

## **Structural Collapse Analysis of a Steel Building Subjected under Seismic Excitation, Tsunami Force, and Debris Collision**

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The Great East Japan Earthquake and the following tsunami which occurred on the 11th of March, 2011, caused a big disaster along the ocean-side of Tohoku area. The big tsunami carried different kinds of debris such as ships and cars up the stream, which caused additional damages to the buildings in the area. In this study, a structural collapse analysis of a steel building is performed using a finite element code based upon the ASI-Gauss technique. A seismic excitation recorded in Kesenuma-shi is first applied to the steel building model, followed by an input of the fluid force and buoyant force due to tsunami wave. At the last phase of the analysis, debris model with a velocity is collided and the collapse behavior of the building is investigated. The damages produced by the tsunami and the collision of the debris are compared by changing the inundation height.

**Keywords:** Structural collapse analysis, Tsunami, Debris collision, ASI-Gauss technique