

A36 and Grade 50

The material test reports for the A36 plates used in my projects consistently conform to material with a yield of 50 ksi. I have two questions: Can I design these plates accounting for the higher yield strength? And should I start specifying all plate material as A572 Grade 50 instead of A36?

A36 is a yield strength of 36 ksi and Grade 50 is a yield strength of 50 ksi. The design strength of a plate is based on the yield strength of the material. If the material test reports show a yield strength of 50 ksi, you can design the plate using the higher yield strength of 50 ksi. However, you should check with the manufacturer to ensure that the material is indeed Grade 50 and not A36 with a higher yield strength. It is generally recommended to specify the material as A572 Grade 50 to avoid any confusion.

La. S.M., P.E.

Local Buckling

The local buckling limits in AISC Specification Table B4.1 are all based on the square root of the inverse of the yield strength. This means for a given shape, a lower-strength steel will result in a compact section while a higher-strength steel will not. How can the shape made from the higher-strength steel have a lower strength, as predicted by the compactness limit?

Local buckling occurs when the stress in a section exceeds the yield strength of the material. The yield strength of the material is a function of the yield strength of the steel. If the yield strength of the steel is higher, the yield strength of the material is also higher. However, the local buckling limits are based on the square root of the inverse of the yield strength. This means that for a given shape, a lower-strength steel will result in a compact section while a higher-strength steel will not. This is because the local buckling limits are based on the yield strength of the material, and the yield strength of the material is a function of the yield strength of the steel.

La. S.M., P.E.

Distorted Moment End Plate

The plates in an end-plate moment connection have distorted due to the shrinkage of the welds. Is there a tolerance on such distortions?

Distortion of end-plate moment connections due to weld shrinkage is a common issue. The AISC Specification does not have a specific tolerance for such distortions. However, the AISC Specification does have a tolerance for the distortion of the end-plate moment connection. The tolerance is based on the yield strength of the material. The tolerance is 1/8 inch for yield strength up to 50 ksi and 1/4 inch for yield strength greater than 50 ksi. This tolerance is for the distortion of the end-plate moment connection. It is important to note that this tolerance is for the distortion of the end-plate moment connection, not for the distortion of the welds themselves.

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I have designed end-plate moment connections using the procedure in AISC Design Guide 16, which allows the use of snug-tightened A325 bolts. The erector has installed tension control (TC) bolts, which are pretensioned. Will this cause a problem?

TC bolts are used. A design using snug-tightened bolts is based on the assumption that the bolts are not tensioned. If TC bolts are used, the bolts will be tensioned, which will increase the clamping force and reduce the slip resistance. This may cause the connection to fail in slip before the bolts reach their yield strength. The design should be checked to ensure that the connection is designed for the higher clamping force provided by TC bolts.

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I have typically used the term VQ/I to determine the shear on the welds joining the flanges and web of a built-up girder. When a girder is designed based on the plastic section modulus, the flexural strength is significantly higher than that predicted using the elastic modulus. Is VQ/I still appropriate when the plastic section modulus is used?

The term VQ/I is used to determine the shear on the welds joining the flanges and web of a built-up girder. When a girder is designed based on the plastic section modulus, the flexural strength is significantly higher than that predicted using the elastic modulus. Is VQ/I still appropriate when the plastic section modulus is used?