



## **Detecting and Preventing Future Aileron Cable Damage** Recommendations for Voluntary AD 2019-23-10 Follow-On Actions ABS Air Safety Foundation

December 16, 2019

FAA Airworthiness Directive 2019-23-10, effective November 22, 2019 with a compliance deadline of December 22, 2019, calls for one-time inspection and repair as necessary of right aileron control cable swaged ends on 1964 through 1977 Beech Bonanzas and Debonairs. As of this writing ABS knows of over 50 affected airplanes with control cable damage so severe that the aileron control was connected only by the safety wire at the turnbuckle. Failure of this connection in flight will result in the right aileron floating in trail and the rudder/aileron interconnect springs driving the left aileron to a full-up deflection, with no way to move the ailerons from the cockpit. There have been two inflight failures of this sort in the last year, with the pilot of each airplane being able to land the airplane with great skill using rudder to control bank.

AD 2019-23-10 requires a single inspection, but it does nothing to detect or prevent similar damage in the future. This remains a serious issue and, if you fly one of the affected airplanes, your life and the lives of your passengers are at stake. The ABS Technical Advisors have developed this guidance to remind airplane owners and their mechanics of the need to inspect the full length of control cables and all connections at each annual inspection. The Technical Advisors have also come up with ideas for minimizing or preventing the condensation from the aft heater duct in these airplanes to reduce the chances of corrosion and cable connection failure.

### **Annual Inspection Actions**

These checks should be part of a routine annual inspection. The first two are required actions. The last two are ABS/ASF recommendations.

1. At each annual inspection make sure that complete length of all flight control cables is inspected as per AC 43.13-1B section 7-149.
2. Per the Beechcraft 100 hour/Annual Inspection checklist, complete the actions in section D (4): "Check the flight control components, cables and pulleys. Replace control system components (pushrods, turnbuckles, end fittings, castings, etc.) that have bulges, splits, bends or cracks. Check control cables, pulleys and associated equipment for condition, attachment, alignment, clearance and proper operation. Replace cables that have more than 3 broken strands in any 3-foot length of cable or evidence of corrosion. Check cables for proper tension. NOTE: It is important to operate controls through their full range so that the cables move away from pulleys and all portions of the cables are exposed for inspection." Note that completing this required inspection requires removing the aft spar cover and cabin floorboards.
3. Removal of the safety wire and visual inspection with a 10X magnifying glass per the AD is not required at each annual. But is still a good idea, and should be done if there is any sign of moisture or dirt in the area around and beneath the turnbuckle.
4. Clean the affected area. Spray the turnbuckle area heavily with LPS3 or Corrosion X.

### **Recommended Repetitive Inspection**

ABS Air Safety Foundation recommends that owners of airplanes affected by AD 2019-23-10 voluntarily repeat the inspection required by that AD at the fifth annual inspection following AD compliance, and at five-year intervals thereafter. Remove the safety wire from the affected turnbuckle, clean the cable swaged ends with a red Scotchbrite™ pad, then inspect the cable swaged ends with a 10X magnifying glass to look for any corrosion or pitting issues. There will be little added time and expense involved in this inspection since the IA will already have exposed this area and done everything except remove the safety wire to inspect the cable swaged ends.

Repeating the AD requirements every five years will detect corrosion or damage that occurs after complying with the AD's one-time inspection to provide an additional level of safety and security for those on board the aircraft. We do not want to be required to replace all flight control cables every 15 years like aircraft in Australia and elsewhere, but it is prudent to repeat this inspection voluntarily.

### Options for Minimizing or Preventing Future Damage

There are two options to help alleviate the corrosion issues in the future. Both options qualify as a minor alteration to the airplane and may be installed with a simple logbook endorsement by your mechanic.

#### Option 1

Replace the original fiberglass-impregnated ducting with double-wall silicone SCEET ducting. SCEET aids in stopping some of the condensation that drips off the heater system, and therefore makes corrosion of the cable swaged ends beneath the duct less likely. SCEET may be purchased by the foot from several different aircraft supply chains. The ducting is 2 ½ inch in diameter. You will need to purchase two feet and then cut it to the correct length for your installation. The part number at **Aircraft Spruce** is **05-30610** and is called **Vena HTD flexible duct**.



(left) Original duct



(right) New SCEET duct

#### Option 2

This option removes the recommendation to complete the full AD check every five annual inspections but does not replace the need for 43.13 and Beech 100 Hour/Annual checks at every annual.

If you do not require heat in the baggage area or aft cabin behind the 3<sup>rd</sup> and 4<sup>th</sup> seats, remove the original ducting completely. Install a 2" PVC plug (**Home Depot SKU 741 264**) inside the plenum to which the original duct is attached, then use a #36 stainless steel hose clamp (**Home Depot SKU 100 494**) to tighten the hose around the plug. The clamp and plug may also be purchased from any of the building supply stores. You will need to sand the plug's outer diameter down slightly to install it inside the flange with a tight fit.



(right) Plug installed on aft heat plenum aft of the outlet for seats 3 and 4

Maintenance and continuing inspection are key to maintaining our fleet of aging aircraft. Inspection as required by AD 2019-23-10 will detect corroded, damaged or broken aileron control cable swaged ends. But it does not stop the cause or do anything to prevent or detect similar damage in the future, even if you replace the control cables. Follow these inspection steps and consider making a minor alteration to your affected Bonanza or Debonair to detect and minimize the chances of future damage before it results in a potentially disastrous inflight control failure and loss of aircraft control.

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