CODE

COMMENTARY

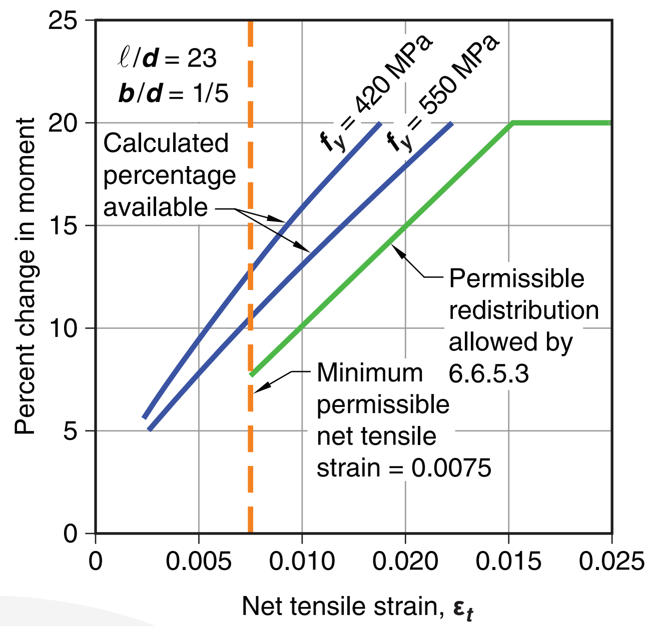

***Fig. R6.6.5**—Permissible redistribution of moments for minimum rotation capacity.*

6.7—Linear elastic second-order analysis

6.7.1 *General*

6.7.1.1 A linear elastic second-order analysis shall consider the influence of axial loads, presence of cracked regions along the length of the member, and effects of load duration. These considerations are satisfied using the cross-sectional properties defined in 6.7.2.

R6.7—Linear elastic second-order analysis

R6.7.1 *General*

In linear elastic second-order analyses, the deformed geometry of the structure is included in the equations of equilibrium so that $P\Delta$ effects are determined. The structure is assumed to remain elastic, but the effects of cracking and creep are considered by using an effective stiffness EI. In contrast, linear elastic first-order analysis satisfies the equations of equilibrium using the original undeformed geometry of the structure and estimates $P\Delta$ effects by magnifying the column-end sway moments using Eq. (6.6.4.6.2a) or (6.6.4.6.2b).

R6.7.1.1 The stiffnesses EI used in an analysis for strength design should represent the stiffnesses of the members immediately prior to failure. This is particularly true for a second-order analysis that should predict the lateral deflections at loads approaching ultimate. The EI values should not be based solely on the moment-curvature relationship for the most highly loaded section along the length of each member. Instead, they should correspond to the moment-end rotation relationship for a complete member.

To allow for variability in the actual member properties in the analysis, the member properties used in analysis should be multiplied by a stiffness reduction factor ϕ_K less than 1. The cross-sectional properties defined in 6.7.2 already include this stiffness reduction factor. The stiffness reduction factor ϕ_K may be taken as 0.875. Note that the overall stiffness is further reduced considering that the modulus of elasticity of the concrete, E_c, is based on the specified concrete compressive strength, while the sway deflections