

Analysis of a RCC Building Frame on Terrain Considering Different Seismic Zone

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ABSTRACT: India has reputation of ruinous tremors, at better places or in different zones, which has realized loss of different lives and overwhelming beating to property and economy. Examination of structures in inclination region is to some degree unprecedented in association with the structures on levelled ground, ensuing to the portion of the inclination building rests at specific levels on the review. The unsymmetrical structures require mind boggling thought in the examination and course of action under the activity of seismic excitation, in high risk seismic zone the seismic execution of structures are considered as the fundamental ascertain which impacts seismic zones, may be the effect of impact qualities occurring in light of earth headway more crucial than the powers accomplished by soil sort and subsequently, Seismic stacking chooses shape and last arrangement of the structure. STAAD.Pro V8i is a whole and joined obliged part examination and format offering, including a state of-the-workmanship client interface, representation instruments, and overall setup codes.

In this study we adopt loading combination in each case as PER 875 PART V and dimensions of column (400 mm x 400 mm) and beam (350 mm x 280 mm) in all the cases. IN this study we consider two seismic zones II & IV with two different soils soft and hard as per I.S code 1893 part 1. ON A TALL STRUCTURE OF (G+10) Here we consider comparative study on sloping angle 0° and 7°. We observed the result of all the cases in a same manner where soft soil shows maximum values in all parameter result and hard soil shows minimum.

KEYWORDS: structural analysis, staad.pro, Shear force, soil, seismic zone, sloping ground.

I. INTRODUCTION

Structures are described as structures utilized by the overall public as house for living, working or stockpiling. As, these days there is absence of region for building more structures for the improvement in both private and present day regions the vertical advancement is given due essentialness by virtue of which Tall Buildings are being developing on a generous scale.

India has notoriety of destructive tremors, at better places or in various zones, which has brought about loss of various lives and overpowering pounding to property and economy. Examination of structures in slant area is to some degree extraordinary in connection to the structures on leveled ground, consequent to the segment of the slant building rests at particular levels on the grade. The unsymmetrical structures require unbelievable thought in the examination and arrangement under the action of seismic excitation, in high hazard seismic zone the seismic execution of structures are considered as the essential calculate which impacts seismic zones, might be the impact of effect strengths happening in light of earth advancement more vital than the forces achieved by soil sort and hence, Seismic stacking decides shape and last plan of the structure

Sujitkumaret. al. (2014)observed the behavior of sloping ground structures considering inclinations of (7.5°, 15°) under seismic forces. Considering seismic zones comparison has been done on sloping ground and plane ground building. Here G+ 4 storeys are taken with same properties and loadings for its conduct and comparison. Observed that bending moment in column increases with increase in sloping angle of the ground whereas axial force in columns remains almost same.

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II. METHODOLOGY AND PROBLEM FORMULATION

This study deals with comparative study of Earthquake behavior on high rise structures G+10 building frame with three different soil types and different slope of ground as 0° , & 7° Under the Earthquake effect as per IS 1893(part I) -2002 static analysis. A comparison of analysis results in terms of Maximum displacements, , Maximum Storey Displacement, Maximum shear force has been carried out.

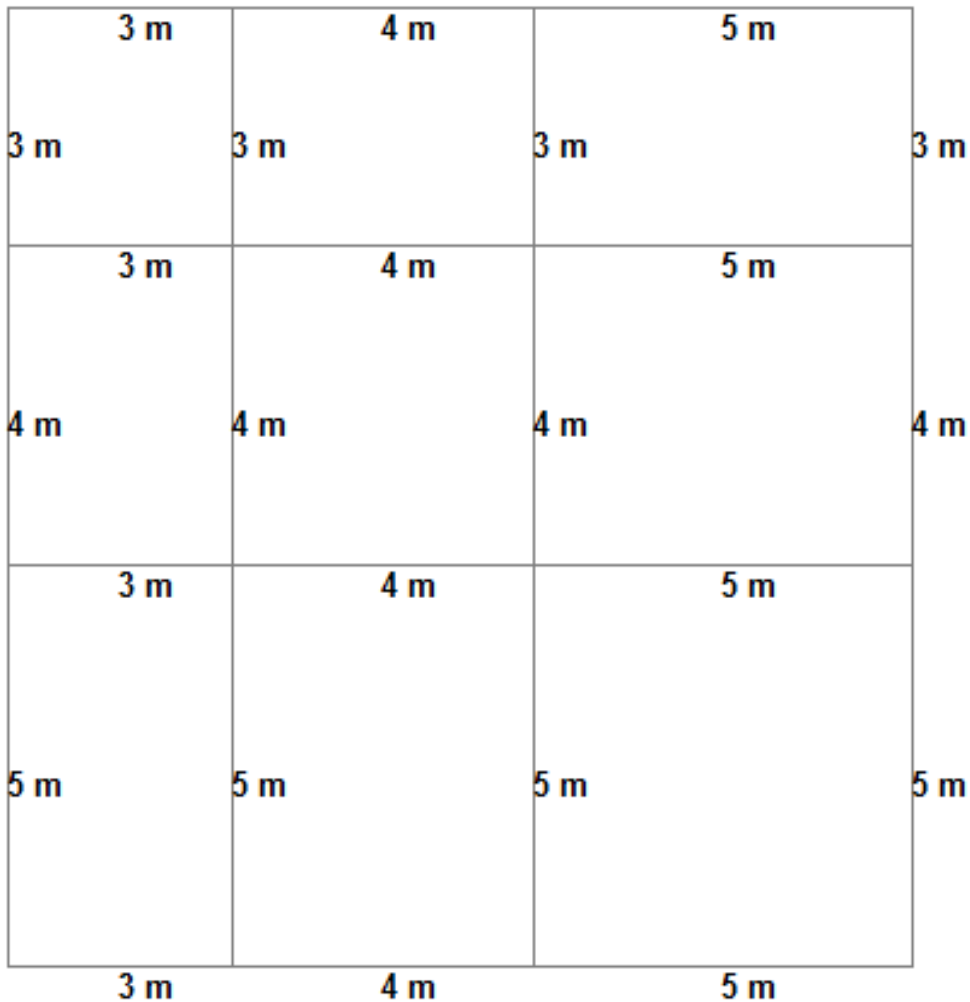


fig. 1 plan

- Modelling of structure in staad.pro
- Assigning property and supports.
- Assigning seismic loads and load combinations.
- Comparing results for different cases considered.

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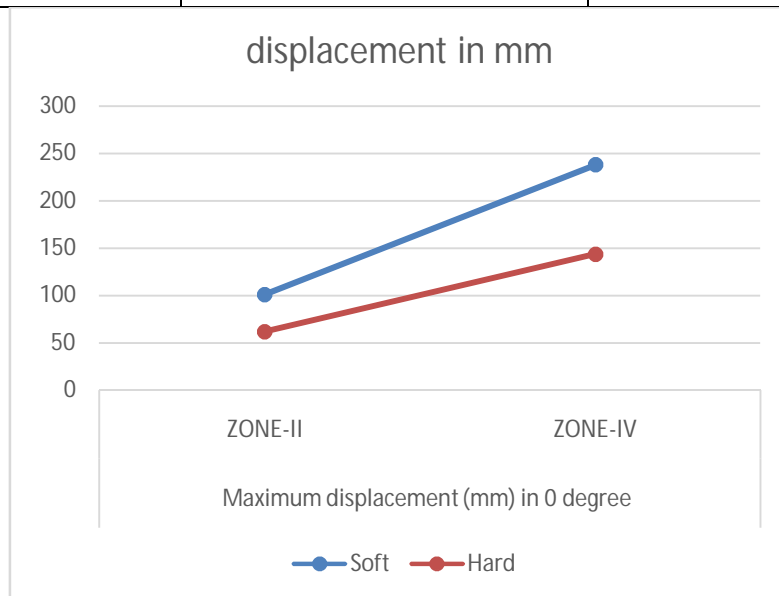
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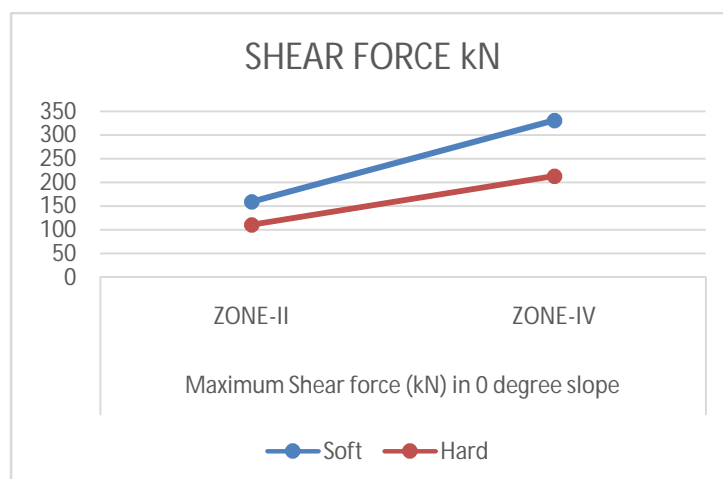
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III. RESULT & ANALYSIS

| Soil Type | Maximum displacement (mm) in 0° sloping ground | |
|-----------|--|---------|
| | ZONE-II | ZONE-IV |
| Soft | 101.03 | 238.1 |
| Hard | 61.75 | 143.83 |



| Soil Type | Maximum Shear force (kN) in 0 degree slope | |
|-----------|--|---------|
| | ZONE-II | ZONE-IV |
| Soft | 159.5 | 330.8 |
| Hard | 110.5 | 213 |



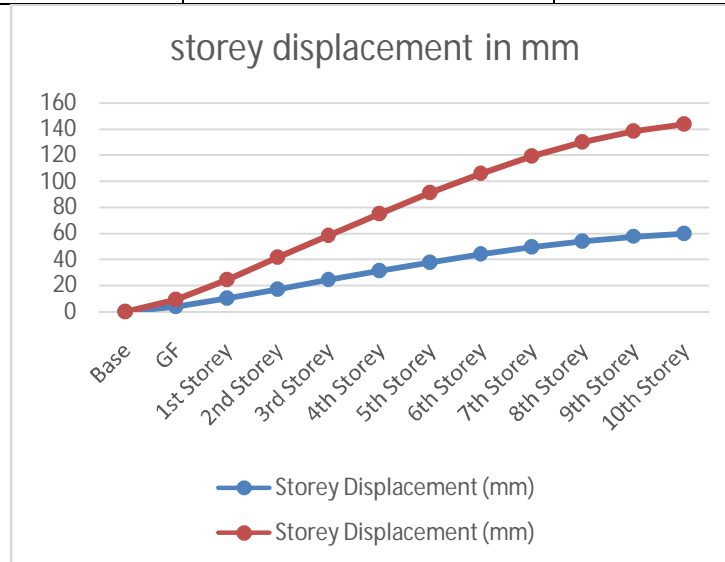
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| Storey | Storey Displacement (mm) | |
|-------------|--------------------------|---------|
| | ZONE-II | ZONE-IV |
| Base | 0 | 0 |
| GF | 3.84 | 9.22 |
| 1st Storey | 10.32 | 24.78 |
| 2nd Storey | 17.35 | 41.65 |
| 3rd Storey | 24.45 | 58.68 |
| 4th Storey | 31.41 | 75.3 |
| 5th Storey | 38 | 91.36 |
| 6th Storey | 44.23 | 106.1 |
| 7th Storey | 49.7 | 119.3 |
| 8th Storey | 54.26 | 130.24 |
| 9th Storey | 57.7 | 138.48 |
| 10th Storey | 59.98 | 143.95 |



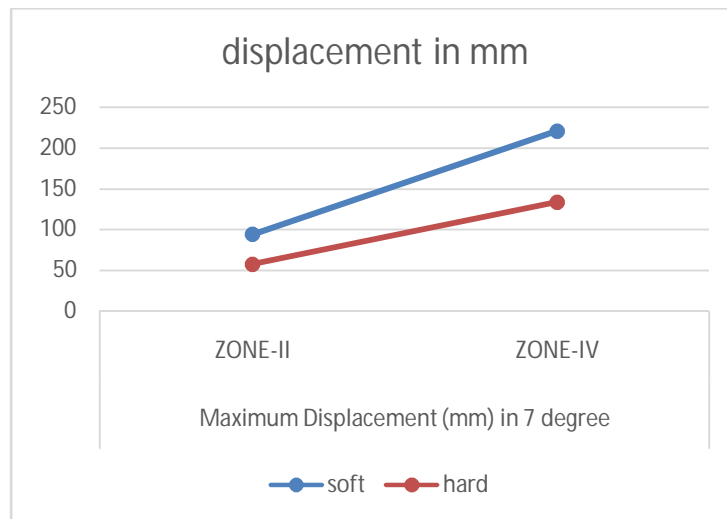
| Soil Type | Maximum Displacement (mm) in 7degree | |
|-----------|--------------------------------------|---------|
| | ZONE-II | ZONE-IV |
| soft | 93.99 | 220.79 |
| hard | 57.65 | 133.58 |

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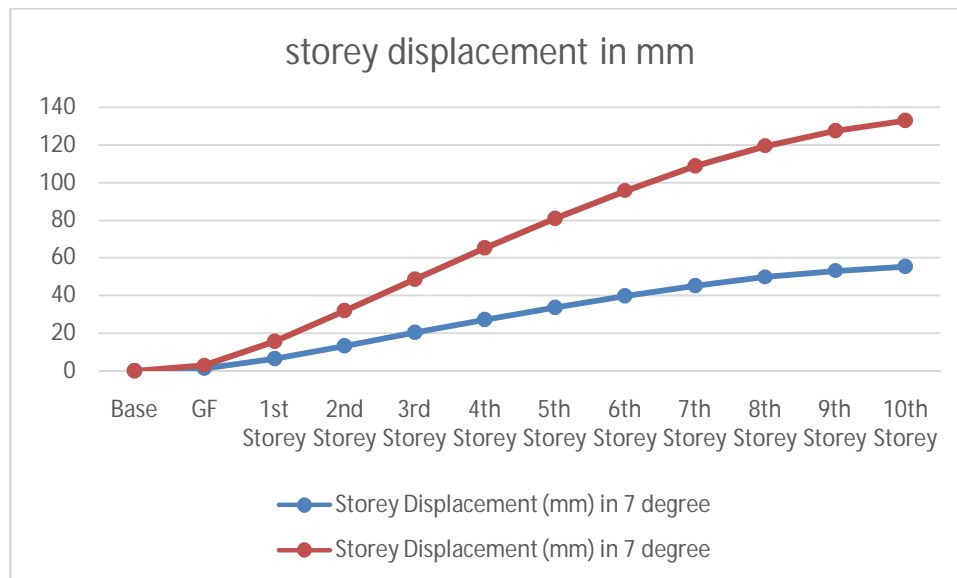
| Storey | Storey Displacement (mm) | |
|------------------------|--------------------------|---------|
| | ZONE-II | ZONE-IV |
| Base | 0 | 0 |
| GF | 1.21 | 2.9 |
| 1st Storey | 6.519 | 15.64 |
| 2nd Storey | 13.3 | 31.94 |
| 3rd Storey | 20.3 | 48.72 |
| 4th Storey | 27.19 | 65.26 |
| 5th Storey | 33.78 | 81.1 |
| 6th Storey | 39.89 | 95.74 |
| 7th Storey | 45.309 | 108.73 |
| 8th Storey | 49.81 | 119.55 |
| 9 th Storey | 53.19 | 127.66 |
| 10th Storey | 55.42 | 133.02 |

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IV. CONCLUSION

In this study we observed that :

Max. displacement and shear force is increasing as we increasing the ground slope as well as with changing zone ii to zone iv. Considering maximum effects in soft soil and minimum in hard soil in storey displacement as we are using tall structure maximum storey displacement is shown in top floor in both slope but here 7° slope with soft soil and zone iv is showing maximum displacement. therefore as we are increasing slope forces are increasing. higher zones in seismic as per 1893 part1 table no. 2 shows increasing effects. soft soil shows more effects as compared to hard strata.

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