



National Transportation Safety Board Aviation Accident Final Report

Location:	Towanda, PA	Accident Number:	ERA17FA248
Date & Time:	07/19/2017, 1130 EDT	Registration:	N601PH
Aircraft:	AIRCRAFT MFG & DVLPM T CO CH601XLi SLSA	Aircraft Damage:	Destroyed
Defining Event:	Aerodynamic stall/spin	Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The student pilot had just completed a 20-minute local flight and had returned to the airport to conduct touch-and-go takeoffs and landings. During the pilot's second touch-and-go landing, witnesses reported that the engine seemed to be producing partial power during the initial climb and the airplane appeared to stall and recover three times during climb out. As the pilot continued to climb, he bypassed several areas off the departure end of the runway and north and west of the extended runway centerline in which to conduct a forced landing in an open field. The airplane made a shallow turn to the right, then, about 1.5 miles southwest of the airport, it made left a turn south. The pilot declared an emergency over the airport's common traffic advisory frequency, stating that he was attempting to return to the runway; the airplane continued to turn left towards rising terrain. During the turn, the left wing dropped and the airplane descended at a steep angle into trees and rising terrain. The airplane's ballistic recovery system was activated; however, it could not be determined if it was deployed before impact or if accident dynamics caused activation of the system. Examination of the wreckage did not reveal any evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation; however, the scope of the examination was limited due to thermal damage.

The weather conditions at the time of the accident were in the area of a carburetor icing probability chart that was conducive to the formation of serious carburetor icing at descent power and light carburetor icing at cruise or descent power. The pilot operating handbook for the airplane required the application of carburetor heat before landing. If the pilot did not apply carburetor heat during the approach and landing, carburetor ice may have formed, and when he added power for the subsequent takeoff, the engine power would have been reduced. However, the carburetor heat lever could not be functionally tested due to impact and thermal damage, so it could not be determined whether the pilot used the carburetor heat or not; thus the reason for the partial loss of engine power could not be determined. Suitable off airport landing locations were available on the extended runway centerline and to the northwest of the extended runway centerline; however, the pilot elected to turn south toward rising terrain. The

pilot subsequently exceeded the airplane's critical angle of attack while attempting to return to the airport following the partial loss of engine power, resulting in an aerodynamic stall and loss of control.

The pilot had significant heart disease with an enlarged heart, aortic valve replacement, and some arrhythmia that required treatment with a pacemaker, all of which put him at increased risk for sudden incapacitation. However, his heart disease would not have affected his decision-making nor his ability to respond to an inflight emergency, and there is no evidence that his heart disease contributed to the accident.

Probable Cause and Findings

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

A partial loss of engine power for reasons that could not be determined based on the available information, and the pilot's exceedance of the airplane's critical angle of attack during an attempted return to the airport, which resulted in an aerodynamic stall and loss of control. Contributing to the accident was the pilot's decision to return to the airport following a partial loss of engine power.

Findings

Aircraft	Angle of attack - Capability exceeded (Cause)
Personnel issues	Aircraft control - Pilot (Cause) Decision making/judgment - Pilot (Factor)
Not determined	Not determined - Unknown/Not determined (Cause)

Factual Information

History of Flight

Initial climb	Loss of engine power (partial) Aerodynamic stall/spin (Defining event)
Uncontrolled descent	Collision with terr/obj (non-CFIT)

On July 19, 2017, at 1130 eastern daylight time, an Aircraft Manufacturing & Design (AMD) CH601XLi special light sport airplane (S-LSA), N601PH, was destroyed when it collided with terrain shortly after takeoff from Bradford County Airport (N27), Towanda, Pennsylvania. The student pilot, who was also the owner of the airplane, was fatally injured. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight, which departed about 1110.

Several witnesses at N27 reported that the pilot departed the traffic pattern for a 20-minute local flight before returning to the airport to perform touch-and-go landings on runway 23. The first touch-and-go appeared normal. During takeoff following the second touch-and-go landing, the engine seemed to be producing partial power during initial climb; one witness reported, "It was clearly behind the power curve." The airplane climbed on runway heading and the airplane "stalled and recovered three times." The airplane made a shallow turn to the right, then, about 1 1/2 miles southwest of the airport, it made a shallow left turn south towards rising terrain. Shortly thereafter, the pilot declared an emergency over the airport's common traffic advisory frequency, stating that he was attempting to return to the airport. The pilot continued the left turn back toward the airport. During the turn, the left wing dropped; the airplane descended at a steep angle and impacted trees and rising terrain. Witnesses observed the airframe ballistic parachute rocket deploy immediately before seeing black smoke from the accident site.

Pilot Information

Certificate:	Student	Age:	53, Male
Airplane Rating(s):	None	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	None None	Last FAA Medical Exam:	
Occupational Pilot:	No	Last Flight Review or Equivalent:	04/14/2016
Flight Time:	(Estimated) 21.5 hours (Total, all aircraft), 21.5 hours (Total, this make and model)		

The pilot, age 53, held a student pilot certificate. He did not possess a Federal Aviation Administration (FAA) medical certificate, nor was he required to in order to operate the light sport airplane.

The pilot's logbook was not recovered. According to his flight instructor, the pilot mentioned that he had lost his previous flight records. They started flying together on September 20, 2016; when the pilot accumulated 19 hours of dual instruction, on November 17, 2016, he was given a 90-day solo flight endorsement. On April 10th and 14th, 2017, he received an additional 1.2 and 1.0 hours of instruction, respectively, and a new 90-day solo endorsement, which expired 3 days before the accident.

Aircraft and Owner/Operator Information

Aircraft Make:	AIRCRAFT MFG & DVLPM T CO	Registration:	N601PH
Model/Series:	CH601XLi SLSA	Aircraft Category:	Airplane
Year of Manufacture:	2007	Amateur Built:	No
Airworthiness Certificate:	Experimental Light Sport	Serial Number:	601-040S
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	09/16/2016, Condition	Certified Max Gross Wt.:	1320 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	264.7 Hours as of last inspection	Engine Manufacturer:	CONT MOTOR
ELT:	Installed, not activated	Engine Model/Series:	O-200
Registered Owner:	On file	Rated Power:	100 hp
Operator:	On file	Operating Certificate(s) Held:	None

The airplane was issued a special airworthiness certificate for S-LSA on July 18, 2007. According to FAA airworthiness records, the pilot purchased the airplane on January 6, 2014. The airplane was an all-metal, side-by-side, two-seat, fixed landing gear airplane equipped with a Continental O-200, 100-horsepower engine driving a Sensenich two-bladed wooden propeller. According to the airframe maintenance logbook, the most recent condition inspection was performed on September 16, 2016, at 264.7 total airframe hours and no discrepancies were noted. The previous condition inspection was conducted on August 15, 2015, at 258.2 total airframe hours and no discrepancies were noted. On July 5, 2013, an oil analysis was conducted, and the findings indicated wear consistent with normal operation.

The airplane was equipped with a Ballistic Recovery Systems, Inc. (BRS) emergency parachute recovery system installed in the rear baggage compartment.

Two days before the accident flight, the pilot fueled the airplane with 18.79 gallons of 100LL aviation fuel. The airplane held a total of 30 gallons of fuel between two wing tanks, 28 gallons of which were usable. The pilot then conducted a 20-minute local solo flight. The airplane was not flown again until the day of the accident.

The AMD Pilot Operating Handbook (POH) for the accident airplane make and model specified the following approach and prelanding procedures:

Auxiliary Fuel Pump...ON
Mixture.....RICH
Carburetor Heat.....ON
Flaps..... AS Required
Speeds..... As Required
Harness.....Tight
Lights..... As Required

The Emergency Procedures section of the POH stated:

Engine roughness is usually due to carburetor icing, which is indicated by a drop in RPM, and may be accompanied by a loss of airspeed or altitude. If too much ice is allowed to accumulate, restoration of full power may not be possible; therefore, prompt action is required.

Pull carburetor heat on. RPM will decrease slightly, and roughness will increase. Wait for a decrease in engine roughness and increase in RPM, indicating ice removal.

Additionally, the POH described expanded procedures in the event of an engine power loss during takeoff:

Any turn will increase the risk of a stall or stall spin, fatal at low altitude. Land as straight ahead as practical and maintain a safe airspeed and make only very shallow turn if necessary, to avoid obstructions...

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	ELM, 954 ft msl	Distance from Accident Site:	34 Nautical Miles
Observation Time:	1153 EDT	Direction from Accident Site:	140°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	7 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	230°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.07 inches Hg	Temperature/Dew Point:	28° C / 19° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	TOWANDA, PA (N27)	Type of Flight Plan Filed:	None
Destination:	TOWANDA, PA (N27)	Type of Clearance:	None
Departure Time:	1110 EDT	Type of Airspace:	Class G

At 1153, the weather conditions reported at Elmira/Corning Regional Airport (ELM), 32 miles northwest of N27, included a clear sky, wind from 230° at 7 knots, 10 statute miles visibility, temperature 28°C, dew point 19°C, and an altimeter setting of 30.07 inches of mercury.

An FAA carburetor icing probability chart indicated that the temperature and dew point conditions were in the area of the chart that was conducive to the formation of serious icing at descent power and light icing at cruise or descent power.

Airport Information

Airport:	BRADFORD COUNTY (N27)	Runway Surface Type:	Asphalt
Airport Elevation:	730 ft	Runway Surface Condition:	Dry
Runway Used:	23	IFR Approach:	None
Runway Length/Width:	4300 ft / 75 ft	VFR Approach/Landing:	None

The airport field elevation at N27 was 730 ft mean sea level. The single asphalt runway, oriented 05/23, was 4,301 ft long by 75 ft wide. The airport was not tower-controlled. The airport was situated in a valley between mountainous terrain (1,200 ft elevation) bordering the north and south of the airport and paralleling the runway. Off the departure end of runway 23, there was an open field in the runway overrun area that extended about 1/4 of a mile, and there were several open fields to the northwest that extended about 1 mile from the runway.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal	Latitude, Longitude:	41.718611, -76.463056

The airplane impacted steep, wooded terrain in an inverted attitude about 1 1/2 miles from the departure end of runway 23. All major components of the airplane were accounted for at the scene.

The forward fuselage, cockpit, and instrumentation were consumed by postimpact fire. Both wings were separated from the fuselage but were found in the immediate vicinity of the accident site. The empennage impacted a tree. The carburetor heat controls could not be examined due to impact and fire damage.

Control continuity was established from the cockpit to the flight control surfaces through several breaks consistent with overload separation and cuts made by first responders.

Continuity of the fuel system could not be confirmed. Both fuel tanks were breached; the right fuel tank exhibited thermal damage and the left fuel tank was heavily impact damaged. The fuel selector valve and fuel lines were damaged by impact forces and the postimpact fire; the selector position could not be determined.

The engine remained attached to its mounts and was found inverted. It exhibited postimpact fire and impact damage but remained largely intact. All cylinders remained attached to the crankcase. The engine could not be rotated by hand via the propeller hub or through the accessory section. The accessories were removed and the engine crankcase was opened to expose the crankshaft, camshaft, and valvetrain, revealing seized lifters consistent with exposure to high temperatures. There were no pre-impact anomalies noted with the crankshaft. The camshaft remained intact and displayed thermal damage consistent with the post-impact fire. All four pistons and their respective connecting rods showed normal wear and all overhead components (valves, valve springs, and rocker arms) displayed normal operating and lubrication signatures. The Nos. 1 through 4 main bearings showed discoloration consistent with a post-impact fire; no anomalies were noted. Several ounces of oil drained from the engine during the examination and all internal engine components appeared lubricated.

The left and right magnetos remained attached to their installation points and displayed thermal and impact damage. The ignition harness displayed impact and thermal damage to all ignition leads. The left and right magnetos did not produce spark at the leads when rotated; the housings of both magnetos were thermally damaged and partially melted and the internal

gears of both magnetos indicated damage when rotated.

All spark plugs remained installed in their cylinders. The top spark plugs were automotive style plugs and the bottom plugs were aviation plugs. When compared to the Champion Check-a-Plug chart, both sets of spark plugs and their respective electrodes displayed normal wear and signatures, although the top spark plugs were covered with oil consistent with the engine's inverted position following the accident.

The carburetor was removed for examination; it was thermally damaged. Both carburetor floats were melted and had separated from their attach points consistent with a post-impact fire. The needle valve remained intact and was capable of normal operation when manually operated. The fuel inlet screen was clear of any contaminants. There were no mechanical anomalies noted with the carburetor. The fuel pump was damaged by impact and fire; it was partially melted and deformed.

The oil filter was disassembled; the internal paper filter was damaged by heat and was heavily carbonized. No metal or ferrous material was found internally. The oil filter screen was clear and free from obstructions and no anomalies were noted. The oil sump remained attached and displayed impact and thermal damage. There were no anomalies noted with the oil sump. The oil pump was capable of rotation and displayed no anomalies.

The exhaust system displayed impact and thermal damage signatures. There were no signs of exhaust leaks.

The propeller displayed thermal and impact damage. One of the propeller blades fractured from the hub and was found 25 ft from the main wreckage. The second blade was destroyed by fire. The blade hub was exposed to significant heat and was heavily charred.

The BRS emergency airframe parachute deployed and was found immediately adjacent to the wreckage. The envelope was partially opened and suspended on tree branches about 40 ft above the ground. The suspension lines were connected to the parachute and suspended against several nearby trees and were damaged by heat. The BRS container was destroyed by impact forces and heat. Impact and fire damage to the cockpit precluded examination of the BRS handle.

Medical And Pathological Information

The Lourdes Hospital Department of Pathology, Binghamton, New York, performed an autopsy on the pilot and the report stated that the cause of death was severe thermal injury. A pacemaker was identified in the pilot's chest, but no data was recovered from the device. The pilot's heart was enlarged at 640 gm. Average for a man of his weight is 345 gm with a range of 261-455 gm. In addition, there was evidence of a surgical aortic valve replacement, but no evidence of coronary artery disease.

The FAA Forensic Sciences Laboratory performed toxicology testing on specimens from the pilot. The testing identified minoxidil in the urine but not in blood. Minoxidil is an antihypertensive drug which, when used topically, may cause hair re-growth. It is not generally considered impairing.

Additional toxicology testing by NMS Laboratories, Willow Grove, Pennsylvania, identified caffeine and 5% carboxyhemoglobin.

Administrative Information

Investigator In Charge (IIC):	Lawrence A Mccarter	Report Date:	04/20/2020
Additional Participating Persons:	David Sakmar; FAA; Harrisburg, PA Kurt Gibson; Continental; Mobile, AL		
Publish Date:	04/20/2020		
Note:	The NTSB traveled to the scene of this accident.		
Investigation Docket:	http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=95607		

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