

Global-loss-of-stability progressive collapse mechanisms of 3D steel frame buildings

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ABSTRACT

The progressive collapse phenomenon of buildings has gained great attention from the structural engineering community since the collapses of the World Trade Center in New York in 2001. The response of structural systems, such as high-rise buildings, to local (extended or not) damage is in the core of this attention. The available methods for the analysis of such phenomena are described in [1] which is the dominating code for progressive collapse today. The current work extends the analysis included in [4] by using techniques able to identify global loss of stability phenomena. As presented in recent publications [2]-[5], these loss-of-stability phenomena (local or global) are usually more critical for the integrity of the structure than others (e.g. yielding-type of failures). Through a 3D FEM analysis of steel high-rise buildings, the potential of global loss of stability is investigated, a collapse mode which is not usually considered by the codes or by structural engineers mainly due to its complexity.

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