

ABSTRACT

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APPLICATIONS OF SYNTHETIC EARTHQUAKE ACCELEROGRAMS IN GROUND RESPONSE ANALYSIS

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For regions where there are a few or no historic records of strong earthquakes it is necessary to artificially generate earthquake records. One way to generate these accelerogram is based on the program *SIMQKE* developed at MIT in the seventies. This program was updated with a graphical user interface and other enhancements at UPRM. Basically the program produces an accelerogram that is compatible with a given ground response spectrum. A calibration was performed at UPRM to assess its accuracy. All the options and parameters of the program were used to select the most appropriate ones. After this was done, the artificial earthquakes were used as input to another program written in *MATLAB* that calculates the response spectrum at the surface of a multilayer soil deposit. The object of this phase of the study was to determine the effect of different assumptions regarding the layers beyond a certain depth. In practice, it is not common to have information about the soil layers beneath a certain depth. Therefore, one can use several assumptions (the deepest layer continues without boundary, there is a stiff rock beyond that point, etc). All these cases are examined using a real soil profile to determine the most accurate or the most conservative assumption.

Data on *Faculty Supervisor* of Research Project

(Please, provide complete information on separate sheet if more than one supervisor.)

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