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Collapse performance of steel buildings with infill walls

Gravity load collapse response of five actual buildings was investigated by pyshically testing them and through computational simulations. Steel columns and load bearing walls were removed from the first story of three steel frame buildings and two masonry wall buildings. Four of the test buildings were located on the Ohio State University campus. The goal of the experimental and computational research was to better understand and model the building system resistance to loss of one or more vertical members, e.g., due to fire, seismic or blast loading, although the column and wall removal process in this research was load independent. The test data obtained from the field experiments were used to validate the computational models developed to simulate static and dynamic collapse response of existing buildings that may experience progressive collapse after sudden loss of columns or walls. This research investigated redistribution of internal forces within the building after the loss of vertical load carrying members. Current design guidelines and methodologies and potential analysis methods have been evaluated using the test data from field experiments. Progressive collapse response of test buildings was simulated using two and three-dimensional structural models and compared with the experimental data. This study showed robustness of different structural systems and potential contribution of structural components to collapse resistance under extreme loads.

Biography

Halil Sezen has received his BS, MS, and PhD degrees from the Middle East Technical University, Ankara, Turkey; Cornell University, New York; and University of California, Berkeley; respectively. He has been a Faculty Member at The Ohio State University since 2002. He has more than 130 technical publications. He has been serving as an Assocaite Editor and Editorial Board Member of several journals including the *ASCE Journal of Structural Engineering,* and *Engineering Structures*.

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