Specification Elastic LTB Eq.

$$F_{cr} = C_b \frac{\pi^2 E}{(KL_b / r_t)^2} \sqrt{1 + \frac{0.078}{X^2}(KL_b / r_t)^2}$$

$$X^2 = \frac{S_{xc} h_o}{J}$$

X² varies from 13 to 2500 for ASTM A6 W shapes

$$\cong \frac{2 I_x}{J} \quad \text{doubly-symmetric sections}$$

$$r_t = \frac{(I_y C_w)^{1/4}}{S_x^{\;1/2}}, \quad \text{doubly-symmetric sections}$$

$$r_t \cong \frac{b_{fc}}{\sqrt{12\left(1 + \frac{1}{6} a_w\right)}}, \quad a_w = h_c t_w / A_{fc} \quad \text{in general}$$

Design Calculation of LTB K Factor ($K = K_z = K_y$)

- Procedure recommended in the SSRC Guide, originally developed by Nethercot & Trahair (1976)
  - Starts with LTB resistance based on K = 1
  - Uses column sidesway-inhibited alignment chart
- Use of K = 1 is significantly conservative in many cases for longer unbraced lengths

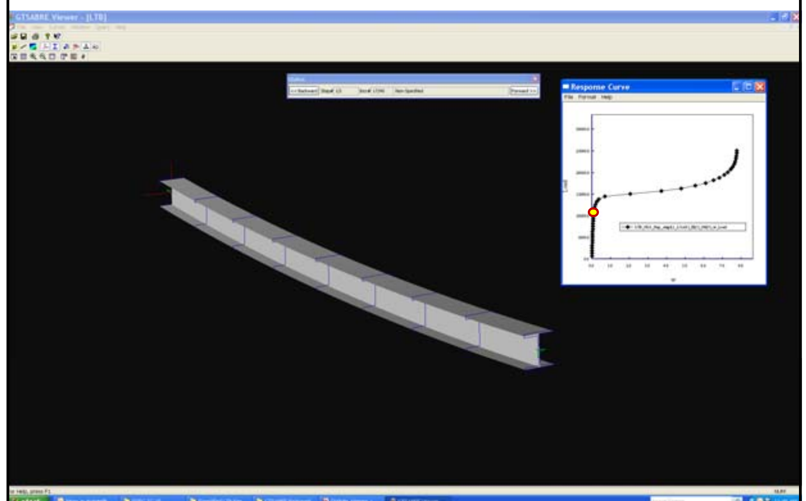
$C_b = ?$

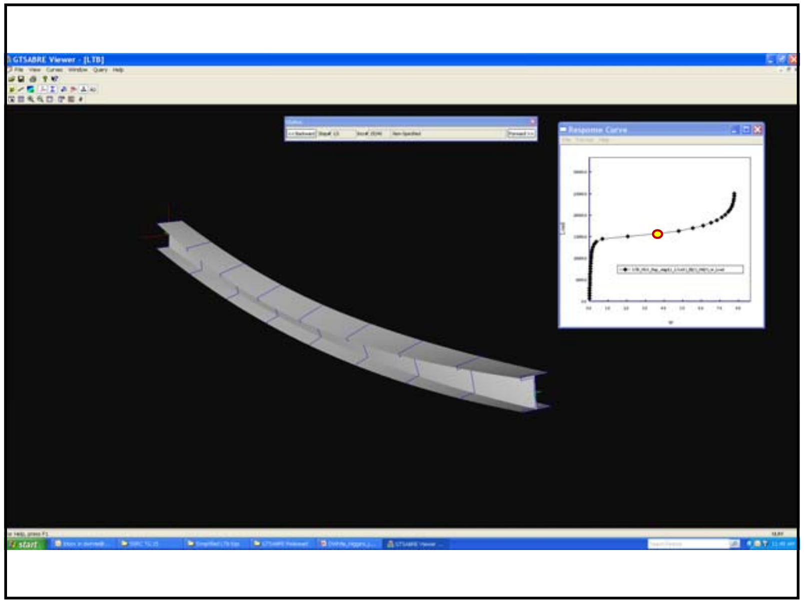
$K_y = ?$

$K_z = ?$

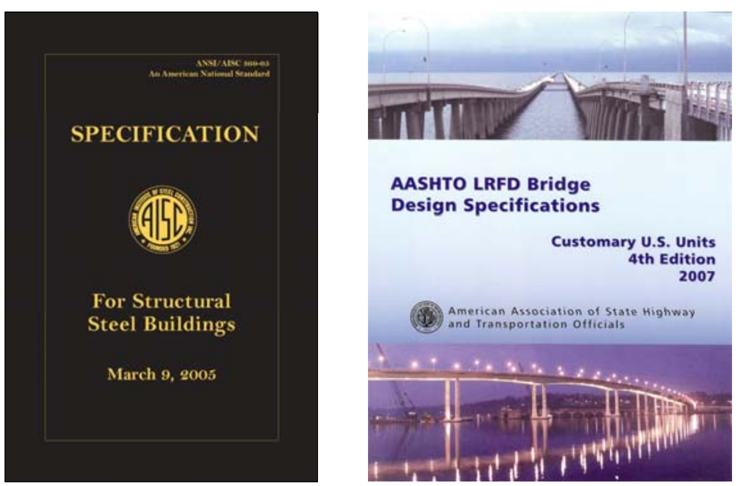
$F_{cr} = ?$

- F_{cr}? JUST DO IT !
- See SSRC Guide
- Software ???

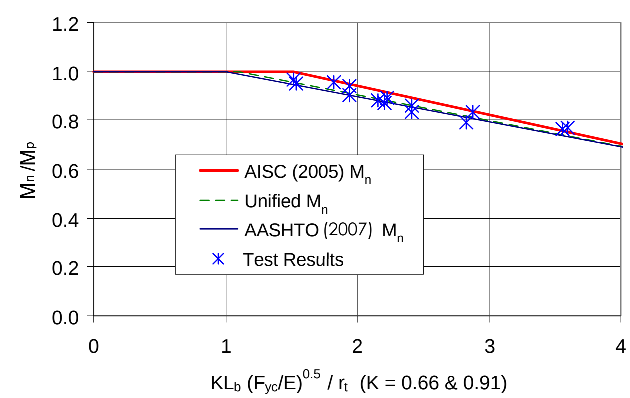


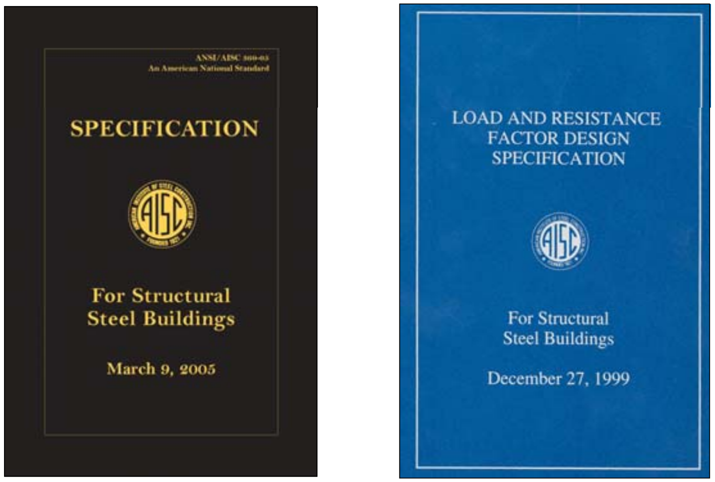


Major-Axis Bending
General I-Section Members

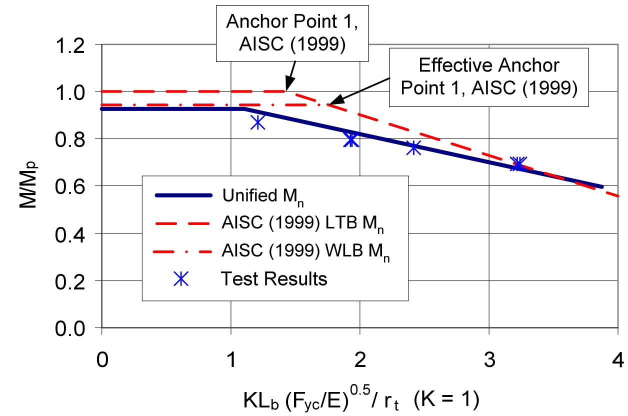


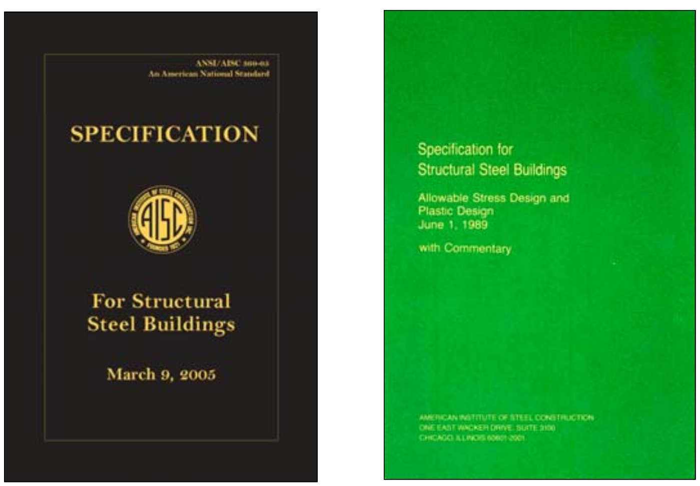
Rolled I-beam LTB Tests (Kitipornchai et al. 1983 & 1987)





Noncompact-Web Welded Member Test Results (Richter 1998)





AISC (2005) vs AISC ASD (1989), FLB