



The National Transportation Safety Board

Office of Aviation Safety
Central Region
Memorandum for the Record
Airframe Examination
Findings
CEN18LA270
Bismarck Illinois
July 13 2018

On site examination of the airframe and flight controls were conducted by the FAA and Air Tractor. The following findings were reported to and reviewed by the NTSB:

The accident site was located about 800 feet east of the edge of a corn field. There were some large trees along a fence line about 125 feet to the north of the impact site. These trees showed no signs of impact or damage. There were no large trees, electric lines, or transmission towers noted between the accident site and the field that the pilot was spraying. There was no evidence of pre-impact or post-impact fire. There was no noticeable smell of jet fuel present at the scene. The aircraft data plate was missing. The Hobbs hour meter remained intact in the cockpit and showed 6,388.7 hours-time-in-service on the airframe. The engine power section revealed a serial number of PC-E 84242. The wreckage was found in an upright position with the fuselage leaning to the right and oriented toward the south. The forward fuselage was crushed in the upward and aft direction. There was no horizontal ground scar but there was an impression in the soybeans that indicated an initial impact location slightly southeast of the final wreckage location. See the figure below which shows the aircraft location (red) and ground scar location (green) overlaid on an undated satellite image of the field. The single red dot located to the northwest of the wreckage was the location of the rudder, which was found approximately 50 feet away from its proper location on the fuselage.



Fuselage

The fuselage sustained severe damage to all components forward of the cockpit area. The firewall, main landing gear attachments, and hopper were crushed and segmented by the impact forces. These components remained loosely attached to the fuselage wreckage. The aft fuselage showed evidence of crumpling of the fuselage structure between the cockpit and the vertical fin.

The cockpit overturn/rollover structure was intact and both cockpit doors were present. The forward wall of the cockpit and the windshield frame were intact, and the cockpit retained a survivable space. The windshield glass was laying adjacent to the fuselage wreckage. The seat pan was deflected downward. The cockpit floor structure was heavily segmented and deformed. The aircraft was equipped with a standard 4-point harness which was found unbuckled. The shoulder harness and lap belt were intact.

Landing Gear

The aircraft tailwheel spring and yoke remained attached to the aft fuselage. The tailwheel and axle were separated from the yoke and laying near the fuselage wreckage. The axle bolt remained installed in the axle but was sheared on both sides where it was attached to the yoke. The bearing housing on top of the tailwheel yoke showed signs of direct contact with the bottom of the rudder control horn. The main landing gear were located under the wing wreckage.

Wings

Both wings were substantially damaged. The wings showed impact damage primarily on the bottom sides of the wing. There was also crumpling damage to the leading edges on both wings. On both wings, the ailerons and flaps remained attached and installed. The ailerons and flaps exhibited deformation and damage. The wing center splice connection remained intact with all structural connections in place. Both wing fuel tanks were ruptured, and no fuel remained. The fuel caps were in place.

Empennage:

The righthand elevator and stabilizer were attached to the fuselage and to the V-strut. All three elevator hinge points were intact. The elevator and stabilizer exhibited a crease at the roughly 1/3-span and were bent upward. The left-hand horizontal stabilizer was attached to the fuselage at the aft spar connection. The forward spar connection was separated at the fuselage and the attach bolt remained in the fuselage lug. The left-hand elevator was separated from, and laying adjacent to, the horizontal stabilizer. The elevator was separated at all three hinge locations. The hinge hardware remained intact in the pivot points.

The vertical fin remained intact on the aft fuselage. The rudder was not attached to the vertical fin. The bottom of the rudder had contact marks consistent with the tailwheel and with the top of the bearing housing on the tailwheel yoke. These contact marks were consistent with upward travel of the tailwheel forcing the rudder upward. The rudder hinges showed signs of the rudder being forced upward. The righthand side of the rudder was punctured at a location consistent with the righthand elevator trim tab. These details were consistent with the rudder being ejected from the aircraft upon impact.

Flight Controls:

All flight control surfaces were located with the primary wreckage and in their expected locations within the wreckage. Flight control continuity was established to the extent possible.

Elevator Controls: The elevator controls are manually operated by steel and aluminum pushrods connecting the control stick to the elevator control horns through two control idlers. The elevator controls were found to be continuous from the control stick to the elevator horns. It was found that the elevator down-spring system was not installed on the airplane. According to the manufacturer, this system is a required system that increases the stability and improves the handling of the aircraft.

Rudder Controls: The rudder controls are manually operated by a pair of stainless-steel cables running from the rudder pedal assemblies to the rudder control horns. The rudder cables were attached to the rudder control horn at the bottom of the rudder. The control horn was heavily damaged and was no longer attached to the rudder. The control cables were continuous and were routed forward to the rudder pedal adjustment channels. The right-hand rudder adjustment channel was no longer attached to the rudder pedal. The left-hand rudder adjustment channel remained attached to the rudder pedal.

Aileron Controls: The aileron controls are manually operated by steel and aluminum pushrods connecting the control stick to the aileron control horns through a torque tube and multiple bell cranks and idlers. In addition, the AT-602 ailerons incorporate a drooping feature that lowers both ailerons in conjunction with deployment of the flaps. The aileron drooping controls are documented below under "Flap System". The primary aileron controls were heavily damaged due to impact forces and fuselage deformation, and were found to be continuous from the control stick to the ailerons.

It was found that the rudder-aileron interconnect system had been removed from the aircraft. According to the manufacturer, this system is a required aircraft system that is intended to improve the handling of the aircraft and to promote coordinated flying.

Flap System: The flap actuator was found and measured to have an extension of approximately 1.0". This extension corresponds to a 7-degree flap deflection. This flap deflection was within the recommended range used by Air Tractor pilots during the "ag turn" portion of the flight profile. The flap range on the AT-602 is 0 to 28 degrees. The flap torque tube was found to be continuous to the flap arms on both sides of the fuselage. The left-hand flap pushrod was separated in the threaded portion of the pushrod. The right-hand flap controls were not observed at the accident scene.

As with the aileron control system, the aileron drooping system was found to be heavily damaged due to impact damage and fuselage deformation. The right-hand flap drooping system was found to be continuous. The left-hand drooping system was found to be continuous except for one pushrod separation in the threaded area of the pushrod. All drooping system hardware was found to be installed and intact.

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