



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Central Region

DATE September 19, 2023

Wreckage Examination Summary

CEN23FA412

NTSB IIC Mike Folkerts

FAA: Brent Allen, Fargo FSDO

Party Members

Air Tractor: Dakota Lowe & Stephan Nelle

A. ACCIDENT

Location: New Rockford, North Dakota

Date: September 19, 2023

Aircraft: N502NB Air Tractor, AT-502B, SN: 502B-2814

Hobbs: 4396.9

NTSB IIC: Michael Folkerts, Damian Galbraith

B. SUMMARY

On September 19, 2023, about 1232 central daylight time, an Air Tractor AT-502B, N502NB, was substantially damaged when it was involved in an accident near New Rockford, North Dakota. The pilot was fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 137 Agricultural flight.

Examination of the airframe and engine were conducted at the accident site on September 20, 2023, by NTSB IIC, FAA, and Air Tractor representatives.

Examination of the airplane revealed no anomalies that would have precluded normal operation prior to impact of the power lines. Flight control continuity was established from the cockpit to the flight control surfaces through impact separations. Torsional deformation to the engine and rotational damage to the propeller were consistent with producing power during impact with terrain. There was no data recovered for the Garmin or SATLOC units. The power company calculated the height of the impacted power line at 26.8 ft above ground level. The airplane was applying roundup to the field of sunflowers that were about 5 ft tall. The distance between the power line and the tops of the sunflowers was estimated to be about 21.8 ft. The airplane's flight profile is 13.75 ft. With the airplane's profile, the clearance between the tops of the sunflowers and the power line was about 8 ft.

C. DETAILS OF THE INVESTIGATION

Accident Site Information

The airplane impacted a powerline during a low-level aerial application pass about 1/4 mile east of the main wreckage. The airplane impacted the ground inverted in about a 45° nose down attitude and came to rest on about a 175° magnetic heading about 15 ft southeast of its ground impact point. A postimpact fire ensued in the accessory case area of the engine which was extinguished by first responders. The accident site was a relatively flat cultivated field with about 8' standing corn (see figure 1). Numerous corn stalks exhibited 45° separations consistent to that of a propeller strike were noted near the initial ground impact area (see figure 2). An odor consistent to that of jet fuel was observed at the main wreckage area. All major component of the airplane were identified and located at the main wreckage area. Majority of the wire deflector cable and a section of the upper vertical stabilizer were separated from the airplane and not observed during the examination. The separated section of the vertical stabilizer, with about an 8-inch section of the wire deflector attached, was later located just east of the stricken powerlines by the landowner in October. About 2 inches of the wire deflector cable remained attached to its

forward attach point; deformation consistent to that of tension overload were noted to this section of the wire deflector cable. The separated end of the wire deflector cable attached to the section of vertical stabilizer exhibited a splayed, broomstrawed appearance, consistent to that of tension overload separation. About 154-inches or 12.83 ft of the wire deflector cable was not recovered.



Figure 1: Annotated photograph of the accident site (Wreckage Photo NTSB & Vertical Stabilizer Photo by FAA)

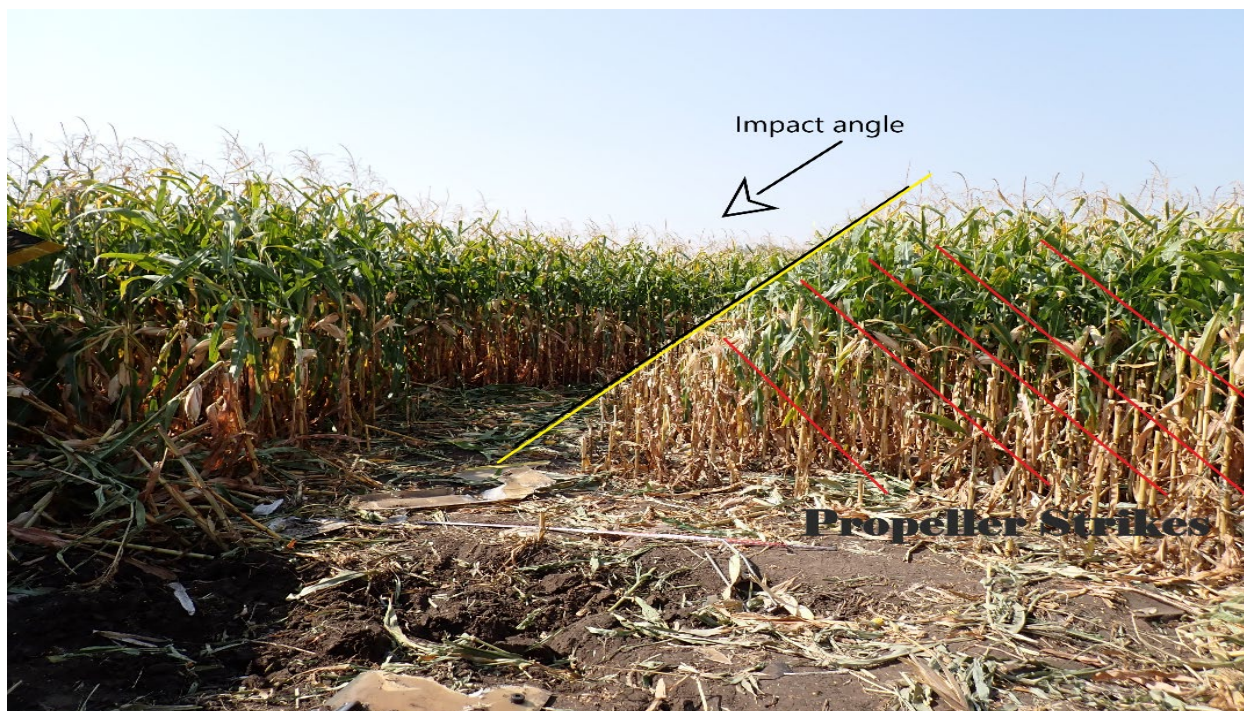


Figure 2: Annotated photo of the impact angle (NTSB Photo)

Airframe Examination

The fuselage exhibited impact damage and its tubular structure was fragmented forward of the cockpit area. The airplane was equipped with five-point AmSafe inflatable restraints (airbags). The restraints remained attached to their mounts and were deployed; the seat belt was latched with its crotch belt fitting present but not latched. The webbing of the left lap belt and left shoulder harness were cut by first responder. The seat and its seat rails remained attached to their respective mounts with impact damage noted. The power and propeller levers were found in the full forward position. The fuel condition lever was found between the ground and flight idle position.

Flight control continuity was established from the cockpit to all flight control surfaces through impact separations.

The left and right horizontal stabilizers exhibited impact damage and were partially separated from their supporting structure. The left and right elevators remained attached to their respective mounts. The vertical stabilizer was partially separated from its supporting structure and about 10" of its upper area was separated and not located during the examination; the wire deflector cable which attached to the separated section was not located. The cable's forward nicopress sleeve remained attached to its forward attach point; the nicopress sleeve was deformed and the separated ends of the cable were consistent with tension overload.

The rudder was separated from its mounts and located underneath the left wing. The rudder's flight control cables remained attached to their respective mounts and were both separated about 6" from their rudder attach points. The separated cable ends exhibited a splayed, broomstrawed appearance, consistent to that of tension overload separation. A linear impression consistent to that of a powerline impact were noted to the rudder's upper area and the leading edge of the vertical stabilizer. A semi-circle impression was observed at the bottom area of the rudder as well as a puncture in the aluminum structure about 2" from the semi-circle impression. Further examination revealed that the impression and puncture lined up with the tailwheel housing. Furthermore, yellow transfer marks consistent to that of the rudder's paint were noted on the tailwheel housing. The puncture hole in the rudder as previously stated, correlated to the tailwheel housing's grease zikr fitting.

The left and right wings remained attached to the fuselage and exhibited leading edge impact damage with upward deformation. The right fuel tank was breached from impact forces. The right fuel tank appeared intact, and a residual amount of fuel was observed within; the tank's supply line to the engine was fractured from impact forces. A strong smell of Jet-A fuel was observed in the vicinity of the wings.

The left and right ailerons remained attached to their respective attached points with impact damage noted. The left and right flaps remained attached to their respective attach points and were noted in the "up/0°" position.

Engine and Propeller Examination.

Make: Pratt & Whitney Model: PT6A-34AG

Serial #: PCE-PH0748 Engine Build Spec: 975

The engine remained attached to the fragmented engine mount. Thermal damage from the post-impact fire was observed contained to the accessory area of the engine. The fire was extinguished by first responders. There was no evidence of an in-flight fire observed. The exhaust duct case exhibited torsional deformation consistent to that of impact with a mid to high power setting.

The Hartzell three-bladed aluminum propeller remained attached to the engine propeller shaft flange. The propeller spinner was fragmented. Two propeller blades remained attached, and one was separated from the hub. All three propeller blades exhibited varying degrees of leading-edge damage, S-type bending and longitudinal twisting. One propeller blade was fractured in two sections near its outboard area and about a 5-inch section of the blade's tip was not observed during the examination.

Additional Information

The onboard SATLOC G4 system device was recovered from the airplane and shipped to the NTSB Vehicle Recorder's Laboratory for download. The NTSB laboratory reported that the exterior of the SATLOC unit was in fair condition, but interior examination revealed thermal damage to its main board. Microscope imaging of the controller chip revealed localized overheating. Therefore, no data pertinent to the flight was recovered. A Garmin Aera 510 was recovered from the airplane and retained by the NTSB for field download. The download revealed that there was no data pertinent to the accident flight.

A representative from the Western Area Power Administration reported that, on September 19, 2023, at 1231 central daylight time, their dispatch center received notice that their power line relayed, auto reclosed and relayed again. They left the line open and dispatched personnel to investigate the power line. The inspection revealed no damage to the power line and the power was returned to service. The investigation of the anomaly revealed that the airplane impacted the lower power line and caused the conductors to gallop and contact each other, which triggered the initial relay. The representative further stated that, the numbers provided are accurate with the caveat that the engineer estimated the added temperature due to loading. The conductor would have been at least at the ambient temperature, if there was no load on the line. The most accurate measurement of the line above the ground would be 26.8 ft at 90° Fahrenheit, which was taken directly where the arrow in the image below is (see figure 3).

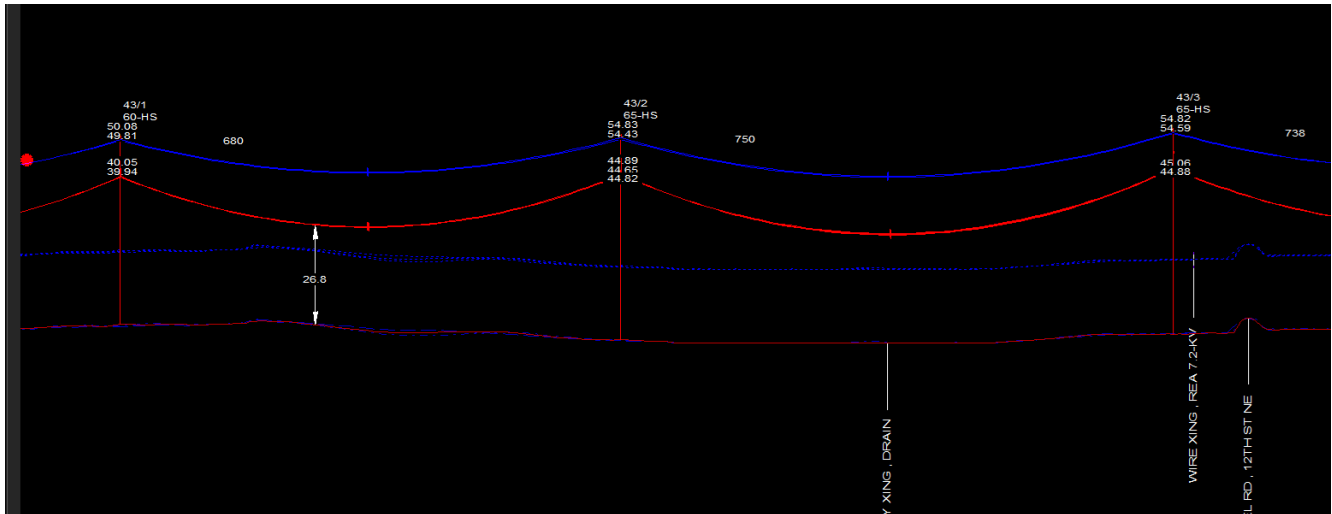


Figure 3: Photo of the calculated distance between the power line and the ground (Photo provided by Western Area Power Administration)

According to Air Tractor, the length of the wire deflector is 164-inches or 13.67 ft and is made of a 5/32-inch diameter MIL-DTL-83420, Type I – non-jacketed wire rope, Composition B – corrosion resistant steel cable, rated to a minimum breaking strength of 2,400 pounds. The Air Tractor model AT-502B has a level flight profile of 165-inches or 13.75 ft (see figure 4).

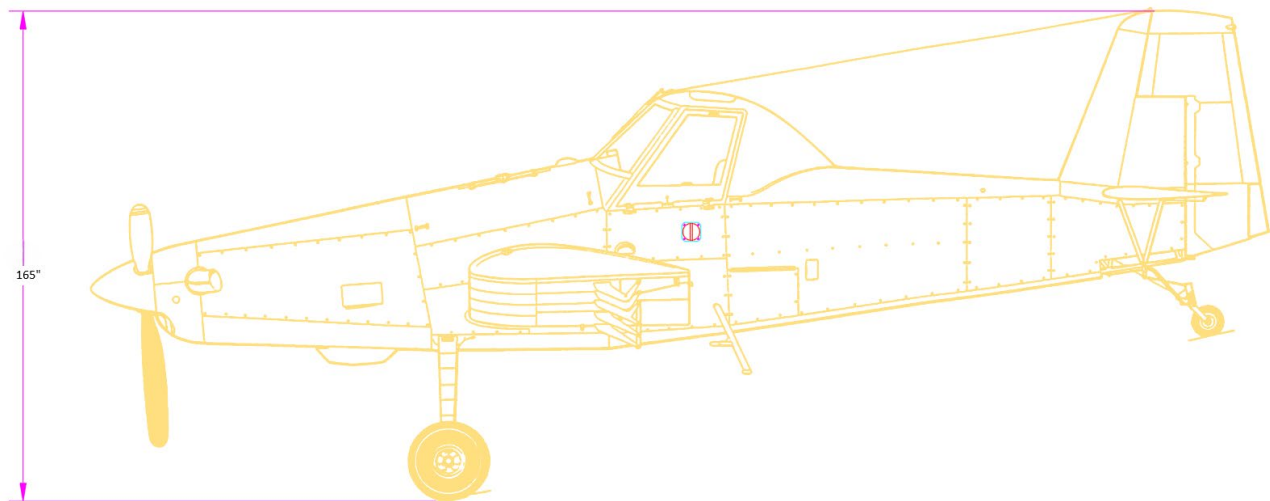


Figure 4: Air Tractor AT-502B level flight profile (Photo Provided by Air Tractor)