

## PROPOSAL 6-3R (2009)

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### SCOPE: Revise Table 12.1-1 and 15.7 of ASCE 7-05

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#### PROPOSAL FOR CHANGE:

- 1) Delete lines B.2 and B.25 from Table 12.1-1 of ASCE 7-05. Modify the names of the Seismic Force Resisting Systems in lines B.1 and B.26 to read as follows:

Line B.1       “Steel eccentrically braced frames”  
Line B.26      “Buckling-restrained braced frames”

- 2) **Modify Section 15.7 of AISC 341-05 as follows:**

#### 15.7. Beam-to-Column Connections

Beam-to-column connections shall conform to one of the following:

(1) Beam-to-column connections shall meet the requirements for FR moment connections as specified in Sections 11.2a; or

(2) Beam-to-column connections shall have sufficient rotation capacity to accommodate the required rotation at a minimum story drift of 2.5% of the story height.

~~Beam-to-Column Connections away from the link shall be designed as either moment resisting connections or as connections that can accommodate at least a total rotation of 0.02 radians.~~

~~Where moment resisting connections are provided away from the link, then the beam-to-column connections shall meet the requirements for FR Ordinary Moment Connections as specified in Sections 11.2a and 11.2e and 11.5.~~

- 3) **Add Section 16.7 to AISC 341-05 as follows:**

#### 16.7 Beam-to-Column Connections

Beam-to-column connections shall conform to one of the following:

(1) Beam-to-column connections shall meet the requirements for FR Moment Connections as specified in Sections 11.2a; or

1                    (2) Beam-to-column connections shall have sufficient rotation capacity to  
2                    accommodate the required rotation at a minimum story drift of 2.5% of the story  
3                    height.

4                    ~~Beam-to-Column Connections shall be designed as either moment resisting~~  
5                    ~~connections or as connections that can accommodate at least a total rotation of~~  
6                    ~~0.02 radians.~~

7                    ~~Where moment resisting connections are provided, then the beam-to-column~~  
8                    ~~connections shall meet the requirements for FR Ordinary Moment Connections~~  
9                    ~~as specified in Sections 11.2a and 11.2c and 11.5.~~

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11 **COMMENTARY**

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13 ASCE 7-05 included two different systems for both Eccentrically Braced Frames (EBF) and  
14 Buckling Restrained Braced Frames (BRBF). The primary distinction between these two systems  
15 was whether or not there were moment resisting beam-column connections within the braced  
16 bays. Recent testing at UC Berkeley (Uriz and Mahin, 2004) has indicated that designs that do  
17 not properly account for the stiffness and distribution of forces in braced frame connections may  
18 be subject to undesirable performance. This proposal consolidates the EBF and BRBF building  
19 frame systems into a single designation, with proper consideration of the beam-column  
20 connection demands. The proposal allows the engineer to either provide a fully restrained  
21 moment connection meeting the requirements for Ordinary Moment Connections in AISC 341-  
22 05, thereby directly providing a load path to resist the connection force and deformation  
23 demands, or to provide a connection with the ability to accommodate the potential rotation  
24 demands. An example of this would be a configuration tested at Lehigh University (Fahnestock,  
25 et. al. 2006), shown in Figure 1 that effectively formed a pinned condition in the beam just  
26 beyond the beam-column-brace connection.

27 **References:**

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29 Uriz, Patxi and Mahin, Stephen A., *Seismic Performance Assessment of Concentrically Braced*  
30 *Steel Frames* 13th World Conference on Earthquake Engineering; Vancouver, B.C., Canada;  
31 August 1-6, 2004; Paper No. 1639.

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33 Fahnestock, Larry A. Ricles, James M. and Sause, Richard, *Experimental Study of a Large-Scale*  
34 *Buckling Restrained Using the Pseudo-Dynamic Testing Method*, Proceedings of the 8<sup>th</sup> National  
35 Conference on Earthquake Engineering, San Francisco, CA, April, 2006.

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37 **REASON FOR PROPOSAL:**

38 See Commentary above.

39 This proposal was modified to be consistent with the latest version of AISC 341 that is presently  
40 being balloted by the AISC Committee on Specifications. It is the intended for these two  
41 documents to be in parallel to the greatest extent possible. The primary technical change from  
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1 the previous version is that the qualifying rotation capacity has been increased from 0.02 to  
2 0.025 radians to be more consistent with the expected demands generated in the analytical  
3 studies that are referenced.

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