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Performance Assesment of Column by Using Retrofitting

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Abstract – The many years ago the buildings were constructed without any consideration of IS Codes and without considering future plan. But peoples wants to add more storeys without demolishing the existing structures for like residential, commercial purposes. The present work is based on the weakening columns by using retrofitting technique by using ETABS 2016 software. When the floors are added on the previous constructed building the strength of previous constructed buildings are become lesser, that's why to regain its strength back retrofitting method is used The parameters checked before and after retrofitting technique the structure are displacement, story drift.

Key Words: column, retrofitted column, RC Jacketing, ETABS2016, AUTO CAD

1. INTRODUCTION

Jacketing is the most popularly used method for restoring of building columns. Jacketing is the process by which a section of an existing structural member is restored to original dimensions or increased in size by encasement using suitable materials. Jacketing of columns consists of added concrete with longitudinal and transverse reinforcement around the existing columns. Because of excessive loading, errors in design or construction, seismic damage also structural cracks, corrosion due to penetration and honeycombing retrofitting is needed. Reinforced concrete jacketing can be employed as a repair or strengthening scheme. Damaged regions of the existing members should be repaired prior to their jacketing.

2. LITERATURE REVIEW

a) B M Varsha1, Dr. M D Vijayananda

In this paper analysis of the structure is carried by using equivalent static method and modelling is carried out using ETABS-2016 software. To retrofit, the existing 4 storey building at Bangluru in zone II is taken, when a residential building is converted into commercial. According earthquake code book IS 1893(part I) 2002, the analysis is made on existing building on ZONE II and soil type II. Due to increase in loading on the existing building, beams and columns due to heavy loads are got weaken. Thats why, columns and beam retrofitting technique is used regain its strength. RC retrofitting technique enhances the axial load and moment carring capacity in beam and column. Hence, it is concluded that retrofitting technique enhances the axial load and moment carring capacity in beam and column.

b) Nikita Gupta1, Poonam Dhiman2, Anil Dhiman3

In this paper, column jacketing is carried out as per recommendations of Indian standard code IS 15988 (2013).Reinforced concrete jacketing improves column flexural strength and ductility. Closely spaced transverse reinforcement provided in the jacket improves the shear strength and ductility of the column. The procedure as per code for reinforced concrete jacketing is as follows: The existing column size and amount of Reinforcement is deducted to obtain the Amount of concrete and steel to be provided in the jacket .The extra size of column cross-section and Reinforcement is provided in the jacket. Increase the amount of concrete and steel actually to be provided .Thus, Jacketing for these types of building becomes a necessity in order to minimize the effects of future seismic shaking.

c) Bhavar Dadasaheb O,Dhake Pravinchandra D,Ogale Ramesh A.

Here the paper has its focus on a Health building which is under execution (for re modification and strengthening of existing structure). Strengthening of building considered in the report is an attempt to increase the life and to sustain the unwanted disturbances like, earthquakes floods etc. The building though was proposed to have been constructed as six storied building and was designed as per requirements, but was constructed only up to two storey, it should have worked or served for a period more than the designed life span, which is not so. And recommended the strengthening at early stage due to minor effects of disaster, uplift pressure of ground water table, bad workmanships, hence had to be retrofitted. Timely Repair of the structures can be concluded as, 'A stitch in time, Saves nine.'

d) Pranay Ranjan1, Poonam Dhiman2

In this paper, The building that is considered for this work has been modelled in STADD PRO

software. This residential building is situated in Patna, Bihar. As existing building was modelled as per cross-section of columns provided and load applied & analyze in Stadd Pro V8i and found that till 4 storey there is no any deficient (failed) columns because initially building was designed as per 4 storey. As we model 5 storey some of columns (six columns) of building failed. In this paper they studied the detailed comparison of RC, FRP and SFRC Jacketing.

e) **B Shivakumara Swamy1, Dhananjaiah M2**

In this paper, the study attempt is made on weakening points of structure (COLUMN RETROFITTING), when additional floor is constructed above existing floors. According earthquake code book IS 1893(PART-I) 2002, the analysis is made on existing building on weak zone(ZONE IV) and weak soil (TYPE-III).As above study G+4(existing structure) and 2storeys additionally added, so this the existing structure column has get weaken, so this column retrofitting technique is taken to regain its strength on existing columns. In this paper, The following are the conclusion taken before and after retrofitting. Storey displacement, is decrease displacement as storey height increase, displacement curve before and after retrofitting. Base shear is increased for different loading as before and after retrofitting. Storey drift is decrease as height increase as retrofitting is done. Percentage of reinforcement/column sizes increase after retrofitting is done for existing structure.

f) **Anju T.S1, Abin T.P2, Sreedevi A.Pillai3, Muhammed Ebrahim4, Babitha Peter5**

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g) **Ashhar Husain1 , Amit2 , Praveen Kumar P3 , B V Ramesh 4 , Basavaraj Dhannur5**

In this paper, the study attempt is made on weakening points of structure in STAAD-Pro software for the existing building (S+G+4) and for the building when two additional floors are added (S+G+6). They calculate loads for the existing S+G+4 building model and for the model when two additional floors are added (S+G+6) for which the use of Porotherm clay blocks is used. For S+G+6 building model, the increased sizes of each group are calculated and tabulated. For both column and footing retrofitting is required when two more stories are added on the top of existing S+G+4 building. Based on this study they conclude that retrofitting increases the load carrying capacity of the members by strengthening of the structure and enhances its performance.

h) **Y. Krishna Chaitanya 1 , Dr. S.R.K. Reddy 2 , Dr. G. Rakesh Reddy 3**

In this paper, One flat of a six storey apartment building situated in seismic zone III is chosen for evaluation, assessment and if found necessary, for appropriate retrofit methods. Assessment methods are followed according to the International codes FEMA-356 and ATC-40. Seismic analysis is carried out using IS 1893(2002) code provisions. This paper concludes that, slabs are parallel to earthquake forces generally, then slabs are not required to be strengthened. But, columns and beams which were not designed for seismic loads like earthquake forces are more dangerous against earthquake forces since shear forces will be induced in these elements for which it was not designed. Hence, generally columns and beams are to be retrofitted. R.C.C retrofitting technique enhances the axial load and moment carrying capacity in column. In order to overcome the earthquake risk associated with the existing building, the currently developing strategies and implementation of retrofit techniques are employed to better performance levels. The proper use of these emerging technologies in building retrofit will be cost economical.

3. METHODOLOGY

An existing four storey RC framed residential building situated in zone II is taken for this study.An existing FOUR storey RC framed residential building situated in ZONE II is taken. When this building was analyzed (i.e FOUR storey), none of the columns failed. When one more storey was added, 1 columns failed, after adding one extra

storey 9 columns are failed. The failed columns were retrofitted using concrete Jacketing.

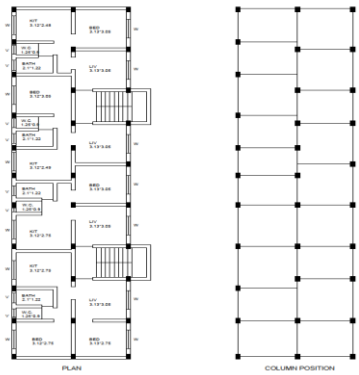

Fig -1: plan and column positions

4. CONCLUSIONS

1. The study was to investigate the response of an existing building. It showed that the building was in danger after adding two stories and after that RC jacketing was provided. It was analyzed in ETABS 2016.
2. While studing this I concluded providing RC jacketing will make it more strong.
3. We will also observe the behavior of building under storey drift and displacement.

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