

National Transportation Safety Board

Office of Aviation Safety

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AIRCRAFT EXAMINATION SUMMARY

May 1, 2023

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A. ACCIDENT

Location: Lewisville, AR
Date: May 1, 2023
Time: 1700 Local
2200 UTC
Airplane: Titan Tornado II, N31311

B. AIRCRAFT EXAMINATION SUMMARY

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C. SUMMARY

On-site examination of an experimental light sport Titan Tornado II airplane. According to witness information and an examination of the accident site, the airplane impacted trees and terrain in a heavily wooded marsh shortly after departing a private airstrip in Lewisville, AR. Federal Aviation Administration (FAA) inspectors were present to participate and assist. The examination revealed no pre-accident mechanical anomalies that would have precluded normal operation of the aircraft.



Figure 1: Accident airplane overview

D. DETAILS OF THE EXAMINATION

1.0 Accident Site

The airplane impacted trees and terrain (Lat/Long: +033.265673° / -093.574788°) in a heavily wood marsh about .14 nautical miles south of a private airstrip. The accident site location was consistent with a left crosswind after takeoff to downwind leg of the airplane traffic pattern. The airplane fuselage and left wing came to rest on a slight terrain rise above the surrounding partially wet marsh. The right wing was separated during contact with a tree and located in the crown of the tree about 80' above ground level. The accident flight path was on a 100° heading about a 61° nose down attitude.

The fuselage came to rest on the right side against a large pine tree with a small pine tree through the entire fuselage lengthwise. The small pine tree was observed to be broken at the trunk with lead bird shot ballast weight covering the fracture area. A large witness mark was observed on the trunk of the large pine tree that was consistent with the large semicircular crush impact damage on the left-wing leading edge. Several smaller witness marks were observed lengthwise along the tree consistent with fuselage impact. A large ground depression at the base of the large pine tree was observed that was consistent with impact of the left-wing tip.



Figure 2: Tree damage and fuselage location

The left-wing was separated at the root and came to rest upright adjacent to the left side of the fuselage. The left-wing was observed to have crush damage along the entire leading edge and damage consistent with tree and ground impact.

The right-wing was located in the pine tree about 80 ft from the main wreckage and on a heading of 280° from the fuselage. The wing was about 80 ft above ground level. A large semi-circular impact mark was noted near the wing root, consistent with a large tree impact. The pine tree displayed contact marks consistent with the wing damage. Fragmented wing Styrofoam was embedded within the tree damage and scattered near the base of the tree to the main wreckage.

Multiple cut branches were noted on multiple trees that was consistent with propeller blade strikes.

2.0 Airframe Examination

2.1 Fuselage

- No issues noted. The fuselage tubular frame structure was bent, distorted, and crushed in numerous areas. The forward and rear seats remained partially attached to the tubular structure.



Figure 3: Fuselage

2.2 Empennage

- No issues noted. The empennage structure was wrinkled and bent in numerous location consistent with the impact sequence.

Stabilator

- No issues noted. The right side was bent upwards and buried in the marsh. The left side displayed skin wrinkling and crush damage along the leading edge. Attached with free movement. Flight control continuity was established from the surface with no separations to the control sticks. The trim tab remained attached to the control surface.

Vertical Stabilizer and Rudder

- No issues noted. The vertical stabilizer and rudder had multiple areas of crush damage. Rudder was attached with free movement. Flight control continuity was established from the surface with no separations to the cockpit rudder controls.



Figure 4: Empennage

2.3 Wings

Right Wing

- No issues noted. Wing separated at root with fracture surfaces consistent with overload failure. Multiple witness marks from tree impacts were present on all surfaces. Crush damage on the lower surface with witness marks consistent with tree impact at about a 45° angle from the root leading edge to midspan of the flap. Crush damage along the entire leading edge. Skin wrinkling on all surfaces.
- Crush damage to the outboard portion beyond midspan and wing tip surfaces. The right wing was located in the canopy of a large pine tree prior to the tree being cut to recover the wing.
- Flight control continuity was established to flap and aileron. The flap torque tube and aileron push/pull tube were pulled from the wing and remained attached to their respective center driver at the left wing. The aileron turnbuckle, at the tip of the tube, rivets were pulled against the direction of wing failure with damage consistent with overload.



Figure 5: Right wing after recovery from the tree

Right Flap

- No mechanical issues noted. Crush damage midspan on the lower surface with witness marks consistent with tree impact. Skin wrinkling on all surfaces. Remained attached to the wing.

Right Aileron

- No mechanical issues noted. Remained attached to the wing. Control tube was pulled from the structure and remained with the left wing structure.

Left Wing

- No issues noted. Wing separated at root with fracture surfaces consistent with overload failure. Crush damage along entire leading edge with a semicircular crush damage into the structure of the wing at midspan. Numerous witness marks from tree and ground impact. Wrinkling was noted on all surfaces. Wing tip found separated with crush damage along leading edge and came to rest adjacent to the main wreckage.
- Flight control continuity was established for the flap and aileron to the fuselage separation. The right-wing flap torque tube and aileron push/pull tube remained connected to fuselage center driver. The fuselage center drivers were separated with fractures consistent with overload from its respective tubes.



Figure 6: Left wing

Left Flap

- No mechanical issues noted. The outboard hinge was separated, and the flap was bent underneath the wing with crush damage.

Left Aileron

- No mechanical issues noted. Attached with free movement.

2.4 Landing Gear

- Remained attached to the fuselage structure.

2.5 Cockpit

- The cockpit tubular structure and fuselage skin panels displayed significant crush damage and fragmentation. All flight instruments were attached to the instrument panel with impact damage on multiple instruments. Flight controls and engine controls were attached and had free movement.
- AvMap EFIS Ultra, S/N 6020**Obscured**, was recovered and sent to the NTSB Vehicle Recorder Lab for possible data recovery. Pitot Static connectors were found to be finger loose during removal of the instrument.
- GRT Engine Information System Model 2000, S/N 9491, was recovered and sent to the NTSB Vehicle Recorder Lab for possible data recovery of the last engine parameters.

2.6 Survivability

- Cockpit structure compromised and destroyed. Forward and rear seats remained partially attached to the structure. The forward 4-point seat restraint was found cut and separated from the structure. The cuts were consistent with rescue/recovery efforts.

2.7 Fuel/Fuel System

- An unknown quantity of automobile-type fuel was observed in the fuel tank. When partially disassembled, the engine driven fuel pump contained fuel within the pump, in the output line to the carburetors, and in the intake fuel line. Fuel was also present in the fuel pump diaphragm.
- A strong fuel odor consistent with automotive fuel was present at the accident site.

2.8 Other Systems

- Emergency Locator Transmitter (ELT) was found in the on position and actively transmitting. No reports of a signaling ELT were received from the rescue coordination centers.



Figure 7: ELT activation light.

3.0 Engine Examination

- The throttle cable was found attached to carburetor and cockpit throttle control.
- The engine crankshaft rotated freely with no mechanical issues noted.
- Removed cylinder rocker covers and observed valve movement on all cylinders when the propeller was manually rotated.
- Mechanical continuity noted throughout the engine when propeller was manually rotated.
- Air intake filters observed to be discolored/dirty.

4.0 Propeller Examination

- Blade A (labeled for documentation purposes) remained attached to the hub with delamination noted in the carbon fiber structure.
- Blade B and C were found separated from the hub at the root with fragmentation of the carbon fiber structure.
- Separated blade sections were located within the debris field.
- Damage to blades was consistent with power at impact with the tree canopy and subsequent tree branches.



Figure 8: Propeller Hub

5.0 Pilot Information

- Christopher Wayne Bailey, residence in Haynesville, Louisiana.
- No pilot certificate or medical certificate were found on file with the FAA.

6.0 Aircraft Information

- Titan Tornado II, N31311 S/N D99912SOHK0356. Airplane Airworthiness Certificate issued shows an Experimental Operating Light Sport Aircraft built by Titan Aircraft with a date of manufacture of 2007.

7.0 Meteorological Information

- Multiple accident witness stated that the wind was very gusty with periods of calm in between the strong gusts.
- METAR KAGO 302155Z AUTO 28009G15KT 250V320 10SM CLR 25/06 A2981 RMK A01=

Submitted by:

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