

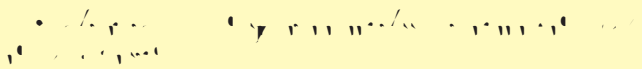
# Steel Interchange

*Steel Interchange* is an open forum for *Modern Steel Construction* readers to exchange useful and practical professional ideas and information on all phases of steel building and bridge construction. Opinions and suggestions are welcome on any subject covered in this magazine. If you have a question or problem that your fellow readers might help you to solve, please forward it to *Modern Steel Construction*. At the same time, feel free to respond to any of the questions that you have read here. Please send them to:



Answers and/or questions should be typewritten and double-spaced.

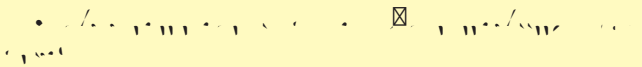
Listed below are questions that we would like the readers to answer or discuss.



**T**here is no specified upper limit on the installed tension for a high-strength bolt that needs to be fully tightened. The Research Council on Structural Connections Specification for Structural Joints Using A325 or A490 Bolts gives a minimum tension requirement. One only has to make sure the installation method achieves the minimum tension.

The specification lists the acceptable installation methods to get the appropriate tension. There is no torque installation method for fully-tightened bolts. The differences between two people installing the bolt and starting at the snug tight condition will not have a great effect on the final preload.

The installed tension in a bolt will not effect the applied load on the bolt. Many people will state that since the fully tensioned bolt is installed to 70% of the minimum tensile strength, the applied load on the bolt can only be such that it causes a stress of 30% of the minimum tensile strength, but the installation subjects the bolt to a combined torque and tension. Once installed, the torque is removed and the bolt is subject to only a tensile stress which is always less than the combined stress.



**A**n A307 bolt is a soft bolt and can not take much tension, therefore there is no specified tension requirement for A307 bolts. These are installed only to the snug tight condition, that is to the point where the plies of the connected elements are brought together. This is defined in the Research Council on Structural Connections Specification for Structural Joints Using A325 or A490 Bolts.

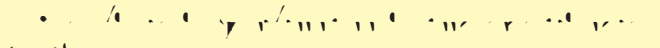
This is also why A307 bolts can only be used in bearing type connections. Most bearing type connections need only be installed to the snug tight condition, slip-critical connections require fully-tightened bolts.

Submittals that have been prepared by word-processing are appreciated on computer diskette (either as a Wordperfect file or in ASCII format).

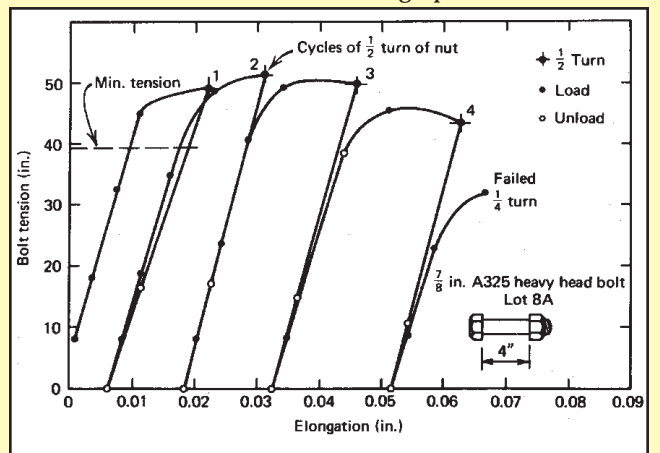
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Information on ordering AISC publications mentioned in this article can be obtained by calling AISC at 800/644-2400.

Obviously this will allow less involved inspection as well as easier installation. But because of strength you will need more bolts than if you used A325 bolts, therefore, it would be less expensive to use the higher strength A325 bolts.

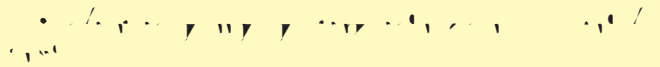


**A**n A325 bolt that is tightened multiple times exceeds the elastic limit and it can not achieve the same tension after repeated tightening. An A325 bolt will be able to reach the proper tension 3 or four times before the applied tension can not reached the specified minimum. Therefore we allow A325 bolts to be reused at the discretion of the engineer. The figure from the Guide to Design Criteria for Bolted and Riveted Joints shows a graph of an A325 bolt



that is tightened, loosened and retightened.

An A490 bolt drops off much quicker so it should not be reused after it has been fully tightened.



**T**he Research Council on Structural Connections Specification for Structural Joints Using A325 or A490 Bolts defines full thread engagement as when the bolt is flush with or outside the face of the nut. A stick-through requirement is not necessary because it will do nothing to

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Questions and responses will be printed in future edi-