



ABS Air Safety Foundation

Beechcraft Control Cable Turn Buckle Inspection Recommendation

February 8, 2019

The American Bonanza Society is aware of six recent cases of failure of the swaged end of flight control cables at the turn buckles in Beech piston airplanes. Four were in aileron control cables, one in an elevator control cable and one in a rudder control cable. Two of these cases are currently under investigation by the U.S. National Transportation Safety Board. Failure of a control cable connection at the turn buckle will result in loss of use of the associated control surface(s) and probable loss of control of the aircraft in flight. NOTE: This condition is not related to the control cable failures that were subject of an Australian (CASA) Airworthiness Directive in 2012.

In all these cases the failure resulted from corrosion of the swaged end of the cable in turn buckles located beneath heater ducts (in the case of the aileron cables) or beneath the overhead fresh air inlet duct in the aft fuselage (the rudder and elevator cables). ABS has also received several reports from mechanics who have found cables and turn buckles in these areas that are very wet from condensation but that did not yet show signs of corrosion.

Safety wire prevents visual inspection of the affected areas. Further, the safety wire itself tends to trap moisture and debris from the lower fuselage, potentially accelerating corrosion in the aileron turn barrels. Safety wire must be REMOVED in order to inspect the swaged ends for the type of damage we have seen. In two cases the swaged ends of the cable had failed between the safety wire hold and threaded end completely and the safety wire was all that was holding it together. Later airplanes have turn barrels held by clips that make visual inspection easier, and some pre-1970 airplane cables may have been replaced with the clip style turn barrels. The aileron cable turn buckles are located in the wheel wells post 1977 with this type of cable, which may be exposed to moisture but tend to dry from air flow in flight.

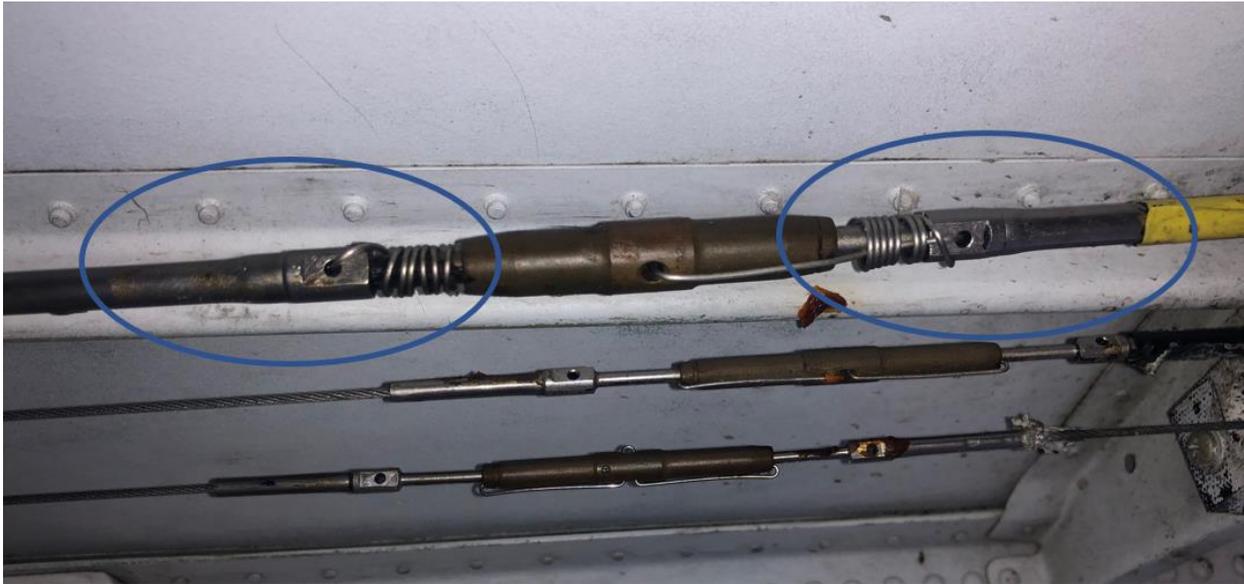
Although these failures appear to be related to condensation from environmental ducts we are not certain this is the only possible cause. That is why ABS/ASF recommends the following action for **ALL** ABS-type airplanes:

Recommended Action

ABS Air Safety Foundation recommends owners/operators of all Beechcraft Bonanza, Debonair, Baron and Travel Air airplanes do the following:

1. **Within the next 20 flight hours.** Inspect all flight control swaged ends at the turn buckles as follows:
 - a. Remove safety wire from swaged ends that use safety wire.
 - b. Visual inspect each swaged end using a 10-power magnifying glass.
 - i. Any evidence of corrosion, pitting or cracking requires replacement of the affected control cables before further flight.
 - ii. If cables are replaced, use MS21251clip style turn buckle barrels. This makes them quicker and easier to inspect in the future and removes the safety wire that may trap moisture and promote corrosion.
 - c. Treat the swaged ends and turn buckles with a corrosion preventative such as Corrosion X, LPS-3 or similar product.
 - d. Reinstall safety wire, if safety wire-style turn buckle barrels are still in use.
 - e. Document the work performed in the airframe logbook.
 - f. File an FAA Service Difficulty Report (SDR), or non-U.S. equivalent, for any corroded or damaged swaged end.

2. **At each annual inspection thereafter:** Inspect all flight control turn buckles and cables immediately adjacent to the turn buckles using the same procedure listed above.



NTSB study

ABS Technical Advisors are working with the NTSB Laboratory, which is currently testing two of the damaged aileron cable swages and the rudder cable swage.

Future actions

ABS Air Safety Foundation will take these additional actions:

1. Communicate these recommendations to ABS members and other Beechcraft owners through ABS and other outlets.
2. Update the ABS membership on the results of NTSB testing when information becomes available.
3. Update the ABS *Flight Controls, Flaps and Trim System Inspection, Repair and Rigging Guide* to include these recommendations.
4. Request that Textron Aviation update Beech Safety Communique 322 to include these recommendations.
5. Request that the Federal Aviation Administration update Special Airworthiness Information Bulletin (SAIB) CE-12-18 to include these recommendations.
6. Update and communicate these recommendations as needed if new information arises.

If you or your mechanic have questions, please contact the ABS Technical Advisors at 316-945-1700 or info@bonanza.org.

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