SEISMIC UPGRADE

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EARLIER THIS YEAR, AISC introduced the 2nd Edition of the *Seismic Design Manual*.

Built upon the 2010 AISC *Seismic Provisions for Structural Steel Buildings*, the new *Seismic Design Manual* provides additional discussion and design examples and demonstrates the application of that standard. It is organized as follows:

- Part 1: General Design Considerations
- Part 2: Analysis
- Part 3: Systems not Speci cally Detailed for Seismic Resistance
- Part 4: Moment Frames
- Part 5: Braced Frames
- Part 6: Composite Moment Frames
- Part 7: Composite Braced Frames and Shear Walls
- Part 8: Diaphragms, Collectors and Chords
- Part 9: Provisions and Standards
- Part 10: Engineered Damping Systems

Part 9 includes the 2010 AISC *Seismic Provisions* and the 2010 AISC *Prequali ed Connections for Special and Intermediate Steel Moment Frames for Seismic Applications*. Some topics in the new edition are expanded from the 1st Edition while others, such as analysis and composite systems, are new.

There are several other changes as well. In addition to the burgundy cover, one of the obvious updates is the inclusion of both load and resistance factor design (LRFD) and allowable strength design (ASD) methods throughout the design examples. There was also a concerted effort by the committee responsible for the maintenance of the *Seismic Design Manual* to incorporate expanded discussion for each chapter, as well as expanded explanatory text and gures in the design examples themselves. As part of this effort the 2nd Edition *Seismic Design Manual* illustrates more of the seismic design and detailing concepts and also offers alternatives in design that readers can consider in their own projects.

For example, the special moment frame connection design example illustrates full design checks for doubler and continuity plates and their required welds, as shown in Figure 1. As an alternative, the example calculates the next largest column for which this extra panel zone detailing would not be required, so that readers can understand the options available and choose the best one for each application. In addition, by including step-by-step descriptions and citing the applicable sections and equations from the AISC *Speci cation for Structural Steel Buildings* and the AISC *Seismic Provisions* used in each example, the new *Seismic Design Manual* will prove to be an effective reference for designers.

provided, however, to make clear where special seismic detailing is and is not required.

Part 3 of the

and SMFs: story drift and stability checks based on ASCE/SEI 7, beam and column design and connection designs (eight-bolt stiffened end plate for OMF and prequali ed reduced beam section—RBS—moment connection for SMF). The eight-bolt stiffened end plate connection was used in the 2nd Edition as an alternative to the prescriptive connection described in *Seismic Provisions* Section E1.6b(c). The prequali ed reduced beam section moment connection is just one of the types of connections available for use in IMFs or SMFs according to the *Prequali ed Connections for Special and Intermediate Steel Moment Frames for Seismic Applications*. Part 4 concludes with two examples on column splice design, including a column that is part of an SMF and two types of xed column base designs—one with a base plate and one with the column base embedded in concrete.

Part 5, Braced Frame Systems, includes discussion and design examples for ordinary concentrically braced frames (OCBFs), special concentrically braced frames (SCBFs), eccen-

address ASD. This is consistent with the recommendation that ASD and LRFD methods not be combined within a structure.

The design of diaphragms, collectors and chords is not specifically addressed in Parts 4 through 7; therefore, Part 8 applies to these elements and their connections that are also required to be detailed for seismic resistance. A general discussion is included on diaphragms explaining that diaphragms and collectors are required to distribute lateral forces to vertical frames that may not be uniformly spaced and continuous throughout the building. Part 8 also defines collector elements as tension and compression members that deliver the diaphragm forces to the lateral force resisting frames. New discussion has been added on determining the compressive strength of a collector due to flexural-torsional buckling when the section is constrained to twist about its top flange rather than its centroid. This condition occurs when the top flange is continuously braced by a steel deck with ribs perpendicular to the beam In0aue