THE EFFECT OF SOURCE DISTANCE IN DETERMINATION OF SITE-SPECIFIC HAZARD SPECTRUM

Mohammad Reza SOGHRAT
PhD Student, IIEES, Tehran, Iran
m.soghrat@iiees.ac.ir

Mansour ZIYAEIFAR
Associate Professor, IIEES, Tehran, Iran
mansour@iiees.ac.ir

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Some elements of the completed structure that supply strength, stiffness and stability may not be existed at the special phases of the construction procedure. Incomplete structures must have enough structural integrity in various stages of construction to ensure stability and resistance against the seismic loads. Stability of the partially completed structures and the probability of progressive collapse should be considered in seismic design. For seismic design during construction, It seems that we should use reduced seismic load compared to design spectrum (return period, Tr, is considered 475 years). To achieve this goal, we should estimate the site-specific spectrum. In this study, we use the probabilistic seismic hazard analysis (PSHA) to determine the uniform hazard spectrum in short return period.

The main purpose of seismic hazard assessment for a particular site or area is to condense seismotectonic knowledge and experience into parameters used for predicting ground motion which in turn can be applied by engineers in design and subsequent earthquake resistant construction. Generally, The seismic hazard is considered for sensitive structures like dams, mines, nuclear power plants, underground depositories for radioactive waste, oil platforms, etc (Ameer et al., 2005).

In short return period, the low intensity measure is important. This measure may be originated from the occurred earthquakes in distant, large earthquakes or by near and small. It is clear that the radius of imaginary circle can be effective in evaluation of seismic hazard. Generally, the radius of studied region is assumed about 150 km. In this study; we consider three different radiuses (100, 200, 400 km) and compare the obtained result.

The selection of ground motion prediction equations (GMPEs) is important because the GMPEs should cover the distance up to 400 km. We can use three categorize to select the GMPEs; Ground motion models developed specially for the region of Iran (Category 1); Ground motion models developed for the Mideast-Europe region (Category 2); Global ground motion models developed by the “Next Generation of Ground Motion Attenuation Models” (NGA) project (Category 3). For example, the model that proposed by Boore et al. (2014) is valid for distances up to 400 km.

It should be noted that two various regions (Tehran; very high seismic zone and Arak; moderate seismic zone) in Iran are chosen to analyze. The ratio of obtained response spectra in different return period is plotted in Figure 1 that the Average shear wave velocity of the top 30 m, $V_{S,30}$, is considered 760 m/s.

Figure 1 shows that the predominant earthquake scenario in short return periods for Tehran is near and small rather than Arak which is large distant. These different scenarios may be because of various seismicity zones.

As a result, it can be said that in low seismicity zone, radiuses larger than 200 km has significant effect on spectrum in short return periods that are important in during construction structure.

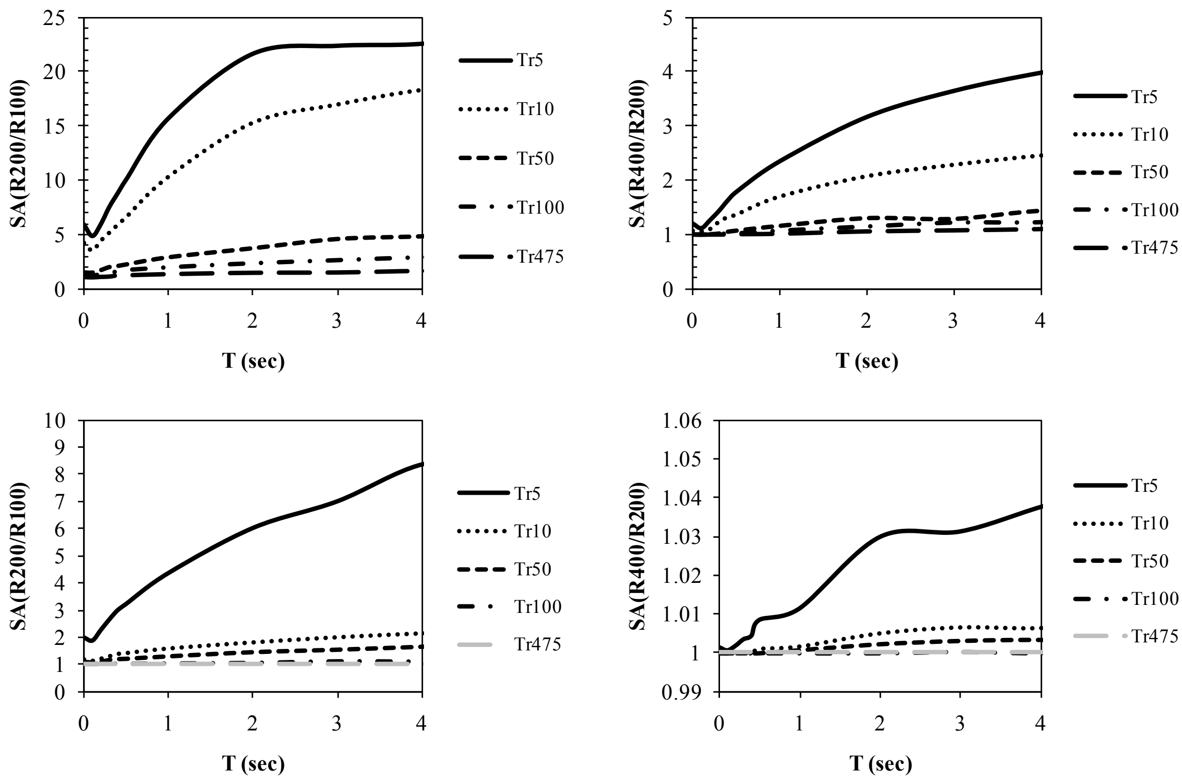

Figure 1. Comparison of ratio of response spectra for Arak (top) and Tehran (bottom)

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