or:

$$k = \frac{\varphi M_n}{1.33 M_u}$$

Rating Equations

Extract from MBE 3rd Ed.

Inventory Rating

$$RF = \frac{6\sqrt{f_c'} - (F_d + F_p + F_s)}{F_1} \quad \text{Concrete Tension}$$

$$RF = \frac{0.6 f_c' - (F_d + F_p + F_s)}{F_1} \quad \text{Concrete Compression}$$

$$RF = \frac{0.4 f_c' - \frac{1}{2}(F_d + F_p + F_s)}{F_1} \quad \text{Concrete Compression}$$

$$RF = \frac{0.8 f_y^* - (F_d + F_p + F_s)}{F_1} \quad \text{Prestressing Steel Tension}$$

$$RF = \frac{\varphi R_n - (1.3D + S)}{2.17 L(1+I)} \quad \text{Flexural and Shear Strength}$$

Operating Rating

$$RF = \varphi R_n - \frac{(1.3D + S)}{1.3 L(1+I)} \quad \text{Flexural and Shear Strength}$$

$$RF = \frac{0.9 f_y^* - (F_d + F_p + F_s)}{F_1} \quad \text{Prestressing Steel Tension}$$

where:

RF = Rating factor

f'_c = Concrete compressive strength

$6\sqrt{f'_c}$ = Allowable concrete tensile strength. A factor of $3\sqrt{f'_c}$ may be applicable, or this allowable stress may be zero, as provided by Article 9.15 of the AASHTO Standard Specifications.

F_d = Unfactored dead loss stress

F_p = Unfactored stress due to prestress force after all losses

F_s = Unfactored stress due to secondary prestress forces

F_1 = Unfactored live load stress including impact