



DSA Structural Amendments under review are highlighted in GRAY and YELLOW

Template 22-11

2001 CBC - Chapter 22A
STEEL

Section - 2213A - SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS IN SEISMIC ZONES 3 AND 4

Subsection(s) - 2213A.7 - 2213A.7.7.2

1 **2213A.7 Special Moment-resisting Frame (SMRF) Require-**
 2 **ments.**

3
 4 **2213A.7.1 Girder-to-column connection.**

5
 6 **2213A.7.1.1 Required strength.** The girder-to-column connec-
 7 tion shall be adequate to develop the lesser of the following:

- 8
 9 1. The strength of the girder in flexure.
 10
 11 2. The moment corresponding to development of the panel
 12 zone shear strength *including strain hardening and overstrength*
 13 as determined from Formula (13A-1).

14
 15 **EXCEPTION:** Where a connection is not designed to contribute
 16 flexural resistance at the joint, it need not develop the required strength
 17 if it can be shown to meet the deformation compatibility requirements
 18 of Section 1633A.2.4.
 19

20 **2213A.7.1.2 Connection strength.** Connection configurations
 21 utilizing welds or high-strength bolts shall demonstrate, by ap-
 22 proved cyclic test results or calculation, the ability to sustain in-
 23 elastic rotation and develop the strength criteria in Section
 24 2213A.7.1.1 considering the effect of steel overstrength and strain
 25 hardening.

26
 27 *Design of beam-to-column joints shall be substantiated by test-*
 28 *ing to have an inelastic rotation of at least 0.03 radians.*

29 ● ● ● ●

30
 31 **2213A.7.5 Strength ratio.**

32 ● ● ● ●

33
34 M_{pz} = the sum of beam moments when panel zone shear
35 strength reaches the value specified in Formula (13A-1)
36 *determined with F_y increased to include the effects of*
37 *strain hardening and overstrength.*

38
39 **EXCEPTION:** Columns meeting the compactness limitations for
40 beams given in Section 2213A.7.3 *determined with F_y increased for*
41 *overstrength and strain hardening* need not comply with this require-
42 ment provided they conform to one of the following conditions:

43 • • • •

44
45 **2213A.7.6 Trusses in SMRF.** *Not adopted by DSA and OSHPD.*

46 • • • •

47
48 **2213A.7.7 Girder-column joint restraint.**

49
50 **2213A.7.7.1 Restrained joint.** Where it can be shown that the
51 columns of SMRF remain elastic, the flanges of the columns need
52 be laterally supported only at the level of the girder top flange.

53 • • • •

54
55 *3. The lesser of the girder flexural strength, including the*
56 *effects of overstrength and strain hardening, or the panel zone*
57 *strength, including the effects of overstrength and strain harden-*
58 *ing,* will limit column stress ($f_a + f_{bx} + f_{by}$) to F_y of the column.

59 • • • •

60
61 **2213A.7.7.2 Unrestrained joint.** Columns without lateral sup-
62 port transverse to a joint shall conform to the requirements of
63 Division III, with the column considered as pin ended and the
64 length taken as the distance between lateral supports conforming
65 with Section 2213A.7.7.1. The column stress, f_a , shall be deter-
66 mined from gravity loads plus the lesser of the following:
67

- 68 1. Ω_o times the design seismic forces.
69
70 2. The forces corresponding to either 125 percent of the girder
71 flexural strength or *twice* the panel zone shear strength.

72 • • • •