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REVIEW ON COUPLED SHEAR WALL IN MULTI STORY BUILDING

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ABSTRACT:

The cluster of research has been going on to develop the sustainable civil structures all over the world. The Coupled shear walls are general lateral load-resisting structural components in high-rise Reinforced Concrete (RC) buildings. These structures are having coupling beams spanning across the openings are normally the most critical elements. Due to less area availability, these beams are designed to be small in dimensions. Due to this the beams will be bended and there is stress on beams. Researchers have proposed the slender high rise buildings in recent years. The scope of this paper is to present the review on coupled shear wall for buildings.

KEYWORDS: Shear wall, Coupling beam, Earthquake resisting structure, etc.

I.INTRODUCTION:

Several structures have been developed, tested and implemented by the researchers for sustainable development. The civil structure plays a vital role in development of any country. The civil structure developed should withstand the loads, shear, and stresses throughout the life. Coupled shear wall is formed by joining two shear walls by beams. The shear walls are developed with the perspective of rational arrangements of the doors and windows. Ductile response is taken in to consideration during the design.

The plastic hinges are used in the coupling beams. The general aspects were considered for the selection of the various dimensions of the beams.

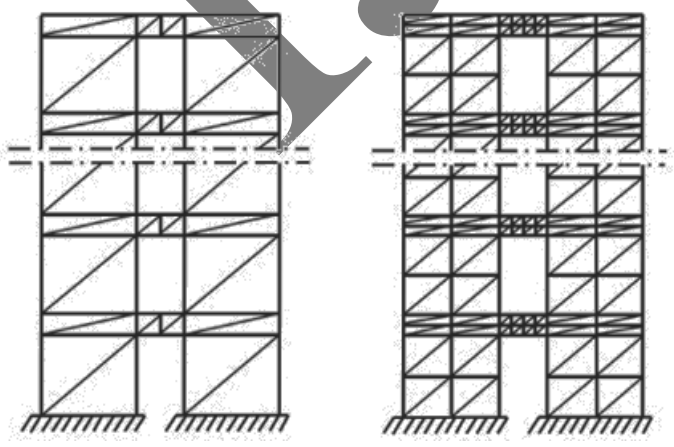

Fig.1: Coupled Shear Wall

II.LITERATURE REVIEW:

Binginan Gong, Bahram M. Shahrooz (2001), have proposed the study of Structural steel/composite material as coupling beam. The study is carried out to understand the response of steel coupling beam system. The motive of the study is to produce the results useful for the developing the structures with such beams. The study has proven that the encasement of steel for such beams prevents the collapsing.

Although their design process results in a conservative design and featured information of encased steel coupling beams, the improved strength and stiffness due to the neighboring concrete encasement.

Akash K. Walunj, Dipendu Bhunia, Samarth Gupta, Prabhat Gupta.etal (2013), have proposed the model for the analytical studies and calculations related to the coupling beams.

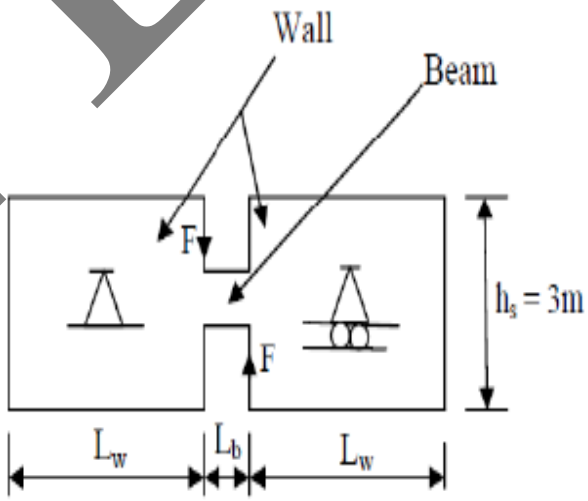

Fig.2: Proposed Investigative model

In this paper they were concluded that rotational capacities of beam depends on size of the beam, i.e. Lb, bw and d. and the behavior of the coupling beam should be governed by shear. The aspect ratio (Lb/db) of the coupling beam should be less than 1.5 to design as a coupling beam. Authors have got rotational limit at collapse prevention level (CP) for conventional reinforced coupling beam should be in the range of 0.01-0.02 radian.

Farrokh Forootan, Dr. Moghadam .etal(1998), have proposed the reinforced RC coupled beam for reducing the difficulties in the construction. The structure is suitable for the diagonally reinforced coupling beams. The study proposes an innovative and

simplistic reinforcing layout for RC coupling beams that significantly reduces design and construction difficulties when using diagonally reinforced coupling beams. The new Double-Beam Coupling Beam (DBCB) consists of two separate cages similar to those used for typical beams in reinforced concrete special moment frames. Upon large displacements, cracks begin developing at the DBCB's mid-span and mid height, then gradually propagates towards the beam's ends. The two beams will be former due to cracks. This split essentially transforms the shear-dominated single coupling beam behavior into a flexure-dominated slender beam behavior.

H.M. Arslan Antonio Capsoni .etal(2002) have proposed the contribution to the state of the art of coupled wall (CW) analysis and design by introducing a new design paradigm: expanding the concept of performance-based design into a domain where the nature of the structural form evolves within the context of the proposed performance objective. Furthermore, the damage is progressive; resulting in a structural system that does, in fact, evolve from behaving as a coupled wall (CW) system to behaving as a collection of linked wall piers (LWP) as shown schematically Based on this evolution of performance, the LWP system was found to be subject to large demands since the system is behaving as a stiffer CW system at lower performance levels. The procedure for the coupling beam failure mechanisms has been carried out by the authors.

A. Eljadei, Kent A. Harries.et.el, (2014) have presented the study on RC coupling beams on the basis of analysis method. Various 144 combinations of RC coupling beams have been studied by the authors.

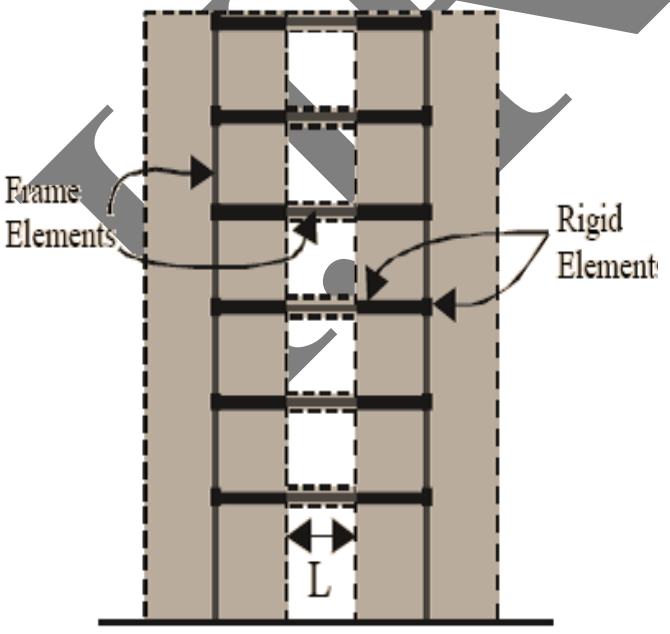

Fig.3: Two dimensional equivalent frame model of coupled wall system

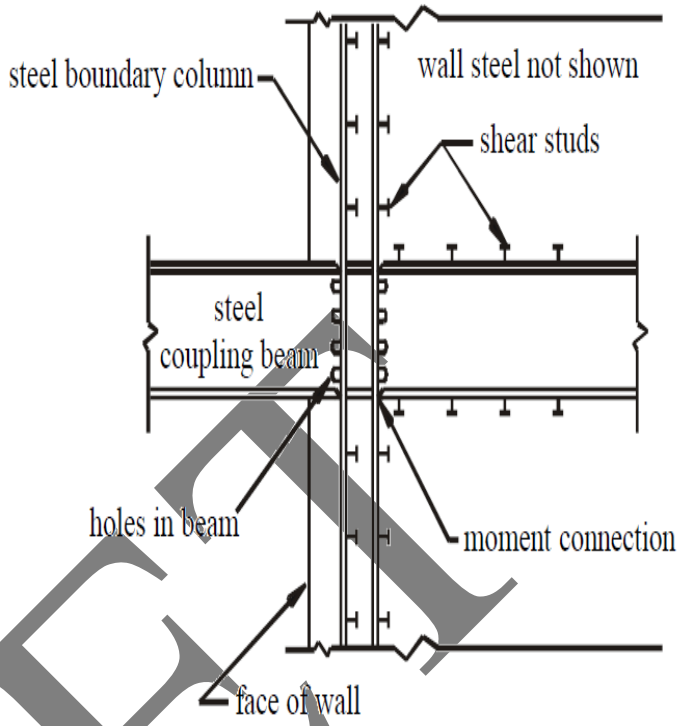

Fig. 4: Coupling beam connection to embedded steel column

III. CONCLUSION

Most of the researchers have done their work with steel coupling beam and by providing conventional reinforcement this paper is relevant to the diagonal reinforcement. Providing diagonal reinforcement is economic and proves better option during the extreme lateral forces. The various factors affecting the beam structures are studied. Developing the world class sustainable structure of the walls is the need of the time.

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