

CODE

ately after transfer and at service loads shall not exceed the permissible stresses in 24.5.3 and 24.5.4.

8.4—Required strength**8.4.1** *General*

8.4.1.1 Required strength shall be calculated in accordance with the factored load combinations in Chapter 5.

8.4.1.2 Required strength shall be calculated in accordance with the analysis procedures given in Chapter 6.

8.4.1.3 For prestressed slabs, effects of reactions induced by prestressing shall be considered in accordance with 5.3.11.

8.4.1.4 For a slab system supported by columns or walls, dimensions c_1 , c_2 , and ℓ_n shall be based on an effective support area. The effective support area is the intersection of the bottom surface of the slab, or drop panel or shear cap if present, with the largest right circular cone, right pyramid, or tapered wedge whose surfaces are located within the column and the capital or bracket and are oriented no greater than 45 degrees to the axis of the column.

8.4.1.5 A column strip is a design strip with a width on each side of a column centerline equal to the lesser of $0.25\ell_2$ and $0.25\ell_1$. A column strip shall include beams within the strip, if present.

8.4.1.6 A middle strip is a design strip bounded by two column strips.

8.4.1.7 A panel is bounded by column, beam, or wall centerlines on all sides.

8.4.1.8 For monolithic or fully composite construction supporting two-way slabs, a beam includes that portion of slab, on each side of the beam extending a distance equal to the projection of the beam above or below the slab, whichever is greater, but not greater than four times the slab thickness.

COMMENTARY

R8.4—Required strength**R8.4.1** *General*

R8.4.1.2 To determine service and factored moments as well as shears in prestressed slab systems, numerical analysis is required rather than simplified approaches such as the direct design method. The equivalent frame method of analysis as contained in the 2014 edition of the Code is a numerical method that has been shown by tests of large structural models to satisfactorily predict factored moments and shears in prestressed slab systems (Smith and Burns 1974; Burns and Hemakom 1977; Hawkins 1981; PTI DC20.8; Gerber and Burns 1971; Scordelis et al. 1959). The referenced research also shows that analysis using prismatic sections or other approximations of stiffness may provide erroneous and unsafe results. Moment redistribution for prestressed slabs is permitted in accordance with 6.6.5. PTI DC20.8 provides guidance for prestressed concrete slab systems.

R8.4.1.7 A panel includes all flexural elements between column centerlines. Thus, the column strip includes the beam, if any.

R8.4.1.8 For monolithic or fully composite construction, the beams include portions of the slab as flanges. Two examples of the rule are provided in Fig. R8.4.1.8.