

Numerical Analysis On The Collapse Behavior Of Single-Story Composite Sub-Frames With Different Span-Depth Ratios

Tan ZHENG

After a column of steel frame structure fails, the two-bay beams connected with the failed column plays a key role in internal force redistribution and re-equilibrium of the remaining structure, while the span-depth ratio has a significant impact on the structural collapse behavior. The quasi-static test results of the beam-column assembly with rigid connections are used for verify the finite element modeling method. The numerical models of single-story composite sub-frames with different span-depth ratios were established and the influence of span-depth ratios on internal force development and collapse resistance of composite beam-column substructure were analyzed in detail. The contribution level of flexural mechanism and catenary mechanism resistance are quantitatively proposed, which can provide the basis for structural collapse resistance design and reference for practical engineering application. The analysis results show that the span-depth ratios of the two-bay beams determines the resistance level of the flexural mechanism, while the span of the two-bay beams determines the resistance level of the catenary mechanism, and the beam height has little influence on it.