

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594



March 1, 2019

MATERIALS LABORATORY FACTUAL REPORT

Report No. 19-002

A. ACCIDENT INFORMATION

Place : Patriot, Indiana
Date : July 18, 2018
Vehicle : Fisher Celebrity
NTSB No. : CEN18FA282
Investigator : Arnold Scott, AS-CEN

B. COMPONENTS EXAMINED

Lower wing main spar attachment fittings, lower wing rear spar attachment fitting, and right aileron control rod upper end threaded shank and jam nuts.

C. DETAILS OF THE EXAMINATION

Overall views of the submitted components are shown in figures 1 through 3. The wing spar attachment fittings shown in figures 1 and 2 were from the lower right wing of the biplane, and the threaded shank shown in figure 3 was from the upper end of the control rod connecting ailerons on the upper and lower right wing. According to build drawings for the airplane, the main wing spar was attached to the fuselage with 2 attachment fittings on the forward and aft faces of the spar (figure 1), and the rear wing spar was attached to the fuselage with 1 attachment fitting (figure 2) affixed to the forward face of the rear spar.

Each of the submitted attachment fittings had fractures intersecting the inboard wing spar attachment bolt hole. The fracture features for each attach fitting were rough and matte gray in appearance, consistent with ductile overstress fracture. Overall deformation patterns associated with the fractures were consistent with upward bending of the wing at the attachment location. The outboard end of the attachment fitting piece for the aft spar was also bent to the aft relative to the inboard end. No evidence of any preexisting damage was noted on the wing spar attachment fittings.

The outboard ends of the main spar attachment fittings were bolted to the main spar pieces shown in figure 1. The spar had been cut outboard of the attachment fittings as indicated in figure 1 to facilitate shipment to the NTSB Materials Laboratory. The upper spar cap was fractured from the upper side of the main spar piece.

The threaded shank from the right aileron control rod was fractured through the threads as indicated in figure 3. The fracture surface had rough features, and the shank

adjacent to the fracture was deformed, features consistent with ductile overstress fracture under bending loads. The fracture surface was partially covered by reddish orange oxides consistent with post-fracture oxidation. No evidence of any preexisting damage was noted on the threaded shank.

Matthew R. Fox, Ph.D.
Senior Materials Engineer

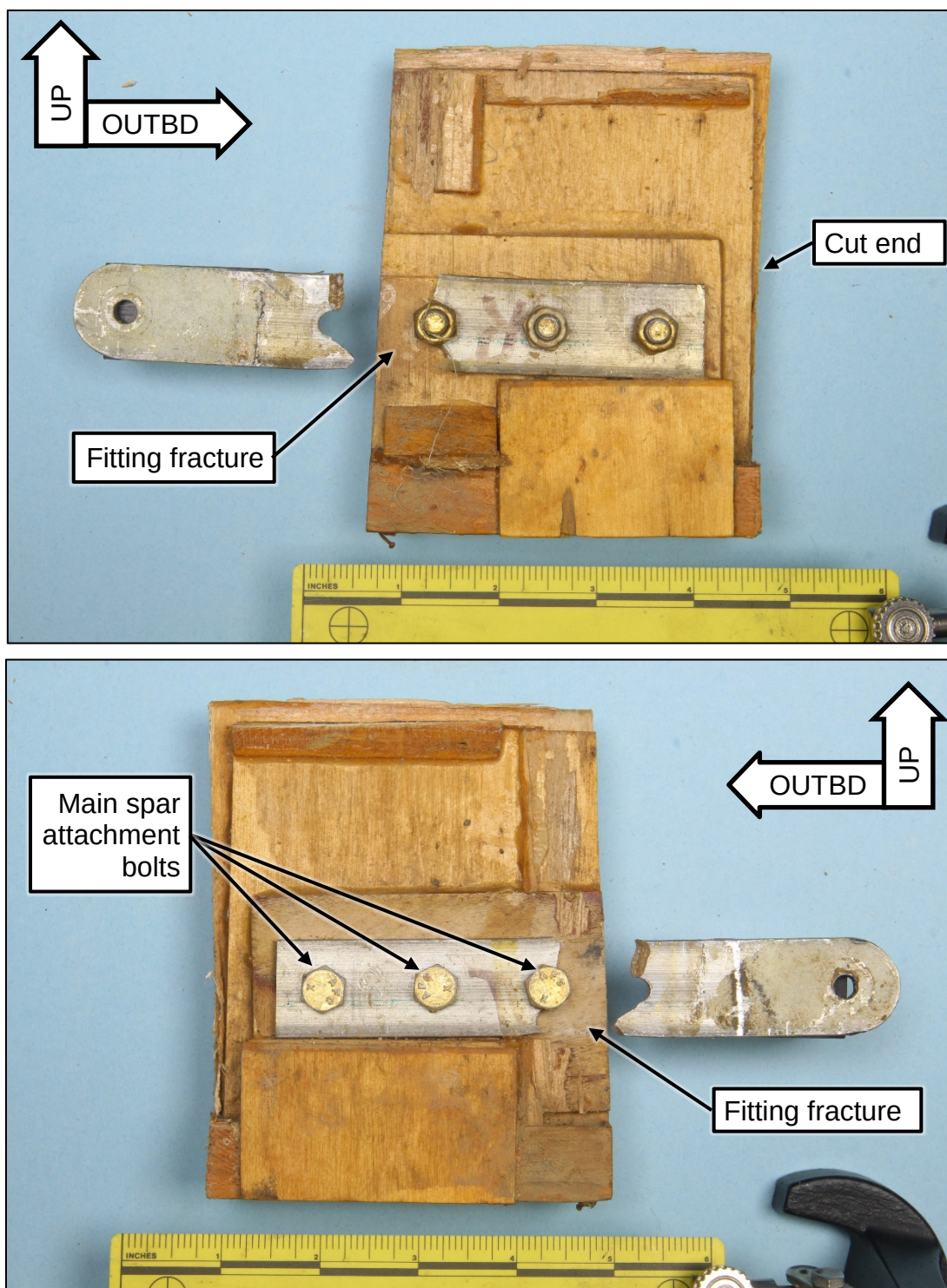


Figure 1. Overall views of the right wing main spar attachment fittings at the aft (upper image) and forward (lower image) sides of the spar.



Figure 2. Inboard portion of the fractured aft spar attachment fitting.



Figure 3. Right aileron control rod threaded shank with attached jam nuts.