
National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA577	09/02/2017 1730 EDT	Regis# N547CT	Newport, RI	Apt: Newport State UUU
Acft Mk/Mdl FLIGHT DESIGN GMBH CTLS-NO SERIES	Acft SN 08-01-18	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 912ULS	Acft TT 456	Fatal 0	Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: DOMENIC ESPOSITO	Opr dba:	Aircraft Fire: NONE		AW Cert: LTSP

Events

1. Landing - Abnormal runway contact
-

Narrative

The solo student pilot reported that, during the landing flare, he "felt an updraft" and the airplane landed hard. The airplane bounced, the nose landing gear struck the ground, bounced again, and the he performed a go-around. The student entered the traffic pattern and landed without further incident.

The student reported that, during the taxi to the ramp, the rudder pedals "felt funny". He added that, as he and the flight instructor put a cover over the airplane, he noticed the nose landing gear "looked funny". He requested a local mechanic examine the airplane, and then decided to send the airplane to a repair station to be repaired.

During the airplane repair, it was revealed that the airplane sustained substantial damage to the engine mounts.

The student reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

A review of recorded data from the automated weather observation station located on the airport reported that, about 30 minutes before the accident, the wind was from 180° at 8 knots. The same weather observation station reported that, about 23 minutes after the accident, the wind was from 190° at 5 knots. The airplane landed on runway 22.

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Accident Rpt# GAA18CA029	10/26/2017 900 PDT	Regis# N781SC	Mabton, WA	Apt: N/a
Acft Mk/Mdl SIX CHUTER WEST LLC LEGEND XL-NO	Acft SN 3172	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 912E	Acft TT 93	Fatal 0	Ser Inj 1	Flt Conducted Under: FAR 091
Opr Name: WILLIAM R. NELSON	Opr dba:	Aircraft Fire: NONE		
AW Cert: LTSP				

Events

2. Maneuvering-low-alt flying - Miscellaneous/other

Narrative

The pilot of the powered parachute reported that, during a biennial flight review, they descended to about 30 ft. above the ground to fly an arc around a field. While over the field, the powered parachute dropped another 10 to 15 ft. and he added power to compensate before initiating a left turn. He added that, during the turn, he saw transmission wires that neither he nor the flight instructor noticed prior. He applied full power and attempted a turn to avoid the wires. Subsequently, the powered parachute struck the transmission wires and impacted terrain.

The powered parachute sustained substantial damage to the fuselage. The pilot sustained serious injuries.

The flight instructor reported that there were no preaccident mechanical failures or malfunctions with the powered parachute that would have precluded normal operation.

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Accident Rpt# GAA18CA042	11/11/2017 700 PST	Regis# N141WC	Burlington, WA	Apt: Skagit Rgnl BVS
Acft Mk/Mdl STINSON SR 5E-UNDESIGNAT		Acft SN 9256A	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING R680-13		Acft TT 1313	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: NELSON, DON		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

2. Landing - Landing area overshoot

Narrative

The pilot of the amphibious, float-equipped airplane reported that, two days before a repositioning flight, he inspected the destination airport. He had planned to land on an alternate grass landing area, adjacent to an asphalt runway, and stop prior to a gravel driveway. He further reported that he noticed in the airport facility directory that the intended landing area was closed due to soft, wet conditions.

The pilot reported that, during landing, he was "high and fast". He further reported that he landed "too far along to stop before the gravel drive". The airplane encountered the gravel driveway, bounced, and landed hard, resulting in a nose over.

The airplane sustained substantial damage to the left wing.

The pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation.

The airport facility directory for the accident airport, in part stated:

"[Alternate Grass Landing Area (AGLA)]: AGLA clsd 1 Nov-1 June. Gnd soft when wet. [Daylight] hrs only. Use of AGLA prohibited when Rwy 04-22 in use."

It further stated: "Pilots use at own risk."

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Accident Rpt# ERA16LA251 07/11/2016 1250 EDT Regis# N867TG Zellwood, FL Apt: Tangerine FL97
Acft Mk/Mdl TUMBLING GOOSE LLC 12S Acft SN 353 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl BARRETT PERFORMANCE ENGINE Acft TT 7 Fatal 0 Ser Inj 1 Flt Conducted Under: FAR 091
Opr Name: TUMBLING GOOSE LLC Opr dba: Aircraft Fire: NONE
AW Cert: SPE

Summary

The private pilot reported that this was his second flight in his newly manufactured, experimental exhibition airplane. Earlier in the morning, the pilot flew the airplane for 30 minutes over the airport to become familiar with the airplane and noted no anomalies. Several hours later, the pilot departed again to perform aerobatics. While returning to the airport, he reduced power to descend, and once the airplane was at the desired altitude, he advanced the throttle, but the engine did not respond. He then looked at the engine monitor and noted that the engine had lost total power. The pilot noticed a positive indication of fuel pressure, and he used the primer switch, which bypassed the fuel servo, to restart the engine. Once he released the switch, the engine again lost power. The pilot added that, when the airplane was over the airport, he set up for landing, but he believed that the airplane was going too fast to land, so he used the primer switch to develop engine power and perform a go-around maneuver. During the next approach, the pilot slowed the airplane, and once over the runway, he flared for landing. The airplane continued to fly about 10 ft above ground level (agl) down the length of the runway. The pilot tried using the primer switch again to perform another go-around maneuver, but about 200 ft agl, the engine lost total power. He then tried to perform a forced landing to a clearing but impacted trees and terrain before the clearing.

Postaccident examination of the engine confirmed engine control and fuel system continuity up to the fuel servo. The fuel servo could not be tested due to impact damage; therefore, the cause of the loss of engine power could not be determined.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power during descent for reasons that could not be determined because impact damage precluded a complete examination of the fuel servo.

Events

1. Landing - Loss of engine power (total)
2. Landing - Landing area overshoot

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Lateral/bank control-Not attained/maintained - C
2. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
3. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Contributed to outcome

Narrative

On July 11, 2016, about 1250 eastern daylight time, an experimental exhibition Tumbling Goose LLC, 12S, N867TG, was substantially damaged during a forced landing following a loss of engine power while approaching Tangerine Airport (FL97), Zellwood, Florida. The pilot incurred serious injuries. Visual meteorological conditions prevailed and no flight plan was filed for the personal, local flight. The airplane was operated under the provisions of 14 Code of Federal Regulations Part 91.

According to the pilot, this was his second flight in the newly manufactured experimental exhibition airplane. His first flight was earlier that morning, and he flew for approximately 30 minutes over the airport to get familiar with the new airplane. The flight was uneventful and he made two practice approaches before landing and debriefing with the airplane builders on the handling characteristics of the airplane.

Several hours later, the pilot departed again to perform aerobatics in the airplane with a sufficient amount of fuel for the planned flight. About 1 hour into the flight, while flying at 4,000 feet above ground level (agl), the pilot reduced the engine power in order to descend towards the airport for landing. At 2,000 feet agl, the pilot advanced the throttle with no response from the engine. He looked at the engine monitor and discerned that the engine had lost total power, though the propeller continued to rotate. The pilot turned the fuel boost pump on and noticed positive fuel pressure, and he moved the mixture and throttle controls with no effect on the engine. The pilot then toggled the spring loaded fuel primer switch, the engine restarted, and appeared to go to full power. Once the pilot released the fuel primer switch, the engine again ceased producing power.

The airplane was now over the airport, so the pilot set up for a landing on the grass runway. The pilot noticed he was still high and flying "very fast" for landing, so he performed a go-around maneuver by using the primer switch to start the engine and fly around the traffic pattern to set up for another landing. On the next landing approach, the pilot slowed the airplane, and once over the runway, he attempted to flare for landing. The airplane continued to fly about 10 feet agl for the length of the runway. The pilot tried to perform another go-around by toggling the fuel primer switch again. The engine restarted, but lost total power shortly

after and did not restart. At the time, the airplane was about 200 feet agl. The pilot then attempted to perform a forced landing to a clearing. The airplane was "too low and slow," and impacted trees and terrain prior to the clearing.

According to the Federal Aviation Administration (FAA) the single seat, bi-wing, fixed landing gear, experimental airplane, serial number 353, was manufactured in 2016. It was powered by a Barrett Performance, Vedeneyev M14P, 430 horsepower engine, equipped with a 3-blade MT propeller. The airplane's most recent 100-hour inspection was completed on March 16, 2016, and it had accumulated 7 hours of total hours of flight time since that date. The airplane was equipped with an engine primer system for starting purposes, which injected an unregulated fuel supply directly from the fuel boost pump into the supercharger, which bypassed the fuel/air servo controller.

Examination of the wreckage by the Federal Aviation Administration inspector revealed that it came to rest upright with the nose and engine buried in the ground. Both wings were substantially damaged, and the tail section fractured just behind the pilot's seat. The fuselage was crushed by the impact with the tree.

The engine controls all appeared to be intact from the cockpit to the engine. The fuel system was clear of blockages up to the fuel servo. Operation of the fuel servo could not be confirmed due to impact damage. The induction system was free of blockages. The original ignition system had been replaced after the engine's most recent overhaul with an experimental electronic system, and the original carburetor was replaced with an experimental fuel injection system, also after the last overhaul.

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Accident Rpt# GAA18CA073	12/07/2017 1815 MST	Regis# 395SC	Spanish Fork, UT	Apt: N/a
Acft Mk/Mdl BROCK STEINER SPORT COPTER	Acft SN 095	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim	Prob Caus: Pending
Opr Name: CHARLES D. WAKAMATSU	Opr dba:	Fatal 0	Ser Inj 0	Flt Conducted Under: FAR 091
				Aircraft Fire: NONE

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Accident Rpt# GAA18CA084 12/12/2017 1430 MST Regis# N552EZ Salmon Bar, OR Apt: UNK
Acft Mk/Mdl CORBEIL SHAWN CORBEIL SHAWN SER Acft SN 60010-040 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: CORBEIL SHAWN Opr dba: Aircraft Fire: NONE

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Accident Rpt# ERA16LA270 07/24/2016 915 EDT Regis# N750AZ Waynesburg, PA Apt: Greene County WAY
Acft Mk/Mdl CRAIG D CARTER STOL CH 750-NO SERIEAcft SN 75-8188 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL O-200-A EXP Acft TT 107 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: DANIEL D SMITH Opr dba: Aircraft Fire: NONE
AW Cert: SPE

Summary

The flight instructor and student pilot were conducting a local instructional flight. Following uneventful touch-and-go landings and a refueling, the student pilot and flight instructor departed again. Shortly after departure, the engine began to vibrate and lose power. The flight instructor took control of the airplane and landed straight ahead. During landing, the airplane impacted a row of tractor tires.

Postaccident examination of the engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. The atmospheric conditions at the time of the accident were conducive to the accumulation of carburetor icing. The flight instructor stated that he applied carburetor heat once he noted the drop in rpm. After applying carburetor heat and noting the continued loss of rpm, he turned off the carburetor heat to reduce the loss of rpm and to extend the airplane's glide range. Rapid ice accumulation would have required the carburetor heat to be on for a longer period of time to fully melt the ice and restore full power to the engine. Therefore, it is likely that the carburetor accumulated ice during departure, which resulted in the partial loss of engine power and vibration during the subsequent climb.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The partial loss of engine power due to carburetor icing.

Events

1. Emergency descent - Off-field or emergency landing
2. Landing - Collision with terr/obj (non-CFIT)
3. Initial climb - Fuel related

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Temp/humidity/pressure-Conducive to carburetor icing-Effect on operation - C

Narrative

On July 24, 2016, about 0915 eastern daylight time, an experimental amateur-built Zenith STOL CH 750, N750AZ, was substantially damaged during a forced landing following a loss of engine power during the initial climb after takeoff from Greene County Airport (WAY), Waynesburg, Pennsylvania. The flight instructor and a student pilot were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local instructional flight conducted under the provisions of 14 Code of Federal Regulations Part 91.

The purpose of the flight was for the student pilot and flight instructor to practice touch-and-go landings. After about 0.8 hours of touch-and-go landings, they added 8 gallons of fuel. During the ensuing climb, about 1/2-mile beyond the runway at 300 feet, the engine began to vibrate and lose power. The instructor took control of the airplane and decided to land straight ahead. He noted that there was no oil pressure, normal oil temperature, and decreasing engine rpm. He elected to perform a forced landing on the midfield of the Green County Fairgrounds.

During the landing roll, the airplane impacted tractor tires and the landing gear folded back. Examination of the wreckage by a Federal Aviation Administration (FAA) inspector revealed damage to the wing spar and wing struts. Delaminating of the composite propeller, consistent with impact damage, was also noted.

The airplane was equipped with a Continental O-200-A EXP, 100-horsepower engine, which was examined by an FAA inspector. The accessory section, and oil pump was removed for inspection, with no noted anomalies; about 5 quarts of oil was drained from the oil sump. The oil filter was opened and free of debris. The oil pressure sending unit was removed and tested, no malfunction was observed. Thumb compression was obtained on all cylinders. The #2 cylinder had lower compression than the other cylinders. Engine powertrain continuity was established and no anomalies that would have precluded normal operation were observed. Fuel drained from the wing tanks were free of debris or contamination.

The closest weather reporting facility was the about 15 miles north of the accident site. At 1035, the weather conditions reported at Washington County Airport (AFJ) included temperature 29 degrees C; dewpoint 23 degrees C.

According to a statement provided by the flight instructor, the carburetor heat was not used during takeoff, "as recommended in the pilot manual," and "carburetor heat was applied at the first sign of vibration and power reduction." After applying carburetor heat and noting the loss of RPM, the instructor turned

the carburetor heat off to get as much power from the engine as possible to extend their glide range.

An FAA carburetor icing probability chart indicated the temperature and dew point conditions were conducive to the formation of serious icing at glide power, and icing at glide and cruise power.

According to the FAA Pilot's Handbook of Aeronautical Knowledge, carburetor ice occurs due to the effect of fuel vaporization and the decrease in air pressure in the carburetor's venturi, which can cause a sharp temperature decrease in the carburetor. If water vapor in the air condenses when the carburetor temperature is at or below freezing, ice may form on the internal surfaces of the carburetor, including the throttle valve. This then restricts the flow of the fuel/air mixture and reduces engine power. Generally, the first indication of carburetor icing in an airplane with a fixed-pitch propeller is a decrease in engine rpm, which may be followed by engine roughness. Under certain conditions, carburetor ice can build unnoticed until power is added.

The handbook further described that carburetor heat is an anti-icing system that preheats the air before it reaches the carburetor, and is intended to keep the fuel/air mixture above the freezing temperature to prevent the formation of carburetor ice. Carburetor heat can be used to melt ice that has already formed in the carburetor if the accumulation is not too great, but using carburetor heat as a preventative measure is the better option.

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Accident Rpt# ERA16LA305 08/20/2016 930 EDT Regis# N516VB Eustis, FL Apt: N/a
Acft Mk/Mdl DAYTON A BABCOCK STORM-NO SERIES Acft SN TTS61 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl SUZUKI - GEO G13B Acft TT 45 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: ROLANDO DIAZ Opr dba: Aircraft Fire: NONE
AW Cert: SPE

Summary

The commercial pilot reported that he was conducting a local flight in the weight-shift-control aircraft when the engine lost total power. He added that he landed the aircraft in a field and determined that the main battery was "completely dead," so he obtained another battery and installed it on the aircraft. He test ran the engine before takeoff, and it performed satisfactorily. During the subsequent takeoff in high grass, the aircraft did not accelerate as expected, and the engine began to lose power. The pilot aborted the takeoff and applied the wheel brakes. The brakes locked, and he lost directional control. The aircraft then impacted a fence and a house before coming to rest on its left side.

The pilot reported that the alternator on the automotive engine, which had an electronic ignition, was likely not charging and that this resulted in the battery becoming depleted and the subsequent loss of engine power. He also reported that he did not account for the effect of the high grass on the airplane's performance and should have aborted the takeoff sooner.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control during an aborted takeoff. Contributing to the accident were the loss of engine power due to a malfunctioning alternator, which precipitated the off-field landing, and the pilot's decision to attempt to take off from an area with high grass, which precipitated the loss of directional control.

Events

1. Takeoff - Loss of engine power (total)
2. Takeoff-rejected takeoff - Loss of control on ground
3. Takeoff-rejected takeoff - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft systems-Electrical power system-AC generator-alternator-Malfunction - F
4. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-(general)-Decision related to condition - F
5. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - F
6. Environmental issues-Physical environment-Object/animal/substance-(general)-Contributed to outcome

Narrative

On August 20, 2016, about 0930 eastern daylight time, an experimental amateur-built Storm, N516VB, was substantially damaged while attempting to depart from a grass field in Eustis, Florida. The airline transport pilot was not injured. The weight-shift-control aircraft was registered to Lake Hoppers Air Adventures, Inc. and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day, visual meteorological conditions prevailed at the time, and no flight plan was filed. The local flight originated from Mid Florida Air Service Airport (X55), Eustis, about 0915.

The pilot reported that he was en route to Tavares, Florida, when he noted a red indicator light on his instrument panel, and a loss of engine power. Approximately 12 gallons of fuel were on board. He landed the aircraft in a field uneventfully and called friends for assistance. The aircraft battery was found to be "completely dead," so he obtained a new battery, installed it, and test ran the engine. He ran the engine again prior to takeoff and found it to perform "satisfactory." He commenced the takeoff from the grass field and noticed that the aircraft was not accelerating as expected. He later reported that the grass was tall, possibly hindering acceleration. The engine subsequently began to lose power. He rejected the takeoff and applied the wheel brakes. The brakes locked up and the airplane skidded toward a fence. The aircraft collided with the fence and a house and came to rest on its left side. The pilot reported the aircraft damage as substantial; the front fork collapsed and the wing spar was broken. He reported that he did not consider the effect of the tall grass on performance and could have aborted the takeoff more quickly.

The pilot later stated, in retrospect, he was convinced that, ".the component that failed was the alternator that was not charging, hence the loss of engine power when the voltage ran low." The aircraft was equipped with a Suzuki G13B automotive engine. The engine utilized electronic fuel injection and ignition. He stated that the engine was overhauled about 45 hours prior to the accident.

The pilot held airline transport, commercial, and sport pilot certificates with ratings for airplane multiengine land, airplane single engine land, airplane single

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engine sea, and glider. He reported 17,000 hours of total flight time, including 350 hours in the accident aircraft type.

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Accident Rpt# ERA18LA027	11/17/2017 1000 EST	Regis# N470CH	Oak Island, NC	Apt: Cape Fear Rgnl Jetport/howie F SUT
Acft Mk/Mdl DONALD L HOMER AUTOGYRO		Acft SN V00015	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl ROTAX 914UL		Acft TT 217	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: AIC RECYCLING LLC		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Initial climb - Loss of engine power (partial)

Narrative

On November 17, 2017, about 1000 eastern standard time, an experimental amateur-built Autogyro Cavalon, N470CH, operated by AIC Recycling, LLC, was substantially damaged during a forced landing at Cape Fear Regional Jetport (SUT), Oak Island, North Carolina. The private pilot and a flight instructor were not injured. The instructional flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight.

The private pilot reported that he was receiving instruction for his biannual flight review. The engine run-up and takeoff to the southwest were normal, but while climbing through 100 ft above ground level, the engine lost power rapidly, decreasing from 5,000 to 3,000 rpm. The flight instructor took over the flight controls and turned 180° back towards runway 5. Immediately after the turn was completed, the gyrocopter landed hard in the grassy area west of runway 5, and rolled to a stop.

Examination of the gyrocopter by a Federal Aviation Administration (FAA) inspector revealed that the fuselage was cracked in multiple locations, and the center throttle console was crumpled.

According to FAA records, the gyrocopter was issued a special airworthiness certificate in the experimental amateur-built aircraft category on May 11, 2012. It was a two-place, carbon fiber gyrocopter of semi monocoque design. It was equipped with fixed tricycle landing gear, a Rotax 914UL 115-horsepower turbocharged engine and a Sensenich three-blade fixed propeller.

The weather conditions reported at an airport located 22 miles northeast of the accident site, at 0953 included, wind from 020° at 13 knots, visibility 10 miles, clear skies, temperature 11° C, dew point 1° C, and an altimeter setting of 30.23 inches of mercury.

The gyrocopter was recovered from the accident site and retained for additional examination

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Accident Rpt# WPR17LA009	10/19/2016 910 MDT	Regis# N716JB	Caldwell, ID	Apt: Caldwell Industrial EUL
Acft Mk/Mdl GRAY JIM ROBERT EXEC 90		Acft SN Exec-3000	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl ROTORWAY 55005		Acft TT 223	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JIM R. GRAY		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Takeoff - Loss of engine power (partial)

Narrative

On October 19, 2016, about 0910 mountain daylight time, an experimental amateur-built Jim Gray Rotorway Exec 90 helicopter, N716JB, was substantially damaged following a forced landing after experiencing a loss of engine power at the Caldwell Industrial Airport (EUL), Caldwell, Idaho. The private pilot and registered owner of the helicopter was not injured. Visual meteorological conditions prevailed at the time of the accident. The flight was being conducted in accordance with 14 Code of Federal Regulations Part 91, and a flight plan was not filed. The proposed local flight was originating at the time of the accident.

In a report submitted to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the pilot reported that during the takeoff everything seemed normal. He then accelerated and began a slow climb. At between 15 to 20 ft above ground level and about 40 to 45 knots, the helicopter suddenly yawed right, followed by the engine losing power. The pilot stated that being so low he could not perform a normal autorotation. The pilot opined that he did a partial nose-up, collective-down maneuver, but due to the low altitude and not being able to maintain sufficient rotor rpm, he elected to land in the soft dirt off the side of the runway. A hard landing resulted in the helicopter coming to rest on its left side. The helicopter sustained substantial damage to the tail boom and horizontal stabilizer.

Subsequent to a postaccident examination of the engine, which was performed by a Federal Aviation Administration aviation safety inspector, the inspector reported to the NTSB IIC that the pilot had recently changed the alternator belt, however, had failed to properly tighten the tension bolts, which resulted in inadequate voltage to sustain ignition, thus precipitating the loss of engine power and hard landing.

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Accident Rpt# ERA17LA031 10/29/2016 1600 EDT Regis# N27832 New Bern, NC Apt: N/a
Acft Mk/Mdl HADDOW WILLIAM H PITTS SPECIAL S Acft SN WHPS-0086 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-360 Acft TT 170 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: MARCO BOUW Opr dba: Aircraft Fire: NONE
AW Cert: SPE

Summary

The commercial pilot reported that he was practicing aerobatics in the experimental, amateur-built biplane over a river. During the maneuvers, as he input left aileron, the control stick was stiff, and he believed he observed abnormal movement of the upper left aileron. He then applied more force to free the control stick and input right aileron; however, the airplane rolled left and entered a spin. The pilot was unable to recover from the spin and subsequently parachuted from the airplane. The airplane came to rest at the bottom of the river.

Examination of the recovered wreckage revealed that most of the left wings' parts, including the ailerons and aileron control tubes, were not recovered. As such, control continuity could not be verified or tested.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A loss of biplane control during aerobatic maneuvers for reasons that could not be determined because a portion of the biplane's flight control system was not recovered and could not be tested.

Events

1. Maneuvering-aerobatics - Loss of control in flight
2. Uncontrolled descent - Miscellaneous/other
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-(general)-Not attained/maintained - C

Narrative

On October 29, 2016, about 1600 eastern daylight time, an experimental, amateur-built Pitts Special S-1, N27832, was substantially damaged when it impacted a river, following a loss of control during aerobatic flight near Coastal Regional Airport (EWN), New Bern, North Carolina. The commercial pilot incurred minor injuries. The airplane was registered to and operated by the commercial pilot as a personal flight conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that departed EWN about 1545.

The pilot reported that he was practicing aerobatics about 3 miles northeast of EWN, over the Neuse River. During the maneuvers, as he input left aileron, the control stick was stiff and he believed he observed abnormal movement of the upper left aileron. He then applied more force to free the control stick and input right aileron; however, the airplane continued to roll left and entered a spin. The pilot was unable to recover from the spin and subsequently parachuted from the airplane. Both the pilot and the airplane came to rest in the Neuse River.

Examination of the wreckage by a Federal Aviation Administration (FAA) inspector and the pilot revealed substantial damage to the wings and fuselage. They also noted that a majority of the left wings, including the ailerons and aileron control tubes, were not recovered from the river. As such, control continuity could not be verified.

The single-seat, bi-wing, fixed-tailwheel airplane, was assembled from a kit and issued an FAA experimental airworthiness certificate in 1994. Its most recent annual conditional inspection was completed on July 21, 2016. At that time, the airplane had accrued 170 total hours.

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Accident Rpt# GAA18CA075 12/07/2017 1920 MST Regis# N9738J

Limon, CO

Apt: Limon Muni LIC

Acft Mk/Mdl JONES KENT C VANS RV-10-NO SERIES Acft SN 40296

Acft Dmg: SUBSTANTIAL

Rpt Status: Prelim

Prob Caus: Pending

Fatal 0 Ser Inj 0

Flt Conducted Under: FAR 091

Opr Name:

Opr dba:

Aircraft Fire: NONE

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Accident Rpt# ERA18LA039	12/02/2017 1700 CST	Regis# N7481ZK	Hernando, MS	Apt: Eagles Ridge Airport MS9
Acft Mk/Mdl KEVIN LEUE SPARROW HAWK		Acft SN SH2004002K	Acft Dmg: DESTROYED	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl SUBARU 2.5			Fatal 2 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: WAYNE S. HOUSE		Opr dba:		Aircraft Fire: GRD
				AW Cert: SPE

Events

1. Unknown - Unknown or undetermined
-

Narrative

On December 2, 2017, about 1700 central standard time, an experimental amateur-built Sparrow Hawk gyroplane, N481ZK, impacted terrain near Eagles Ridge Airport (MS9), Hernando, Mississippi. The sport pilot and pilot-rated passenger were fatally injured. The gyroplane was destroyed by a postcrash fire, and was being operated under the provisions of 14 Code of Federal Regulations Part 91 as a local personal flight. Visual meteorological conditions prevailed at the time and no flight plan was filed for the flight.

There were no known witnesses to the departure or accident. According to an individual who was hunting, about 1700, he heard a loud sound similar to a gunshot, but dismissed it as another hunter. He left the area about dusk, and while walking, spotted a grass fire. He walked to a nearby home to tell the homeowner to call 911 to report the fire. First responders who arrived to extinguish the fire subsequently observed the wreckage.

The wreckage was recovered from the accident site and retained for further examination.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA16LA177	04/30/2016 1556 EDT	Regis# N7044Q	Worcester, MA	Apt: Worcester Rgnl ORH
Acft Mk/Mdl MAHER DANIEL J VELOCITY-SE		Acft SN DM100	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING IO-360		Acft TT 870	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JAMES A. SIELIS		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Summary

The commercial pilot stated that, immediately after landing the experimental, amateur-built airplane, the nose landing gear (NLG) collapsed. Examination of the NLG revealed that the nosewheel and its mounting fork had separated. Further examination of the NLG fork revealed that it had fractured from overstress. The NLG fork was the original one installed in the airplane. Since that time, the manufacturer had determined that the original design was prone to shimmying, which could result in overstress fractures, and had twice modified the design to eliminate the failure. The new part design had not been installed on the airplane; therefore, the original NLG fork design, which was prone to fracture due to overstress, eventually fractured during the accident landing.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The overstress failure of the nose landing gear fork assembly.

Events

1. Landing-flare/touchdown - Landing gear collapse

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Nose/tail landing gear-Failure - C

Narrative

On April 30, 2016, about 1556 eastern daylight time, an experimental amateur-built Velocity SEFG, N7044Q, was substantially damaged during landing at Worcester Regional Airport (ORH), Worcester, Massachusetts. The airline transport pilot and passenger were not injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight conducted under the provisions of 14 Code of Federal Regulations Part 91

According to the pilot, immediately after nose wheel contact upon landing, the nose wheel fork separated from the nose wheel landing gear strut, and the airplane began skidding on the bottom of the nose landing gear strut. After the separation of the nosewheel fork, the pilot applied held backpressure on the control stick, which resulted in a propeller strike.

The pilot stated that he had purchased the airplane in November 2015. There were no preflight anomalies noted before the local area flight, and no mechanical or performance deficiencies before the final full-stop landing. There was no record of any maintenance done on the nose landing gear fork.

Examination of photographs revealed the airplane rested on the nose landing gear strut with the nose wheel and its mounting fork separated. The nose wheel remained in the fork and the nose gear fork was fractured at the gear mount attach point. The propeller tips were damaged, and parallel slash marks consistent with a propeller strike were visible on the runway surface prior to where the airplane came to rest. The composite airframe structure at the nose landing gear strut attach point had also fractured, and had punctured the cockpit footwell, which resulted in substantial damage to the airframe.

Further examination of the nose landing gear fork revealed it fractured from overstress. The manufacturer stated that this part and design had been modified twice because of similar fractures, as it had been discovered that excessive nose landing gear shimmying would result in overstress fractures. The first redesign included a dampener consisting of bellville washers to reduce stress on the nose fork. The next iteration included a hydraulic dampener. In addition to changing the design of the nose fork, the new parts were made of a different material.

The accident airplane did not have either modification installed, and was the original nose fork installed on the airplane.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# WPR17LA082 03/31/2017 1655 PDT Regis# N610TT The Dalles, OR Apt: Columbia Gorge Regional/the Da DLS
Acft Mk/Mdl OTT 601XL-B Acft SN 6-7884 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl OTT 3250 Acft TT 129 Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: OTT LOUIS W Opr dba: Aircraft Fire: NONE

Summary

The commercial pilot, who was also the owner/builder of the experimental amateur-built airplane, reported that, after departure and while climbing through 3,500 ft mean sea level, he heard the engine sound abruptly change and observed a loss of rpm and higher-than-normal exhaust gas temperature readings. The pilot turned back toward the airport and attempted to troubleshoot the problem; however, the airplane continued to produce less power than expected. The pilot established a normal traffic pattern for the runway. After turning to final, the airplane started descending and had insufficient power to reach the runway. The airplane subsequently impacted terrain short of the runway.

Postaccident examination of the airplane revealed that all six propeller bolts that held the propeller hub to the drive hub were fractured. Further examination of the bolts revealed that the fracture surfaces all exhibited similar features consistent with reverse bending fatigue, likely from not fitting tightly into the propeller hub holes. The pilot reported that he had converted the engine and that, given its unique conversion, the bolts that were typically used to connect the propeller hub to the drive hub were too short; therefore, he chose to use the bolts that were on the hub at the time of the accident. Given the condition of the bolts and the pilot's statement, it is likely the bolts did not fit tightly in the propeller hub holes, which led to their failure due to reverse bending fatigue.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A partial loss of engine power due to the reverse bending fatigue failure of the propeller hub bolts, which resulted from the bolts not fitting tightly into the propeller hub holes. Also causal was the pilot's decision to use improper bolts for this type of installation/operation.

Events

1. Enroute-climb to cruise - Loss of engine power (partial)
2. Enroute-climb to cruise - Off-field or emergency landing
3. Landing - Landing area undershoot
4. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft propeller/rotor-Propeller system-Propeller hub section-Failure - C
2. Aircraft-Aircraft propeller/rotor-Propeller system-Propeller hub section-Fatigue/wear/corrosion - C
3. Aircraft-Fluids/misc hardware-Misc hardware-(general)-Incorrect use/operation - C
4. Personnel issues-Task performance-Maintenance-Modification/alteration-Pilot
5. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C

Narrative

On March 31, 2017 about 1655 Pacific daylight time, an OTT 601XL-B airplane, N610TT, the pilot executed a precautionary landing about one mile southeast of the Columbia Gorge Regional/The Dalles Municipal Airport (DLS), The Dalles, Oregon after the engine experienced a partial loss of engine power. The commercial pilot and one passenger sustained minor injuries, and the airplane was substantially damaged throughout. The airplane was registered to and operated by the pilot as a 14 Code of Federal Regulations Part 91 personal, local flight. Visual meteorological conditions prevailed at the time of the accident and no flight plan was filed.

The pilot reported that the purpose of the flight was to verify the proper fuel mixture setting for the electronic mixture system. The airplane departed the airport to the northeast and while climbing through 3,500 feet, the pilot heard the engine sound abruptly change. Concurrent with the change, he observed a loss of RPM and high exhaust gas temperature readings. The pilot returned towards the airport and attempted to troubleshoot the problem, however, the airplane was producing less power than expected. The pilot established a normal traffic pattern for runway 31. After turning final the airplane was low, and despite the pilot adding power, the airplane impacted terrain short of the runway surface.

A postaccident examination revealed no indications of catastrophic malfunction. The engine was rotated and compression was established on all cylinders. The spark plugs were removed and the cylinders were boroscoped; all cylinders exhibited normal operating signatures. The external timing marks at the rear of the engine were not consistent with the markings on the multi-toothed plate on the propeller shaft. Further examination revealed the bolts holding the propeller hub to the drive hub were all fractured. The bolts were removed and sent to the National Transportation Safety Board (NTSB) materials laboratory for further

examination.

The NTSB materials laboratory reported that the bolts were fractured in the 13th-15th thread root from the base of the bolt. The general features of the fracture surfaces were consistent with each other. The fracture surfaces exhibited opposite-facing flat thumbnail-shaped regions with a middle rougher region. The thumbnail regions exhibited crack arrest marks, which were orientated with propagation inward from the surface of the thread roots. The thumbnail regions also exhibited ratchet marks near the thread root surfaces, consistent with multiple crack initiation sites. These features were all consistent with fatigue in reverse bending.

The pilot reported that the engine was a Corvair conversion engine built by him and a friend. They built this engine to be slightly different than other conversions, which allows it to be more powerful. The bolts that are normally used to connect the propeller hub to the drive hub were too short; therefore, he elected to use the accident bolts. He further reported that he believes he torqued the bolts properly, however, he noted that the holes on the propeller hub were not very tight.

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Accident Rpt# WPR18CA028	10/28/2017 1410 MST	Regis# N651P	Chandler, AZ	Apt: Chandler Municipal CHD
Acft Mk/Mdl STILL MICHAEL J TITAN T-51-NO SERIES	Acft SN 055	Acft TT 27	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Opr Name: MICHAEL J STILL	Opr dba:	Fatal 0	Ser Inj 0	Flt Conducted Under: FAR 091
				Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA18CA069 12/02/2017 1655 CST Regis# N912GR Plato Center, IL Apt: Olson LL53
Acft Mk/Mdl WEAVER DAVID A PULSAR 912XP-NO Acft SN 329 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: WEAVER, DAVID A. Opr dba: Aircraft Fire: NONE

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Accident Rpt# CEN16FA307 08/06/2016 820 CDT Regis# N110PX Burns Flat, OK Apt: Clinton-sherman CSM
Acft Mk/Mdl WILSON BUGATTI-DEMONGE 100P Acft SN 002 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl SUZUKI 1300 CC Fatal 1 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: PILOT Opr dba: Aircraft Fire: GRD
AW Cert: SPE

Summary

The airline transport pilot departed from a 13,500 ft long runway with a right quartering headwind present on a local test flight in an experimental, amateur-built, twin-engine airplane, which was a replica of a 1930s-era air racer. During the initial climb after takeoff, the airplane entered a right bank followed by a left bank. The left bank increased, and the airplane entered a nose-low descent that continued until it impacted terrain in an inverted attitude.

The airplane was equipped with several onboard cameras that captured video footage of the accident flight. The video revealed that the left/forward engine began surging after liftoff and reached its maximum operating speed (red line) twice during the short flight. Although the pilot attempted to control the forward engine rpm with the throttle lever, the throttle inputs had no apparent effect. Based on the design of the propeller drive train, it is a possibility that the forward engine clutch was slipping. The airplane's airspeed decreased below its design stall speed and the angle of attack increased; the airplane then rolled left and subsequently impacted the ground. A postaccident examination of the airplane did not reveal any preimpact flight control anomalies. Examination of the engines did not identify a reason for the surging of the forward engine or slipping of the clutch. The sequence of events as described by witness statements and the onboard video was consistent with a loss of airspeed following an engine anomaly and a subsequent aerodynamic stall.

Toxicological testing revealed alcohols were present in samples taken during the autopsy. Given the putrefaction of the samples, it is likely that all detected alcohols were the result of postmortem production.

Terrain from the accident site to one quarter mile north of the accident site was suitable for an emergency landing there.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain airspeed following an engine anomaly during the initial climb after takeoff, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall. Contributing to the accident was an engine anomaly, the reason for which could not be identified during postaccident examination.

Events

1. Takeoff - Powerplant sys/comp malffail
2. Takeoff - Loss of control in flight
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Aircraft-Aircraft power plant-(general)-(general)-Malfunction - F
4. Not determined-Not determined-(general)-(general)-Unknown/Not determined - F

Narrative

HISTORY OF FLIGHT

On August 6, 2016, about 0820 central daylight time, an experimental amateur-built Wilson Bugatti-DeMonge 100P airplane, N110PX, impacted terrain shortly after takeoff from runway 35L at the Clinton-Sherman Airport (CSM), near Burns Flat, Oklahoma. The airline transport pilot was fatally injured, and the airplane was destroyed during impact and a subsequent postcrash fire. The airplane was registered to Le Reve Bleu LLC and was operated by the pilot as a 14 Code of Federal Regulations Part 91 test flight. Day visual meteorological conditions prevailed in the area about the time of the accident, and no flight plan was filed. The local flight was originating from CSM at the time of the accident.

A witness at the airport reported that the airplane lifted off the runway. During the initial climb, the airplane banked to the right and then to the left. The airplane's left bank increased, it descended nose down, and subsequently impacted terrain inverted. Review of a chase helicopter's video was consistent with the witness statements.

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PERSONNEL INFORMATION

The 66-year-old pilot held a Federal Aviation Administration (FAA) airline transport pilot certificate with single-engine land, multi engine land, and instrument airplane ratings. He held a second-class FAA medical certificate issued on May 12, 2016. This medical certificate was issued with limitations: "Must wear corrective lenses. and Not valid for any class after 05/31/2017." The pilot reported on that medical certificate application 10,700 hours of total flight time and 25 hours of flight time in the previous six months.

AIRCRAFT INFORMATION

N110PX was an experimental amateur-built, twin-engine, single-seat, tailwheel monoplane built as a replica of the Bugatti-DeMonge 100P, a 1930's era air racer that was never flown. There was only one original airplane produced, and the accident airplane was the first and only replica produced to the date of this report. According to airworthiness documents, the airplane was constructed to duplicate the original airplane's structure, systems, and dimensions. The accident airplane was powered by two Suzuki Hyabusa reciprocating, clutched motorcycle engines mounted in tandem aft of the cockpit. The engines drove two coaxial two-blade contra-rotating Hercules fixed-pitch wooden propellers. The forward engine was installed with the output drive shaft forward and was directly connected to the propeller reduction gearbox through universal joints and drive shafts on the left side of the fuselage. The rear engine was installed with the output drive shaft aft and was indirectly connected to the propeller reduction gearbox through a chain drive and sprockets that drove the drive shafts and universal joints on the right side of the fuselage. Both engine gearboxes were set in 6th gear and could not be changed. The propeller reduction gearbox was contained in a single housing with two separate drive trains to drive the forward and aft contra rotating propellers. The forward engine engaged the left gearbox drivetrain and drove the forward propeller. The aft engine engaged the right drivetrain and drove the aft propeller.

Engine throttle control was accomplished through two levers installed side-by-side on the left side of the cockpit with the left throttle lever controlling the forward engine and the right throttle lever controlling the aft engine. Engagement of the hydraulic clutches on the engines was accomplished independently by two levers mounted side-by-side on the right side of the cockpit. Each engine could be run without propeller movement until the respective clutch was engaged.

The airplane's maximum gross weight was listed as 2,939 pounds and its empty weight was 2,470 pounds. The airplane received its FAA Special Airworthiness Certificate in the experimental category on August 4, 2015.

METEOROLOGICAL INFORMATION

At 0753, the recorded weather at CSM was wind 040ø at 9 knots, visibility 10 statute miles, sky condition clear, temperature 23ø C, dew point 21ø C, and altimeter 30.06 inches of mercury.

AIRPORT INFORMATION

CSM was a public, towered airport, which was owned by the Oklahoma Space Industry Development Authority/State of Oklahoma. It was located about 2 miles west of Burns Flat, Oklahoma. The airport had an estimated elevation of 1,922.1 ft above mean sea level. Two runways, 17R/35L and 17L/35R serviced the airport. Runway 17R/35L was a 13,503 ft by 75 ft runway with a concrete surface. Runway 17L/35R was a 5,193 ft by 75 ft runway with a concrete surface. Airport operations personnel examined the runway after the accident and no liberated airplane parts were found.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was found about 1,900 ft and 335ø from the departure threshold of runway 35L. The airplane came to rest inverted on an approximate 330ø heading. A depression was observed in the ground about 110ø and 23 ft from the wreckage. Sections of clear plastic were found in the depression and the surface of sections of the depression contained a blue color transfer consistent with the color of the airplane. The airplane, forward of its empennage, was discolored, deformed, and charred, with sections consumed by fire. The rudder's skin was consumed by fire. The lower section of the right main landing gear separated from its strut and the lower section was found resting on vegetation northwest of the main wreckage. Splintered wooden propeller blade fragments

were found resting on the ground in the area around the wreckage.

An on-scene examination of the wreckage was conducted. The rudder control cables were traced from the rudder to the rudder pedals. The elevators' push/pull tubes were attached to the control arms for each elevator. Forward of the empennage, the elevator tubes were found to be consumed by fire. Sections of the aileron tubes were found to be consumed by fire outboard of the fuselage. However, outboard sections of the aileron's control tubes were found connected to each aileron. Control continuity for the elevators and ailerons could not be established due to the fire damage. The propulsion drivetrain was traced from the engines to the gearbox and propellers, and no preimpact anomalies were detected. There were no observed damage or witness marks to indicate that the chain and sprockets for the aft engine became disengaged under power. The engines sustained thermal damage. The engines could not be rotated by hand and their clutches were not examined on scene. However, no external indications of engine anomalies were observed. The propeller gearbox was intact but had sustained thermal damage and sooting. The propeller hub was attached and charred. A portion of the left driveshaft remained attached to the universal joint and the right drive shaft was separated from the universal joint. There were no external indications of gearbox anomalies observed.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Office of the Chief Medical Examiner in Oklahoma City, Oklahoma, and toxicological samples were taken. The autopsy listed multiple blunt force injuries as the cause of death and accident as the manner of death.

The FAA Bioaeronautical Sciences Research Laboratory's Civil Aerospace Medical Institute (CAMI) prepared a Final Forensic Toxicology Accident Report on the samples taken during the autopsy. The report indicated that the samples sustained putrefaction and subsequently, in part, stated:

178 (mg/dL, mg/hg) Ethanol detected in Muscle

38 (mg/dL, mg/hg) Ethanol detected in Brain

N-Butanol detected in Muscle

Propanol (N-) detected in Muscle

Propanol (N-) detected in Brain

The CAMI description of Ethanol indicated that it is "primarily a social drug with a powerful central nervous system depressant. After absorption, ethanol is uniformly distributed throughout all tissues and body fluids. The distribution pattern parallels the water content and blood supply of each organ. Postmortem production of ethanol also takes place due to putrefaction processes, but vitreous humor and urine do not suffer from such production to any significant extent in relation to blood. Vitreous humor would normally have about 12% more ethanol than blood if the system is in the post absorptive state, and urine would normally have about 25% more ethanol than blood. The average rate of elimination of ethanol from blood is 18 mg/dL (15-20 mg/dL) per hour."

The CAMI description of N-Butanol indicated that it is "an alcohol. It is also produced postmortem, along with ethanol and other alcohols."

The CAMI description of N-Propanol indicated that it is "an alcohol. It is also produced postmortem, along with ethanol and other alcohols."

FIRE

Review of a chase helicopter's video showed that there was no inflight fire and that the accident airplane's fire started after the ground impact.

TESTS AND RESEARCH

The airplane was fitted with GoPro cameras for the flight. Six of these cameras were found in the area of the wreckage and were sent to the National Transportation Safety Board (NTSB) Recorder Laboratory. The airplane wreckage was released and subsequent to the release, a mechanical engineer in the recorder laboratory examined the cameras, convened a Video Group as its Chairman, and subsequently produced an Onboard Image Recorder Factual Report.

The Onboard Image Recorder Factual Report stated that the cameras exhibited witness marks consistent with various levels of impact damage. The cameras

recorded video data on micro secure data (microSD) cards. Five of the six microSD cards contained retrievable video data for the entire flight and one microSD card contained retrievable data for a portion of the flight before impact.

The report, in part, described the timing and correlation of the cameras' data and the group's observations of the accident flight recorded video and a previous flight's recorded video. The description of the accident flight, in part, indicated that the pilot was in a conscious state during the recording. No pilot or ground crew conversations pertinent to the investigation were captured. All preflight activities appeared to be consistent with known procedures. The pilot was seated and belted during the recording. He moved the left/forward ignition master switch to its "on" position and depressed the starter button. Then a sound consistent with a running engine was heard and the front propeller rotated counter-clockwise. The pilot depressed the right/rear starter button. No additional engine sound was heard and the pilot moved the right/rear ignition master switch to its "on" position. The pilot then depressed the starter button again, the rear propeller spun clockwise, and the sound consistent with a running engine was heard. The pilot appeared to manipulate the area consistent with the location of the engine clutch engagement lever and the front propeller began to spin counter-clockwise. The pilot movements were consistent with flight control check. The engine and gearbox gauge indications, which included engine oil temperature, engine oil pressure, fuel pressure, water temperature, volts, gearbox oil temperature, and gearbox oil pressure for both engines were within their respective green ranges at the start of the taxi to runway 35L and through the remainder of the recording. The airplane crossed the runway edge marking for runway 35L, the pilot added power, and the airplane tracked the right side of the runway centerline. The pilot added power and the airspeed indication became alive during the takeoff roll. The airspeed was about 60 knots during the roll abeam taxiway E. The airspeed indicated 80 knots after the airplane passed abeam taxiway D. The pilot applied backpressure to the control stick when the indicated airspeed was above 80 knots. The airplane crossed abeam taxiway C and it became airborne. The left/forward throttle lever was about 3/4 knob-width behind the right/rear throttle lever. The airplane laterally transitioned from the right side of the runway centerline to the left side of the centerline. The pilot moved the gear selector switch to the "up" position, a red light nearby illuminated, and the light extinguished about five seconds later. The runway centerline was visible below and to the right of the airplane. A change in pitch was heard in the ambient engine sounds. The rpm indication for the left/forward engine began to climb and the right rear engine appeared to remain stabilized. The pilot looked downward in the cockpit area near the hydraulic valve lever. The end of runway 35L became visible and the airplane was left of runway centerline. The pilot's right arm appeared to reach in the direction of the hydraulic valve lever. The left forward throttle lever appeared to be a knob and a half width distance from the right/rear throttle lever. The left/forward rpm indications trended upward, the pilot returned his left hand to the throttles, and his right hand to the control stick. The airplane entered an uncommanded slight left roll. The left/forward engine rpm indication reached about 10,000 rpm and the pilot pulled back the left/forward throttle lever near the closed position. Engine sounds decreased, the left/forward rpm indication decreased, and the airspeed was around the start of the green arc about 70 knots. The ambient engine sound surged. The pilot appeared to have pushed the right/rear throttle forward. The left/forward engine rpm indicated an increase in rpm near its redline. The left/forward throttle lever was positioned near its closed position. The airplane exhibited an uncommanded right roll and some flutter was observed on the left aileron. The airspeed was below the green arc about 65 knots. The right roll was arrested and the airplane appeared level. About a second later, the airplane entered an uncommanded left roll. The airspeed indication was about 65 knots. The control stick was in a neutral position. The left/forward rpm indication was near redline and the right/rear engine indication was about 4,500 rpm. As the airplane rolled through 90° of left bank, the pilot placed both hands on the control stick and commanded a right roll with a positive pitch attitude. The airplane continued to roll left, the nose dropped, and a green field came into view out of the front of the windscreen. The airplane rolled inverted and the recording continued until the subsequent ground impact. The altimeter during the recording did not exhibit an increase in altitude. However, an estimate from a chase helicopter video showed that airplane reached a maximum altitude between 80 and 100 ft above ground level. Additionally, a plot of observed parameters during the accident flight video was produced. The Onboard Image Recorder Factual Report is appended to the docket associated with this investigation.

An NTSB aerospace engineer, who was a member of the video group, reviewed the video recordings, assisted in observed video documentation, and produced an Airplane Performance Study. The performance study, in part, reviewed instrument readings as a function of camera elapsed time. The readings included indicated airspeed (VIAS), indicated angle-of-attack (α), left/forward and right/rear engine throttle lever angles (TLA), and the corresponding engine speeds (rpm).

A plot of the tabulated TLA's, rpm's, and VIAS's as a function of camera elapsed time was produced and the data showed that the engine speed for the forward engine began increasing from 6,000 rpm about 7 seconds elapsed time without any apparent TLA input from the pilot. The pilot responded by reducing TLA for the forward engine at 31 seconds elapsed time, about two seconds before the forward engine reached its maximum operating speed (red line) of 9,500 rpm.

The pilot continued to reduce TLA to a minimum of about 40° for the forward engine until, about 38 seconds elapsed time, he increased the forward TLA by 10°. The airplane's airspeed was observed decaying. The forward engine reached red line for a second time about 42 seconds elapsed time.

The input TLA and engine rpm for the right/rear engine appeared more consistent than for the left/forward engine. The rpm for the rear engine remained at

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approximately 5,800 rpm for most of the recording until, about 31 seconds elapsed time, the pilot began increasing the rear engine TLA by 7ø through the next ten seconds. During this time, the rear engine rpm remained constant despite the 7ø increase in TLA. The right engine rpm reduced to about 4,500 rpm after the pilot pulled the TLA back to 45ø about 41 seconds elapsed time.

The airspeed plot showed that the airplane decelerated below the published stall speed of 70 knots equivalent airspeed (based on a gross weight of 2,850 lb and a normal load factor of 1.04) about 41 seconds elapsed time and remained below the stall speed for the remainder of the recording. The video evidence reflected a sequence of events consistent with an aerodynamic stall.

The performance study used the tabulated airspeed and an estimated operational gross weight of 2,650 lb and determined the airplane lift coefficient that was extracted from the data as a function of indicated angle-of-attack. Where angle of attack data was available, the lift from the observed accident data compared consistently with design estimates derived by the Le Reve Bleu team. The Airplane Performance Study is appended to the docket associated with this investigation.

ADDITIONAL INFORMATION

Examination of the terrain from the accident site to one quarter mile north of the accident site revealed that a suitable field for an emergency landing was present there.