INFLUENCE OF M-SAND IN SELF COMPACTING CONCRETE WITH ADDITION OF STEEL FIBER IN M30 GRADE [A REVIIEW PAPER]

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ABSTRACT

Steel fiber fortified self-compacting concrete (SFRSCC) is a generally ongoing material that joins the advantages of a self-combined material with those got from adding filaments to a bond based material, coming about a composite material that can be utilized in a few auxiliary applications with specialized and monetary preferences, when contrasted with customary fortification arrangements. The present paper condenses the fundamental accomplishments got in research programs did at the Department of Civil Engineering of Minho University, inside the ambit of SFRSCC innovation. The secured themes are: blend plan; fiberpullout; age effect on the pressure and flexural conduct; displaying the monotonic and cyclic pressure conduct; flexural and punching opposition of models and full scale boards; material nonlinear investigation under the system of FEM. The Self Compacting Concrete doesn't require vibration for compaction. It can stream with its own weight, totally rounding formwork and doing full compaction, even within the sight of blocked support. The solidified cement is thick, homogeneous and has the equivalent designing homes and strength as ordinary vibrated concrete. It diminished framework costs as no vibration is required, abbreviated generation time, early quality gain. By including steel filaments, it enhances the elastic parameters. The steel strands (straight) can be successful on miniaturized scale and full scale breaks. In the present paper, the impact of steel filaments with a length of 30mm and distance across of 0.5 mm were utilized in oneself compacting concrete. It decreases the functionality of the solid. Increment the usefulness by including super plasticizer. The solid is trying at a time of 28 days. At 28 days 60% of solidarity will accomplish. In SCC the steel fiber sum is 0.3 %, 0.6 %, 0.9 %, 1.2 % has taken. By expanding the level of steel fiber, the compressive quality and flexure quality will pick up.

Keywords: Steel filaments, Workability, Super plasticizer, flexure, Split-Tensile, Self-Compacting Concrete.

I. INTRODUCTION

Steel Fiber Self-Compacting Concrete (SFSCC) can be characterized as a steel fiber fortified solid that can stream in the inside of the formwork, filling it in a characteristic way. SFSCC has likewise the ability of going through the obstructions, streaming and combining under the activity of its own weight. Because of the generally high substance of fine particles connected to the make of SFSCC, a solid and solid fiber-network interface can be accomplished, which is a great medium to activate the fiber fortification instruments, bringing about a material of high post-splitting obstruction and flexibility, gave that the fiber crack is maintained a strategic distance from. The high compacity of this material and the capacity of the fiber support framework to guarantee diffuse small scale split examples can add to the improvement of more strong solid materials. Be that as it may, the expansion of steel strands to granular bond based materials bothers the streaming capacity of crisp solid, which requires exceptional blend procedures to guarantee SCC attributes. SFSCC is particularly suitable for the precast business, since an excellent control on the materials constituents can be guaranteed, and also on the blending, throwing and relieving systems. Because of the characteristic fortification given by fiber expansion, a few basic components, particularly those experiencing issues in guaranteeing great throwing conditions when utilizing customary cement, can be produced with SFSCC with specialized, monetary and feel benefits. Nonetheless, to augment the number, type and pertinence of auxiliary applications in SFSCC, even in precast industry, substantially more research is required covering the angles identified with: mechanical properties of the material; plan on the point of view of basic security and strength; improvement of more refined numerical devices ready to recreate the conduct of complex SFSCC structures up to their disappointment. The present work has the motivation behind adding to this point.

ll. LITERATURE REVIEW

S. M. Dumne (2014) [1] he go through the “Effect of Superplasticizer on Fresh and Hardened Properties of Self-Compacting Concret” The use of mineral and chemical admixtures in concrete is a common solution to achieve full compaction particularly where reinforcement congestion and shortage of skilled workers. The past researchers have been underscored the use of mineral and chemical admixtures imparts the desirable properties to concrete in both fresh and hardened state. This paper has been made an attempt to study the influence of superplasticizer dose of 0.25, 0.30 and 0.35percentage on performance of Self-Compacting Concrete containing 10% fly ash of cement content. The experimental tests for fresh and hardened properties of Self-Compacting Concrete for three mixes of M20 grade are studied and the results are compared with normal vibrated concrete. The tests considered for study are, slump test, compaction factor test, unit weight and compressive strength test The results show that for the constant water cement ratio, increase of superplasticizer dose in Self-Compacting Concrete leads to gain of good self compaction ability in addition to marginal reduction in unit weight. Moreover, there is also slightly increase in compressive strength than that of normal concrete mix.

Jin Tao (2010) [2] he study on “Compressive Strength of Self-Compacting Concrete during High-Temperature Exposure” Self-compacting concrete (SCC) is being used in high-rise buildings and industrial structures which may be subjected to high temperatures during operation or in case of an accidental fire. The proper understanding of the effects of elevated temperatures on the properties of SCC is necessary. This paper reports the results of laboratory investigations carried out to study the effects of high temperatures ranging from room temperature to 800°C on the compressive strength of different water-cement ratio SCC and high-strength concrete. It is found that the hot compressive strength of SCC decreases with increasing temperature. Compared with normal-strength SCC, high-strength SCC possesses a larger compressive strength exposed to high temperature. Another result of tests is that addition of polypropylene fibers decreased the strength and probability of explosive spalling.

Madhuri k. (2010) she study on “Comparison of Normal Compacted Concrete and Self Compacted Concrete in Shear & Torsion” Self-compacting concrete (SCC) offers several economic and technical benefits; the use of steel fibers extends its possibilities. Since fly ash is not highly reactive, the heat of hydration can be reduced through replacement of part of cement with fly ash. Therefore, a research work was performed to compare the mechanical properties like shear and torsion strength of SCC and NCC with and without fibres with different aspect ratio. A comparison is made between NCC and SCC; in SCC, a marginal improvement in all properties is observed. Results indicate that with optimum volume fraction i.e.

2.5%, concrete with HK 80 type steel fibre giving better performance in terms of strength compare to all other type of fibres and both type of concrete.

Tomasz Błaszczyńskia(2015) he study on “Steel fibre reinforced concrete as a structural material” Fibre-reinforced concrete is the concrete with addition of short fibres targeting the improvement of the propriety of this material. Its durability is basely connected with the long-term dynamic loading. The main characteristic in that case are the critical stresses. The object of this article is steel fibre reinforced concrete (SFRC). For both materials (concrete and SFRC) are also different levels of critical stresses: initiation and critical Test findings during compression of concrete samples with and without fibre addition by means of acoustic and classical methods is presented. Three kinds of samples are assumed: BZ1 (1% fibres), BZ3 (3% fibres) and BZS (without fibre). In the case of concretes from groups BZ1 and BZ3, the level of initiation stresses was not found. The process of fibre-reinforced concrete compression has a two-stage character, instead of the process for witness concrete destroying is three-stages. It can be stated that the addition of steel fibres has the influence on σ-ε relationship for concretes in compression, and the level of critical stresses increases together with the height of the quantity of steel-fibres added to the concrete-mixture. During compression the presence of dispersed reinforcement in concrete influences the propagation of cracks

Jan Tomana(2016) he don a resurch on “Experimental study on electrical properties of steel-fibre reinforced concrete” The electrical resistivity is an important parameter describing materials’ ability to conduct electric current. Dry cementitious materials exhibit very high value of the electrical resistivity due to their insulating nature. Indeed, the electrical resistivity of an oven-dried concrete is about 10m. However, it can be significantly decreased by a sufficient amount of electrically conductive admixture. Such an enhancement is beneficial in self-sensing or self-heating concrete design, but it is not convenient in special cases such as design of concrete used for railroad ties production. In this case, mechanical properties (tensile strength) need to be improved without an accompanying decrease of the electrical resistivity. In this paper, reference concrete together with three types of steel-fibre reinforced concrete (0.5% vol., 1% vol., 2% vol.) were prepared and analyzed in terms of determination of electric properties. Experiments were carried out in both, DC and AC electric regime by means of precise DC multimeter and LCR meter measurements.

Joaquim A. (2010) he study on “PULLOUT BEHAVIOR OF STEEL FIBERS IN SELF-COMPACTING CONCRETE” In steel fiber reinforced composites materials, fiber and matrix are bonded together through a weak interface. The study of this interfacial behavior is important for understanding the mechanical behavior of such composites. Moreover, with the outcome of new composites materials with improved mechanical properties and advanced cement matrices, such in the case of steel fiber reinforced self-compacting concrete, the study of the fiber/matrix interface assumes a new interest. In the present work, experimental results of both straight and hooked end steel fiberspullout tests on a self-compacting concrete medium are presented and discussed. Emphasis is given to the accurate acquirement of the pullout load versus endslip relationship. The influence of fiber embedded length and orientation on the fiberpulloutbehavior is studied. Additionally, the separate assessment of the distinct bond mechanisms is performed, by isolating the adherence bond from the mechanical bond provided by the hook. Finally, analytical bond-slip relationships are obtained by back-analysis procedure with an interfacial cohesive model.

Eduardo N. B. (2008) he go through on "STEEL FIBER REINFORCED SELF-COMPACTING CONCRETE – EXPERIMENTAL RESEARCH AND NUMERICAL SIMULATION" Over the last few decades, the astonishing developments of super plasticizers technology allowed great achievements on the conception of concrete mixes exhibiting self-compacting ability. Since the eighties, some methodologies have been proposed to achieve self-compacting requirements in fresh concrete mixes, based on the evaluation of the flowing properties of these mixes. There still persist, however, some doubts about the most appropriate strategy to define the optimum composition of a self-compacting concrete (SCC) mix, based on a required performance. The behavior of SCC as a structural material can be improved if adequate steel fiber reinforcement is added to SCC mix composition. In fact, the fiber reinforcement mechanisms can convert the brittle behavior of this cement based material into a pseudo-ductile behavior up to a crack width that is acceptable under the structural design point-of-view. Fiber addition, however, increases the complexity of the mix design process, due to the strong perturbation effect that steel fibers cause on fresh concrete flow. In the present work, a mix design method is proposed to develop cost effective and high performance Steel Fiber Reinforced Self-Compacting Concrete (SFRSCC). The material properties of the developed SFRSCC are assessed as well as its potentiality as a structural material, carrying out punching and flexural tests on panel prototypes. A material nonlinear analysis is carried out.

B. Krishna Rao (2010) he study on "STEEL FIBER REINFORCED SELF COMPACTING CONCRETE" Self-compacting concrete (SCC) offers several economic and technical benefits; the use of steel fibers extends its possibilities. Steel fibers acts as a bridge to retard their cracks propagation, and improve several characteristics and properties of the concrete. Fibers are known to significantly affect the workability of concrete. Therefore, an investigation was performed to compare the properties of plain normal compacting concrete (NCC) and SCC with steel fiber. Ten SCC mixtures and one NCC were investigated in this study. The content of the cementitious materials was maintained constant (600 kg/m3), while the water/cementitious material ratio is kept constant 0.31. The self-compacting mixtures had a cement replacement of 35% by weight of Class F fly ash. The variables in this study were aspect ratio (0, 15, 25 and 35) and percentage of volume fraction (0, 0.5, 1.0 and 1.5) of steel fibers. Slump flow time and diameter, J-Ring, V-funnel, and L-Box were performed to assess the fresh properties of the concrete. Compressive strength, splitting tensile strength and flexural strength of the concrete were determined for the hardened properties. A marginal improvement in the ultimate strength was observed. The addition of fiber enhanced the ductility significantly. The optimum volume fraction (V) and aspect ratio (A) of fiber for better performance in terms of strength was found to be 1.0 percent and 25. The results indicated that high-volume of fly ash can be used to produce Steel fiber reinforced selfcompacting concrete, even though there is some increase in the concrete strength because of the use of steel fiber and high-volume of fly ash.

Hazrina A (2004) he go through on "Effects of Steel Fibre Addition on the Mechanical Properties of Steel Fibre Reinforced Self-Compacting Concrete" Selfcompacting concrete (SCC) mix that is highly workable has the ability to fill formworks and tight spaces between rebars under its own weight without applying any vibration. In this research, normal strength steel fibre reinforced self-compacting concrete (SCC Fibre) of grade C30 was produced with the addition of Stahlcon HE 0.55/35 steel fibres at volume fraction of 1% (80 kg/m3). The effect of the steel fibre addition on the SCCFibre mix was investigated in terms of its rheological properties (slump flow diameter and time, J-ring) and mechanical properties (compressive strength, splitting tensile strength, flexural strengths and moduli of elasticity). The compressive strength test was carried out using cubes of 150 x 150 mm, splitting tensile and MOE were performed using 150 x 300 mm cylinders while the flexural strength test was using beams of 150 x 150 x 550 mm. The results from the tests revealed that the workability and the rheological properties of the SCC mix specified by the EFNARC were decreased with the 1% addition of steel fibres. Similar decrement was also discovered in the compressive strength and the MOE value. In contrast, the splitting tensile strength, flexural strength and toughness showed significant increase with the introduction of the fibres.

M. Vijayanand(2006) he study on "Ultimate Moment of Resistance of Steel Fiber Reinforced Self-compacting Concrete Beams" Self-compacting concrete (SCC) has been accepted as a quality product and is widely used. A large number of studies are available with respect to several parameters, namely, flexural strength, load-deflection behavior, toughness, ductility, crack control, effects of beam dimensions, concrete filling sequence, flexural toughness parameters, etc., of fiber reinforced concrete. A suitable method is needed for estimating the ultimate flexural strength of steel fiber reinforced SCC (SFRSCC) beams. An experimental program was designed, and the test data have been used for the analytical study. Available analytical methods have been used, and their predictions are reported. An analytical method is also proposed to determine the ultimate moment of resistance of SFRSCC beams. A sectional analysis has been developed based on force and moment equilibrium equations. An iterative procedure involving updating of strain is employed. The predicted ultimate moment of resistance has been compared with the test data of 48 fiber reinforced SCC beams.

lll CONCLUSION

This paper shows that the self-compacting concrete is having more compressive strength. Due to addition of steel fiber at various stages in it. But the workability is decreased because of adding steel fiber in self-compacting concrete. To increase the workability of the self-compacting concrete super plasticizer is added. At hardened state compression test done. Whereas In 28-days test the Specimen is gained maximum strength, Finally the result shows that the self-compacting concrete has gained some more strength after adding of steel fiber.

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