Research on the Seismic Energy Dissipation Response of substation equipments

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Abstract： Porcelain equipments in substations are vulnerable to earthquake, mainly because porcelain is a brittle material and has almost no energy-absorbing capabilities. Damages to substation equipments by recent destructive earthquakes have prompted for the need to find a way to seismically retrofit equipments.

Many proposals have been made to mitigate the effect of earthquake motions on substation equipments. This research designs different proposals of earthquake mitigation or isolation according to structural properties of equipments. Damping devices are designed and produced to mount onto the porcelain electrical equipment to protect the electrical equipment by absorbing large amount of earthquake energy. The analyses of the seismic energy dissipation response of the equipments are carried out under different types of ground motions using finite element analysis software and shake table tests. This research finds that the mitigation or isolation system is effective in reducing the peak responses including stress, acceleration and displacement of the entire equipments.