A5 and Chapters C and F designated for *ASD* and *LRFD*.

A6.1.1 LSD Requirements

Structural members and their *connections* shall be designed to have *resistance* such that the *factored resistance* equals or exceeds the effect of *factored loads*. The design shall be performed in accordance with Equation A6.1.1-1:

$$\phi R_n \geq R_f \qquad \text{(Eq. A6.1.1-1)}$$

where

ϕ = *Resistance factor* specified in Chapters B through G and Appendix 1
R_n = *Nominal resistance* specified in Chapters B through G and Appendix 1
ϕR_n = Factored resistance
R_f = Effect of factored loads

A6.1.2 Load Factors and Load Combinations for LSD

Load factors and *load combinations* for *LSD* shall be as stipulated by Section A6.1.2 of Appendix B. ☜B

A7 Yield Stress and Strength Increase from Cold Work of Forming

A7.1 Yield Stress

The *yield stress* used in design, F_y, shall not exceed the *specified minimum yield stress* of steels as listed in Section A2.1 or A2.3.2, as established in accordance with Chapter F, or as increased for cold work of forming in Section A7.2.

A7.2 Strength Increase from Cold Work of Forming

Strength increase from cold work of forming shall be permitted by substituting F_{ya} for F_y, where F_{ya} is the average *yield stress* of the full section. Such increase shall be limited to Sections C2, C3.1 (excluding Section C3.1.1(b)), C4, C5, D4, and D6.1. The limits and methods for determining F_{ya} shall be in accordance with (a), (b) and (c).

(a) For axially loaded compression members and flexural members whose proportions are such that the quantity ρ for strength determination is unity as determined in accordance with Section B2 for each of the component elements of the section, the design yield stress, F_{ya}, of the steel shall be determined on the basis of one of the following methods:
   (1) full section tensile tests [see paragraph (a) of Section F3.1],
   (2) stub column tests [see paragraph (b) of Section F3.1],
   (3) computed in accordance with Eq. A7.2-1.

$$F_{ya} = CF_{yc} + (1 - C) F_{yf} \leq F_{uv} \qquad \text{(Eq. A7.2-1)}$$

where

F_{ya} = Average yield stress of full unreduced section of compression members or full flange sections of flexural members
C = For compression members, ratio of total corner *cross-sectional area* to total cross-sectional area of full section; for flexural members, ratio of total corner cross-sectional area of controlling flange to full cross-sectional area of

controlling flange

F_{yc} = $B_c F_{yv}/(R/t)^m$, tensile yield stress of corners. (*Eq.* A7.2-2)

Eq. A7.2-2 applies only when $F_{uv}/F_{yv} \geq 1.2$, $R/t \leq 7$, and the included angle $\leq 120^o$.

where

B_c = $3.69\,(F_{uv}/F_{yv}) - 0.819\,(F_{uv}/F_{yv})^2 - 1.79$ (*Eq.* A7.2-3)

F_{yv} = Tensile yield stress of *virgin steel* specified by Section A2 or established in accordance with Section F3.3

R = Inside bend radius

t = *Thickness* of section

m = $0.192\,(F_{uv}/F_{yv}) - 0.068$ (*Eq.* A7.2-4)

F_{uv} = *Tensile strength* of virgin steel specified by Section A2 or established in accordance with Section F3.3

F_{yf} = Weighted average tensile yield stress of flat portions established in accordance with Section F3.2 or virgin steel yield stress if tests are not made

(b) For axially loaded tension members, the yield stress of the steel shall be determined by either method (1) or method (3) prescribed in paragraph (a) of this section.

(c) The effect of any welding on mechanical properties of a member shall be determined on the basis of tests of full section specimens containing, within the gage length, such welding as the manufacturer intends to use. Any necessary allowance for such effect shall be made in the structural use of the member.

A8 Serviceability

A structure shall be designed to perform its required functions during its expected life. *Serviceability limit states* shall be chosen based on the intended function of the structure and shall be evaluated using realistic *loads* and *load combinations*.

A9 Referenced Documents

The following documents or portions thereof are referenced in this *Specification* and shall be considered part of the requirements of this *Specification*. Refer to Section A9a of Appendix A or B for documents applicable to the corresponding country. ☜A,B

1. American Iron and Steel Institute (AISI), 1140 Connecticut Avenue, NW, Washington, DC 20036:

AISI S200-07, North American Standard for Cold-Formed Steel Framing - General Provisions

AISI S210-07, North American Standard for Cold-Formed Steel Framing – Floor and Roof System Design

AISI S211-07, North American Standard for Cold-Formed Steel Framing – Wall Stud Design

AISI S212-07, North American Standard for Cold-Formed Steel Framing – Header Design

AISI S214-07, North American Standard for Cold-Formed Steel Framing – Truss Design

AISI S901-02*, Rotational-Lateral Stiffness Test Method for Beam-to-Panel Assemblies

AISI S902-02, Stub-Column Test Method for Effective Area of Cold-Formed Steel Columns

AISI S906-04, Standard Procedures for Panel and Anchor Structural Tests