Literature Review on Design Approach of Alteration of Two Storey into Four Storey Structure

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Abstract— Due to the scarcity of space and change in utility of structure, vertical expansion of the structure has become essential. There can be many reasons such as ever increasing population, changes in the operating system, required improvement of safety margins etc. This will be managed by increasing the number of stories. But the existing structure may or may not be able to sustain the newly constructed stories. Since the load carrying capacity of existing structure reduces due to age and relaxation. The existing structure must be strengthened to sustain additional storey load. During the design process various governing factors (like additional load, earthquake load, additional live load etc) will be considered.

Key words: Structure, Earthquake, Load Storey, Load Stories

I. INTRODUCTION

Jacketing is one of the most widely used worldwide technique for the strengthening of the structure. In this method, the R.C columns are strengthened by increasing stiffness and axial strength of an existing column. A durable material is fastened over concrete and gap is filled with grout. The section of an existing structural element is restored by encasing in new concrete. Previously designed existing structures were not earthquake resistant, to enhance the capacity of the existing structure following strengthening techniques are to be studied. Jacketing of beams, columns, beam-column joints, footings. Jacketing is a widely used and well-established technique. It involves the addition of steel reinforcing bars encased in a concrete jacket.

II. AIM AND OBJECTIVES

1) To study the static behavior of the structure.
2) To analyze and design existing structure (G+1) for design load.
3) To study strengthening techniques and its application in the existing structure.
4) To design (G+3) structure.

III. LITERATURE SURVEY

Oliveto and Marletta (2005), this paper considers the retrofitting of buildings subjected to earthquakes and briefly describes the main traditional and innovative methods of seismic retrofitting. examples taken from the professional, editorial and research activity of the senior author are used to illustrate the problems. among all the methods of seismic retrofitting, particular attention is devoted to the method which is based on stiffness reduction. this method is used in practice by application of the concept of springs in series, leading in fact to base isolation. the two springs in series represents the structure and the base isolation system.

gomes (2000), this paper presents a synthesis of strengthening of reinforced concrete beams and columns by external reinforcement. the design procedure, the methods of analysis and the evaluation of the design resistant bending moment and shear are presented. construction details for this type of strengthening procedure are also presented.

brena and alcocer (2009), in this paper, a comparison of the laboratory tests of jacketed reinforced concrete columns with modelling parameters is presented. this data is part of ongoing activities taking place within aci committee 369 – seismic repair and rehabilitation, that concentrate on an evaluation of existing guidelines for the seismic rehabilitation of concrete buildings. present laboratory tests found in the literature are used to compare the plastic deformation capacity of jacketed reinforced concrete columns with the corresponding modelling parameters. the primary types of jacketing materials that have been used to date (concrete, steel, and frp) are included in the study. particular attention is paid on whether plastic drifts in jacketed columns compare favorably with modelling parameters.

kaliyaperumal and sengupta (2009), the study has researched the effect of jacketing on the flexural strength and performance of columns. first, slant shear tests were carried out to study the interface between the old and new concrete. second, test was carried out column specimens to study the strength. third, tests were carried out on beam-column-joint sub-assemblage specimens to study the energy absorption and dissipation. analytical investigations were carried out to predict the experimental results. a lamellar approach and a simple method of analysis were used for the prediction of the moment interaction curves versus axial load and moment versus curvature curves for the retrofitted columns. an incremental nonlinear analysis was adopted to predict the lateral load versus displacement behavior for a retrofitted sub-assemblage specimen. guidelines for the retrofitting of columns by concrete jacketing are presented.

IV. CONCLUSIONS

Many of the studies have been carried out for various strengthening techniques. It can be found and observed that when the utility of structure changes during its lifespan, the structure can be modified to sustain or face the present day demands. There is further need for studies and research on this subject.

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