FAA
Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SAIB: CE-12-01

SUBJ: Flight Controls: Rudder Cable Maintenance **Date:** October 24, 2011

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin informs you of a possible airworthiness concern on Extra Aircraft Models EA-300/L, EA-300/LT, and EA-300/LC airplanes, all serial numbers.

At this time, this airworthiness concern is not considered an unsafe condition that would warrant an airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR part 39).

Background

During a scheduled 100-hour maintenance inspection on an Extra EA 300/L airplane, the rudder cable assembly, part number 50155, was found to have its rudder cable frayed where only three of the seven wire strands remained. The cable was inspected 50 hours prior and had shown no evidence of wear. This discrepancy was located on the aft-right side of the aircraft where the rudder cable protrudes out of the airframe fabric near the rear-most fairlead. Per MIL-W-83420[1], the cable is constructed using a 7 x 19 configuration such that 6 outer strands of 19 wires are laid around a center strand core of 19 wires. To avoid excessive bending, the cables are guided using fairleads that maintain changes in direction to less than 3 degrees.

These aircraft models use stainless steel cables in their flight control system. A general service history has shown the use of stainless steel cables in aircraft control systems results in premature wear and has been a factor in minor incidences as well as catastrophic failure.[2] A current trend is underway in the aviation industry to move away from the use of stainless steel cable for primary flight control applications, except where marine operations are performed.

Although stainless steel has a greater resistance to corrosion, it is not corrosion proof. Stainless steel is very difficult to inspect for corrosion and wear damage. It does not provide a build-up of residue when deterioration occurs or show discoloration and other subsequent warning signs advantageous for inspections. Stainless steel cable is considerably stiffer than galvanized cable and has a lower bending fatigue resistance in flight control operations. It has a higher friction coefficient that results in increased wear every time the cable is flexed. Over its service life, stainless steel cable becomes more stiff, leading to increased abrasion wear on the inside as well as the outside of the cable.

On September 15, 2011, Extra Aircraft issued Engineering Change Order AM-300-11-27. This order states they will discontinue the use of stainless steel cables as standard equipment and will use galvanized cable in the near future.

Recommendations

Until the transition to galvanized cable occurs, the FAA recommends all owners and operators comply with the cable inspection requirements outlined in the Extra Service Manual. In addition, we recommend inspecting the bond of the heat shrink tubing at each 50-hour inspection of the rudder

cable system and doing a tension release inspection of the rudder cable assembly by disconnecting one end of the cable. Special attention should be given to the areas where the cable goes through the fairleads. Also, care should be given during the cable inspection on aircraft where smoke oil operations are done. Before inspecting, the cable should be thoroughly cleaned using an approved solvent.

The Extra EA 300/L service manual has instructions to install 800 mm (31.50 inches) and 600 mm (23.62 inches) of the protective hose onto the rudder cable. However, the 800 mm (31.50 inches) callout is in error. The correct length should read 500 mm (19.69 inches). This is not considered an airworthiness issue because the amount of liner supplied in the rudder control cable kit is sufficient to meet Extra Aircraft's design requirement to protect the cable from the airstream. Extra Aircraft will correct the improper callout length with the next regular revision of the service manual.

For Further Information Contact

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Footnotes:

1 This specification has been superseded by MIL-DTL-83420.

2 Piper Service Bulletin No. 1048 and corresponding FAA Special Airworthiness Information Bulletin No. CE-01-30; FAA Special Airworthiness Information Bulletin No. CE-11-36, which addresses premature wear of stainless steel cables used on Cessna Model 172S aircraft; Bureau d'Enquetes et d'Analyses Final Accident Report No. ISBN: 978-2-11-098029-8, which details its findings on the De Havilland (Viking) DHC-6 Twin Otter 300 fatal crash.