

Tim Sorensen

From: Donald Kramer
Sent: Tuesday, March 4, 2025 9:59 AM
To: Tim Sorensen
Subject: Materials Laboratory Factual Report - Email - ANC25MA018
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ACCIDENT INFORMATION

Location: Nome, Alaska
Date: February 6, 2025
Vehicle: Cessna 208B, N321BA
Investigator: Timothy Sorensen, AS-CEN

COMPONENTS EXAMINED

Piece of elevator torque tube and separated flanged tube-end fitting.
Left-side flap interconnect rod assembly, separated into two pieces.

EXAMINATION PARTICIPANTS

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DETAILS OF THE EXAMINATION

Two fractured and separated component assemblies were submitted to the NTSB Materials Laboratory for examination. The first was an elevator torque tube that had separated from its tube-end fitting. The second was the left-side flap interconnect rod assembly, separated into two pieces. Both separations occurred at riveted joints and all rivets fractured in shear overstress. Each separation is described in more detail below.

The elevator torque tube was originally connected to the tube end fitting. The fitting contained a ring-shaped flange that lapped approximately 0.75 inches inside the end of the tube. Six equally spaced rivets joined the tube to the ring-shaped flange around the circumference of the tube. All rivets exhibited shear deformation and all fractures exhibited shear sliding features consistent with overstress shear fractures. Two adjacent rivets exhibited shear fracture features aligned primarily in the longitudinal direction of the tube. On either side of these two rivets, the adjacent rivets exhibited shear fracture features in a mixed longitudinal and circumferential direction. The final two rivets, adjacent to one another and 180 degrees opposite of the longitudinally sheared rivet pair, the shear features were aligned primarily in the circumferential direction. The combined deformation and fracture features were consistent with overstress separation of the torque tube from the fitting from bending followed by torsion loads on the torque tube.

The flap interconnect rod assembly contained a lapped and riveted joint where the hollow tube was fit over and joined to an approximately 1.75-inch-long fitting by six rivets. The rivets were spaced at 90-degree intervals around the circumference of the tube, such that there were two rivets at each of two diametrically opposed clock positions and one rivet at each of the other two clock positions. All rivets were fractured at the interface between the tube and the fitting. The rivets exhibited shear deformation

oriented in the longitudinal direction of the rod assembly and the fracture surfaces exhibited shear sliding marks, also in the longitudinal direction. The combined deformation and fracture features were consistent with a tensile overstress separation of the tube assembly.

Donald Kramer, Ph.D.
Materials Engineer







