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## Response of base-isolated nuclear power plants under long period ground motions

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The effect of long period ground motions on structure seismic responses has become an important consideration because of the increasing number of long-period buildings such as base-isolated structures and high-rise buildings. As a reliable anti-seismic technology, base isolation is used in many research programs to minimize seismic response of nuclear power plants (NPPs), which are a kind of critical constructions and any damage of them could lead to severe disasters. However, long period ground motion effects on isolated structures are not considered in these researches. In this paper, a representative multi-particle model of NPPs is built and lead-rubber bearing is considered as isolation system. Several classic long period and ordinary ground motions are chosen to investigate their characteristics of time domain and frequency domain, and the comparison analysis well explain the response differences of isolated NPPs under long period ground motions and ordinary ground motions. According to the comparison of acceleration responses, displacement responses and shear force responses of these two kinds earthquake, time-domain analysis is carried out using the NPPs model with and without isolation system. It is observed that seismic responses of superstructures could be reduced more effectively under ordinary ground motions than with long period motions input, and isolation layer displacements are larger with long period ground motions action. Seismic safety of nuclear power plants could be enhanced effectively by isolation system, and influences of long period ground motions on it should be considered carefully in further isolation design.

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