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RESEARCH ARTICLE OPEN ACCESS

A Survey on Seismic Response of Low, Mid and Highrise R. C. Building with Floating Column and Soft Storey at Different Level

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Abstract:

The point of this work is to look at the reaction of RC frame structure with floating columns and soft story building under earthquake loading and under normal loading. The significant goals of this work are, for example, to think about different structure and drawings,design of RC building. Additionally the essential point of this work is the similar investigation of seismic conduct of floating columns and non-floating columns at low Mid and Highrise R.C. Building. Assurance of seismic reaction of the models by utilizing response spectrum analysis in ETABS15 software

***Keywords*–Floating Columns, ETABS15, RC Frame, RC Building**

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I. INTRODUCTION

Presently a days multi-story structures built with the end goal of private, business, mechanical and so forth..with an open ground story is turning into a typical element. For the reason for stopping all, normally the ground story is kept free with no developments, aside from the segments which exchange the building weight to the ground. For a lodging or business building, where the lower floors contain dinner corridors, meeting rooms, halls, indicate rooms or stopping ranges, vast intruded on space required for the development of individuals or vehicles.Firmly dispersed segments in light of the format of upper floors are not alluring in the lower floors. So to maintain a strategic distance from that issue gliding section idea has appeared.

In urban zones, multistory structures are developed by giving gliding sections at the ground floor for the different purposes which are expressed previously. These skimming section structures are intended for gravity burdens and safe under gravity stacks however these structures are not intended for quake loads. So these structures are hazardous in seismic inclined zones.

II. WHAT IS FLOATING COLOUM

A column is meant to be a vertical member ranging from foundation level and transferring the load to the bottom. The term floating column is additionally a vertical element which ends at its lower level (termination level) rests on a beam which could be a horizontal member. The beams successively transfer the load to other columns below it. Such columns where the load was considered as point load. Theoretically such structures will be analyzed and designed. In practice, actuality columns below the termination level don't seem to be constructed with care and more prone to failure.

III. AIM OF THE WORK

The aim of this work is to compare the response of RC frame buildings with floating columns and soft

storey building under earthquake loading and under normal loading. The main objectivesofgiven workareasfollows:

1.TostudyvariousdesignanddrawingsofRCbuilding.

2. The primary aim of this work is the comparative study of seismic behavior of floatingcolumnsandnon-floatingcolumnsat low Mid and Highrise R.C.Building.

3.Determinationofseismicresponseof themodelsbyusingresponsespectrumanalysisinETABS15software.

4.Tostudytheeffectofinternalandexternalfloatingcolumnsonthebuildingunderearthquakeloadingforseismic zone.

5.Findingouteffectsonvariousparametersofbuildingunderseismiceventsduetopresenceoffloatingcolumns.

6.Tochecktheseismicresponseofanyexistingstructure withfloatingcolumns.

7.Todeterminewhichstructureissuperiortoanotherinhigherearthquakezones.

There won't be paper detailing the diff. Of adopting floating columns. You've got to try and do a 3 dimensional analysis and be very careful at the joints where the floating columns meet the transfer girders. A column is meant to be a vertical member ranging from foundation level and transferring the load to the bottom. The term floating column is also a vertical element which ends (due to architectural design/ site situation) at its lower level (termination level) rests on a beam which could be a horizontal member

IV. LITERATURE REVIEW

Literature survey and the study of it is done for the determination of the short comes of the Floating Column research. It is necessary for the investigation of the load transfer path of the building. This survey helps to decide the purpose and objectives of the present study. Literature study is done on the research of floating column, effect of load transfer path and seismic behavior of floating column and non floating column and short study on the effect of response spectrum. -

Nikhil Bandwal1, AnantPande [1]

In this paper the creator has investigated the working with all engineering complexities for all conditions including tremor stack. The building picked was 16.8 m high building. To concentrate the impact of different loads in different Earthquake zone the building was demonstrated according to arrange and the arrangement was re-altered in four diverse ways with the goal that aggregate number of cases are four to be specific. Typical RC Building with no coasting section. RC Building with External skimming segments. RC Building with Internal drifting segments. RC Building with Internal and External Floating segments. The Authors reasoned that: Provision of Case 2 (External Floating sections) may Increase removals at different hubs. With the arrangement of Case 4 (External and Internal Floating sections) and case 3(Internal Floating Columns) may increment Axial Force Fx and Shear in z heading (Fz) at all floors. It is observed that case 4 (Internal and External Floating sections) Increases the Mx and Mz Values at all floors for All zones.

Mr. P.V. Prasad ,T.RajaSekhar [2]

The creators have considered conduct of multistorey structures with gliding sections under seismic tremor excitations. Limited component strategy is utilized to explain the dynamic administering condition. In this paper entitled investigation of conduct of seismic examination of multi storied structures with and without drifting section is completed on gliding segment and different segments influenced because of coasting segment. A four story two straight 2D outline with and without drifting segment are dissected for static stacking utilizing the present FEM code and the business programming STAAD Pro. Taking after conclusion was drawn the static and free vibration comes about got utilizing present limited component code are approved. The dynamic examination of edge is considered by shifting the segment measurement. It's presumed that with increment in ground floor section the foremost extreme uprooting is diminishing and base shear changes with the segment measurement.

Isha Rohilla1, S.M. Gupta [3]

In this paper, the basic position of skimming section in vertically sporadic structures has been talked about for G~ez_plus~5 and G~ez_plus~7 RC structures for zone II and zone V. Likewise the impact of size of pillars and segments conveying the heap of drifting section has been evaluated. Additionally for each model 2 instances of abnormalities have been taken. Each model comprises of two coves at the dispersing of 5 m each and 1 inlet at 6m separating in X course. However in Y-heading each straight is at dividing of 5m. The significance element and reaction diminishment figure have been utilized as 1 and 5 individually in the investigation. Tremor has been considered in X course as it were. The reaction of building, for example, story float, story uprooting and story shear has been utilized to assess the outcomes acquired utilizing ETABS programming. The creators stated: Drifting segments ought to be kept away from in tall structure in zone 5 in light of its poor execution. Story dislodging and story float increments because of nearness of drifting segment. Story relocation increments with increment in load on coasting section. Story shear diminishes in nearness of skimming segment due to decrease mass of section in structure.

Er. Ashfi Rahman. [4]

He investigated a multistorey working with and without skimming segments by utilizing reaction range examination. Distinctive instances of the building are examined by shifting the area of skimming sections floor astute and inside the floor. In this review initial a typical building (NB) with no gliding segments is displayed. At that point, two sorts of models, specifically 1 and 2 are demonstrated. In model 1, the coasting segments

are situated at ground floor and in model 2 they are situated at first floor. For each model three unique cases are examined by fluctuating the area of gliding sections. The conclusions were as per the following It was watched that in working with skimming sections there is an expansion in major day and age in both X direction and in addition Z-course when contrasted with working without coasting segments (NB). By presentation of coasting sections in a building base shear and unearthly speeding up reductions. Along these lines, it has this specialized and utilitarian preferred standpoint over customary development.

SreekanthGandlaNanabala. [5]

This paper additionally concentrates the variety of the both structures by applying the powers of the past quakes i.e., applying the ground movements to the both structures, from that uprooting time history qualities are thought about: The accompanying conclusions were drawn in light of the examination. From the time history investigation it is seen that the gliding section building is having a greater number of removals than a typical building. So coasting section building is hazardous than an ordinary building.

V. METHODOLOGY

The present work is to study the importance of explicitly recognizing the presence of with and without floating column in Bare and Infill Frame in the analysis of building; and also along with floating column some complexities were considered forG+5, G+10 and G+15 storey building at different alternative location, for ZONE II by using equivalent static load method.

Structural Details

Unit weight of Reinforced Concrete = 25 kN/m3

- Unit weight of Brick = 19 kN/m3
- Zone factor = 0.36 (zone V)
- Importance factor = 1.0
- Soil condition = Medium soil
- Damping = 5%•

Parameters to find the equivalent diagonal strut Size of beam = 400mm*400mm

- Size of column = 500mm*500mm
- Thickness of masonry infill, t = 0.230 m
- Moment of Inertia of Beam / Column = 1.08 x 10-08 m

•2 Modulus of elasticity of concrete = 2.5 x 107 kN/m2

Modulus of elasticity of masonry infill = 1.38 x 107 kN/m2

VI. INTRODUCTION TO ETAB SOFTWARE

For nearly 30 years, ETABS has been recognized as the industry standard for Building Analysis and Design Software. Today, continuing in the same tradition, ETABS has evolved into a completely Integrated Building Analysis and Design Environment.

ETABS is the solution, whether you are designing a simple 2D frame or performing a +dynamic analysis of a complex high-rise that utilizes non-linear dampers for inter-story drift control. In any endeavor, a tool tailored to a task is the most efficient. For Buildings, ETABS provides the automation and specialized options needed to make the process of model creation, analysis and design fast and convenient. In addition, because ETABS includes complete and detailed steel and concrete design calculations for beams and columns, braces, wall sand slabs, the time typically associated with the transfer of data between analysis and design programs has been eliminated.

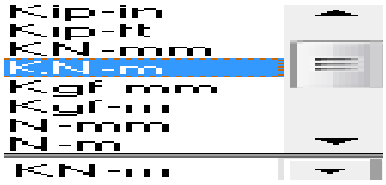
LEARNING OF ETABS SOFTWARE

A step-by-step procedure for modeling and analysis of frame structure using ETABS is explained using a simple example. Subsequently an example of analysis of regular frame structure are solved through ETABS.Step by step procedure to learn ETABS

Step 1: Modeling using ETABS

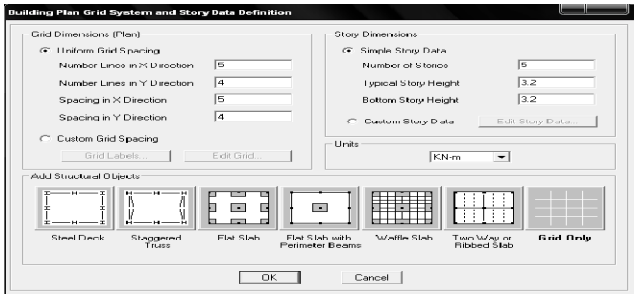
1) Open the ETABS Program

2) Check the different units of the model in the drop-down box in the lower right-hand corner of the ETABS window, click the drop-down box to set units to kN-m.



2) Click the File menu >New model command

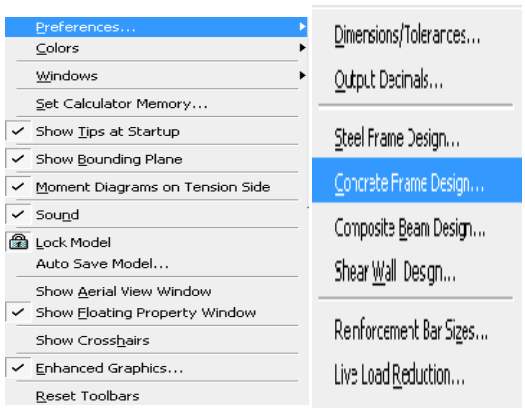
4) The next form of Building Plan Grid System and Story Data Definition will bedisplayed after you select NO button.

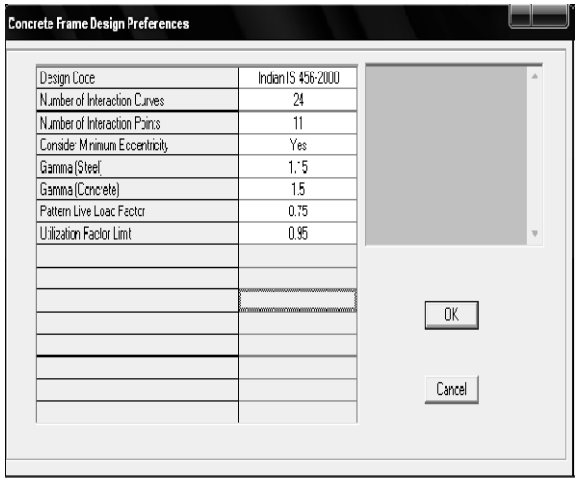


Set the grid line and spacing between two grid lines. Set the story height data using Edit Story Data command

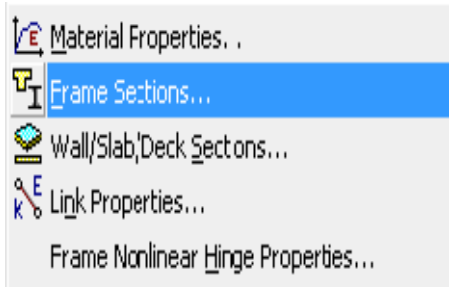
5)Define the design code using Options > Preferences > Concrete Frame DesignCommand.

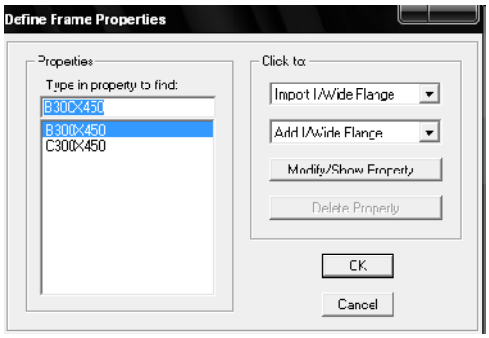
This will Display the Steel Frame Design Preference form as shown in the figure



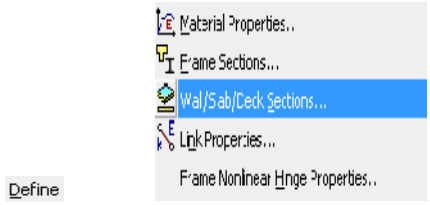


7) Define section columns and beams using Define > Frame section

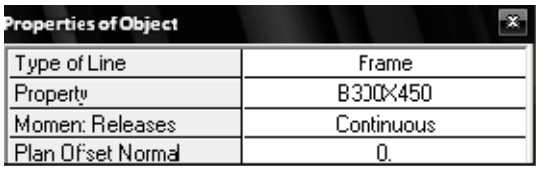




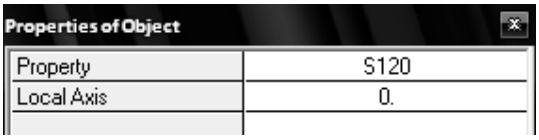
8) Define wall/slab/deck



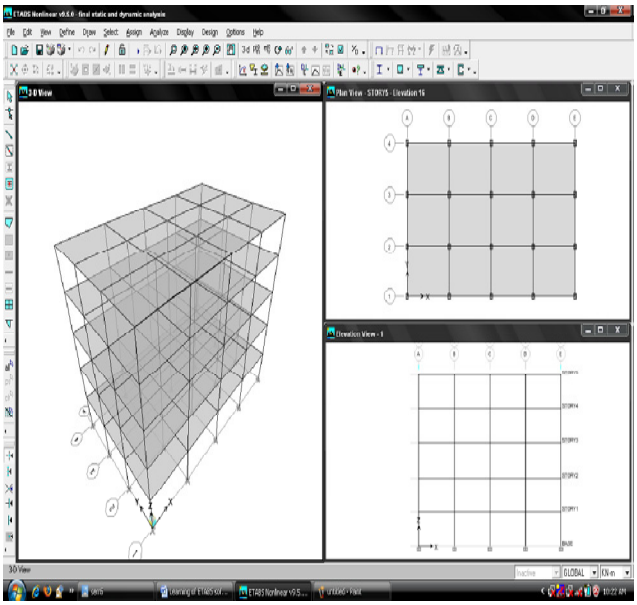
9) generate the model Draw beam using Create Line Command and draw column using Create Column Command



Slab is created using 3 options in which 1st draw any shape area, 2nd draw rectangular area and 3rd create area in between grid line



Above creating option used to generate the model as shown in below figure



VII. CONCLUSIONS

As per this study it is found that, structure with floating column construction has grown rapidly and caught everyone's attention in structural engineering. Floating column system is one of such developments considering the disaster and vulnerability to disasters of tall structure in higher seismic zone more efficient structural system has become the need of the society and environment. Buildings with floating columns have discontinuities in the load transfer path. Closely spaced columns are not desirable at the lower level floors. These buildings are designed for gravity loads but not for earthquake loads. These buildings are unsafe in seismic prone areas.

VIII. REFERENCES

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