

**NATIONAL TRANSPORTATIONS SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594**

SUMMARY OF AIRCRAFT EXAMINATION

-- CEN18FA053 --

A. ACCIDENT

Location: Oldenburg, Indiana
Date: December 16, 2017
Time: 2057 eastern standard time
Aircraft: Cessna T210M (s/n 21062637), N761YZ

B. PARTICIPANTS

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Summary of Aircraft Examination

C. ACCIDENT SUMMARY

On December 16, 2017, at 2057 eastern standard time, a Cessna T210M airplane, N761YZ, impacted trees and terrain following a loss of engine power near Oldenburg, Indiana. The pilot, pilot-rated passenger, and passenger were fatally injured. The airplane was destroyed by impact forces and a postimpact fire. The airplane was registered to N761YZ LLC and operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Dark night visual meteorological conditions prevailed along the route of flight, and the flight was operated on an instrument flight rules (IFR) flight plan. The flight originated from the Columbus Municipal Airport (BAK), Columbus, Indiana, at 2039 and was destined for the Frederick Municipal Airport (FDK), Frederick, Maryland.

D. AIRCRAFT DESCRIPTION

Airframe

The accident airplane, a Cessna T210M, was a single-engine, high-wing, six-place configuration with a retractable tricycle landing gear design. It incorporated a conventional flight control arrangement. The flight control surfaces were directly actuated by control cables from the cockpit controls. The accident airplane was issued a normal/utility category standard airworthiness certificate in July 1978.

Engine / Propeller

The airplane was equipped with a 310-horsepower Continental TSIO-520-R engine. This engine incorporated a horizontally-opposed, six-cylinder, turbocharged, air-cooled design configuration. Thrust was provided by a three-blade McCauley D3A34C402B/90DFA-10 constant speed (variable pitch), hydraulically actuated propeller assembly. The engine and propeller were controlled through direct linkages from the cockpit controls to the engine throttle body and propeller governor.

E. DETAILS OF AIRCRAFT EXAMINATIONS

An on-scene examination was conducted on December 17, 2017. The engine was recovered to the Batesville Airport (HLB) for further examination on December 18th. All examinations were completed by or under the direct supervision of an NTSB investigator. Textron Aviation and Continental Motors provided on-scene technical support as parties to the investigation.

F. DESCRIPTION OF ACCIDENT SITE

The accident site was located in a wooded ravine about two miles north of the Batesville airport at 39.3725 degrees north latitude / 085.2481 west longitude. Tree heights were 80 to 100 feet. The debris path was oriented on an approximate 315-degree magnetic bearing. The initial tree strike was about 70 feet above ground level and located about 190 feet southeast of the main wreckage at 39.37206 degrees north latitude / 085.24756 degrees west longitude.

The main wreckage consisted of the fuselage, right wing, and engine. The right-wing tip had separated and was located in a tree at the initial impact point. A right aileron fragment was located along the debris path about 147 feet southeast of the main

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F. DESCRIPTION OF ACCIDENT SITE *(concluded)*

wreckage. The left wing was separated and located about 53 feet from the main wreckage. The empennage and propeller had both separated and were located adjacent to each other about 32 feet southeast of the main wreckage.

G. SUMMARY OF AIRCRAFT EXAMINATIONS¹

Airframe – Cessna T210M (s/n 21062637)

The fuselage came to rest inverted. The lower fuselage nose structure was intact; although, it exhibited sooting and was damaged by a post-accident fire. The cockpit and cabin areas were consumed by the fire, and the lower center fuselage section was partially consumed by the fire. The left cabin door had separated from the fuselage and was located about 20 feet northwest from the main wreckage. The door appeared to be otherwise intact.

The firewall and the aft portion of the engine exhibited fire damage. The engine remained attached to the engine mount and the mount remained attached to the firewall. The lower engine cowling remained attached. The upper engine cowling was partially separated. The cowl flaps remained attached and were in the closed position. The nose landing gear was in the retracted position. The nose landing gear doors remained attached and were in the closed position.

Both pilot seats were consumed by the fire. The rear seat bench frame remained attached to the airframe structure. The seat covering and cushion material were consumed by the fire. The main landing gear was in the retracted position. The wheels remained attached to the struts; however, the tires had been consumed by the fire.

The instrument panel and instrumentation were destroyed by the fire. The left control column was damaged by the fire and the control wheel was consumed. The control column remained attached to the elevator torque tube. The landing gear and flap selector handles were in the up position. The fuel selector was thermally damaged. It was separated from the airframe but located in the cockpit area of the fuselage debris. Examination and disassembly of the selector determined that it was set to the right fuel tank. The throttle quadrant was separated from the panel and retained by the control cables. The throttle, mixture, and propeller control cables remained attached to their respective control levers and were continuous to the engine. The throttle and mixture control levers were bent toward the throttle body.

The elevator control cables remained attached to the cockpit control torque tube and were continuous to the aft fuselage bellcrank. The bellcrank had separated from the airframe structure. The push-pull tube remained attached to the bellcrank. The push-pull tube had separated mid-way between the fuselage and the elevator bellcranks. The rudder pedals and torque-tube remained attached to the airframe. The rudder cables remained attached to the torque tubes and were continuous to the aft fuselage. The cable separations at the aft fuselage appeared consistent with overload. An aileron cable segment, about 6-feet in length, was retained at the left door post. The turnbuckle and swaged cable end were

¹ Directions related to accident site placement and component damage/deformation are with respect to an intact airframe unless otherwise noted.

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G. SUMMARY OF AIRCRAFT EXAMINATIONS *(continued)*

intact. A second aileron cable segment, about 4 feet in length, was retained at the firewall. The cable separations appeared consistent with overload.

The left wing had separated from the fuselage near the wing root and came to rest inverted. The structure was deformed adjacent to the separation and exhibited sooting consistent with the fire. In addition, the wing exhibited leading edge crushing and a semi-circular impression consistent with a tree impact located about 3 feet from the wing tip. The wing section containing the fuel tank had separated from, and was located adjacent to, the remainder of the wing. The fuel cap was secure. Blue tinted liquid consistent in appearance and odor to 100-low lead aviation fuel was present in the fuel tank.

The inboard portion of the left wing was located with the main wreckage. The inboard section of the wing spar remained attached to the carry-through spar. The separation at the inboard end of the wing spar appeared consistent with overload. The flap actuator appeared intact. The flap cable segments remained attached to the actuator. The actuator extension was approximately 4.4 inches, which was consistent with a flaps-up position.²

The outboard portion of the left aileron remained attached to the wing; it was deformed and exhibited sooting consistent with the fire. The aileron bellcrank was intact and the push-pull tube remained attached. The aileron control cables remained attached to the bellcrank and were continuous to the inboard end of the wing section. The flap remained attached at the mid and outboard hinges; it was deformed and exhibited sooting consistent with the fire. The inboard and outboard flap bellcranks appeared intact. The bellcrank push-pull tube remained attached to the bellcranks but was separated at the inboard rod end. The separation appeared consistent with overload. The bellcrank-to-flap push-pull tubes were intact.

The right wing was located with the fuselage and was partially consumed by the fire. The wing spar remained attached to the carry-through spar. The wing tip had separated and was located at the initial impact point. The inboard portion of the aileron remained attached to the wing. The outboard portion of the aileron had separated and was located in the debris path. The aileron bellcrank appeared intact. The push-pull tube from the bellcrank to the aileron was attached and intact. The aileron control cables remained attached to the bellcrank and were continuous to the wing root. The wing flap was consumed by the fire. The flap control cables were continuous from the actuator to the right bellcrank. The push-pull tube from the bellcrank to the flap appeared to be attached to the bellcrank; however, a concentration of melted aluminum covered the end of the tube. The flap attachment bracket remained attached to the push-pull tube; however, the bracket had separated from the flap. The fuel cap was securely installed.

The aft fuselage and empennage has separated approximately in-line with the leading edge of the elevators. The empennage was deformed and exhibited sooting. Both horizontal stabilizer leading edges exhibited crushing damage. The rudder and elevators remained attached to the vertical and horizontal stabilizers, respectively. Rudder cable segments, approximately 6 inches in length, remained attached to the rudder horns. The cable separations appeared consistent with overload. The elevator bellcrank had

² Flap position was provided by Textron Aviation based on the observed flap actuator extension.

Summary of Aircraft Examination

G. SUMMARY OF AIRCRAFT EXAMINATIONS *(continued)*

separated; the mounting flange attached rivets appeared to have failure due to shear loads. The elevator push-pull tube remained attached to the bellcrank; the tube has separated about 1-foot forward of the bellcrank consistent with overload. The trim tab remained attached to the elevator. The control chain was intact and was retained by the sprocket. The trim tab was positioned about 5 degrees trailing edge down. The trim actuator extension was approximately 1.5 inches, which corresponded to the 5-degrees trailing edge down position.³

Engine – Continental TSIO-520-R9B (s/n 269562)

Propeller – McCauley D3A34C402B/90DFA-10 (s/n 803339)

The engine came to rest inverted and remained attached to the firewall and cockpit area. The aft end of the engine sustained fire damage. The front, right side of the engine sustained impact damage, with embedded dirt and debris. The intake filter was consumed by the fire. The filter bracket and induction ducting to the turbocharger compressor inlet was thermally damaged.

All rockers and valve springs appeared to be intact and well lubricated. The pistons were intact except for the no. 4 piston, which was missing a portion of the piston face and a compression ring. The cylinders, remaining pistons and valves exhibited mechanical damage consistent with impact (peening) damage from the piston and ring fragments; otherwise, the cylinders appeared to be intact. Mechanical (peening) damage to the no. 4 cylinder appeared to be more extensive than to the remaining cylinders. Examination of the induction and exhaust system revealed a significant amount of metallic debris, consistent with piston and piston ring material, in the intake balance tube and the exhaust system. No debris was observed within the oil sump.

The turbocharger compressor inlet was free of obstructions and the compressor rotated freely. Removal of the tailpipe from the turbocharger outlet flange and wastegate revealed metallic debris, consistent with piston ring material, at the wastegate valve. The turbine wheel sustained mechanical damage to the blade tips. The compressor impeller did not exhibit any foreign object damage. The oil lines to and from the turbocharger bearing were intact.

The intercooler remained attached to the engine. The overboost valve remained secured to the intake ducting. No anomalies consistent with a pre-impact failure were observed with respect to the intercooler or overboost valve. The pressure controller was separated from the engine and the housing was partially melted. The oil lines to and from the wastegate actuator remained attached to the wastegate actuator. The intake tube transition into the throttle body was thermally damaged. The intake elbow on the left side was partially consumed by the fire. The intake manifolds and risers appeared intact, except for the no. 5 intake riser which was fractured and embedded with dirt. The oil cooler was separated.

The fuel system components remained in place and attached to the engine, though all sustained thermal damage. The fuel hoses were also thermally damaged. The fuel injector nozzles were free of obstructions or blockage.

³ Trim tab position was provided by Textron Aviation based on the observed trim actuator extension.

Summary of Aircraft Examination

G. SUMMARY OF AIRCRAFT EXAMINATIONS *(concluded)*

The magnetos remained attached to the engine. The left magneto appeared intact; the right magneto mounting flange was fractured adjacent to a mounting point. Rotation of the left magneto drive shaft produced a spark from each of the leads at the ignition harness cap in firing order; the impulse coupling appeared intact. Rotation of the right magneto drive shaft did not produce a spark; the impulse coupling appeared intact. Partial disassembly of the right magneto revealed thermal damage to the capacitor wire. Subsequent rotation of the drive shaft resulted in a spark at the points during each engagement of the impulse coupling. The ignition harness was thermally damaged. The ignition leads remained attached to their respective sparkplugs. The spark plugs appeared intact, except for the no. 3 and no. 4 upper sparkplugs. They had sustained mechanical damage that deformed and displaced the outer electrodes.

The vacuum pump was removed and disassembled. The component exhibited thermal damage and could not be rotated. The coupling was melted. The rotor and vanes appeared intact.

The propeller had separated from the propeller flange; the propeller bolts remained attached to the crankshaft. The three propeller blades remained attached to the hub; the spinner was dented on one side. The blades were labeled with their relative hub position; 1, 2, and 3. Each blade rotated in the hub, consistent with a fracture of the pitch change link. Blade 1 was bent aft about 12 inches outboard from the shank. The trailing edge displayed wave-like warping. The tip had a chord-wise scrape and gouge. Blade 2 appeared intact. Blade 3 was bent forward slightly at the mid-span. It displayed light paint erosion and scrapes in the mid-span area. The propeller hub was cracked around the Blade 1 shank, but the crack was irregular in shape and did not display any pre-accident evidence of leakage.