

CODE

(b) Negative moment reinforcement shall be bent, hooked, or otherwise anchored into spandrel beams, columns, or walls, and shall be developed at the face of support

8.7.4.1.2 Where a slab is not supported by a spandrel beam or wall at a discontinuous edge, or where a slab cantilevers beyond the support, anchorage of reinforcement shall be permitted within the slab.

8.7.4.1.3 For slabs without beams, reinforcement extensions shall be in accordance with (a) through (c):

- (a) Reinforcement lengths shall be at least in accordance with Fig. 8.7.4.1.3, and if slabs act as primary members resisting lateral loads, reinforcement lengths shall be at least those required by analysis.
- (b) If adjacent spans are unequal, extensions of negative moment reinforcement beyond the face of support in accordance with Fig. 8.7.4.1.3 shall be based on the longer span.
- (c) Bent bars shall be permitted only where the depth-to-span ratio permits use of bends of 45 degrees or less.

COMMENTARY

R8.7.4.1.3 The minimum lengths and extensions of reinforcement expressed as a fraction of the clear span in Fig. 8.7.4.1.3 were developed for slabs of ordinary proportions supporting gravity loads. These minimum lengths and extensions of bars may not be sufficient to intercept potential punching shear cracks in thick two-way slabs such as transfer slabs, podium slabs, and mat foundations. Therefore, the Code requires extensions for at least half of the column strip top bars to be at least $5d$. For slabs with drop panels, d is the effective depth within the drop panel. In these thick two-way slabs, continuous reinforcement in each direction near both faces is desirable to improve structural integrity, control cracking, and reduce creep deflections. As illustrated in Fig. R8.7.4.1.3, punching shear cracks, which can develop at angles as low as approximately 20 degrees, may not be intercepted by the tension reinforcement in thick slabs if this reinforcement does not extend to at least $5d$ beyond the face of the support. The $5d$ bar extension requirement governs where ℓ_n/h is less than approximately 15. For moments resulting from combined lateral and gravity loadings, these minimum lengths and extensions may not be sufficient.

Bent bars are seldom used and are difficult to place properly. Bent bars, however, are permitted provided they comply with 8.7.4.1.3(c). Further guidance on the use of bent bar systems can be found in 13.4.8 of the 1983 Code.