The experimental behavior of cold-formed steel (CFS) structures under seismic loads remains relatively unexplored. Modern design codes are based on member and sub-system level testing and have not been validated at the system level. The work detailed herein represents the full-scale experimental component of the multi-year NSF-funded project CFS-NEES (part of the George E. Brown Network for Earthquake Engineering Simulation). The overarching goal of this work is to improve structural design codes at the system level and to provide validation of and calibration for high-throughput computational models. To this end, two full-scale two-story CFS-framed buildings [23 ft. x 50 ft.] were tested with 141 different excitations on the shake tables at the Structural Engineering and Earthquake Simulation Laboratory (SEESL) at the University of Buffalo. The first building was outfitted with the structural system only, consisting of CFS framing with oriented strand board (OSB) sheathed shear walls as the lateral force resisting system. The second building was nominally identical to the first in structural system, but was fully finished with exterior OSB, interior gypsum, partition walls, floor systems, stairways, and weatherproofing. The building specimens were outfitted with 168 sensors to capture general building behavior; multi-story shear wall behavior; load transfer to and from shear walls; the impact of nonstructural finishing on building performance; effect of openings on building motion; diaphragm flexibility; and to identify the system characteristics. Results are described within, and comparisons to existing design codes and sub-system level tests are presented and design recommendations are formulated.

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