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ANALYSIS AND DESIGN OF WIND LOAD AND EARTH LOAD ON G+30 HIGH RISE BUILDING USING ETABS IN ZONE IV AND ZONE V

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ABSTRACT- From the olden time we realize that quake is a calamity causing event. Cutting edge days developments are fitting progressively limited and extra slanted to influence and subsequently to influence and subsequently adverse inside the earthquake. Analysts and designers have worked out inside the past to make the developments as quake safe. After numerous useful reports it has demonstrated that utilization of horizontal burden opposing techniques in the developing arrangement has definitely expanded the presentation of the structure in seismic tremor by utilizing ETABS 9.7.4, the work has been done for the particular examples using shear divider and bracings for the outstanding statures, and greatest top respected for the reward gain information of is 93.5m.
The displaying is finished to look at the result of unique conditions alongside explicit statures seismic parameters like Story displacement, Shear force, Building Torsion, Bending Moment, Time period. The gain knowledge of has been implemented for the Zone IV and Zone V in Soil Type II (medium soils) as targeted in IS 1893-2002.

Key words: Earthquake, ETABS 9.7.4, Story drift, Shear force, Building torsion, bending moment, Time period.

I. INTRODUCTION

As of late there has been a significant increment in the quantity of tall structures, both private and business, and the cutting edge pattern is towards taller structures. Tall Buildings are a typical element nowadays in both created and creating economies and with the expansion in populace and absence of open spaces rather than single celebrated developments, multi-celebrated structures are progressively getting to be prominent and henceforth exceptional thought should be given for the investigation of these structures by considering the dynamic idea of wind and seismic tremor. Along these lines the impacts of parallel burdens like breezes loads, tremor powers are achieving expanding significance and pretty much every originator is looked with the issue of giving satisfactory quality and solidness against horizontal burdens. Therefore, to gauge wind burden and seismic tremor stacking on elevated structure plan.
From an auxiliary specialist's factor of view the tall developing or high upward push building (HRB) might be sketched out in show that, with the guide of excellence of its top, is influenced by horizontal powers given that of wind or seismic tremor or every single to a degree that they play a dreadfully significant capacity inside the basic kind. Tall developments have included gathering from the earliest starting point of progress. The Egyptian Pyramids, one of the critical seven marvels of world, made in 2600 B.C. Among such old tall structures. Such structures were made for protect and to show joy. By and large, for plan of tall structures both breeze just as tremor burdens should be considered. Administering criteria for completing unique investigations for tremor burdens are not quite the same as wind loads.

OBJECTIVE 0F THE STUDY

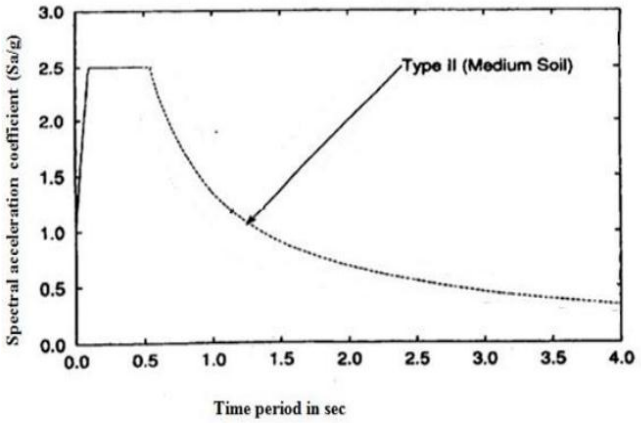
The following are the objectives for the study

1) To calculate the design lateral forces on G+30 stories buildings using response spectrum analysis and to compare the results of Zone 4 and Zone 5.
2) To study the building by using Zone 4 and Zone 5 seismic zones.
3) Calculating the buildings response which were subjected to different types of ground motions like low, intermediate and high frequency ground motion.
4) To carry out study by using as per IS 1893:2002 code.

II METHODOLOGY

A. Response Spectrum Method

Response Spectrum method is also known as mode superposition method. According to the code IS 1893-2002 (part1) response spectrum analysis is carried out. Here type of soil, seismic zone factor should be entered from IS 1893-2002 (part1). The standard response spectra for type of soil considered is applied to building for the analysis in ETABS 2013 software. Following diagram shows the standard response spectrum for medium soil type and that can be given in the form of time period versus spectral acceleration coefficient (Sa/g).



Resp0nse spectrum for medium soil type for 5% damping

B. Types of 1oads acting on the building

1. Dead 1oad
2. Live 1oad
3. Floor 1oad
4. Earth quack load
5. Wind load

III DESIGN CONSIDERATIONS AND MODELING OF BUILDING

A. Problem statement

In the present study, analysis of G+ 30 stories building in Zone IV and Zone V seismic zones is carried out in ETABS. Basic parameters considered for the analysis are

1. Grade of concrete : M3O
2. Grade of Reinforced steel :HYSD Fe500
3. Dimensions of beam :450mmX650mm
4. Dimensions of column : 800mmX500mm
5. Thickness of slab : 23Omm
6. Height of bottom story : 4m
7. Height of Remaining story : 3m
8. Live 1oad : 5 KN/m^2
9. Dead 1oad : 2 KN/m^2
10. Density of concrete : 25 KN/m^3
11. Seismic Zones :Zone 4,5
12. Silt type : II
13. Importance factor : 1.5
14. Response reduction factor : 5
15. Damping Ratio : 5%
16. Structure class : C
17. Basic wind speed : 55m/s
18. Risk coefficient (K1) : 1.O8
19. Terrain size coefficient (K2) : 1.14
20. Topography factor (K3) : 1.36
21. Wind design c0de : IS 875: 1987 (Part 3)
22. RCC design c0de : IS 456:2000
23. Steel design c0de : IS 800: 2007
24. Earth quake design code : IS 1893 : 2002 (Part 1)

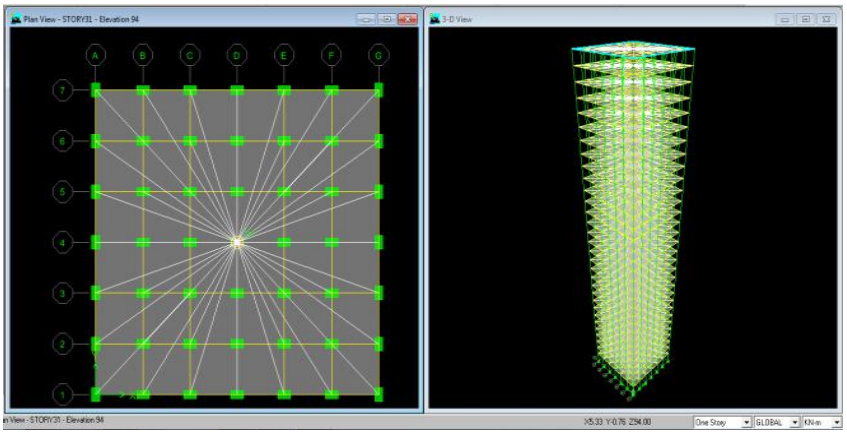


Fig.4.1 Building model in ETABS Software

IV RESULTS AND ANALYSIS

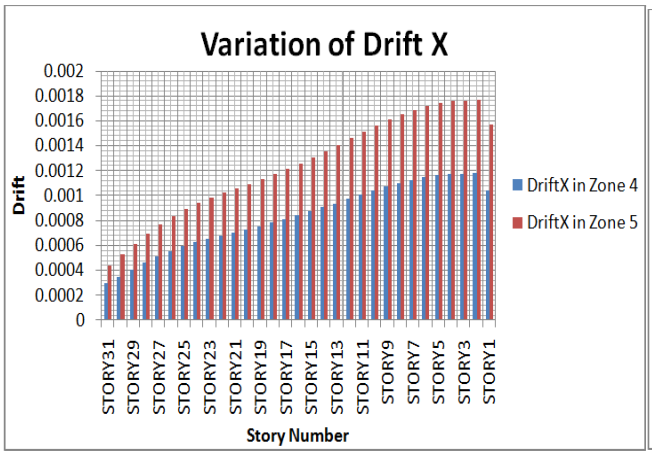


Fig.5.1 Variation of Drift X

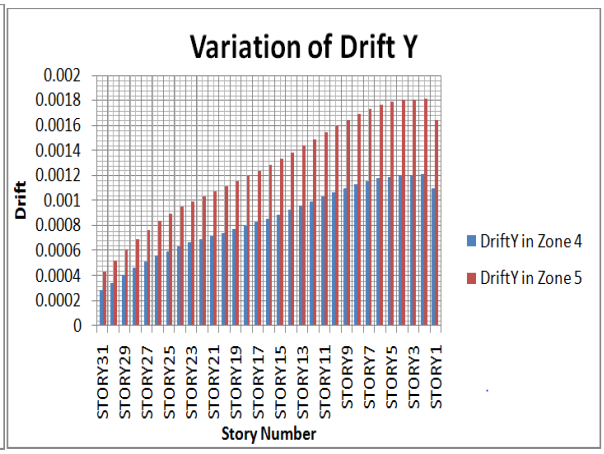


Fig.5.2 Variation of Drift Y

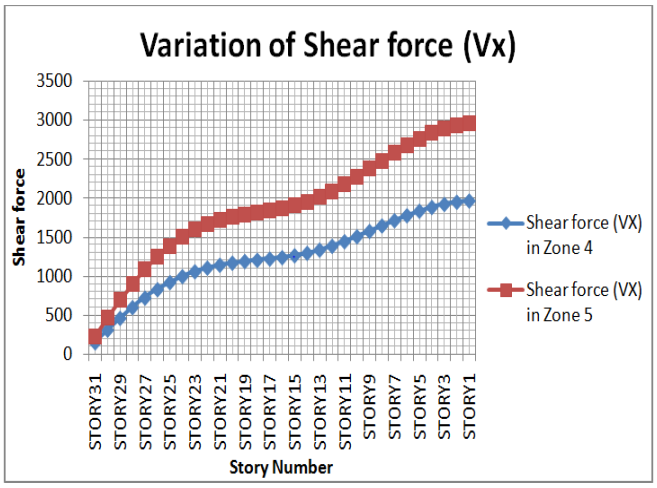


Fig.5.3 Variation of Shear force (Vx)

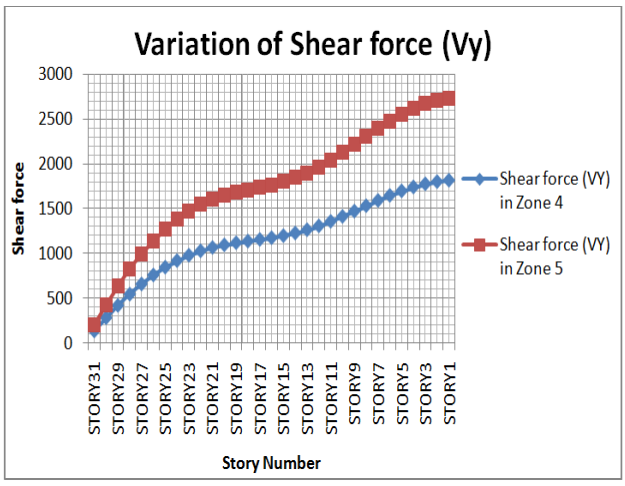


Fig.5.4 Variation of Shear force (Vy)

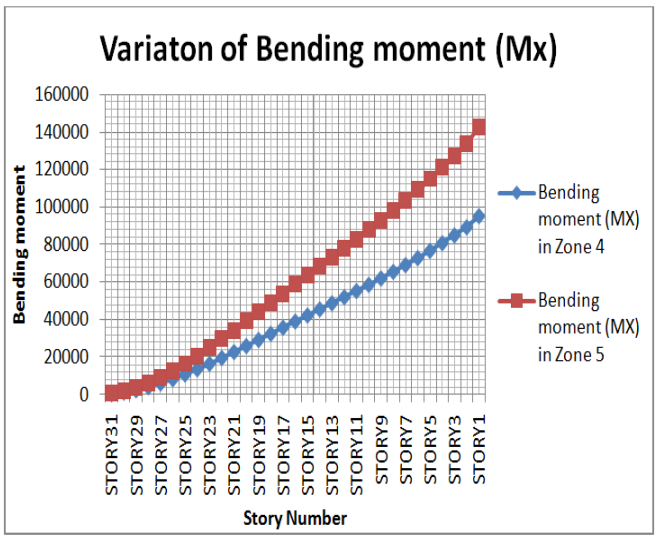


Fig.5.5 Variation of Bending Moment(Mx)

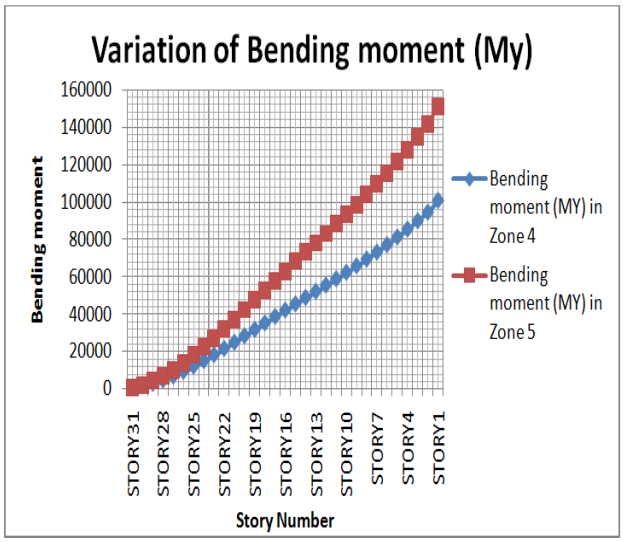


Fig.5.6 Variation Bending Moment(My)

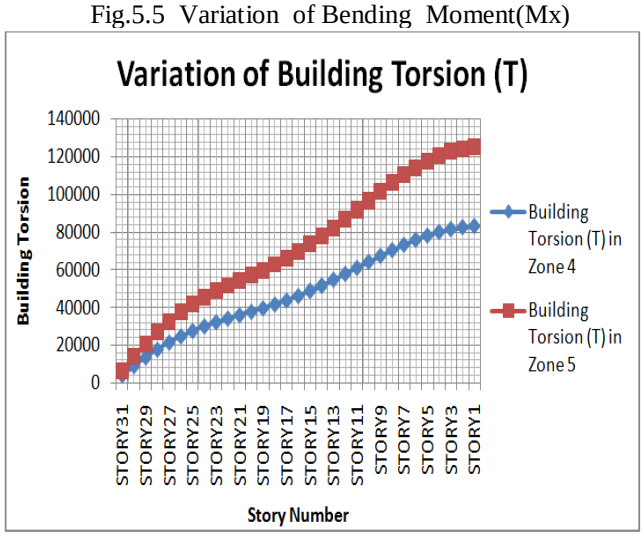


Fig.5.7 Variation of Building Torsion (T)

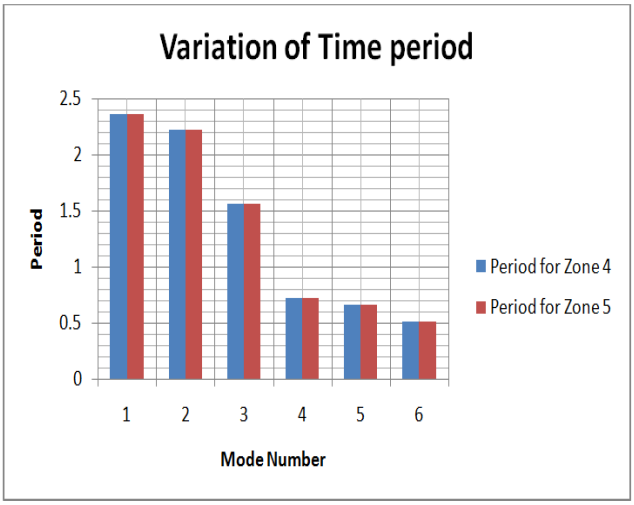


Fig.5.8 Variation of time period

VI. CONCLUSION

The following conclusions were made from the above study

1. The va1ues of Drift in both X and Y direction are higher for Seismic Zone V than Zone IV and the values of story Drift increases from top story (31st story) to bottom story (1st story).
2. The va1ues of Shear force in both X and Y-Direction are higher for Seismic zone V than Zone IV and the values of shear force increases from top story (31st story) to bottom story (1st story).
3. The values of Bending moment in both X and Y direction increases from top story (31st story) to bottom story (1st story). As per bending moment point of view the value of bending have higher value for Seismic zone V than Zone IV
4. The values of time period in both Zone IV and Zone V for G+30 Stories building are same. From this it was concluded that there is no effect on the time period of building for seismic zones.
5. From building torsion point of view the maximum values for torsion was observed for Zone V than Zone IV and the values of Building torsion increases from top story (31st story) to bottom story (1st story).
6. The va1ues of Shear force, Bending moment, Building torsion were found to be higher for the zone V than Zone IV due to action of seismic forces in both X and Y direction for G+30 stories building.
7. The maximum value occurs in zone5 than zone4 for forces and moments for G+30 building.
8. Designing by Software like ETABS reduces ton of your time in design work. Details of each and every member will be obtained by ETABS.
9. All the List of unsuccessful beams will be obtained and conjointly higher Section is given by the software. Accuracy is improved by using software.

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