

San Diego Earthquake Hazard: Geotechnical Data Synthesis

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With a population of ~1.3 million, the City of San Diego is the third largest city in California, and it is traversed by the Holocene-active Rose Canyon Fault Zone (RCFZ). The Rose Canyon Fault is a strike-slip fault with a slip rate of 1-2 mm/yr and the potential to produce a M6.9 event. This project focuses on the strands of the RCFZ that traverse through the downtown area, which is the economic center of the city. The seismic hazard of the RCFZ has a direct impact on development in and around the city via the Alquist-Priolo Earthquake Fault Zoning Act, which regulates locations of structures for human occupancy. As a result, geotechnical firms in San Diego have been conducting many private, small-scale studies and investigations of the local fault architecture since the 1980s and have amassed an impressive amount of data. However, each report is plot or parcel specific and, at most, will only reference data from neighboring parcels. As there exists no resource where all of the data can be studied at once, reports are commonly studied independently. This project synthesizes the existing geotechnical data into a comprehensive geodatabase in an effort to show the current fault geometry within the city and provide insight to the evolution of the RCFZ.

Historically, geotechnical companies are hesitant to share results of fault studies and field investigations with each other, as the data is proprietary. Recently, however, several geologists and engineers within the professional community have called for a combined resource and many of San Diego's geotechnical firms have contributed data, including Geocon, Kleinfelder, Leighton & Associates, CTE, and URS/AECOM. This project compiles the data as a means to contribute to and improve upon the community fault model and give the city an accurate model for use in updating its seismic safety element. The geodatabase also aids the science community by helping to establish the variety of fault characteristics and complexities along strike, illuminate recurrence intervals or patterns of multi-segment ruptures, and provide evidence for long term slip rate. To date, we have collected over 500 geotechnical reports, and locations of all trenches, borings, and CPT soundings are being compiled in a GIS database.