

## **Study of the effects of uplift on seismic behavior of concrete structures resting on flexible bases**

### **Abstract:**

In dynamic analyses, it is generally supposed that the soil under the foundation is rigid and the foundation is involved in the ground exactly fixed, in this supposition not only flexibility of the soil under the foundation is not regarded, but the possibility of uplifting the foundation from the ground is not also considered. Whereas in case that the foundation has possibility to uplift, and the soil under the foundation is also considered in the analyses, a new system resulting from uplifting the structure will be formed in flexible support that its behavior differs from the previous state. After exerting these effects on the structure, it is observed that the effect of uplift phenomenon accompanied by the soil-structure interaction on the reaction of the structure, may be in the form of attenuation or amplification based on the features of structure and soil, and not considering these events as support conditions in the methods for building resistant constructions and designing new structures reduce the reliability of structure designing. Various researches have been performed for exerting these phenomena in modeling, but most of the modeling has been performed in the form of the simplified system of the spring dash pot or sometimes in the form of 2-dimensionanl frameworks or in a few works single 3-dimensionanl model has been studied that their results have not enough precision; In this dissertation I have tried to study better the real behavior of the structure as a result of uplift in flexible support with modeling and non-linear analysis of the structure, the foundation and soil under it for several concrete models with the 2 systems of lateral loader, moment resistance frame with intermediate elasticity and shear wall with intermediate elasticity for the two types of soils standard 2800 III & IV and study the effect of uplift in the flexible soil on the parameters of the base shear, period, soil type, internal forces and also the level of structure function, and then compare it with a exactly fixed state that their designs have been carried out on the basis of the latest changes in By-laws and standards of the country. Based on this research uplift phenomenon in flexible support has an important and role in constructing resistant buildings and designing of the structures against earthquake force and even though it reduces internal forces of the organs in general, but not regarding these effects not only gives us an incorrect picture of the structure behavior to us, but in some cases it inflicts local or general damages to the structure.

### **Key words:**

Uplift, soil-structure interaction, period, intermediate shear wall, intermediate concrete moment resistance frame, base shear, internal forces, level of structure function.

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