ANALYSIS OF THE SEISMIC BEHAVIOUR OF CONFINED MASONRY STRUCTURE

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ABSTRACT: ***The article focused confined masonry structure because unreinforced masonry building collapsed during earthquake but multistoried building using confined masonry structure they were able to withstand the earthquake of the same magnitude.We are taking example low-rise, medium rise building in different seismic zone first we have taken low rise building. The reinforced concrete used at every floor and also used post cast are used at each intersection of interior and exterior wall. For medium rise building, it used additional ring beams or tie columnsas intermediate column and also provided horizontal belts placed at masonry wall at spacing of 2-3m and 1-1.5 respectively. Confined Masonry Model experimentally showed good strength and deformable seismic reliability.***
Keywords: Confined Masonry; Ring Band; Tie Beams; Tie Columns

I. INTRODUCTION

Seismic Zones in India are divided into 4 zones.Confined masonry is best suitable in seismic zone where earthquake can damage Unreinforced or RC Frame structure economically. In seismic zone lot of buildings were damaged which were using unreinforced masonry in past due to earthquake therefore to improve the horizontal load bearing capacity and seismic reliability of masonry building, this method of Confined Masonry Construction was selected. We can avoid the earthquake damage using sufficient strength prove tie –beams and columns .Confined Masonry resists both lateral and gravity load. Tie beam resists overturning moment and confinement effect due to tie beam and column. They improve wall displacement capacity and seismic cyclic load. It also distributes the mass and provides more stiffness.

II. ANALYTICALMODEL

Tie beams and columns prevent diagonal cracks and also surface area restricted by tie beam and column between bands. Experimental results show that the horizontal bearing capacity wall was better because of RC belts. It was best than reinforced mortar joints. Column provided in the structure increased the horizontal and vertical load bearing capacity of the wall and it gave the partial method on the improvement of ductility and bearing capacity of masonry building. The confining members reduced the brittleness of the masonry wall under earthquake load and hence improving the earthquake performance.
It is shown here in figure 1 below -

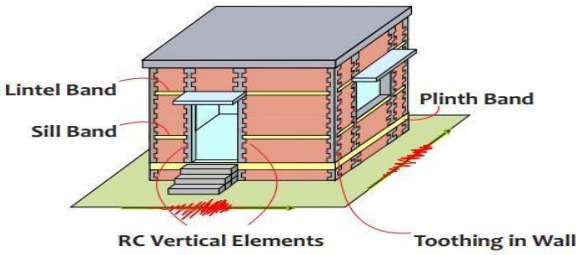

Fig.1. Confined Masonry earthquake-resistant structure

RoofSlab
Roof slab is directly tough with the wall and transfer loads to walls and both elements resistant against earthquake
Walls
Masonry structure transfer all vertical loads from roof slab to foundation and to resist the seismic forces, only confined wall are be able to resist the forces
Plinth Beam
Transfer the loads from the walls to the foundation and protect the first floor wall.
Foundation
Transfer by it all the loads from the structure to the ground

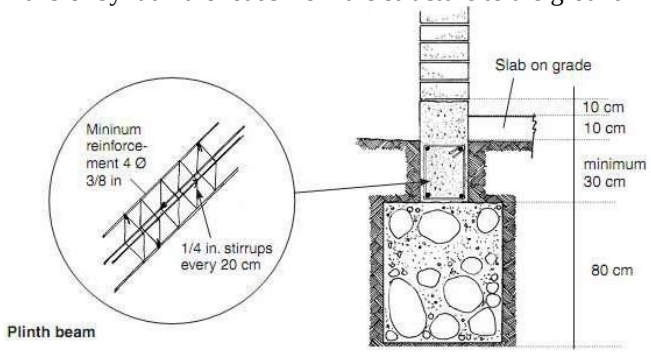

Fig.2. Plinth beam/band Steel Reinforcement

The behavior of strip foundation totally depends on the ground conditions. A modern trench digging for continuous foundation should be made. Bottom of trench should be compacted and leveled. Reinforcement bars of columns previously assembled so as a basket are placed and previously fixed into the foundation with reinforcement of all columns placed and provisionally fixed.

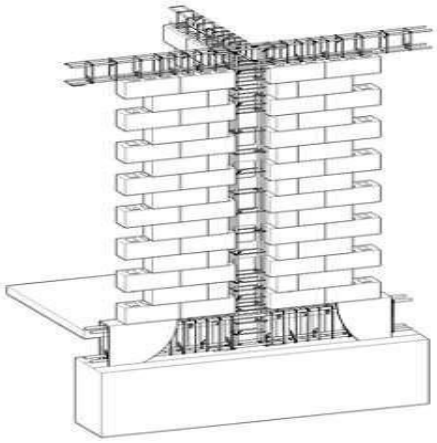

Fig.3. Beam with Column Reinforcement

About the over above plinth beam, it starts layering of brick/block units over mortar bed, forming masonry wall. Toothed edge has been left on each side of the wall. Toothed edges are essential for adequate wall confinement, which contributes to satisfactory earthquake performance. Masonry wall structure is uniform and regular. Details of confined masonry walls shown in following figure 4

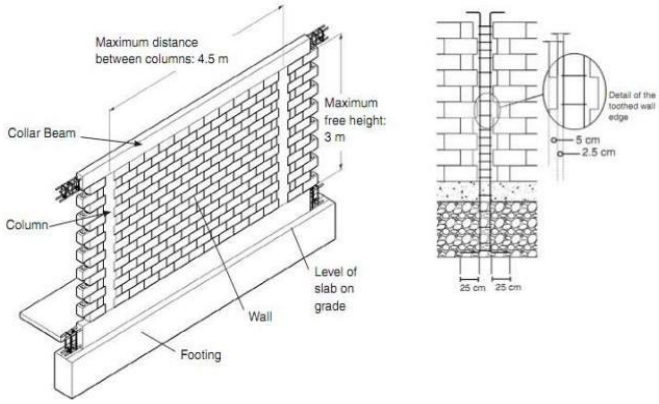

Fig.4Leftfigureshowsmaximumdistancetheconfinedelements withthemasonry wall and right figure shows toothed edges of the wall with tie columns.

Wall density of at least 2% in each of two orthogonal directions is required to ensure good earthquake performance of confined masonry construction in building. Since the earthquake performance of confined masonry buildings largely depends on the shear resistance of masonry walls Confined masonry structures will be more safe and stable if the walls are symmetrical along both sides, as shown in fig. 05. Wall density we keeps at least 2%in in at least two or orthogonal direction is be ensure good earthquake performances confined masonry structure its behavior largely depend on shear resistance among masonry wall its more safe at list there some description in figure 5

Fig.5. Poor and good distribution of wall left and right respectively

Horizontal and RC band provide atsill

The band mainly a role of "crack stopper" blocking diagonal cracks before they also provided stretch over the whole wall panel, thus its ensuring an increase in wall homogeneity during seismic load due to earthquake. here shown as in figure 6

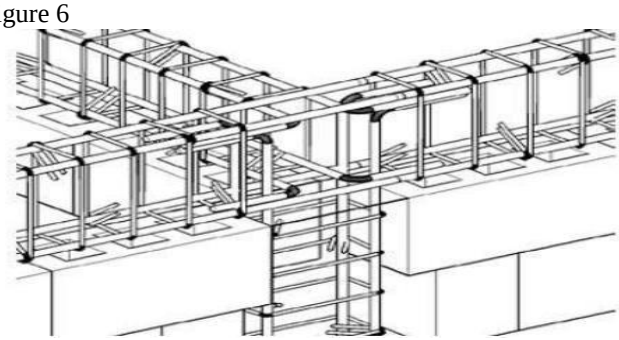

Fig. 6. earthquake performances. In tie beam and column

Length of opening should be not more than half of total length of wall Length of opening = l <L/2.

L= length of opening Good location Wall.

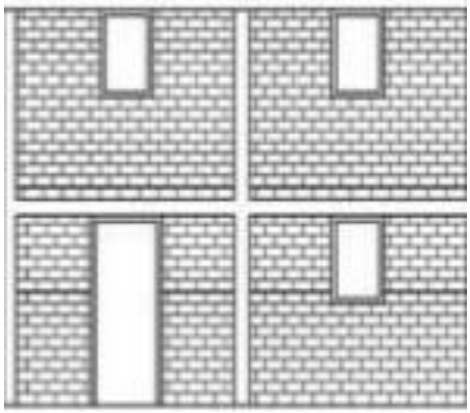

Fig. 7. Good location of window and doors openings for confined masonry structures.

Table 1 Comparison between Confined Masonry Construction with RC Frame Construction

	Confined masonry construction	RC frame construction
Gravity and lateral load resisting system	Masonry walls are the main load bearing elements and are expected to resist both gravity and lateral loads.	RC frames resist both gravity and lateral loads through their relatively large beams, columns
Foundation Construction	Strip footing beneath the wall and the RC plinth beam	Isolated footing beneath each column
Time period	Its take less time all complication	more time for completion
Economical	More economical than RC frame	Less economical than confined masonry

Fig.8. Confined masonry structure defined seismic reinforcement

III. EXPERIMENTAL ANALYSIS

We performed the cost estimation analysis of the building constructed as per the guidelines for Confined Masonry Construction. It was found out that it just not was easy to construct but also used lesser material than the same building would have took if constructed using RC frame construction. It saved the material by 16% as per the calculation and comparison between confined and RC frame construction.

IV. CONCLUSION

Above discussion and experimental analysis results shows that confined masonry structures are best suitable for resisting earthquake damage. It provides more strength and reliability against earthquake. It is also economical and easy to construct. We performed the cost estimation analysis of the building constructed as per the guidelines for Confined Masonry Construction. It was found out that it just not was easy to construct but also used lesser material than the same building would have took if constructed using RC frame construction. It saved the material by 16% as per the calculation and comparison between confined and RC frame construction.

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