

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24FA160

STRUCTURES

Group Chair's Factual Report

September 23, 2025

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A ACCIDENT

Location: Hartsburg, MO
Date: April 16, 2024
Time: 1205 Central Standard Time
1705 Coordinated Universal Time (UTC)
Airplane: Piper Aircraft Inc PA-46-350P, N451MA

B STRUCTURES GROUP

Group Chair	Leani Benitez-Cardona National Transportation Safety Board Washington, DC
Group Member	Clinton R. Crookshanks National Transportation Safety Board Aurora, Colorado
Group Member	Jon Hirsch Piper Aircraft, Inc. Wichita, Kansas

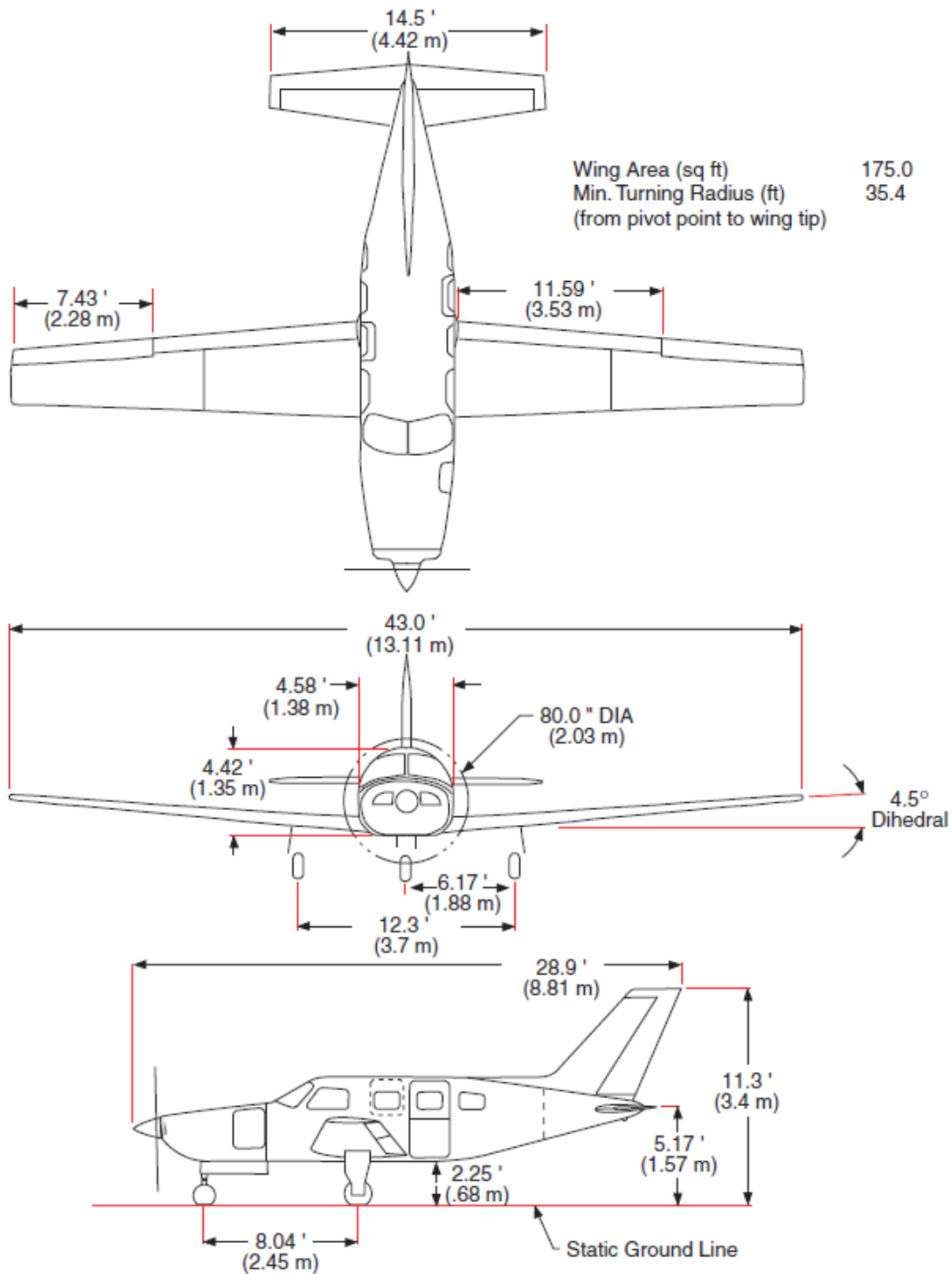
C DETAILS OF THE INVESTIGATION

The group examined the accident airplane from June 25-26, 2024, at Dawson Aircraft located in Clinton, AR.

D FACTUAL INFORMATION

1.0 Airplane Information

The Piper Aircraft PA-46-350P airplane is a single engine airplane originally certified in 1988 (figure 1). The airplane is equipped with a conventional tail and retractable tricycle landing gear. The airplane is 28.9 feet long, 11.3 feet tall at the tail, has a fuselage diameter of 4.58 feet, has a wingspan of 43 feet, and has a horizontal stabilizer span of 14.5 feet. The airplane primary and secondary wing, fuselage, and tail structure are of all metal construction, primarily aluminum alloys. The accident airplane, N451MA, was acquired by Upward Aviation on December 28, 2023.



Three View (PA-46-350P / PA-46R-350T)

Figure 1. Three-view diagram (provided by Piper)

Locations on the airplane are defined in terms of stations that identify specific reference planes or lines on the airplane. All stations, reference planes, and lines are measured in inches from the specified reference point. Fuselage stations (FS) define locations along the longitudinal axis, buttock lines (BL) define locations along the

lateral axis, and water lines (WL) define locations along the vertical axis (figure 2). The FS origin (FS 0.00) is located 100.00 inches forward of the forward pressure bulkhead of the airplane, the BL origin (BL 0.00) is located at the lateral centerline of the airplane, and the WL origin (WL 0.00) is located 46.00 inches below the lower skin of the fuselage. FS reference planes are measured at right angles to the centerline of the fuselage along the airplane longitudinal axis. The fuselage stations generally coincide with frame locations in the fuselage.

Wing stations (WS) are reference planes parallel to the airplane longitudinal axis (figure 2). The WS origin (WS 0.00) is located at the centerline of the airplane at BL 0.00. The wing intersects the fuselage at WS 29.00. The wing stations generally align with wing rib locations.

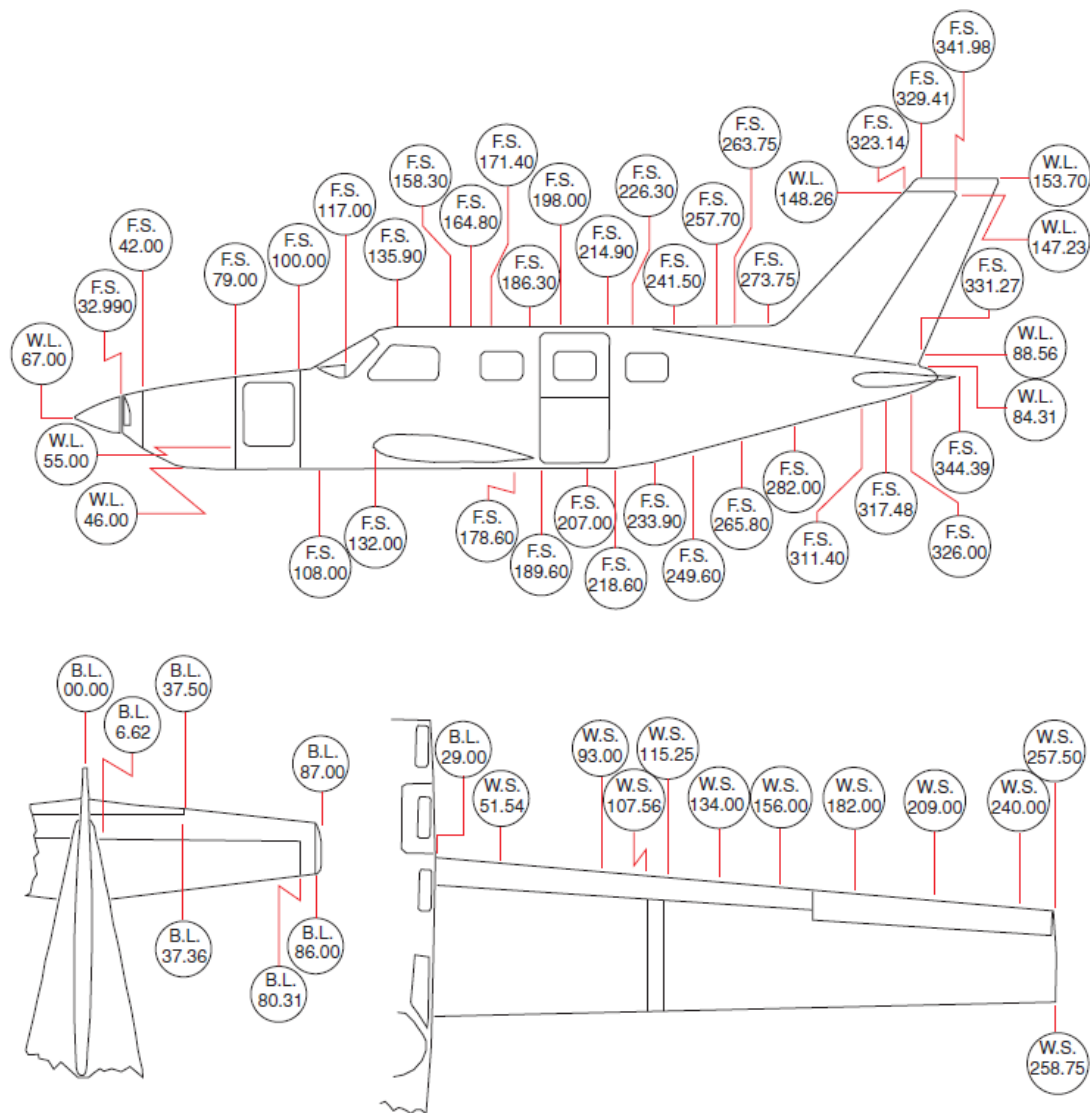


Figure 2. Piper PA-46-350P station diagram (provided by Piper)

2.0 Accident Site

The main wreckage consisted of the airplane's fuselage which came to rest on a wooded hillside next to a pasture (figure 3). The tree canopy was mostly undisturbed and the few broken tree limbs suggested a near vertical descent and impact with the ground. The fuselage was resting upright. The engine was pushed rearward and the forward fuselage exhibited accordion crushing into the area of the forward baggage compartment. The inboard 4 ft of each wing remained attached to the fuselage. The fuselage side over the wing exhibited signs of crush damage. The roof of this area was folded back, presumably by first responders for occupant extraction. The fuselage between the front seats and the rear baggage compartment was fragmented. The aft 8 feet of the fuselage was predominately intact. No tail surfaces were present at the main wreckage site.



Figure 3. Accident airplane on site (NTSB photo)

The tail surfaces and both outboard wings had separated from the airplane (figure 4). The wings, elevator, vertical stabilizer, and the rudder were located along a line extending from the fuselage on an 18° heading for about 3.1 nm. The vertical stabilizer was the farthest piece of wreckage located, with the other pieces found between the fuselage and the vertical stabilizer. Most of the horizontal stabilizer pieces were not located.

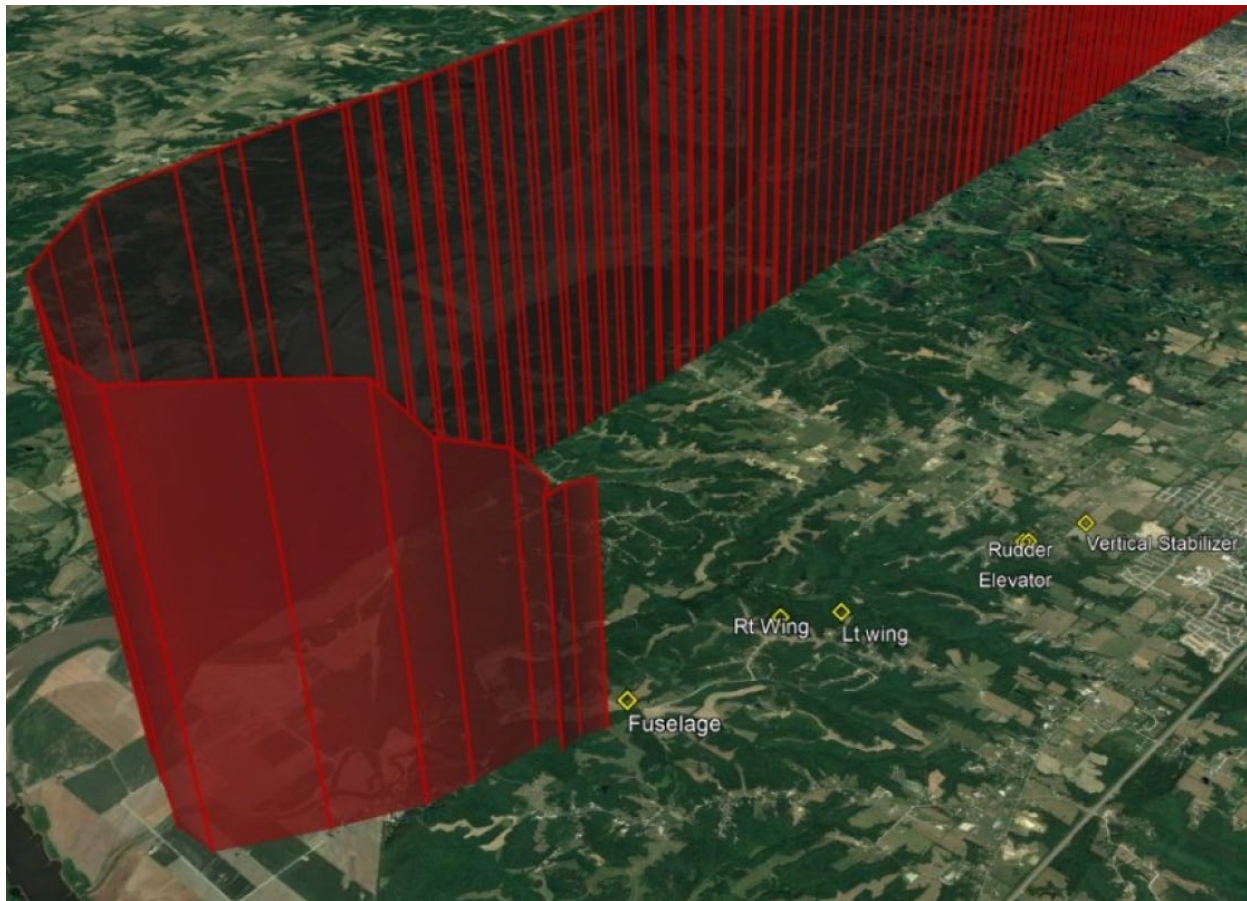


Figure 4. Final portion of the flight path and location of recovered components (NTSB diagram)

3.0 Airplane Examination

The examination focused on the wings and stabilizers that separated prior to ground impact. There was significant impact damage to the fuselage structure, and it was separated into 3 major pieces (figure 5). Both outboard sections of the wings separated from the airplane near wing station WS 75 at the outboard ends of the main landing gear wheel wells. The inboard wing sections remained attached to the fuselage and the outboard sections were recovered. The horizontal stabilizer, vertical stabilizer, flaps, ailerons, elevator, and rudder separated from the airplane during the event. The right aileron, right flap, and left flap were separated from the wings and recovered. Most of the left and right sides of the horizontal stabilizer aft spar and the center portion of the elevator, about 6 feet long, were separated and recovered. The vertical stabilizer, vertical stabilizer aft spar, and the rudder were separated and recovered.

All the fracture surfaces examined had an angled, dull, grainy appearance consistent with overstress separation. There was no evidence of pre-existing cracking or corrosion noted.



Figure 5. Accident airplane (NTSB photo)

3.1 Right Wing

The right wing inboard section remained attached to the airplane (figure 6). The leading edge structure was deformed down and inboard almost 180 degrees between WS 75 and WS 100. The main spar was fractured near WS 89, and the aft spar was fractured near WS 92.



Figure 6. Right wing inboard section (NTSB photo)

The main spar upper cap was deformed down about 60 degrees and there was no obvious deformation of the lower cap at the fracture location (figure 7).



Figure 7. Right wing inboard section fractured leading edge and main spar (NTSB photo)

The aft spar upper cap, lower cap, and attached skins were deformed downward at the fracture location (figure 8). The aft spar lower cap fractured approximately 5 inches inboard with respect to the upper cap.

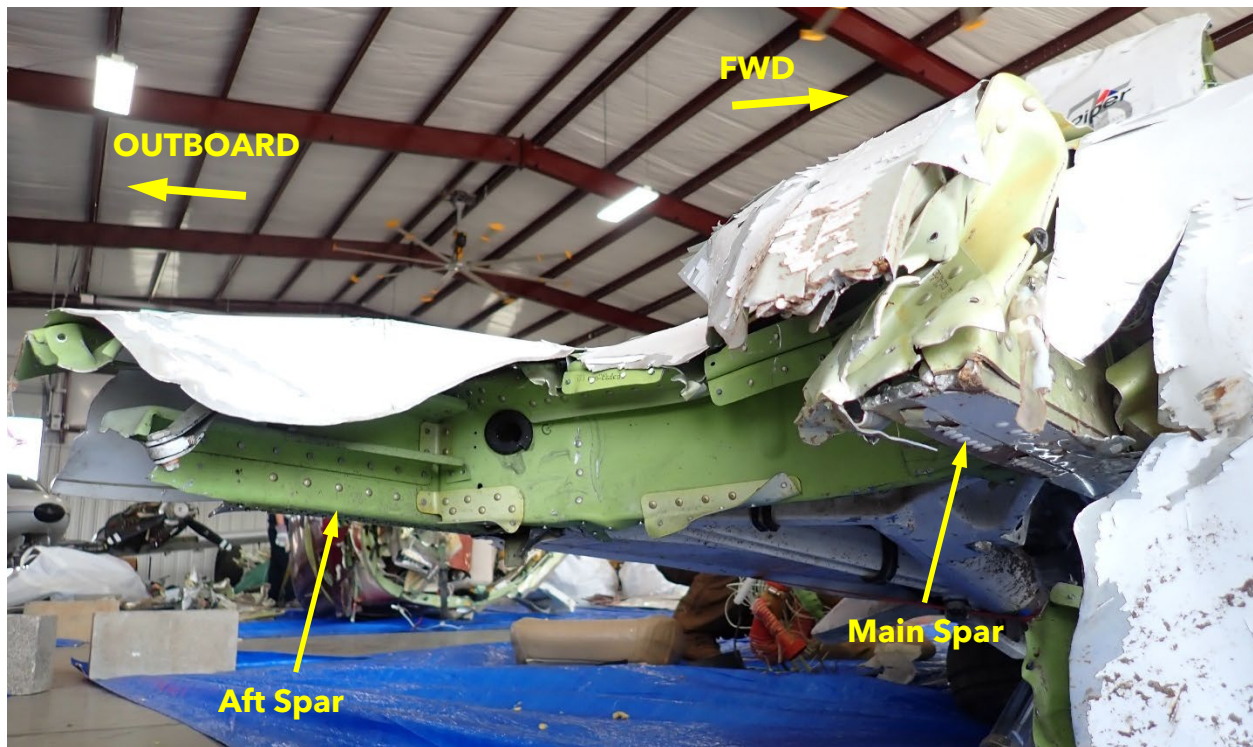


Figure 8. Right wing inboard section aft spar fracture (NTSB photo)

The right outboard wing section separated from the airplane near WS 90 and was recovered (figure 9). The flap and aileron separated from the wing but were recovered. The outboard wing was bent slightly downward, and the arc extended the full length of the section.



Figure 9. Right wing outboard section (NTSB photo)

At the fractured area, both main and aft spar were deformed in the downward direction (figure 10).



Figure 10. Right wing outboard section main spar fracture (NTSB photo)

The right flap separated from the airplane and was recovered (figures 11 and 12). The flap was complete but separated in half, at about 77 inches from the outboard end. Both halves buckled and fractured at the flap track attach points.



Figure 11. Right flap inboard section (NTSB photo)



Figure 12. Right flap outboard section (NTSB photo)

The right aileron separated from the airplane and was recovered (figure 13). The aileron was complete with signs of buckling and impact damage. The aileron hinges were fractured from the wing structure. The largest impact damage was located about 56 inches from the inboard end, and measured to be approximately 3 inches wide and 5 inches long. There was over travel impact damage at the aileron hinge locations.



Figure 13. Right aileron (NTSB photo)

3.2 Left Wing

The left wing inboard section remained attached to the airplane (figure 14). The main spar was fractured near WS 78, and the upper and lower caps were deformed downward. The aft spar was fractured near WS 108 and was deformed aft and twisted leading edge down outboard of WS 75.



Figure 14. Left wing inboard section (NTSB photo)

The left outboard wing section separated from the airplane near WS 78 and was recovered (figure 15). The flap and aileron separated from the wing; the flap was recovered, the aileron was not recovered. The outboard wing was bent slightly downward, and the arc extended the full length of the section.



Figure 15. Left wing outboard section. (NTSB photo)

The leading edge and aft spar were deformed downward at the fracture location, and the main spar did not have any obvious deformation (figures 16 and 17).



Figure 16. Left wing outboard section aft spar (left) and leading edge (right) (NTSB photos)

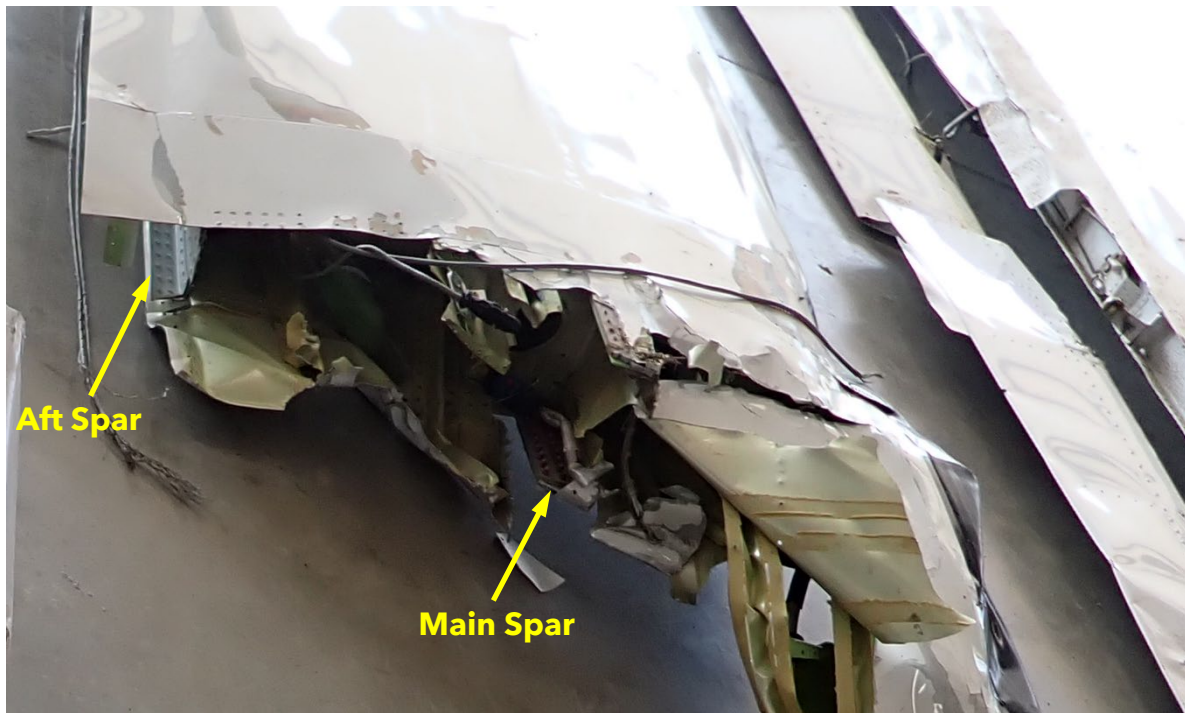


Figure 17. Left wing outboard section fractured aft spar and main spar (NTSB photo)

The left flap separated from the airplane and was recovered (figures 18 and 19). The flap was complete but separated in half, at about 77 inches from the outboard end. Both halves buckled and fractured at the flap track attach points.



Figure 18. Left flap inboard section (NTSB photo)



Figure 19. Left flap outboard section (NTSB photo)

The left aileron was not recovered.

3.3 Empennage

Most of the empennage components separated from the airplane during the event (figure 20). The vertical stabilizer, rudder and a section of the elevator were recovered. Three sections of the horizontal stabilizer aft spar and the aft spar of the vertical stabilizer were also separated and recovered.



Figure 20. Empennage wreckage (NTSB photo)

3.3.1 Horizontal Stabilizer

A 9 inch section of the horizontal stabilizer aft spar remained attached to the fuselage (figures 21). The elevator trim actuator rods fractured from the fuselage at the thread of both rod ends.

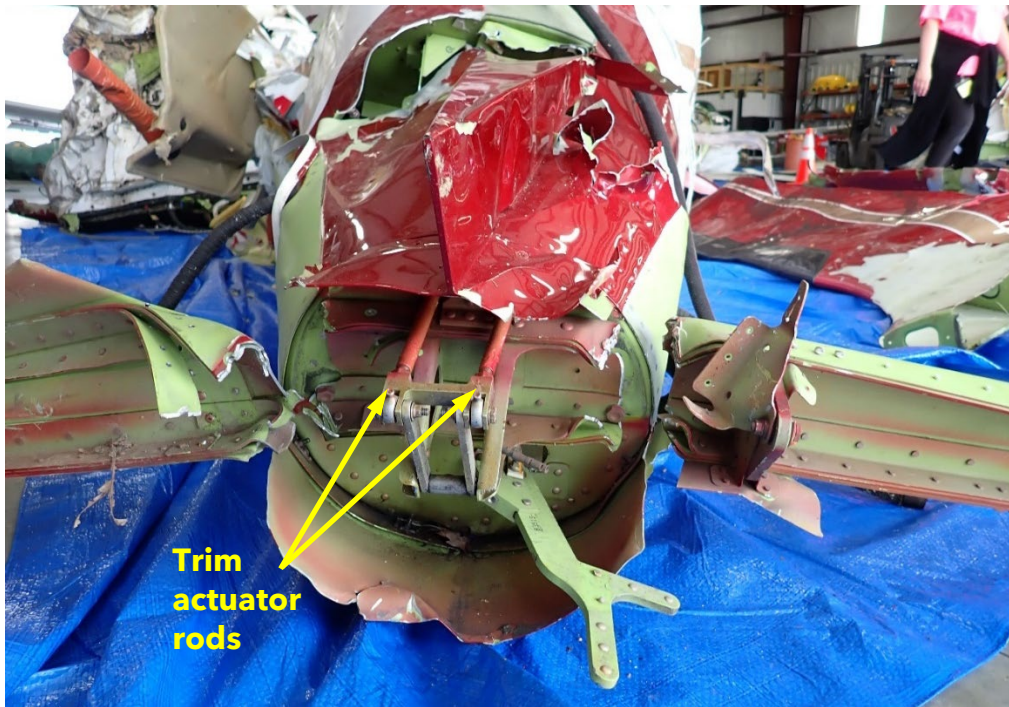


Figure 21. Horizontal stabilizer aft spar fractures (NTSB photo)

About 6 ft of the center of the elevator was recovered with the trim tab attached (figure 22). This section was deformed downward on the left side and upward on the right side. The elevator trim rods remained attached to the trim tab and were fractured at the forward rod ends.



Figure 22. Elevator top side (above) bottom side (below) (NTSB photo)

The left and right sides of the horizontal stabilizer separated at the root areas and most of the structure was not recovered (figure 23). Three separate sections of the horizontal stabilizer aft spar were recovered. The damage and deformation of the center section of the aft spar and the adjacent left and right sections was consistent with separation in a downward direction. The right section of the aft spar was approximately 3.5 feet long and the outboard piece was not recovered. The left section of the aft spar was fractured in two pieces, the inboard piece approximately 4 feet long and the outboard piece approximately 2 feet long. The outboard end of the inboard piece and the outboard piece were twisted forward.

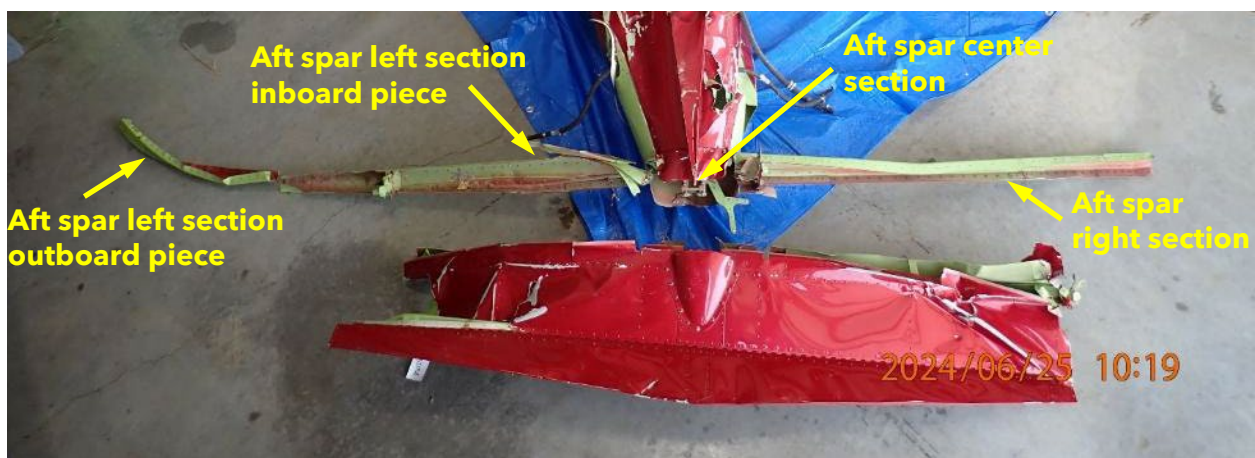


Figure 23. Horizontal stabilizer with the elevator upside down (NTSB photo)

3.3.2 Vertical Stabilizer

The vertical stabilizer separated from the airplane into three main sections, the vertical stabilizer, the aft spar, and the rudder (figure 24). The vertical stabilizer had bending deformation to the right and the trailing edge was splayed open where the aft spar separated. The forward attach bolt was intact in the vertical stabilizer, and the fuselage fitting was pulled through. The aft spar had an aftward deformation at the fracture point and additional aft bending along its length. The rudder was mostly intact with bending deformation to the right.



Figure 24. Vertical stabilizer, aft spar and rudder (NTSB photo)

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