

Providing Linear & Nonlinear Spectrums Containing Soil –Structure Interaction effects

The two subjects : “Spectral Analysis “ and “ Soil – Structure Interaction “ were considered , first of all , in this thesis. To reach a new method with a good accuracy to generate some linear and nonlinear spectrums containing Soil – Structure Interaction effects; in the linear spectrum generation procedure, at first, a 3-DOF dynamic model was analyzed and then spectrum generation was done based on the mentioned results. For solve the matrix equations of 3-DOF dynamic system, “Direct Integration Method” (Newmark solution) was used and a computer program was structured for determining the system reactions. For loading this systems, the accelerograms associated with Iran earthquakes registered on soils type III and IV were used and 4 situations:

1. Heavy and Short buildings and Low soil – structure interaction
2. Light and High buildings and Low soil – structure interaction
3. Heavy and Short buildings and High soil – structure interaction
4. Light and High buildings and High soil – structure interaction

were assumed.

Then with simplifying the 3 – DOF model and converting it to a 1- DOF model , nonlinear spectrum generation procedure has been done for 2 situations:

1. Light and High buildings and Low soil – structure interaction
2. Heavy and Short buildings and High soil – structure interaction

So by assuming the modifying accelerograms procedure with a good efficiency, the initial loading in a suitable way to enter the plastic phase and providing nonlinear analysis and to reach suitable results; were possible. In the following by initializing some earthquake factors, the Ductility needed for structures has been reached and finally by interpolation for 3 certain ductilities and for different periods, earthquake factor as been calculated and changing curve has been described, Based on the period. In the end, the usefulness of the mentioned way comparing with usual methods such as standard 2800 suggestions has been announced.

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