

# Threaded Fastener Loosening

by David D. Archer

A common frustration of threaded fastener suppliers is their customers pointing to their fastener as the cause of their joint loosening problems. Even when the problem is failure from fastener fracture, in the vast majority of instances the fastener meets all specifications and the root cause of their problem is the joint design or assembly process. Furthermore, even when the customer believes the solution lies in altering their installation torque, the end result can still result in a phone call to the fastener supplier because the corrective action may be counter-intuitive. Reducing installation torque for fasteners that fracture in the field can create larger problems when the cause is fatigue failure generated by insufficient clamp load. Likewise, when a joint doesn't clamp-up sufficiently because the parts are deflecting or yielding under the clamp load, increasing the installation torque is not going to produce a happy ending. While joint design and fastener installation are generally not the responsibility of the fastener distributor, being able to associate common problems with their root

causes and solutions helps speed troubleshooting and lends added technical credibility.

While a wide variety of loading profiles can cause fastener loosening, it is understood that forces which lead to slipping of the clamped parts relative to one another will cause the most dramatic losses. The force that resists loosening is generated by friction between the mating threads and between the bolt or nut and the mating part. In the standard bolted joint this resisting force is directly proportional to

bolt tension—the greater the elongation of the bolt, the greater the friction force available to resist loosening. Because resistance to loosening decreases with decreased bolt elongation, the common occurrence of joint relaxation due to embedment within the joint stack will leave the joint more susceptible to loosening.

The following flowchart identifies these three primary means of preventing threaded fastener loosening and lists specific remedies under each of the three headings.

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## DAVE ARCHER



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A member of SME and SAE, Dave holds a B.S. degree in Mechanical Engineering & Applied Mechanics and an M.S. degree in Manufacturing Engineering from the University of Rhode Island. He is interested in hearing from you and appreciates your feedback. Dave can be reached at 248.377.1147 or [darcher@archetypejoint.com](mailto:darcher@archetypejoint.com).



## THREADED FASTENER LOOSENING SOLUTION TREE

