

## **Collapse Capacity Assessment of Inelastic Structures under Seismic Sequences**

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**Abstract :** All seismic design codes are based on the determination of the design earthquake without taking into account the effects of aftershocks in the design practice. In regions with a high level of seismicity, the occurrence of several aftershocks of various magnitudes and different time lags is very likely. This research aims to estimate the collapse capacity of a 10-story steel bundled tube moment frame subjected to as-recorded seismic sequences. The studied structure is designed according to the seismic regulations of the fourth revision of the Iranian code of practice for the seismic-resistant design of buildings (Code No.2800). A series of incremental dynamic analyses (IDA) is performed up to the collapse level of the intact structure. Then, in order to demonstrate the effects of aftershock events on the collapse vulnerability of the building, aftershock IDA analyzes are carried out. To gain deeper insight, collapse fragility curves are developed and compared for both series. Also, a study on the influence of various ground motion characteristics on collapse capacity is carried out. The results highlight the importance of considering the decisive effects of aftershocks in seismic codes due to their contribution to the occurrence of collapse.

**Keywords :** IDA, aftershock, bundled tube frame, fragility assessment, GM characteristics, as-recorded seismic sequences

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