

Seismic Behaviour of Multi-Storied Building With And Without Floating Column

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Abstract- In today's stream age, we have a large group of development methods available to us. Steel structures, R.C.C. structures, Core and frame kind of structure (mix of steel and R.C.C development). Now and again this decision accessible prompts to perplexity. The most ideal path is to choose the kind of development, contingent upon the conditions and sort of structure. Stack exchange way has an incredible significance in the event of auxiliary steadiness in extremely real seismic tremor. There are various perceptions of harms created by anomaly in structures, for example, vertical abnormality is transcendent to structure while seismic tremor excitation, the quake strengths created at various floor levels in building should be conveyed down along the tallness to the ground by the most brief way, any deviation or intermittence, for example, gliding segments brings about poor execution of building. The point of this work is to look at the reaction of RC casing structures with and without drifting sections under seismic tremor stacking and under ordinary stacking. The impact of tremor powers on different building models for different parameters is proposed to be completed with the assistance of reaction range investigation. Fetched assessment of both the models. The thought is to achieve a clear conclusion in regards to the predominance of the two structures more than each other.

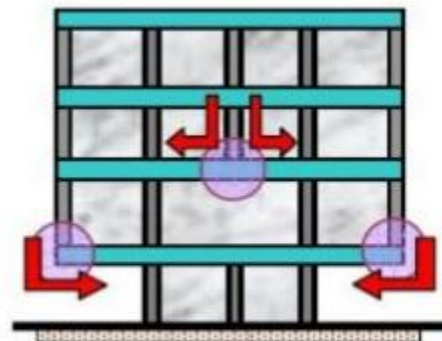
Keywords- Floating Columns, Earthquake, Storey Drift, Base Shear.

I. INTRODUCTION

A section should be a vertical part beginning from establishment level and exchanging the heap to the ground. The term skimming section is likewise a vertical component which at its lower level lays on a bar which is a flat part. Structures with sections that hang or buoy on pillars at a transitional story and don't go the distance to the establishment, have discontinuities in the heap exchange way. The pillars thus exchange the heap to different sections beneath it. Such segments where the heap was considered as a point stack.

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, multi story 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.



Hanging or Floating Columns

Fig.1: Floating columns in a multi-storey building

II. LITERATURE REVIEW

1. Various literature has introduced for SEISMIC BEHAVIOUR OF MULTI-STORIED BUILDING

Nikhil Bandwall, Anant Pande., (2014) 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 F_x and Shear in z heading (F_z) at all floors. It is watched that case 4 (Internal and External Floating sections) Increases the M_x and M_z Values at all floors for All zones.

Mr. P.V. Prasad ,T.Raja Sekhar, (2014) 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 is presumed that with increment in ground floor section the most extreme uprooting is diminishing and base shear changes with the segment measurements.

Srikanth M.K., (2014) Made an endeavor to uncover the impacts of coasting segment and delicate story in various quake zones by seismic examination. For this reason Push over examination is received on the grounds that this investigation will yield execution level of working for plan limit (relocation) did up to disappointment, it helps assurance of fall load and malleability limit of the structure. To accomplish this goal, three RC uncovered casing structures with G+4, G+9, G+15 stories individually will be broke down and analyzed the base compel and uprooting of RC exposed casing structure with G+4, G+9, G+15 stories in various seismic tremor zones like Rajkot, Jamnagar and Bhuj utilizing SAP 2000 14 investigation bundle. Creators closed: In existing G+4 building, First story made with delicate story and Floating section demonstrates its execution in Immediate Occupancy (IO) go. In existing G+9 building, First story made with delicate story and Floating section demonstrates its execution in Immediate Occupancy (IO) - Life Safety (LS) run. In New G+15 building, First story made with delicate story and Floating section demonstrates its execution in Immediate

Occupancy (IO) - Life Safety (LS) go. At Soft Story level, Most of pivots are in Life Safety run.

Isha Rohilla1, S.M. Gupta. (2015) 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. (2015) 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 unearthy speeding up reductions. Along these lines, it has this specialized and utilitarian preferred standpoint over customary development.

A.P. Mundada and S.G. Sawdatkar. (2014) In this paper the review is completed on a working with and without coasting sections. The building considered is a private building having G+7. Add up to building comprises of 2 stages. first stage comprises of lower two story accommodated stopping purpose. 2nd stage is of private pads from first floor to seventh floor. Three cases were viewed as: Case 1: It is the model in which every one of the sections are refreshed on the ground. Every one of the sections ascend to the top floor of the building and no segment is glided or ended at any level. It alludes to typical casing building. Case 2a: In this all the section are not refreshed on the ground level. Certain sections are coasted from the primary floor to upper floors. Additionally a few segments are ended at first floor from which the sections are drifted. For this situation, the arrangement covers more zone than when contrasted with case 1. Cantilever projections are additionally given at specific focuses. Case 2b: It is same as case 2.a with the exception of that struts are given beneath the skimming sections keeping in mind the end goal to adjust the minutes and gives security. Certain sections i.e. comparable segments in every one of the three models are considered and checked for its minutes in X and Z bearings, diversion and section shear at each floor. The results are introduced as charts utilizing STADD.Pro. In light of the examination comes about after conclusions are drawn, The likelihood of disappointment of Case 2a is higher by contrasting estimations of M_x and M_z and different cases. The probabilities of disappointment of without skimming section are less when contrasted with gliding segment. For this situation, the minute qualities are essentially not exactly with skimming segment (Case 2a). The distinction in the probabilities of disappointment with coasting segment is more than gliding segment with slanted compressive part i.e. struts. (Case 2b). From the review, It is found that, the redirection in Case 2a (with gliding segment) is more than the avoidance in Case 2b (skimming segment with struts).

Srekanth Gandla Nanabala. (2014) 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.

III. OBJECTIVES

The aim of this work is to compare the response of RC frame buildings with and without floating columns under earthquake loading and under normal loading. The major objectives of this work are as follows:

1. The primary aim of this work is the comparative study of seismic behavior of floating columns and non-floating columns of R.C. Building
2. Determination of seismic response of both the models by using response spectrum analysis in ETABS15 software.
3. To study the effect of internal and external floating columns on the building under earthquake loading for seismic zones.
4. Cost evaluation of both the models if designed as earthquake resistant.
5. Finding out effects on various parameters of RC building under seismic events due to presence of floating columns
6. To check the seismic response of any existing structure with floating columns.
7. To determine which structure is superior to another in higher earthquake zones.

III. METHODOLOGY

A few investigation techniques, both versatile and inelastic, are accessible to foresee the seismic conduct of the structures. A Response Spectrum Analysis (RSA) will be done utilizing ETABS15 programming. ETABS15 is a completely incorporated program that permits display creation, alteration, execution of examination, outline improvement, and results survey from inside a solitary interface. ETABS15 is an independent limited component based auxiliary program for the examination and plan of common structures. It offers a natural, yet effective UI with many devices to help in fast and exact development of the models, alongside refined strategy expected to accomplish more unpredictable undertakings. An aggregate 2 number of issues will be brought with and without gliding sections to concentrate seismic conduct. The issues will incorporate, near investigation of seismic examination of working without coasting segments, and seismic investigation of a working with skimming sections. The yield results will be communicated as far as sidelong relocations, internal story float, base shear and examination of measure of steel and cement required in various cases.

IV. RESULTS & DISCUSSION

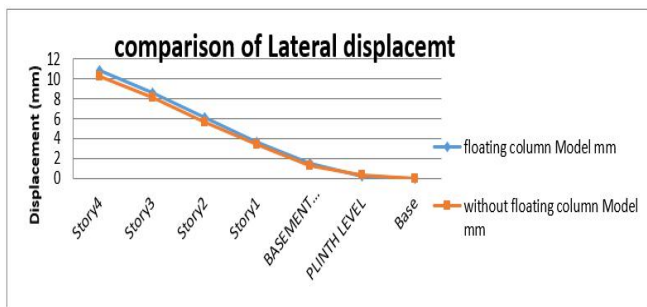


Fig.1: Comparison of Lateral Displacements

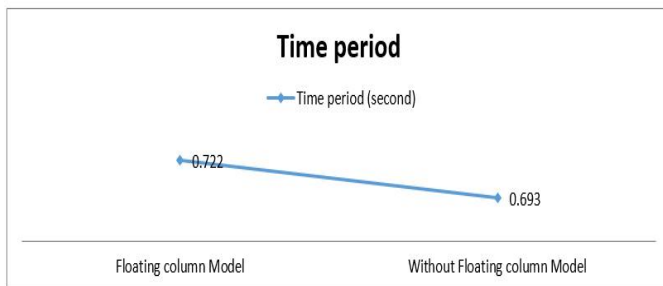


Fig.2: Time period of one cycle of shaking of building.

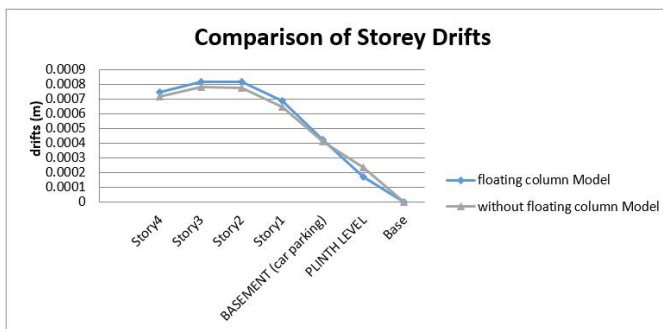


Fig.3: Comparison of Storey Drifts

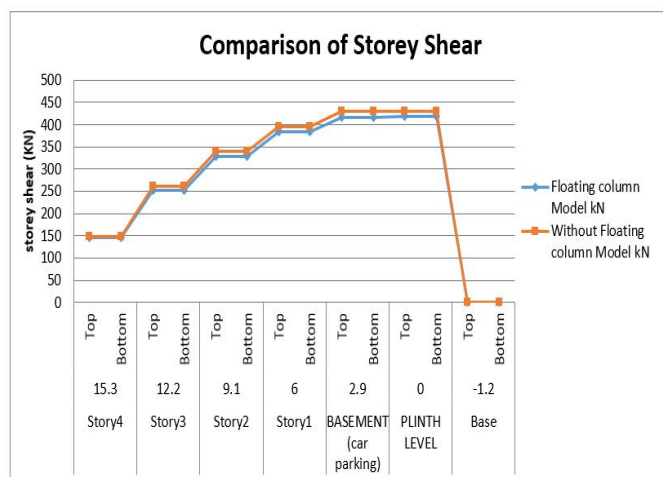


Fig.4: Comparison of Storey Shear

V.CONCLUSION

Writing audit introduces the seismic conduct of structures with gliding sections and without gliding sections for various basic complexities. It was watched that, arrangement of drifting segments at various areas influences the execution of working amid tremor moreover diverse parameters, for example, story float, story shear, dislodging increments. It was too watched that, structures with gliding sections are not prudent if outlined as quake safe. It was also observed that, buildings with floating columns are not economical if designed as earthquake resistant.

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