A Review on Comparative study on Self Compacting Concrete

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Abstract

Making solid structure without compaction has been done previously. Like position of cement submerged by the utilization of tremie without compaction. Difficult to reach regions were cemented utilizing such strategies. The generation of such blends regularly utilized costly admixtures and expansive amount of concrete. Be that as it may, such cement was for the most part of lower quality and hard to acquire. This lead to the advancement of Self Compacting Concrete (SCC) The usefulness properties of SCC, for example, filling capacity, passing capacity and isolation obstruction are assessed utilizing functionality tests, for example, droop stream, V-channel and L-Box tests.

Introduction

Self-compacting concrete (SCC) is a spearheading solid that does not include shivering for addition and compaction. It can spout under its very own heap, totally filling structure work and accomplish the full compaction, even in the event of clogged help. The solidified cement is thick, uniform and has a similar property and solidness as standard vibrated concrete.

Making solid structure without compaction has been done before. Like situation of cement submerged by the utilization of tremie without compaction. Blocked off regions were cemented utilizing such procedures. The creation of such blends frequently utilized costly admixtures and extensive amount of concrete. Be that as it may, such cement was for the most part of lower quality and hard to acquire. This lead to the improvement of Self Compacting Concrete (SCC) whose idea was first started by Japan in the mid of 1980s. SCC is a superior solid that solidifies under its self-weight, and enough fills every one of the voids without isolation, inordinate draining or some other detachment of materials, without the need of mechanical solidification. The key properties of SCC are-filling capacity, passing capacity and protection from isolation. Filling capacity encourages SCC to move through the formwork and totally fill every one of the spaces inside it. Passing capacity is the property by which it streams with no blocking. The advantage of protection from isolation gives the favourable position to the solid in keeping up a uniform creation subsequently the glue and the total tie together.

The use of SCC goes for getting a solid of elite, better and progressively dependable, improved toughness, high quality and quicker development. For SCC it is commonly essential to utilize superplasticizers so as to acquire high portability. Some volume of powdered materials, for example, silica seethe, fly cinder, glass filler, stone powder, and so on is likewise included. Self-compacting concrete has been effectively utilized in Japan, Denmark, France, U.K., and so on. It is broadly been acknowledged due to its upgraded properties likewise it lessens clamour contamination, spares time, work and vitality.

Literature

Prof. Shriram H. Mahure (2014) [1] had studied about the fresh and hardened properties of self-compacting concrete using Fly ash as partial replacement of cement in different percentages in addition to filler. The fresh properties have been determined by computing the Slump value, V-funnel value and L-box value and the hardened properties are determined by computing the Compressive strength, Flexural strength and Split tensile strength of the specimens. It is observed that the fresh properties of concrete show an acceptable value up to 30% replacement of fly ash and also the hardened properties of concrete are significantly improved when compared to the conventional mix.

Sherif.A.Khafaga (2014) [2] had investigated about the fresh and hardened properties of self compacting concrete using recycled concrete aggregate as both coarse and fine aggregates. The concrete was prepared by replacing 25%, 50% and 75% of coarse and fine recycled aggregates. The study consisted of thirteen concrete mixes which reflect the key variables and their effects on the fresh and hardened properties of the produced SCC. The results indicated that the properties of the recycled aggregates SCCs have only a slight difference, in their properties from the natural aggregates SCC. The recycled concrete aggregate as both coarse and fine aggregates can successfully be used for making of SCC.

M.Iyappan (2014) [3] had investigated about the fresh and hardened properties of self-compacting concrete in which the Portland cement is partially replaced with Nano silica. In addition the durability properties of the concrete like acid resistance using HCL were also examined with three different percentages of Nano-silica. He concluded that 2% and 4% replacement of Nano silica results in improved hardened properties where as 6% replacement of Nano silica results in reduction in hardened properties of concrete. He also obtained that 4% replacement of Nano silica results in better acid resistance of the concrete.

Abbas Al-Ameeri (2013) [4] had investigated about the self-compacting concrete in which the steel Fibre is partially replaced. He studied the fresh properties that comprise of flow ability, passing ability and viscosity and computed the hardened properties like compressive strength, split tensile strength and flexural strength of the specimens. He concluded that with the increase in Fibre content the workability of the concrete is reduced. He also concluded that at an optimum percentage of 0.75% to 1% replacement of steel Fibres, the compressive strength, split tensile strength and flexural strength characteristics of the self compacting concrete had been improved.

Prajapati Krishnapal (2013) [5] had studied about the self compacting concrete containing different percentages of fly-ash such as 10%, 20% and 30% as replacement of cement by its weight where the quantities of fine aggregate and coarse aggregate are kept constant. The fresh properties of the concretes such as slump value, V-funnel and L-box value which in turn used to determine the flow and passing ability of the concrete were obtained from EFNARC Guidelines. He observed that the addition of flyash in concrete results in decrease in super-plasticizer content for better workability. He concluded that with increase in fly-ash content in concrete results in decrease in strength of concrete at the age of 28 days.

Dhiyaneshwaran.S (2013) [6] had investigated about the workability and durability characteristics of self-compacting concrete containing Viscosity modifying admixture and class F fly-ash. The workability of the concrete is determined by conducting slump flow, V-funnel, L-box and U-box tests and the durability of the concrete is computed using acid resistance, sulphate attack and saturated water absorption test. He concluded that 30% replacement of fly-ash is optimum. He observed that fresh properties, mechanical properties and the durability properties of the concrete have been improved compared to the convention mix of the concrete.

J. Guru Jawahar (2012) [7] focused on finding the properties of self-compacting concrete by replacing the aggregate with crushed granite stones of size 20mm and 10mm. The concrete is obtained by replacing the cement with the class F fly ash by 35% and 0.36 water/cementitious ratio by weight. The fresh properties of the concrete were obtained by conducting workability test, V-funnel and L-box test. The test is conducted for different type of mixes. The test reveals that some mixes are successful in slump flow test they were failed in V-funnel and L-box test. He also concluded about the range of coarse aggregate content suitable for particular coarse aggregate blending in self compacting concrete.

Benmounah Abdelbaki (2011) [8] had investigated about the effect of marble powder content in self-compacting concrete at the fresh and hardened state. The fresh properties of the concrete are identified by conducting the workability test, the V funnel flow test and viscosity test and the hardened properties are determined by computing the compressive strength of the specimen at the age of 28 days. The increase in marble powder in concrete shows an improvement in fresh properties of concrete with decreased v-funnel flow time and increased slump and viscosity values but with the increase in marble powder content in the concrete results in decrease in the compressive strength of the specimens.

O. Gencel (2011) [9] had studied about the fresh and hardened properties of SCC with fly ash reinforced with the type of monofilament polypropylene Fibres. The water/cement ratio, fly ash content and admixtures were kept constant to determine the fresh and hardened properties of concrete. To evaluate the fluidity, filling ability and segregation risk of the fresh concrete, tests like Slump flow, J ring, V funnel and air content tests were conducted and to determine the hardened properties of concrete tests like compressive strength, splitting tensile strength, flexural strength, pulse velocity and elasticity modulus test were conducted. If there is uniform distribution of fibres, the problems in mixing and batching of concrete are minimized. He finally concluded that

the usage of Polypropylene Fibres in concrete upgraded the fresh and mechanical properties of SCC significantly.

Rafat Siddique (2013) [10] investigated about the strength and durability properties of Self-Compacting concrete which is obtained by partially replacing natural sand with waste foundry sand (WFS). He replaced the Natural sand with WFS by 0%, 10%, 15% and 20% in terms of weight. He studied the fresh properties of concrete before computing the strength parameters. Compressive strength and split tensile strength test were obtained at the age of 7, 28, and 56 days and to determine the durability of the concrete, sulphate resistance was evaluated at the age of 7, 28 and 56 days and Rapid Chloride Permeability test was conducted at age of 28 days. Test results have shown that there is increase in compressive strength and split tensile strength of self-compacting concrete and also the durability properties have been improved by incorporating waste foundry sand as a replacement of Natural sand.

Conclusion

To build the security of crisp solid (cohesiveness) utilizing expanded measure of fine materials in the blends. To improvement of self-compacting concrete with diminished isolation potential. The efficient exploratory methodology demonstrated that incomplete substitution of coarse and fine total with better materials could deliver self-compacting concrete with low isolation potential as evaluated by the V-Funnel test. The measure of totals, fasteners and blending water, as well as sort and measurements of super plasticizer to be utilized are the central point impacting the properties of SCC. Droop stream, V-channel, L-stream, U-box and compressive quality tests were done to inspect the execution of SCC. On the off chance that we include the mineral admixture substitution for we can have a superior useful cement. It has been checked, by utilizing the droop stream, T50 cm droop stream J-ring test, L-box test and U-tube tests, that self-compacting concrete (SCC) accomplished consistency and self-similarity under its own weight, with no outside vibration or compaction. SCC with mineral admixture showed acceptable outcomes in usefulness, on account of little molecule size and progressively surface zone.

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