

Influence of M-Sand in Self Compacting Concrete with Addition of Steel Fiber in M30 Grade

V. GOKULNATH¹, B. RAMESH², C. VISHNUSAI³

¹Assitant professor, Department Of Civil Engineering, , Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India., gokunath4civil@gmail.com

²Vice Principal, , Department Of Civil Engineering, , Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India, bramesh@gmail.com,

³Undergraduate Student, Department , Department Of Civil Engineering, , Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India, chittarivishnusai1996@gmail.com

Abstract

Self-compacting concrete is a stream sort of solid that spreads into the structure without the requirement for mechanical vibration. Self-compacting concrete is a non-isolating solid that is put by methods for its own weight. The measure of steel fiber in SCC has 0.3%, 0.6%, 0.9%, 1.2% and the steel fiber length has 30mm and 0.5diameter. To increment the functionality of cement the super plasticizer can be included. In this paper the solid throwing by utilizing the 3D square and new solid test should be possible .To recognize the solid quality the pressure quality should be possible in 7 days and 28 days

Keywords: Self compacting concrete, super plasticizer, flexural strength, split-tensile strength, steel fiber.

1. Introduction

M sand is utilized rather than stream sand for development reason. Normal or River sand are endured and destroyed particles of rocks and are of different evaluations or sizes relying on the measure of wearing. Self-solidifying concrete typically known as SCC is a solid blend which has a low yield and great deformability high isolation that diminishes partition of particles in cement with ordinary thickness important to ensure uniform suspension of strong particles while transporting, laying of cement without vibrates and up to setting of cement. Self-uniting cement can be utilized for profoundly fortified structures where mechanical vibrates are difficult to come to their by making great surface than standard cement. Steel filaments are ordinarily added to concrete in low volume portions (consistently under 1%), and have been had all the earmarks of being fruitful in diminishing plastic shrinkage breaking. Steel filaments typically don't by and large alter free shrinkage of concrete, anyway at adequately high estimations they can extend the security from part and lessening break width. In the vast majority of the building site the steel fiber has broadly utilized and diverse sorts of steel strands variable in the market. In this paper the steel fiber straight has been

utilized. It improves a few portrays and properties of the solid. The expansion of steel fiber has been increment the compressive quality of cement. Standard cement does not have palatable quality and solidness properties which is the most essential factor in different storied structure and in overwhelming solid structures. Because of the fast development in development industry and illicit mining of stream sand there is a shortage for sand which represent a genuine danger to eco framework too. For the above conditions there is a need to improve the solid with the required quality and improved execution with prudent and accessible materials. This paper demonstrates the utilizing of M sand supplanting waterway sand and steel fiber in Self compaction concrete.

2. Materials & Methods

3.1. Materials

3.1.1. Cement

Cement is the fine dim powder that goes about as restricting materials which is utilized for the development. The concrete that was utilized amid investigation was Ordinary Portland Cement 43 grade affirming to IS 8112 polluting influences were evacuated before the procedure.

3.1.2. Fine Aggregate

3.1.2.1. Sand

The sand that was utilized for the examination work was gotten locally that satisfies the necessity given by Indian Standard 383 1970. The immaculateness of the sand was broke down looking the code given by Indian Standard. This sand is normally happening in streams, lakes and lake zones. For the most part for setting up the solid 4.75mm size sand is utilized.

3.1.2.2. M-Sand

Fabricated sand (M-Sand) is a substitute of stream sand for solid development. Fabricated sand is delivered from hard rock stone by pounding. The pounded sand is of cubical shape with grounded edges, washed and reviewed to as a development material which can be utilized as ideal substitute for waterway sand for development.

3.1.3. Coarse Aggregate

The totals that are utilized for this exploration work are taken from the locally accessible regular shakes that are get held on 4.75micron strainer in the wake of being pulverized. These rock passes the necessity given by Indian Standard 383 1970. The totals should comprise the 20mm size to blend the SCC.

3.1.4. Steel Fiber

Section headings should be left justified, bold, with the first letter capitalized and numbered consecutively, starting with the Introduction. Sub-section headings should be in capital and lower-case italic letters, numbered 1.1, 1.2, etc, and left justified, with second and subsequent lines indented. All headings should have a minimum of three text lines after them before a page or column break. Ensure the text area is not blank except for the last page.

3.1.5 Super Plasticizer

Avoid hyphenation at the end of a line. Symbols denoting vectors and matrices should be indicated in bold type. Scalar variable names should normally be expressed using italics. Weights and measures should be expressed in SI units. All non-standard abbreviations or symbols must be defined when first mentioned, or a glossary provided.

3.1.6. Water

Crisp water free from acidic and natural substances is utilized for the analysis.

3. Result And Discussion

The stream capacity of oneself compacting concrete is checked through further test: J-ring, V-channel, L-box and U-box. The quality of oneself compacting concrete in solidified state is checked by another test. Pressure test is finished.

4.1. Fresh State Test

There are absolutely four kinds of new state tests done on self-compacting concrete.

4.2. U- Box Test

The filling ability of the self-compacting concrete is analyzed by U-box test. The U-box equipment is divided by using middle wall into sliding gate, the height of concrete in both sections to be measured. Where it can fill it in various forms of the structures.

Table. 1. U- Box Test Result

| % of Steel Fiber | River Sand | M-Sand |
|-------------------------|-------------------|---------------|
| 0.3 | 16 | 18 |
| 0.6 | 19 | 24 |
| 0.9 | 26 | 23 |
| 1.2 | 29 | 30 |

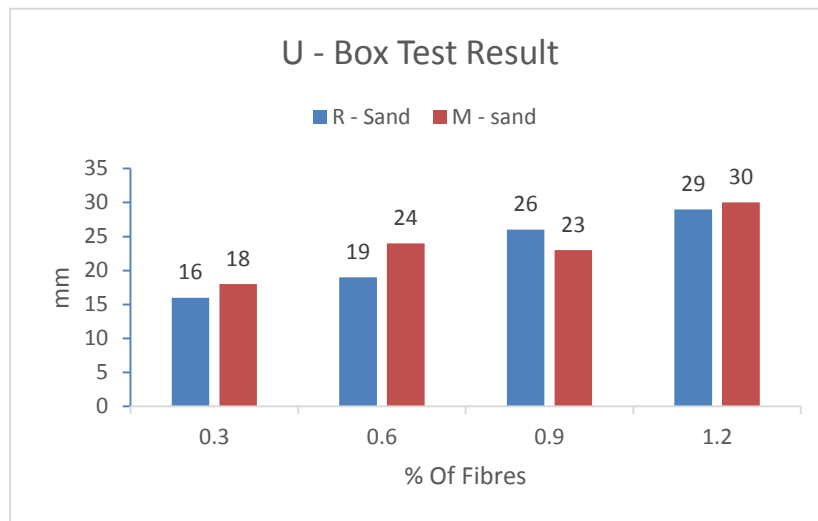


Fig. 1. Graph for U – Box Test Result

4.3. L – Box Test

The passing capacity of oneself compacting concrete is examined by L-box test. The base proportion of the tallness in the vertical segment is in respect to the flat segment is viewed as 0.8. In the event that guess the SCC streams as unreservedly as water, it will be completely level, and the proportion will be equivalent to 1.0. It is utilized to pass judgment on oneself compacting solid goes through basic stage.

Table. 2. L- Box Test Result

| % of Steel Fiber | River Sand | M-Sand |
|-------------------------|-------------------|---------------|
| 0.3 | 0.95 | 0.9 |
| 0.6 | 0.94 | 0.92 |
| 0.9 | 0.89 | 0.84 |
| 1.2 | 0.87 | 0.8 |

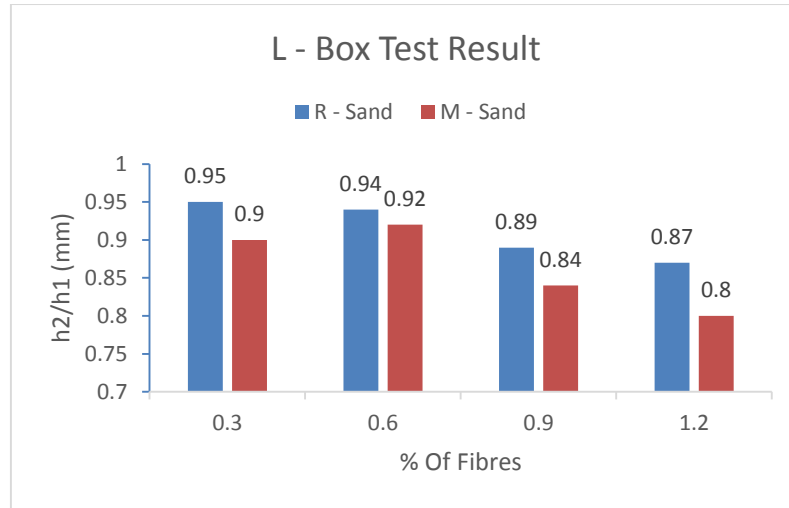


Fig. 2. Graph for L – Box Test Result

4.4. V – Funnel Text

This test is further to break down the streaming capacity of oneself compacting concrete. It isn't appropriate when total size surpasses 25mm. They utilize standard total size to frame self-compacting concrete.

Table. 3. V – Funnel Test Result

| % of Steel Fiber | River Sand | M-Sand |
|------------------|------------|--------|
| 0.3 | 8 | 7 |
| 0.6 | 9 | 10 |
| 0.9 | 10 | 9 |
| 1.2 | 8 | 6 |

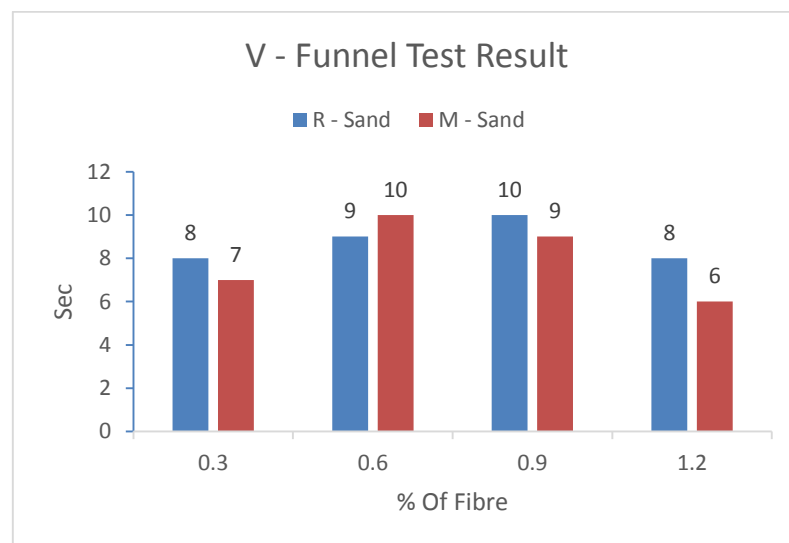


Fig. 3. Graph for V – Funnel Test Result

4.5. J – Ring Test

J-ring test is utilized to look at the stream capacity of one compacting concrete. It is made out of a size of inflexible ring upheld in distance across of 16mm bars similarly dispersed with 12 in breadth of 300mm hover 4 in 100mm over the level surface. The section of 25mm demonstrates great passing capacity and 50 mm shows poor passing capacity. It is estimated in separations (mm).

Table. 4. J – Ring Test Result

| % of Steel Fiber | River Sand | M-Sand |
|-------------------------|-------------------|---------------|
| 0.3 | 549 | 534 |
| 0.6 | 544 | 539 |
| 0.9 | 534 | 529 |
| 1.2 | 529 | 519 |

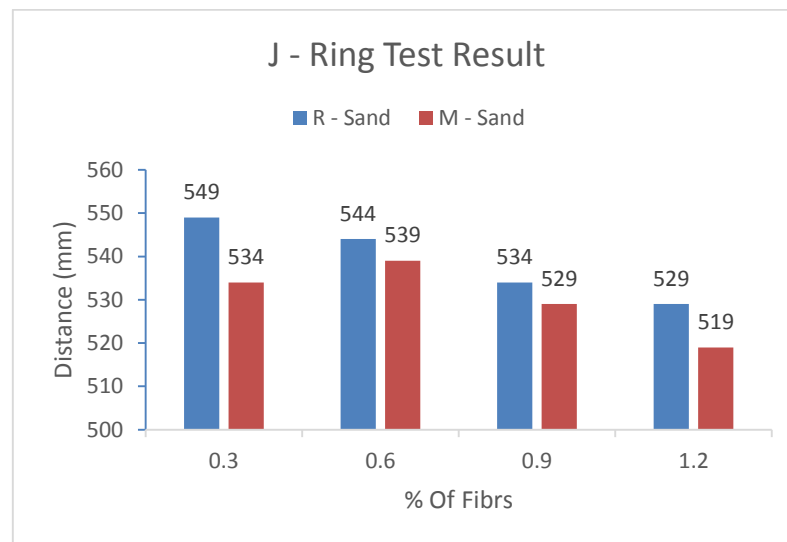


Fig. 4. Graph for J – Ring Test Result

4.6. Hardened State Test

In this test, we are going to test the examples of 3D shapes for 28-days. In which we can think about the consequences of River sand and M-sand. The qualities will be changed, because of variety of sand and distinctive level of steel fiber. Along these lines, the quality of oneself compacting concrete is done on CTM.

4.6.1. 28 Day Test for Flexural Test

This test demonstrates that one compacting concrete has picked up its most extreme compressive quality.

Table. 5. 28 Days Test Result For Flexural Test

| % of Steel Fiber | River Sand | M-Sand |
|-------------------------|-------------------|---------------|
| 0.3 | 7.7 | 7.3 |
| 0.6 | 8.6 | 8.3 |
| 0.9 | 9.3 | 9 |
| 1.2 | 9.8 | 9.2 |

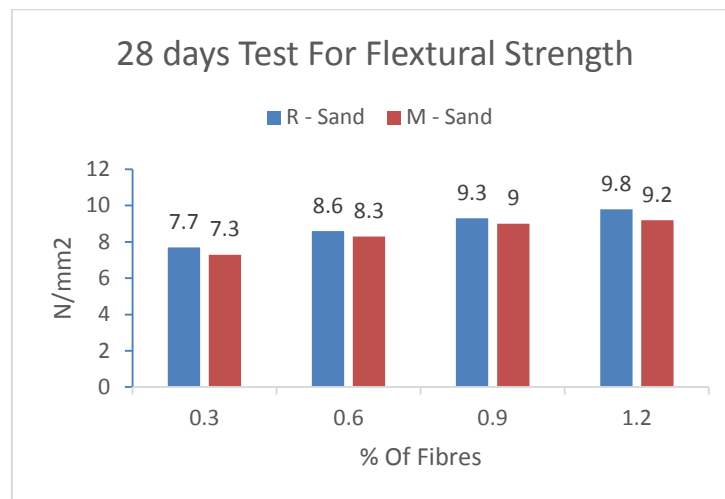


Fig. 5. 28 Days Test Result for Flexural Test

4.6.2. 28 Days Test For Split – Tensile Test

This test demonstrates that one compacting concrete has picked up its most extreme compressive quality.

Table. 6. 28 Days Test Result for Split – Tensile Test

| % of Steel Fiber | River Sand | M-Sand |
|-------------------------|-------------------|---------------|
| 0.3 | 1.4 | 1.2 |
| 0.6 | 1.7 | 1.5 |
| 0.9 | 4.2 | 4 |
| 1.2 | 5.2 | 5 |

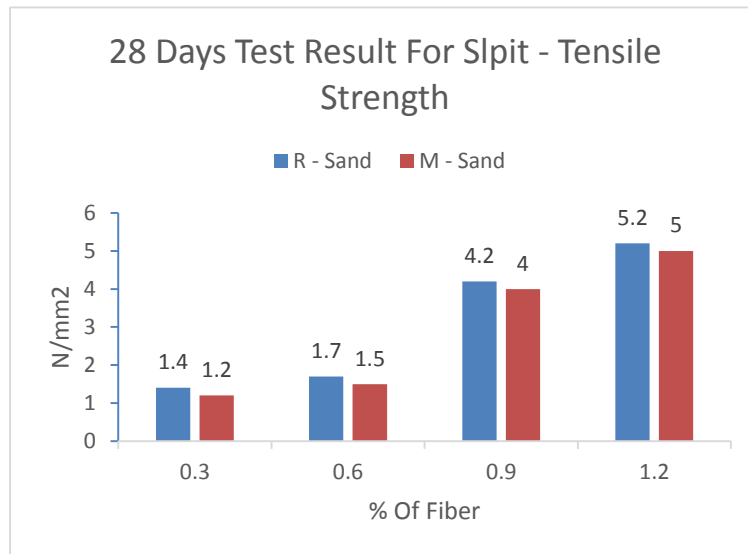


Fig. 6. 28 Days Test Result for Split – Tensile Test

Conclusion

In this paper we learn about quality gotten by including stream sand and supplanting of waterway sand with M sand in self-compaction concrete with expansion of steel filaments. The examination determines the accompanying end.

- By adding steel strands to crisp cement compressive quality increments by opposing breaks and their by expanding the solidness.
- Replacement of waterway sand with m sand gives a tasteful quality and can be utilized as exchange material for stream sand.
- Self-compaction concrete (SCC) can take care of effectively due to its accessibility property and utilizing of m sand can cut down the contamination and can be utilized as eco-friendly material.

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