COMPRESSIVE RESISTANCE

Note Title 1/16/2008

EULER BUCKLING (IDEAL COLUMN)

$$P_{crit} = \frac{\pi^2 EI}{(KL)^2}$$

$KL = L'$: EFFECTIVE LENGTH

E : MODULUS OF ELASTICITY

I : MOMENT OF INERTIA

$$\sigma_{crit} = \frac{\pi^2 EI}{A(KL)^2}$$

SECANT FORMULATION (ECCENTRICALLY LOADED COLUMN)

$$\sigma_{max} = \frac{P}{A}\left[1 + \frac{e \cdot c}{r^2} \sec\left(\frac{L}{2r}\sqrt{\frac{P}{EA}}\right)\right]$$

e : ECCENTRICITY

c : DISTANCE FROM NEUTRAL AXIS

A : CROSS SECTION

P : AXIAL LOAD

ALLOWABLE STRESS DESIGN

$$\sigma_{all} \geq \frac{P}{A} + \frac{M \cdot c}{I}$$

INTERACTION METHOD

$$\frac{P/A}{\sigma_a} + \frac{Mc/I}{\sigma_b} \leq 1$$

σ_a : ALLOWABLE STRESS

σ_b : BENDING STRESS

LIMIT STATES DESIGN (FOR CANADIAN STEEL STRUCTURES)

$$C_r = \phi A F_y \left(1 + \lambda^{2n}\right)^{-1/n}$$

ϕ : PERFORMANCE FACTOR

F_y : SPECIFIED YIELD STRENGTH

λ : $\frac{KL}{r}\sqrt{\frac{F_y}{\pi^2 E}}$

n : PARAMETER DEPENDS ON CROSS SECTION