Australian Government
Civil Aviation Safety Authority

AIRWORTHINESS BULLETIN

Control Cable Terminal - Retirement

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1. Applicability

All aircraft flight control cable terminal fittings over 15 years old made from stainless steel specification SAE-AISI 303 Se, including, but not limited to, standard terminal part numbers AN669 and MS21260.

2. Purpose

The objective of this bulletin is to urge operators and maintainers to consider replacing all control cables having terminal fittings manufactured from stainless steel SAE-AISI 303Se before reaching 15 years time in service.

3. Background

Reports of flight control cable terminal fitting separation failures continue to be received in Australia and the United States. Failure of a flight control cable can result in loss of control.

Investigations have revealed that the failed terminals had been in service for approximately 15 years or more, were manufactured from SAE-AISI 303Se stainless steel and identified by standard terminal fitting part numbers AN669 and MS21260.

It should be noted that these terminal fittings have been incorporated into flight control cable assemblies which are then identified by different manufacturers part numbers in the aircraft Illustrated Parts Catalogue (IPC).

Terminal fitting separation as described in this Airworthiness Bulletin is due to chloride stress-corrosion cracking, a form of intergranular cracking which can originate from within the terminal. Therefore, even very small corrosion pits on the surface of the terminal fitting are indications that the terminal maybe very close to failure.

Figure 1 - Separation at threaded end of terminal

Figure 2 - Separation at swaged end of terminal

Figures 1 and 2 show how separation failures have occurred at the shaft on the threaded end and at the swaged section of the terminal.

An inspection for pitting on the terminal surface is not considered adequate to determine the extent of the intergranular corrosion that may exist beneath the surface of the terminal, because with this form of corrosion, in this material, the terminal may be close to failure and may even fail, with no visible pitting on the surface.

By the time that surface pitting, however minute, is observed on the surface of the subject terminals, extensive internal corrosion has already taken place in the fitting should be considered unserviceable.

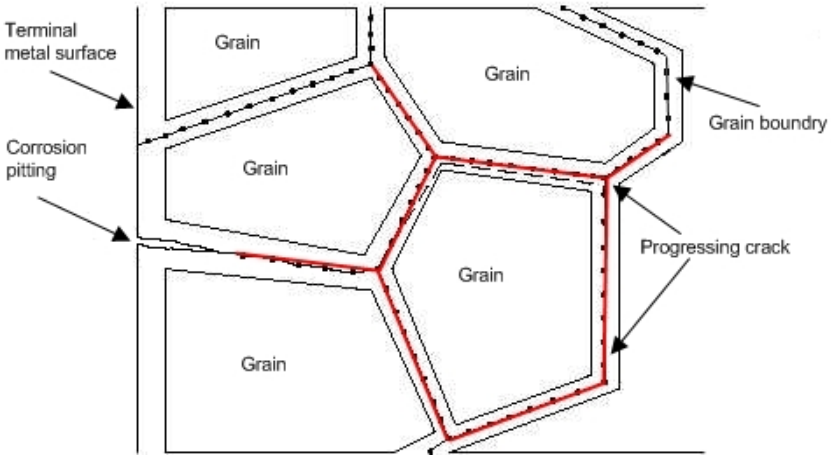

Figure 3 - Intergranular Corrosion Cracking

Adapted from: Corrosion DOE-HDBK-1015/1-93 SPECIALIZED CORROSION Rev. 0 CH-02 Page 33 Figure 14 Intergranular Corrosion Cracking.

Figure 3. While the sketch shows surface pitting as evidence of intergranular corrosion, the terminal may be extensively corroded internally and close to failure without any surface pitting.

4. References

(i) FAA SAIB CE-11-01 Stabilizers - Horizontal Stabiliser - Turnbuckle (Piper Aircraft Inc)

(ii) U.S. Department of Energy DOE-HDBK-1015/1-93 SPECIALIZED CORROSION

(iii) FAA AC 43-13-1B chapter 7, section 8, paragraph 7.149d

5. Recommendations

a. Review the aircraft technical records (Log books) to establish which flight control cables have been replaced in the last 15 years.

b. Retire all flight control cables made from stainless steel (SAE-AISI 303Se) including, but not limited to, standard flight control cable terminal part numbers AN669 and MS21260, before reaching 15 years time since installation.

c. Where required by aircraft maintenance documentation, flight control cables should be periodically inspected in accordance with the manufacturer's data and FAA AC 43-13-1B chapter 7, section 8, paragraph 7.149d.

6. Enquiries

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