## CODE

(a) The beam extends at least one beam depth ***h*** beyond the joint face.
(b) Longitudinal and transverse reinforcement from the beam on the opposite side of the joint is continued through the extension.

**15.2.8** A beam-column joint shall be considered to be confined for the direction of joint shear considered if two transverse beams satisfying (a), (b), and (c) are provided:

(a) Width of each transverse beam is at least three-quarters of the width of the column face into which the beam frames
(b) Transverse beams extend at least one beam depth ***h*** beyond the joint faces
(c) Transverse beams contain at least two continuous top and bottom bars satisfying 9.6.1.2 and No. 10 or larger stirrups satisfying 9.6.3.4 and 9.7.6.2.2

**15.2.9** For slab-column connections transferring moment, strength and detailing requirements shall be in accordance with applicable provisions in Chapter 8 and Sections 15.3.2 and 22.6.

### 15.3—Detailing of joints

#### 15.3.1 *Beam-column joint transverse reinforcement*

**15.3.1.1** Beam-column joints shall satisfy 15.3.1.2 through 15.3.1.4 unless (a) through (c) are satisfied:

(a) Joint is considered confined by transverse beams in accordance with 15.2.8 for all shear directions considered
(b) Joint is not part of a designated seismic-force-resisting system
(c) Joint is not part of a structure assigned to SDC D, E, or F

**15.3.1.2** Joint transverse reinforcement shall consist of ties, spirals, or hoops satisfying the requirements of 25.7.2 for ties, 25.7.3 for spirals, and 25.7.4 for hoops.

**15.3.1.3** At least two layers of horizontal transverse reinforcement shall be provided within the depth of the shallowest beam framing into the joint.

**15.3.1.4** Spacing of joint transverse reinforcement ***s*** shall not exceed 200 mm within the depth of the deepest beam framing into the joint.

#### 15.3.2 *Slab-column joint transverse reinforcement*

**15.3.2.1** Except where laterally supported on four sides by a slab, column transverse reinforcement shall be continued through a slab-column joint, including column capital, drop panel, and shear cap, in accordance with 25.7.2 for ties, 25.7.3 for spirals, and 25.7.4 for hoops.

## COMMENTARY

guish those members contributing to joint shear from those that do not contribute to joint shear but may serve to confine the joint. For a given joint shear direction, lateral confinement is provided by transverse beams while the width of the beams generating joint shear is accounted for through the effective joint width in 15.4.2.4. These classifications are made for the purpose of establishing nominal joint shear strength in Tables 15.4.2.3 and 18.8.4.3. For beam-column joints with circular columns, the column width and depth may be taken as those of a square section of equivalent area.

### R15.3—Detailing of joints

#### R15.3.1 *Beam-column joint transverse reinforcement*

Tests (Hanson and Connor 1967) have shown that the joint region of a beam-to-column connection in the interior of a building does not require shear reinforcement if the joint is laterally supported on four sides by beams of approximately equal depth. However, joints that are not restrained in this manner, such as at the exterior of a building, require shear reinforcement to prevent deterioration due to shear cracking (ACI 352R). These joints may also require transverse reinforcement to prevent buckling of longitudinal column reinforcement.