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# Application of seismic margin map in a high rise mid-height seismic isolation building with mega-truss

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**SUMMARY**

Generally, there are two or more factors about determining the ultimate state of a building, and mostly these are individually considered.

A high rise mid-height seismic isolation building that we designed is composed of low-story part(involving a concert hall of 2700 seats), seismic isolation part, mega-truss part and high-story part. These all are connected vertically. Each part has important factors that lead to the collapse of the building. On this characteristics of the building we had to consider the relationship of each factors in parallel.

Therefore we made a seismic margin map considering the relationship of each factors in parallel. In a seismic margin map, X axis indicates a response ratio of horizontal motion, Y axis indicates a response ratio of vertical motion. In each axis, the standard value is a response of earthquake motions defined by the building standard law of Japan. The line of 45 degrees from X axis means to increase/decrease the same horizontal/vertical response ratio of the earthquake motions defined by the building standard law of Japan.

Each factors of ultimate state, shear failure of shear wall in low-story part, rupture deformation of rubber bearings in seismic isolation part, hit against another non-isolation part in seismic isolation part, elastic□plastic buckling in mega-truss part, overturning in high-story part, exceeding the allowable story drift angle in high-story part, and so forth were calculated by numerical analysis. These factors were plotted in the map considering the correlation of responses by horizontal and vertical motion.

By using the seismic margin map weak points of the building were quite clear, we reinforced the weak points and improved the seismic performance.