



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Eastern Region

February 14, 2022

AIRFRAME AND ENGINE EXAMINATION

ERA20LA217

EXAMINATION PARTICIPANTS:

Eric Alleyne
Air Safety Investigator IIC
National Transportation Safety Board

Michael Jones
FAA Inspector
Atlanta FSDO

Dakota Lowe
Air Safety Investigator
Air Tractor Inc.

Andre Spits
Air Safety Investigator
PWC

SUMMARY

Examination of the recovered airframe and engine was conducted on 6/29/2020 at the Atlanta Air Salvage, Griffin, GA. No evidence of preimpact mechanical malfunction was noted during the examination of the recovered airframe and engine.

DETAILS OF THE INVESTIGATION

The aircraft was confirmed to be N879JA, an Air Tractor model AT-502B, serial number 502B-2879 which was manufactured in 2013.

Airframe Examination

Examination of the airframe revealed the fuselage was found to have separated at the cockpit into three sections. The aft fuselage section contained the overturn structure, seat, and the fuselage aft of the cockpit. The aft fuselage section was found with crush damage to the lower frame. The lower fuselage section contained the cockpit floor, control stick and the wing mount locations. The lower fuselage section was found with severe crush damage. The forward fuselage section, containing hopper segments, the firewall and engine mount was found crushed aft and up. The preimpact position of the powerplant control levers could not be determined due to impact forces. Engine control continuity could not be established due to impact damage.

Both main gear springs were found separated from the fuselage. The left wheel/tire remained attached to the gear springs. The right wheel/tire was found separated from the gear spring. The tail gear was found attached at the empennage attach points without any significant damage.

The left wing and inboard section of the right wing remained connected at the inner splice, and to the frame. The left wing was found with aft crush damage to the leading edge and an upward and aft bow near the center. Both the left flap and aileron were found attached to the left wing.

The right wing was found separated from the fuselage. The right wing was found with crush damage to the leading edge in the aft direction. Both the right flap and aileron were found attached to the right wing.

Each of the wings were equipped to hold 85 gallons of fuel in the integral wing fuel tanks for a total of 170 gallons.

The vertical fin and rudder were found attached to the aft fuselage with minimal damage. Both horizontal stabilizers were found separated from the aft fuselage. The aft attach point for both horizontal stabilizers was found bent forward with elongated holes. Both horizontal stabilizers exhibited crush damage to the forward inboard corner. This damage is consistent with rapid forward deceleration which would cause the stabilizer to crush against the fuselage. The forward and lower attach points were separated consistent with overstress. Both elevators were found attached to the horizontal stabilizers.

All flight control surfaces remained attached to the appropriate locations. The flight controls were damaged, but flight control continuity was established to the extent possible by the condition of the wreckage. All observed separations were consistent with overstress or separation occurring during recovery of the airplane. The right aileron counterweight was not located in the wreckage. Damage was found to the aileron at the counterweight attach point. All other counterweights were found in place.

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 controls were found to be continuous from the control stick to the elevators, except for a separation in the for the aluminum pushrod forward rod end which was separated consistent with overstress.

The rudder controls are manually operated by a pair of stainless-steel cables running directly from the rudder pedal assemblies to the rudder control horns. Both rudder cables remained attached at the rudder control horn. The cables were traced forward and found to be separated aft of the rudder pedal. The left cable was found with a horse tail separation consistent with overstress. The left cable was found separated consistent with being cut. Both cables were found attached to the rudder pedal attach point.

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 bellcranks and idlers. In addition, the AT-502 ailerons incorporate a drooping feature that lowers both ailerons in conjunction with extension of the flaps. The aileron drooping controls are documented below under "Flap System".

The right aileron controls were continuous from the control stick to the aluminum wing mounted pushrod. The inboard rod end of the aluminum wing mounted pushrod was found to be separated consistent with overstress. The bellcrank was found separated from the fuselage. The inboard section of the wing mounted pushrod was found separated from the outboard section consistent with being cut. The right aileron controls shown to be continuous from the cut to the aileron by sympathetic movement of the pushrod when the aileron was moved.

The left aileron controls were found to be continuous from the control stick to the aluminum wing mounted pushrod. The inboard rod end of the wing mounted pushrod was found separated consistent with overstress. The left aileron controls were found to be continuous from the separation to the left aileron

The flap actuator was found to be an aftermarket hydraulic actuator. The actuator was found loosely attached to the flap torque tube mount. The actuator with a separation in the actuator rod. The controls were continuous from the torque tube to both flap control horns. The upper ear of both left and right torque tubes end plates were found fragmented. Both left and right fragments were found attached to the respective torque tube arms.

The aileron drooping system was found continuous except for a separation in the pushrod between the two right bellcranks. The pushrod between the two bell cranks was not found. Both rod ends of the pushrod were found attached in the appropriate locations with separations consistent with overstress.

Engine Examination

The powerplant was found attached to the engine mount. The engine exhibited impact damage. The engine was confirmed to be a Pratt & Whitney PT6A-34AG engine, serial number PCE-PH0177.

Examination of the engine revealed debris consisting of sticks, feathers and dirt was found on the outside of the air filter. This debris was found in the intake area, but the engine was also partially buried in the ground. The engine was equipped with three-bladed constant speed, fully reversible, propeller. Two of the blades were found to have separated from the propeller. One of the separated blades was not located in the wreckage.

The external condition of the engine revealed impact damage. The engine case was breached, and no oil was found within the engine. Examination of the engine oil filter screen revealed it was clean. Examination of the fuel system revealed that the system was breached, and no fuel was found within the system. The fuel filter screen was clean.

Examination of Reduction Gearbox (RGB) & Prop Shaft showed impact damage. The exhaust duct was buckled and warped. The engine C flange was partially separated. The Gas Generator Case was warped, and the Accessory Gearbox (AGB) showed impact damage from contact with airframe. The FCU and fuel pump were fractured off and separated from the AGB. The Power Control and Reversing Linkage was mangled from impact damage. The Pneumatic Lines Compressor Discharge Air (P3): The P3 line between the GGC and the FCU was secure. The power Turbine Control (Py): The Py line between the FCU and propeller governor was secure.

The Compressor inlet area including screen Limited borescope was done. No damage was observed to the 1st stage compressor blades. Examination of the Power Turbine (PT) revealed All the PT blades were fractured at various heights and several airfoil fragments were found in the exhaust case. The Compressor Turbine (CT) was Not accessed.