DYNAMIC HYBRID TESTING WITH SHAKING TABLES

Mettupalayam V. Sivaselvan

Department of Civil, Environmental and Architectural Engineering
University of Colorado at Boulder
Siva@colorado.edu

Hybrid simulation is a technique for examining the behavior of complex engineering structures. It involves creating a hybrid model of a structure that consists of two parts actively interacting during the test, (a) a physical subsystem - an experimental specimen representing a portion of a structure and (b) a computational subsystem - a computer model of the remainder of the structure.

This paper presents some preliminary results from attempts to perform hybrid simulations using a servo-hydraulic shaking table. Such an approach is necessary when the experimental specimen has distributed inertia and the interface conditions cannot be applied at discrete points by actuators as commonly done in other forms of hybrid simulation. The challenges arise from the nonlinear dynamics of the shaking table and from its interaction with the specimen. Some interesting theoretical findings and algorithms for the implementation of the test methodology are discussed.

Keywords: dynamics, Shaking Table, Hybrid Tests