

EXPERIMENTAL ANALYSIS OF A CRANE FOR SEISMIC VIBRATIONS

Phillip C. Rogers* and Elizabeth K. Ervin, University of Mississippi, University, MS
38677

The research objective is to determine the frequency sensitivity of a crane constructed using an erector set. The stabilized crane was placed on a shake table in two orientations, and two sensors were attached to measure acceleration versus time. Sensor 1 was attached to the body of the crane, and Sensor 2 was attached to a weight hanging on the crane hook. Data was collected in National Instruments LabVIEW[®] and exported to Microsoft[®] Excel for graphing. Plotted as response amplitude versus frequency content, the resulting frequency response functions reveal the natural frequencies of the system. Comparison of time histories, frequency responses, and visual examinations confirm that the greatest structural motion occurs at the frequency of 5.2 Hertz. Different vibratory modes and acoustic resonances are also detected.