U. S. HIGHWAY BRIDGE SEISMIC INSTRUMENTATION NETWORK

by

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SYNOPSIS

In view of the destructive nature of recent earthquakes, the Federal Highway Administration (FHWA) has undertaken sponsorship of a strong-motion seismic instrumentation network for highway bridges. This network will ultimately provide data that will be used to evaluate structural performance during an earthquake. Because of the uncertainty of earthquake magnitude, location, and occurrence, it is necessary to instrument a number of bridges in various locations of the United States that have the highest probability of seismic activity and thus potential for data acquisition.

INSTRUMENTATION PROGRAM FOR HIGHWAY BRIDGES

Strong-motion monitoring is necessary to gain insight into the structural performance of bridges during an earthquake. The 1964 Alaska earthquake caused 46 million dollars damage to bridges and highways. No records of strong ground motion or structural response were obtained. At the time of the San Fernando, California, earthquake, a network of strong-motion accelerographs captured what has been the best recorded earthquake in history. Data were obtained from highrise buildings, hospitals, dams, and the free field. However, no records of bridge response were obtained from this earthquake. Therefore, the FHWA recently initiated a seismic bridge instrumentation program to collect data during future earthquakes. To make this program a viable one, a representative sampling of bridge types and locations is essential. Bridges selected for instrumentation are representative of current predominant construction types in the U. S.

Instrumentation requirements vary for each bridge. Structural variables that influence instrumentation are foundation type; number of spans; superstructure type; discontinuities, i.e., joints and hinges; and geometry, i.e., horizontal and vertical curvature, and superelevation. As a minimum, typical bridges and sites are instrumented to determine; (1) free field motion, (2) pier foundation response, (3) superstructure response, and (4) relative motion at discontinuities such as expansion joints, hinges, and abutments. Currently, 20 bridges across the U. S. have been or are in the process of being instrumented.

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