Ain Shams University

# DYNAMIC SOIL-STRUCTURE INTERACTION FOR LOW AND HIGH RISE BUILDINGS

**BY**

**Eng. Mohamed Fouad Ahmed Mohamed El-taib**.

B.Sc. 2002 (Structural Engineering)

Faculty of Engineering at Shoubra - Benha University

## A thesis

**Submitted in Partial Fulfillment for The**

**Requirements of the Degree of Master of Science**

**In Structural Engineering**

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# Statement

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Structural Engineering. The work included in this thesis was carried out by the author in the Department of Structural Engineering, Ain Shams University, no part of this thesis has been submitted for a degree or qualification at any other University or Institution.

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**FACULTY OF ENGINEERING**
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Abstract of M.Sc. thesis submitted by:

**Eng. Mohamed Fouad El-Taib**

Title of thesis:

# DYNAMIC SOIL-STRUCTURE INTERACTION FOR LOW AND HIGH RISE BUILDINGS

## ABSTRACT

When structures in direct contact with ground, like building, tunnels and bridge foundations exposed to Earthquake forces, this forces applied externally to the elements of the structures or develop internally in the ground, both of the structure and the ground in fact deform and move in a compatible manner, and this because of the dependency of each other as a result of their intimate physical contact. Problems like these are referred to as dynamic soil structure interaction (DSSI) problems.

This thesis studies the effect of soil on the dynamic behavior of structures. Full interaction between soil, substructure and superstructure are represented as a Dynamic Soil-Structure Interaction (DSSI)problem, using the finite element method (**MIDAS GTS** program). Nonlinear behavior of soil is taken according to Mohr coulomb theory a damping ratio. El Centro

earth quake have been used to predict the effects of **DYNAMIC SOIL-STRUCTURE INTERACTION (DSSI)**. comparison between the results of the sophisticated full interaction model and the simplified models (either using springs or hinged supports) is illustrated, the base shear and although the internal forces due to seismic excitation of sophisticated full interaction model is less than the base shear and internal forces of simplified models (either using springs or hinged supports) as expected, also axial force Bending moment and the shear force diagrams of the sophisticated full interaction model are more realistic than of simplified models.

Key Notes: Dynamic Soil Structure Interaction (DSSI) - Finite Element - High Rise Building-Low Rise Building - Mohr Coulomb Theory- El Centro earthquake – seismic loads.

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