



Factual Report Figures

Aaron McCarter
Air Safety Investigator
Eastern Region Aviation

May 1, 2019

Subject: ERA18FA120- Figures for Factual Report

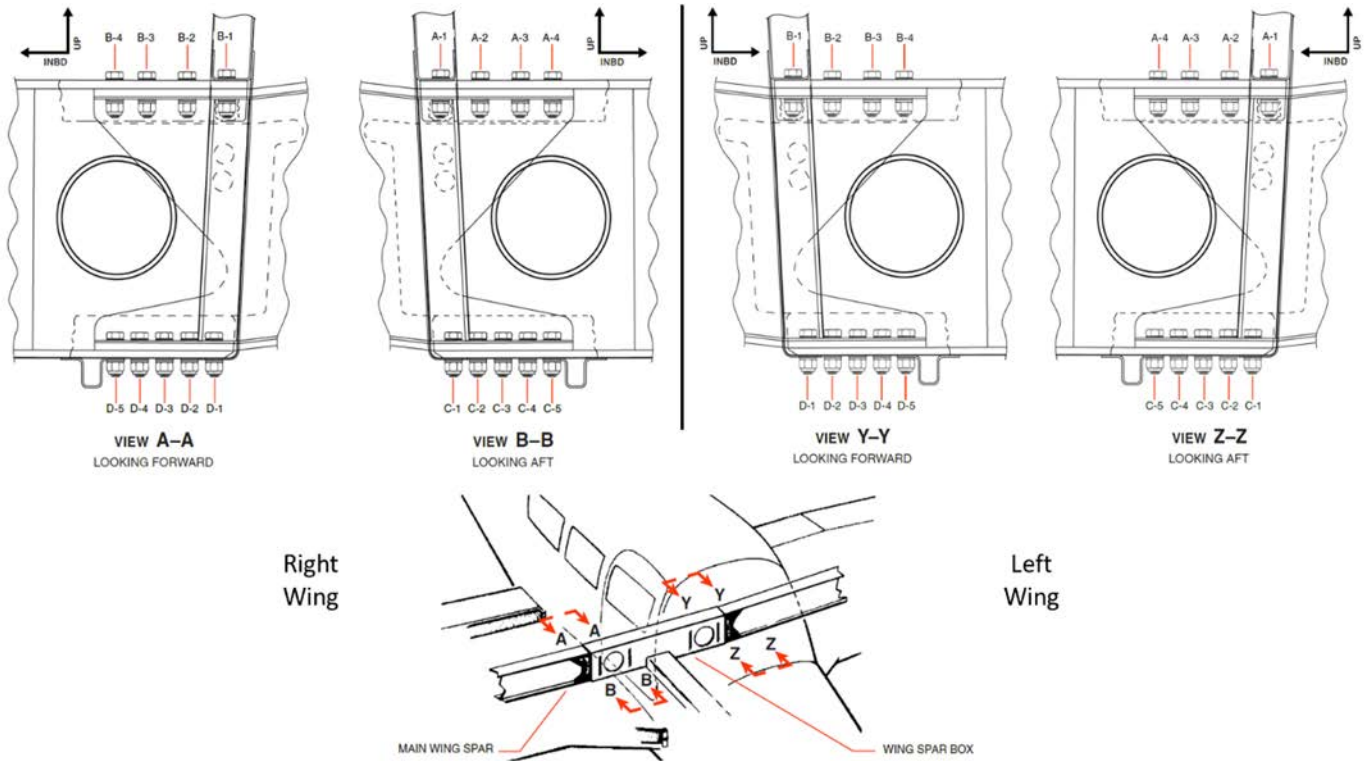


Figure 1. Diagram showing forward and aft side of wing spars and associated attachment bolt designator map. Courtesy of Piper Aircraft, Inc. Arrow Wing Installation Drawings



Figure 2. Photograph showing the separated left wing in foreground and main wreckage in background.

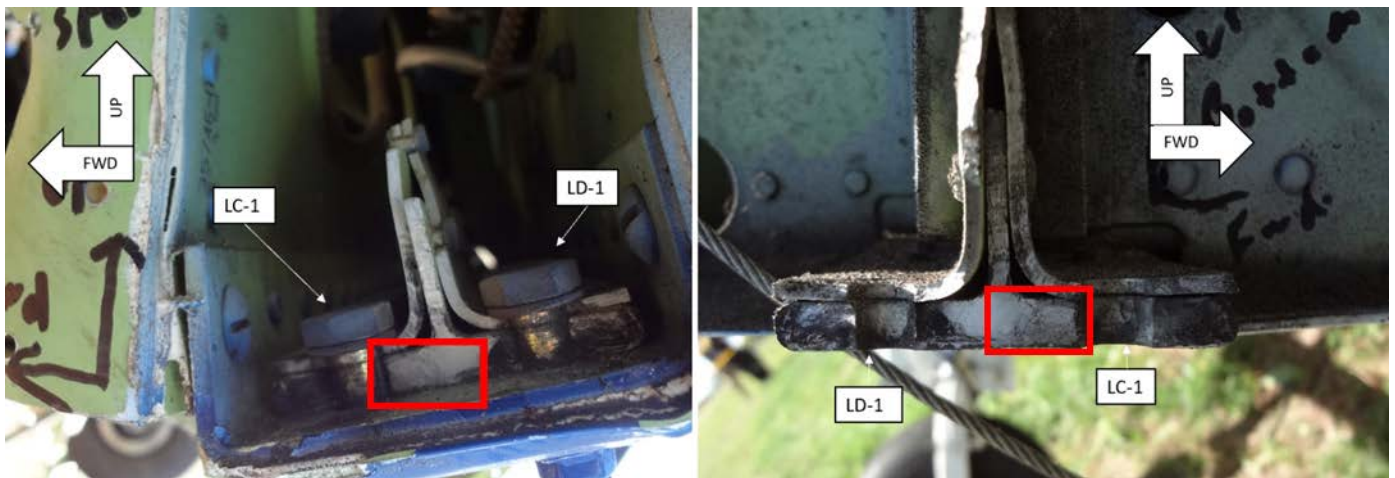


Figure 3. Left-wing fuselage lower spar cap (left frame) and left wing lower spar cap (right frame) with red boxes highlighting areas visually inspected on scene that showed fatigue regions.

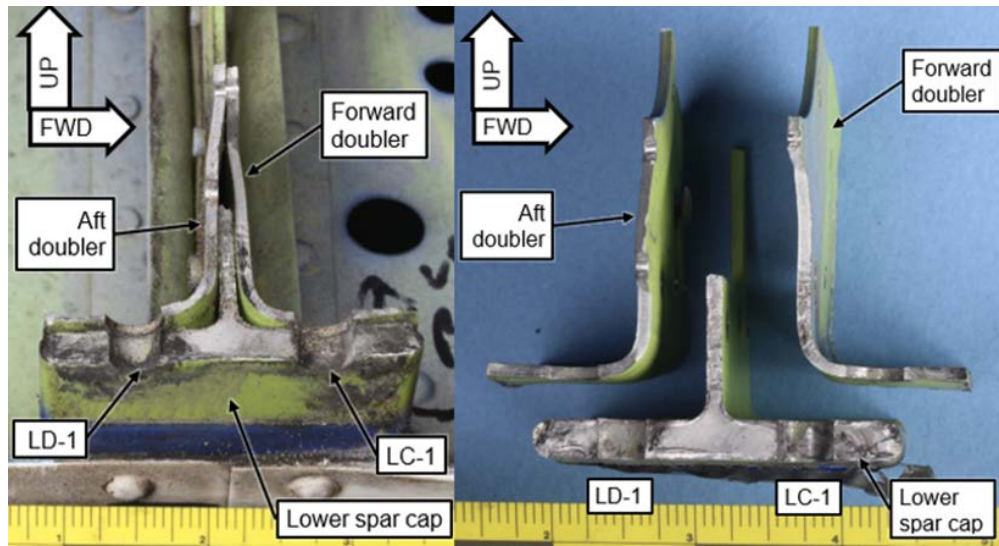


Figure 4. Photographs showing pieces of the accident left-wing lower spar cap and doublers before (left) and after (right) sectioning and rivet removal to facilitate examination.

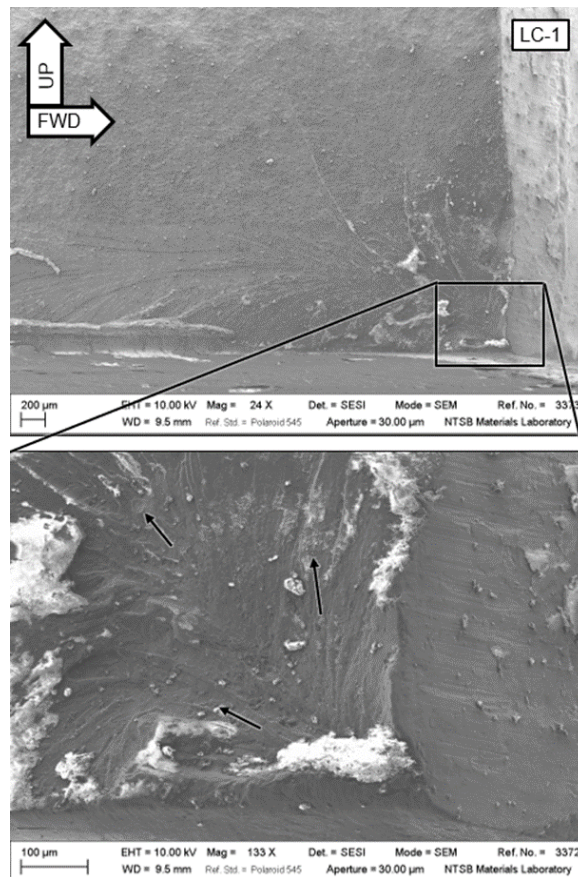


Figure 5. SEM images of fracture features at the aft side of hole LC-1 with a view of the origin area shown at higher magnification (lower image). Unlabeled arrows indicate local directions of crack propagation.

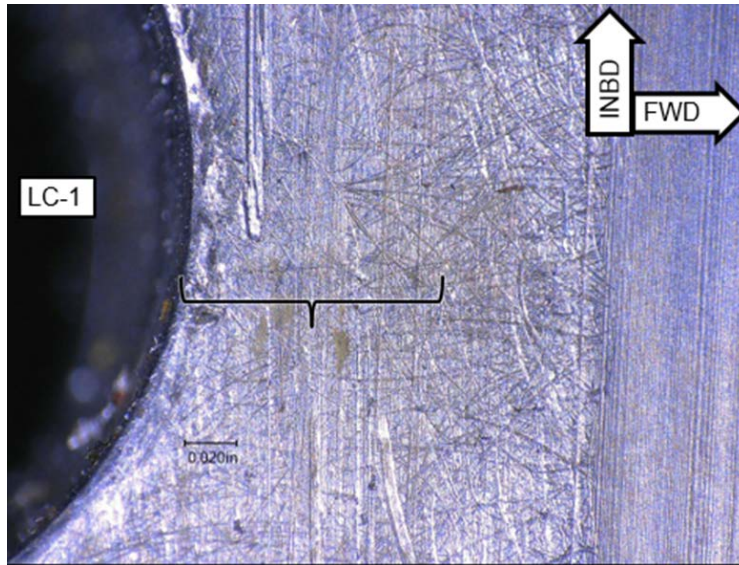


Figure 6. Magnified image showing a crack feature on the lower surface of the left-wing main spar from airplane N104ER.

A. Normal Usage, Class 'A'.

This class applies to all aircraft which do not and have not engaged in operations considered as "Severe", "Extreme", or "Unknown" in the Usage Class described below.

Most aircraft affected by this Service Bulletin will fall into this "Normal Usage Class". Normal flight training operations fall into this class as well. However, if there is any doubt as to the aircraft's operating history, it is recommended that the initial inspection be conducted in accordance with the UNKNOWN USAGE CLASS 'D' Compliance Time.

B. Severe Usage, Class 'B'.

This class applies to aircraft which have engaged in severe usage, involving contour or terrain following operations, (such as power/pipeline patrol, fish/game spotting, aerial application, aerial advertising, police patrol, livestock management or other activities) where a significant part of the total flight time has been spent below one-thousand (1000) feet AGL, altitude.

NOTE: Aircraft with part of total time in service in SEVERE USAGE CLASS 'B' operations and part in NORMAL USAGE CLASS 'A', may adjust compliance times by a "Factored Service Hours" calculation. See Instruction 2A to calculate "Factored Service Hours".

C. Extreme Usage, Class 'C'.

This class applies to aircraft which have been damaged due to operations from extremely rough runways, flight in extreme damaging turbulence or other accident/incident which required major repair or replacement of wing(s), landing gear or engine mount.

D. Unknown Usage, Class 'D'.

This class applies to aircraft and/or wings of unknown or undetermined operational or maintenance history.

Figure 7. Excerpt of Service Bulletin 886 from 1988 showing usage categories.