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A Review-Parametric Performance Analysis of Tall Building under various Seismic Zone and Soil Condition

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***Abstract:** In our project seismic analysis of RC frame structure is conducted with the aid of StaadPro software. Three different types of RC frame structures like 10storey, 15storey and 20storey buildings has analysed in this project work. Different loading conditions like dead load, live load, seismic load is applied in our study. Apart from the inclusion of various load patterns, different properties have assigned to the structures. Shear forces and Bending moment at critical sections have examined with the provision of software analysis.*
***Keywords:** Seismic Analysis, Earthquake loading, StaadPro, Displacement, Comparison.*

I. INTRODUCTION

Now a days whole world is damaging from effects of seismic Hazards. There is require to investigate the seismic behaviour and soil condition of that place is necessary throughout the construction process. In tall buildings the effect of lateral forces have to be given due consideration because of exceed the lateral loads have potential to undesirable Vibrations, stresses, deflection, bending and instability in the buildings.

In present days there is high demand of tall buildings due to increasing urbanization and rapidly rise population, and earthquakes forces have the potential for causing the damages to those tall structures. Since earthquake forces are in nature and cannot be predictable, so that engineering tools need to be sharpened for analysing structures under the action of these forces. Earthquake loads are required to be carefully modelled so as to assess the genuine behaviour of structure with a clear understanding that damage is expected but it should be regulated. Analysing the structure for various earthquake intensities and checking for multiple criteria at each level has become a necessary exercise for the last couple of decades.

II. SEISMIC ANALYSIS

The mass of the building being structured controls seismic plan notwithstanding the building solidness, because earthquake induces inertia forces that are proportional to the building mass. Designing tall buildings to behave elastically during earthquakes without damage may build the project economically unremunerated. As a result, it may be essential for the structure to go through damage and thereby dissipate the energy input to it during the earthquake. Therefore it is necessary, the traditional earthquake-resistant design philosophy requires that normal buildings should be able to resist

III. OBJECTIVE OF PROJECT

A. To analyze a multistoried RC framed building for available earthquake considering different earthquake zone(i.e., I, III, IV, V)
B. Evaluation of performance of RC frame building under seismic zone.
C. Compare the performance of structure in different seismic zone & soil condition.

IV. LITERATURE REVIEW

1) *Ketan Bajaj et. al. (2013)*[(1)] he studied different type of building subjected to different earthquake loading and behaves differently with diversification in the types of soil condition. It has been sown that with change in soil properties from hard to medium and from hard to soft the lateral deflection decreased by 53.33% and 60.25% respectively for flexible base. In flexible foundation with change in zone from III to IV and III to V with same hard soil the deflection has increased by 4.07% and 24.72% for symmetrical building respectively.

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2) *K. Shaiksha Vali et. al. (2014)*[2] observed that roof displacement for 35 storey building the displacement increases with increase in the zone factor both the static and dynamic loads for 35 storey modal the variation of displacement is about 30.7% for zone II to III and about 30.8% from zone III to zone IV and about 35% for zone IV to V. It has been observed that base shear increases with increase of zone factored. All these studies is carried out in hard soil type.
3) *Umal Chandekar el. al. (2015)*[3] from SAP 2000 the response of the structure with flexible foundation has been studied and observed that the time period is change for different soil condition or foundation flexibility and base shear is decrease from fixed to flexible foundation. The axial force is found to increase from fix to flexible foundation when rectangular footing type is taken there was no change or negligible change in the result.
4) *Abhishek Verma et. al. (2016)*[4] concluded that as we move from zone II to III and zone IV to V base shear increased by 60% and 50% for (G+8) storey and soft soil respectively, and ongoing from G+8 to G+16 and G+16 to G+24, in medium soil and zone II base shear increased by 207% and decreased by 9% respectively. From moving zone II to III and zone IV to V storey drift increased by 60% and 67% for soft soil and G+8 storey building respectively, in medium soil and zone II from moving G+8 to G+16 and G+16 to G+24 storey drift increase by 14% and 10% respectively.
5) *Bhavani Shanker et. al. (2016)*[5] analysis carried out by equivalent static analysis and static non-linear analysis for G+3 and G+5 for various soil layer and conclude that displacement or settlement result in cohesion less soil, and also by changing the soil layer gets some variation of displacements. Hence changing the soil layers we will get slightly change of settlement of solids. Problem of bulging and no extra settlement would not occur by giving strength to the soil layer by fixing the soil layer in all the sides.
6) *Vardhman Jain et. al (2017)*[6] observed that in different soil condition and very severe seismic condition (zone V) using ETABS 2016 time period depends on height and lateral dimension in the case of infill walls. Top storey displacement is more in case of the soft soil while less in the hard soil, and similar result for base shear also. Shear strength is negligible in case of soft soil mostly.
7) *A. Parvathy Karthika et. al. (2018)*[7] she studied soil structure interaction is the response of soil which influence the motion of the structure which consist (G+10) and (G+20) for analysis which alters the response of soil. The response of the building is analysed in terms of fundamental natural period, Lateral displacement, storey drift, lateral deflection and seismic base shear. This study shows that, the soil structure interaction will have an influence on dynamic behaviour of the building needs to be considered in the design of earthquake resistance building.

V. PROBLEM STATEMENT

It has been observed that no data is available in the research record about the seismic zonal as well as soil condition investigation. Therefore it is highly needed to start working on the various zone by researchers. Earthquake is the event which is vary from place to place and even there is no such provisions available in the IS code about micro zones. In this review it has been observed that staadPro can be used for the analysis of the EQ events on various building geometry and height plan. Based on the various research paper it is also concluded that the compression between the various zones are not available for the different geometry therefore it is also recommended that the researches can work on comparison part of seismic performance of different building in different zones and soil condition

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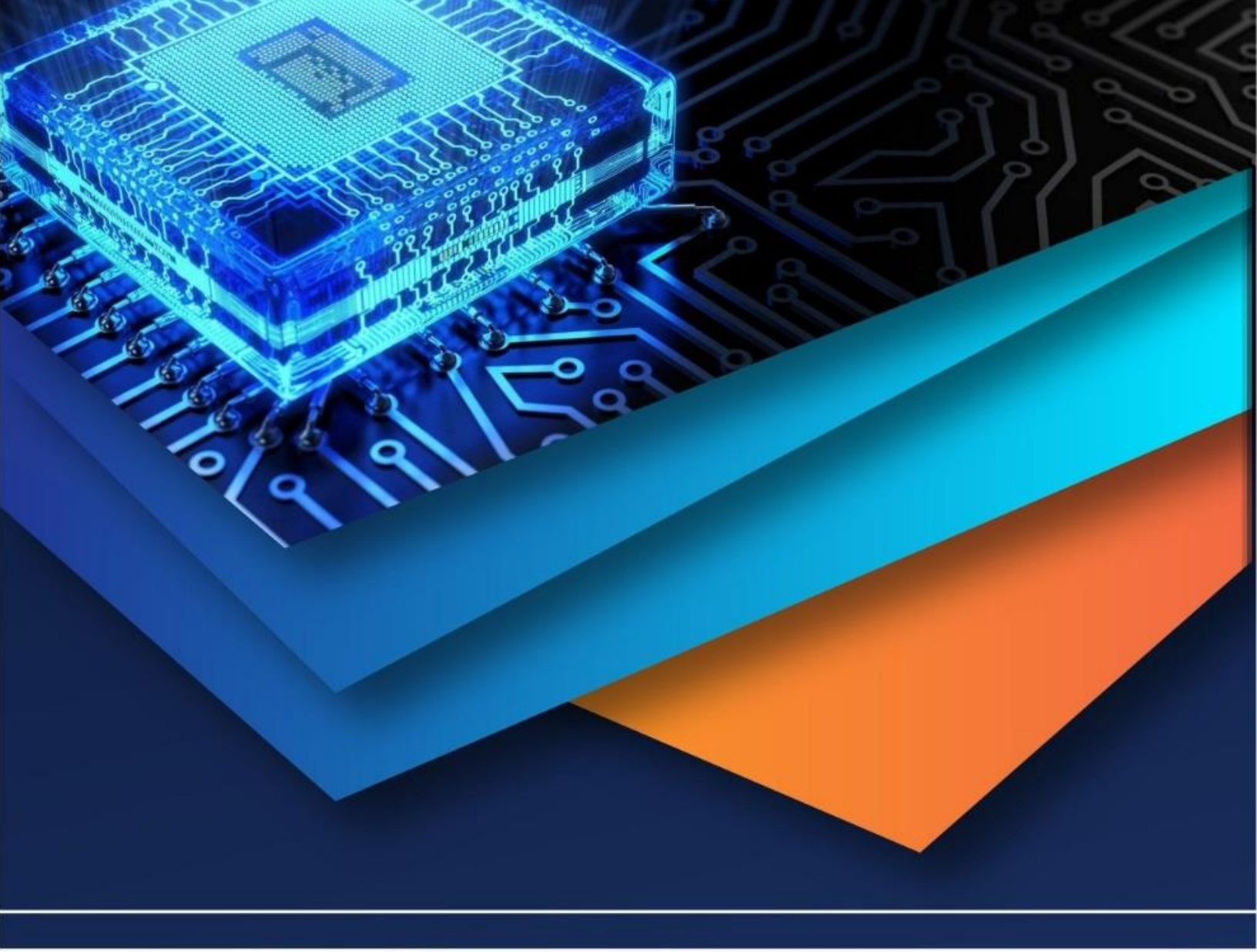

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