

CODE

16.2.3 *Design strength*

16.2.3.1 For each applicable load combination, design strengths of precast member connections shall satisfy

$$\phi S_n \geq U \quad (16.2.3.1)$$

16.2.3.2 ϕ shall be determined in accordance with 21.2.

16.2.3.3 At the contact surface between supported and supporting members, or between a supported or supporting member and an intermediate bearing element, nominal bearing strength for concrete surfaces, B_n , shall be calculated in accordance with 22.8. B_n shall be the lesser of the nominal concrete bearing strengths for the supported or supporting member surface, and shall not exceed the strength of intermediate bearing elements, if present.

16.2.3.4 If shear is the primary result of imposed loading and shear transfer occurs across a given plane, it shall be permitted to calculate V_n in accordance with the shear friction provisions in 22.9.

16.2.4 *Minimum connection strength and integrity tie requirements*

16.2.4.1 Except where the provisions of 16.2.5 govern, longitudinal and transverse integrity ties shall connect precast members to a lateral-force-resisting system, and vertical integrity ties shall be provided in accordance with 16.2.4.3 to connect adjacent floor and roof levels.

16.2.4.2 Where precast members form floor or roof diaphragms, the connections between the diaphragm and those members being laterally supported by the diaphragm shall have a nominal tensile strength of not less than 4.4 kN per meter.

16.2.4.3 Vertical integrity ties shall be provided at horizontal joints between all vertical precast structural members, except cladding, and shall satisfy (a) or (b):

(a) Connections between precast columns shall have vertical integrity ties, with a nominal tensile strength of at least $1.4A_g$, in Newtons, where A_g is the gross area of the column. For columns with a larger cross section than required by consideration of loading, a reduced effective area based on the cross section required shall be permitted. The reduced effective area shall be at least one-half the gross area of the column.

COMMENTARY

R16.2.4 *Minimum connection strength and integrity tie requirements*

R16.2.4.1 It is not intended that these minimum requirements supersede other applicable provisions of the Code for design of precast concrete structures.

The overall integrity of a structure can be substantially enhanced by minor changes in the amount, location, and detailing of member reinforcement and in the detailing of connection hardware. The integrity ties should constitute a complete load path, and load transfers along that load path should be as direct as possible. Eccentricity of the load path, especially within any connection, should be minimized.

R16.2.4.2 The connection between the diaphragm and the member laterally supported by the diaphragm may be direct or indirect. For example, a column may be connected directly to the diaphragm, or it may be connected to a spandrel beam, which is connected to the diaphragm.

R16.2.4.3 Base connections and connections at horizontal joints in precast columns and wall panels, including structural walls, are designed to transfer all design forces and moments. The minimum integrity tie requirements of this provision are not additive to these design requirements. Common practice is to place the wall integrity ties symmetrically about the vertical centerline of the wall panel and within the outer quarters of the panel width, wherever possible.