

ATTACHMENT 4

Beechcraft Letter Regarding Aileron Components Examination

Reference 940201400189\RB-226



Beechcraft Corporation
10511 E. Central Avenue
Wichita, Kansas
67206 USA

In Reply, Refer to: 940201400189\RB-226

January 21, 2014

National Transportation Safety Board
Mr. Tom Jacky

Subject: Beechcraft Corporation Model 390, Serial Number RB-226, Registration N26DK,
accident in South Bend, Indiana on March 17, 2013

Dear Mr. Jacky:

This letter is to relay the results of laboratory examinations and testing that were conducted at our facilities under your direction and oversight. On September 10, 2013, you delivered to our laboratory three components of the aileron control system from the referenced airplane.

Part Number: 390-521109-0016, Sector Assy- WSTA 233, RH
Part Number: 390-521155-0006, Fitting Assy- Pivot, RH
Part Number: 390-381016-005, Pushrod

The following Beechcraft engineers attended the examination:

Pete Harmon, Process Engineer
Kris Wetherell, Air Safety Investigator
Brian Weber, Air Safety Investigator



Figure 1: Aileron Bellcrank Assembly before Removal

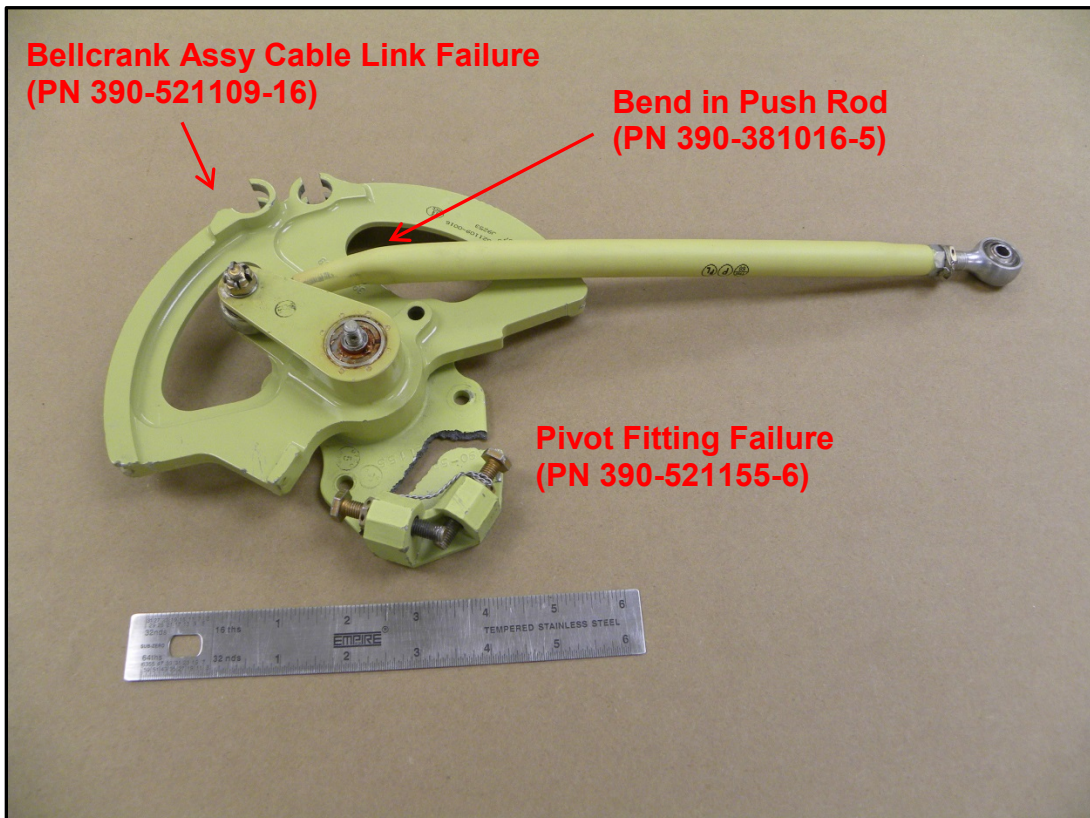


Figure 2: Bellcrank Assembly as Received

The assembly presented three different areas of separation. Figure 2, above, displays the parts as received by the lab with each area noted. The bolts in the pivot fitting serve as physical stops for the bellcrank assembly's rotation. Visual inspection of the fitting showed that the bellcrank made an impact with the left-side bolt. As shown in Figure 3, the bellcrank itself also showed signs of impact from the same bolt. The right-side bolt showed no signs of impact or wear. Figure 4 is the underside of the pivot fitting where it buckled under compression near the bolt opposite the impact. Once the fitting had completely fractured, the cable continued to pull on the bellcrank causing the push rod to bend as shown in Figure 2. Finally, the cable broke loose from the bellcrank. Figure 5 shows the cable link failure. Both fracture faces, on the pivot fitting and on the bellcrank, are clean; consistent with the entire assembly failing collectively and recently.

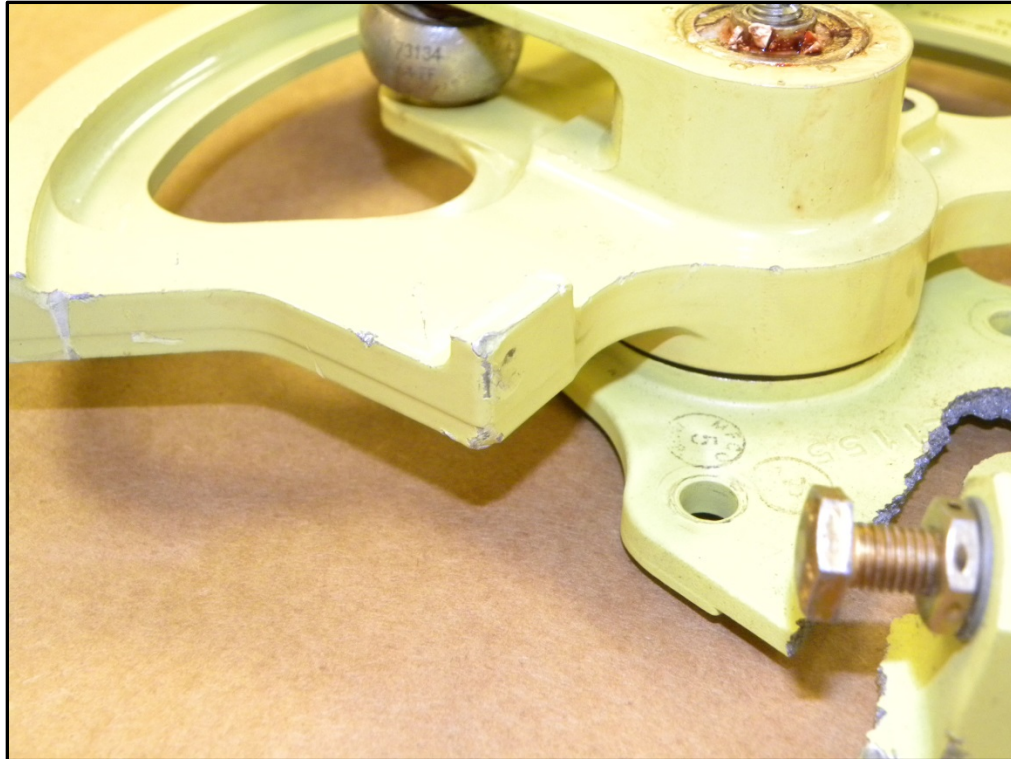


Figure 3: Impact Zone on -16 Bellcrank

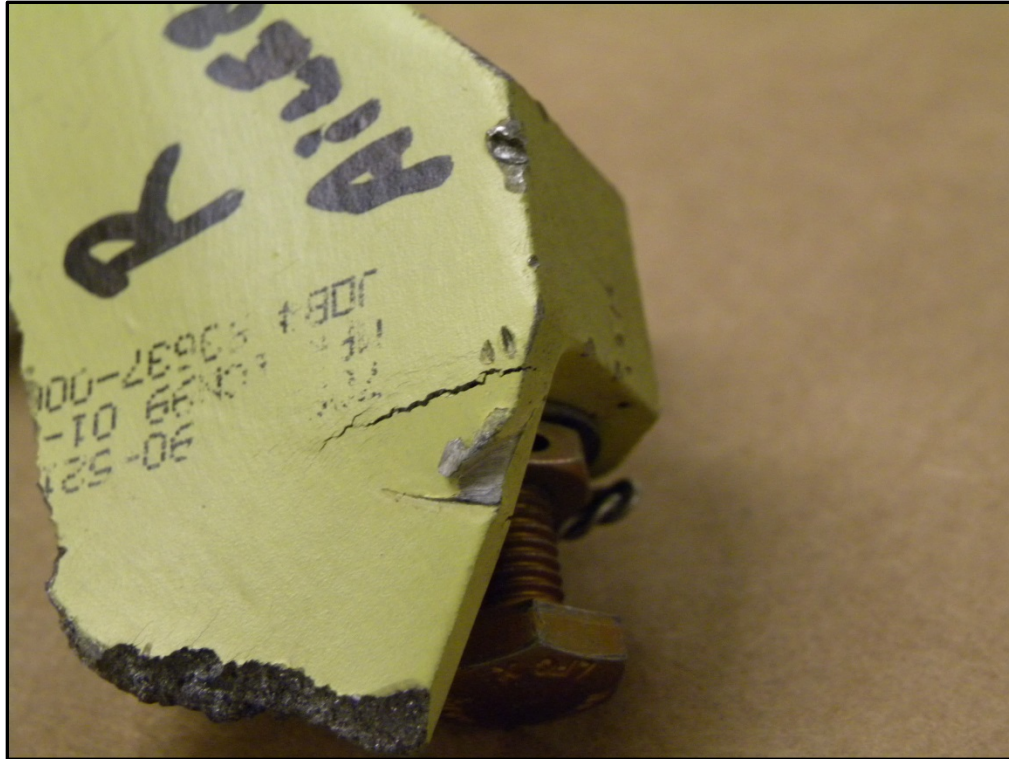


Figure 4: Fracture Under -6 Pivot Assembly from Buckling



Figure 5: Cable Link Failure on -16 Bellcrank

After the initial visual inspection, the fracture surfaces were examined using a Scanning Electron Microscope (SEM). Figure 6 displays the fracture face of the pivot fitting at 300X. This image shows a fracture surface common to overload on castings. The cable link failure was also examined (Figure 7) and was found to have similar characteristics of overload.

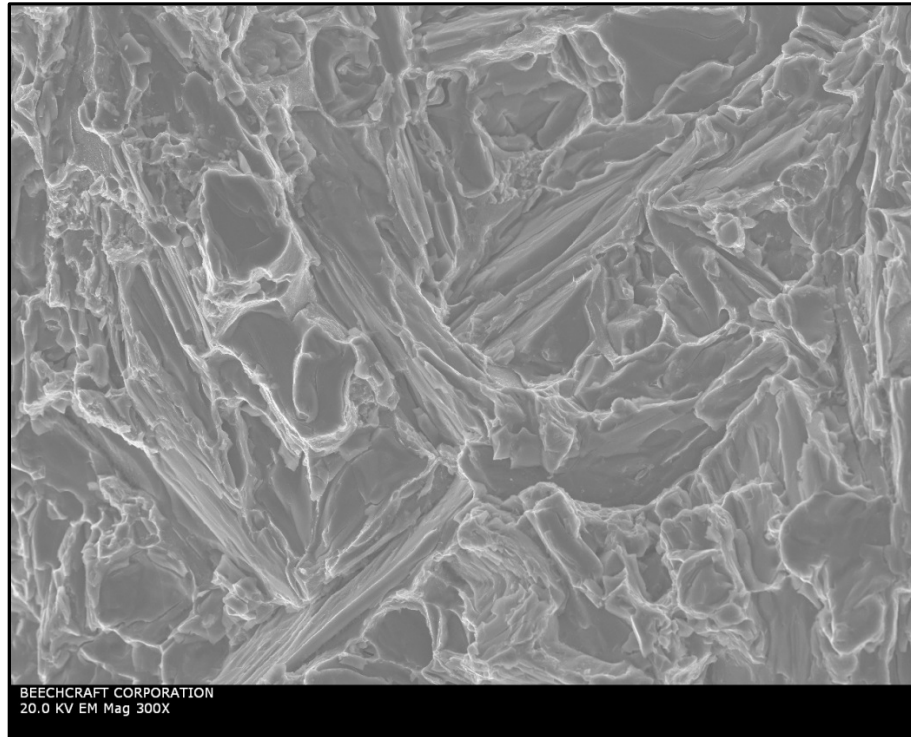


Figure 5: Pivot Fitting Fracture Face at 300X

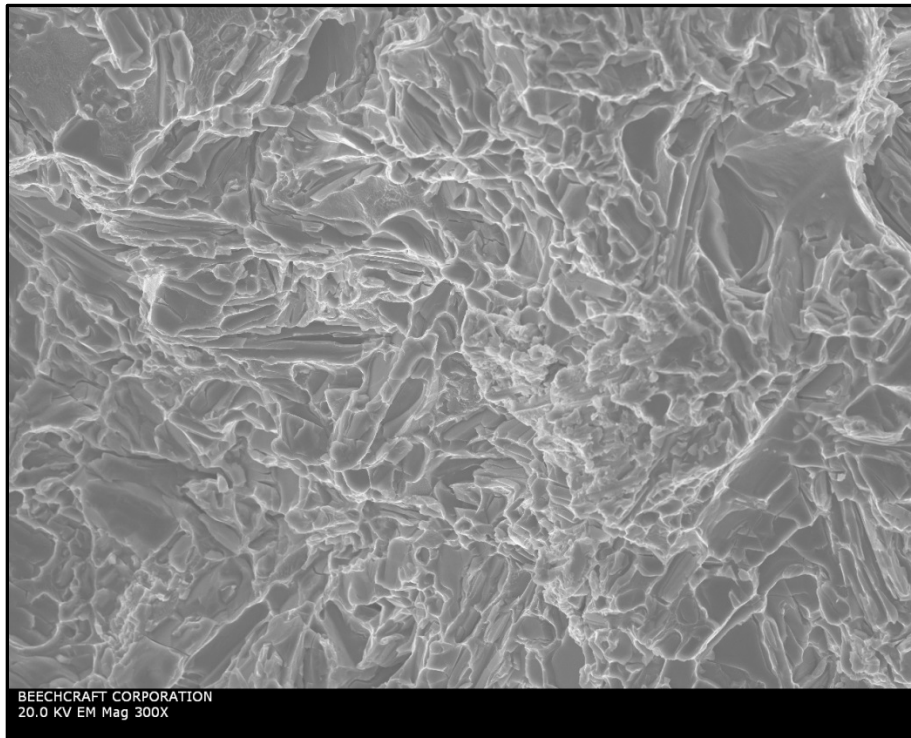


Figure 6: Cable Link Fracture Face at 300X

A material verification was performed on the assemblies. The 390-521109-16 & 390-521155-6 assemblies are made from -992 and -988 castings respectively. The engineering parts lists call for the -992 and -988 castings to be made of aluminum alloy A357 in the T6 temper per MIL-A-21180 Class 11. AMS4219 mandates that A357 in the specified temper shall have a minimum Rockwell hardness of HRE 78. Rockwell hardness testing of the parts produced a value of HRE 90.0. Light emission spectrochemical analysis of the castings showed that they met the chemical composition requirements for A357 as stipulated in AMS4219.

Should you have any questions, please call me at [REDACTED].

Sincerely,

BEECHCRAFT CORPORATION

Brian J. Weber
Air Safety Investigator

cc: Todd Fox