



## Evaluation of seismic performance factors of special steel moment resisting frames with basement walls

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### Abstract

Special steel moment frame (SSMRF) is a prevalent type of steel structures around the world, and sometimes, because of using space efficiently, floors under the base level are added to this type of structures. Based on FEMA P695 methodology for quantifying seismic factors of this type of structure, SSMRFs with basement wall for floors under the base level are designed and nonlinear models are analyzed to anticipate the collapse capacity of each archetypes and the adjusted collapse margin ratios (ACMR) are evaluated and compared to acceptance criteria. Due to the change of the structural system in height, the initial seismic parameters  $R$  (response modification coefficient),  $C_d$  (deflection amplification),  $\Omega_o$  (overstrength factor) for the whole structure are considered the same as the parameters of the special SSMRF in order to validate this assumption. Finally it is proved that these factors can be used for designing this particular type of structure.

### Keywords:

Seismic performance factors, Special Steel moment resisting frames, Basement wall, Nonlinear analyses

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