

## CODE

## COMMENTARY

**9.7.6.3.2** Transverse torsional reinforcement shall extend a distance of at least  $(b_t + d)$  beyond the point required by analysis.

**9.7.6.3.3** Spacing of transverse torsional reinforcement shall not exceed the lesser of  $p_h/8$  and 300 mm.

**9.7.6.3.4** For hollow sections, the distance from the centerline of the transverse torsional reinforcement to the inside face of the wall of the hollow section shall be at least  $0.5A_{oh}/p_h$ .

#### **9.7.6.4 Lateral support of compression reinforcement**

**9.7.6.4.1** Transverse reinforcement shall be provided throughout the distance where longitudinal compression reinforcement is required. Lateral support of longitudinal compression reinforcement shall be provided by closed stirrups or hoops in accordance with 9.7.6.4.2 through 9.7.6.4.4.

**9.7.6.4.2** Size of transverse reinforcement shall be at least (a) or (b). Deformed wire or welded wire reinforcement of equivalent area shall be permitted.

- (a) No. 10 for longitudinal bars No. 32 and smaller
- (b) No. 13 for longitudinal bars No. 36 and larger and for longitudinal bundled bars

**9.7.6.4.3** Spacing of transverse reinforcement shall not exceed the least of (a) through (c):

- (a)  $16d_b$  of longitudinal reinforcement
- (b)  $48d_b$  of transverse reinforcement
- (c) Least dimension of beam

**9.7.6.4.4** Longitudinal compression reinforcement shall be arranged such that every corner and alternate compression bar shall be enclosed by the corner of the transverse reinforcement with an included angle of not more than 135 degrees, and no bar shall be farther than 150 mm clear on each side along the transverse reinforcement from such an enclosed bar.

#### **9.7.7 Structural integrity reinforcement in cast-in-place beams**

closed stirrups should not be made up of pairs of U-stirrups lapping one another.

**R9.7.6.3.2** The distance  $(b_t + d)$  beyond the point at which transverse torsional reinforcement is calculated to be no longer required is greater than that used for shear and flexural reinforcement because torsional diagonal tension cracks develop in a helical form. The same distance is required by 9.7.5.3 for longitudinal torsional reinforcement.

**R9.7.6.3.3** Spacing of the transverse torsional reinforcement is limited to ensure development of the torsional strength of the beam, prevent excessive loss of torsional stiffness after cracking, and control crack widths. For a square cross section, the  $p_h/8$  limitation requires stirrups at approximately  $d/2$ , which corresponds to 9.7.6.2.

**R9.7.6.3.4** The transverse torsional reinforcement in a hollow section should be located in the outer half of the wall thickness effective for torsion where the wall thickness can be taken as  $A_{oh}/p_h$ .

#### **R9.7.6.4 Lateral support of compression reinforcement**

**R9.7.6.4.1** Compression reinforcement in beams should be enclosed by transverse reinforcement to prevent buckling.

#### **R9.7.7 Structural integrity reinforcement in cast-in-place beams**