

Earthquake protection of historical buildings using base isolation technology - A case study on wooden structure in Northern Iran

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Abstract The study of historical buildings in Iran show that some base isolation techniques have been used to decrease earthquake fluctuations in several buildings. Construction of multi-layer stones, pouring sand between the ground and the bearing walls, and installing pieces of woods between the ground and bearing walls in traditional buildings, for instance, are some techniques to make buildings resistant against earthquakes which despite the modern developments, shows the creativity of our ancestors in engineering even better than now. Special features of Northern Iran's buildings in performance of consumed materials have been studied in this paper. Also wood is believed to be the initial material in constructing houses and isolated bases. Based on this fact, numerous developed countries' houses are made by wood which shows its superiorities than brick, concrete, cement, etc.

Keywords base isolation, earthquake, construction stability

EXTENDED ABSTRACT

Wood is considered as one of the oldest and earliest building materials ever existed in nature, which human being has benefited during the history. In addition to its resistance in diverse situations, it has an adequate capability and flexibility in safety of residents and absorbing, reducing and dispersing the energy which caused by earthquake. Woods are the only materials which could be obtained from renewable resources; consequently they are good options for earthquake prone areas. Considering these facts, that Iran has been located on the earth's earthquake belt and the advantage of accessing to wood resources in this country, it is feasible to build inexpensive and resistant wooden houses. Wood has been used as a building material in different parts of houses since the ancient times and also it's capable in all matters to be used as a building material. In addition to its everyday use, due to its proper compressive and tensile swing, it has been exploited in bridge construction, and wooden base structures. Study of historical buildings in Iran show that some base isolation techniques have been used to decrease earthquake fluctuations in several buildings. Construction of multi-layer stones, pouring sand between the ground and the bearing walls, and installing pieces of woods between the ground and bearing walls in traditional buildings, for instance, are some techniques to make buildings resistant against earthquakes which despite the modern developments, shows the creativity of our ancestors in engineering even better than now. Special features of Northern Iran's buildings in performance of consumed materials have been studied in this paper. Also wood is believed to be the

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