SIMPLE MODELS FOR SOIL-STRUCTURE INTERACTION

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Abstract: Many problems in Earthquake Engineering require to model the structure as a dynamic system which includes the sub-grade. The structural engineer usually is familiar with the Finite Element Method but he has a problem to model the sub-grade where its infinite extension and the wave propagation are the essential features. If the dynamic equation of the soil-structure system is written in the frequency domain and the variables of the system are the total displacements then the governing equations are given as in statics. The dynamic stiffness matrix of the system is obtained as the sum of the stiffnesses of the sub-structures structure and sub-grade. To illustrate the influence of the sub-grade onto the dynamic behavior of the structure the frequency response of two tower-like structures excited by a seismic harmonic wave field are shown. The sub-grade is modeled as elastic homogeneous half-space. The structure is modeled as finite beam element with lumped masses.

Key words: Soil-structure interaction, frequency domain, spectral elements.

MODELING OF STRUCTURES

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