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The Study and Behaviour of Conventional Mix Concrete with Replacement of Robo Sand and Steel Fibers in Coarse Aggregates

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ABSTRACT: Now a days the cost of building materials is increased day by day. Ingredients of concrete are cement, fine aggregate, coarse aggregate and water. This project deals with the study of effect of partial replacement of Robo sand in Fine aggregates and addition of steel fibers in coarse aggregates. By using Robo sand the depth of the water table will be increased and its helpful environment. Robo sand is industrial by product using this material to increase the strength and durability. The use of steel fibers reinforced concrete (SFRC), steel fibers to improve the mechanical property of concrete. To increase the toughness and durability. Steel fibers are generally utilized in concrete to manage the plastic shrinkage, cracking and drying shrink cracking. The length of steel fibers is 30mm and diameter 0.5mm. By addition of steel fibers in coarse aggregates to increase the tensile strength.. Here we use the percentage of steel fibers is 2%, 5%. Add to the coarse aggregates. The natural sand is replaced with robo sand with a percentage of 50%, 100% present generation the cost of natural sand is increased day by day. So, there is need to search alternative material to fine aggregate.

The cubes are casted with the dimension of 150*150*150mm. grade of concrete is M15. the cubes will be tested 7days, 14days, 28days the testing is done to the cubes of the strength characteristics like compressive strength is evaluated.

The cylindrical cubes are casted with the dimension of 150mm diameter and 300mm length of the cylinder. Grade of concrete is M15. The cylinders will be tested 7 days, 14 days and 28 days the testing is done to the cylinder of the strength characteristics like Tensile strength is evaluated.

KEYWORDS: SFRC, steel fibers, Robo sand, compressive strength, tensile strengthtest.

I. INTRODUCTION

Concrete is the most widely used man-made construction material all around the globe because of its superior specialty of being caste in any desirable shape. It is material synonymous with strength and longevity has emerged as the dominant construction material for the infrastructure needs of the present situation. Around five billion tons of concrete have been used around the world wide every year, in terms of cost it is equivalent to 25 to 30% of the nation budget. It is also inevitable material in human life due to its enormous usage in modern way of construction and now the per capita consumption is reached to more than 2kg.

Concrete has relatively high compressive strength but very low tensile strength. For this reason, it is usually reinforced with materials to makes strong in tension (often steel). Concrete can be damaged by many processes, such as the freezing of trapped water, permeability in concrete composition. To overcome the damage of concrete, proper quality of ingredients shall be used in the concrete composition.

ROBO sand is an ideal substitute of river sand. It is manufactured just the way nature has done for over a million years. ROBO sand is created by rock-hit-rock crushing technique is use state of the art plant and machinery with world class technology. robo sand is the environmental –friendly solution that serves as a perfect substitute for the fast depleting and excessively mined river sand, which is so essential and percolating and storing rain water in deep underground pockets and protects the ground water table.



by using the robo sand in partial replacement of natural sand or river sand. To Reducing defects in concrete like segregation, bleeding and honeycomb structure formation. Setting time of concrete is comparatively fast as compared to another type of concrete where we use natural sand. Compressive strength and flexural strength of concrete is very high as compared to other concrete where we use natural sand and the strength parameters of SFRC and contribute to the reduction of cracks. The concept of using fibers as reinforcement is not new. Fibers have been used as reinforcement since ancient times. Historically, horse-hair was used in mortar and straw in mud bricks. In the 1900s, asbestos fibers were used in concrete. In the 1950s, the concept of composite materials came into being and fiber-reinforced concrete was one of the topics of interest. Once the health risks associated with asbestos were discovered, there was a need to find a replacement for the substance in concrete and other building materials. By the 1960s, steel, glass (GFRP), and synthetic fibers, such as steel fibers were used in concrete. Research into new fiber-reinforced concretes continues today

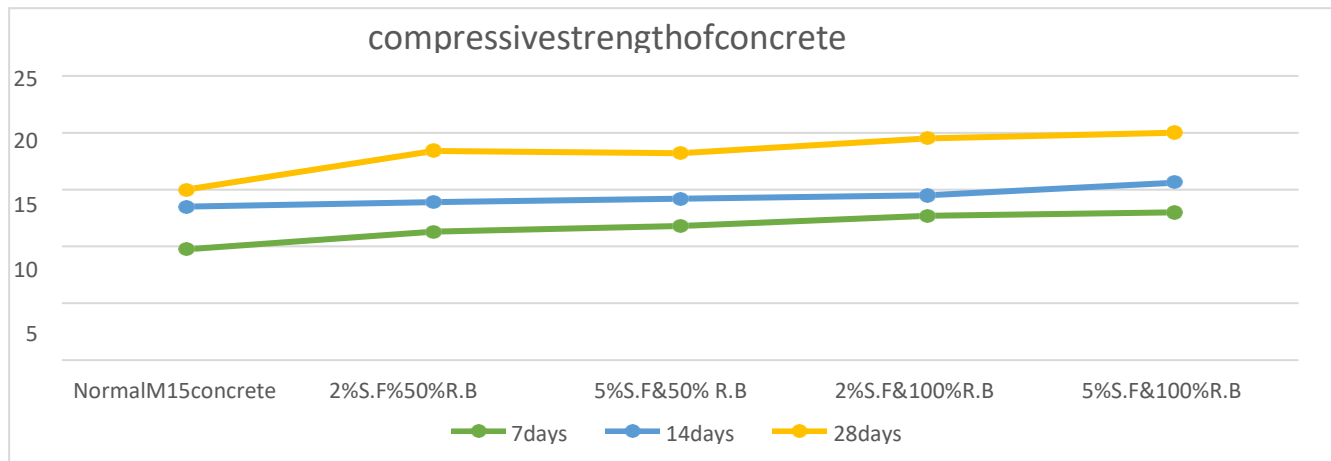
II. RELATED WORK

[1] Take three cube moulds for each mix. Assemble the mould with base plate so that it is rigidly held together. Clean the inside of the mould and see that joints (at the edges) are perfectly tight. Pour properly mixed concrete for the given mix to the cube moulds. [2] Compaction by needle vibrator will be preferred. If vibrator is not available, hand compaction is to be done by placing concrete in three layers; each layer be compacted with the help of standard tamping rod by means of 25 blows. [3] Level the concrete at the top of the mould by means of trowel and give proper identification mark of the specimen. Keep the cubes in laboratory for 24 hours. [4] After 24 hours, dismantle the plates of cube mould and take out the hardened concrete cubes carefully so that edges specimens are not damaged. Immerse the cubes in curing tank filled with water. Keep it for curing up to 28 days. [5] Test the cubes after 7, 14 and 28 days of curing to find the compressive strength. Tabulate Compressive strength for each cube and calculate average value for each mix. [1] Take a sample from a good quality mix of concrete, Clean the cylindrical mold and ensure mold free from dust and rust. [2] Fill the mold with concrete in three equal layers by proper compaction with the help of a tamping rod. Keep the top surface of concrete smooth by the trowel. [3] Mold with concrete samples should be covered with wet gunny bags or keep it undisturbed water for 24 hours at a temperature of $27^{\circ}\text{C} \pm 2$. [4] At the end of 24 hours take out the sample and remove the concrete samples from the mold and it should be immersed into the water for 7 or 28 days based on the test. [5] Take out a sample from the water after 24 hours prior to the test and it should be in dry condition. [6] The bearing surfaces of the machine and the loading strip free from dust. The specimen should be weighed in Newton prior to the test. [7] Now, place the specimen centrally between the loading strips and ensure the upper platen is parallel to the bottom platen. [8] Then apply the load gradually until the specimen break and note down the Value. The same method has been repeated for other samples

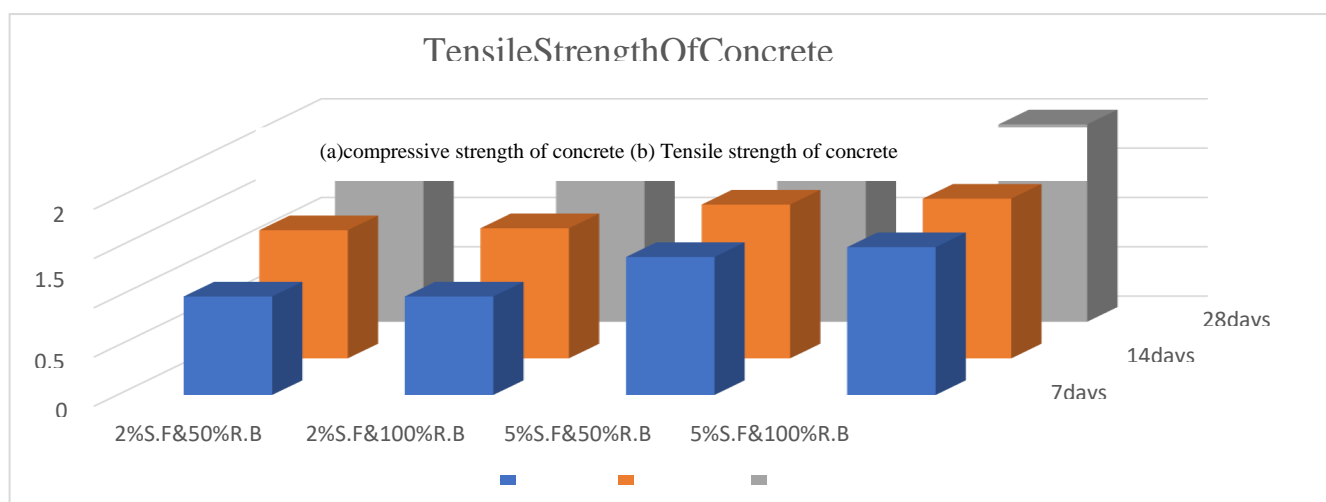
III. METHODOLOGY

The evaluation of Robo Sand and Steel fibers for use as a partial replacement of fine aggregate and coarse aggregates material begins with the concrete testing. The study is conducted to analyze the compressive strength of concrete when the base materials, i.e., fine aggregate and coarse aggregate is replaced with Robo sand and Steel fibers respectively. Compressive strength tests were done on compression testing machine using cube samples. Three samples per different proportions were tested with the average strength values reported in this paper. The Robo sand replacement with Fine aggregate was kept at 50%, and 100% by weight of M 15 grade concrete. Similarly, steel fibers replacement in Coarse aggregate was kept at 2%, 2.5%. In all total 27 cubes of OPC (150mm * 150mm * 150mm) were examined and results were analyzed after 28 days. Information obtained from the replacement is compared with data from a Conventional concrete.

IV. EXPERIMENTAL RESULTS



Figures shows the results of compressive strength test for nominal M15 concrete is 15 N/MM², by using ratios of fine aggregate and coarse aggregate partial replacement of robo sand and steel fibers. Figs. 2 shows the tensile strength test of concrete comparison of nominal M15 grade concrete and ratios of using the robo sand and steel fibers in the conventional concrete.



V. CONCLUSION

Compressive strength of grade of concrete mixes (M15) increased due to replacement of fine aggregate with robo sand. And adding steel fibers in coarse aggregate. However, compressive strength observed for grade of concrete mixes were appropriate for structural uses. M15 (15MPa) grade concrete mix obtained increase in 28-day compressive strength from 20MPa to 100% replacement of fine aggregate with robo sand and adding steel fibers in coarse aggregate strength was achieved.

Compressive strength also increased with increase in age for both grades of concrete. The rate of compressive development of robo sand concrete mixes were higher compared to no robo sand concrete mixes.

Concrete mixes obtained linear increase in 28-day splitting tensile strength from 1.5MPa to 1.9MPa for M20 grade of concrete mix

on replacement of fine aggregate with robo sand and adding steel fibers in coarse aggregate at percentages of 2% and 5%. tensile strength of all concrete mixes for both grades of concrete (M15) was found to increase with increase in replacement of fine aggregate with robo sand and adding steel fibers in coarse aggregate at percentages of 2% and 5%.

At the age of 28 days, splitting tensile strength of M15 grade of concrete mix (M-1) increased by 10%

Maximum increase in tensile strength was observed at 100% replacement of fine aggregate with robo sand and adding steel fibers in coarse aggregate at all age for grade of concrete (M15)

We have implemented an automatic text detection technique from an image for Inpainting. Our algorithm successfully detects the text region from the image which consists of mixed text-picture-graphic regions. We have applied our algorithm on many images and found that it successfully detect the text region.

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