

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ANC25LA030

MATERIALS LABORATORY

Factual Report 25-044

June 17, 2025

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A. ACCIDENT INFORMATION

Location: Highline Lake, Alaska
Date: March 7, 2025
Vehicle: Cessna 185F
Investigator: Stacia Joyce

B. COMPONENTS EXAMINED

Bolt and nut from main landing gear (Figure 1)

C. EXAMINATION PARTICIPANTS

Specialist Joseph Panagiotou
National Transportation Safety Board
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D. DETAILS OF THE EXAMINATION

The dimensions of the bolt were consistent with an AN7-20 bolt. There was a cross drilled hole through the threaded portion of the bolt which is also consistent with an AN7-20 bolt. The bolt exhibited patchy and faint remnants of cadmium plating on the flats of the head. The shank of the bolt did not exhibit any remaining cadmium plating. The bolt head had the raised letters "C" and "S" on the periphery and a raised cross in the middle (Figure 2). The nut was a locking type of nut with a nylon locking insert consistent with an MS20365-720A nut. The nut had worn and patchy cadmium plating.

Using a handheld alloy analyzer the material composition of the bolt was found to be consistent with 8620 alloy steel. Hardness measurements on the bolt shank averaged 27 HRC. This hardness corresponds to a tensile strength of approximately 128ksi. The composition and the hardness of the bolt were consistent with typical specifications for an AN type bolt.

Both the bolt (Figure 3) and nut (Figure 4) exhibited worn threads. The worn threads near the end of the bolt contained bits of the nut's nylon locking insert. The nylon locking insert was worn down to the depth of the worn threads inside the nut. This wearing down of the threads would have occurred over time and not from a sudden instance of overload.

The flat washer (Figure 5) that would have been underneath the nut was deformed and had a wear groove where it had been in contact with the nut.

According to the parts listing for the Cessna 180F main landing gear installation as shown in the Cessna 180 and 185 Parts Catalog, the hardware at the inboard end of the main landing gear spring should consist of an AN7-20A bolt, which does not have a cross drilled hole, an MS20365-720C nut, which is a locking nut with an all-metal design, and a spring adjustment shim part number 0541105, which is displayed having a rectangular outer edge in the parts catalog illustration.

Submitted by:

Joseph Panagiotou
Fire Protection Engineer



Figure 1. Main landing gear bolt, nut and washer as received.



Figure 2. Markings on the bolt head.



Figure 3. Two views of the worn threads on the bolt. The threads on the end contain remnants of the nylon locking insert from the nut.



Figure 4. Locking nut exhibiting worn internal threads and a damaged nylon insert.



Figure 5. Flat washer with wear groove.