CODE

25.4.4.5 For anchorages other than in beam-column joints, tie reinforcement, A_{tr}, shall not be considered, and ψ_p shall be taken as 1.0 provided the spacing is at least $6d_b$.

25.4.4.6 If beam negative moment reinforcement is provided by headed deformed bars that terminate in a joint, the column shall extend above the top of the joint a distance at least the depth h of the joint, where h is the horizontal dimension of the joint in the direction of the forces being considered. Alternatively, the beam reinforcement shall be enclosed by additional vertical joint reinforcement providing equivalent confinement to the top face of the joint.

25.4.5 *Development of mechanically anchored deformed bars in tension*

25.4.5.1 Any mechanical attachment or device capable of developing f_y of deformed bars shall be permitted, provided it is approved by the building official in accordance with 1.10. Development of deformed bars shall be permitted to consist of a combination of mechanical anchorage plus additional embedment length of the deformed bars between the critical section and the mechanical attachment or device.

25.4.6 *Development of welded deformed wire reinforcement in tension*

25.4.6.1 Development length ℓ_d for welded deformed wire reinforcement in tension measured from the critical section to the end of wire shall be the greater of (a) and (b), where wires in the direction of the development length shall all be deformed MD200 or smaller.

(a) Length calculated in accordance with 25.4.6.2
(b) 200 mm

25.4.6.2 For welded deformed wire reinforcement, ℓ_d shall be calculated from 25.4.2.3 or 25.4.2.4, times welded deformed wire reinforcement factor ψ_w from 25.4.6.3 or 25.4.6.4. For epoxy-coated welded deformed wire reinforcement meeting 25.4.6.3, it shall be permitted to use $\psi_e = \mathbf{1.0}$ in 25.4.2.3 or 25.4.2.4.

25.4.6.3 For welded deformed wire reinforcement with at least one cross wire within ℓ_d that is at least 50 mm from the critical section, ψ_w shall be the greater of (a) and (b), and need not exceed 1.0:

(a) $\left(\dfrac{f_y - 240}{f_y}\right)$

COMMENTARY

R25.4.4.5 No evidence is available regarding the effect of parallel reinforcement on the development length of headed bars except in beam-column joints.

R25.4.4.6 Refer to R18.4.4.5.

R25.4.5 *Development of mechanically anchored deformed bars in tension*

R25.4.5.1 Anchorage of deformed bars through the use of mechanical devices within concrete that do not meet the requirements in 20.2.1.6, or are not developed in accordance with 25.4.4, may be used if tests demonstrate the ability of the head and bar system to develop or anchor the desired force in the bar, as described in this provision.

R25.4.6 *Development of welded deformed wire reinforcement in tension*

R25.4.6.1 ASTM A1064 for welded deformed wire reinforcement requires the same strength of the weld as required for welded plain wire reinforcement. Some of the development is assigned to welds and some assigned to the length of deformed wire.

R25.4.6.2 The welded deformed wire reinforcement factor ψ_w is applied to the deformed wire development length calculated from 25.4.2.3 or 25.4.2.4.

Tests (Bartoletti and Jirsa 1995) have indicated that epoxy-coated welded deformed wire reinforcement has essentially the same development and splice strengths as uncoated welded deformed wire reinforcement because the cross wires provide the primary anchorage for the wire. Therefore, ψ_e of 1.0 is used for development and splice lengths of epoxy-coated welded deformed wire reinforcement with cross wires within the splice or development length.

R25.4.6.3 Figure R25.4.6.3 shows the development requirements for welded deformed wire reinforcement with one cross wire within the development length.