



ABS Air Safety Foundation

## Recommended Beechcraft Control Cable Turnbuckle Inspection

Update 3 November 7, 2019

This update includes this change:

- Adds C33 and C33A Debonairs to the list of airplanes recommended for inspection. These models share the same aft cabin heat duct as contemporary Bonanzas and were inadvertently left off the list.
- References AD 2019-21-08.
- Updates the known cable failures to “over 30.”
- Includes the “hard up” left aileron condition expected to occur with inflight cable failure.

The American Bonanza Society is now aware of over 30 cases of total failure of the swaged end of flight control cables at the turnbuckles in Beech piston airplanes. 29 were total failures of the right aileron control cable swaged end, 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 turnbuckle will result in loss of use of the associated control surface(s), cause the right aileron to float in trail and the left aileron to move to and remain in the full up position, and result in 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.

At the ABS Air Safety Foundation's request, the FAA published Final Rule Airworthiness Directive 2019-21-08 on November 7, 2019. This AD has an effective date of November 22, 2019, and requires all inspection and any necessary repairs to be complete no later than December 22, 2019.

In all these cases the failure resulted from corrosion of the swaged end of the cable in turnbuckles 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 right aileron cables and turnbuckles in these areas that are very wet from condensation and lightly pitted or corroded, but that did not yet show signs of cracking.

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 turnbuckles. Safety wire must be REMOVED in order to inspect the swaged ends for the type of damage we have seen. In multiple 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 Bonanzas have turnbuckles held by clips that make visual inspection easier. Some pre-1977 airplane cables may have been replaced with the clip style turnbuckles. The aileron cable turnbuckles 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. Turnbuckles are in the wheel well in all vintage of Barons (which also have extended aft cabin heat) and are therefore not affected by heater duct condensation.

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. **1964-1977 Beechcraft Model 33, 35 and 36 Bonanzas, within the next 20 flight hours:**  
Inspect the right aileron control cable turnbuckle swaged ends using the procedure below:
  - 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 MS21251 clip style turnbuckle 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 turnbuckles with a corrosion preventative such as Corrosion X, LPS-3 or similar product.
  - d. Reinstall safety wire, if safety wire-style turnbuckle barrels are still in use.
  - e. Document the work performed in the airframe logbook. Here is a suggested logbook endorsement if no defects or damage is found:
 

Inspected (right aileron/all/or as appropriate) flight control cable turnbuckles and swaged ends by removing safety wire and cleaning swaged ends with red Scotch Brite pad. Inspected each swaged end with 10X magnifying glass for cracking and corrosion. No defects noted. Safetied with double wrap .041 safety wire I.A.W. AC 43.13-1B, Chapter 7, Section 10, 7-180. Applied LPS3 to prevent further corrosion. Aircraft returned for service. (signed)
  - f. File an FAA Service Difficulty Report (SDR), or non-U.S. equivalent, for any corroded or damaged swaged end.
2. **All airplanes, at the next scheduled annual inspection:** Inspect all flight control turnbuckles and cables immediately adjacent to the turnbuckles 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. Provide data to FAA for and publicize Special Airworthiness Information Bulletin CE-19-13, which addresses control cable swaged end inspection in all makes and models of airplane.
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](mailto:info@bonanza.org).

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