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FLEXURAL BEHAVIOR OF RC BEAM WITH WELDED MESH AS SHEAR REINFORCEMENT

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Abstract : An alternative reinforcement system, Welded mesh is planned to achieve the purpose of stirrups in Reinforced Concrete Beams. Welded Wire Mesh Built-up Method, comprises of galvanize welded wire mesh and vinyl glazed welded wire mesh making process. Welded mesh excludes some of the detailing problems linked in conventional rebar in the Reinforced Concrete. Usage of welded wire mesh results in stress-free and quicker assembly, and better budget and superiority control. In this present experimental work on the behavior of Rectangular concrete beams with Shear reinforcement by Welded mesh was carried out. Two beams with conventional reinforcement and four other beams with vary welded mesh were cast and tested under two point loading. The results were used to study the flexural behavior. It is obtained that the beam with continuous weld mesh and longitudinal bar given the maximum load carrying capacity

Keywords : Welded wire mesh ,Shear Reinforcement, Crack width, Stirupps

I. INTRODUCTION

This paper presents Flexural behavior of beam under two point loading with welded mesh as shear reinforcement. Welded wired mesh generally consists of wires arranged in two orthogonal directions and is prefabricated in a production line. Because of its economy, easy and faster of construction as well as better quality control. Welded mesh has been widely used in buildings that weld mesh can be a good substitute for the conventional reinforcement and yielded excellent results both in strength and ductility. This is because of a little is known about the structural behavior of RC Beams confined by Weld mesh as shear reinforcement. A Total of six beam specimens to made in this study. Four of the specimens with weld mesh at various longitudinal section as transverse reinforcement, while the other specimen is with conventional reinforcement. The parameters are to be investigated in this research included the spacing and grid configuration of weld mesh reinforcement, and the distribution of longitudinal reinforcement. It is well known that confined concrete behaves differently from unconfined concrete due to the effect of lateral pressure. Tests of reinforced concrete beams indicate that the strength and the ductility of concrete are improved not only by longitudinal reinforcement but also by shear reinforcement.

II. MATERIAL

Cement

The cement used in this experimental investigation was 53 grade OPC manufactured by Chettinad cements. This study holds out an Ordinary Portland cement of 53 Grade. Property testing on cement has resulted in a Specific gravity value of about 3.15

Fine Aggregate

The sand used for experimental program was locally procured and conforming to zone II. The sand was primarily sieved over 4.75 mm size sieve to take out any units bigger than 4.75 mm. The fine aggregates were tested as per Indian Standard Specification IS: 383-1970. Specific gravity of FA is 2.61

Coarse aggregate

Locally available coarse aggregates were used in this work. Aggregates passing through 20mm sieve and retained on 16mm sieve were sieved and tested as per Indian Standard Specifications IS: 383-1970. Coarse aggregate comprised a maximum size of 20 mm. The coarse aggregate specific gravities is 2.85(IS 2720(Part I – Sec I):1980)

Welded Mesh

Our range of welded mesh, highest in class and manufactured with compatible to IS: 1566-1982 with lengthy and cross wire space altering from 20 mm to 150 mm and diameter ranges from 2mm to 6mm..The connections are firmly welded and has the capability to tolerate the shear stress up to 210 N\mm^2 on the orientation area of the wire.

III. EXPERIMENTAL SETUP AND LOADING

Compressive strength

Compression test has been carried out on concrete cubes with standards confirming to IS 516-1999. All the samples were tested in a 1000KN capacity universal testing machine. After 28 days of curing, the cubes were permitted to turn into dry condition before testing. Plane surfaces of the specimen were between platens of compression testing machine and subjective to loading.

Tests for beams

All beams were tested in reaction type loading frame of capacity 500 KN. The span of the beams kept as 2000 mm with simply supported end condition and was tested under two-point loading applied at one third span points through a stiff beam. Deflections of the beams were measured by three LVDTs at mid span, one third span and one fourth span.

a. Load Deflection Behavior

Load Vs deflection plot has been drawn for all test specimens from the experimental data. The first crack and failure load were recorded along with corresponding displacements and strains

Table 3-Beam Specimen Details

Specimen Id	Details
control beam(12mm)	RC Beam
control beam (8 mm)	RC Beam
WM 1 (12mm)	Fully WM
WM 2 (8 mm)	Fully WM
WM 3 (12 mm)	Partial WM
WM 4 8mm)	Partial WM

Table 4-Load Vs Deflections

Type	Weld Mesh	Load(Tons)	Deflection
WM1	Fully(12mm)	20.4	6.9
WM2	Fully (8mm)	19.5	8.6
WM3	Partial(12mm)	15.4	7.4
WM4	Partial(8mm)	10.4	7.3

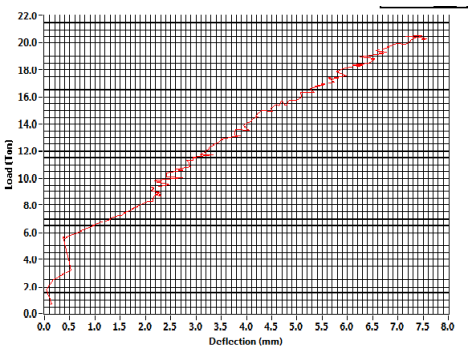

Fig 1-Load Vs Deflection For Specimen (WM 1)

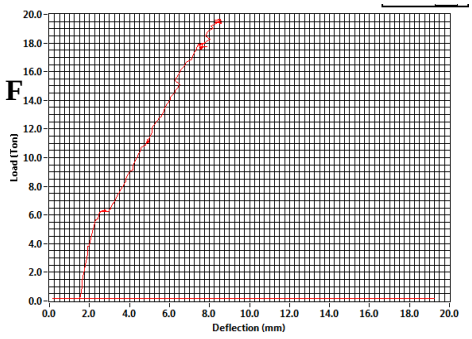

Fig 2-Load Vs Deflection For Specimen (WM 2)

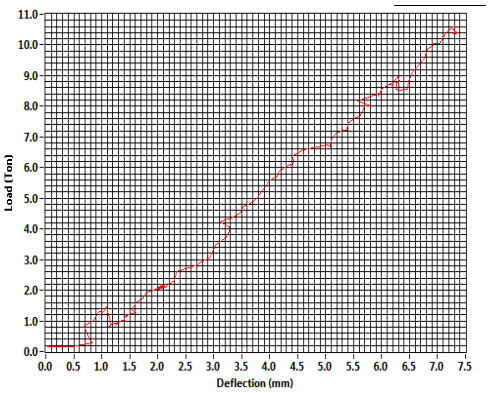

Fig 3-Load Vs Deflection For Specimen (WM 1)

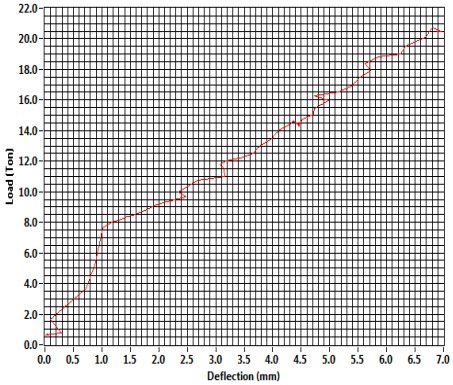

Fig 4-Load Vs Deflection For Specimen (WM 2

IV. CONCLUSION

- The flexural strength of beam increases nominally and remains unaffected compared to that of control specimen for the fully welded mesh shear reinforcement provided throughout the length of the specimen.
- Even though Shear Reinforcement was replaced with welded mesh there is no appreciable change in flexural load carrying capacity.
- The load carrying capacity reduces in the case of specimen provided with very small volume of welded mesh shear reinforcement at the supports only.
- In the mode of failure, the conventional RCC Beam specimen and welded mesh specimen are similar.
- When the shear stirrups are completely replaced with welded mesh, when the welded mesh distribute throughout the span, behavior of beam is better than other beam
- Out of the four specimens tested the specimens with the provision of fully welded mesh of grid configuration exhibits better performance.

- Since there is reduction in cost, the use if welded mesh is found to be an suitable alternative to conventional shear stirrups.

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