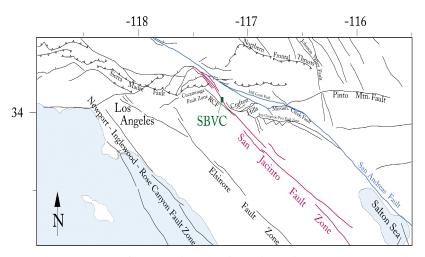


SEISMIC DESIGN PARAMETERS

for New Buildings at San Bernardino Valley College, San Bernardino, California

PROJECT DESCRIPTION

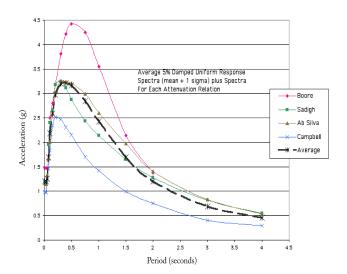
San Bernardino Valley College (SBVC) is built on the San Bernardino Valley segment of the San Jacinto fault. The right-lateral strike-slip San Jacinto fault is thought capable of generating an upper bound earthquake (UBE) of moment magnitude Mw=7.3. Earth Consultants International (ECI) was asked to study the seismically induced ground motions at the SBVC site. The purpose of the project was to quantify the strong ground motion anticipated at SBVC due to local earthquakes. We explored the code-based methodology using a 10% probability of exceedance in 100 years. This is the definition of UBE which the California Geological Survey recommended at that time for critical structures. We also looked at fault-specific earthquakes and ground motions that could cause damage at SBVC.



San Bernardino Valley College in relation to the major Quaternary faults in the region

SOLUTION

ECI determined an upper bound earthquake for SBVC based on geologic, tectonic, kinematic and seismological factors. We calculated the probabilistic peak horizontal acceleration (PGA) and spectral acceleration with a 10 percent probability of exceedance in 100 years for all faults within 100 km of SBVC using site-specific data and published attenuation relationships. We developed 5 percent damped, uniform risk design response spectra, and compared it to the California Building Code (CBC) and International Council of Building Officials (ICBO) design code standards in effect then. International strong ground motion databases were searched to obtain time history records of ground displacements caused by recent large earthquakes near the site, and source parameters pertinent to SBVC. The ground motion estimates obtained for SBVC are high compared to many other parts of southern California because the campus is built directly on the San Jacinto fault zone and within 6 km of the San Andreas fault. Therefore, SBVC must be prepared for very strong ground motions at the campus.



Average 5% damped uniform response spectra and spectra for different attenuation relations

