

CODE

27.5.3.2 Members tested shall not exhibit cracks indicating imminent shear failure.

27.5.3.3 In regions of members without transverse reinforcement, structural cracks inclined to the longitudinal axis and having a horizontal projection greater than the depth of the member shall be evaluated. For variable-depth members, the depth shall be measured at the midlength of the crack.

27.5.3.4 In regions of anchorage and lap splices of reinforcement, short inclined cracks or horizontal cracks along the line of reinforcement shall be evaluated.

27.5.3.5 Measured deflections shall satisfy:

$$\Delta_r \leq \frac{\Delta_1}{4} \quad (27.5.3.5)$$

27.5.3.6 If the maximum deflection measured during the test, Δ_1 , does not exceed the larger of 1.3 mm or $\ell_t/2000$, the residual deflection requirements in 27.5.3.5 shall be permitted to be waived.

27.5.3.7 If 27.5.3.5 or 27.5.3.6 is not satisfied, it shall be permitted to repeat the load test, provided that the second load test begins no earlier than 72 hours after removal of externally applied loads from the first load test.

27.5.3.8 Portions of the structure tested in the second load test shall be considered acceptable if:

$$\Delta_r \leq \frac{\Delta_2}{5} \quad (27.5.3.8)$$

27.6—Cyclic load test procedure

27.6.1 A cyclic load test in accordance with **ACI 437.2M** shall be permitted to be used to evaluate the strength of an existing structure.

COMMENTARY

R27.5.3.2 Forces are transmitted across a shear crack plane by aggregate interlock at the interface of the crack that is enhanced by clamping action of transverse reinforcement and by dowel action of stirrups crossing the crack. The member is assumed to be approaching imminent shear failure when crack lengths increase to approach a horizontal projected length equal to the depth of the member and concurrently widen to the extent that aggregate interlock cannot occur, and as transverse stirrups, if present, begin to yield or display loss of anchorage so as to threaten their integrity.

R27.5.3.3 Inclined cracks may lead to brittle failure of members without transverse reinforcement. Assessment of all inclined cracks is advisable where transverse reinforcement is not present.

R27.5.3.4 Cracking along the axis of the reinforcement in anchorage zones may be related to high stresses associated with the transfer of forces between the reinforcement and the concrete. These cracks may be indicators of impending brittle failure of the member if they are associated with the development of main reinforcement. It is important that their causes and consequences be evaluated.

R27.5.3.5 If the structure shows no evidence of failure, recovery of deflection after removal of the test load is used to determine whether the strength of the structure is satisfactory.

R27.5.3.6 In the case of a very stiff structure, errors in measurements under field conditions may be of the same order as the actual deflections and recovery. To avoid penalizing a satisfactory structure in such a case, recovery measurements are waived if the maximum deflection does not exceed the larger of 1.3 mm or $\ell_t/2000$.

R27.6—Cyclic load test procedure

R27.6.1 Cyclic load testing involves the cyclic application and removal of load to a structure or structural element. The cyclic load test protocol described in **ACI 437.2M** involves the application of increasing levels of load to a structure in repeated load cycles. The measured load-deformation