عنوان مقاله:

a SIMPLIFIED ONE DIMENSIONAL STICK MODEL FOR EARTHQUAKE RESPONSEANALYSIS OF FRAMED BUILDINGS

محل انتشار:

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خلاصه مقاله:

A procedure for modifying an existing model that resembles a two dimensional moment resisting frame of a building for its dynamic behavior to develop a one dimensional stick model is presented. The procedure is assumed to be applicable for both time domain and response spectrum analysis for earthquake base excitation such as (El_Centro) that acts on the original 2D frame of the building. The modified stick model is assumed tocompose of an assemblage of a series of two node cantilever beams havingtwo degrees of freedom per node, the rotational degree of freedom at eachnode is further condensed at element level resulting in a new stiffness andmass matrices taking into account the effects of those rotations. Differentcorrection factors are implemented for the exterior and interior columns inaddition to the number of floors of the original 2-dimensional frame of thebuilding in each direction. The developed procedure is then implemented intime domain and response spectrum analysis using a computer programespecially coded and written for the purpose of the study on the basis ofMTAB. For each case study of multi-story building, the natural time periodand the resulting base shear and drifts which are predicted by the proposedstick model are evaluated and compared with other existing modelingtechniques. Though a good agreement of the natural time periods of thebuilding frames between the proposed modeling technique and othermethods was found but, the responses were found to be –in general- higherthan those of the conventional 2D frame. While, the drifts as expected bythe stick model seem to be lower than those of the conventional 2D framemodeling techniques (the finite element based on SAP2000).

کلمات کلیدی:

Multi-story, time domain analysis, response spectrum analysis, natural time period, base shear