



FAA
Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SAIB: CE-14-03

Date: November 15, 2013

SUBJ: Wing Spar Damage

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin (SAIB) informs registered owners/operators of all airplane models of **Univair Aircraft Corporation/under Type Certificate Data Sheets TCDS (A-718/Mooney, ERCO/415C, 415CD) and A787 (ERCO, 415-D, E, G, Forney, F-1, F-1A, Alon, A-2, A2-A, Mooney, M10)** of an airworthiness concern. Specifically, this SAIB provides and references procedures to inspect and repair or replace, as necessary, affected airplanes with main wing spars showing evidence of inappropriate modifications and/or holes with or without cracks.

At this time, this airworthiness concern has not been determined to be an unsafe condition that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Regulations (14 CFR) part 39.

Background

During the course of investigating an accident on an Ercoupe 415-D airplane, an inappropriate modification was identified. The inappropriate modification was an additional hole drilled and tapped in a location that affected the radius of a flanged member on the main wing center section spar. The probable cause leading to the accident was identified as the pilot's exceedance of the design stress limitations of the airplane. Although it was not cited as a probable cause of the accident, the specific location where this hole was drilled can lead to a reduction in strength of the affected structure. The focus of this SAIB is to look for these types of modifications and any cracking that may result from these modifications. In addition, as a result of the investigation into this particular accident, the FAA has identified concerns with the airspeed and flight control systems, which were addressed in Airworthiness Directive (AD) 2012-08-06.

Recommendations

The FAA recommends the following:

- Use visual inspection methods to detect inappropriate modifications and/or unfilled drill holes. In addition, correct any cracking that may be a result from these modifications and/or unfilled holes.
- When inspecting the front and rear wing spars, wing spar caps, and spar web areas in the wing center section for wrinkles and skin cracks, keep in mind that the inappropriate modifications could exist from prior ownership and may have been overlooked. There have been some airframes in the past that were modified by field approval for installation of Cessna 150 airplane seats and seat rails that required attachment holes in the spar caps. Visual inspection is the primary means of examining the airplane structure for the presence of cracks and other anomalies that can lead to reduced structural strength. Essential aids for visual inspection include a powerful flashlight, mirror with a ball joint, and a magnifying glass. A 10-power magnifying glass is usually sufficient to confirm the existence of suspected cracks. A preliminary inspection should take place to check

for overall cleanliness of the area, presence of foreign objects, deformed or missing fasteners, and security of parts, corrosion, and damage. Use a 10-power magnifying glass to confirm the existence of a suspected crack. If this is not adequate, use other NDI techniques, such as liquid dye penetrant, to verify the cracks. After inspection and/or repair(s), treat the area with a corrosion preventative compound. If during any center spar area inspection, wrinkles, cracks in the spar cap or spar shear web, or inappropriate modifications, are found to exist, repair to restore structural strength before further flight. At this time, there are no approved repair instructions from the manufacturer. You may submit proposed repairs to the Denver aircraft certification office (ACO) for evaluation and approval using the contact information in this SAIB. We recommend consulting with Designated Engineering Representatives (DERs) authorized in the structural repair disciplines appropriate to this aircraft type before submitting the proposed repair to the Denver ACO. In some cases, spar replacement may be the only solution.

- If during any inspection open holes are found to exist in the spar cap structure as shown in Figure 2, or in the spar web areas; fill the open hole locations using the following guidance documents: Advisory Circular (AC) 43.13-1B Section 4-57, Advisory Circular 43.13-2B, Chapter 1, Paragraphs 106-110, and Metallic Materials Properties Development and Standardization (MMPDS-04) April 2008, Chapter 8, Page 8-13. Monitor this repair under standard aircraft inspection intervals. If it is necessary to drill an open hole location to obtain a clean hole for rivet installation, the final hole diameter should not intersect the tangent point to the flange radius as shown in Figure 2. Avoid drilling holes larger than 10-percent of the existing cross sectional area; or otherwise decreasing the effective tensile strength areas and/or edge distance of wing spar cap strips, web areas, or highly stressed tensile areas. If these criteria cannot be satisfied, further repair as noted above will be necessary.

Note: See Figures 1 and 2 below for information of an example of an inappropriate modification performed on a spar cap. This particular spar cap most probably failed due to the pilot exceeding the design stress limitation of the airplane. A self-tapping fastener had broken off in one threaded hole and another had been threaded right into the radius of the flanged member of the spar cap (the “T” junction). The location of the hole in the spar cap T junction can lead to a reduction in structural strength of the affected structure.

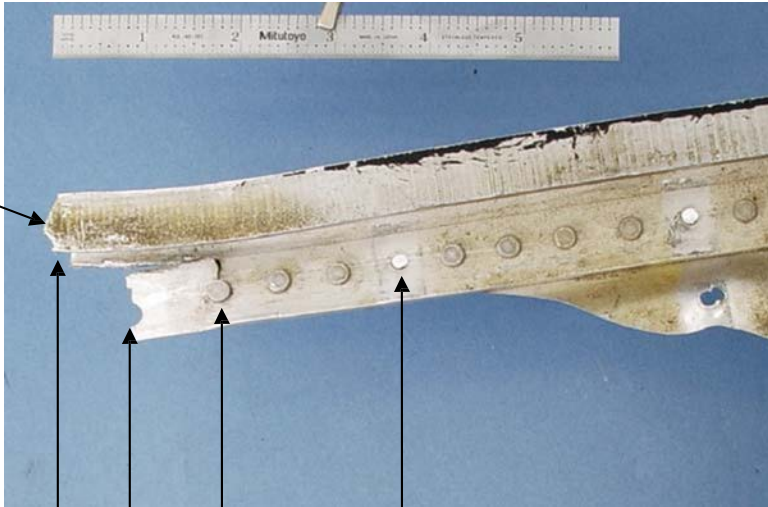
For Further Information Contact

Roger Caldwell, Aerospace Engineer, ANM-100D, 26805 East 68th Avenue, Room 214, Denver, CO 80249; Phone: (303) 342-1086; fax: (303) 342-1088; e-mail:roger.caldwell@faa.gov.

For Related Service Information Contact

Univair Aircraft Corporation, 2500 Himalaya Road, Aurora, Colorado, 80011, Tel: 303-375-8882, Fax: 800-457-7811.

Centerline of carry through. The three threaded screw holes are on this fracture surface.



Centerline of carry through.

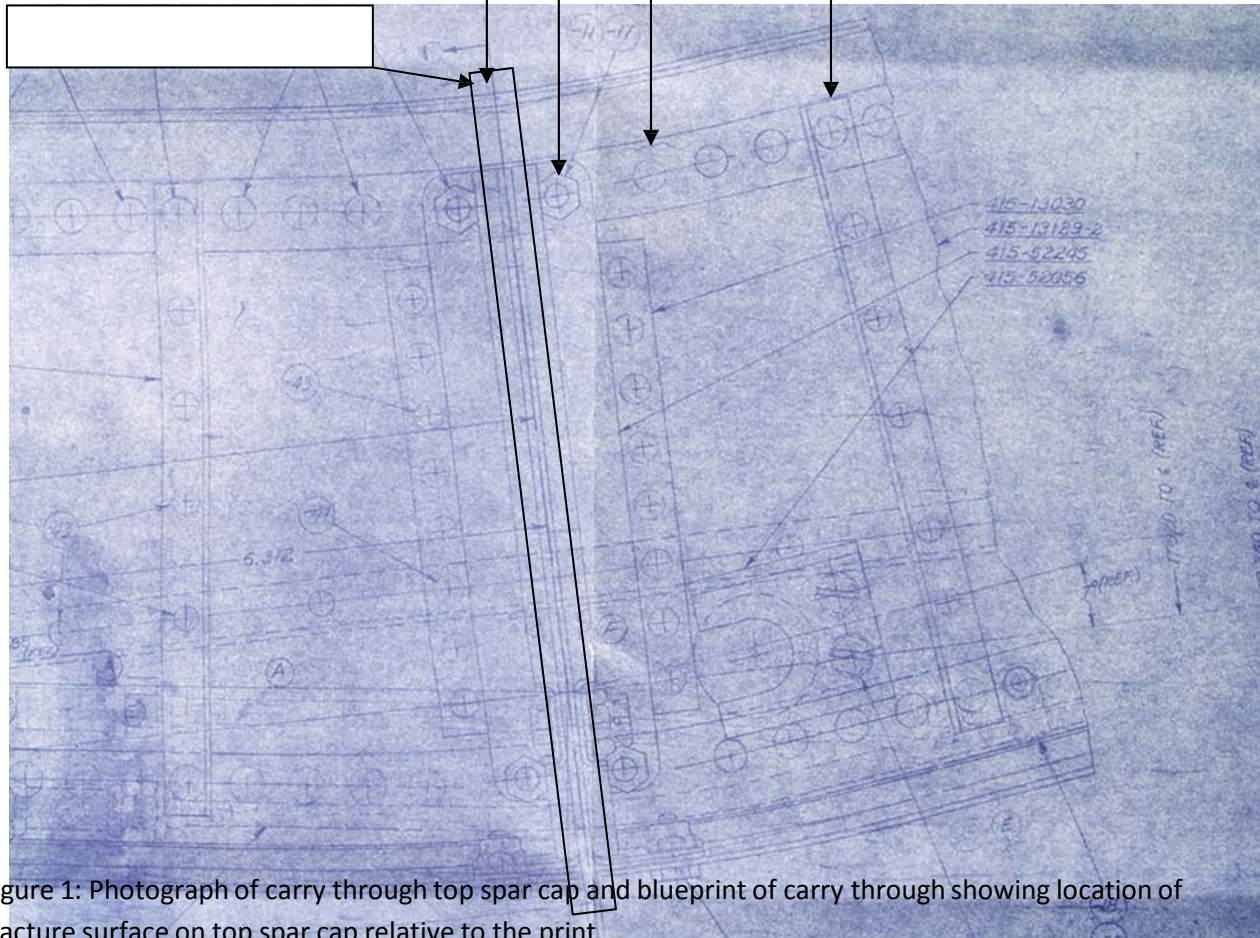


Figure 1: Photograph of carry through top spar cap and blueprint of carry through showing location of fracture surface on top spar cap relative to the print.

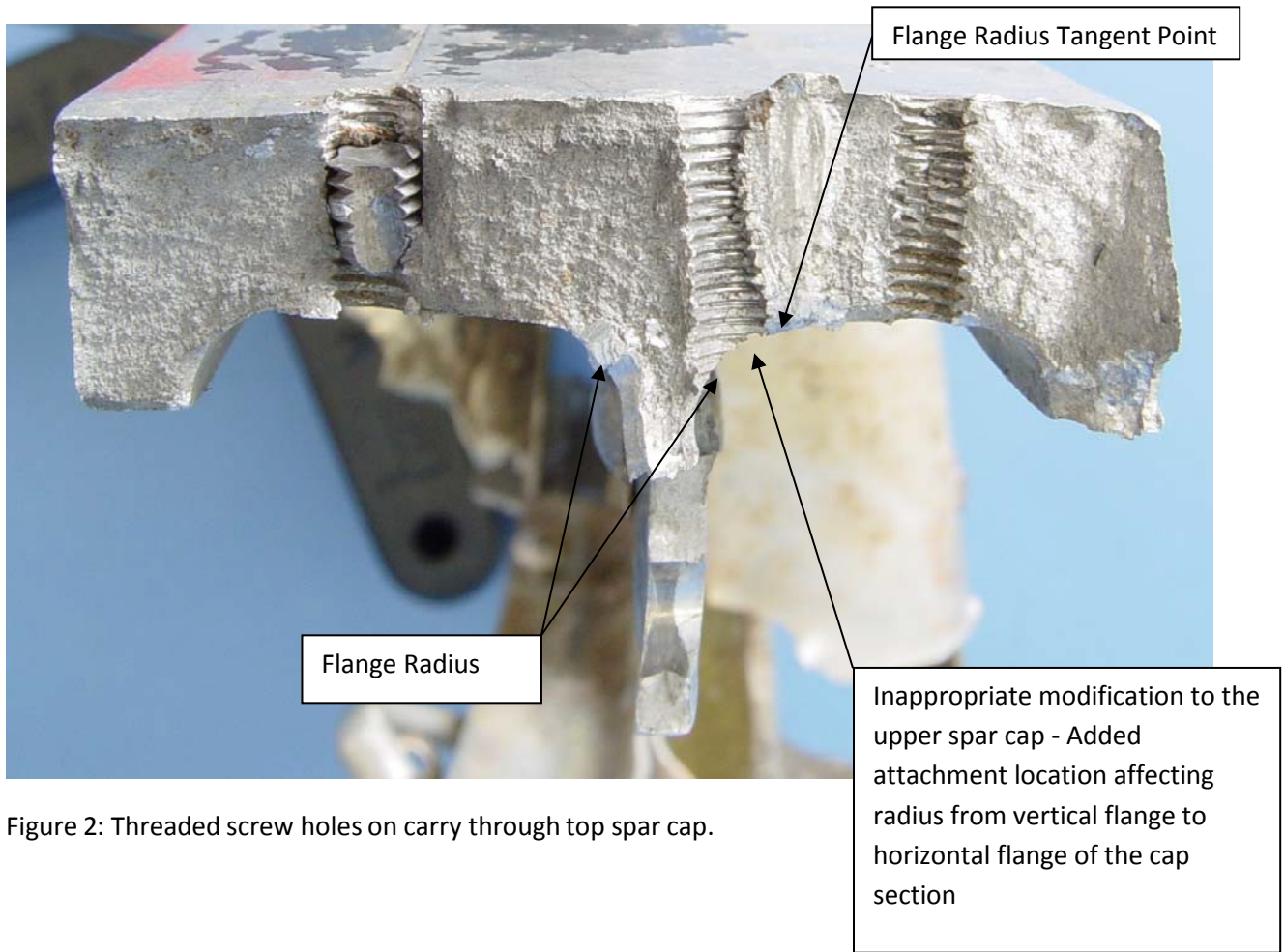


Figure 2: Threaded screw holes on carry through top spar cap.