International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

STUDY ON FLEXURAL STRENGTHENING OF RC BEAM WITH STEEL FIBRES IN FERROCEMENT LAMINATES

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Abstract - *The enhancement of the performance of a deficient structural element in a structure by analysing the behaviour of similar member failed before in the same loading circumstances is referred as strengthening. In this paper flexural strengthening of a RCC beam is analyzed when strengthened it with different combinations of ferrocement laminates under same loading conditions. In addition to a regular ferrocement laminates in this experiment steel fibres are incorporated so as to find the compatibility of fibres in laminates for strengthening purpose*

Key Words: Ferrocement, Stregnthening, Flexural strengthening, steel fibres, laminates

1. INTRODUCTION

The enhancement of the performance of a deficient structural element in a structure by analysing the behaviour of similar member failed before in the same loading circumstances is referred as strengthening. The fine diameter wires, with smaller openings pose more problems. This is overcome by using different types of fibres to improve the specific surface of the reinforcement. As the fibre take care of cracking of mortar, bigger diameter wire meshes with larger opening can be used and which simplify the penetration of mortar in the meshes. This results in a high strength material for which flexural properties can be designed and predicted with much accuracy. It also offers higher energy absorption capacity and impact resistance to ferrocement. Behaviour of such fibre in ferrocement laminates on reinforced beam will be studied in this project which includes flexural test.

2. CONCRETE CASTING AND TESTING

A concrete mixer is a device that homogeneous combines cement, aggregate, such as sand and water to form concrete. A typical concrete mixer uses a revolving drum to mix the components.

Fig -1: concrete mixing in pan mixer

2. TEST ON HARDENED CONCRETE

Table -2: compressive strength test results

NO. OF TRAIL	COMPRESSIVE STRENGTH AT 7 DAYS N/mm²	COMPRESSIVE STRENGTH AT 28 DAYS N/mm²
1	14.5	26.7
2	14.8	26.4
3	13.8	27.4
Average	**14.3**	**26.8**

3. FERROCEMENT AS A LAMINATE COMPOSITE

3.1 Combination of Mesh Used

Fig -2: Combination of mesh used

One layer of welded square mesh with steel fibres, Two layers of woven mesh and One layer of woven mesh + one layer of square welded mesh

3.2 Ferrocement laminates casting

Fig -3: Casting laminates using wooden mould of 25mm

3.3. Bonding agent used for laminates and beam

Fig -4: SBR 40 LATEX

4. TEST SETUP OF BEAM

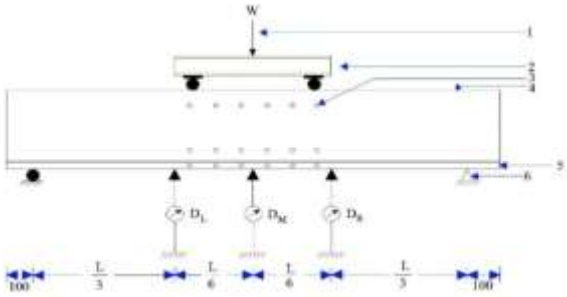
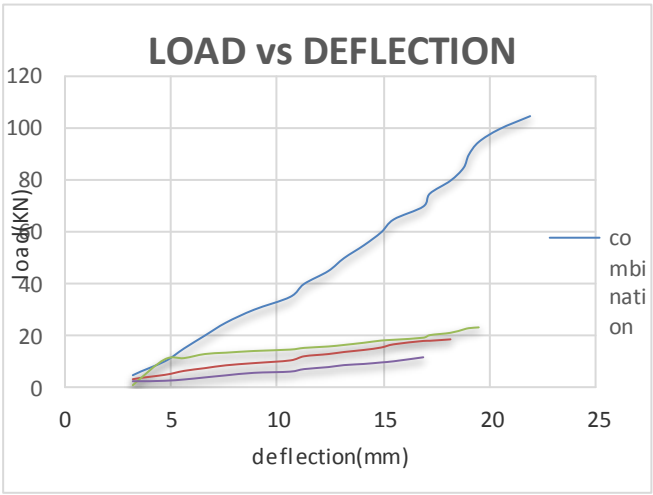


Fig -5: Test setup for strengthened beam

5. RESULTS AND DISCUSSION

A total of four beams were casted of size 250mm × 125mm ×3200mm in which one beam was treated as control beam and other three beams were strengthened using ferrocement laminates of 25mm thickness with different mesh combinations and the results obtained are as follows



3. CONCLUSIONS

•In the earlier work, attempts have been made by different authors to investigate the flexural, shear and tensile behaviour of ferrocement laminates with different parameters.
•Also most of the investigation are focused on the behavior of ferrocement laminates cast with cement and sand mortar with different parameter such as volume fraction, water cement ratio, type of wire mesh etc.,
•Further, no more information is available in the literature about the effect of fibre in ferrocement laminate on the strength and other properties like ductility factor, energy absorption, load deflection behavior etc.,
•Higher strength is attained when we use combination of woven and square mesh.
•Hence there is a lot of scope for studying the effect of fiber in ferrocement laminates and its application in strengthening of RC beams in flexure.

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