

## **ERRATA (June 7, 2019)**

The abstract in the online version of this report is incorrect. Below is the proper abstract.

### **ABSTRACT**

Five cover-plate and five flange-plate-reinforced steel moment-resisting connections were studied by analysis and experimentation. All ten were single-sided steel beam-column assemblies that are representative of exterior beam-column connections, and all ten were composed of W14x176 Grade 50 columns and W30x99 Grade 50 beams. The reinforcing plates were fabricated from Grade 50 steel. A solid-element model of each connection was prepared and analyzed prior to the fabrication of the test specimen. Following completion of the testing program, solid-element and shell-element models of selected connections were prepared using measured material properties and were analyzed for the purpose of augmenting the experimental observations. None of the ten connections failed in a catastrophic manner; the strength of each connection degraded slowly due to local buckling of the beam web and flanges. The ten reinforced connections performed substantially better than the unreinforced connection of the SAC Phase I project and are technically viable alternatives to moment-resisting connections reinforced with haunches, or connections utilizing reduced beam sections. The procedures of FEMA 267A can be used to design and detail connections reinforced with flat plates. Flange-plate connections are marginally less likely to suffer brittle or ductile fracture than cover-plate connections. Beam web connections should be groove welded to the column flange. Rectangular reinforcing plates are preferable to trapezoidal or swallowtail-shaped plates. Reinforcing plates should be joined to beam flanges using three-sided fillet welds. Bracing of the beam bottom flange outside the plastic hinge zone will not produce significant improvements in connection hysteresis. It is impractical to share large plastic rotations between a panel zone and a beam cross section across a wide range of story drifts. The effectiveness of beam web reinforcement in the form of plates welded to the beam web and the column flange is likely most limited. The use of overly thick reinforcing plates in either cover- or flange-plate connections is discouraged.