Poster Abstract

Current Situation on Seismically Isolated Buildings in the U.S. and Japan

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In order to protect occupants, buildings and other important contents from damage caused by earthquakes, seismic isolation systems have been developed. With seismic isolation, the whole structure is mounted on a flexible foundation which is called an isolator. The main effect of the isolator is to decouple the structure from the ground and increase the resonant period of the structure to a value outside the range of periods containing the principal earthquake energy. It is a technically elegant solution to minimize and to eliminate earthquake damage in buildings.

In Japan, a first seismically isolated building was completed in 1983. It is a 2-storeys single family house which is installed laminated rubber bearings and supplemental dampers. At that time, many engineers were skeptical of a performance of the seismic isolation system, and an adoption of seismic isolation used to be very few. But the 1995 Kobe earthquake changed its situation. After that, gradually the number has increased, and now more than 2600 seismically isolated buildings have been constructed in Japan.

In the U.S., a first seismically isolated building, Foothill Communities Law and Justice Center, was completed in 1985 in Rancho Cucamonga, CA. This 170,000 square foot facility uses high-damping rubber bearings. In the middle of 1980s, sliding seismic isolation system bearings and lead rubber bearings were also developed. An author of reference 1 estimates that presently the total number of seismically isolated buildings is less than 250. And Authors of reference 2 estimate that about four or five seismically isolated buildings are constructed each year. But unfortunately, the details are not specified. By contrast, the Building Center of Japan (BCJ) design review for seismically isolated buildings started in 1985 in Japan. A database based on the design review contributes to grasp current situation.

The poster introduces an overview of seismically isolated buildings in the U.S. using a database which is collected from papers of major American Institutes, books, and websites of structural design offices and so on. We found 67 buildings. Furthermore, we compare the current situation in the U.S. with Japan, and we try considering the reason why the U.S. is slow to adopt seismic isolation.

References: