

INVESTIGATING THE EFFECT OF CHANGES IN WEIGHT AND EMBEDDING DEPTH OF THE BASEMENT ON STRUCTURAL LATERAL DISPLACEMENT IN SOIL-STRUCTURE INTERACTION SYSTEM

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Keywords: Displacement, Soil-structure interaction, Embedding depth, Weight, Basement

One of the most important parameters in dynamic analysis and design of structures is the lateral displacements caused by loading and instigations to the structure, which is very important in the process of calculation and determination of the sections and dynamic parameters of the structure. In the past, in the stage of structural analysis and determination of forces and tensions and the response of the structure to existing investigations stimulies, soil and foundation and structure systems were investigated and studied and analyzed with districted and separated forms and great simplifications. These studies were modeled and analyzed with consideration of placing the structure on a solid foundation on a soil with sufficient resistance to resist the summits and forces transmitted from the structural foundation to it.

Field studies and the results and observations obtained from visiting the damaged areas of the earthquake showed that even at a certain location and among similar structures in terms of shape and geometry and dynamic characteristics, the damage caused by the earthquake could be very different, and this can only be attributed to the impact of structure interaction - soil and foundation.

Further studies have shown that this interaction can greatly affect the seismic responses created in the system, and even eliminate or alter the guidelines and formulas used.

Subsequent studies showed that the interaction of soil and foundation and structure themselves are strongly influenced by many parameters such as environmental factors, mechanical properties of material and soil, and the form of foundation and gender, and the depth of soil and substrate seismicity of the zoning of the site of the structure and geotechnical specifications and the like.

An example of these effective parameters in the dynamic response of the interaction system is the embedding depth of the basement of the structure and also the basement weight. In this research, it is attempted to investigate these two parameters and model them in the powerful Abaqus software taking into account the number of required models in each of them, one of the parameters under investigation changes, their effect on the dynamic response structures should be studied.

The obtained results are numerically arranged and shown in plots such as Figure 1.

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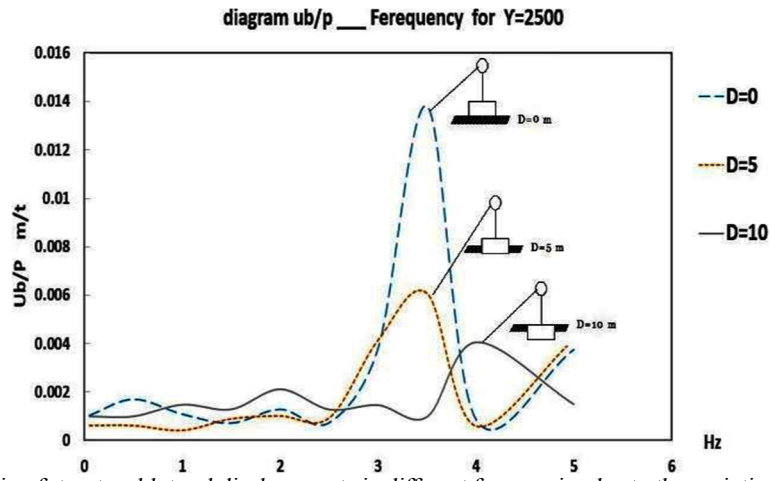


Figure 1. The variation of the ratio of structural lateral displacements in different frequencies due to the variation of the embedding depth of the basement of the structure in a fixed density of base $Y=2500$.