

CODE

24.5.4 *Permissible concrete compressive stresses at service loads*

24.5.4.1 For Class U and T members, the calculated extreme concrete fiber stress in compression at service loads, after allowance for all prestress losses, shall not exceed the limits in Table 24.5.4.1.

Table 24.5.4.1—Concrete compressive stress limits at service loads

Load condition	Concrete compressive stress limits
Prestress plus sustained load	$0.45f'_c$
Prestress plus total load	$0.60f'_c$

COMMENTARY

R24.5.4 *Permissible concrete compressive stresses at service loads*

R24.5.4.1 The compressive stress limit of $0.45f'_c$ was originally established to decrease the probability of failure of prestressed concrete members due to repeated loads. This limit also seemed reasonable to preclude excessive creep deformation. At higher values of stress, creep strains tend to increase more rapidly as applied stress increases.

Fatigue tests of prestressed concrete beams have shown that concrete compressive failures are not the controlling criterion. Therefore, the stress limit of $0.60f'_c$ permits a one-third increase in allowable compressive stress for members subject to transient loads.

Sustained live load is any portion of the service live load that will be sustained for a sufficient period to cause significant time-dependent deflections. Thus, when the sustained live and dead loads are a large percentage of the total service load, the $0.45f'_c$ limit of Table 24.5.4.1 typically controls. On the other hand, when a large portion of the total service load consists of a transient or temporary service live load, the increased stress limit of $0.60f'_c$ typically controls.

The compression limit of $0.45f'_c$ for prestress plus sustained loads will continue to control the time-dependent behavior of prestressed members.