

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA258	05/04/2017 1515 EDT	Regis# N991TC	Stevensville, MD	Apt: Bay Bridge Airport W29
Acft Mk/Mdl AUTOGYRO CALIDUS		Acft SN US-C00483	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl ROTAX 914UL		Acft TT 18	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: DAVID M. ROGERS		Opr dba:		Aircraft Fire: NONE
				AW Cert: LTSP

Events

1. Takeoff - Loss of control on ground
-

Narrative

The pilot of the gyrocopter reported that during the takeoff roll, the rotor RPM was not increasing. He continued the takeoff and kept the gyrocopter on the ground to gain airspeed by not moving the stick in the full aft position. He added that this was an "old existing airplane habit". Subsequently, during the takeoff the gyrocopter developed a "rotor flap" and he lost directional control. The gyrocopter came to rest on its side to the left of the runway.

The pilot added that not having the stick full aft prevented the rotor RPM from increasing, and the appropriate corrective action would have been to apply full aft stick.

The gyrocopter sustained substantial damage to the fuselage and rotors.

The pilot reported that there were no pre-accident mechanical failures or malfunctions with the gyrocopter that would have precluded normal operation.

The Gyrocopter's Flight Manual states that during the takeoff roll, the pilot must "bring the control stick fully aft".

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Accident Rpt# ERA15FA245	06/21/2015 1532 EDT	Regis# N35EP	Holly Ridge, NC	Apt: Topsail Airpark 01NC
Acft Mk/Mdl CZECH SPORT AIRCRAFT AS PIPER	Acft SN P1001059	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 912 ULS	Acft TT 75	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: POWELL DILLARD M	Opr dba:	Aircraft Fire: NONE		AW Cert: LTSP

Events

1. Prior to flight - Miscellaneous/other
4. Initial climb - Loss of control in flight

Narrative

HISTORY OF FLIGHT

On June 21, 2015, about 1532 eastern daylight time, a Czech Sport Aircraft Piper Sport, N35EP, was substantially damaged when it impacted trees and terrain after a loss of control during climb after departing from Topsail Airpark (01NC), Holly Ridge, North Carolina. The private pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight, which was destined for the Albert J. Ellis Airport (OAJ), Jacksonville, North Carolina.

According to his wife, on the day of the accident, the pilot went to the airport to check on the airplane after they had lunch together. When he arrived at the airport, he met with the mechanic who was completing the condition inspection on the airplane, paid him for his services, and received a receipt. The pilot then went home but planned to return later and fly the airplane back to OAJ where it was based.

About 1500, the pilot's wife dropped him off at the airport. The temperature was in the "upper 90s;" the humidity was high, and there was little or no breeze. According to the pilot's wife, due to the airplane's "clear roof" (canopy), it would get hot inside of the airplane, and it was her husband's habit to leave the canopy up when it was hot until he was ready to depart.

The pilot's wife reported that he called her from the airplane before he took off at 1524 and advised her that it would take 45 minutes for her to reach OAJ, and he would be there in 15 minutes. He also advised her that he would meet her in the air-conditioned office of the fixed base operator (FBO) at OAJ. However, when she arrived at the FBO, he was not there.

At 1711, one of the two mechanics who had performed the condition inspection on the airplane received a call from the owner of 01NC who said that he had received a telephone call from the pilot's wife and that the pilot had not arrived at OAJ. The mechanic determined that the airplane was not at 01NC. After not finding the airplane around the area adjacent to the airport, the mechanic called 911. A search for the airplane by federal, state, and local authorities was initiated. About 2130, the wreckage of the airplane was discovered in a wooded area about 1.1 miles west of 01NC.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with a rating for airplane single-engine land. His most recent FAA third-class medical certificate was issued on July 24, 2013. He reported on that date that he had accrued 1,850 total hours of flight experience.

AIRCRAFT INFORMATION

The light-sport airplane was a single-engine, low-wing monoplane of conventional metal construction. It was equipped with a fixed-tricycle undercarriage with a castoring nose wheel, and was powered by a 100-horsepower, Rotax 912 ULS engine, driving a three-bladed Woodcomp ground-adjustable propeller.

The fuselage consisted of a semi-monocoque structure. The cockpit frame and canopy frame were constructed of carbon fiber. The canopy was made of Plexiglass. It was hinged at the front and was equipped with a sliding window on each side.

The fuselage also contained a ballistic recovery system (BRS) with a parachute to be deployed in case of emergency. The BRS consisted of a rocket-deploying container that was located just forward of the cockpit in the nose section of the fuselage. A cable ran from this container to an activation handle just to the right

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of the pilot's seat on the instrument panel. Once the activation handle had been pulled, the rocket would exit the fuselage and accelerate away from the airplane. After the parachute was completely extracted and exposed to the relative wind, it would begin to inflate, generating drag forces to decelerate the airplane. When the parachute had fully deployed, the airplane would descend at a rate of about 1,000 to 1,500 ft per minute.

According to FAA and maintenance records, the airplane was manufactured in 2010. Its most recent condition inspection was completed on the day of the accident. At the time of the inspection, the airplane had accrued 74.7 total hours of operation.

According to one of the two mechanics who performed the condition inspection, on June 19, 2015, the pilot flew the airplane to 01NC on a ferry permit. The ferry permit was required because the pilot had been sick and could not fly the airplane somewhere to have the condition inspection performed when it was due.

On June 20, 2015, the two mechanics began the condition inspection. On that date, the pilot advised the mechanics that he had accidentally "put oil" into the coolant fill port on top of the engine because he thought the oil level was low. The mechanics flushed the cooling system and added new coolant. The mechanics also noticed that the bushings holding the radiator onto the engine were cracked and replaced them.

The pilot told the mechanics that the engine oil had been changed 23 hours earlier and that the oil should not be changed. The mechanics then discovered that the spark plugs needed cleaning, but, after advising the pilot of the cost of new spark plugs, the pilot had them install new plugs instead of cleaning the old ones.

According to the mechanic, on the day of the accident, as part of the inspection, to the mechanics opened all the inspection panels on the airplane, closed them, and the airplane was returned to service about 1400. The mechanics then locked up the hangar and went home.

METEOROLOGICAL INFORMATION

At 1556, the recorded weather at the New River Marine Corps Air Station (NCA), Jacksonville, North Carolina, located 16 nautical miles northeast of the accident site, included: wind 230ø at 6 knots, 10 miles visibility, scattered clouds at 5,000 ft, temperature 34øC, dew point 22øC, and an altimeter setting of 29.94 inches of mercury.

AIRPORT INFORMATION

01NC was an uncontrolled, privately-owned airport, located 2 miles southwest of Holly Ridge, North Carolina.

The field elevation was 65 ft above mean sea level. The airport had two runways oriented in a 18/36 and 3/21 configuration. Runway 21 was turf covered, in good condition, and measured 3,200 ft long and 75 ft wide.

FLIGHT RECORDERS

The airplane was equipped with a Garmin GPSMAP 696 portable multifunction display that was mounted in a recess in the instrument panel. The unit consisted of a GPS receiver with a 7-inch diagonal high resolution liquid crystal display.

The unit could store data including, date, time, latitude, longitude, and altitude information for multiple flights in non-volatile memory (NVM).

Data recovered from the unit included track logs from June 5, 2011, through June 21, 2015. The last track log corresponded to the accident flight and contained data from 1525:57 to 1531:35.

According to the data, the airplane began its takeoff roll on runway 21 at 1530:19 and became airborne about 1530:38. The airplane continued to climb while turning to the west until about 1 minute after the takeoff, and, at 15:31:35, the airplane reached a GPS altitude of 309 ft and a derived groundspeed of 104 knots. This was the final recorded position.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that the airplane struck trees in a steep, nose-low attitude, and the pilot was ejected from the cockpit. The airplane then fell nose first to the forest floor below, impacted in a 90° nose-down attitude, nosed over, and came to rest inverted.

Numerous areas of crush and compression damage to the fuselage and wings were noted, and there was evidence of fuel staining on the leading edges of the wings. There was no evidence of any inflight structural failure, inflight fire, or inflight explosion.

Examination of the cockpit canopy revealed that it was detached from its mounting location and was lying underneath the aft portion of the inverted fuselage. The majority of its clear bubble was broken into multiple pieces; however, the pieces were not scattered around the accident site but were collocated with the canopy frame. One of the canopy lift struts was missing and was not recovered. The damage patterns observed on the canopy frame and cockpit sill did not match and could not be correlated with each other. The canopy latching mechanism hooks were found to be partially retracted, the canopy locking mechanism and activation handle were in the "OPEN" position, and the slots in the canopy frame that the hooks engaged when the canopy was closed and locked showed no evidence of tear-out.

Both wing fuel tank caps were closed, both wing locker doors were closed and secured, all the inspection panels were closed and secured, and the pitot tube was clear and free of debris. The wing flaps were in the up position, and flight control continuity was established from the ailerons, elevator, and rudder to the control stick and rudder pedals in the cockpit. The aileron, elevator, and rudder trims, were about neutral.

The pilot's four-point harness was intact and attached to its attachment fittings; however, the center buckle assembly was unlatched. The emergency locator transmitter had not been armed, and the ballistic recovery system activation handle safety pin with its "REMOVE BEFORE FLIGHT" flag was still in place.

The master switch, strobes switch, landing light switch, and electric fuel pump switch were all in the on position. The magneto switch was in the both position; the throttle was in the full throttle position; and the choke lever was in the off position. The fuel selector was in the right tank position. The carburetor heat control was in the off position.

Examination of the propeller speed reduction unit (PSRU) revealed that it was impact damaged, and the case had been breached. Examination of the propeller, the PSRU propeller gear assembly, and the PSRU overload clutch, revealed evidence of rotation. Smearing was evident on the metal faces of the overload clutch. The propeller drive shaft was also sheared, displayed a 45° conical break at the shear face, and showed evidence of torsional rotation.

Examination of the engine revealed that it was impact damaged; both carburetors had separated from their mounting locations, and the float bowls had separated from the carburetors. Portions of the air intake system, exhaust system, and the ignition harnesses had separated from their mounting positions.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot was an 89-year-old male, who, as of his last FAA medical exam, was 68 inches tall and weighed 187 pounds. The pilot had first applied for a medical certificate in 2004 and reported to the FAA a medical history that included coronary artery disease treated with a stent in 2002 and coronary artery bypass grafting in 2004. In addition, he had hypertension and a history of a period of atrial fibrillation. After additional detailed information was reviewed, the pilot received a special issuance third-class medical certificate in 2005 with the limitation that it was valid for 1 year.

The pilot continued to renew his special issuance medical certificate annually, providing detailed information requested by the FAA. He developed recurrent atrial fibrillation in 2008 when an atrial clot was also diagnosed. He was treated with rate control medication and blood thinners. With a few periods of being deferred because he needed to get better control of his rate or degree of blood thinning, the pilot generally continued to receive special issuance third-class medical certificates. At the time of his last exam, he reported using warfarin (a blood thinner), diltiazem (a blood pressure medicine also used to control the heart rate in patients with atrial fibrillation), and febuxostat (a medication to prevent attacks of gout) and received a special issuance third-class medical certificate limited by a requirement for corrective lenses and marked, "not valid for any class after 07/31/2014." At the time of the accident, the pilot was flying an airplane that met the definition of a light sport aircraft; thus, he was required only to hold a valid driver's license.

According to the autopsy performed by the Brody School of Medicine at East Carolina University, Division of Forensic Pathology, the pilot's cause of death was multiple extreme injuries due to aircraft crash, and the manner of death was accident. The evaluation of natural disease was limited. The heart was described

as "mildly enlarged" and weighed 430 grams (average for a 185-pound man is 358 grams with a range of 271-473 grams). The coronary arteries were significantly narrowed by atherosclerotic plaques including 80% stenosis of the left main and left anterior descending, 90% stenosis of the first diagonal, 70% stenosis of the circumflex, and 30% of the right coronary, which was fed by a patent coronary artery bypass graft. The septum was 1.5 centimeters thick (average is 1.3 centimeters). Microscopic evaluation of heart tissue demonstrated mild interstitial fibrosis.

The FAA's Bioaeronautical Research Laboratory, Oklahoma City, Oklahoma, performed toxicology testing, but it and was limited by the absence of available blood. The evaluation for volatiles identified 79 mg/hg of ethanol in muscle and 19 mg/hg in liver as well as N-butanol and N-propanol in muscle. Ethanol may be ingested in beer, wine, and liquor but may also be produced by microbial action after death. The alcohols N-butanol and N-propanol are only produced by microbial action after death. In addition, atenolol, verapamil, its metabolite norverapamil, and warfarin were detected in liver, and verapamil and warfarin were detected in muscle. Atenolol and verapamil are prescription medications used to treat hypertension and control the heart rate in atrial fibrillation. Warfarin is a blood thinner used to prevent clot formation and resulting strokes in patients in atrial fibrillation. None of these medications are impairing.

TESTS AND RESEARCH

The airplane manufacturer's published Pilot's Operating Handbook (POH) for the airplane stated that "Before engine starting," the canopy should be "clean, closed, and locked" and that the pilot should "tighten" the safety harness. The POH also stated that "Before takeoff," the cockpit canopy should be "closed and locked," recommended to "manually check by pushing the canopy upwards," and again stated to "tighten" the safety harness.

Review of Section 7 (Description of Airplane and Systems) in the POH revealed guidance regarding the canopy that stated, "make sure that the canopy is latched and mechanism is securely locked into position on both sides before operating the aircraft." Section 7 also provided guidance regarding the safety harness that stated, "adjust the buckle to a central position on the body."

Supplement 03 to the POH, issued September 2010, advised that, if a canopy inadvertently opened on an airplane, it would not be possible to close the canopy, but the airplane would be fully functional. The supplement indicated the following:

- During takeoff: the canopy would open about 2-inches.
- During climb and descent (with the airspeed at 60-75 knots): the canopy would stay open 2-3.2 inches.
- During horizontal flight (with airspeed at 60-80 knots): the canopy would stay open 2-3.2 inches.

The supplement advised that in all of the above-mentioned cases, there would be no flight problems, no vibrations, good aircraft control, and no change of flight characteristics. It recommended that, before takeoff, the pilot should "manually check the canopy is locked by pushing on the canopy upwards," and cautioned that, with the canopy open in flight, "do not perform any slipping."

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Accident Rpt# CEN15FA277	06/18/2015 738 MDT	Regis# N51311	Taos, NM	Apt: Taos Regional Airport SKX
Acft Mk/Mdl NORTHWING DESIGN APACHE SPORT-NOA	acft SN 41746	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 582		Fatal 1	Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: WATERHOUSE BUZZ	Opr dba:		Aircraft Fire: NONE	AW Cert: SPX

Summary

The 69-year old sport pilot, who had over 300 hours of flight experience in the accident airplane, successfully took off in his powered lift aircraft. Several witnesses who were working on the departure end of the runway reported seeing the aircraft take off from the runway, climb to about 500 ft, and then enter a right turn. The witnesses stated that the aircraft seemed to "fall out of the sky." One witness reported hearing the engine revving. Postaccident examination revealed no preimpact mechanical failures or malfunctions with the aircraft or the engine that would have precluded normal operation.

The pilot's autopsy revealed that he had severe coronary artery disease with 80% stenosis in the proximal left anterior descending coronary artery. In addition, there was evidence of scarring, indicating some previous damage to the myocardium. This degree of coronary disease placed him at risk for acute ischemia, or limitation of blood flow to the heart muscle, which can cause chest pain, shortness of breath, or decreased blood pressure. Ischemia can also be associated with an arrhythmia, which can cause palpitations, shortness of breath, or fainting. The identified scarring further increased the likelihood that he experienced an arrhythmia. None of these events would have left visible evidence on the autopsy.

The autopsy also revealed that the pilot had "extensive" emphysema or chronic obstructive pulmonary disease (COPD). Further, his wife reported that he had shortness of breath and used an inhaler to treat it. Significant COPD is commonly associated with the development of pulmonary hypertension or elevated pressures affecting the right side of the heart, which can lead to significant hypertrophy of the right side of the heart without affecting the left side. This likely caused the pilot's 0.7-cm-thick right ventricular wall, which was more than twice the average thickness. Although the severity of the pilot's pulmonary hypertension could not be determined by the postmortem evaluation, the combination of pulmonary hypertension and COPD significantly increased the pilot's risk of an acute cardiac event. Given the circumstances of the accident and the pilot's cardiac conditions, it is possible that he became acutely impaired or incapacitated by symptoms from his cardiac disease and that could have resulted in the loss of aircraft control. Given the lack of evidence on autopsy of a medical event occurring and given the limited witness observations, it could not be determined whether the loss of control was the result of incapacitation or if there was another reason that the aircraft departed controlled flight and the pilot was unable to regain control of the aircraft.

Toxicology tests showed that the pilot used zolpidem, which is used as a sleep aid and is acutely impairing. However, based on the available information and the tested specimen, it could not be determined whether effects from the pilot's use of zolpidem contributed to the accident. The pilot's toxicology results also indicated that he had used marijuana some time before the flight. However, tetrahydrocannabinol can undergo significant postmortem redistribution, which could have elevated or decreased the postmortem levels. As a result, the investigation could not determine whether effects from the pilot's use of marijuana contributed to the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The powered-lift aircraft's departure from controlled flight for reasons that could not be determined from the available information.

Events

1. Initial climb - Loss of control in flight

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Personnel issues-Physical-Health/Fitness-Predisposing condition-Pilot

Narrative

HISTORY OF FLIGHT

On June 18, 2015, about 0738 mountain standard time, a North Wing Apache Sport powered-lift aircraft, N51311, impacted terrain following a loss of control during initial climb after takeoff from Taos Regional Airport (SKX), Taos, New Mexico. The sport pilot sustained fatal injuries, and the aircraft sustained substantial damage. The aircraft was registered to the pilot/owner and was being operated as a 14 Code of Regulations (CFR) Part 91 personal flight. Day visual meteorological conditions existed at the time of the accident near the accident site, and a flight plan had not been filed for the local flight, which departed about 0736.

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Several witnesses who were working on the departure end of runway 22 reported seeing the aircraft take off from the runway, climb to about 500 ft, and then enter a right turn. The witnesses stated that the aircraft seemed to "fall out of the sky" and stall before it collided with terrain adjacent to and right of the departure end of the runway. One witness stated that he heard the engine revving before impact. See figure 1 for an overhead image of SKX and the accident location.

PERSONNEL INFORMATION

The 69-year old pilot held a sport pilot certificate for powered-lift aircraft. A review of the pilot's logbook revealed that he had 540 total flight hours, all of which were in powered-lift aircraft and 300 hours of which were in the accident aircraft. According to logbook entries, the last time that the pilot had flown the accident aircraft was August 9, 2014. The most recent entry in the pilot's logbook was dated September 8, 2014, in which he flew another aircraft of the same make and model. Interviews with a family member and a friend of the pilot confirmed that this was pilot's last flight before the accident flight. The family member stated that the pilot kept meticulous records. According to an entry on the last page of his logbook, the pilot had successfully completed a flight review in accordance with 14 CFR Section 61.56(a) on November 22, 2014. The entry was signed by a flight instructor, but the number of flight hours for that flight were not recorded.

According to the logbook entries, in previous years, there was a pattern of the pilot not flying the aircraft for several month periods during the winter.

The pilot did not record any flights between:

October 28, 2013, and May 28, 2014

October 14, 2002, and February 5, 2014

January 3, 2013, and May 13, 2012

September 28, 2011, and January 3, 2012

AIRCRAFT INFORMATION

The two-seat, powered-lift aircraft, serial number 4608087, was manufactured and owned by the pilot since 2003. The aircraft had a special airworthiness certificate classifying its operation in the experimental light sport aircraft category.

The aircraft was powered by a rear-mounted engine, Rotax model 582 UL. According to a friend of the pilot, the aircraft was in good condition, was well maintained by the pilot, and had been stored in an airport hangar since it was new.

AIRPORT INFORMATION

SKX is a public airport located about 8 miles northwest of Taos at an elevation of 7,094 ft mean sea level. SKX's principal runway is 4/22, which is 4,083 ft long and 75 ft wide and surfaced with asphalt. A postaccident examination of the runway revealed no abnormalities, and no aircraft parts were found along the takeoff path.

METEOROLOGICAL INFORMATION

At 0713, the routine aviation weather report for SKX was calm wind, no ceiling, clear skies, visibility 10 statute miles, temperature 18°C, dew point 8°C, and an altimeter setting of 30.35 inches of mercury.

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WRECKAGE AND IMPACT INFORMATION

On-site examination of the aircraft, including the flight controls, structure and engine, revealed no evidence of any mechanical anomalies. Ground scars and the orientation of the wreckage were consistent with the aircraft impacting the ground in a nose-low attitude. No manufacturing anomalies were noted with the aircraft. The wooden propeller assembly was shattered and exhibited signatures consistent with the engine producing power at the time of impact. See figure 2 for a photograph of the accident site and wreckage.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsy

The University of New Mexico Health Sciences Center, Office of the Medical Investigator, performed an autopsy on the pilot. The cause of death was reported to be "multiple blunt force injuries," and the manner of death was reported to be "accident."

The autopsy identified significant coronary artery disease with 80% stenosis of the proximal left anterior descending coronary artery, as well as increased interstitial fibrosis (scarring) of the wall of the heart. The thickness of the right ventricular wall was significantly increased at 0.7 cm (average thickness is 0.3 cm). In addition, there was evidence of arteriosclerosis in the kidneys and extensive emphysema in the lungs.

Toxicology

The Federal Aviation Administration's (FAA) Bioaeronautical Research Laboratory performed toxicology testing of specimens from the pilot. The testing detected sildenafil, its metabolite desmethylsildenafil, and zolpidem in the urine and blood (0.003 ug/ml of zolpidem in blood). In addition, 0.0036 ug/ml of tetrahydrocannabinol (THC) and 0.0105 ug/ml tetrahydrocannabinol carboxylic acid (THC-COOH) were identified in the cavity blood. THC-COOH was also identified in the liver (0.0219 ug/ml) and brain (0.0012 ug/ml).

Sildenafil is a prostaglandin inhibitor used to treat erectile dysfunction or pulmonary hypertension and is not impairing. Zolpidem is a short-acting prescription sleep aid and is a Schedule IV controlled substance that carries the warning, "May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)." Therapeutic levels of zolpidem are typically between 0.0250 and 0.3000 ug/ml.

THC is the psychoactive compound found in marijuana, and THC-COOH is its inactive metabolite. THC concentrations typically peak while smoking, whereas THC-COOH concentrations typically peak about 9 to 23 minutes after the start of smoking. Significant performance impairments are usually observed for at least 1 to 2 hours after using marijuana, and residual effects have been reported up to 24 hours.

Medical History

Attempts were made to locate the pilot's primary physician and obtain his personal medical records, but according to the pilot's wife, the physician had recently retired and left town. Therefore, no personal medical records were made available for review. The pilot's wife reported that he had shortness of breath and often used an inhaler to treat it.

ADDITIONAL INFORMATION

The wreckage was released to the owner's representative.

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Accident Rpt# GAA17CA370 06/26/2017 1645 PDT Regis# N473CQ Cottonwood, AZ Apt: Cottonwood P52
Acft Mk/Mdl AERO-ACE CE 1 Acft SN PARD-1 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: MIGUEL A. GONZALEZ Opr dba: Aircraft Fire: NONE

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Accident Rpt# GAA17CA251	04/30/2017 1715	Regis# N164JB	Wheatland, WY	Apt: N/a
Acft Mk/Mdl BENDER JOSEPH KIT ROTOWAY-NO		Acft SN 6763	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl ROTORWAY		Acft TT 298	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: BEN HILTY		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

3. Landing-flare/touchdown - Dynamic rollover

Narrative

The pilot of an experimental amateur-built helicopter, which had a clockwise rotating main rotor blade, reported that he took off from private property with a right crosswind. He added that when the helicopter reached 20-30 knots, about 50 ft. above ground, he turned southwest, which resulted in a right quartering tailwind. He further added that as he made the turn, he applied right anti-torque pedal, but "nothing was there." Subsequently, the pilot reported that he decided to "set it down" in a field ahead, and about 3-5 ft. above the ground the "tail started to come around counter-clockwise." During the touchdown, the right skid caught on a hidden car muffler and the helicopter rolled onto its right side and impacted terrain.

During a postaccident interview, the pilot reported that he "lost tail rotor effectiveness," and he encountered "too much wind for this aircraft [helicopter]."

The main rotor and tail boom sustained substantial damage.

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

In an interview with the National Transportation Safety Board investigator-in-charge, the pilot reported that the wind was from the north, about 15 knots. An automated weather observation station (AWOS), 41 nautical miles (NM) from the accident site, about the time of the accident, recorded wind 350ø at 14 knots, gusting to 26 knots. The AWOS recorded a peak wind, about 20 minutes before the accident, 340ø at 30 knots. The density altitude, at the nearest airport with a recorded AWOS, 41 NM from the accident site, was 5,332 ft.

The Federal Aviation Administration Helicopter Flying Handbook stated in part: Loss of tail rotor effectiveness (LTE) or an unanticipated yaw is defined as an uncommanded, rapid yaw towards the advancing blade which does not subside of its own accord. It can result in the loss of the aircraft if left unchecked." The handbook further stated in part: "At higher altitudes where the air is thinner, tail rotor thrust and efficiency are reduced. Because of the high density altitude, powerplants may be much slower to respond to power changes. When operating at high altitudes and high gross weights, especially while hovering, the tail rotor thrust may not be sufficient to maintain directional control, and LTE can occur."

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Accident Rpt# ERA17FA211	06/25/2017 906 EDT	Regis# N50130	Federalsburg, MD	Apt: Private PVT
Acft Mk/Mdl BUCKEYE POWERED PARACHUTES INC	Acft SN 3315	Acft Dmg: SUBSTANTIAL	Fatal 1	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl ROTAX 582		Ser Inj 0	Fit Conducted Under: FAR 091	
Opr Name: MALICK MICHAEL L	Opr dba:	Aircraft Fire: NONE		AW Cert: SPX

Events

1. Initial climb - Controlled flight into terr/obj (CFIT)

Narrative

On June 25, 2017, at 0906 eastern daylight time, an experimental light-sport Buckeye Powered Parachutes Inc. Dream Machine 582, N50130, was substantially damaged after it impacted power lines and terrain near Federalsburg, Maryland. The commercial pilot was fatally injured. Visual meteorological conditions prevailed and no flight plan was filed for the flight that originated from a private airstrip, at the time of the accident. The local personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

A neighbor and friend assisted the pilot with the aircraft and watched the accident flight. He provided a written statement and was interviewed at the scene. According to the witness, the pilot taxied into position for takeoff to the north from his turf airstrip, which was orientated 33/15. The pilot "gave more throttle" after liftoff and the aircraft turned to its left. The aircraft climbed to about 35 feet above ground level, turned approximately 60 degrees to the left, and collided with the wires along the roadway which were about 245 feet left of the runway centerline. During the entire flight, the engine sounded smooth, continuous, and "normal" with no interruption of power. The aircraft struck the wires on the near side of the roadway, the pilot was ejected, and both the pilot and the aircraft came to rest on the far side of the road.

In a written statement, a neighbor reported she watched the initial ground run of accident aircraft "parallel to the road," and believed it might be a "4-wheeler or something." When she looked again, she saw the aircraft in flight, and watched as it collided with power lines that ran along the roadway.

The aircraft came to rest upright, and except for some structural tubing and landing gear which was fractured, it remained largely intact. Flight and engine control continuity was confirmed, and the engine was secure in its mounts. The blades of the three-bladed propeller were fractured near their roots, but the propeller hub was securely mounted to the crankshaft. The battery was out of its tray, and the positive lead was disconnected. The 'aft' carburetor was separated from its rubber intake manifold/mount. All fuel lines remained connected and intact. There was no odor of fuel, and no evidence of fuel leakage anywhere in the fuel system. A test run of the engine revealed that it ran smoothly and continuously with no anomalies noted.

The pilot held a commercial pilot certificate with ratings for airplane single engine land, airplane multiengine land, and instrument airplane. His most recent Federal Aviation Administration (FAA) third-class medical certificate was issued March 27, 1984, he reported 400 total hours of flight experience on that date.

Examination of the pilot's logbook revealed a single entry which reflected an instructional flight of 1.2 hours in a powered parachute. He annotated 6.5 hours of ground instruction in July 2016. There was no solo endorsement for powered parachutes annotated in the logbook.

The tandem-seat, parachute-wing, tricycle-gear aircraft was manufactured in 1995 and was powered by a Rotax 582, 66-horsepower engine. The maintenance records for the aircraft were not located during an extensive search, and therefore the maintenance history of the aircraft could not be determined.

At 0845, weather conditions reported at Easton/Newnam Field Airport (ESN), Easton, Maryland, 12 nautical miles northwest of the accident site included scattered clouds at 7,000 feet, 10 statute miles of visibility, and wind from 330ø at 4 knots. The temperature was 25ø C, the dew point was 19ø C, and the altimeter setting was 30.05 inches of mercury.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA16FA084 01/07/2016 1540 CST Regis# N508AH Lebanon, TN Apt: Lebanon Muni M54
Acft Mk/Mdl EROS 1600 Acft SN 001 Acft Dmg: SUBSTANTIAL Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl ROTAX 532 Acft TT 14 Fatal 1 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: HARRELL MARK L Opr dba: Aircraft Fire: NONE
AW Cert: SPE

Summary

The private pilot conducted a 20-minute local flight in the experimental, amateur-built airplane after installing a new ignition coil on the two-stroke, two-cylinder engine. He then returned to the departure airport, where he landed the airplane, back-taxed on the runway, and initiated a second takeoff. Witnesses reported that, shortly after takeoff, the airplane experienced a total loss of engine power. The airplane entered a left turn back toward the runway, then subsequently turned "sharply" left and descended to ground contact.

Examination of the airframe revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. Examination of the engine revealed that the front spark plug was burnt white, consistent with exposure to high temperatures or an excessively lean carburetor calibration. Although both front and aft carburetor adaptors exhibited degradation, the front cylinder adaptor exhibited significantly more damage and cracking compared to that of the aft cylinder. This likely resulted in additional air being ingested by the front carburetor, which subsequently resulted in a leaner fuel/air mixture in that cylinder. In addition, the front cylinder piston exhibited a hole about 1 centimeter in diameter, consistent with detonation/preignition. Records located in the pilot's hangar indicated that the pilot was servicing the engine with a fuel/oil ratio of 40:1, rather than the manufacturer-recommended ratio of 50:1.

It is likely that the use of an improper fuel/oil ratio resulted in carbon deposits in the front cylinder. Combined with the effects of the lean fuel/air mixture as a result of the degraded carburetor adaptors, the engine was susceptible to the development of detonation and/or preignition, which subsequently resulted in the development of a hole in the front cylinder piston head. As a result, the engine experienced a total loss of power, to which the pilot responded by attempting to turn back to the airport at low altitude. During the turn, the pilot allowed the airplane's airspeed to decay and exceeded its critical angle of attack, which resulted in an aerodynamic stall and collision with terrain.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A failure of the front cylinder piston due to the pilot's improper maintenance, which resulted in a total loss of engine power after takeoff. Contributing to the accident was the pilot's decision to return to the runway at low altitude following the loss of engine power, and his failure to maintain adequate airspeed during the turn, which resulted in the airplane exceeding its critical angle of attack and experiencing an aerodynamic stall.

Events

1. Initial climb - Loss of engine power (total)
2. Emergency descent - Abrupt maneuver
3. Emergency descent - Aerodynamic stall/spin
4. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine (reciprocating)-Recip eng cyl section-Failure - C
2. Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Pilot - C
3. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - F
4. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - F
5. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - F
6. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Angle of attack-Not attained/maintained - F

Narrative

HISTORY OF FLIGHT

On January 7, 2016, about 1540 central standard time, an experimental amateur-built Eros 1600 airplane, N508AH, collided with terrain following a total loss of engine power near Lebanon, Tennessee. The private pilot was fatally injured, and the airplane was substantially damaged. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed in the area, and no flight plan was filed for the local flight, which departed from Lebanon Municipal Airport (M54).

GPS data indicated that the airplane departed M54 at 1515 and conducted an approximate 20-minute local flight. The airplane then returned to the airport,

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landed, and initiated a second takeoff.

One witness, who was a pilot, stated the airplane conducted a normal takeoff, then began a right turn at low altitude. The airplane then "abruptly" turned left about 100 ft above ground level (agl) "as if it was trying to return to the airport." The airplane subsequently rotated "sharply" to the left and descended to ground contact as it disappeared from his view. Several witnesses reported hearing the airplane "circle" at low altitude, followed by a loss of engine power.

A friend of the pilot stated that the pilot had been performing maintenance on the engine because it was "intermittently missing." The pilot had installed a new ignition coil onto the engine, and on the day of the accident, the pilot reinstalled the engine onto the airplane. The accident flight was a test flight to determine if the engine problem had been resolved.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with a rating for airplane single-engine land. In addition, the pilot held a repairman experimental aircraft builder certificate that was issued on May 15, 2014. He was issued a third-class FAA medical certificate on August 24, 2006, with no limitations. The pilot's logbooks indicated that he had about 259 total hours of flight time, of which 8.9 hours were in the accident airplane. His most recent flight review was completed on May 27, 2014.

AIRPLANE INFORMATION

According to FAA records, the experimental amateur-built airplane was owned by the pilot and issued an airworthiness certificate on May 15, 2014. It was equipped with a two-cylinder Rotax 532, 64-horsepower (hp) engine, which was installed on October 7, 2015. According to maintenance logbooks, the airplane had a total time of about 14 hours. The airplane's most recent condition inspection was completed by the pilot on October 7, 2015, at a total time of 1.6 hours. A white board in the pilot's hangar noted that he serviced the engine with a fuel/oil ratio of 40:1. According to the pilot's son, the engine was previously installed on a snowmobile.

According to the airplane operating handbook, the airplane was designed to be equipped with a 41-hp, Rotax 447 engine. With this engine installed, the airplane's flaps-up stall speed was 34 mph, and its flaps-extended stall speed was 29 mph. The emergency procedures section stated,

"About the only failure you can have in planes as simple as the MAX is an engine failure, and since you are flying an uncertified engine, that occurrence is not too unlikely. Unless the failure is a result of inadvertently switching off the magneto, a restart is unlikely, therefore, begin planning immediately for a forced landing.

Establish a glide at minimum airspeed at least 45 [calibrated airspeed]. If you are climbing, immediately lower the nose to the glide attitude. Pick a landing spot (you should already have one in mind). The MAX glides at about 6/1 angle, but any turbulence will strongly effect this. Also, keep in mind wind shear (gradient) as you approach the ground, and keep your airspeed up in a strong wind.

Perform a normal power off landing (you should have practiced this many times). Minimum airspeed as you begin your flare should be approximately 40 mph. Any lower airspeed and you may not have enough energy to arrest your sink rate."

METEOROLOGICAL INFORMATION

The 1553 recorded weather observation at Smyrna Airport (MQY), Smyrna, Tennessee, located about 14 nautical miles southwest of the accident location, included wind from 120° at 4 knots, visibility 10 statute miles, broken cloud layers at 3,500 ft agl and 4,400 ft agl, temperature 13°C, dew point 8°C, and an altimeter setting of 30.02 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted terrain and came to rest inverted on a westerly heading, next to a residence located about 850 ft from the departure end of runway 04. All components of the airplane were located near the wreckage. Flight control continuity was established from the flight controls in the cockpit to all flight control surfaces.

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The propeller was rotated by hand and engine continuity was confirmed from the propeller flange to the back of the engine. The two spark plugs were removed; the aft cylinder spark plug was dark grey in color and exhibited normal wear. The front spark plug was white in color. Thumb compression was obtained on the aft cylinder, however, no compression was observed on the front cylinder.

The top section of the engine case was removed to facilitate further examination, and a hole was found in the front cylinder piston. The hole was approximately 1 centimeter in diameter located in the center of the piston. The aft cylinder exhibited carbon deposits and oil residue on the top of the cylinder. The connecting rod bearings were loose in both the front and aft cylinders. The exhaust y-pipe was removed and carbon deposits were noted in the aft exhaust pipe. The front cylinder exhaust gas temperature probe was white in color, and the aft cylinder exhaust gas temperature probe was grey in color.

Each of the engine's two carburetors were impact separated but remained attached to the engine through cables. Disassembly of both carburetors revealed that the respective jet needles were on the third clip from the top and were under the white retaining cup, and both the main jet and the pilot jet were free of debris. The front and aft carburetor rubber adaptors contained cracks and evidence consistent with material degradation. The front carburetor adaptor was also partially fractured in several places around the boot.

The rotary valve plate cover was removed to examine the timing of the rotary valve. It was timed so that the intake port on the cylinder was fully open when the respective piston was at the top dead center position.

The ignition coil remained attached to the engine; however, a wire was separated. The coil was rigged and was tested. Ignition continuity was confirmed from the flywheel to the spark plugs during propeller rotation.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Medical Examiner, Nashville, Tennessee, performed an autopsy on the pilot. The autopsy report indicated that the pilot died as a result of multiple blunt force injuries.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of the pilot. Fluid and tissue specimens from the pilot tested negative for carbon monoxide and ethanol. Sitagliptin, an oral prescription medication for the treatment of Type 2 diabetes, was detected in the liver and blood. The pilot's diabetes and his treatment were not likely to be impairing at the time of the accident.

TESTS AND RESEARCH

A Garmin Aera 500 GPS navigation device was recovered from the wreckage and sent to the NTSB Recorders laboratory for download. The retrieved data indicated that the airplane began its taxi at 1509 and departed runway 01 about 1515. The airplane maneuvered in the area, returned to the airport, and landed on runway 04 about 1537. It back-taxied on the runway and began another takeoff at 1538:08. At 1539:02, the airplane reached a maximum of 853 ft GPS altitude at a ground speed of 41 knots, and then began a descending left turn. The airplane continued descending, completed a 360° left turn, and the last data point recorded was at 1539:49, at 620 ft GPS altitude. During the last minute of recorded data, the airplane's ground speed peaked at 46 knots and decreased to 2 knots through the turn.

ADDITIONAL INFORMATION

Engine Operator's Manual

According to the engine operator's manual, the proper mixing ratio of fuel to oil was 50:1. The manual stated, "Too much oil will cause carbon deposits on the spark plug, on the piston, in the cylinder ports and in the muffler and will cause problems." The manual stated that white spark plug electrodes indicated a low heat range (hot plug) or excessively lean carburetor calibration.

Engine Repair Manual

The engine repair manual stated that the carburetor must be checked and adjusted after every 25 hours of operation. The carburetor adaptor should be checked thoroughly for "tightness, cracks, cuts or other physical damage." The manual stated that, at "the slightest signs of damage" the carburetor adaptor

should be exchanged, "Otherwise pressure conditions in carburetor will be changed, additional air will be taken in, possibly leading to engine damage."

Pilot's Handbook of Aeronautical Knowledge - Aircraft Systems

According to the Pilot's Handbook of Aeronautical Knowledge,

"Detonation is an uncontrolled, explosive ignition of the fuel/air mixture within the cylinder's combustion chamber. It causes excessive temperatures and pressures which, if not corrected, can quickly lead to failure of the piston, cylinder, or valves.

Detonation is characterized by high cylinder head temperatures and most likely occur when operating at high power settings. Common operational causes of detonation are:

- Use of a lower fuel grade than that specified by the aircraft manufacturer.
- Operation of the engine with extremely high manifold pressures in conjunction with low rpm.
- Operation of the engine at high power settings with an excessively lean mixture.
- Maintaining extended ground operations or steep climbs in which cylinder cooling is reduced.

Preignition occurs when the fuel/air mixture ignites prior to the engine's normal ignition event. Premature burning is usually caused by a residual hot spot in the combustion chamber, often created by a small carbon deposit on a spark plug, a cracked spark plug insulator, or other damage in the cylinder that causes a part to heat sufficiently to ignite the fuel/air charge. Detonation and preignition often occur simultaneously and one may cause the other."

According to an engine manufacturer presentation on piston failure analysis, the damage noted on the front piston was consistent with piston dome detonation, which can be a result of "pre-ignition, leading to detonation."

A pamphlet published by the FAA Safety Team entitled, "Aircraft Control After Engine Failure on Takeoff" stated, "Studies have shown that startle responses during unexpected situations such as a powerplant failure during takeoff or initial climb have contributed to loss of control of aircraft. Research indicates a higher probability of survival if you continue straight ahead following an engine failure after takeoff. Turning back actually requires a turn of greater than 180 degrees after taking into account the turning radius. Making a turn at low altitudes and airspeeds could create a scenario for a stall/spin accident."

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15LA169	03/07/2015 1230 CST	Regis# N154BH	Rusk, TX	Apt: Cherokee County Airport JSO
Acft Mk/Mdl HOKE BOBBY F RANS S 12		Acft SN 0195553	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl BOMBARDIER ROTAX (ALL)		Acft TT 1406	Fatal 0 Ser Inj 2	Flt Conducted Under: FAR 091
Opr Name: ROBERT GATEWOOD		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Approach-VFR pattern downwind - Loss of engine power (partial)
-

Narrative

On March 7, 2015 about 1230 central standard time, a Rans S-12 Experimental Ultralight, N154BH, registered to a private individual, collided with trees and the ground while maneuvering to land after reported engine problems while in the landing pattern at the Cherokee County Airport (JSO), near Rusk, Texas. The pilot and passenger sustained serious injuries and the aircraft was substantially damaged. The local flight was being conducted under the provisions of Federal Code of Regulations Part 91. Visual meteorological conditions prevailed in the area and a flight plan was not filed.

According to the FAA, about 2 weeks prior to the accident, the passenger had purchased the ultralight aircraft. The purpose of the flight was to become familiar with the newly acquired aircraft. The PIC had about 11,000 hours of total flight time, with about 2 hours in the accident make and model. The PIC's most recent BFR was conducted on December 9, 2014. According to a written bill of sale, the passenger purchased the airplane on February 19, 2015. The aircraft's most recent conditional inspection was conducted on March 3, 2015.

Witnesses reported that the ultralight aircraft was doing touch and go landings at JSO. They reported that the engine did not sound normal and observed the aircraft maneuver toward a field before it stalled, collided with trees and impacted the ground. The pilot and passenger were transported to the hospital after the accident. The FAA traveled to the accident scene and inspected the accident area and wreckage. There was evidence of fuel smell at the accident site. Inspection of the airframe and engine at the accident site did not reveal any abnormalities.

The reported weather observation METAR at JSO about the time of the accident was:

KJSO 071735Z AUTO 0000KT 10SM BKN100 12/M05 A3048 RMK AO2 T01211051

According to the Icing Probability Chart, with a temperature of 12 degrees and dew point of 5 degrees, the aircraft engine was operating in an area conducive to severe icing at any power setting.

The NTSB did not receive a NTSB form 6120, Pilot/Operator Report or statements from the pilot and passenger. It is unknown if the passenger/owner had flight experience.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA272	05/07/2017 1315 CDT	Regis# N458V	Chesterfield, MO	Apt: Spirit Of St Louis SUS
Acft Mk/Mdl JOHN MURPHY JSX-2-NO SERIES		Acft SN 004	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl PBS VELKABITES TJ-100		Acft TT 7	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JOHN R. MURPHY TRUSTEE		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Landing - Hard landing
-

Narrative

The pilot reported that, after takeoff, about "100 ft. above ground level" the canopy opened and the airplane became "very hard to control". He added, that he was able to return to the airport to land, however during the approach the airplane was unstable due to the "pitching and yawing". Subsequently, during the landing flare when he reduced engine power, the airplane touched down hard and the landing gear collapsed. The airplane exited the runway to the right, and came to rest nose down.

The airplane sustained substantial damage to the fuselage.

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

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15FA426	09/26/2015 1222 CDT	Regis# N401	Ama, LA	Apt: St Charles LS40
Acft Mk/Mdl JONES RALPH D ZODIAC CH 601 HD		Acft SN 6-3106	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-235-C1		Acft TT 1387	Fatal 1 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: GUY J SEGHERS III		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Initial climb - Loss of control in flight

Narrative

HISTORY OF FLIGHT

On September 26, 2015, at 1222 central daylight time, an amateur-built Zodiac CH 601 HD airplane, N401, impacted terrain near St. Charles Airport (LS40), Ama, Louisiana. The pilot was fatally injured, and the airplane was substantially damaged. The airplane was registered to Buffalo RD, LLC, and was operated by the pilot as a 14 Code of Federal Regulations Part 91 personal flight. Day visual meteorological conditions existed near the accident site about the time of the accident, and no flight plan had been filed. The local flight originated from LS40 at 1221.

According to GPS data downloaded from a Garmin Aera 500 GPS located in the wreckage, the airplane began its takeoff roll on runway 17 at LS40 at 1221:18. The maximum groundspeed during the takeoff roll was 84 knots. After takeoff, the groundspeed varied between 45 and 96 knots as the airplane turned to a southwesterly heading. At 1222:32, the airplane made a right turn toward the northwest. At 1222:37, the last recorded data point, the airplane was at 66 ft GPS altitude at a groundspeed of 15 knots. LS40 field elevation is 13 ft. When the airplane failed to return to the airport, a search was initiated. The wreckage was found the next day about 1300.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with airplane single-engine land and gyroplane ratings. He held a Federal Aviation Administration third-class airman medical certificate, dated December 1, 2014, which contained the restriction, "must wear corrective lenses." The pilot's flight logbook was not located. The pilot did not report his flight time on his most recent application for his medical certificate; however, on a 1987 application for a medical certificate, the pilot reported he had logged an estimated 170 total flight hours.

AIRCRAFT INFORMATION

Zodiac Aircraft manufactured the airplane, serial number 6-3106, in kit form, and it was assembled in 2002. It was powered by a 65-horsepower Lycoming O-235-C1 engine, serial number 5544-15, and was equipped with a Warp Drive 3-bladed, fixed-pitch composite propeller. The propeller had been trimmed from 72 to 70.5 inches to increase static rpm to 2,750.

Maintenance records indicated that the airframe's last conditional inspection was completed on June 9, 2015, at a tachometer time of 1,384.9 hours. At the accident site, the tachometer read 1,387.5 hours.

The engine received a field overhaul on January 18, 1965, and was installed in the airplane on May 22, 2012. At the time of the accident it had accrued 227.73 total hours and 72.77 hours since the overhaul. The engine's last 100-hour inspection was completed on June 9, 2015, at a tachometer time of 1,384.9 hours.

METEOROLOGICAL INFORMATION

The closest official weather reporting station was at Louis Armstrong New Orleans International Airport (MSY), New Orleans, Louisiana, about 3 miles northeast from the accident location. At 1153, the MSY Automated Surface Observing System reported wind from 030 \emptyset at 9 knots; visibility 10 miles; few clouds at 3,000 ft; ceiling 12,000 ft broken, 20,000 ft overcast; temperature 27 \emptyset C, dew point 21 \emptyset C; and an altimeter setting 29.97 inches of mercury.

A review of the Carburetor Icing Probability Chart indicated the temperature and dew point about the time of the accident near the accident site were conducive to "serious icing at descent power."

National Transportation Safety Board - Aircraft Accident/Incident Database

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was found in a thickly wooded area less than .25 miles southwest of the departure end of runway 17 at LS40. Tree branches directly above the wreckage were broken, and the airplane struck the ground in about an 80°-nose-down attitude, as evidenced by damage to the wreckage and broken tree branches. The engine was skewed to the right with the right wing leading and the left wing trailing. The empennage was bent down to the left. The three-blade composite propeller remained attached to the engine. Two blades were intact. The third blade was broken off and located near the engine. All major airplane components and flight control surfaces were accounted for at the accident site.

MEDICAL AND PATHOLOGICAL INFORMATION

The St. Charles Parish Coroner's Office, Luling, Louisiana, conducted an autopsy of the pilot. According to the autopsy report, the pilot's cause of death was "multiple blunt force injuries, atherosclerotic cardiovascular disease". The autopsy identified 60% narrowing of the left anterior descending coronary artery, a transmural infarct (scar from an old heart attack) in the left ventricle, and no obvious recent infarcts (damage).

The FAA's Bioaeronautical Sciences Research Laboratory conducted toxicology testing on specimens from the pilot. Results were negative for all substances tested for.

TESTS AND RESEARCH

Emergency Locator Transmitter.

An Ameri-King Corporation AK-450 Emergency Locator Transmitter (ELT), S/N 499-664, was recovered from the wreckage and examined for functionality. The ELT was designed to transmit an emergency signal on 121.5/243 Mhz when activated. The recovered ELT passed all functional test during the examination and no anomalies were noted. Cospas-Sarsat Satellite monitoring for 121.5/243 Mhz was terminated in 2009. As such, ELTs broadcasting on 121.5/243 Mhz rely on reception by nearby aircraft or search and rescue personnel.

Engine and Airframe Examination.

The engine was rotated by turning the propeller. Continuity was confirmed from the crankshaft to the rear gears and to the valve train. Compression and suction were observed from all four cylinders. The interiors of the cylinders were examined using a lighted borescope and no anomalies were noted.

A review of copies of airframe and engine logbooks revealed the engine was last overhauled on 01/18/1965. It was installed on the accident aircraft on the accident aircraft on 05/22/2012 with 72.77 hours since that overhaul and had accumulated a total of 227.73 hours time in service and more that 50 calendar years since overhaul at the time of the accident.

The engine was equipped with a Warp Drive 3-blade composite propeller, S/N T7872. The propeller spinner was fragmented. The propeller and two propeller blades remained attached to the crankshaft flange. The remaining propeller blade was separated from the hub at the blade root.

The carburetor air box was impact damaged and the position of the carburetor heat valve undetermined. The carburetor heat knob in the cockpit was in a full forward position. The carburetor remained attached to the engine. The throttle and mixture control cables were impact damaged. The throttle cable remained attached to the carburetor throttle control arm and the arm was observed in a full throttle position. There were two controls labeled "throttle" in the cockpit. The left control was over extended aft. The right control was full forward. The mixture control cable remained attached to the carburetor mixture control arm. The arm was observed in a full lean position. The cockpit mixture control knob was fully forward.

The carburetor was removed and partially disassembled. No damage was noted to the carburetor internal components. A few drops of liquid were observed in the carburetor fuel bowl. The liquid had an odor consistent with aviation fuel. A check of the liquid with water finding paste was negative for water. The carburetor fuel inlet screen was unobstructed. The aircraft fuel strainer/gascolator bowl was separated and found among the wreckage. The fuel screen was not observed.

The aircraft fuselage fuel tank was partially crushed and empty. The tank on/off valve and screen assembly was removed. Debris was observed on the outer

National Transportation Safety Board - Aircraft Accident/Incident Database

surface of the screen. A hole was observed in the screen mesh. A fuel vent tube was observed in the upper corner of the fuel tank. No hose was attached to the tube and a bolt was observed driven into the tube, obstructing the opening. The fuel tank cap appeared to be an automotive type "screw on" oil cap drilled for a float and rod type fuel level indicator. The float was observed about « full of liquid. The liquid from the float was not examined.

The left magneto was impact separated from the engine. The right magneto mounting flange was fractured and it remained partially attached to the engine. Both magnetos produced spark from all ignition towers when rotated by hand.

The starter was impact fractured and separated from the engine. The alternator remained attached to the engine and no damage was noted. The alternator belt remained in place. Oil was observed in the engine. No debris was observed in the engine oil screen.

No mechanical malfunctions or failures were noted with the engine or airframe that would have precluded normal operation.

ADDITIONAL INFORMATION

Lycoming Engines Service Instruction 1009AW states the following:

Engine deterioration in the form of corrosion (rust) and the drying out and hardening of composition materials such as gaskets, seals, flexible hoses and fuel pump diaphragms can occur if an engine is out of service for an extended period of time. Due to the loss of a protective oil film after an extended period of inactivity, abnormal wear on soft metal bearing surfaces can occur during engine start. Therefore, all engines that do not accumulate the hourly period of TBO [time between overhaul] specified in this publication are recommended to be overhauled in the twelfth year.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# ERA17CA129 03/12/2017 1358 EDT Regis# N7195R Mount Airy, SC Apt: Mount Airy/surry County MWK
Acft Mk/Mdl KERNS KENNETH H KENS WINGLESS Acft SN 290163188-1 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: JOSEPH JONES Opr dba: Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA239	06/04/2017 1609 CDT	Regis# N169BZ	Georgetown, TX	Apt: Georgetown Muni GTU
Acft Mk/Mdl LEVY ADAM V LEGACY 2000-NO SERIE	Acft SN L2K-241	Acft Dmg: SUBSTANTIAL	Fatal 0	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR IO-550-C		Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name:	Opr dba:	Aircraft Fire: NONE		
			AW Cert: SPE	

Events

1. Enroute-cruise - Loss of engine power (total)
-

Narrative

On June 4, 2017, about 1609 central daylight time, an amateur-built Lancair Legacy 2000, N169BZ, sustained substantial damage during a forced landing following a loss of engine power during cruise flight near Georgetown, Texas. The pilot and passenger were not injured. The airplane received damage to its wings and fuselage when the landing gear separated from the airplane. The aircraft was registered to DA Leasing LLC and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not on a flight plan. The local flight originated from the Georgetown Municipal Airport (GTU), Georgetown, Texas about 1540.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA257	05/04/2017 1123	Regis# N832SD	Englewood, CO	Apt: Centennial APA
Acft Mk/Mdl NELSON SYDNEY VANS ACFT		Acft SN 80832	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl LYCOMING O-360-A1A		Acft TT 735	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: JAMES GEYMAN		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

2. Landing-flare/touchdown - Hard landing

Narrative

The pilot reported that, during the landing flare in gusting crosswind conditions, he realized that the descent rate was a "little fast/ heavy," so he "reached to [the] left to add power and smooth out [the] flare." He further reported that he mistakenly grabbed the "red knob," the mixture control, instead of the throttle to arrest the descent rate. Subsequently, the airplane continued to descend, bounced hard on the runway, and became airborne again. When the airplane settled back onto the runway, the nose landing gear collapsed, the propeller struck the runway, and the airplane veered off the runway to the left and nosed over.

The fuselage and vertical stabilizer sustained substantial damage.

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

An automated weather observation station, at the accident airport, about the time of the accident, recorded wind 360ø at 8 knots, gusting 15 knots. The pilot reported that the landing was on runway 28.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA136	02/11/2017 1740 EST	Regis# N289MN	Punta Gorda, FL	Apt: Punta Gorda PGD
Acft Mk/Mdl NIELSEN MARTIN M CHALLENGER II	Acft SN 2089	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 503 DCDI	Acft TT 22	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: MARTIN M. NIELSEN	Opr dba:	Aircraft Fire: NONE		AW Cert: SPR

Events

1. Landing - Loss of control in flight
-

Narrative

The pilot reported that, during the landing flare, while on his second landing attempt, the airplane began to sink rapidly and the right wing dropped. He applied right rudder and power in an attempted to maintain directional control, but was unsuccessful. The airplane settled in the bushes to the left of the runway.

The airplane sustained substantial damage to the right wing.

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

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN15LA329 07/30/2015 1941 CDT Regis# N55J Sulphur Springs, TX Apt: Sulphur Springs Municipal Airp SLR
Acft Mk/Mdl O'DELL AEROMASTER Acft SN REO-2 Acft Dmg: DESTROYED Rpt Status: Factual Prob Caus: Pending
Eng Mk/Mdl CONTINENTAL E185 Fatal 1 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: PILOT Opr dba: Aircraft Fire: GRD

Events

3. Initial climb - Loss of control in flight

Narrative

On July 30, 2015, at 1941 central daylight time, an experimental amateur-built O'Dell Aeromaster, N55J, experienced a total loss of engine power and impacted terrain during climb after takeoff from runway 1 (5,001 feet by 75, concrete) at Sulphur Springs Municipal Airport (SLR), Sulphur Springs, Texas. The airplane was destroyed by impact forces and post-crash fire. The private pilot sustained fatal injuries. The airplane was recently purchased by the pilot but was still registered to the previous airplane owner. The airplane was operated by the pilot under Title 14 Code of Federal Regulations Part 91 as a personal flight that was not operating on a flight plan. Visual meteorological conditions prevailed at the time of the accident. The flight was originating at the time of the accident and was en route to an unknown destination.

Witnesses observed the airplane taxi to the runway and take off, not performing any preflight or engine run-up. The engine ran smoothly until the aircraft was 200 feet above ground level, back-fired and experienced a total loss of engine power. The pilot maintained the same nose-up attitude and turned to the left, causing the left wing to stall. The airplane stalled entered a « turn stall-spin toward the left and impacted the ground, left wing and nose first.

A Federal Aviation Administration Aviation Safety Inspector stated that about two weeks prior to the accident the pilot purchased the accident airplane from the previous airplane owner in Lufkin, Texas, located about 150 miles south of SLR. The previous owner explained the very sensitive engine mixture controls and warned the pilot several times not to lean the engine on takeoff and never below 3,000 feet mean sea level (msl). The previous owner stated that the pilot did not seem to pay attention to his instructions and appeared distracted. The previous owner stated that the pilot mentioned that he could not understand why the engine should not be leaned on takeoff because the pilot said that he always had to lean the mixture on takeoff when he flew other airplane(s). The previous owner explained to the pilot that Lufkin, Texas, was only at 450 feet above msl, not the 4,500 feet msl the pilot was used to.

The previous owner stated that the pilot did not want any instruction in the airplane, but the previous owner insisted and took the pilot for a one-hour familiarization flight in the airplane. The previous owner stated that during the familiarization flight, the pilot leaned the mixture on takeoff, the engine quit. The previous owner pushed the mixture control back to full rich, the engine started, and the flight continued. The pilot leaned the mixture again during the flight, below 3,000 feet msl, causing the engine to run rough. The previous owner, again, returned to mixture control to full rich, and the engine smoothed out. The pilot, again, was told by the previous owner not to lean the mixture below 3,000 feet msl and never on takeoff.

The previous owner stated that the pilot was "ancy [sic] and in a hurry to leave". The previous owner stated that the pilot did not have any aviation navigation sectional charts in his possession. The pilot did not preflight the aircraft prior to the departing flight and did not check weather nor file a flight plan for his departure from Lufkin, Texas. The pilot then landed at SLR and reported the engine was running rough to maintenance personnel located at the airport.

On July 18, 2015, an aircraft mechanic at the SLR examined the airplane and engine and made the following observations:

1. Both airspeed indicators indicate 50 miles per hour while in the hangar.
2. Gascolator leaking fuel.
3. Exhaust leak at number 1 cylinder.
4. No emergency locator transmitter installed in the airplane.

5. No fuel shutoff on the top fuel tank.
6. No fuel quantity indicators.
7. No master switch or circuit breakers.
8. Brake fluid around the right tire. Found the brake piston installed backwards, causing the O-ring to leak.
9. All of the aileron trailing edges were broken away from the aileron ribs.
10. Flying wires and landing wires were too loose.
11. No javelins on wires.
12. No battery master switch installed. The electrical power was always "on".
13. A two sided switch was installed for the starter. One side was "momentary on" and the other switch was glued in place, not functioning.
14. The required "EXPERIMENTAL" placard was not installed as required by the Operating Limitations assigned at the time the Special (Experimental) Airworthiness Certificate was issued.
15. A bushing was made by tying a knot in clothes line rope on the throttle shaft in order to act as a travel stop.
16. All installed safety wire were too small and many times backwards.
17. All cotter keys too small for the fasteners.
18. Landing gear bungees too soft and worn out.
19. Right lower wing had a broken rib.
20. The engine had three different types of spark plugs installed, all worn beyond limits and oil fouled.

National Transportation Safety Board - Aircraft Accident/Incident Database

21. The number 5 cylinder, lower spark plug was found to be finger tight.

22. The engine was 5 quarts low on oil.

23. Various hardware missing from the engine cowling.

24. Fuel line fittings were aluminum, not steel.

25. Fuel lines were hydraulic hoses, not fuel lines.

26. The carburetor was installed backwards.

The mechanic was asked by the pilot to "annual" the aircraft. The mechanic refused, stating that the airplane was in too rough of condition and should be completely dismantled and rebuilt. The pilot was told by two certificated mechanics and two other experiential aircraft builders that the aircraft was unsafe and should be taken apart and "trailed" home.

The mechanic repaired the leaking brake and replaced all of the spark plugs, serviced the oil and ran the engine. The magnetos were checked and appeared to function properly. The engine started easily and appeared to run smoothly.

On July 30, 2015, the pilot pumped 19.7 gallons of fuel into the top fuel tank and asked the mechanic if he would fly with him. The mechanic refused and again told the pilot not to fly the aircraft.

The airplane was destroyed by a post-crash fire. Impact forces and post-crash fire precluded functional testing of the airplane, engine, and its accessories.

The pilot's last airman medical certificate was issued January 2000 and at that time the pilot reported a total of 151 flight hours.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA308	05/27/2017 1300 CDT	Regis# N721E	Fort Worth, TX	Apt: N/a
Acft Mk/Mdl ROBERT HAMBLIN AUTOGYRO GMBH	Acft SN V00255	Acft Dmg: SUBSTANTIAL	Rpt Status: Factual	Prob Caus: Pending
Eng Mk/Mdl ROTAX 914	Acft TT 94	Fatal 0	Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: ROBERT HAMBLIN	Opr dba:	Aircraft Fire: NONE	AW Cert: SPE	

Events

1. Enroute - Controlled flight into terr/obj (CFIT)

Narrative

The pilot of the gyrocopter reported that after flying over his passenger's house to take pictures, he headed back to the airport. He added that while in level flight, he noticed that "the trees on the ground under [him were] rapidly getting closer". He initially presumed something was wrong with the engine, so he reduced throttle and then successfully applied full throttle in an attempt to troubleshoot the situation. He made a left 180ø turn and the gyrocopter struck trees and impacted terrain.

The gyrocopter sustained substantial damage to the empennage.

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

The pilot reported that he had presumed the terrain he was flying over was flat, but had later realized he had flown into rising terrain.

National Transportation Safety Board - Aircraft Accident/Incident Database

Incident Rpt# CEN17IA233	06/01/2017 1830 EDT	Regis# N366TF	Fulton, NY	Apt: Oswego County FZY
Acft Mk/Mdl SCHRODER DAVID LANCAIR IV P-NO	Acft SN LIV-388	Acft Dmg: NONE	Rpt Status: Prelim	Prob Caus: Pending
Eng Mk/Mdl CONT MOTOR TSIO-550 SER	Acft TT 1147	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091	Aircraft Fire: NONE
Opr Name: MS ROCHELLE LLC	Opr dba:		AW Cert: SPE	

Events

1. Maneuvering - Loss of engine power (total)
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Narrative

On June 1, 2017, at 1830 eastern daylight time, an amateur built Lancair IV-P airplane, N366TF, lost engine power and was forced landed at the Oswego County Airport (FZY), Fulton, New York. The pilot and flight instructor were not injured and the airplane sustained minor damage. The airplane was registered to and operated by MS Rochelle LLC under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Day visual meteorological conditions prevailed for the local flight, which departed from FZY at 1819.

The purpose of the flight was to calibrate an angle of attack indicator, which required a series of zero G maneuvers. During the first maneuver, the flight instructor and pilot noticed the engine overspeed, as well as a noticeable "bang". Following a total loss of power, a forced landing was performed at FZY without further incident. Post flight examination revealed engine damage which included two fractured connecting rods. The engine was retained for follow on examination

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# GAA17CA358 06/19/2017 1630 PDT Regis# N234VA Eugene, OR Apt: Mahlon Sweet Field EUG
Acft Mk/Mdl VANS AIRCRAFT INC RV-12-NO SERIES Acft SN 12008 Acft Dmg: SUBSTANTIAL Rpt Status: Prelim Prob Caus: Pending
Fatal 0 Ser Inj 0 Flt Conducted Under: FAR 091
Opr Name: LANE COMMUNITY COLLEGE Opr dba: Aircraft Fire: NONE

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA236	06/18/2017 715 MDT	Regis# N999WX	Canon City, CO	Apt: Fremont County 1V6
Acft Mk/Mdl WELLS JOHN L JR STOL CH 701-NO	Acft SN 7-6078	Acft Dmg: SUBSTANTIAL	Fatal 0	Rpt Status: Prelim Prob Caus: Pending
		Ser Inj 0	Flt Conducted Under: FAR 091	
Opr Name: WELLS JOHN L JR	Opr dba:		Aircraft Fire: NONE	
			AW Cert: SPE	

Events

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

Narrative

On June 18, 2017, about 715 mountain daylight time, an amateur-built Wells STOL CH701, N999WX, sustained substantial damage to the fuselage and firewall during a forced landing to a field near Canon City, Colorado, after the airplane's engine lost power during initial climb after takeoff from the Fremont County Airport (1V6), Canon City, Colorado. The pilot received minor injuries. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight was originating from 1V6 when the accident occurred.

National Transportation Safety Board - Aircraft Accident/Incident Database

Accident Rpt# CEN17LA216	06/05/2017 824 MDT	Regis# N78DZ	Albuquerque, NM	Apt: Double Eagle AEG
Acft Mk/Mdl WILLIAM D TELFAIR/ZIA Z TELFAI		Acft SN 2614	Acft Dmg: SUBSTANTIAL	Rpt Status: Prelim Prob Caus: Pending
Eng Mk/Mdl ROTAX 582UL-99		Acft TT 64	Fatal 0 Ser Inj 0	Flt Conducted Under: FAR 091
Opr Name: TELFAIR WILLIAM D		Opr dba:		Aircraft Fire: NONE
				AW Cert: SPE

Events

1. Maneuvering - Flight control sys malffail

Narrative

On June 4, 2017, about 0824 central daylight time, an experimental Excaliber Light Sport Aircraft (LSA), N78DZ, registered to the pilot, was substantially damaged when it impacted terrain near Albuquerque, New Mexico, during an emergency landing due to flight control anomalies. The commercial pilot, who was the sole occupant, was not injured. Visual meteorological conditions prevailed throughout the area and a flight plan was not filed. The personal flight was being conducted under the provisions of Federal Code of Regulations Part 91. The local flight originated at 0715 from the Double Eagle Airport (AEG), Albuquerque, New Mexico, and was enroute back to AEG when the accident occurred.

The pilot had been flying a little over an hour without any problems since takeoff from AEG. He was flying straight and level, about 75 mph, when the pitch control became erratic. The control stick started slamming fore and aft to the limits and the nose began pitching up and down. The airplane began buffeting like it was going to come apart. The pilot declared an emergency and reduced airspeed to 50-60 mph, which slightly lessened the fore and aft stick movement and pitch, but did not control it. The pilot turned to clear steep terrain and choose a relatively flat field for an emergency landing. He was able to make final directional corrections and flew the airplane to landing about 40-45 mph and 200-300 fpm rate of descent. The airplane remained upright, but the nose gear and the left main gear sheared off, the airplane turned 180-degrees, and the left wing and horizontal stabilizer struck the ground.

Inspection of the aircraft after the accident revealed a broken, right elevator control rod. The left elevator control rod was not broken. The control rod that separated was a factory-supplied, 1/2-inch aluminum tube with bearings at each end. The attach points of the control rods appeared to be intact. The bearings were still connected and safety wired and all other control rod linkages and attach points were connected. There was normal movement of the left elevator control system (rod still intact), The control damaged control (right elevator) and the intact control rod (left elevator) were sent to the NTSB Materials Laboratory for further evaluation.