



Beechcraft 19, 23 and 24 Series
Stabilator Hinge – Fastener Shearing

AWB 27-017 **Issue** : 1
Date : 5 September 2013

1. Applicability

Beechcraft 19, 23 and 24 Series Aeroplanes identified in AD/BEECH 23/44.

2. Purpose

To provide additional guidance to maintainers, operators and pilots on detecting and replacing failed stabilator hinge fasteners in order to prevent in-flight separation of the stabilator and subsequent loss of control.

3. Background

Stabilator hinge bracket attachment fasteners (rivets) have failed in a mode apparently not anticipated by the manufacturer. Despite being inspected in accordance with AD/BEECH 23/44 (based on FAA AD 87-02-08), an aircraft was returned to service with undetected failing rivets.

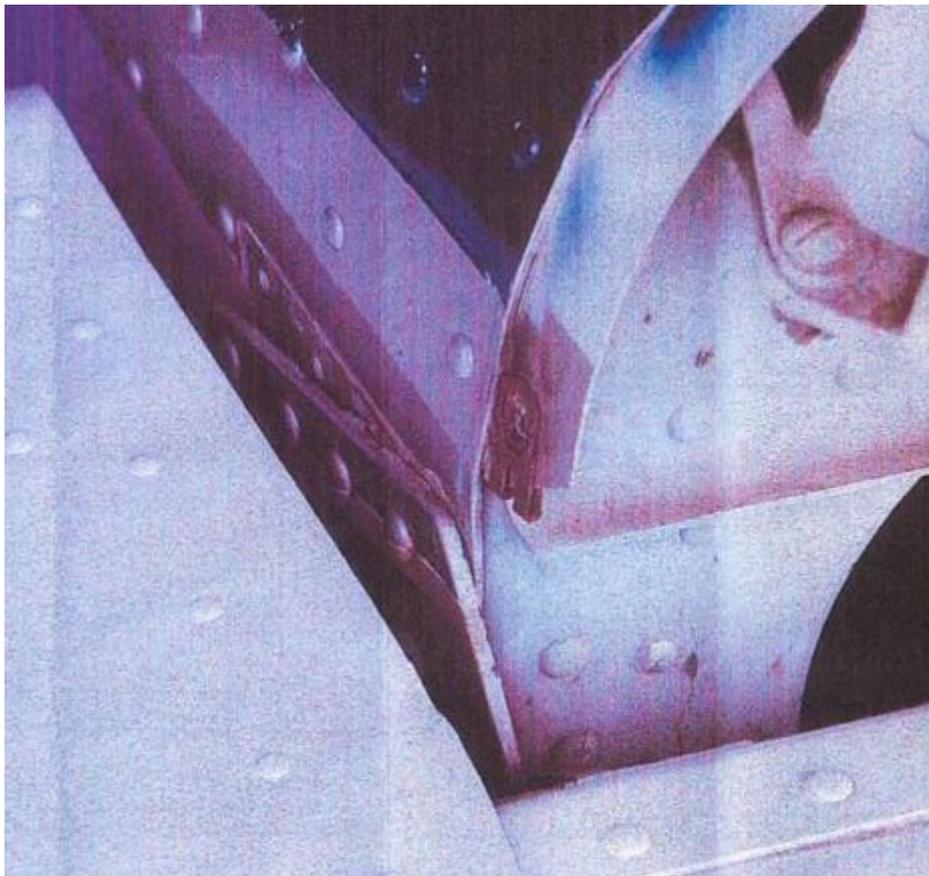


Figure 1

During a very light tail strike during a “ground loop” event, all of the attachment rivets sheared in each attachment bracket on each side of the fuselage allowing the brackets to pivot around the AN525–10 Screw. See Figure 1. There was no other damage.



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The rivets had failed, but no rivet heads were missing and apparently none of the accompanying signs of impending failure mentioned in Beech SB 2182 were evident. The stabilator was essentially attached to the aircraft by only two AN525-10 screws.

It now appears that the rivet strength may be severely compromised by undetected corrosion on the shanks of the aluminium rivets, in a narrow zone between the steel plate of the stabilator hinge block and the supporting aluminium fuselage structure, allowing the heads of the rivets to stay in place.

Following the initial introduction of the “Musketeeer” type, the aft bulkhead flange in the area of the stabilator attachment structure came under review by the manufacturer due to field reports of cracking. It was found that the aft bulkhead area, including the stabilator attachment, required strengthening because it was determined that *“a nose shimmy dampener in bad repair would set up abnormal shimmy at the nose wheel and transfer additional stress to the aft structure”*.

NOTE: Nose wheel shimmy is a condition where, at high ground speeds during take-off and the landing roll, the wheel oscillates very rapidly from side to side about the swivel axis, introducing violent lateral vibration to the airframe. In the “Musketeeer” type, this lateral vibration in the nose shakes the aft fuselage and the attached stabilator rapidly from side to side, resulting in fatigue cracking in the stabilator attachment structure.

While Beechcraft strengthened the stabilator attachment for aircraft on the production line, they also issued Service Bulletin (SB) 64-22 *Inspection Of The Fuselage Structure at the aft Bulkhead* - which recommended that the aft fuselage structure be inspected for cracking and that the strengthening Kit 23-10SR be installed within the next 100 hours, *“even though a nose shimmy dampener in good repair was installed in the airplane.”*

Beechcraft SB 64-22 also authorised the use of CAM 18 (Now AC43 -13-1) for structural repairs that may be required outside the scope of the strengthening Kit 23-10SR. CASA mandated SB 64-22 via AD/BEECH 23/3 - Stabilator Hinge Assembly. This CASA AD has since been cancelled and Beech advise that Beechcraft SB 64-22 *Inspection of the Fuselage Structure at the aft Bulkhead and strengthening Kit 23-10SR* is no longer supported.

Beech later issued SB 2182 *Flight Controls-Inspection of Stabilator Hinge Brackets for Working Rivets* mandated by FAA AD 87-02-08 and CASA AD/BEECH 23/44 refer. AD/BEECH 23/44 focusses on inspecting for working rivets, missing rivet heads, cracking structure etc. induced by vibration and flight loads, etc.

While the aft structure supporting the stabilator may suffer fatigue cracking, it now appears that the rivets attaching the steel stabilator hinge



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plate to the fuselage may also suffer a latent failure due to undetected corrosion, without the signature indication of rivet heads falling off.

The strength of the stabilator hinge attachment to the fuselage may be severely compromised - at the point of failure - without exhibiting any of the signs of impending failure mentioned in CASA AD/BEECH 23/44 and Beech SB 2182.

4. Recommendations

Due to the history of cracking in the rear bulkhead structure and the difficulty in detecting working or even failed stabilator hinge assembly fasteners due to hidden corrosion, CASA strongly recommends that in addition to the requirements of CASA AD/BEECH 23/44 (FAA AD 87-02-08), that operators consider:

1. Replacing all the stabilator hinge fasteners (rivets) which have been in place for 15 years or more, even though they may appear serviceable when inspected in accordance with the requirements of Beech SB 2182.
2. Inspecting the rear bulkhead structure and stabilator attachment to detect cracking bulkhead flanges and failing rivets following any nose wheel shimmy, heavy landing or flight through turbulence event.

NOTE: It is reported that working or failing rivets may also be detected by placing a finger tip on the junction between the stabilator attachment plate and the skin of the aircraft and feeling for any relative motion between the two while applying up and down pressure on the stabilator attachment plates.

3. Report all instances of any stabilator hinge rivet failures via the CASA SDR system.

5. References

1. CASA AD/BEECH 23/44 - Stabilator Hinge Fastener Shearing
2. FAA AD 87-02-08. Beechcraft SB 2182 Flight Controls-Inspection Of Stabilator Hinge Brackets For Working Rivets.

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link e-mail address:

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