CODE

(b) At locations where anchorage or development for f_y is required
(c) Where bars are required to be continuous
(d) For hooked, headed, and mechanically anchored deformed reinforcement
(e) In seismic-force-resisting systems in structures assigned to Seismic Design Categories C, D, E, or F
(f) Anchorage of concrete piles and concrete filled pipe piles to pile caps in structures assigned to Seismic Design Categories C, D, E, or F

COMMENTARY

hook or head was considered in developing the provisions of 25.4.3 and 25.4.4. Because the anchorage strength, and in particular the concrete breakout strength of a hooked or headed bar is a function of the embedment depth to a power slightly more than 1.0 (Shao et al. 2016; Sperry et al. 2017b), a reduction in development length with the application of the excess reinforcement factor could result in a potential concrete breakout failure.

Where a flexural member is part of the seismic-force-resisting-system, loads greater than those anticipated in design may cause reversal of moment at supports; some positive reinforcement should be fully developed into the support. This anchorage is required to ensure ductile response in the event of serious overstress, such as from earthquake or blast. It is not sufficient to use more reinforcement at lower stresses.

The reduction factor based on area is not to be used in those cases where anchorage development for full f_y is required. For example, the excess reinforcement factor does not apply for development of shrinkage and temperature reinforcement according to 24.4.3.4 or for development of reinforcement provided according to 7.7.7, 8.7.4.2, 8.8.1.6, 9.7.7, and 9.8.1.6.

25.5—Splices

25.5.1 *General*

R25.5—Splices

R25.5.1 *General*

Lap splice lengths of longitudinal reinforcement in columns should be calculated in accordance with 10.7.5, 18.7.4.4, and this section.

25.5.1.1 Lap splices shall not be permitted for bars larger than No. 36, except as provided in 25.5.5.3.

R25.5.1.1 Because of lack of adequate experimental data on lap splices of No. 43 and No. 57 bars in compression and in tension, lap splicing of these bar sizes is prohibited except as permitted in 25.5.5.3 for compression lap splices of No. 43 and No. 57 bars with smaller bars.

25.5.1.2 For contact lap splices, minimum clear spacing between the contact lap splice and adjacent splices or bars shall be in accordance with the requirements for individual bars in 25.2.1.

25.5.1.3 For noncontact splices in flexural members, the transverse center-to-center spacing of spliced bars shall not exceed the lesser of one-fifth the required lap splice length and 150 mm.

R25.5.1.3 If individual bars in noncontact lap splices are too widely spaced, an unreinforced section is created. Forcing a potential crack to follow a zigzag line (5-to-1 slope) is considered a minimum precaution. The 150 mm maximum spacing is added because most research available on the lap splicing of deformed bars was conducted with reinforcement within this spacing.

25.5.1.4 Reduction of development length in accordance with 25.4.10.1 is not permitted in calculating lap splice lengths.

R25.5.1.4 The development length ℓ_d used to obtain lap length should be based on f_y because the splice classifications already reflect any excess reinforcement at the splice location; therefore, the factor from 25.4.10.1 for excess A_s should not be used.