

CODE

12.5.2.2 It shall be permitted to resist tension due to moment by (a), (b), (c), or (d), or those methods in combination:

- (a) Deformed bars conforming to 20.2.1
- (b) Strands or bars conforming to 20.3.1, either prestressed or nonprestressed
- (c) Mechanical connectors crossing joints between precast elements
- (d) Precompression from prestressed reinforcement

12.5.2.3 Nonprestressed reinforcement and mechanical connectors resisting tension due to moment shall be located within $h/4$ of the tension edge of the diaphragm, where h is diaphragm depth measured in the plane of the diaphragm at that location. Where diaphragm depth changes along the span, it shall be permitted to develop reinforcement into adjacent diaphragm segments that are not within the $h/4$ limit.

COMMENTARY

rily using an approximate tension-compression couple with the strength reduction factor equal to 0.90.

R12.5.2.2 Bonded prestressing reinforcement used to resist in-plane moment and axial force can be either prestressed or nonprestressed. Mechanical connectors crossing joints between precast concrete elements are provided to complete a continuous load path for reinforcement embedded in those elements. The use of precompression from prestressed reinforcement is discussed in R12.5.1.4.

R12.5.2.3 Figure R12.5.2.3 illustrates permitted locations of nonprestressed reinforcement resisting tension due to moment and axial force. Where diaphragm depth changes along the span, it is permitted to develop tension reinforcement in adjacent sections even if the reinforcement falls outside the $h/4$ limit of the adjacent section. In such cases, the strut-and-tie method or elastic plane stress analysis can be used to determine bar extensions and other reinforcement requirements to provide continuity across the step. The restriction on location of nonprestressed reinforcement and mechanical connectors is intended to control cracking and excessive joint opening that might occur near the edges if reinforcement or mechanical connectors were distributed throughout the diaphragm depth. The concentration of flexural tension reinforcement near the edge of the diaphragm also results in more uniform shear flow through the depth of the diaphragm.

There are no restrictions on placement of prestressed reinforcement provided to resist moment through precompression. In effect, the precompression determines a moment that the prestressed reinforcement can resist, with the remainder of the moment resisted by reinforcement or mechanical connectors placed in accordance with 12.5.2.3.

The Code does not require that diaphragm boundary elements resisting design flexural compression forces be detailed as columns. However, where a boundary element resists a large compressive force compared with axial strength, or is designed as a strut adjacent to an edge or opening, detailing with transverse reinforcement similar to column hoops should be considered.