

DYNAMIC ANALYSIS OF G+20 RESIDENTIAL BUILDING IN ZONE-2 AND ZONE-5 BY USING ETABS

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Abstract:

Natural disasters are inevitable and it is not possible to get full control over them. The history of human civilization reveals that man has been combating with natural disasters from its origin but natural disasters like floods, cyclones, earthquakes, volcanic eruptions have various times not only disturbed the normal life pattern but also caused huge losses to life and property and interrupted the process of development. With the technological advancement, man tried to combat with these natural disasters through various ways like developing early warning systems for disasters, adopting new prevention measures, proper relief and rescue measures. But unfortunately it is not true for all natural disasters. Earthquakes are one in all such disasters that's connected with in progress tectonic process it suddenly comes for seconds and causes nice loss of life and property. So earthquake disaster prevention and reduction strategy is a global concern today. Hazard maps indicating seismic zones in seismic code are revised from time to time which leads to additional base shear demand on existing buildings.

Keywords: Earthquakes, Hazard maps, Shear demand.

1. INTRODUCTION

Building construction is that the engineering offers with the development of constructing to residential buildings in a really effortless constructing will probably be outline as an enclose area via partitions with roof, Fabric and accordingly the basic desires of contributors. Inside the early earlier interval people lived in caves, over bushes or beneath bushes, to safeguard themselves from wild animals, rain, sun, etc. Because the occasions handed as people being started dwelling in huts created from trees branches. The shelters of these previous are developed at the moment into wonderful residences. Rich individuals reside in sophisticated houses. Structures are the primary indicator of social growth of the country. Every human has wished to possess houses on an average most commonly one spends his two-third life occasions within the houses. The protection civic feel of the responsibility, These are the few motives which are accountable that the man or woman do utmost effort and pay tough-earned saving in owning houses. These days the condominium building is essential work of the social progress of the county. Day-to-day new techniques

are being developed for the development of residences economically, speedily and pleasing the requirements of the group engineers and designers do the seam work, planning and layout etc, of the constructions. Trained employees are dependable for doing the drawing works of building as for the path of engineers and designers.

2. RELATED WORK

The trained worker will have to apprehended his job and could also be competent to comply with the instruction of the engineer and could also be able to attract the desired drawing of the building, website plans and layout plans and many others, as for the necessities. A constructing body consists of variety of bays and storey. A Multi-storey, multi-paneled body would be a tricky statically intermediate structure. A design of R.C building of G+20 flooring body work is preoccupied.

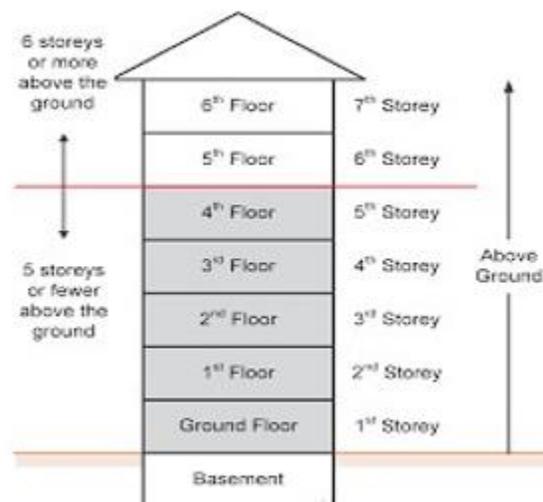


Fig.1.Floor Plan

The constructing in arrange (38.5×31) consists of columns designed monolithically forming a community. The scale of constructing is 38.5x31m. The amounts of columns are eighty five. It is residential advanced. The design is created by using ETABS software. The constructing subjected to every the vertical hundreds additionally as horizontal masses. The vertical load consists of lifeless load of structural elements equivalent to beams, columns, slabs etc and are living loads. The horizontal load includes the wind forces so building is intended for lifeless load, reside load and wind load as per IS 875(part3):1987. The constructing is meant as two dimensional vertical body and analyzed as per IS 456-2000. The help is taken via program furnished in institute and for this reason the computations of hundreds, moments and shear forces and received from this program. Defined as the difference in lateral deflection between two adjacent stories. During an earthquake, large lateral forces can be imposed on structures; Lateral deflection and drift have three primary effects on a structure; the movement can affect the structural elements.

3. PROPOSED SYSTEM

The paper concludes that there is a gradual increase in the value of lateral forces from bottom floor to top floor in both manual as well as software analysis. Calculation of seismic weight by both manual analysis as well as software analysis gives exactly same result. There is slight variation in the values of base shear in manual analysis as well as software analysis. Base shear values obtained by manual analysis are slightly higher than software analysis. Results as compared and approximately same mathematical values are obtained for 8-storey building. Complete guideline for the use of ETABS 9.7.1 for seismic coefficient analysis is made available by this paper.

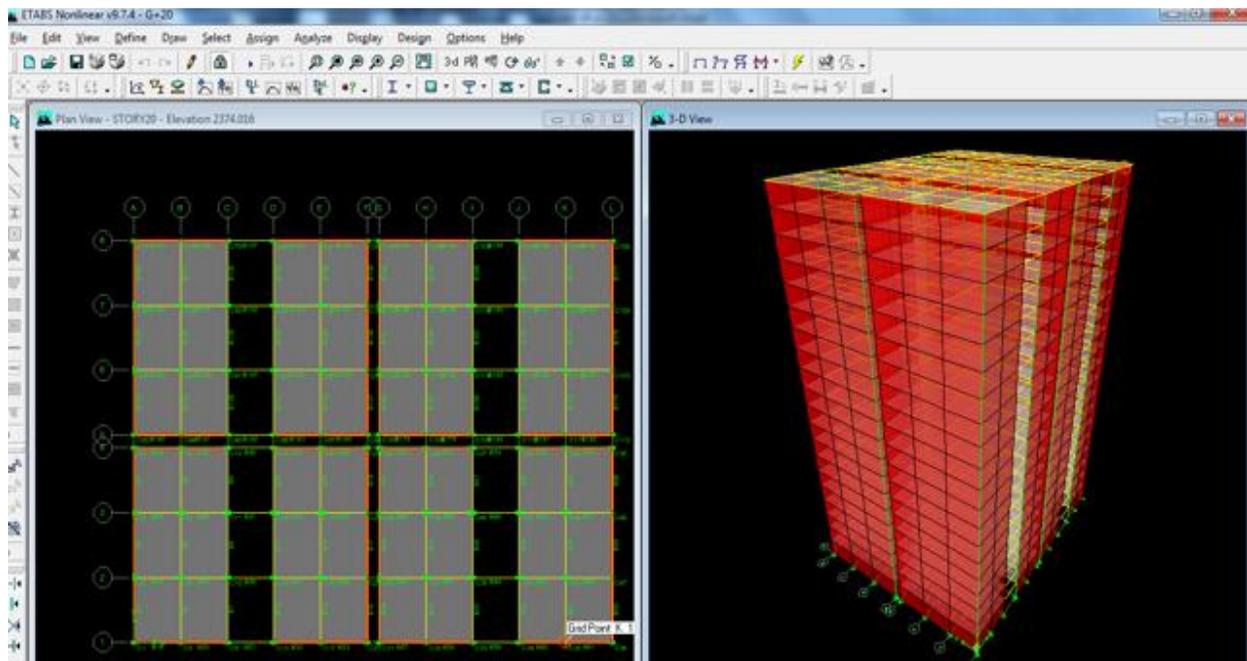


Fig.2.Design

To conclude a complete design involving several parameters so as to result the earthquake has been done and 3D prospective is shown for easy understanding and use. Seismic motion consists of horizontal and vertical ground motions, with the vertical motion usually having a much smaller magnitude. Further, factor of safety provided against gravity loads usually can accommodate additional forces due to vertical acceleration due to earthquakes. So, the horizontal motion of the ground causes the most significant effect on the structure by shaking the foundation back and forth. The mass of building resists this motion by setting up inertia forces throughout the structure. The magnitude of the horizontal shear force F depends on the mass of the building M , the acceleration of the ground a , and the nature of the structure. If a building and the foundation were rigid, it would have the same acceleration as the ground as given by Newton's second law of motion, i.e. $F = Ma$. However, in practice all buildings are flexible to some degree.

4. ANALYSIS

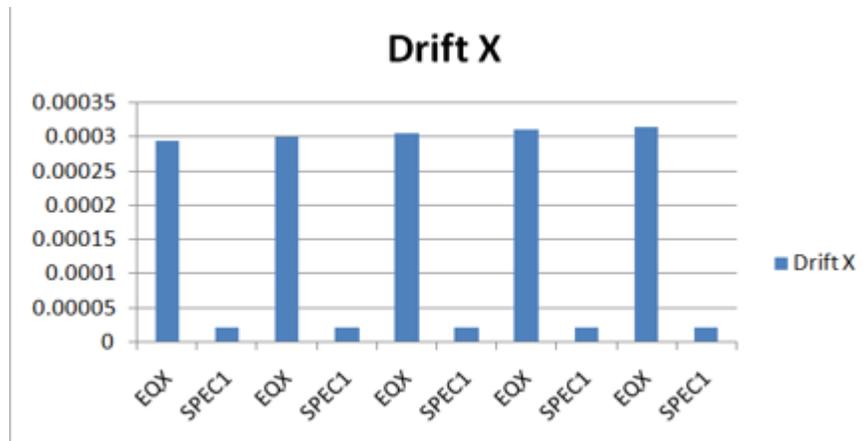


Fig.3.Direction

The result of a response spectrum analysis using the response spectrum from a ground motion is typically different from that which would be calculated directly from a linear dynamic analysis using that ground motion directly, since phase information is lost in the process of generating the response spectrum. In cases where structures are either too irregular, too tall or of significance to a community in disaster response, the response spectrum approach is no longer appropriate, and more complex analysis is often required, such as non-linear static analysis or dynamic analysis.

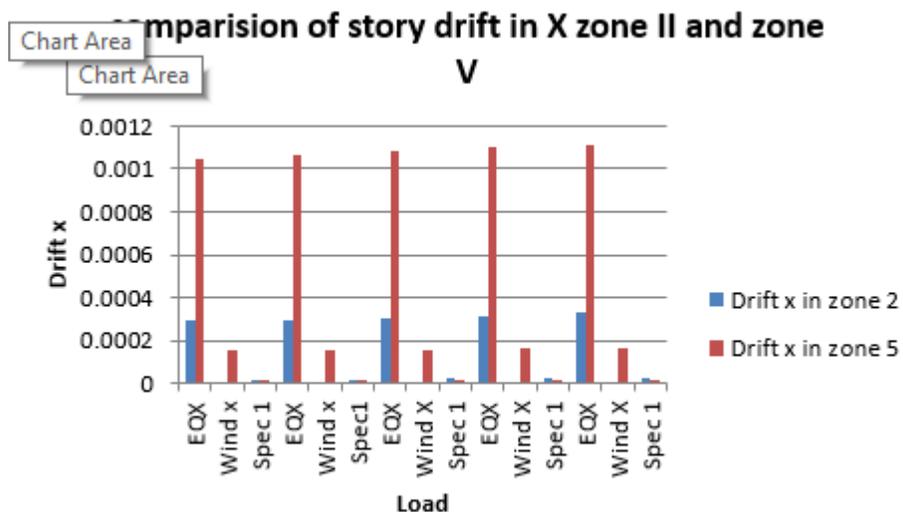


Fig.4.Comparison

CONCLUSION

The behavior of high rise structure for both the scheme is studied in present paper. In this paper we got the results from mathematical model for models. The graph clearly shows the storey drift, lateral displacement and time period. It is also observed that the results are more conservative in Static analysis as compared to the dynamic method resulting uneconomical structure. Because of the Box effect of modular type scheme, it is increasing overall stiffness of the building thus, reducing the sway problem in the structure. As building is in irregular the behavior in both directions is not similar. Further, the comparison between regular and modular type indicates the overall feasibility of the scheme without affecting its stability in gravity as well as lateral loads.

REFERENCES

- [1] IS 1893 (Part 1): (2002), "Criteria for Earthquake Resistant Design of Structures Part1 General Provisions and Buildings", Bureau of Indian Standards.
- [2] CSI Computers and Structures INC. "Introductory Tutorial for E- TABS: Linear and Nonlinear Static and Dynamic Analysis and Design of Three- Dimensional Structures"2011
- [3] CSI (2009). "E-TABS: Static and Dynamic Finite Element Analysis of Structures "Nonlinear Version 14, Computers and Structures.
- [4] B.C. Punmia, A.K. Jain, 2006, "R.C.C Designs", Laxmi publications New Delhi.
- [5] IS-456 2000 plain and reinforced concrete code of practice.
- [6] P. Agarwal, M. Shrikhande, Earthquake resistance design of structures, PHI learning Pvt. 2012.
- [7] Theory of Structures by Ramamrutham for literature review on kani's method.