Abstract

The San Andreas Faultline is the largest fault in California. On average, this fault has produced a major earthquake every 150 years, the last to strike the southern section was the magnitude 7.9 Fort Tejon earthquake of 1857. Today the Greater LA Area is one of the largest urban agglomerations in the world and the second largest metropolitan region in the U.S. The area is well known for its urban sprawl and expansive highway system. The weak points of any highway system are the bridges and overpasses. Modeling the effects of an earthquake on this infrastructure will help inform emergency planning and speed economic recovery.

Experts have predicted a major earthquake, from magnitude 7.0 to 8.0, will strike the fault within the next 30 years. The goal of this project was to examine enhanced HAZUS hazard datasets to assess potential earthquake damage to highway bridges and how this may correspond to bridge closures. NEHRP soils maps were created by joining shear wave velocity data to STATSGO and Geological Unit data, then classifying each soil unit by the NEHRP class shear wave velocity range. USGS Scenario ShakeMaps at M7.4 and M8.0 were selected near the area of fault section with the highest probability of a great earthquake. Eight scenarios were modeled with this data. Results of this work show that user-supplied datasets for ground motion generally reduce HAZUS bridge damage outputs, that all earthquake scenarios will significantly damage southern California bridge infrastructure, and how relative damage state outputs translate into bridge restrictions and closures.