4.2 RC C Specification
A M A490.

RC C Specification 4.1. C A M A325.

High-strength bolts are sensitive to variations in tension loads. Fatigue is usually considered in structural steel design above 20,000 cycles, but bolts can suffer degradation at fewer cycles. Pretension has been shown to reduce the magnitude of the change in applied tension loads to about 10% of the full applied load, effectively eliminating the degradation possible due to few cycles of high loads.

It used to be a requirement for all high-strength bolts. Testing was performed to show that ASTM A325 bolts have sufficient ductility to allow the elimination of the requirement to pretension them when used in tension applications as a default.

Tom Schlafly

Use of the plastic section modulus, Z_{x} is not restricted to when the LRFD load combinations are used in the design process. This is equally applicable to when ASD load combinations are used. The only restriction is that the use of the plastic section modulus is only permitted for compact shapes.

The older ASD specifications, back to the 1963 version, included a plastic distribution effect in disguise, with the 10% increase $(0.66F_y$ versus $0.6F_y$) in allowable stress permitted for compact shapes. This additional 10% was reflected in the use of a lower bound for the shape factor (Z_x/S_x) of 1.1 for W-shapes. In effect, you've "always" been using something closer to Z, even when the bending equation had S in the ASD formula. The difference is that the 2005 *Specification* permits the use of the actual Z_x for the section.

Kurt Gustafson, S.E., P.E

There is no industry standard with regard to the amount of surface rust that is permissible. This really comes down to engineering judgment, but here are a few things to investigate that may help in your decision. Look to see if the rust is tight and can withstand a vigorous wire brushing. Also make sure there is no appreciable loss of cross section. Determine if the steel will be enclosed such that future deterioration is prevented. If spray fireproofing is to be applied, one should consult the applier as to their requirements for adherence of the fireproofing.

Kurt Gustafson, S.E., P.E.

The entering direction of the bolt does not affect the performance of the connection. The only exception would be if the bolts are assumed to have the threads excluded from the shear plane. In this case it is possible for the entering direction to cause the threads to be included in the shear plane, resulting in a lower shear value.

Larry S. Muir, P.E.

steel interchange

