

Galling Prevention and Run-In Torque Reduction

Situation:

An aircraft structures manufacturing company was encountering galling when installing titanium bolts (type NAS1581) to threaded stainless steel nut-plates (type MS21060L6). The fastener system is used to attach a large exterior communications structure to the airframe.

The end customer had set a specification of 5 installation/removal cycles with no galling for maintenance purposes. While the manufacturer could achieve this at times during pre-production testing, the results were not reliable and required careful manual installation.



Testing:

DICRONITE[®] dry lubrication was coated on bolts and nut-plates for testing of manual and automated installation. Run-in torque was measured and fasteners were inspected for damage following test trials.

Results:

Manual Installation:

As shown, the run-in torque was low and decreased with every installation/removal cycle. No evidence of galling was noted and the coating was found to be in good condition throughout the test.

Automated Installation:

The run-in torque measured after the 5th cycle was 32 in-pounds and no evidence of galling or coating loss was noted. The data from the subsequent five cycles (#s 6-10) is shown. Interestingly, the 6th cycle run-in torque was higher but then consistently decreased with each cycle. No evidence of galling was noted throughout; minimal coating degradation was observed.

