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Robustness of Steel Gravity Frame Systems with Single-Plate Shear Connections

By NIST

CreateSpace Independent Publishing Platform. Paperback. Book Condition: New. This item is printed on demand. Paperback. 116 pages. Dimensions: 11.0in. x 8.5in. x 0.3in. This report presents a computational assessment of the performance of steel gravity framing systems with single-plate shear (, shear tab) connections and composite floor slabs under column loss scenarios. The computational assessment uses a reduced modeling approach, while comparisons with detailed model results and available experimental data are presented to establish confidence in the reduced models. The reduced modeling approach enables large multi-bay systems to be analyzed much more efficiently than the detailed modeling approaches used in previous studies. Both quasi-static and sudden column loss scenarios are considered, and an energy-based approximate procedure for analysis of sudden column loss is adopted, after verification through comparisons with direct dynamic analyses, further enhancing the efficiency of the reduced modeling approach. Reduced models are used to investigate the influence of factors such as bay spacing, slab continuity, and the mode of connection failure on the collapse resistance of gravity frame systems. Simple equations for the rotational capacities of the connections are derived as a function of a few parameters including the span length and the connection depth. These equations yield good...



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