Abstract

The conventional design procedure involves the assumption of the fixity at the base of the foundation and therefore, neglects of the flexibility of the foundation and the compressibility of
the sub-soil. For the realistic solution, it is essential that the superstructure-foundation-soil interaction be considered as one compatible unit. Finite element method is one such amongst them. In view of the afore-mentioned observations, the interaction analyses have been reported to quantify the effect of soil-structure interaction on the response of the building frame resting on raft foundation recently. Along similar lines and based on the scope outlined in those studies, an attempt has been made here to carry out the interactive analysis of the building frame having forty and eighty storey resting on typical raft foundation. For this purpose a study is carried out on raft foundation resting in cohesive soil, subjected to lateral load. For the purpose of the analysis, simplified idealizations are made in the theory of finite elements. The slab of the frame is idealized as three dimensional four-noded shell elements. Beams and columns of the superstructure frame are idealized as three dimensional two-noded beam elements. Raft of the sub-structure is idealized as three dimensional four-noded shell elements. In the independent analysis response of the structure is considered in terms of bending moments, shear force, deflection developed in structure. The effect of soil-structure interaction is observed to be significant for the behavior of structure considered in the present study for all the cases considered. The building is analyzed for various load cases, mainly gravity loads (due to dead load and live load) and lateral loads. Analysis is carried out by using standard package ETABS. The comparison of these models for different parameters like Storey Displacement, Column Bending moments and Time period are presented.

References

(Fourth Revision) "Soil Structure Interaction of Tall Buildings"

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Index Terms

Computer Science

Keywords

Lateral Displacement  Shear Force  Storey Drift  Storey Shear  Shear Wall  Time Period

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