it is generally important to use high temperature plasticizers to achieve high fluidity. It also includes some powdered materials such as silica fume, fly ash, glass filler, stone powder, and so on. Self-compacting concrete has been successfully used in Japan, Denmark, France, and the UK. Its characteristics have been improved, reducing noise pollution, saving time, labor and energy, and have been widely accepted.

II. LITERATURE REVIEW

Ozawa et al. (1989) focused on the fluidity and separation resistance of self-compacting concrete focusing on the effects of mineral mixtures such as fly ash and loast furnace slag. They found that the partial replacement of OPC by fly ash and blast furnace slag significantly improved the fluidity of the concrete. He concluded that he has the best fluidity and strength properties of 10-20% of fly ash and 25-45% of the mass of slag cement.

Domone and His-Wen (1997) conducted a slump test on highly workable concrete. The beneficial correlation between slump value and flow rate was obtained in laboratory tests. It showed satisfactory value of the slump flow.

Take Bui et al. (2002) discussed a rapid method for testing the resistance of self-compacting concrete to segregation. An extensive test program of SCC has been carried out with various moisture-binder ratios, paste volumes, combinations between coarse aggregates and fine aggregates, and various types and minerals content. This test has helped conclude this method with the device used to inspect the SCC's separation resistance in both directions (vertical and horizontal).

Xie et al. (2002) announced the manufacture of high strength self-molding concrete (SCC) containing superabsorbent fly ash (UPFA) and hot plasticizer (SP). Various parameters of concrete, namely good processability, high mechanical properties and high durability, have been selected and SCC has been developed. Fresh SCC blends have less slump loss. The processability of high strength SCC containing UPFA and SP can be evaluated by a combination of slump flow and L-box test. The slump flow is 600-750 mm. The flow rate of the L-box test was 35-80 mm / sec.

Lachemi and Hossain (2004) presented a study on the suitability of four types of viscosity modifiers (VMA) in the manufacture of SCCs. The fresh and cured properties of SCC were studied by adding other VMA to SCC. Deformation through the restricted area can be evaluated using the v-funnel test. In this test, the funnel was completely filled with concrete, the floor outlet was open and the concrete could flow out. Flow times from the opening of the outlet to the seizure of the flow were recorded. Flow times can be related to low deformation due to high paste viscosity, higher inter-particle friction, or blockage of flow. For concrete to be considered SCC, the flow time should be less than 6 seconds. All mixtures were well performed without significant separation and clumps were clogged.

Cengiz (2005) used fly ash with SCC in proportions of normal Portland cement (NPC) at 0%, 50% and 70%. He investigated the strength properties of self-compacted concrete using high volume fly ash (HVFA). Cured concrete mixture with moisture content ratio of 0.28 to 0.43 in wet and dry curing conditions. He investigated the strength properties of mixtures and developed the relationship between compressive strength and flexural tensile strength. This study has proven that it is possible to convert RCC (zero-slump) concrete into flexible concrete using a suitable superfine.

Ferrara et al. (2006) evaluated all the basic properties of HLSCC: fluidity, separation resistance and filling capacity of fresh concrete. Testing of the time required to reach the slump flow (for flow measurement) and slump flow (S) (500 mm slump flow (S) (for separation resistance capability measurement) of HLSCC) met the expected dose levels in all mixes, The time is to meet most levels of LC mixed concrete (Mixed No. 2-4) and Mixed Concrete (Mixed No. 2-4), which is required to fully flow through the V-funnel (S) It appeared. 6).

Kumar (2006) reported the history of SCC development and various test methods to test its basic principles, high fluidity, resistance to separation, and ability to pass. The characteristics and mixing ratios of the materials have a great impact on their compact capacity, and a variety of mixed design methods using various materials depending on the actual acceptance and future prospects in the field of application and field have been discussed in this paper. As a result of performing Orimet tests, the more dynamic flows of concrete in this test better simulate the behavior of the SCC mix when actually placed compared to the slump flow changes. The Orimet / J-ring combination test shows great potential as a way to evaluate the filling capacity, the ability to pass and the resistance to separation.

Take Sahmaran et. (2007) published a paper on fresh and mechanical properties of fiber-reinforced self-compacting concrete containing a large amount of fly ash in a mixture containing fly ash. 50% by weight of cement has been replaced by fly ash. The slump flow diameters of all mixtures were in the range of 560-700 mm, were within the acceptable range and the slump flow time was recorded to be less than 2.9 seconds.

Khatib (2008) investigated the properties of self-compacting concrete prepared by adding fly ash (FA). FA was used as a replacement for Portland cement (PC). PC was replaced by 0-80% by fly ash. The water binder ratio was maintained at 0.36 for all mixtures. In this study, not only strength characteristics, but also workability, shrinkage, absorption and ultrasonic pulse rate were studied. Observations show that 40% replacement of FA results in an intensity of 65 N / mm2 or more for 56 days. Increasing the amount of fly ash resulted in higher absorption values and less than 2% absorption.

Grdić et al. (2008) presented the characteristics of self-compacting concrete mixed with various types of additives such as silica fume and fly ash. The L-box test was used to evaluate the ability of the SCC to pass through an airtight enclosure without clogging or clogging, including the space between the reinforcement rod and other obstacles. The L-box has an array and dimensions that differ from the height of the horizontal section of the box, and these three measurements are used to calculate the average depth of the concrete in h2 mm. The same procedure was used to calculate the concrete depth immediately behind the gate h1 mm. The acceptance ability was calculated from the following equation: Pa = h2 / h1; Pa was acceptable and Pa was in the range of 2 to 10 mm. h1 and h2 are the distance from the perspective and the height (mm) at the fabric, respectively.

Miao (2010) conducted a study to develop SCC with up to 80% cement replenishment and new characterization of all mixtures. The results show that fly ash acts as a lubricant. It does not react with the super softener and produces repulsive force, and the superplasticizer can only act on the cement. As a result, the greater the amount of fly ash, the less superfine agents needed.

Heba (2011) published an experimental study of SCC with two cement contents. The work contains three types of mixtures, the first being considered a different percentage of fly ash, the second using a different percentage of silica smoke, and the third using a mixture of fly ash and silica smoke. It was concluded that higher concrete asphalt content increased the value of concrete compressive strength up to 30% of FA but higher value of concrete compressive strength was obtained from mixture containing 15% FA.

III. CONCLUSION

Increases the amount of fine material in the mix to increase the stability of fresh concrete (cohesion). Development of self - compacted concrete with reduced separability. A systematic experimental approach has shown that partial replacement of fine aggregates and fine aggregates can produce self-compacting concrete with low segregation potential when evaluated by the V-Funnel test. The amount of coagulant, binder, and mixed water as well as the type and dosage of the superscent agent used are key factors affecting the properties of the SCC. Slump flow, V-funnel, L-flow, U-box and compressive strength tests were performed to investigate the performance of the SCC. When we add a mineral mixture, we can have concrete that can be run better. Using slump flow, T50 cm slump flow J-ring test, L-box test and U-tube test, we found that self-compacting concrete (SCC) achieved consistency and self-compatibility with its own weight. External vibration or compression. SCC containing mineral admixture has satisfactory processability because of its small particle size and large surface area.

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