NUMERICAL MODELLING OF SHAKING TABLE SUBJECTED TO INTERACTION WITH SURROUNDING ENVIRONMENT

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Degradation of the performance of the shaking tables, such as difficulties in maintaining system stability, has been observed during tests involving heavy and tall structures (Abdulkarim and Blondet, 1988). Some of problems seem to cause by dynamic interaction effects between specimen and table (Ozcelik et al., 2008; Pitilakis et al., 2008). Study of table-specimen interaction and soil structure interaction is hence important to understand behavior of seismic simulator system during dynamic tests (Ceresa et al., 2012).

This paper present the mathematical model used to study specimen-table-reaction mass interaction. The model developed for sensitivity analysis of shaking table and evaluating performance characteristics of seismic simulator. The influence of mechanical characteristics of test structure, seismic simulator and reaction mass on the dynamic response of system and surrounding environment was evaluated. Figure 1 shows a schematic view of dynamic facility to be analytically modeled.
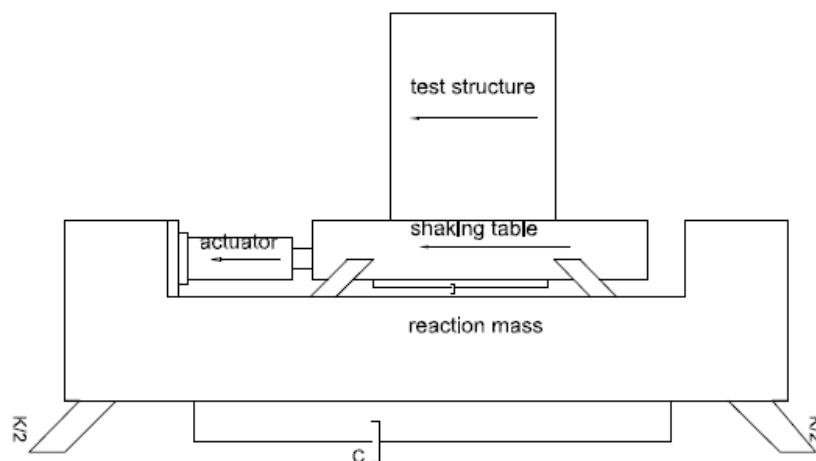

Figure 1. Schematic view of large dynamic testing facility to be analytically model
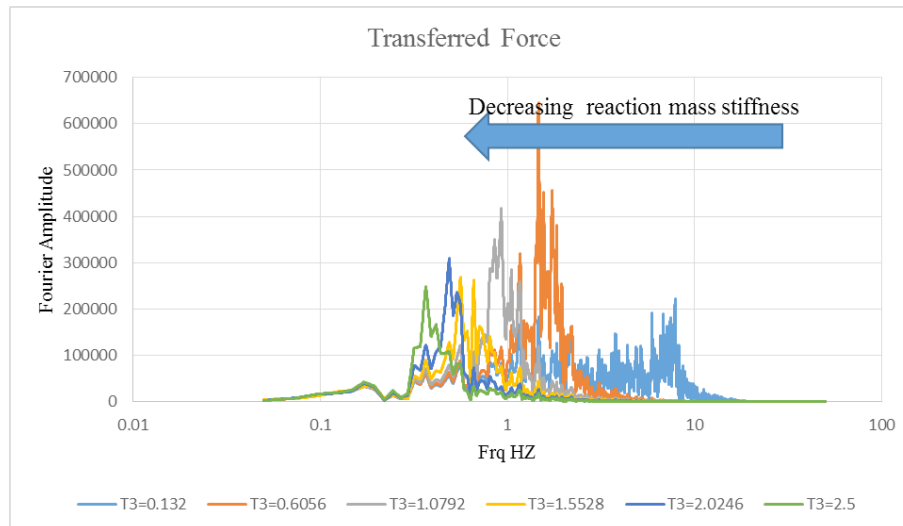
Figure 2. Reaction mass Displacement with different stiffness, under El Centro 1940 record

The result obtained explain of the table performance observed in numerical simulation involving interactions and providing guide lines for increasing efficiency of the table performance and decreasing effects of interactions on tests response.

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