

Seismic Behavior of Three-Dimensional Steel Buildings with Post-Tensioned Connections

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Abstract : The seismic responses of steel buildings with semi-rigid post-tensioned connections (PC) are estimated and compared with those of steel buildings with typical rigid (welded) connections (RC). The comparison is made in terms of global and local response parameters. The results indicate that the seismic responses in terms of interstory shears, roof displacements, axial load and bending moments are smaller for the buildings with PC connection. The difference is larger for global than for local parameters, which in turn varies from one column location to another. The reason for this improved behavior is that the buildings with PC dissipate more hysteretic energy than those with RC. In addition, unlike the case of buildings with WC, for the PC structures the hysteretic energy is mostly dissipated at the connections, which implies that structural damage in beams and columns is not significant. According to this results, steel buildings with PC are a viable option in highseismicity areas because of their smaller response and self-centering connection capacity as well as the fact that brittle failure is avoided.

Keywords : inter-story drift, nonlinear time-history analysis, post-tensioned connections, steel buildings

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