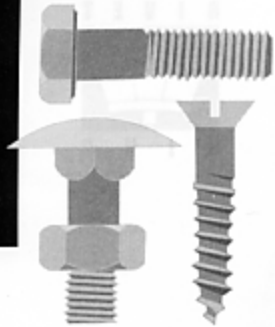


How Much Torque Did the Customer Apply?

by Joe Greenslade



At one time or another, every fastener supplier has received customer complaints about breaking bolts or screws. Experience shows that well over three-quarters of these situations result from the customer improperly installing the parts and not because the subject fasteners are of poor quality. The most common installation errors resulting in broken fasteners are:

- The customer is not specifying a tightening torque for installing the part in his assembly, thus some parts are over-torqued to the point of failure.
- The customer has an appropriate torque specified for his application, but tightening torque control is inadequate or nonexistent, thus some parts are being over-torqued to the point of failure.
- The customer has specified an inappropriately high tightening torque resulting in some parts breaking.

The challenge for the fastener supplier is to explain this tactfully to the customer so the problem can be resolved and stay resolved without causing hard feelings. Frequently, the customer's first response to a supplier's inquiries about what torque they are using is negative. They assume the supplier is trying to avoid dealing with having supplied poor quality fasteners.

VERIFY PRODUCT QUALITY FIRST

When a complaint is received from a customer the first thing that must be done is for the supplier to check all appropriate documentation and inspect samples from the same lot if they are available. If this investigation indicates that the parts meet all specifications, the supplier has to investigate the installation and use of the parts to help the customer discover the true root cause of the problem.

DETERMINE WHAT THE PROPER SEATING TORQUE SHOULD BE

Before starting to ask the customer what torque value they are using to install the bolts or screws, the supplier should consult their technical resources to determine what the appropriate tightening torque should be for the fastener's size, strength level, and finish. A copy of this information should be provided to the customer when discussing this issue.

By providing the customer a copy of the chart or calculation from a technical resource the customer generally does not perceive that the supplier is trying to tell them what to do. The information is normally perceived as the supplier sharing helpful, technical information.

Giving the customer a copy of the tightening information instead of just telling them may sound like a small point, but the customer's attitude is usually much more positive toward this approach.

VERIFY THE TORQUE BEING APPLIED TO THE SUBJECT PARTS THROUGH TESTING

Even if the customer advises the supplier they are using the torque value that is suggested, the supplier should take one more investigative step. The supplier should go to the point of installation and actually verify what torque is being applied to the fasteners in question. Verification is accomplished by using a torque wrench of the appropriate size to examine bolts or screws that have already been installed.

By applying the torque wrench to the seated parts and rotating the bolt or screws clockwise (tightening direction) and noting the point at which the part begins to move from its seated position, the installation torque can be verified. The value at which the part starts to move is approximately the torque value to which it was originally seated.

It is extremely important that this auditing method employ the clockwise rotation described above and not a counter-clockwise rotation (loosening

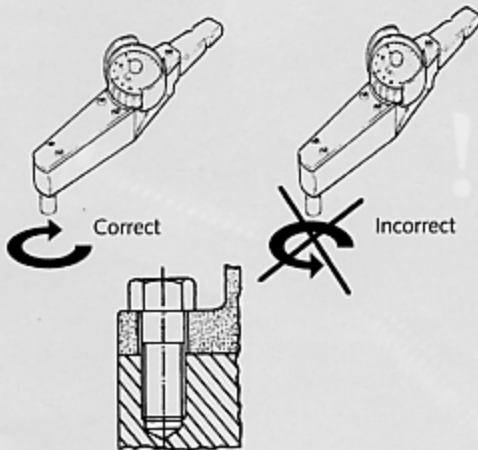


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Mr. Greenslade holds twelve U.S. patents on various fastener related products. He has authored over 136 trade journal articles on fastener applications, manufacturing and quality issues. He is one of the fastener industry's most frequent speakers at trade association meetings and conferences. He is the youngest person ever inducted to the Fastener Industry Hall of Fame.

Mr. Greenslade is active in numerous fastener industry associations and societies holding office in several of them. In addition to guiding the activities of Greenslade & Company, Mr. Greenslade works as a consultant with fastener suppliers and end users on product design, applications engineering, and quality issues. In this capacity he works to resolve fastener applications problems, to help select the best fastening approaches in new product designs, to assist in the standardization of fasteners used within an organization, and to provide training on various aspects of fastening technology and fastener quality assurance. He also serves as Expert Witness in litigation involving fastener related issues.

direction). Clockwise rotation is used because the torque value obtained in the counter-clockwise direction equals only approximately 60% of the value obtained when rotating the same part in the same application clockwise.



The use of this improper (counter-clockwise) rotation to check seating torque is very common. It leads assemblers to think they are applying far less torque than they actually are. This

means that if an assembler is targeting 100 foot pounds as a seating value, and he checks this with a torque wrench by rotating seated parts in the counter-clockwise direction, the bolts are over-torqued to about 167 foot pounds. Bolts targeted for seating at 100 foot pounds, but actually seated at 167 foot pounds, can result in the assembler breaking some of the bolts.

It is the author's experience that many assemblers do not actually tighten fasteners to the intended torque values. Performing the test as stated above is the only way to verify what the customer is telling the supplier about torque values. When it is found that bolts and screws are not being seated as the customer claims, the customer is usually unaware that the assemblers are not providing the values that are specified. This is usually due to poor assembly techniques and/or the use of driving tools that do not provide the customer's assumed degree of torque control.

Suppliers need to resolve complaints about breaking screws and bolts very

quickly to keep a small problem from erupting into a full-scale catastrophe. The supplier should immediately:

- Verify all part quality documentation including test reports.
- Investigate what the appropriate tightening value should be for the fastener in question and make a copy of the technical reference for the customer's information.
- Verify the amount of torque actually being applied to the parts by determining the torque values required to rotate seated parts in the clockwise direction.

Suppliers will find that taking these three steps will uncover the root cause of the fastener breakage in the majority of cases. Fastener users will hold suppliers that can take these three steps in higher regard than those who simply try to argue their way through the problem. A little bit of factual data is much more helpful and persuasive in problem solving than are mounds of theoretical information. ■

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