CODE

17.6.5.2 *Basic single anchor bond strength*, N_{ba}

17.6.5.2.1 Basic bond strength of a single adhesive anchor in tension in cracked concrete, N_{ba}, shall be calculated by Eq. (17.6.5.2.1)

$$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef} \qquad (17.6.5.2.1)$$

17.6.5.2.2 Characteristic bond stress, τ_{cr}, shall be taken as the 5 percent fractile of results of tests performed and evaluated in accordance with ACI 355.4M.

17.6.5.2.3 If analysis indicates cracking at service load levels, adhesive anchors shall be qualified for use in cracked concrete in accordance with ACI 355.4M.

17.6.5.2.4 For adhesive anchors located in a region of a concrete member where analysis indicates no cracking at service load levels, τ_{uncr} shall be permitted to be used in place of τ_{cr} in Eq. (17.6.5.2.1) and shall be taken as the 5 percent fractile of results of tests performed and evaluated according to ACI 355.4M.

17.6.5.2.5 It shall be permitted to use the minimum characteristic bond stress values in Table 17.6.5.2.5, provided (a) through (e) are satisfied:

(a) Anchors shall meet the requirements of ACI 355.4M
(b) Anchors shall be installed in holes drilled with a rotary impact drill or rock drill
(c) Concrete compressive strength at time of anchor installation shall be at least 17 MPa
(d) Concrete age at time of anchor installation shall be at least 21 days
(e) Concrete temperature at time of anchor installation shall be at least 10°C

COMMENTARY

R17.6.5.2 *Basic single anchor bond strength*, N_{ba}

R17.6.5.2.1 The equation for basic bond strength of adhesive anchors as given in Eq. (17.6.5.2.1) represents a uniform bond stress model that has been shown to provide the best prediction of adhesive anchor bond strength based on numerical studies and comparisons of different models to an international database of experimental results (Cook et al. 1998). The basic bond strength is valid for bond failures that occur between the concrete and the adhesive as well as between the anchor and the adhesive.

R17.6.5.2.2 Characteristic bond stresses should be based on tests performed in accordance with ACI 355.4M and should reflect the particular combination of installation and use conditions anticipated during construction and during anchor service life. If product-specific information is unavailable at the time of design, Table 17.6.5.2.5 provides lower-bound default values.

R17.6.5.2.5 The characteristic bond stresses in Table 17.6.5.2.5 are the minimum values permitted for adhesive anchor systems qualified in accordance with ACI 355.4M for the tabulated installation and use conditions. Use of these values is restricted to the combinations of specific conditions listed; values for other combinations of installation and use conditions should not be inferred. If both sustained tension and earthquake-induced forces are required to be resisted by the anchors, the applicable factors given in the footnotes of Table 17.6.5.2.5 should be multiplied together. The table assumes a concrete age of at least 21 days and a concrete compressive strength of at least 17 MPa.

The terms "indoor" and "outdoor" as used in Table 17.6.5.2.5 refer to a specific set of installation and service environments. Indoor conditions represent anchors installed in dry concrete with a rotary impact drill or rock drill and subjected to limited concrete temperature variations over the service life of the anchor. Outdoor conditions are assumed to occur if, at the time of installation, the concrete is exposed to weather that might leave the concrete wet. Anchors installed in outdoor conditions are also assumed to be subject to greater concrete temperature variations such as might be associated with freezing and thawing or elevated temperatures resulting from direct sun exposure. While the indoor/outdoor characterization is useful for many applications, there may be situations in which a literal