The accident pilot and a friend flew in the friend’s airplane to pick up the accident airplane after recent repairs were completed due to a previous ground loop event in 2016. The accident pilot’s friend and the mechanic observed the airplane during the takeoff. The airplane accelerated straight and normal and flew "cleanly" off the turf runway. Shortly after rotation, the airplane rolled left until the airplane impacted trees in a near inverted attitude adjacent to the runway. The mechanic stated that he thought the airplane experienced a departure stall during the takeoff. A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The witness observations are consistent with the pilot’s loss of control after exceeding the airplane’s critical angle of attack during takeoff, which resulted in a power-on, aerodynamic departure stall.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's loss of control after exceeding the airplane’s critical angle of attack during takeoff, which resulted in an aerodynamic stall.

Findings

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Angle of attack - Not attained/maintained (Cause)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel issues</td>
<td>Aircraft control - Pilot (Cause)</td>
</tr>
</tbody>
</table>
On April 12, 2017, about 1250 eastern daylight time, a Temco GC-1B airplane, N2377B, impacted trees and terrain shortly after takeoff from the Williams Flying Field Airport (24IN), Hartsville, Indiana. The commercial pilot sustained fatal injuries, and the airplane sustained substantial damage. The airplane was registered to and operated by the pilot as a Title 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed at the time of the accident, and a flight plan was not filed. The flight was originating at the time of the accident and was destined for the Shelbyville Municipal Airport (GEZ), Shelbyville, Indiana.

The accident pilot and a friend flew in the friend's airplane to 24IN to pick up the accident airplane. Repairs and maintenance had recently been completed on the accident airplane following a ground loop event in June 2016. After arriving at 24IN, the accident pilot and a mechanic (who was also a pilot) inspected the repairs and reviewed the airplane records. The mechanic provided about 3 to 4 gallons of fuel, which filled the tanks to about 1/2 full. The accident pilot asked the mechanic to perform a few takeoffs and landings with him; the mechanic declined as he had concerns with weight and balance, he was not a flight instructor, and he was unsure of the accident pilot's flight experience. The mechanic suggested the pilot fly to GEZ, which has a longer, hard surface runway, to practice some maneuvers.

Before takeoff, the accident pilot, who had not flown the airplane since the ground loop event, took a few minutes to re-familiarize himself with the cockpit and preflight the airplane. The friend then went to his airplane to prepare for departure. After about 5 minutes, the pilot signaled to the friend that he was experiencing a problem with the radios. In addition, they also noted a "light misfire at idle" with the engine. The pilot performed a brief engine run-up and the misfire was corrected. The pilot and friend then decided to fly to GEZ and resolve the radio issue at that airport and obtain additional fuel. The pilot then taxied ahead of his friend and positioned the airplane to depart on runway 2.

The accident pilot's friend, located in his airplane, and the mechanic, located adjacent to the runway, observed the airplane depart 24IN. According to the friend, the airplane accelerated straight and normal and flew "cleanly" off the ground. Shortly after rotation, about 35 ft above ground level (agl), the airplane rolled left as it continued to climb to about 75 ft agl, at which time the wings were near vertical. The left roll continued until the airplane impacted trees in a near inverted attitude adjacent to the runway.

The mechanic estimated that the airplane rotated about 60 knots, climbed to about 20 ft and then began to roll left; he estimated the airplane struck trees about 85 to 90 knots. He also stated that he thought the airplane experience a departure stall during the takeoff.
Pilot Information

<table>
<thead>
<tr>
<th>Certificate:</th>
<th>Commercial</th>
<th>Age:</th>
<th>77, Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airplane Rating(s):</td>
<td>Single-engine Land; Single-engine Sea</td>
<td>Seat Occupied:</td>
<td>Left</td>
</tr>
<tr>
<td>Other Aircraft Rating(s):</td>
<td>None</td>
<td>Restraint Used:</td>
<td>4-point</td>
</tr>
<tr>
<td>Instrument Rating(s):</td>
<td>Airplane</td>
<td>Second Pilot Present:</td>
<td>No</td>
</tr>
<tr>
<td>Instructor Rating(s):</td>
<td>None</td>
<td>Toxicology Performed:</td>
<td>Yes</td>
</tr>
<tr>
<td>Medical Certification:</td>
<td>Class 3 With Waivers/Limitations</td>
<td>Last FAA Medical Exam:</td>
<td>05/31/2016</td>
</tr>
<tr>
<td>Occupational Pilot:</td>
<td>No</td>
<td>Last Flight Review or Equivalent:</td>
<td>06/19/2015</td>
</tr>
<tr>
<td>Flight Time:</td>
<td>(Estimated) 1397 hours (Total, all aircraft), 64 hours (Total, this make and model)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The pilot’s friend reported that he’d known the pilot for over 25 years. He stated the pilot had over 50 years of flying experience, owned multiple land and amphibian airplanes, and built several experimental airplanes.

The pilot’s logbook indicated the pilot had recorded one flight in another airplane for 0.3 hours since the ground loop.

Aircraft and Owner/Operator Information

<table>
<thead>
<tr>
<th>Aircraft Make:</th>
<th>TEMCO</th>
<th>Registration:</th>
<th>N2377B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model/Series:</td>
<td>GC 1B</td>
<td>Aircraft Category:</td>
<td>Airplane</td>
</tr>
<tr>
<td>Year of Manufacture:</td>
<td>1948</td>
<td>Amateur Built:</td>
<td>No</td>
</tr>
<tr>
<td>Airworthiness Certificate:</td>
<td>Normal</td>
<td>Serial Number:</td>
<td>3677</td>
</tr>
<tr>
<td>Landing Gear Type:</td>
<td>Retractable - Tailwheel</td>
<td>Seats:</td>
<td>2</td>
</tr>
<tr>
<td>Date/Type of Last Inspection:</td>
<td>04/04/2017, Annual</td>
<td>Certified Max Gross Wt.:</td>
<td>1975 lbs</td>
</tr>
<tr>
<td>Time Since Last Inspection:</td>
<td>1 Hours</td>
<td>Engines:</td>
<td>1 Reciprocating</td>
</tr>
<tr>
<td>Airframe Total Time:</td>
<td>2624 Hours as of last inspection</td>
<td>Engine Manufacturer:</td>
<td>Continental</td>
</tr>
<tr>
<td>ELT:</td>
<td>C91A installed, not activated</td>
<td>Engine Model/Series:</td>
<td>IO-360-C</td>
</tr>
<tr>
<td>Registered Owner:</td>
<td>SAGAERT REN C</td>
<td>Rated Power:</td>
<td>215 hp</td>
</tr>
<tr>
<td>Operator:</td>
<td>On file</td>
<td>Operating Certificate(s) Held:</td>
<td>None</td>
</tr>
</tbody>
</table>
The two-seat, low-wing, retractable-gear tailwheel airplane, serial number 3677, was manufactured in 1948. It was powered by a Continental IO-360-D, 215-horsepower engine, equipped with a controllable-pitch two-blade propeller. The airplane was registered to the pilot on September 12, 2012.

According to the airplane records and the mechanic who performed the repairs, as a result of the ground loop, the airframe, engine, and propeller were all repaired. Airframe repairs were completed on the landing gear system, lower fuselage skin, a wing rib, right flap and right aileron. For transport to the repair facility, the outboard wing sections were removed, and the wing sections and aileron control cable connection were reassembled during the repairs.

The engine was disassembled for a propeller strike inspection and overhauled by a repair station per manufacturer specifications.

According to airworthiness records, the airplane had Cessna 150 seats installed in 1972. Per the records, Cessna factory seat rails and reinforcements were used in the installation.

### Meteorological Information and Flight Plan

<table>
<thead>
<tr>
<th>Conditions at Accident Site:</th>
<th>Visual Conditions</th>
<th>Condition of Light:</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation Facility, Elevation:</td>
<td>BAK, 656 ft msl</td>
<td>Distance from Accident Site:</td>
<td>10 Nautical Miles</td>
</tr>
<tr>
<td>Observation Time:</td>
<td>1245 EDT</td>
<td>Direction from Accident Site:</td>
<td>270°</td>
</tr>
<tr>
<td>Lowest Cloud Condition:</td>
<td>Clear</td>
<td>Visibility</td>
<td>10 Miles</td>
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<tr>
<td>Lowest Ceiling:</td>
<td>None</td>
<td>Visibility (RVR):</td>
<td></td>
</tr>
<tr>
<td>Wind Speed/Gusts:</td>
<td>Calm /</td>
<td>Turbulence Type</td>
<td>/</td>
</tr>
<tr>
<td>Wind Direction:</td>
<td></td>
<td>Forecast/Actual:</td>
<td>None</td>
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<tr>
<td>Altimeter Setting:</td>
<td>30.4 inches Hg</td>
<td>Temperature/Dew Point:</td>
<td>15°C / 2°C</td>
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<tr>
<td>Precipitation and Obscuration:</td>
<td>No Precipitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departure Point:</td>
<td>Hartsville, IN (24IN)</td>
<td>Type of Flight Plan Filed:</td>
<td>None</td>
</tr>
<tr>
<td>Destination:</td>
<td>Shelbyville, IN (GEZ)</td>
<td>Type of Clearance:</td>
<td>None</td>
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<tr>
<td>Departure Time:</td>
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<td>Type of Airspace:</td>
<td>Class E</td>
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Airport Information

<table>
<thead>
<tr>
<th>Airport:</th>
<th>Williams Flying Field Airport (24IN)</th>
<th>Runway Surface Type:</th>
<th>Grass/turf</th>
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<tbody>
<tr>
<td>Airport Elevation:</td>
<td>745 ft</td>
<td>Runway Surface Condition:</td>
<td>Dry</td>
</tr>
<tr>
<td>Runway Used:</td>
<td>2</td>
<td>IFR Approach:</td>
<td>None</td>
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<tr>
<td>Runway Length/Width:</td>
<td>3200 ft / 150 ft</td>
<td>VFR Approach/Landing:</td>
<td>None</td>
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</table>

Wreckage and Impact Information

<table>
<thead>
<tr>
<th>Crew Injuries:</th>
<th>1 Fatal</th>
<th>Aircraft Damage:</th>
<th>Substantial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Injuries:</td>
<td>N/A</td>
<td>Aircraft Fire:</td>
<td>None</td>
</tr>
<tr>
<td>Ground Injuries:</td>
<td>N/A</td>
<td>Aircraft Explosion:</td>
<td>None</td>
</tr>
<tr>
<td>Total Injuries:</td>
<td>1 Fatal</td>
<td>Latitude, Longitude:</td>
<td>39.236389, -85.693056 (est)</td>
</tr>
</tbody>
</table>

Examination of the accident site revealed that the airplane impacted several trees and came to rest inverted in a tree-covered ravine. The main wreckage, which consisted of the fuselage, left and right wings, empennage, and engine, came to rest at the base of a large tree. The left wing displayed several semi-circular impacts, consistent with tree strikes. The two-blade propeller hub was fractured and remained partially attached to the crankshaft; both blades were separated from the hub. One propeller blade came to rest adjacent to the forward fuselage, and one propeller blade was located about 150 ft west of the main wreckage. Both propeller blades displayed bending and twisting deformation.

On May 3, 2017, at the facilities of AMF Aviation, Springfield, Tennessee, the National Transportation Safety Board investigator-in-charge, representatives of Continental Motors and the Swift Museum Foundation, LLC, examined the airplane. Examination of the hydraulic power package showed the landing gear valve was in the landing gear extended position. The flap valve was in the flaps retracted position, and the flap actuator rod was extended, which was consistent with a flaps retracted condition. Flight control continuity was established to all flight control surfaces. The aileron balance cable was separated near the center section, and the cable ends were broomstrawed which was consistent with an overload failure. A "Saf-T-Stop" seat track stop was installed on the left seat’s right seat track. The seat track stop was secured and no evidence of movement or slippage was noted on the stop or seat track.

The engine was separated from the airframe during recovery from the wooded terrain. The engine oil sump and accessory case were fractured, and wood debris was embedded between the camshaft gear and the crankcase. The fuel system components remained attached to the engine, and the fuel lines remained attached to their respective fittings. The throttle, mixture, and propeller control cables remained attached to their respective components and control levers.
Medical And Pathological Information

On April 13, 2017, at Columbus Regional Hospital, Columbus, Indiana, an autopsy was performed on the pilot. The listed cause of death was blunt force injuries as a result of an accident.

The Federal Aviation Administration's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on the pilot. The tests were negative for cyanide and all screened drugs.

Administrative Information

<table>
<thead>
<tr>
<th>Investigator In Charge (IIC):</th>
<th>Aaron M Sauer</th>
<th>Adopted Date:</th>
<th>05/24/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Participating Persons:</td>
<td>Chris Austin; Federal Aviation Administration; Indianapolis, IN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nicole Charnon; Continental Motors; Mobile, AL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publish Date:</td>
<td>05/24/2018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note:</td>
<td>The NTSB traveled to the scene of this accident.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigation Docket:</td>
<td><a href="http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=94994">http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=94994</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.