

CODE

(b) The test load, when applied to the precast member alone, shall induce the same total force in the tensile reinforcement as would be produced by loading the composite member with the test load in accordance with 27.4.6.

27.4.6 Test load arrangement and load factors

27.4.6.1 Test load arrangements shall be selected to maximize the load effects in the critical regions of the members being evaluated.

27.4.6.2 The total test load T_t , including dead load already in place, shall be at least the greatest of (a), (b), and (c):

$$(a) T_t = 1.0D_w + 1.1D_s + 1.6L + 0.5(L_r \text{ or } S \text{ or } R) \quad (27.4.6.2a)$$

$$(b) T_t = 1.0D_w + 1.1D_s + 1.0L + 1.6(L_r \text{ or } S \text{ or } R) \quad (27.4.6.2b)$$

$$(c) T_t = 1.3(D_w + D_s) \quad (27.4.6.2c)$$

27.4.6.3 It is permitted to reduce L in 27.4.6.2 in accordance with the general building code.

27.4.6.4 The load factor on the live load L in 27.4.6.2(b) shall be permitted to be reduced to 0.5 except for parking structures, areas occupied as places of public assembly, or areas where L is greater than 4.8 kN/m².

27.4.6.5 Unless documentation or tests are available to confirm the density of normalweight concrete used in the structure, the density shall be taken as 2400 kg/m³. For other types of concrete materials, the density shall be determined based upon test results or from other documentation.

27.5—Monotonic load test procedure**27.5.1 Test load application**

27.5.1.1 Total test load T_t shall be applied in at least four approximately equal increments.

COMMENTARY

R27.4.6 Test load arrangement and load factors

R27.4.6.1 It is important to apply the load at locations so the effects on the suspected deficiency are a maximum and sharing of the applied load with unloaded members is minimized. In cases where it is shown by analysis that adjoining unloaded members will help resist some of the load, the test load should be adjusted to produce appropriate load effects in the critical region of the members being evaluated.

R27.4.6.2 Test loads were changed in ACI 318-19 to be consistent with the requirements in **ACI 437.2M** for tests on a portion of a structure and for statically indeterminate structures. The test load separates the dead load into self-weight dead load and the superimposed dead load on the structure during the load test. **ACI 437.1R** provides additional discussion of test loads for concrete structures.

R27.4.6.3 The live load L may be reduced as permitted by the general building code governing safety considerations for the structure. The test load should be increased to compensate for resistance provided by unloaded portions of the structure in question. The increase in test load is determined from analysis of the loading conditions in relation to the selected pass/fail criterion for the test.

R27.4.6.5 Documentation to support a different density (unit weight) may include test results showing concrete density (unit weight) during placement or measured density (unit weight) of concrete core samples. For other types of concrete materials (such as lightweight concrete), the density (unit weight) should be determined based upon concrete core test results or other documentation. The calculation of D_w may include determination of the weight of bonded concrete materials, such as a topping slab to be placed on precast members, not present during a load test. D_s may also include the weight from structural framing members.

R27.5—Monotonic load test procedure**R27.5.1 Test load application**

R27.5.1.1 Inspecting the area of the structure subject to test loading for signs of distress after each load increment is advisable (refer to R27.5.3.1).