

CODE

24.5.2.2 For Class U and T members, stresses at service loads shall be permitted to be calculated using the uncracked section.

24.5.2.3 For Class C members, stresses at service loads shall be calculated using the cracked transformed section.

24.5.3 *Permissible concrete stresses at transfer of prestress*

24.5.3.1 Calculated extreme concrete fiber stress in compression immediately after transfer of prestress, but before time-dependent prestress losses, shall not exceed the limits in Table 24.5.3.1.

Table 24.5.3.1—Concrete compressive stress limits immediately after transfer of prestress

Location	Concrete compressive stress limits
End of simply-supported members	$0.70f_{ci}'$
All other locations	$0.60f_{ci}'$

24.5.3.2 Calculated extreme concrete fiber stress in tension immediately after transfer of prestress, but before time-dependent prestress losses, shall not exceed the limits in Table 24.5.3.2, unless permitted by 24.5.3.2.1.

Table 24.5.3.2—Concrete tensile stress limits immediately after transfer of prestress, without additional bonded reinforcement in tension zone

Location	Concrete tensile stress limits
Ends of simply-supported members	$0.5\sqrt{f_{ci}'}$
All other locations	$0.25\sqrt{f_{ci}'}$

24.5.3.2.1 The limits in Table 24.5.3.2 shall be permitted to be exceeded where additional bonded reinforcement in the tension zone resists the total tensile force in the concrete calculated with the assumption of an uncracked section.

COMMENTARY

R24.5.2.3 Prestressed members are classified based on the magnitude of the stress in the precompressed tension zone, calculated assuming the section remains uncracked. Once it is determined that a member is Class C, with $f_t > 1.0\sqrt{f_c'}$, subsequent calculations of service load stresses are based on the cracked transformed section.

R24.5.3 *Permissible concrete stresses at transfer of prestress*

The concrete stresses at this stage are caused by the weight of the member and the force in the prestressed reinforcement after jacking reduced by the losses due to seating of the prestressed reinforcement and elastic shortening of the concrete. Shrinkage, creep, and relaxation effects are generally not included at this stage. These stresses apply to both pretensioned and post-tensioned concrete with proper modifications of the losses at transfer.

R24.5.3.1 The permissible concrete compressive stresses at transfer of prestress are higher at ends of simply supported members than at other locations based on research in the precast, prestressed concrete industry (Castro et al. 2004; Dolan and Krohn 2007; Hale and Russell 2006).

R24.5.3.2 The tensile stress limits of $0.25\sqrt{f_{ci}'}$ and $0.5\sqrt{f_{ci}'}$ refer to tensile stresses at transfer of prestress at locations other than the precompressed tension zone. Where tensile stresses exceed the permissible values, the total force in the tensile stress zone may be calculated and reinforcement proportioned on the basis of this force at a stress of $0.6f_y$, but not more than 210 MPa. The effects of creep and shrinkage begin to reduce the tensile stress almost immediately; however, some tension remains in these locations after allowance is made for all prestress losses.