

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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STRUCTURES

Group Chair's Factual Report

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A ACCIDENT

Location: Marianna, AR
Date: May 12, 2024
Time: 1956 Central Standard Time
0056 Coordinated Universal Time (UTC) May 13, 2024
Airplane: Piper Aircraft Inc PA-46-500TP, N241PM

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-46-500TP airplane is a single engine turboprop airplane originally certified in 2000 (figure 1). The airplane is equipped with a conventional tail and retractable tricycle landing gear. The airplane is 29.6 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 17 feet. The airplane primary and secondary wing, fuselage, and tail structure are of all metal construction, primarily aluminum alloys. The accident airplane, N241PM, was acquired by Bryant's Aviation Inc in February 2009.

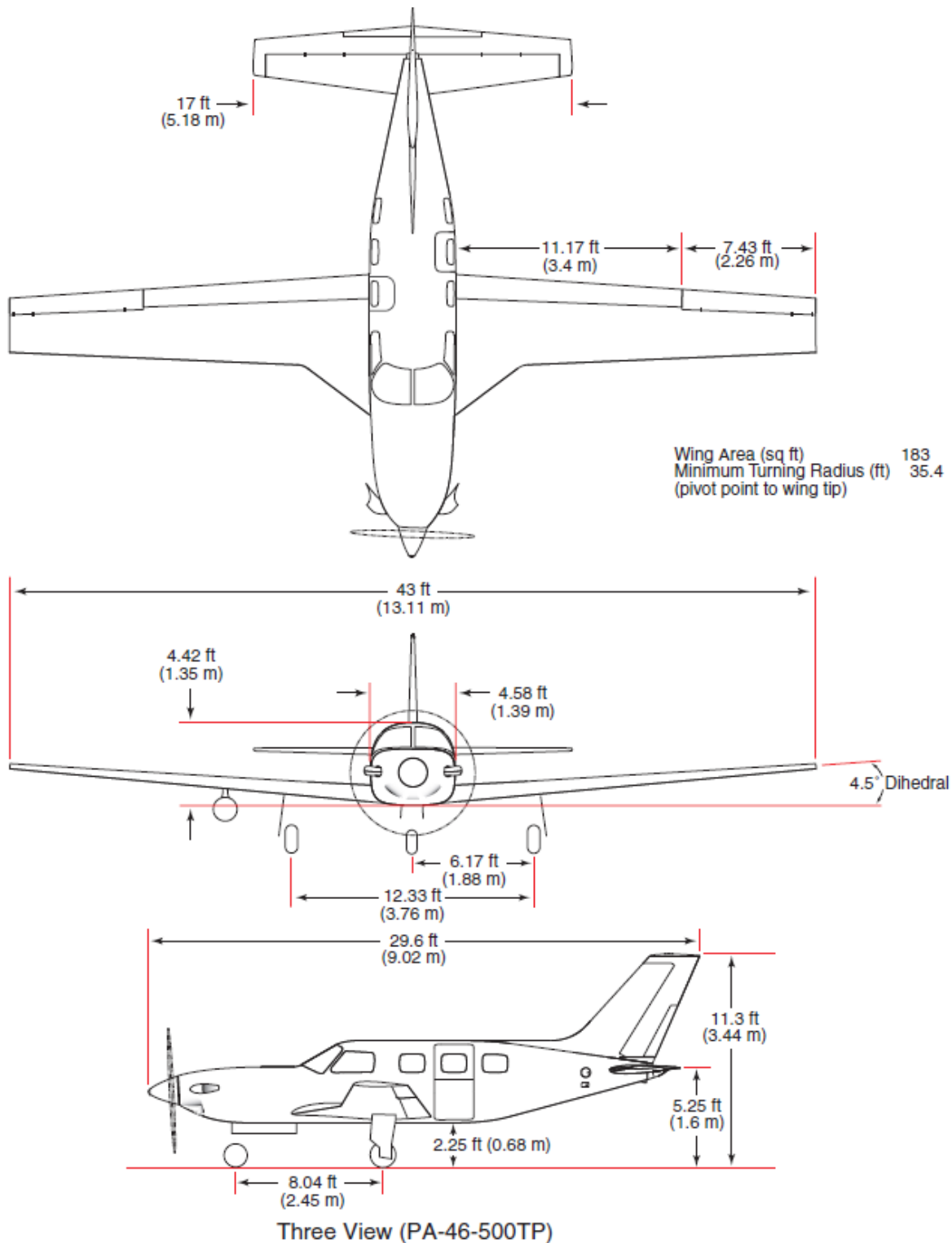


Figure 1. Three-view diagram (provided by Piper)

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 and water lines (WL) define locations along the vertical axis (figure 3). The FS origin (FS 0.00) is located 100.00 inches forward of the forward pressure bulkhead of the airplane and the WL origin (WL 0.00) is located 50.00 inches below the main floor. 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.

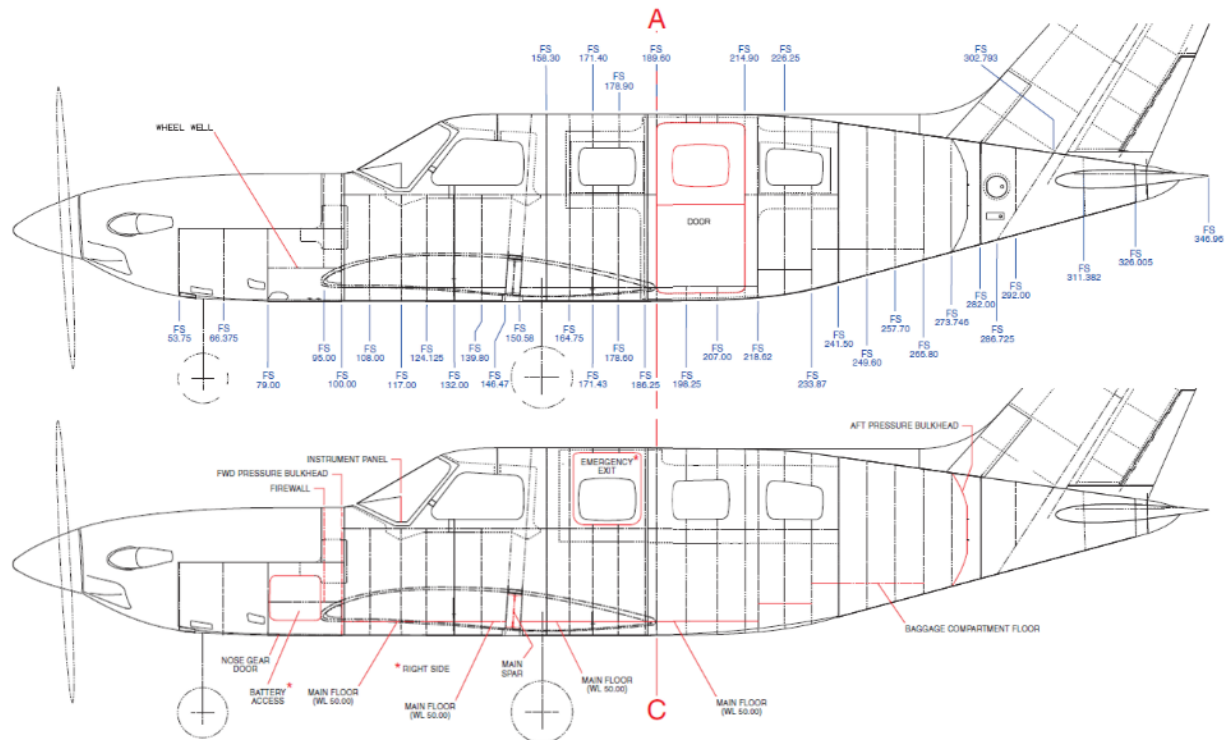


Figure 2. Fuselage station diagram (provided by Piper)

Wing stations (WS) are reference planes parallel to the airplane longitudinal axis (Figure 3). The WS origin (WS0.00) is located at the centerline of the airplane. The wing stations generally align with wing rib locations.

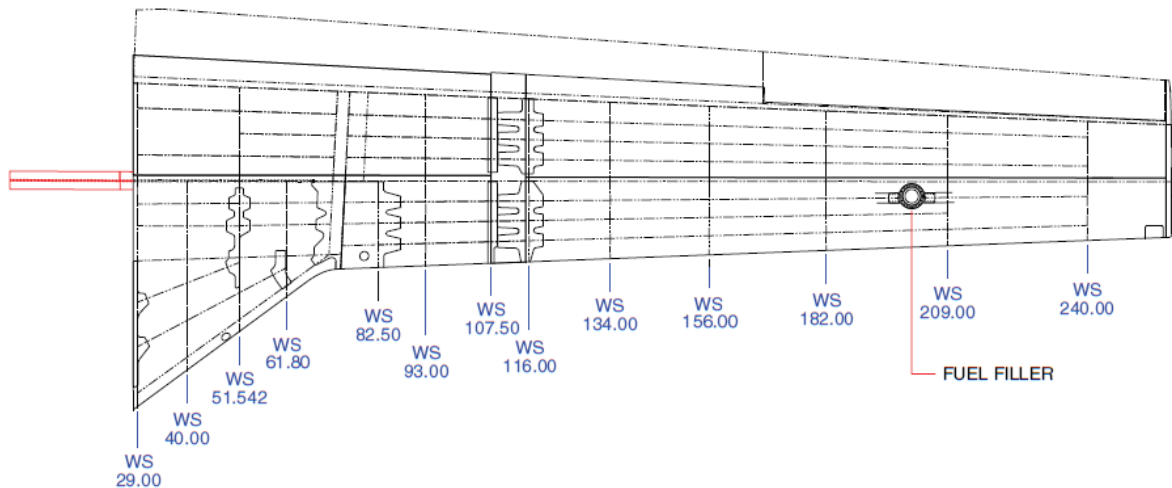


Figure 3. Wing station diagram (provided by Piper)

2.0 Accident Site

The wreckage was located in a sparsely populated agricultural area (figure 4). The fuselage came to rest on a 010° heading. The left wing was detached at the wing root and was found near the fuselage in two pieces. The inboard portion of the left wing was found about 30 ft and 281° from the main wreckage, and the outboard portion of the left wing was found about 80 ft and 353° from the main wreckage. The inboard portion of the right wing was fractured at the wing root and found partially under the fuselage. The engine was attached to the engine mount and embedded in the ground.



Figure 4. Final portion of the flight path and accident site. (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 which was separated into 2 major pieces. Both wings separated from the airplane near WS 108 and both inboard wing sections separated from the airplane at the wing root (WS 29.00). The left horizontal stabilizer, vertical stabilizer, flaps, ailerons, elevator, and rudder separated from the airplane during the event. The left and right inboard wing sections and the left outboard wing section were recovered. The outboard half of the left flap and aileron separated from the wing and were recovered. The inboard half of the left flap remained attached to the inboard section of the wing. Most of the right horizontal stabilizer was recovered. The outboard section of the right wing, right flap and aileron, left horizontal stabilizer, vertical stabilizer, and rudder were not 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.

3.1 Fuselage

The fuselage had significantly more damage to the right side than the left consistent with the airplane landing on that side (figures 5 and 6). Cuts were made along the left side of the fuselage during recovery to separate it and were not related to the event.



Figure 5. Wreckage on site (NTSB photo)



Figure 6. Event airplane right side (left) and left side (right) (NTSB photos)

A portion, 55 inches long, of the main spar center section remained attached to the fuselage (figure 7). The spar was rotated aft on the right side bringing the left side forward. At both fractured ends, the main spar was deformed upward. The main spar also had 4 puncture holes through the web at least 4 inches each in diameter. The outboard holes were spaced about 9 inches from the inboard holes, and the two inboard holes were spaced about 16 inches from each other.



Figure 7. Fuselage (NTSB photo)

The right upper side of the fuselage had rubber transfer marks on the skin about 17 inches long with subsequent smaller marks towards the top and aft of the fuselage (figure 8).



Figure 8. Right side fuselage skin with rubber transfer mark (NTSB photo)

3.2 Right Wing

The right wing inboard section separated from the airplane. It was resting partially under the airplane at the accident site and had significant impact damage and deformation (figure 9). The right wing inboard section was fractured into 3 major pieces. The largest piece fractured about WS 29, at the wing root, and extended to near WS 100 on the main spar and WS 108 on the aft spar. The second piece was about 8 inches of the aft spar that extended from WS 108 to WS 116. The third piece extended from about WS 100 to about WS 136 on the main spar and from about WS 116 to about WS 128 on the aft spar. There was a partial fracture of the main spar near WS 108. The overall deformation of the right wing inboard section was in an upward direction.



Figure 9. Right wing inboard section (NTSB photo)

The right wing outboard section was not recovered.

3.3 Left Wing

The left wing inboard section separated from the airplane and was recovered near the main wreckage (figure 10). The left wing inboard section fractured near WS 29, at the wing root, and extended to about WS 108 at the main and aft spars. There was significant crushing damage to the inboard forward corner of the wing. The accordion-like crushed section extended from about WS 29 to about WS 58. The upper skin had buckling damage that extended to the end of the section.



Figure 10. Left wing inboard section (NTSB photo)

At the WS 108 fracture, there was no obvious deformation of the forward spar but there was upward deformation of the aft spar and skin. The inboard half of the left flap remained attached to the inboard section of the wing. The flap section was deformed upwards and separated from the wing at the outboard flap track.

The left outboard wing section separated from the airplane near WS 108 and was recovered (figure 11). The flap and aileron separated from the left wing and were recovered. The outboard wing was bent upward, and extended the full length of the section (figure 12).



Figure 11. Left wing outboard section (NTSB photo)



Figure 12. Left wing outboard section spar deformation (NTSB photo)

The left outboard half of the left flap separated from the airplane and was recovered (figure 13). The flap was complete but separated in half, at about 77 inches from the outboard end. The outboard section buckled and fractured at the flap track attach points. The inboard half of the flap remained attached to the inboard section of the wing.



Figure 13. Left flap outboard section (NTSB photo)

The left aileron separated from the airplane and was recovered (figure 14). The aileron was mostly intact with some buckling and impact damage noted. The aileron hinges fractured from the wing structure. There was over travel impact damage at the aileron hinge locations.



Figure 14. Left Aileron (NTSB photo)

3.4 Empennage

The left horizontal stabilizer, elevator, vertical stabilizer, and rudder were not recovered.

3.4.1 Horizontal Stabilizer

The right horizontal stabilizer remained partially attached to the fuselage on scene but was separated during recovery (figure 15). The stabilizer had buckling and impact damage. Both forward and aft spars were deformed upward at the fracture location and near the midspan location.



Figure 15. Right Horizontal Stabilizer (NTSB photo)

A section of the horizontal stabilizer aft spar, about 30 inches long, remained attached to the fuselage (figure 16). The spar caps were deformed upwards at the fracture locations. The elevator trim actuator remained attached to the aft spar.



Figure 16. Horizontal stabilizer aft spar (NTSB photo)

3.4.2 Vertical Stabilizer

The vertical stabilizer separated from the fuselage. The forward attach point was pulled through and the aft spar was deformed aft (figure 17).



Figure 17. Vertical stabilizer attach locations (NTSB photo)

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