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Self Compacting Fibric Concrete

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Abstract

Polypropylene Fibre Reinforced Concrete is an embryonic construction material which can be described as a concrete having high mechanical strength, Stiffness and durability. By utilization of Polypropylene fibres in concrete not only optimum utilization of materials is achieved but also the cost reduction is achieved. This report presents a comprehensive review on various aspects Polypropylene Fibre Reinforced Concrete concerning the behaviour, applications and performance of Polypropylene Fibre Reinforced Concrete. Various issues related to the manufacture and strength of Polypropylene Fibre Reinforced are also discussed The purpose of this concrete concept is to decrease the risk due to the human factor, to enable the economic efficiency, more freedom to designers and constructors and more human work. It is a kind of concrete that can flow through and fill gaps of reinforcement and corners of moulds without any need for vibrations and compacting during the pouring process. Because of that, SCC must have sufficient paste volume and proper paste rehology. Paste volumes are usually higher than for conventionally placed concrete and typically consist of high powder contents and water-powder ratios.

Keywords: *Concrete, J-Ring Test, Passing Ability.*

1. Introduction

In modern times of civil engineering, development of new materials and production methods have increased within the field of construction. One example is the use of steel fibers for various applications. Due to its ability to distribute and prevent cracks from appearing steel fibers have proved rather effective as crack controlling reinforcement, particularly in slabs. By replacing parts of the conventional reinforcement by steel fibers a new, more rational way of production has been developed. The favorable properties provided by fibers have lead to increased research efforts aiming at finding other areas of application for steel fiber reinforced concrete. One area where steel fibers may prove effective is as shear reinforcement in concrete beams. Here, the replacement of conventional shear reinforcement may seriously reduce construction time and costs. Quite a few previous investigations have been conducted within this field of application, and some design methods applicable on steel fiber reinforced concrete beams in shear have been reported. Results from these studies have indicated some beneficial effects provided by fibers in terms of improving the shear behavior. However, as most of the shear design procedures have been developed from experimental results, there are reasons to suspect that these will prove to be insufficient, especially regarding the effect of the geometrical dimensions of the beams.

Concrete has better resistance in compression while steel has more resistance in tension. Conventional concrete has limited ductility, low impact and abrasion resistance and little resistance to cracking. A good concrete must possess high strength and low permeability. Hence, alternative Composite materials are gaining popularity because of ductility and strain hardening. To improve the post cracking behavior, short discontinuous and discrete fibers are added to the plain concrete.

2. Experimental Work

While making the experimental study on Fiber-reinforced Self-compacting some impotent results and analysis are done as the observations that are given below. The experimental study about the properties of the used contents was also performed:

- Record the measured now-through time to the nearest 0.1 sec.
- Record the state of flowing (whether the concrete tended to clog up during flowing) as well.

(a) O-funnel $V_m = 1.78/t_0$

(b) V-funnel $V_m = 1.08/t_0$.

To quantify segregation resistance, the flow-through index, S_f, is calculated in terms of initial flow through time, t_0, and the flow through time after 10 minutes, t_{10}. Calculate the average flow-through speed at the orifice by the following equation to 0.01 sec.

J-Ring Test Result Analysis

Para. in mm	100	99	105	98
No. of readings	1	2	3	4

Reading for the diameters in mm:

The average value for J ring test

$$= \frac{100 + 99 + 105 + 98}{\text{Total no. of readings}}$$

$$= \frac{402}{4} = 100.5 \text{ mm}$$

This is the average value for J ring test 100.5 mm by making experimental test that is J – Ring.

3. Pass Ability Test Result Analysis through U- Shaped Tube

These measurements of the height of the concrete at the side nearest the funnel, h1, and the height at the opposite end, h2, are used to calculate the average filling percentage.

When measuring the coarse aggregate content after passing through the obstacle, calculate the coarse aggregate content, mg (kg/m3), (Method of test for washing analysis of fresh concrete). Also calculate the mass ratio.

The percentage of filling is given by the following equation that is the ratios of total sum of both heights and twice of the maximum height:-

$$\text{Percentage of filling} = \frac{h1 + h2}{2h1} \times 100\%$$

h1 = 44cm, h2 = 43cm

Percentage of filling = 98.8%

The closer the filling percentage is to 100%, the greater the filling ability of the concrete. The test is a good representation of actual placement conditions. However, the test is bulky and difficult to perform on site.

The actual percentage of filling in the U shape tube is 98.8%.

Table 1: Test Results L-Box Test

No of reading in unit sec.	Height(H1)	Height(H2)
1	299	199
2	300	200
3	302	203
Total	**901**	**202**

Test results l-box test the passing ability readings.

The passing ability PA is calculated from the following equation. PA = H2/H1

Note:-

$$PA = \frac{199}{299} = 0.66, 0.66, 0.67$$

0.66, 0.66, 0.67 are the average passing ability for individually readings.

The passing ability for the L – Box test is 0.66

- Marking on the test sample;
- Fix the location where the test was performed.
- Date of performed experiments.
- Any segregation observed while filling the L-box.
- Testing two or three bars.
- Time between completion of mixing and performance of the tests.
- Any deviation from the procedure in this document.

The passing ability for the L – Box test is 0.66 as a result for the experiment L – Box.

4. Passing Ability

It a very important and useful characteristic of concrete so during the time of study we found that Fiber Reinforced Self-Compacting Concrete passes through the all kind of needed shapes and size.

We found it is a perfect mixture in the sense of passing feature by making the experimental study. This standard covers the test method for pass ability through spaces of self-compacting concrete with a maximum coarse aggregate. Size of 30 mm or less using a U-shaped or Box-shaped container

The high viscosity of concrete makes it difficult to identify the moment when all the concrete comes out of the funnel. Therefore the moment, seen from above, when the orifice opens is assumed to be the moment when the concrete has flowed through the funnel. Measure the flow-through time to an accuracy of 1/10 sec or higher.

It is desirable that the flow-through time be measured twice or more within 5 minutes using different samples. In this case, wash the funnel with water before subsequent tests. Even if the quantity of the sample available for testing is limited, an average of two or three tests can significantly correct the scatter of sampling.

5. Conclusion

Fiber Reinforced Self-Compacting Concrete (FRSCC) of M30 is a very beneficial and effective concrete mixture for the construction material purpose during the study we found that it has many kind of properties and features upon which we are got best and effective results. We also found that, there are some important factors and parameters that are very effective in the construction of a good and perfects mixture of concrete. The FRSCC so developed was used to cast wall panels (as scaled down models) and the specimens were tested for obtaining vertical and flexural load-carrying capacities. Based on the investigations carried out on Fiber Reinforced Self Compacting Concrete Mixes and Wall Panels, the following conclusions are presented in this chapter these conclusions play an important role for a perfect and effective concentrated mixture. Following characteristics upon which we approach to this kind of concrete mixture.

References

[1] Fiber - reinforced Self-compacting Concrete - Prediction of Rheological Properties; by Ellen Fsdahl. Norwegian University of Science and Technology

[2] Specification and guidelines for self-compacting concrete, EFNARC, www.efnarc.org. February 2002

[3] Specification for coarse and fine aggregates from natural sources for concrete IS: 383 - 1970; B.I.S., New Delhi.

[4] S. Grunewald, Performance-based design of Self - Compacting fiber reinforced concrete, Doctor‘s thesis, 2004

[5] Flexural behavior of Self - Compacting Concrete reinforced with different types of steel fibers M. Pająk, T. Ponikiewski.

[6] A method for mix-design of Fiber - Reinforced Self - Compacting Concrete, Surendra P. Shah; Politecnico Di. Milano.