Accident Rpt# ERA17CA157 04/15/2017 1050 EDT	**Regis# N340TP**	**Kingsland, GA**	**Apt: Oakwell R/c Airfield N/A**
Acft Mk/Mdl AEROPRO CZ EUROFOX LSA-NO SERIE	**Acft SN 20206**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912 ULS	**Acft TT 401**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PISCITELLO THOMAS J	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPX

Summary

The commercial pilot, who was also the owner of the experimental, light-sport airplane, stated that the airplane approached the grass strip with "all systems operating correctly" and that he performed a side slip to lose altitude and align the airplane with the field. The airplane descended "very quickly," and at touchdown, the nose landing gear dug in and collapsed, and the airplane then nosed over and came to rest inverted. A Federal Aviation Administration inspector witnessed the accident, and a video of the accident was posted on a local media website. The inspector's description and the landing shown in the video were consistent with the pilot's description of events. The airplane landed hard in a flat attitude, the nose landing gear collapsed immediately, and the airplane nosed over and came to rest inverted.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper landing flare, which resulted in a hard landing and subsequent nose-over.

Events

1. Landing-flare/touchdown - Hard landing

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
3. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Soft surface-Contributed to outcome

Narrative

The commercial pilot, who was also the owner of the experimental light-sport airplane stated that the airplane approached the grass strip with "all systems operating correctly," he performed a side slip to lose altitude and align the airplane with the field. The airplane descended "very quickly," and at touchdown the nose landing gear dug in, collapsed, and the airplane nosed over and came to rest inverted. A Federal Aviation Administration inspector witnessed the accident, and a video of the accident was posted on a local media website. The inspector's description and the landing depicted in the video was consistent with the pilot's description of events. The airplane landed hard in a flat attitude, the nose landing gear collapsed immediately, and the airplane nosed over and came to rest inverted.

Accident Rpt# GAA17CA195 03/17/2017 1130 CDT	**Regis# N423SA**	**Mosby, MO**	**Apt: Midwest National Air Center GPH**
Acft Mk/Mdl INIZIATIVE INDUSTRIALI ITALIAN SKY	**Acft SN LSA 003**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX	**Acft TT 1218**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: CHONG K. JUE	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: LTSP

Summary

The solo student pilot reported that, during the landing roll, the airplane veered to the left. The student pilot added power to go around, applied back pressure to the control yoke, and applied right rudder inputs. He added that "[he] waited for the plane to lift off the ground. But it did not get off the ground." The airplane veered off the runway to the right and sustained substantial damage to both wings and the fuselage.

The student pilot reported that there were no preaccident mechanical failures or malfunctions with the airplane that would have precluded normal operation. The automated weather observation system on the airport reported, about the time of the accident, that the wind was from 010ø at 10 knots. The pilot landed on runway 36.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The student pilot's failure to maintain directional control during an attempted go-around.

Events

1. Landing - Loss of control on ground
2. Landing-landing roll - Attempted remediation/recovery
3. Landing-landing roll - Runway excursion

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-Student/instructed pilot - C
3. Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Effect on operation

Narrative

The solo student pilot reported that, during the landing roll, the airplane veered to the left. The student pilot added power to go-around, applied back pressure to the control yoke, and applied right rudder inputs. He added that "[he] waited for the plane to lift off the ground. But it did not get off the ground." The airplane veered off the runway to the right and sustained substantial damage to both wings and the fuselage.

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

The automated weather observation system on the airport, about the time of the accident, reported that the wind, was from 010ø at 10 knots. The pilot landed on runway 36.

Accident Rpt# ERA16FA194	**05/24/2016 1625 EDT**	**Regis# N440JM**	**Rhoadesville, VA**	**Apt: N/a**	
Acft Mk/Mdl JIHLAVAN AIRPLANES SRO KP 5 ASA-NO		**Acft SN 5141163M**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 914 UL		**Acft TT 534**	**Fatal 2**	**Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: CHARLES CALDWELL		**Opr dba:**			**Aircraft Fire: NONE**
					AW Cert: SPX

Summary

The sport pilot had recently purchased the airframe-parachute-equipped light sport airplane and was receiving instruction in it to satisfy insurance requirements. Radar data indicated that, during the flight, the airplane's groundspeed decreased from 94 to 62 knots, consistent with airwork including slow flight and stall practice. Subsequently, several witnesses observed the airplane descending nose-down with the parachute still attached, but with the canopy only partially inflated, before the airplane impacted terrain. The parachute handle was located on the left side of the instrument panel, and the sport pilot likely activated the parachute due to inadvertent spin entry. The previous owner of the airplane stated that he had to be vigilant during stall practice because the airplane always seemed to yaw abruptly right and into a spin, more so than any other airplane he had flown.

The parachute attached to the airframe via four risers. Two of the risers shared a front anchor attached to the aluminum bulkhead behind the seats. The other two risers attached to a rear anchor located at each wing root. Examination of the wreckage revealed that the two front risers remained attached to the shared front anchor but that the anchor had separated from the airframe. The two rear risers had separated in overstress. The front anchor was designed to carry the majority load. The remaining two rear risers were designed to stabilize the airplane in an optimal descent attitude and could not carry the full load if the front anchor failed. Metallurgical examination of the separated front anchor revealed that it had been bolted into aluminum bulkhead skin that was about 0.022-inch thick. Although the anchor and seven of its eight bolts remained intact, the surrounding aluminum skin of the airplane had separated from the airplane in overstress. Without any additional supporting structure such as longerons, stringers, or bathtub fittings, it is likely the thin aluminum skin could not withstand the force applied to the front anchor during parachute deployment. The investigation noted that the first in-flight deployment of the parachute on the make and model airplane was on the accident airplane during the accident flight. During certification, one test deployment was performed on the ground. Further, the airplane manufacturer was unable to provide any data or testing of the amount of shock force the surrounding aluminum skin could withstand during deployment.

The airplane's maximum takeoff weight was 1,279 lbs. According to the parachute manufacturer, the parachute could be deployed at a maximum weight of 1,350 lbs and a maximum speed of 138 mph. A representative of the parachute manufacturer stated that, although the engine should be off during parachute deployment, it did not have as significant an effect on deployment as airplane speed and weight. Although the airplane was about 50 lbs over its maximum takeoff weight at the time of deployment, it was under the parachute manufacturer maximum weight of 1,350 lbs. Additionally, the pilot likely activated the parachute in the early stages of a spin and closer to stall speed, significantly slower than the 138-mph parachute limit.

The sport pilot had chronic pain treated with multiple medications, including Methadone, an impairing opioid medication, which was detected in blood at levels consistent with chronic use. Further, the sport pilot had insomnia and depression treated with quetiapine and doxepin, both of which are sedating medications. The pilot's recent use of the combination of two potentially impairing medications likely impaired his cognitive and psychomotor function to some degree. However, the investigation could not determine if the pilot's impairment led to a situation that required activation of the parachute. Additionally, there was no evidence that the decision to activate the parachute was inappropriate. Therefore, it is likely that the pilot was impaired by the combination of medications, but there is no evidence that his impairment contributed to the cause of the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilots' loss of control that necessitated the activation of the parachute system and the airplane manufacturer's inadequate design of the front parachute anchor attachment structure, which resulted in a failure of the parachute after it was deployed in flight and precluded the pilots from safely recovering from the spin.

Events

1. Maneuvering - Aerodynamic stall/spin
2. Uncontrolled descent - Sys/Comp malf/fail (non-power)
3. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Equipment/furnishings-Parachute-Failure - C
2. Aircraft-Aircraft systems-Equipment/furnishings-Parachute-Design - C
3. Organizational issues-Development-Design-Equipment design-Manufacturer - C

4. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Airspeed-Not attained/maintained - C
5. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
6. Personnel issues-Task performance-Use of equip/info-Aircraft control-Instructor/check pilot - C
7. Personnel issues-Physical-Impairment/incapacitation-Prescription medication-Pilot

Narrative

HISTORY OF FLIGHT

On May 24, 2016, about 1625 eastern daylight time, an experimental light sport Jihlavan KP 5 ASA (Skyleader 500), N440JM, was destroyed when it impacted terrain in Rhoadesville, Virginia. The sport pilot/owner and the flight instructor were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the flight, which originated from Culpeper Regional Airport (CJR), Culpeper, Virginia, about 1530. The instructional flight was conducted under the provisions of 14 Code of Federal Regulations (CFR) Part 91.

The sport pilot had recently purchased the airplane and had another pilot ferry it from California to CJR. The airplane arrived at CJR on May 13, 2016. According to an insurance adjuster, the sport pilot had less than 5 hours of flight experience in the make and model airplane. Therefore, his insurance policy required that he receive a "checkout" flight by a certificated flight instructor. The flight was required to include a minimum of 2 hours dual instruction with 15 takeoffs and landings. When the sport pilot inquired about obtaining flight instruction, the airport manager at CJR referred him to the flight instructor.

According to Federal Aviation Administration (FAA) data, no air traffic control services were provided to the flight. Radar returns indicated that, after departing CJR, the airplane flew southwest to Orange County Airport (OMH), Orange, Virginia. There, radar indications disappeared and reappeared four times, consistent with approaches below radar coverage to runway 26. After the fourth approach, the airplane proceeded northeast and later turned east before disappearing from radar. There were no altitude readouts from the airplane during the entire flight. As the airplane traveled east toward the end of the data, the groundspeed slowed from 94 to 62 knots, consistent with slow flight and stall practice. The last target was recorded near the accident site at 1624:28.

According to several witnesses near the accident site, they heard what sounded like thunder or a "crack." They then saw a parachute deployment and the airplane's nose pointed straight down before impacting the ground. Witnesses could not determine the airplane's altitude at the time other than that it was low, nor could they report whether the engine was operating.

One witness provided a photograph of the airplane descending with the parachute still attached and partially inflated.

PERSONNEL INFORMATION

The pilot, age 57, held a sport pilot certificate with endorsements for airplane single-engine land and powered-parachute land. He did not possess an FAA medical certificate nor was he required to. Review of the pilot's logbook revealed that he had accumulated a total flight experience of about 121 hours, of which 2.5 hours were in the accident airplane. The pilot had flown 4.5 and 0 hours during the 90- and 30-day periods preceding the accident, respectively. Further review of his logbook revealed that the 2.5 hours of experience in the accident airplane consisted of two flights on March 20, 2016, and March 22, 2016, in California. The pilot recorded those flights in his logbook as prebuy flights. During the second prebuy flight, the pilot also recorded "Slowflight Stalls" in his logbook. Additionally, the pilot recorded those two flights as dual instruction received; however, there were no accompanying endorsements from a flight instructor. Other than the 2.5 hours in the accident airplane, the pilot did not have any prior experience in the accident airplane make and model.

The flight instructor, age 81, held an airline transport pilot certificate with a rating for airplane multiengine land. He also held a commercial pilot certificate with ratings for airplane single-engine land and airplane single-engine sea. Additionally, he held a flight instructor certificate with ratings for airplane single-engine and instrument airplane. His most recent FAA second-class medical certificate was issued on March 1, 2016. Review of the flight instructor's logbook revealed that he had accumulated a total flight experience of about 32,840 hours, of which 100 and 43 hours were flown during the 90- and 30-day periods preceding the accident, respectively. There was no record of the flight instructor having any prior experience in the accident airplane make and model.

AIRCRAFT INFORMATION

The two-seat, low-wing, retractable tricycle landing gear-equipped airplane, serial number 5141163M, was manufactured in 2007. It was powered by a Rotax 914 UL, 115-horsepower engine, equipped with a DUC Swirl ground-adjustable three-blade propeller. The airplane was issued an FAA special light sport aircraft (S-LSA) airworthiness certificate in 2008, which was superseded by an FAA experimental light sport aircraft (E-LSA) airworthiness certificate in 2010. According

to the previous owner of the airplane, he chose to have the airplane subsequently recertified as an E-LSA, rather than an S-LSA because he could perform more of the maintenance work himself under the E-LSA certification. The previous owner further stated that he had to be vigilant during stall practice because the airplane always seemed to yaw abruptly right and into a spin, more so than any other airplane he had ever flown. The airplane's maximum gross takeoff weight was 1,279 lbs.

Review of the airplane's logbook revealed that its most recent annual condition inspection was completed on May 6, 2016. At that time, the airframe and engine had accumulated 534 hours since new.

Review of the airplane's Pilot's Operating Handbook revealed, "Acrobatic, intentionally driven stalls and spins are prohibited!"

The airplane was equipped with a Galaxy Rescue Systems (GRS) ballistic parachute. According to the manufacturer label, the model parachute could be deployed at a maximum weight of 1,350 lbs and maximum speed of 138 mph. Review of the parachute manual revealed instructions for the engine to be turned off before activation. The parachute attached to the airframe via four risers (cables) and three anchors. Two of the risers shared an anchor (front) attached by eight bolts with nuts to the aluminum bulkhead behind the seats. The other two risers (rear) attached to an anchor located at each wing root near the trailing edge of the wing. According to a representative of the parachute manufacturer, the double-riser front anchor was designed to carry the majority load. The remaining two rear risers were designed to stabilize the airplane in an optimal descending attitude and could not carry the full load if the double-riser front anchor failed. Specifically, the double-riser front anchor could withstand a maximum shock/load of 40.1 kiloNewtons [kN] (9,015 pounds of force [lbf]), and the two rear risers could withstand a maximum shock/load of 13.3 kN (2,990 lbf) each. The representative added that the data were for the anchors and risers and that data for the actual anchor-to-airframe attachment would have to be provided by the airplane manufacturer.

The GRS also included a drogue parachute to assist in main parachute deployment. The parachute manufacturer representative further stated that, although the engine should be off during parachute deployment, it did not have a significant effect on the parachute deployment. Rather, airplane speed and weight had a greater effect on the parachute deployment and performance.

According to a representative of the airplane manufacturer, the first in-flight deployment of the parachute on the make and model airplane was on the accident airplane during the accident flight. During certification, one test deployment was performed on the ground. The representative further stated that they could not perform additional testing on the front anchor attachment because the design had been changed about 8 years before the accident. The current design (Skyleader 600) included two front anchors rather than one. The manufacturer no longer had any airplanes with a single front anchor to test.

METEOROLOGICAL INFORMATION

Orange County Airport (OMH), Orange, Virginia, was located about 9 miles west of the accident site. The 1635 recorded weather at OMH included calm wind, visibility 10 miles, and scattered clouds at 11,000 ft.

WRECKAGE INFORMATION

The wreckage was located in open terrain at an elevation of about 400 ft. The airplane was found upside down and complete with the exception of some smaller pieces that were found nearby. When the airplane was righted, significant fore-to-aft crushing damage was noted to the nose section and to both wings.

The airplane was subsequently moved to a temporary storage facility where it was laid out, and the presence of all flight control surfaces was confirmed, as was control continuity from each flight control surface to the cockpit controls.

At the accident scene, the drogue parachute was found in a nearby field, and the main parachute was found in trees about 100 yards east of the wreckage. At the temporary storage facility, the parachute's fabric canopy was spread out and observed to be undamaged. The two individual risers that had been attached to wing anchors were found separated near their respective anchors with the wire ends broomstrawed, consistent with overload separation. The other two risers were found still attached to their shared single anchor; however, that anchor was itself separated from the airframe. The cockpit parachute activation handle, located on the pilot's side of the instrument panel, appeared to have been pulled (system was activated.)

An engine monitoring system (EMS), electronic flight information system (EFIS), and engine control unit (ECU) were retained and forwarded to the NTSB Vehicle Recorder Laboratory. Attempted data download from the units revealed that the EMS and EFIS did not record any data; however, data were

successfully downloaded and plotted from the ECU. Review of the data revealed that the ECU recorded about the last 20 minutes of the accident flight. About 11 minutes before the end of the data, the engine rpm averaged about 2,000, consistent with the last approach and landing. Subsequently, the engine rpm averaged between 4,000 and 5,000 to the end of the data.

Metallurgical examination of the two separated risers revealed overstress features. Additionally, pull-testing of the separated risers revealed that they exceeded their design specification by about 1,000 lbf. Metallurgical examination of the separated anchor revealed that it had been bolted into aluminum bulkhead skin that was approximately 0.022-inch thick. Although the anchor and seven of its eight bolts remained intact, the surrounding aluminum skin of the airplane had separated, consistent with overstress. There were no longerons, stringers, or bathtub fittings to transfer the parachute deployment loads into the airframe. The airplane manufacturer was unable to provide any data or testing of the amount of shock force the surrounding aluminum skin could withstand (for more information, see the Materials Laboratory Factual Report and Structures Group Chairman's Factual Report in the public docket for this investigation).

MEDICAL AND PATHOLOGICAL INFORMATION

The State of Virginia Office of Chief Medical Examiner, Manassas, Virginia, conducted autopsies on the pilot and flight instructor. The autopsy reports noted the cause of death for both pilots as "blunt force trauma."

The FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing of specimens from the pilot and flight instructor. The results for the flight instructor were negative for alcohol and drugs. The results for the pilot were as follows:

"Carvedilol detected in Liver
Carvedilol detected in Blood
Doxazosin detected in Liver
Doxazosin detected in Blood
2.099 (ug/mL, ug/g) Doxepin detected in Liver
0.451 (ug/mL, ug/g) Doxepin detected in Blood
Methadone detected in Liver
Nordoxepin detected in Liver
Nordoxepin detected in Blood
0.592 (ug/mL, ug/g) Quetiapine detected in Liver
Quetiapine NOT detected in Blood
Blood unsuitable for analysis of Methadone."

According to the pilot's personal medical records, his chronic medical conditions included obstructive sleep apnea, high blood pressure, elevated cholesterol, heart disease, chronic obstructive pulmonary disease, and benign prostatic hypertrophy; these were all reportedly controlled, and the treatments are generally considered not to be impairing. In addition, he had an unspecified clotting disorder treated and controlled with apixaban. Because of the clotting disorder and bleeding into his muscles, he had severe myositis ossificans (bone formation in the muscle tissue), which resulted in limited range of motion and chronic pain treated with the impairing opioid medications methadone and oxycodone. The pilot had a remote history of strokes and heart disease, but no abnormal findings were documented on recent neurological and cardiac examinations. Further, the autopsy did not identify any significant natural disease in the heart or brain. Finally, he had a history of insomnia and depression treated with the impairing medications seroquel and doxepin. Although there was no evidence of depression on recent examinations, both psychoactive medications had been prescribed specifically for their sedating effects.

Title 14 CFR Part 61.23(c)(1) allows sport pilots to use a valid and current U.S. driver's license in lieu of a medical certificate. However, further review of 61.23(c)(2)(iv) revealed that the sport pilot must "Not know or have reason to know of any medical condition that would make that person unable to operate a light-sport aircraft in a safe manner."

ADDITIONAL INFORMATION

According to the manufacturer, the airplane's basic empty weight was 819.82 lbs. Review of fueling records revealed that on the day of the accident, 9.1 gallons of fuel were added to the airplane, and its total fuel capacity was 16.9 gallons (101.4 lbs). Review of autopsy reports revealed that the pilot weighed 270 lbs and that the flight instructor weighed 170 lbs, which resulted in a total airplane weight of 1,361.22 lbs, or 82.22 lbs above the airplane's maximum takeoff weight of

1,279 lbs. The airplane had flown about 1 hour before parachute deployment, and a fuel consumption rate of 5 gallons per hour corresponded to an airplane weight about 50 lbs above its maximum takeoff weight of 1,279 lbs at the time of parachute deployment.

The airplane manufacturer and FAA Office of Accident Investigation, Recommendation and Analysis Division were notified about the overstress failure of the airplane structure to which the front anchor attached. A search of FAA data revealed fifteen other U.S.-registered Skyleader 500 airplanes.

Accident Rpt# CEN16LA381 09/22/2016 1055 CDT	**Regis# N432BD**	**Wichita, KS**	**Apt: Col. James Jabara AAO**
Acft Mk/Mdl SCOTTISH AVIATION SERIES 100 MDL	**Acft SN 163**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360-A1B6	**Acft TT 5370**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ROGER C KIDD	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

The private pilot reported that the engine "sputtered and went to idle" during cruise flight while returning to the departure airport after a local flight. His attempts to restore engine power were not successful. The pilot subsequently conducted a forced landing, during which the airplane impacted a fence and sustained substantial damage.

During postaccident examination, the fuel totalizer indicated that 7.3 gallons of fuel remained; however, only about 1.5 gallons of fuel was recovered from the airplane. After fuel was added to each tank, an engine run was conducted, and the engine ran smoothly at idle and about 1,000 rpm, and no anomalies were noted.

The pilot reported that the airplane fuel gauges were unreliable, so he used the fuel totalizer for fuel quantity information. However, the totalizer's operating instructions stated that the instrument does not provide a measurement of the fuel in the tanks and that it "should never be used as the primary indicator of the fuel quantity." The pilot should not have used the totalizer to determine the amount of fuel onboard the airplane and his reliance on the instrument without ensuring that sufficient fuel was on board for the flight led to fuel exhaustion and a total loss of engine power.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper preflight inspection during which he relied on the fuel totalizer and failed to ensure that sufficient fuel was onboard for the flight, which resulted in fuel exhaustion and a total loss of engine power.

Events

1. Enroute - Fuel exhaustion
2. Enroute - Loss of engine power (total)
3. Emergency descent - Off-field or emergency landing
4. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Task performance-Inspection-Preflight inspection-Pilot - C
2. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
3. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C
4. Environmental issues-Physical environment-Object/animal/substance-Fence/fence post-Contributed to outcome

Narrative

On September 22, 2016, about 1055 central daylight time, a Scottish Aviation Series 100 Model 101 airplane, N432BD, was substantially damaged during a forced landing following a loss of engine power near Wichita, Kansas. The pilot and pilot-rated passenger were not injured. The airplane was registered to the pilot-rated passenger 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 for the flight, which was not operated on a flight plan. The flight originated from the Augusta Municipal Airport (3AU), Augusta, Kansas, about 1040.

The pilot reported that he planned to complete a three-leg local flight from 3AU to the Cpt Jack Thomas Memorial Airport (EQA), to the Col. James Jabara Airport (AAO), and return to 3AU. He proceeded to EQA and completed a takeoff and landing. He then flew to AAO for two additional takeoffs and landings. After departing from AAO to return to 3AU, about 2,500 ft mean sea level, the engine "sputtered and went to idle." His attempts to restore engine power were not successful. The airplane struck a wooden fence during the subsequent forced landing. The airplane sustained damage to the leading edges of the wings.

A postaccident examination was conducted by a Federal Aviation Administration (FAA) inspector. During that examination, about 1.5 gallons of fuel was recovered from the accident airplane. The inspector did not observe any evidence of a fuel spill at the accident site. The fuel totalizer indicated that 7.3 gallons remained. A postrecovery engine exam was conducted under the supervision of an FAA inspector. Five gallons of fuel were added to each fuel tank. A slow leak (approximately 1 drip every 10 seconds) was observed from the left-wing fuel tank at two rivets near the area of the fence post strike. No leaks were observed from the right-wing fuel tank. The engine started and ran smoothly at idle and about 1,000 rpm. No anomalies with respect to the engine were observed.

The pilot reported that about 16 gallons of fuel were on-board upon the initial departure from 3AU, with about 8 gallons remaining at the time of the takeoff from AAO. He added that "the aircraft utilizes a fuel totalizer to calculate fuel on board. A method to verify the totalizer's measurement of fuel remaining versus the actual fuel in [the] tanks is suggested." The pilot informed an FAA inspector that the airplane fuel gauges were unreliable so he used the fuel totalizer for that information.

The fuel totalizer operating instructions noted that "the fuel remaining displayed by the FP-5(L) is not a measurement of the fuel in the tanks. . . . Even after verifying the calibration of the FP-5(L) it should never be used as the primary indicator of fuel quantity in the tanks." The instructions also added that "the use of the FP-5(L) does not eliminate or reduce the necessity for the pilot to use good flight planning, preflight and in-flight techniques for managing fuel."

Federal regulations [14 CFR 91.205(b)(9)] require an operable fuel gauge indicating the quantity of fuel in each tank for all types of operations.

Accident Rpt# CEN15LA355	**08/07/2015 1140 CDT**	**Regis# N65XT**	**Granbury, TX**	**Apt: N/a**
Acft Mk/Mdl WORLD AIRCRAFT CO SPIRIT		**Acft SN AA041115041**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912ULS		**Acft TT 145**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PILOT		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: LTSP

Summary

The private pilot was conducting a personal cross-country flight. The pilot reported that, when the airplane was about 4 miles from the airport, he made a series of prolonged left turns at cruise altitude to allow another airplane that was in the area to land at the airport. After making the left turns, the engine experienced a total loss of engine power. The pilot performed a forced landing on a tall grass field after being unable to restart the engine. The pilot was unable to slow the airplane with full application of wheel brakes due to the tall grass, and the airplane impacted a barbed wire fence and then came to rest.

Examination of the wreckage showed that the fuel system design did not allow for the equalization of fuel between the fuel tanks, which led to the engine being starved of fuel following the sustained left turns. The pilot did not use the fuel boost pump while troubleshooting the loss of engine power, which would have provided a positive fuel flow/pressure to the engine and resolved the fuel starvation condition. Following the postaccident examination of the airplane, the airplane manufacturer modified the fuel system to allow for the equalization of fuel between the fuel tanks.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to use the fuel boost pump following the loss of engine power and the fuel system's inadequate design, which did not allow for equalization of fuel between the fuel tanks and led to a total loss of engine power due to fuel starvation and subsequent forced landing.

Events

1. Maneuvering - Fuel starvation
2. Maneuvering - Loss of engine power (total)
3. Emergency descent - Loss of engine power (total)
4. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Not specified - C
2. Aircraft-Aircraft systems-Fuel system-Fuel pumps-Not used/operated - C
3. Personnel issues-Action/decision-Action-Lack of action-Pilot - C
4. Aircraft-Aircraft systems-Fuel system-Fuel distribution-Design - C
5. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
6. Environmental issues-Physical environment-Object/animal/substance-Fence/fence post-Contributed to outcome

Narrative

On August 7, 2015, at 1140 central daylight time, a World Aircraft Company Spirit, N65XT, impacted a fence and terrain during a forced landing to a field near Granbury, Texas. The airplane experienced a total loss of engine power after a series of circling left turns. The airplane sustained substantial damage. The private pilot and a passenger were uninjured. The airplane was registered to and operated by the pilot under 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 originated from Kickapoo Downtown Airport (CWC), Wichita Falls, Texas, at 1030 and was destined to Pecan Plantation Airport (0TX1), Granbury, Texas.

The pilot stated that when the airplane was about 4 miles from the destination airport, he began to make left turns to allow an inbound Piper airplane that was in the area to approach and land at the airport. As the pilot returned to an inbound course from the left turns, the engine "sputtered and shook" and the pilot made an immediate left turn from above an area that was forest to an area that was pasture. The engine then "sputtered and stopped." The pilot stated that he pushed the throttle control to the full open position, "hit the ignition," and the engine restarted. The engine ran "smoothly," and the pilot retuned the airplane back onto course to 0TX1. The pilot made a radio transmission reporting a rough running engine and "moments later" the engine "shuddered" but was still running. The pilot then made a left turn to an "open" area of terrain and the engine "sputtered and stopped." The pilot then performed a forced landing to a field. The touch down on the field was "smooth but fast" and during the rollout the pilot saw for the first time a barbed wire fence in the direction of the rollout. The pilot was unable to slow the airplane with full application of wheel brakes due to foot-tall grass and cactus, which were "like stopping on wet grass."

The pilot stated that his safety recommendation was: "Always be sure to turn on the fuel pump when the engine runs rough or stops."

The wreckage was initially recovered and moved to Air Salvage of Dallas. Lancaster, Texas but was later moved to World Aircraft Company, Paris, Tennessee

where an examination of the wreckage could be performed. The examination was performed under the supervisor of a Federal Aviation Administration Aviation Safety Inspector, Airworthiness from the Memphis Flight Standards District Office. The World Aircraft Company party representative indicated that there are two one-way fuel valves in the system located at the wing root (attach points). One is on a 5/16-inch line, and the other is 3/8-inch line. They were designed to allow fuel flow in one-direction to preclude the fuel venting on the ramp. Following the circumstances of the accident, continual banking in circle, World Aircraft Company modified the system by replacing the smaller of the two valves with a union in its place. This will allow the fuel to flow back into the tank, thus enabling the ability to equalize fuel distribution.

Accident Rpt# CEN16LA264	**07/10/2016 1205 EDT**	**Regis# N701ZG**	**Dexter, MI**	**Apt: N/a**	
Acft Mk/Mdl ALONSO CH 701		**Acft SN 7-6607**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl ROTAX 912ULS		**Acft TT 194**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: ALONSO GREGORIO F		**Opr dba:**		**Aircraft Fire: NONE**	

Summary

The sport pilot was conducting a personal cross-country flight in the experimental, amateur-built airplane. He reported that, during cruise flight, the engine began running roughly and that he then landed at a nearby airport to examine the engine. The pilot was not able to determine what caused the roughness. He started the engine and performed a run-up, which was normal, so he departed to continue the flight. While en route, the engine again started running roughly and subsequently experienced a total loss of power. The pilot chose to conduct a forced landing in a soybean field, during which he had to lower the pitch altitude to fly under power lines, which resulted in an increase in airspeed and subsequent hard impact in the field.♂♂A postaccident examination of the engine revealed no mechanical malfunctions or failures that would have precluded normal operation. The weather conditions at the time of the accident were not conducive for the accumulation of carburetor ice at cruise power.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The total loss of engine power for reasons that could not be determined because postaccident examination of the engine revealed no mechanical malfunctions or failures that would have precluded normal operation.

Events

1. Enroute - Loss of engine power (total)
2. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C

Narrative

On July 10, 2016, at 1205 eastern daylight time, an Alonso CH 701 airplane, N701ZG, collided with the terrain during an off-airport landing in Dexter, Michigan, following a loss of engine power. The pilot was not injured. The airplane was substantially damaged. The airplane was registered to and operated by a private individual 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 originated from Livingston County Spencer J Hardy Airport (OZW), Howell, Michigan about 1150.

The pilot reported he departed from Howard Nixon Memorial Airport (50G), Chesaning, Michigan, and was flying to Ann Arbor Municipal Airport (ARB) when the engine began running rough. He landed at OZW to examine the engine with another pilot who was flying in an accompanying airplane. He stated they were not able to find anything wrong with the engine. The pilot started the engine and performed a run-up which he stated were normal, so he departed OZW to continue the flight to ARB. While en route, the engine once again started running rough and subsequently experienced a total loss of power.

The pilot chose to land in a soybean field. During the forced landing approach, he saw power lines and had to lower the pitch altitude to fly under them. The airplane impacted hard in the soybean field.

A postaccident examination of the airplane and engine was conducted by a Federal Aviation Administration (FAA) inspector along with an airframe and powerplant mechanic. The examination did not reveal any anomalies that would have resulted in the loss of engine power.

The FAA Special Airworthiness Information Bulletin (SAIB) CE-09-35 "Carburetor Icing Prevention" chart indicated that the temperature and dewpoint, 79ø F and 61ø F respectively, were conducive for serious icing at glide power, not cruise power.

Accident Rpt# ERA16LA153 04/02/2016 1530 EDT	**Regis# N349E**	**South Harrison, NJ**	**Apt: N/a**
Acft Mk/Mdl BUTTERHOF ANTHONY J GINNY B-NO	**Acft SN 001**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL O-200		**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BUTTERHOF ANTHONY J	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

The sport pilot/mechanic reported that the accident flight was the first flight in the experimental, amateur-built airplane after he installed an overhauled engine. About 30 minutes after takeoff, the engine experienced a sudden and total loss of power and would not restart. The pilot then conducted a forced landing to a grass field, and the airplane nosed over.

The pilot and another mechanic subsequently performed a condition inspection of the airplane and found that fuel had leaked from the gascolator between the glass cup and metal frame. They also found that the gascolator bale clamp was not safety-wired, which allowed the clamp to loosen and subsequently relax the seal between the glass cup and the metal frame and the fuel to leak.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot/mechanic's failure to safety-wire the gascolator bale clamp, which resulted in a fuel leak and subsequent total loss of engine power.

Events

1. Prior to flight - Aircraft maintenance event
2. Enroute-cruise - Loss of engine power (total)
3. Emergency descent - Off-field or emergency landing

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C
2. Personnel issues-Action/decision-Action-Lack of action-Owner/builder - C
3. Personnel issues-Task performance-Maintenance-Installation-Owner/builder - C
4. Aircraft-Aircraft systems-Fuel system-Fuel distribution-Related maintenance info

Narrative

On April 2, 2016, about 1530 eastern daylight time, an experimental amateur-built Ginny B, N349E, was substantially damaged during a forced landing in South Harrison Township, New Jersey. The pilot sustained minor injuries. Visual meteorological conditions prevailed, and no flight plan had been filed for the local flight from Alloway Airfield (NJ02), Alloway, New Jersey. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to the pilot, who also held an airframe and powerplant (A&P) certificate, the flight was the first since he overhauled and installed a Continental O-200 engine. The pilot took off about 1500, and headed north from the airport. About 30 minutes later, the engine experienced a sudden and complete loss of power, and the pilot could not get it restarted. The pilot then completed a forced landing to a grassy field, where the airplane nosed over. The airplane's wing spar, vertical stabilizer, and right wing struts were substantially damaged.

The pilot and another A&P rated mechanic subsequently performed a conditional inspection on the airplane, where they found that fuel had leaked from the gascolater between the glass cup and the metal frame. They also noted that the bale clamp was not safety-wired, which allowed it to loosen and relax the seal between the gascolator glass cup and its metal frame.

Accident Rpt# ERA15FA331	**08/28/2015 1407 EDT**	**Regis# N18FJ**	**Newburgh, NY**	**Apt: Stewart Intl SWF**
Acft Mk/Mdl CORNELL W F/SAHAKIAN J A JR GILES		**Acft SN 018**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LY-CON AEIO-360-EXP		**Acft TT 400**	**Fatal 1 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: WRIGHT ANDREW K		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Events

1. Maneuvering-aerobatics - Aircraft structural failure

Narrative

HISTORY OF FLIGHT

On August 28, 2015, at 1407 eastern daylight time, an experimental amateur-built Giles G-202, N18FJ, was destroyed when it collided with terrain after experiencing an in-flight separation of the tail section during a practice aerobatic demonstration flight at Stewart International Airport (SWF), Newburgh, New York. The commercial pilot was fatally injured. The airplane was privately owned and was operated 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, which was operating over runway 09/27 at the time of the accident.

The purpose of the flight was to practice for an air show routine scheduled to be performed the following day at the New York Air Show. Witness statements and video recordings indicated that the airplane had performed 4 or 5 maneuvers and was about 5 minutes into the routine when the tail suddenly separated from the fuselage. At that time, the airplane was performing a left aileron roll while climbing at an approximate 45ø angle. Several witness photographs and video recordings showed the airplane's fuselage twisting toward the left relative to the tail section before the tail section completely separated from the fuselage. The elevator and rudder appeared to be at or near their neutral positions at the time of separation. No abrupt flight control deflections occurred and no parts were seen separating from the airplane in the moments before the separation. The airplane subsequently impacted a grass field about 1,100 ft south of the runway centerline. The engine was running continuously until impact. Airport personnel recovered the tail section and debris from the north side of the runway, about 1,800 ft north of the main wreckage.

PERSONNEL INFORMATION

The pilot, age 53, held a Federal Aviation Administration (FAA) commercial pilot certificate with airplane single engine land and instrument airplane ratings. He was issued a Statement of Acrobatic Competency on March 17, 2014 with a maneuver limitation of solo aerobatics, and an unrestricted altitude limitation. He held an FAA second class medical certificate issued on May 19, 2015, with a restriction for corrective lenses. A review of the pilot's logbook revealed that he had 3,215 total hours of flight experience as of August 23, 2015, with about 1,000 hours in the accident airplane make and model.

AIRCRAFT INFORMATION

The two-seat, low-wing, experimental amateur-built airplane was manufactured in 1998 and powered by a Ly-Con AEIO-360-EXP, 238-horspower, four-cylinder engine driving an MT-Propeller two-blade, constant-speed propeller. The airplane was constructed of glass-fiber-reinforced epoxy, carbon-fiber-reinforced epoxy, and glass fiber and carbon fiber honeycomb sandwich panels. The fuselage was of a monocoque-type design. The airplane's most recent condition inspection was completed on March 25, 2015, at which time the airplane had accumulated 400 total hours in service. At the time of the accident, the airplane had accumulated about 48 hours since that inspection.

METEOROLOGICAL INFORMATION

The 1345 recorded weather observation at SWF included scattered clouds at 4,000 ft above ground level, wind from 290ø at 8 knots, visibility 20 statute miles, temperature 22øC, dew point 13øC, and an altimeter setting of 30.19 inches of mercury.

FLIGHT RECORDERS

The airplane was not equipped with a conventional flight recorder, nor was it required to be. It was equipped with 3 video cameras. Video and audio were recovered from one camera.

WRECKAGE AND IMPACT INFORMATION

The fuselage came to rest on its left side and was heavily fragmented. The right wing separated from the fuselage and came to rest about 30 ft southwest of the main wreckage. The left wing was also separated and found adjacent to the main wreckage. Both wings showed heavy fragmentation of the leading edge, and large sections had fractured and separated from each wing. Flight control continuity was confirmed from the control stick to both ailerons and the elevator through overload fractures in the rod ends of the push-pull tubes. Continuity was established from the rudder pedals, which had separated from the fuselage structure, to the rudder through overload fractures in the left rudder cable and in the right rudder control horn. The engine came to rest partially embedded in soil with both of the wooden propeller blades separated near the hub.

A second debris field was located about 1,800 ft north of the main wreckage. It contained the vertical stabilizer, horizontal stabilizer, and elevator, which remained relatively intact. Several pieces of the structure below and forward of the horizontal stabilizer were found fragmented and separated from the rest of the tail assembly. The rudder and its hinges were found completely separated from and about 600 ft to the east of the vertical stabilizer.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the Chief Medical Examiner, Orange County, New York, conducted an autopsy on the pilot. The cause of death was determined to be "blunt impacts of head, torso, and extremities."

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, conducted toxicological testing of specimens from the pilot. The testing was negative for ethanol and drugs of abuse. Zolpidem, a prescription medication used in the treatment of insomnia, was detected in the liver and cavity blood. This medication may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery). Due to adverse side-effects, the FAA recommends waiting at least 24 hours after use before flying.

SURVIVAL ASPECTS

The pilot was wearing a parachute for the flight. Review of the on-board video recording revealed that he did not attempt to open the airplane's canopy after the tail separated. The five-point seatbelt harness buckle was found fastened securely at the accident site.

TESTS AND RESEARCH

Follow-up examinations of the airframe revealed that the horizontal and vertical stabilizer had fractured from the remainder of the airplane in several locations: along the lower side of the horizontal stabilizer at the bonds between the skin panels and the "L" shaped flanges attaching the lower side of the horizontal stabilizer to the vertical stabilizer and fuselage skin panels, at the bond between the upper end of the banjo bulkhead and the lower skin of the horizontal stabilizer, through the fuselage skin forward of the vertical stabilizer, and through the vertical spar at the aft end of the vertical stabilizer (See Figure 1).

Further examination revealed that the bonds between both right and left "L" flanges, which were constructed of glass-fiber-reinforced cloth and epoxy, were fractured from their mating surfaces on both legs of the "L" (the legs mating to the lower horizontal stabilizer skin and to the fuselage skin) in several locations. The bond between the banjo bulkhead and the horizontal stabilizer lower skin was fractured entirely. Most of the bond surface area in all locations exhibited

evidence of fiber pullout and resin transfer; however, two areas that showed limited fiber or resin transfer were located on the left flange where it had mated to the lower skin of the horizontal stabilizer near its leading edge.

A study examining all the fractures in the tail area determined that the first fracture to occur was the bond fracture in the left flange at the bottom of the horizontal stabilizer near its leading edge. The fracture features in this area were consistent with tensile opening, which translates to a relative upward motion of the left side of the horizontal stabilizer (or, relative downward motion of the lower fuselage skin on the left side of the tail). There was no clear evidence of progressive crack growth on any of the fracture surfaces. Some contact damage on the fracture surface was present.

A finite element model was constructed to evaluate areas of concentrated stress in the tail, specifically in the areas of the "L" flanges and the banjo bulkhead/horizontal stabilizer joint. Results from that model identified areas of concentrated local stress in the fuselage and vertical stabilizer skin near the leading edge cutout for the horizontal stabilizer. The stress and size of these areas increased as the model was iterated to simulate less bond strength in the "L" flange leg on the bottom of the horizontal stabilizer. The results further indicated that these stresses were not significantly affected when the model was iterated with less and less bond strength in the banjo bulkhead joint.

The "L" flanges on the accident airplane were constructed of three layers of fiberglass cloth. According to the airplane designer, the "L" flanges were designed to be installed using wet layup techniques, with four layers of fiberglass cloth applied to the outside of the joint. Earlier kit models were built slightly differently, requiring two 2-layer flanges, one on the outside of the joint and one on the inside of the joint.

The steps that describe the installation of these flanges in the airplane build instructions are found in the section detailing the installation of the left vertical stabilizer skin. Those steps indicate that four cloth strips are to be prepared but do not specifically state that all four are to be applied to the joint on the left side of the stabilizer. However, a subsequent note in the instructions refers to those steps as incorporating a "4 ply lay-up." The section in the build instructions describing the installation of the right vertical stabilizer skin does not include any steps for the installation of flanges.

A reddish-brown residue found on the leading edge and underside of the right horizontal stabilizer near its root tested negative for bird remains.

Maintenance Records

The airframe maintenance logbook contained one structural repair entry. On January 15, 2011, at 140 flight hours: "Repaired cracked rudder mount bulkhead."

Similar Accident

On July 21, 2001, another Giles G-202 airplane, French registration F-PQUX, had an in-flight separation of the tail while in level flight after having performed some aerobatic maneuvers. The pilot was killed. The accident investigation, conducted by the French Bureau of Enquiry and Analysis for Civil Aviation Safety, revealed bond fractures in the "L" flanges at the horizontal stabilizer to vertical stabilizer and fuselage skin joints. The investigation discovered that a majority of the flange bond areas did not exhibit fiber pull-out or resin transfer.

Fleet Information

According to the airplane designer, the fleet consists of about 80 airplane kits, 27 of which were the previous G-200 models incorporating the same tail design. A majority of the kits have been completed.

One maintenance facility reported that six G-202 owners had brought their airplanes in for inspection after the accident occurred. Of those, two airplanes did not have the "L" flanges installed. Instead, epoxy adhesive had been used at the horizontal and vertical stabilizer joints. According to the airplane designer, this was one of example of deviations from the building instructions that have been observed over the history of the fleet. Other examples included material substitutions, such as using marine industry fiberglass cloth instead of the specified aerospace-grade material, and assembly procedures inconsistent with those specified in the build instructions.

The company that supplied the Giles kits was sold to another manufacturer, MX Aircraft, which developed new models based on the Giles design and used many of the same structural parts as those used in the Giles airplanes. The MX fleet size and relevant similarities were not examined.

Operational Information

The pilot purchased the airplane in December 2008, at which time it had accrued 73 hours of flight time. The airplane had since flown 376 hours until the last maintenance entry in the logbook, dated 4 days before the accident. The pilot had flown the airplane extensively in aerobatic competitions across the United States. According to his logbook, in the weeks preceding the accident, he had been performing airshow routine practice and preparing for an upcoming world record attempt for the number of turns completed in an inverted flat spin maneuver. On August 15, 2015, the pilot posted a social media photograph of the airplane's recording "g-meter," which displayed the maximum vertical load factors reached as -4.5 and +9 g, with the title "Practicing for the New York and Atlantic City Air Shows." The meter indicated -4.75 and just under +8 g as found at the accident site.

Video Review

Review of witness video recorded on the day of the accident revealed that, at the time of the tail separation, the airplane was climbing and had just begun an aileron roll to the left. The tail began to separate as the airplane reached an approximate 90ø left-wing-down roll attitude while still climbing. The first indication of separation was a relative twisting motion of the tail section, rotating about a point just forward of the vertical stabilizer leading edge in a clockwise direction as viewed from the rear of the airplane. Initially, it appeared as though the tail section stopped rotating with the fuselage at the time of separation, while the fuselage continued its roll in a counterclockwise direction away from the tail section. The airplane's roll rate at the time of the separation was about 320ø per second. The video recordings did not contain sufficient references to calculate the airplane's speed at the time of the failure.

Video recordings and still photographs of the preceding maneuver, which included a wings-level descent followed by a pull up to start the climb prior to the accident, did contain sufficient references to estimate some performance parameters. A study of the video and images determined that the airplane's groundspeed was about 211 knots at the bottom of the descent, and the vertical load factor during the transition to the climb was about +7.5 g, with a tolerance estimate of ñ 1.5 g. According to the airplane designer, the operational limits for vertical load factor were designed to be ñ10 g at a maximum gross weight of 1,400 lbs. Before this maneuver, the airplane had performed many aileron rolls similar to the accident maneuver at various pitch attitudes in both the left and right directions. Video recordings from a 2014 airshow performance with views from inside and outside the cockpit showed a nearly identical pair of maneuvers; a wings-level descent followed by a pull up at a peak indicated airspeed of about 210-220 knots and a peak airplane load factor of about +9 g. This was followed by a series of aileron rolls on an upline, which began at an airspeed of about 170 knots. The g-meter was not visible throughout all the aileron rolls; however, at one point during those rolls, it indicated an airplane load factor of about -2 g.

Another maneuver of interest was captured by the on-board video recording. Just after takeoff, the airplane performed a double snap roll, a maneuver that places significant loads on the airplane, particularly the tail. A study of the video recording estimated that the airplane's groundspeed at the start of the snap rolls was about 130 knots. The video view did not show any of the instruments in the cockpit. The airplane designer conducted several flight tests to emulate the takeoff conditions observed in the accident on-board video. Based on those tests, he estimated that the airspeed during the accident takeoff may have been as high as 170 knots at the start of the snap rolls. According to the airplane designer, no maximum snap roll entry speed was established for the G-202, nor is one established for many aerobatic airplanes due to an absence of criteria. He further stated that one industry estimation for maximum snap roll entry speed is based on a formula related to the stall speed and the designed vertical load limit. He stated that for the prototype G-202, that estimation is about 120 knots.

Accident Rpt# ERA16CA259	**07/17/2016 1130 EDT**	**Regis# N650WP**	**Hedgesville, WV**	**Apt: Green Landings WV22**
Acft Mk/Mdl HIRN ASSOCIATES LTD ZODIAC CH601XL		**Acft SN 6-7152**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl JABIRU 3300A		**Acft TT 100**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: JUAN SONEN		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

The pilot of the experimental, amateur-built airplane reported that, during the takeoff roll while about 35 knots, he realized that he forgot to turn on the airplane's anticollision lights. He reached over to turn them on, and his forearm brushed across the top of the control stick and activated the electric trim to a full, nose-up position. The airplane suddenly climbed in a steep, nosehigh attitude to about 60 ft before it started to roll left toward trees. As the airplane rolled left, the pilot attempted to compensate with right rudder and aileron input, but it had little effect on directional control, so he chose to turn back to the left and try to climb over the trees. The airplane impacted the top of the tree canopy then descended through the trees and impacted the ground. The wings and fuselage were substantially damaged. The pilot reported no preimpact mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's inadvertent activation of the elevator trim, which resulted in a premature takeoff and subsequent loss of airplane control and collision with trees.

Events

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

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
3. Aircraft-Aircraft systems-Flight control system-Elevator tab control system-Unintentional use/operation - C
4. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Contributed to outcome

Narrative

The pilot of the experimental amateur-built airplane reported that during the takeoff roll at approximately 35 knots, he realized that he forgot to turn on the airplane's anti-collision lights. He reached over to turn them on and his forearm brushed across the top of the control stick and activated the electric trim to a full nose up position. The airplane suddenly climbed off the runway in a steep nose high attitude to an altitude of about 60 ft before it started a roll to the left towards trees. As the airplane rolled left, the pilot attempted to compensate with right rudder and aileron input, but it had little effect on directional control, so he elected to turn back to the left and try to climb over the trees. The airplane impacted the top of the tree canopy then descended through the trees and impacted the ground. The wings and fuselage were substantially damaged. The pilot reported no preimpact mechanical failures or malfunctions with the airplane that would have precluded normal operation.

Accident Rpt# WPR16LA117	**05/27/2016 1050 PDT**	**Regis# N4393H**	**Minden, NV**	**Apt: Minden-tahoe MEV**
Acft Mk/Mdl HOWELL BOB HOWELL SPECIAL-NO SE		**Acft SN**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-540			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: HOWELL BOB		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

The private pilot reported that the landing was "normal" but that, during the landing roll, he noticed that the experimental, amateur-built airplane started veering to the left. Shortly thereafter, the right wing suddenly dropped and impacted the runway. He was unable to maintain directional control of the airplane, and it veered off the runway because the right main landing gear (MLG) had collapsed.

Postaccident examination of the right MLG assembly revealed that the right main tire and wheel had separated from the airplane and that a strut had separated about midpoint. Examination of the fracture features of the right MLG assembly revealed that they exhibited matte-gray features on slant angles, consistent with a ductile overstress fracture. No evidence of preexisting cracks or significant corrosion was observed. The right MLG assembly likely failed due to a hard landing and/or side loading on the MLG.ÿ

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of the right main landing gear assembly due to overstress fracture.ÿ

Events

1. Landing-landing roll - Landing gear collapse
2. Landing-landing roll - Dragged wing/rotor/float/other
3. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Main gear strut/axle/truck-Failure - C

Narrative

On May 27, 2016, about 1050 Pacific daylight time, an amateur built - experimental Bob Howell, Howell Special airplane, N4393H, sustained substantial damage during the landing roll at the Minden-Tahoe Airport (MEV), Minden, Nevada, following a landing gear collapse. The private pilot and sole passenger on the airplane were not injured. The airplane was registered and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the personal flight which originated from Bryant Field Airport, Bridgeport, California, about 1015.

The pilot reported a normal landing, however, during the landing roll he noticed the airplane started to veer to the left. He counteracted the veering with right rudder, and brake. Shortly thereafter, about 400 ft down the runway, the right wing suddenly dropped and impacted the runway. He was unable to maintain direction control of the airplane as it veered off the runway. There were no witnesses to the accident.

Examination of the airplane by a Federal Aviation Administration inspector revealed that the right wing was substantially damaged. The wreckage was transported to a secure location for further examination.

Postaccident examination of the right landing gear assembly revealed that the right main wheel and tire assembly had separated from the airplane. Further, the remaining main gear, a-frame structure, had a strut that had separated about at the midpoint. The bolts and their respective attachment structures that attached the gear assembly to the airframe were intact. All fracture surfaces of the main gear assembly were sent to the NTSB Materials Laboratory for further examination.

The laboratory determined that the fracture features in the tubular steel structure portions showed matte gray features on slant angles consistent with a ductile overstress fracture. Some areas were observed that were consistent with sliding contact between the fracture surfaces under bending or shear loads. The end fitting was fractured in the threads and also had matte gray fracture features and the adjacent deformation of the threads was consistent with a ductile overstress fracture. No evidence of preexisting cracks or significant corrosion was observed.

The owner/builder stated that several years earlier he made a repair to the landing gear where he heated the welds to realign the gear. However, a ductile

overstress fracture would be consistent with a hard landing and/or side loading on the main gear.

Accident Rpt# CEN17LA329 08/24/2017 1000 CDT	**Regis# N61LR**	**Manila, AR**	**Apt: Manila Muni MXA**	
Acft Mk/Mdl JAMES M RAULERSON CH 750	**Acft SN 75-8464**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl UL POWER 350IS		**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: RAULERSON JAMES M	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: SPE	

Events

1. Approach - Loss of engine power (total)

Narrative

On August 24, 2017, about 1000 central daylight time, a Zenith CH 750 airplane, N61LR, experienced a total loss of engine power and landed in a field near Manila, Arkansas. The private pilot and one passenger were not injured and the airplane sustained substantial damage. 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 at the time of the accident and no flight plan was filed. The cross-country flight departed Delta Regional Airport (DRP), Colt, Arkansas about 0930 and was en route to Steele Municipal Airport (M12), Steele, Missouri.

The pilot stated that earlier that morning he flew from M12 to DRP with no anomalies noted. During the return flight at 2,000 ft above ground level, the cylinder head temperature (CHT) on one cylinders was higher than normal. He reduced the throttle and the CHT decreased, then later increased to 340ø. He heard a loud "bang" from the engine, and the airplane and engine both shuttered. He reduced the throttle to idle and made a forced landing in a bean field. During the lading roll the nose wheel collapsed in the mud and the airplane came to rest upright.

The airplane has been retained for further examination.

Accident Rpt# GAA17CA517	**09/04/2017 1400**	**Regis# N682PS**	**Kanab, UT**	**Apt: Kanab Muni KNB**	
Acft Mk/Mdl JEFF JARDINE KITFOX S7 SUPERSPORT		**Acft SN KA12244242**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
			Fatal 0 Ser Inj 0	**Flt Conducted Under: FAR 091**	
Opr Name: FRITZ, PAUL J.		**Opr dba:**		**Aircraft Fire: NONE**	

Accident Rpt# ANC16LA068 09/16/2016 1104 AKD	**Regis# N8008Z**	**Wasilla, AK**	**Apt: N/a**
Acft Mk/Mdl JEFFERY D TUTTLE BDK CARBON	**Acft SN BDK-001**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320-A2B		**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: JEFFERY D TUTTLE	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: LTSP

Summary

The commercial pilot reported that the accident flight was the first flight in the experimental, amateur-built airplane since he had completed building it. He added that, shortly after departure, while in level cruise flight, he heard a loud "pop" and immediately saw that the left wing's leading-edge slat had buckled and distorted, which made the airplane difficult to control. While maneuvering for an emergency landing, the pilot had to make significant power adjustments to maintain control. After making a right turn to begin the approach to the airport, the right wing's leading-edge slat failed, which resulted in an almost complete loss of airplane control. Subsequently, he guided the airplane to an open road using the rudder and varying the engine power settings. The airplane struck the top of a tree before impacting the road in a nose-low attitude, which resulted in substantial damage to both wings and the fuselage.

Each wing was equipped with three carbon fiber leading-edge slats located center, inboard, and outboard. A detailed examination of the airframe and engine revealed that the right wing's leading-edge slats exhibited features consistent with compression failure of the leading edge, trailing edge bond failure, lack of adhesive in the joints, and ply bridging. In addition, the right inboard slat attachment bracket exhibited deformation patterns consistent with an overload failure. The left wing leading edge slats exhibited no leading-edge damage but had signatures consistent with resin starvation. In addition, the left attachment bracket between the inboard and center slats exhibited features consistent with an adhesive failure in the joint and a disbond at the attachment. Microscopic examination of the attachment bracket revealed a lack of adhesion, improper surface preparation, and improper adhesive thickness. No other airframe or engine anomalies were noted.

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Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The structural failure of both wings' leading-edge slats, which resulted in a loss of airplane control.

Events

1. Enroute-cruise - Sys/Comp malf/fail (non-power)
2. Approach-VFR pattern base - Sys/Comp malf/fail (non-power)
3. Approach-VFR pattern base - Loss of control in flight
4. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft structures-Wing structure-Leading edge devices-Failure - C

Narrative

On September 16, 2016, about 1104 Alaska daylight time, a tailwheel-equipped, experimental amateur-built, Tuttle BDK Carbon Concepts airplane, N8008Z, sustained substantial damage following an inflight structural failure of the leading-edge wing slats, followed by a loss of control, and subsequent impact with terrain. The accident occurred as the pilot was attempting to return for an emergency landing near Wasilla, Alaska. The airplane was registered to and operated by the pilot, as a visual flight rules (VFR) flight under the provisions of 14 Code of Federal Regulations (CFR) Part 91 when the accident occurred. The certificated commercial pilot, the sole occupant of the airplane sustained serious injuries. Visual meteorological conditions prevailed, and no flight plan had been filed. The local area flight departed Anderson Lake Airport, Wasilla, Alaska at about 1100 with a planned stop at Palmer Airport, Palmer, Alaska for touch-and-go landings prior to returning to Anderson Lake Airport.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on September 21, the pilot reported, from his hospital room, that the accident flight was the first flight after he completed building the experimental, amateur-built airplane. He added that the airplane was equipped with carbon fiber, leading-edge wing slats, manufactured by Carbon Concepts LLC, Wasilla.

The pilot said that after departure from Anderson Lake Airport, he flew the airplane westbound while climbing to an altitude of about 1,000 feet, followed by a turn to the east. After completing the turn to the east, the pilot heard a loud "pop" and he immediately saw that the airplane's left wing leading-edge wing slat had buckled and distorted making the airplane difficult to control about the longitudinal and vertical axis. He stated that while struggling to maintain control of the airplane he realized that he was too high to make an emergency, straight in approach to the Anderson Lake Airport, so he chose to overfly the airport while descending. He added that during the emergency descent to the airport, he was forced to make significant engine power adjustments in an effort to maintain control of the airplane. After overflying the airport, he made a right turn to begin the approach to the Anderson Lake Airport when the right wing leading-edge

wing slat failed, resulting in almost a complete loss of control. He guided the airplane using the rudder and varying the engine power settings to an open road, with his main concern being not to cause undue harm to people or property on the ground. During the emergency descent the airplane struck the top of a tree before impacting the road in a nose low attitude, sustaining substantial damage to wings and fuselage.

On September 29, 2016, the NTSB IIC, along with the rest of the investigative team examined the airframe and engine at a private residence in Wasilla. All the primary flight control surfaces remained connected to their respective attach points, and flight control continuity was verified from all of the primary flight control surfaces to the cockpit.

Each wing was equipped with three carbon fiber leading-edge slats located center, inboard and outboard. The right wing's leading-edge slats revealed features consistent with a compression failure of the leading edge, trailing edge bond failure, lack of adhesive in the joints, and ply bridging. In addition, the inboard slat attachment bracket exhibited deformation patterns consistent with an overload failure.

The left wing leading-edge slats had no apparent leading edge damage but revealed signatures consistent with resin starvation. In addition, the attach bracket between the inboard and center slat exhibited features consistent with an adhesive failure in the joint and a disbond at the attachment. Microscopic inspection of the attachment bracket revealed a lack of adhesion, improper surface preparation, and improper adhesive thickness.

The propeller remained attached to the engine crankshaft and one of the propeller blades exhibited chordwise scratching. Examination of the Lycoming O-320-A2B engine revealed no anomalies, contamination, or evidence of malfunction in any of the engine accessories. The cylinders, pistons, valve train, crankshaft, and other internal components were all without evidence of anomaly or malfunction.

The closest weather reporting facility is Wasilla Airport, Wasilla, Alaska about 8 miles southwest of the accident site. At 1056, an aviation routine weather report (METAR) at Wasilla, reported: wind from 070ø at 5 knots; visibility, 10 statute miles; sky condition, scattered clouds 7,000 feet, scattered clouds 8,000 feet; temperature, 54ø? F; dew point 41ø F; altimeter, 29.38 inHG.

After repeated attempts, the pilot did not submit an NTSB Pilot/Operator Accident Report form (NTSB Form 6120.1) as required.

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: Factual Prob Caus: Pending**
Eng Mk/Mdl SUBARU 2.5			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: JOSEPH JONES		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot, who was also the owner of the of amateur-built gyroplane, stated that he adjusted the prerotator motor pressure plate before the flight by moving it closer to the clutch to improve rpm. During takeoff, the gyroplane rolled right, and he was unable to maintain control. The gyroplane subsequently impacted the ground and cartwheeled, which resulted in substantial damage to the rotor, mast, and cabin. The pilot further stated that, due to his adjustment, it was likely that the prerotator did not disengage, which resulted in increased right torque and the inability to control the gyroplane during takeoff.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's improper adjustment of the prerotator motor, which resulted in its failure to disengage and the subsequent loss of aircraft control during takeoff.

Events

1. Prior to flight - Preflight or dispatch event
2. Takeoff - Flight control sys malf/fail
3. Takeoff - Loss of control in flight

Findings - Cause/Factor

1. Personnel issues-Task performance-Maintenance-Modification/alteration-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Yaw control-Attain/maintain not possible - C
3. Aircraft-Aircraft power plant-Engine (reciprocating)-(general)-Incorrect service/maintenance - C

Narrative

The pilot, who was also the owner of the of amateur-built gyroplane stated he adjusted the prerotator motor pressure plate prior to the flight by moving it closer to the clutch to improve rpm. During takeoff, the gyroplane rolled right and he was unable to maintain control. The gyroplane subsequently impacted the ground and cartwheeled, which resulted in substantial damage to the rotor, mast, and cabin. He further stated that due to his adjustment, it was likely that the prerotator did not disengage, resulting in increased right torque and the inability to control the gyroplane during takeoff.

Accident Rpt# CEN17LA065	**12/23/2016 1013 MST**	**Regis# N320RJ**	**Cody, WY**	**Apt: Yellowstone Regional Airport COD**
Acft Mk/Mdl LUECK KITFOX 7		**Acft SN S70507084**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl ROTAX 914UL		**Acft TT 39**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: INDIVIDUAL		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: SPE

Summary

The commercial pilot stated that he had experienced engine roughness during previous flights in the accident airplane. Maintenance personnel determined that the airplane was not receiving adequate fuel at full power, even with both electric fuel pumps operating. As a result, they installed check valves in the fuel system and replaced the fuel pressure regulator. On the day of the accident, the engine experienced a total loss of power after both fuel pumps were turned off during a pre-takeoff engine run-up. The pilot and mechanic then performed another run-up check, during which the engine operated normally. The pilot subsequently departed and entered the airport traffic pattern. While on the downwind leg, with both fuel pumps operating, the pilot reduced engine power and the engine experienced a total loss of power. The pilot performed a forced landing to a field, during which the nose landing gear collapsed.

Postaccident examination of the engine revealed that the fuel pressure and airbox pressure differential was not within the engine manufacturer's limits. The fuel pressure regulator was adjusted within those limits, and the engine was subsequently test run with no anomalies.

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Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Improper maintenance of the fuel pressure regulator, which resulted in an excessive fuel and airbox pressure differential and subsequent loss of engine power.

Events

1. Approach-VFR pattern base - Loss of engine power (partial)
2. Approach-VFR pattern base - Attempted remediation/recovery
3. Emergency descent - Loss of engine power (partial)
4. Landing - Off-field or emergency landing
5. Landing-landing roll - Collision during takeoff/land
6. Landing-landing roll - Nose over/nose down

Findings - Cause/Factor

1. Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Maintenance personnel - C
2. Aircraft-Aircraft systems-Fuel system-Fuel pressure-Incorrect service/maintenance - C
3. Aircraft-Aircraft systems-Fuel system-Fuel pressure-Capability exceeded - C
4. Aircraft-Aircraft systems-Indicating/recording systems-(general)-Failure

Narrative

On December 23, 2016, at 1013 mountain standard time, a Kitfox 7, N320RJ, experienced a loss of engine power during a visual approach from the airport traffic pattern at Yellowstone Regional Airport (COD), Cody, Wyoming. The pilot performed a forced landing to a field where the airplane nosed-over and impacted terrain. The commercial pilot was uninjured. The airplane received substantial damage. The airplane was registered to and operated by an individual under 14 Code of Federal Regulations Part 91 as a pilot proficiency flight. Visual meteorological conditions prevailed for the flight that was not operating on a flight plan. The flight originated from COD about 1000 and was to remain in the airport traffic pattern.

The pilot was employed as a flight instructor for Choice Aviation at COD. The pilot stated that the airplane was owned by a former student of his, who was issued a private pilot certificate in November 2016. The pilot stated that he had provided all the airplane owner's flight training toward his private pilot certificate, using a Cessna 172M operated by Choice Aviation. The airplane owner planned on flying the accident airplane and had Choice Aviation perform a condition inspection on October 20, 2016. The airplane owner wanted the pilot to fly the airplane to gain proficiency so that the owner could receive flight instruction from the pilot using the accident airplane.

On November 5, 2016, the pilot and the chief pilot of Choice Aviation performed a checkout flight in the accident airplane, but the flight returned and landed without incident shortly after takeoff due to engine roughness. The airplane then underwent maintenance at Choice Aviation where it was determined that the it was not receiving enough fuel at full power, even with both electric fuel pumps on. Check valves were installed in the fuel system, and the fuel pressure regulator was replaced.

On December 22, 2016, the pilot and chief pilot performed a second checkout flight in the accident airplane, during which there was "slight engine roughness" at high power settings, which was not "as bad" as what had occurred on the previous checkout flight. The airplane "ran perfectly fine" at 35 inches of manifold pressure and below. The pilot and chief pilot performed power off stalls, steep turns, climbs and descent as well as three takeoffs and landings, and the airplane "flew normal."

The pilot stated that to fix the remaining fuel issue at high power settings, a Choice Aviation mechanic adjusted the fuel pressure to the maximum setting for the engine to receive more fuel needed to run at maximum engine power.

On the day of the accident, the pilot flew another flight in the accident airplane to gain further proficiency in the handling characteristics of the airplane. The pilot stated that prior to the flight, he performed a "thorough" preflight inspection of the airplane, and the inspected items were in "working order." The pilot performed "several" start attempts and had to use the choke to start the engine in cold weather conditions. While holding short of runway 22 for takeoff, the pilot ran the engine to 4,000 rpm and checked the ignition circuits. He then turned fuel pump "B" on and ran the engine to maximum power, which brought the fuel pressure to 23 psi; the engine ran "fine." The pilot said that on previous flights, the engine would not run "smoothly" at maximum power settings. The pilot said that when he reduced engine power to 4,000 rpm and turned off both pumps, the engine "slowly quit." He then restarted the engine and taxied to maintenance to confirm normal operation of the engine with the mechanic. The airplane engine was then run-up with the pilot and the mechanic, and the engine remained in limits from maximum power to idle with both fuel pumps on. With both fuel pumps off, the fuel pressure dropped, and the engine did not quit. The mechanic exited the airplane, and the pilot taxied the airplane to runway 22 and performed another run-up at 4,000 rpm with both fuel pumps on and "everything checked out."

The pilot then performed a takeoff from runway 22 and entered a left crosswind, during which the pitot tube rotated sideways resulting in an airspeed indication of 0 knots. The pilot then flew a left traffic pattern to land on runway 22. While in a left downwind and abeam the runway numbers, the pilot reduced engine power to 15 inches of manifold pressure, with both fuel pumps on, to begin a descent. He "sensed" something was not right with the engine so he applied power and there was no response. He turned the airplane onto a left base and maintained what he thought was the pitch attitude for best glide. The propeller continued to turn, but after multiple attempts to adjust the throttle, he realized that the engine was not responding. The pilot performed a forced landing in a grass field short of runway 22 due to a snow bank near the approach end of the runway. During the landing, the airplane rolled for about 75 feet until the nose landing gear collapsed. The airplane then slid for about 90 feet.

Examination of the airplane revealed that a black color fuel line to the pressure regulator was ¬ inch in diameter. The absolute pressure sensor was not mounted using a screw through its mounting hole. The absolute pressure sensor, "966 507," was attached to the engine frame using a black-color substance consistent with sealant in front of and toward the bottom of airplane battery, which was mounted on the right side of the firewall, as viewed from tail-to-nose. The airplane contained useable fuel in the left and right fuel tanks consistent in color with 100 low lead aviation fuel. The left and right wing filler cap vents were unobstructed. The pitot tube was rotated laterally so that the pitot tube inlet was pointed inward toward the fuselage. The airplane engine did not exhibit any leaks of fuel, oil, or coolant. Engine control continuity from the cockpit control to the engine was confirmed. The pressure regulator, "887 130, 16.0280," exhibited a gouge on the side of the its adjustment screw retaining nut. The fuel selector was in the off position. All the fuel line shut off valves were in the on position. The Hobbs meter indication was 109.7 hours.

In preparation of an engine run, the oil quantity level was checked by rotating the propeller by hand until a burp was heard from the engine oil reservoir. The engine oil level then rose, and its quantity was at the base of the oil filler neck, which was above the maximum oil capacity for the engine. The excess engine oil was drained and estimated to be about 16 ounces above the maximum oil capacity for the engine. The propeller was removed due to accident damage and replaced for the engine run. The airplane was then tied down and was started after six start attempts over about a 1:00 minute period. The engine was then run for about 5:30 minutes to a full-power setting without power loss. To replicate the accident flight, a second engine run was then performed during which the engine was run at a full power setting and then retarded to 15 inches of manifold pressure. When engine power was retarded to a manifold pressure of 15 inches, with both fuel pumps in the on-position, the engine quit and was unable to be restarted. Fuel lines were examined after the engine run. The black color fuel line, leading to the fuel pressure regulator, contained fuel and exhibited pressure when the fuel pumps were on; the return fuel line contained fuel. The engine was unable to be started after several attempts. The airplane interior was removed to examine the fuel system/lines for leakage/obstruction and none were noted. A transparent-green color fuel return line from the pressure regulator was connected toward the bottom left side of the fuel header tank behind the passenger seat. There was a second transparent-green color line connected to the top of fuel header tank that had a transducer spliced into the line which was connected to the right fuel tank via the wing root. The transducer, of undetermined function, was at a distance midpoint between the top of the header tank and the right-wing root. Fuel was present up to the transducer but there was no fuel present in the line above the transducer throughout the examination/engine runs. Black color fuel lines from the left and right-wing fuel tanks were connected toward the bottom of the fuel header tank. The fuel pressure regulator fuel

return line was disconnected from the pressure regulator's return port, and a fuel hose was connected from pressure regulator's return port and inserted into the right-wing filler port. A dual needle pressure gauge was attached to the pressure regulator and induction manifold as per the engine maintenance manual. After several engine start attempts, the engine was started and the fuel pressure needle was about 62.5 inches and the manifold pressure was about 29 inches. When engine power was reduced to about 17 inches of manifold pressure with the fuel pumps on, the engine quit. The pressure regulator screw was turned one turn toward decreasing fuel pressure. The engine was started with less start attempts of shorter duration and was run again. The fuel pressure and manifold pressure had a differential of about 5 inches. The engine was run at full power and then at 15 inches with and without the fuel pump on and there was no loss of engine power. The throttle was cycled between full power and 15 inches with the fuel pumps on and there was no loss of engine power.

According to Rotex 914 Fuel Pressure Regulator maintenance information, the "maximum fuel pressure is approximately 10.3 inches of mercury (5.08 psi) above airbox pressure. The minimum fuel pressure is approximately 4.44 inches of mercury (2.18 psi) above the airbox pressure. The fuel pressure regulators are "PRE-SET at the factory and RARELY need adjustment if at all.EVER!"

Accident Rpt# ERA17CA013 10/11/2016 1336 EDT	**Regis# N686RM**	**Bell, FL**	**Apt: Flying Harness Farms 37FL**
Acft Mk/Mdl MICKLER LARRY J RV6 A-A	**Acft SN 20686**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360	**Acft TT 52**	**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: MICKLER LARRY J	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

The pilot/owner was landing at his home airport with a 60ø, 10-knot crosswind that was gusting to 14 knots. The pilot stated the wind was "a little gusty" at the time and that the airplane was "right at stall speed" at touchdown. The airplane touched down on the right main landing gear (MLG) and then the left MLG before the pilot lowered the nose landing gear (NLG). He said that, when the NLG touched down, the airplane bounced into a very nose-high attitude, so he "pushed the nose over," and the propeller struck the ground, the airplane nosed over, and it then came to rest inverted. The pilot was seriously injured, and the airframe sustained substantial damage to the fuselage and vertical stabilizer. According to the pilot/owner, the performance and handling of the airplane on the day of the accident was "fine; you couldn't ask for a better airplane."

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's inadequate compensation for gusting crosswinds, which resulted in a bounced landing and nose-over.

Events

1. Landing-flare/touchdown - Attempted remediation/recovery
2. Landing-flare/touchdown - Abnormal runway contact

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained - C
3. Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Response/compensation - C
4. Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Response/compensation - C

Narrative

The pilot/owner was landing at his home airport with a 60-degree, 10-knot crosswind that was gusting to 14 knots. The pilot stated the wind was "a little gusty" at the time and the airplane was "right at stall speed" at touchdown. The airplane touched down on the right main landing gear, and then the left main gear before the pilot lowered the nose landing gear to the runway. He said that when the nose gear touched down, the airplane bounced into a very nose-high attitude so he "pushed the nose over" and the propeller struck the ground, the airplane nosed over, and came to rest inverted. The pilot was seriously injured and the airframe incurred substantial damage to the fuselage and vertical stabilizer. According to the pilot owner, the performance and handling of the airplane on the day of the accident was "fine. you couldn't ask for a better airplane."

Accident Rpt# CEN17LA015	**10/07/2016 1315 CDT**	**Regis# N522LM**	**Livingston, TX**	**Apt: Livingston Municipal Airport OOR**
Acft Mk/Mdl MILHOLLAND KELLY D		**Acft SN 76**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-290 D2		**Acft TT 686**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: OLIVER WILLIAM R		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The private pilot reported that, while on approach for landing in the experimental amateur-built airplane, the engine experienced a total loss of power. The pilot performed a forced landing to a field, during which the airplane sustained substantial damage. An examination of the engine revealed that the left magneto was not producing spark. Further examination of the left magneto revealed signatures consistent with failure of the magneto capacitor. Although the failure of a single magneto would likely result in a partial loss of engine power, the reason for the total loss of engine power experienced on the accident flight could not be determined based on the available information.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power for reasons that could not be determined based on the available information.

Events

1. Approach - Powerplant sys/comp malf/fail
2. Approach - Loss of engine power (partial)
3. Landing-landing roll - Landing gear collapse

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Aircraft-Aircraft power plant-Ignition system-Magneto/distributor-Failure

Narrative

On October 7, 2016, about 1315 central daylight time, a Milholland Kelly D airplane, N522LM, was substantially damaged during a forced landing 1/2 mile north of Livingston Municipal Airport (OOR), Livingston, Texas. The pilot was not injured. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91 without a flight plan. Visual meteorological conditions prevailed. The cross-country flight departed Sport Flyers Airport (27XS), Brookshire, Texas, about 1200, and was en route to OOR.

According to the pilot, while approaching OOR for landing, the engine rpms decreased and the engine stopped producing power. He added that there were no indications from the engine or the engine gauges prior to the sudden power loss. During the forced landing to the field, the landing gear collapsed and partially separated from the fuselage. The lower wings, fuselage, and firewall were substantially damaged.

An examination of the engine revealed that the left magneto was not producing spark. Further examination of the engine and related systems revealed no additional mechanical anomalies that would have precluded normal operations.

The left magneto was placed on a test machine and brought to operating speed. Each of the four ignition leads produced spark; however, at times the spark was intermittent. Further examination of the magneto revealed a greyish color on the points, consistent with failure of the capacitor. The technician remarked that a magneto could test within expected parameters but when it got hot during normal engine operations, it could fail.

Accident Rpt# GAA17CA400 07/07/2017 1100	**Regis# N599JR**	**Kemmerer, WY**	**Apt: Kemmerer Muni EMM**
Acft Mk/Mdl RITTER JOHN I S D S C-NO SERIES	**Acft SN 001**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360-C1G	**Acft TT 1583**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: RITTER, JOHN I.	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Events

2. Landing - Loss of control on ground

Narrative

The pilot of a tailwheel-equipped airplane reported that, during landing, the airplane bounced and, upon the second touchdown, veered to the right and ground looped. The airplane exited the runway and impacted a drainage ditch.

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.

Accident Rpt# WPR17LA098 05/05/2017 915 MDT	**Regis# N136BC**	**Hanksville, UT**	**Apt: Hanksville HVE**	
Acft Mk/Mdl ROBERT E BOUNDS BOUNDS	**Acft SN 01**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-340-A1A	**Acft TT 289**	**Fatal 0 Ser Inj 2**	**Flt Conducted Under: FAR 091**	
Opr Name: WILLIAM WELLS	**Opr dba:**		**Aircraft Fire: NONE**	

Summary

The flight instructor and private pilot were conducting a personal flight in the tailwheel-equipped, experimental, amateur-built airplane. About 10 minutes before landing, the flight instructor, who had no previous experience flying the airplane, took control of the flight from the pilot and continued flying the airplane to landing. Due to his lack of prior experience flying the airplane, which had foot pedals that were raised off the floor, he inadvertently applied pressure to the toe brakes, which resulted in the airplane nosing over immediately on touchdown.♂♂The airplane sustained substantial damage to the vertical stabilizer and wing attachment fittings during the accident. Both the pilot and flight instructor reported that there were no preimpact mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The flight instructor's failure to maintain airplane control during landing when he inadvertently applied brake pressure to the toe brakes when the airplane touched down.

Events

1. Landing-flare/touchdown - Nose over/nose down

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
3. Aircraft-Aircraft systems-Landing gear system-Brake-Unintentional use/operation - C
4. Personnel issues-Experience/knowledge-Experience/qualifications-Total experience w/ equipment-Pilot

Narrative

On May 5, 2017, about 0915 mountain daylight time, an experimental amateur-built Bounds Bearcoupe, N136BC, nosed-over during landing at Hanksville Airport, Hanksville, Utah. The flight instructor and private pilot were seriously injured, and the airplane sustained substantial damage. The airplane was registered to the private pilot, and operated as a personal flight by the instructor at the time of the accident, under the provisions of 14 Code of Federal Regulations Part 91. The flight departed about 0830 from a backcountry airstrip in Utah, known as Hidden Splendor. Visual meteorological conditions prevailed, and no flight plan had been filed.

The instructor stated that about 10 minutes before landing, he asked the pilot if he could take control of the airplane and perform the landing. The pilot agreed, and he transitioned control to the instructor. The instructor stated that the airplane was a unique design, with foot pedals that were raised off the floor. He therefore needed to hold his feet in place on the pedals to reach the toe-brakes, rather than rest his heels on the floor as he was accustomed. As such, there was no reference for him to properly gauge the position of his foot during the landing approach. He stated that as soon as the main landing gear touched the ground, the airplane nosed-over, and he realized he had been inadvertently applying brake pressure.

The airplane sustained substantial damage to the vertical stabilizer and wing attach fittings during the accident (Photo 1).

The airplane was designed and built by the pilot; it was a mid-wing design, and configured with tailwheel-type landing gear. The pilot reported about 296 hours of flight experience in the airplane, and the landing approach was the first time the instructor had flown the airplane.

Both the pilot and instructor reported that there were no preimpact mechanical malfunctions or failures that would have precluded normal operation.

Accident Rpt# CEN16LA316	**08/09/2016 1500 CDT**	**Regis# N6214C**	**Winterset, IA**	**Apt: Winterset Muni 3Y3**	
Acft Mk/Mdl SCHABACKER KONRAD J ACRO SPORT		**Acft SN KJS 1993**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360-A1D		**Acft TT 89**	**Fatal 0**	**Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: LEO SMITH		**Opr dba:**			**Aircraft Fire: NONE**

Summary

The commercial pilot was landing the airplane during a cross-country flight. The pilot reported that, during the landing roll, the airplane veered left. The pilot straightened the airplane and added power to go around, but the airplane again veered left, traveled off the side of the runway, and impacted two airplanes parked on the ramp. A postaccident examination of the airplane confirmed the pilot's report that there were no mechanical failures or malfunctions with the airplane that would have precluded normal operation.♂♂♂

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to maintain directional control of the airplane during the landing roll, which resulted in an on-ground collision with two parked airplanes.

Events

1. Landing-landing roll - Loss of control on ground
2. Landing-landing roll - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
3. Environmental issues-Physical environment-Object/animal/substance-Aircraft-Contributed to outcome

Narrative

On August 9, 2016, at 1600 central daylight time, an amateur-built Schabacker Konrad J Acro Sport II, N6214C, collided with two parked airplanes following a loss of control while landing at the Winterset Municipal Airport (3Y3), Winterset, Iowa. Neither the airline transport pilot (ATP) pilot nor the airplane owner/pilot rated-passenger were injured. The airplane was substantially damaged. The aircraft was registered to the pilot-rated passenger and it was being operated 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 originated from the Mason City Municipal Airport (MCW), Mason City, Iowa, at 1340.

The airplane owner had recently purchased the airplane and had the pilot fly the airplane because the airplane owner did not hold an endorsement to fly tailwheel equipped airplanes. The pilot had a total flight time of 2.5 hours in the accident airplane.

The pilot reported they overflew the airport, checked the windsock, and noted the wind was calm so they decided to land on runway 32. Shortly into the landing roll, the airplane began to veer to the left. The pilot straightened the airplane and added engine power to initiate an aborted landing. The airplane once again veered to the left and traveled down an embankment before it collided with two unoccupied parked airplanes on the ramp which were: N601FA, an Aerostar 601P, and N31EG, a Piper PA-23-250.

The pilot reported the local wind was calm at the time of the landing. The winds recorded at Des Moines International Airport, Des Moines, Iowa, located about 22 miles northeast of 3Y3, were from 150 degrees at 6 knots.

A postaccident examination of the landing gear and brakes was conducted by a Federal Aviation Administration inspector. The inspector reported that he did not find any anomalies that would have prevented the pilot's ability to maintain directional control of the airplane. In addition, the pilot reported that there was no mechanical failure/malfunction of the airplane.

Accident Rpt# WPR16LA149 07/23/2016 1113 PDT	**Regis# N5103**	**Lancaster, CA**	**Apt: General Wm J Fox Airfield WJF**	
Acft Mk/Mdl SWARTZ GENE TITAN T 51 MUSTANG-N	**Acft SN**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl AMA/EXPR SUZUKI UNKNOWN ENG	**Acft TT 154**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: JOHN TUOSTA	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: SPE	

Summary

The private pilot reported that, while flying the experimental, amateur-built airplane in the airport traffic pattern, the engine experienced a total loss of power.ÿHe quickly attempted an engine restart, but was unsuccessful and decided to land on a nearby road. The airplaneÿlanded hard and theÿright main landing gear collapsed. The airplane subsequently veered to the right and impactedÿa sign.ÿÿÿÿÿÿÿÿ

Postaccident examination of the engine revealed that a loose magnet in the flywheel struck the attachment bracket for the primary and secondary ignition, which disrupted the timing of the ignition system and rendered it inoperative; the engine subsequently experienced a total loss of power.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power due to the separation of a flywheel magnet, which impacted the attachment bracket for the primary and secondary ignition and disrupted the timing of the ignition system, rendering it inoperative.

Events

1. Approach-VFR pattern downwind - Loss of engine power (total)
2. Approach-VFR pattern downwind - Off-field or emergency landing
3. Landing-landing roll - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Ignition system-(general)-Damaged/degraded - C

Narrative

On July 23, 2016, about 1113 Pacific daylight time, an experimental amateur-built Swartz Gene, Titan T-51 Mustang, N5103, sustained substantial damage during a forced landing after a reported loss of engine power while on downwind at the General William J Fox Airfield (WJF) Lancaster, California. The private pilot and passenger were not injured. The airplane was registered to and operated by the pilot as a Title 14 Code of Federal Regulations Part 91 personal flight. Visual meteorological conditions prevailed, and no flight plan was filed. The local flight departed WJF about 1040.

According to the pilot, the airplane was about 1,000 ft above ground level, initiating the base turn to final, when the engine lost power. He quickly attempted an engine restart but was unsuccessful and decided to land on a nearby road. He selected full flaps over the road and landed hard. Subsequently during the landing roll, the airplane's right main landing gear collapsed, causing the airplane to veer to the right and strike a highway traffic sign, which resulted in substantial damage to the right wing.

Postaccident examination of the airplane's engine, under the supervision of a Federal Aviation Administration inspector, revealed that while accessing the engine, a loose portion of a bolt was observed at the bottom of the cowling. It was determined that the loose bolt portion came from the timing pickup bracket that secures the primary and secondary electronic ignition pickups to the engine.

The magnetic flywheel, a part of the ignition system, consisted of four magnets. One magnet became loose and backed out and then struck the secondary timing pickup. Markings were consistent with the impact. The impact force on the secondary timing pickup caused one of the two bolts on the support bracket to separate and break off. Subsequently, the bracket moved about 2 inches, to the right and aft, which effected the primary and secondary ignition system's timing and rendered them inoperative.

The broken bolt was replaced and the attachment bracket was secured back into it's support. The engine started and ran on the primary ignition system with no anomalies noted. However, on the secondary ignition system, the engine could not be started due to the damage sustained to the secondary system.

Accident Rpt# WPR17LA114 05/30/2017 1600 PDT	**Regis# N399DG**	**Puyallup, WA**	**Apt: Pierce County - Thun Field PLU**
Acft Mk/Mdl TAPPEN CHRIS VELOCITY SUV-NO SERI	**Acft SN 115**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING LIO-360-C1E6	**Acft TT 138**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BRUCE ANDERSON	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The private pilot stated that, during the landing roll, the right brake of the experimental amateur-built airplane failed. The airplane subsequently departed the runway and impacted an airport fence, resulting in substantial damage. The airplane was equipped with a castering nosewheel and steering was accomplished through differential brake pressure; therefore, the pilot did not have any other means to either stop the airplane or maintain directional control once it had slowed to a speed below which rudder authority was available.♂♂Postaccident examination revealed that the right brake disc had detached from the wheel hub. None of its attachment bolts were found, and the attachment bolts on the left brake disc were loose. The bolts and discs had holes to accommodate safety wires, but no safety wires were found on either assembly.♂♂The pilot had recently purchased the airplane following the completion of a condition inspection. Before the inspection, the airplane's builder had adjusted the landing gear, which necessitated removal of the brake discs. The builder could not recall using safety wires to secure the brake discs during the reinstallation, and the mechanic who performed the subsequent inspection also could not recall if safety wires were used.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The airplane builder's failure to install safety wires on the brake disc attachment bolts, and the mechanic's failure to identify the omission during the condition inspection. The subsequent brake disc separation resulted in a loss of directional control during the landing roll.

Events

1. Landing-landing roll - Sys/Comp malf/fail (non-power)
2. Landing-landing roll - Runway excursion
3. Landing-landing roll - Collision during takeoff/land

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Brake-Incorrect service/maintenance - C
2. Aircraft-Aircraft systems-Landing gear system-Brake-Inadequate inspection - C
3. Personnel issues-Task performance-Maintenance-Scheduled/routine maintenance-Maintenance personnel - C
4. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Attain/maintain not possible - C

Narrative

HISTORY OF FLIGHT

On May 30, 2017, about 1600 Pacific daylight time, an experimental amateur-built Velocity SUV, N399DG, departed the runway after landing at Pierce County Airport - Thun Field, Puyallup, Washington. The pilot was not injured, and the airplane sustained substantial damage to the canard and both wings after striking an airport fence. The airplane was registered to, and operated by, the private pilot as a 14 Code of Federal Regulations Part 91 personal flight. The local flight departed Thun Field about 5 minutes before the accident. Visual meteorological conditions prevailed and no flight plan had been filed.

The pilot had purchased the airplane in Tennessee from its builder about one week before the accident, and spent the intervening period flying it back to his home base of Thun Field. He stated that during taxi after one of the return flight legs, the right brake became ineffective, and therefore he was unable to turn the airplane right. He inspected the brake system and was not able to find any anomalies, and on the next three flights, he could not duplicate the problem.

On the day of the accident, he planned to fly the airplane in the traffic pattern. He performed a preflight inspection, and reported that during the engine ground-run he checked the brakes, and they held. Additionally, the taxi route from his hangar to the runway required multiple right turns. The takeoff, climbout, and landing approach were uneventful, and he touched down just beyond the runway numbers, at an airspeed of 82 knots. He applied pressure to the combination rudder/brake foot pedals to slow the airplane down, and once it had reached about 35 knots, the resistance in the right pedal suddenly dropped, and the pedal moved to almost full travel.

The airplane immediately veered to the left, and the pilot released pressure on the left pedal. He began to "pump" the right pedal in an attempt to regain braking action, but the airplane did not slow down. As the airplane approached a runway light, the pilot applied left pedal pressure, and the airplane veered left, departed the runway, and struck the fence.

TESTS AND RESEARCH

Brake and Steering System

The airplane was equipped with a castering nosewheel, with steering accomplished through differential brake pressure once rudder effectiveness had reduced at slower speeds. The brakes were activated by the pilot through the rudder pedals. The design did not incorporate conventional toe-brakes, but instead braking action was applied directly via the rudder pedals once they had been pushed about 2 « inches. The main landing gear struts were equipped with Matco W600 series brake and wheel assemblies, which incorporated a triple-piston brake caliper, and a steel brake disk which was attached to a threaded aluminum wheel hub by three hex-head bolts. Each wheel assembly was enclosed in a composite wheel pant, which covered the caliper and brake rotor.

Post-accident examination revealed that all three hex bolts for the right brake disk were missing, and the disk had become detached from the wheel hub. The disk on the left side was still in place, but was loose, and the three bolts were finger-tight. The bolts and disks had holes to accommodate safety wire, but no safety wire was found on either assembly.

Maintenance

Construction of the airplane was completed in June 2012, and at the time of the accident, it had accrued a total flight time of about 138 hours. Maintenance records indicated that it failed to pass its conditional inspection on May 19, 2017, due to the lack of an emergency locator transmitter (ELT). An entry by the builder dated May 26 detailed that he installed an ELT and completed a series of repairs and upgrades including the replacement of the brake master cylinders, adjustment of the main landing gear camber and toe-in, (due to uneven tire wear), along with modifications to the avionics system.

The builder stated that the toe-in adjustment required removal of the brake assembly (including the three hex bolts) and installation of shims at the wheel axle mounting points. He could not recall if he had used safety wire to secure the hex bolts, or if he had ever used safety wire for their retention in the past. He further reported that the master cylinders were replaced because he encountered a loss of brake effectiveness in the right brake, which could be overcome by "pumping" the right pedal.

The builder stated that all the work, except for the ELT installation, had actually been completed prior to the conditional inspection on May 19, but that he did not record the entry until one week later.

On May 26, 2017, the same airframe and powerplant rated mechanic (with inspection authorization) who initially inspected the airplane, certified that it was airworthy. The mechanic reported that he had examined the brake system at the time of the initial inspection, but could not recall if safety wire had or had not been installed on the disk bolts. He did not re-examine the brakes during the follow-up inspection, as the ELT was the only item which required attention.

During the 21-flight hour period leading up to the accident no other brake-related maintenance procedures were performed.

Accident Rpt# CEN16LA281	**07/22/2016 1040 EDT**	**Regis# N807LK**	**Springfield, OH**	**Apt: N/a**	
Acft Mk/Mdl VANS RV9-A		**Acft SN 91528**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl SUPERIOR XP-320		**Acft TT 53**	**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: LEVON G KING		**Opr dba:**		**Aircraft Fire: NONE**	
				AW Cert: SPE	

Summary

Before takeoff on a personal cross-country flight, the private pilot received two official weather briefings of all the forecast and observed weather conditions along the flight route, which included thunderstorms and convective SIGMETs. A review of air traffic control (ATC) information revealed that, while en route to the destination airport, the pilot was in contact with ATC and attempting to circumnavigate oncoming weather and precipitation. The pilot requested ATC assistance and stated that he could avoid the clouds if ATC could help him avoid the precipitation, indicating that he was aware of the weather conditions but that he likely did not have onboard weather information. The Middletown sector approach controller provided two route options: one of the options would have allowed the pilot to completely avoid the precipitation and taken him farther away from his destination, and the other option would have allowed the pilot to proceed between two areas of precipitation and stay closer to his intended route. The controller obtained PIREPs from two pilots who had previously transitioned through the two areas of precipitation, and they reported that they "didn't really have any problems" flying through the area. The controller also provided the pilot the intensity of the two cells and the estimated distance between the two areas of precipitation. After the controller relayed this information to the pilot, he chose to fly between the two areas of heavy precipitation. The controller then transferred communication to the Urbana sector approach controller. After the pilot checked in with the Urbana approach controller, the controller issued the pilot several heading suggestions to the northwest to avoid the precipitation, but the pilot responded that he wanted to continue on his present heading and then continued flying east toward the severe weather. Despite several subsequent suggestions by the controller to the pilot to change course to avoid the weather, according to radar data, the airplane continued flying east toward the severe weather. In the final 3.5 minutes of the flight, while flying east, the airplane made a left 360ø turn while descending about 2,900 ft per minute (fpm), then resumed a climb while heading east. Less than 1 minute later, the airplane made a right 310ø turn while descending about 1,200 fpm. The airplane then flew northeast and descended about 4,600 fpm to 3,440 ft above ground level. Subsequently, the descent rate increased to about 6,450 fpm, at which point radar contact was lost.ÿThe airplane entered an area of an outflow boundary and thunderstorms and likely encountered heavy precipitation, severe-to-extreme turbulence, updrafts and downdrafts, and wind shear.

A witness saw the airplane in a steep descent and heard the engine operating; the airplane then disappeared behind a tree line, at which point she heard the sound of an impact. The airplane impacted a corn field heading north. The vertical stabilizer and rudder were found 0.61 to 0.63 nautical miles southwest of the main wreckage, respectively, and exhibited overload signatures consistent with an in-flight breakup. A postaccident examination of the airframe and engine did not reveal any anomalies, other than the separated components, that would have precluded normal operation.

Although the Middletown sector controller provided general information about the observed weather, she did not provide specific information, such as the direction relative to the airplane and distance to the bands of weather and the widths of the weather bands, as required by Federal Aviation Administration Order 7110.65. The controller's workload did not prevent her from providing general weather information and suggesting headings to the pilot, which indicates that the controller could have provided more specific adverse weather information without detriment to other duties, as required. However, it is unlikely that this affected the pilot's decision about the route he flew. The pilot's continued flight into known thunderstorms resulted in the in-flight breakup of the airplane.

Although toxicology testing detected ethanol in the pilot's muscle and liver, the ratio of the detected ethanol suggested that some or all the ethanol was from sources other than ingestion.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's decision to fly into known thunderstorms, which resulted in an in-flight breakup.

Events

1. Enroute-cruise - Loss of control in flight
2. Enroute-cruise - Inflight upset
3. Enroute-cruise - Other weather encounter
4. Enroute-cruise - Windshear or thunderstorm

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Convective weather-Thunderstorm-Effect on equipment - C
2. Environmental issues-Conditions/weather/phenomena-Convective weather-Thunderstorm-Decision related to condition - C
3. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
4. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C
5. Aircraft-Aircraft structures-Empennage structure-Vertical stabilizer-Capability exceeded - C

Narrative

HISTORY OF FLIGHT

This report was modified on August 16, 2017. Please see the docket for this accident to view the original report.

On July 22, 2016, about 1040 eastern daylight time, a Levon G King Vans RV9A airplane, N807LK, impacted terrain near Springfield, Ohio. The pilot and one passenger were fatally injured and the airplane was destroyed. 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. Marginal visual meteorological conditions prevailed near the accident site and the airplane was receiving visual flight rules flight following. The flight departed Tri-Cities Regional Airport (TRI), Bristol/Johnson/Kingsport, Tennessee, about 0850 and was en route to Grosse Ile Municipal Airport (ONZ), Detroit/Grosse Ile, Michigan.

A review of the air traffic control (ATC) and radar data revealed that while en route to ONZ, the pilot was in contact with ATC and attempted to navigate around the oncoming weather and precipitation. From 0957 to 1038 the pilot communicated with the controllers about avoiding the precipitation and requested assistance in doing so. The pilot stated that he could avoid the clouds if ATC could keep him out of the precipitation. The controllers gave the pilot several heading suggestions to the northwest to avoid the precipitation that they observed on their radar scopes. The pilot continued flying east toward the severe weather (figure 1).

In the final 3.5 minutes of the flight while flying east, the airplane made a left 360ø turn while descending about 2,900 ft per minute (fpm), then resumed a climb while heading east. Less than one minute later, the airplane made a right 310ø turn, descending about 1,200 fpm. The airplane then flew northeast and descended about 4,600 fpm to an elevation of 3,440 ft above ground level (agl). The descent rate increased to about 6,450 fpm until radar contact was lost (figure 2).

A witness observed the accident airplane above her house as it flew east-northeast (figure 2). She stated that the airplane was in a steep descent and disappeared behind a tree line when she heard the sound of an impact. She heard the engine operating before the airplane disappeared behind the trees.

PERSONNEL INFORMATION

AIRCRAFT INFORMATION

The pilot built the airplane from a kit, which was configured for 2 occupants with side-by-side seating. The airplane received a special airworthiness certificate with an experimental designation on April 27, 2015. The pilot logged the airplane's first flight on July 30, 2015.

The airplane was equipped with a TruTrak electronic flight instrument system, a Garmin GTX 327 transponder, and Free Flight automatic dependent surveillance-broadcast (ADS-B). A Garmin 795 handheld GPS was found onboard and was damaged to the extent that a download of non-volatile memory was not possible. An external Garmin GPS antenna was found by the FAA inside the pilot's hangar at ONZ.

The investigation did not find any evidence of a satellite weather subscription and could not determine if the pilot was receiving weather information to the cockpit instruments.

METEOROLOGICAL INFORMATION

While en route, air traffic controller advised the pilot that two other airplanes had flown over Dayton, Ohio, but that route was located between two cells with heavy precipitation, and there was only 5 to 8 miles clearance on either side. The controller informed the pilot that she would request pilot reports (PIREPs) from the pilots. The air traffic controller informed the accident pilot that the pilots who had transitioned over Dayton indicated that they "didn't really have any problems" flying through that area.

A search of weather briefing sources revealed that the accident pilot contacted Lockheed Martin Flight Service at 0619 and 0804 and received weather briefings. During the first weather briefing, the briefer explained a Convective SIGMET (a weather advisory concerning convective weather significant to the safety of all aircraft) outlook which bordered the area along the western edge of the intended flight track and was valid through 1150. An Airmen's Meteorological Information (AIRMET) for moderate turbulence was current to the west of ONZ. It was anticipated that thunderstorms would continue to develop due to a frontal boundary in the area and turbulence was likely near ONZ.

During the second weather briefing at 0804, the briefer explained that rain had developed through northern portions of Ohio and was slowly moving east-southeast. A Convective SIGMET had been issued for the route of flight and an AIRMET for higher level turbulence had been issued for the northern portion of the route of flight. Additional Convective SIGMETs could be issued for Ohio northward during the accident flight and deviations to the west would likely avoid the SIGMET. Thunderstorms were moving southeast toward Columbus, Ohio. The briefer further explained that due to the weather conditions, the pilot would likely go direct Ohio State University Airport (OSU), Columbus, Ohio, then direct to ONZ in order to avoid the thunderstorms.

There is no record of the accident pilot receiving or retrieving any other weather information other than the information provided by ATC.

FAA Advisory Circular AC 00-24C, "Thunderstorms," defines the echo intensity levels and weather radar echo intensity terminology associated with those levels. For decibel (dBZ) values less than 30 the weather radar echo intensity terminology should be "light," 30 to 40 dBZ should be "moderate," and 40 to 50 dBZ should be "heavy." Any values above 50 dBZ shall be described as "extreme." From the National Weather Service, precipitation conditions at the surface can be inferred from VIP Levels described as:

- VIP 1 (Level 1, 18-30 dBZ) - Light precipitation
- VIP 2 (Level 2, 30-38 dBZ) - Light to moderate rain.
- VIP 3 (Level 3, 38-44 dBZ) - Moderate to heavy rain.
- VIP 4 (Level 4, 44-50 dBZ) - Heavy rain
- VIP 5 (Level 5, 50-57 dBZ) - Very heavy rain; hail possible.
- VIP 6 (Level 6, >57 dBZ) - Very heavy rain and hail; large hail possible.

The GPS flight track indicated that the airplane flew through an area of 10 to 40 dBZ reflectivity values located along the route of flight before the accident time. Reflectivity values of 25 to 40 dBZ were located north of the flight path. The accident flight flew into an area of defined thunderstorms while an outflow boundary north of the accident site was moving south. As the outflow boundary moved south across the accident site there was a corresponding increase in the dBZ values in the base reflectivity data. There were lightning flashes and strikes surrounding the accident area with more than 900 lightning flashes associated with the thunderstorms between 1030 and 1040 EDT. The flight path was within 2 miles of the lightning flashes after 1037:02 EDT through the accident time (figure 1).

COMMUNICATIONS

ATC Transcripts - Partial Summary

10:34:15 - (pilot) good morning Columbus, experimental November eight zero seven lima kilo we 're level (unintelligible) at nine point four

10:34:22 - (ATC) experimental eight zero seven lima kilo Columbus approach altimeter is three zero seven seven

10:34:28 - (pilot) three zero seven seven, seven lima kilo

10:34:35 - (pilot) and seven lima kilo we'd like all the help you can give us around this precip[itation]

10:34:40 - (ATC) experimental seven lima kilo say again

10:34:43 - (pilot) any help you can give us to avoid the precip[itation] we'd appreciate

10:34:47 - (ATC) seven lima kilo roger my radar scope you need to turn straight to the northwest about a three twenty to three thirty heading uh if you want to try and go through the least amount of precip[itation] on your present heading then your current heading looks good you might you might need to turn a little bit to the right but if you want to stay out of it completely then you need to turn to the northwest

10:35:09 - (pilot) seven lima kilo I think I'll maintain present heading

10:35:13 - (ATC) Roger

10:36:07 - (pilot) Columbus approach seven lima kilo [what do you show] as my present heading?

10:36:13 - (ATC) experimental seven lima kilo your present heading takes you through the uh worst of the precipitation heavy to extreme precipitation I suggest you turn to the south southwest

10:36:23 - (pilot) seven lima kilo

10:37:38 - (ATC) experimental seven lima kilo Columbus

10:37:40 - (pilot) seven lima kilo go ahead

10:37:43 - (ATC) I was just, are you turning back to the northeast?

10:37:46 - (pilot) I intended to turn to the southeast

10:37:50 - (ATC) okay your present heading is taking you straight eastbound again right into, at least on my scope, the worst of the precip[itation] so you need to turn the right, if you want to turn to the right to the southwest or southeast if you want to go through the least of it

10:38:04 - (pilot) okay we'll go to the right

10:39:50 - (ATC) experimental seven lima kilo I can see you continuing to the northeast at least on my scope if you turn a little bit to the left go northbound that you be a through the precipitation here in about twenty miles

10:40:10 - (ATC) experimental seven lima kilo Columbus

10:40:17 - (ATC) experimental seven lima kilo if you can hear me Springfield airport is off to your right or the Lisbon airport is just off to your left it's runway five two three one thousand eight hundred by seventy-five feet

10:41:10 - (ATC) experimental seven lima kilo if you can hear radar contact is lost, if you can hear me uh just uh respond

End of Transcript.

WRECKAGE AND IMPACT INFORMATION

The responding Federal Aviation Administration (FAA) inspector reported that the airplane was found in a corn field (figure 3) about 7 statute miles east of Springfield-Beckley Municipal Airport (SGH), Springfield, Ohio.

The main wreckage debris path was generally oriented north and contained the engine, propeller, left and right wings, fuselage, and most of the empennage. The debris path was about 25 yards in length beginning with pieces of a wing and ended with the main wreckage. The instrument panel and forward cockpit area separated from the airplane and were found near the middle of the debris path. The throttle, mixture, and propeller knobs were found near the full forward position. The engine separated from its mounts and sustained impact damage. The propeller was separated from the engine and sustained leading edge damage, S-bending, and rearward bending.

The vertical stabilizer, rudder, and several small pieces separated from the empennage and came to rest in separate locations 0.61 to 0.63 nautical miles southwest of the main wreckage. The vertical stabilizer and rudder (figure 5) and were found with overload signatures at all separation points. The vertical stabilizer separated near the bottom of the rear spar. The rudder was found separated in two large pieces with several small pieces also identified. The counterweight was laterally separated from the top of the rudder. The rudder hinge brackets remained attached to the control rod ends. Most of the hinge bracket rivets were pulled through the vertical stabilizer.

MEDICAL AND PATHOLOGICAL INFORMATION

Clark County Coroner's Office, Dayton, Ohio, completed an autopsy on the pilot and the cause of death was blunt force injuries. The Bioaeronautical Research Laboratory at the FAA's Civil Aerospace Medical Institute conducted toxicology testing, which revealed 48 milligrams per deciliter (mg/dL) of ethanol in the muscle and 23 mg/dL in the liver. No putrefaction was reported.

Ethanol 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.

ADDITIONAL INFORMATION

Air Traffic Control Information

Controllers are required to provide weather and precipitation information to pilots as stated in FAA Order 7110.65, Paragraph 2-6-4, "Weather and Chaff Services":

a. Issue pertinent information on observed/reported weather and chaff areas by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

NOTE - Weather significant to the safety of aircraft includes such conditions as funnel cloud activity, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, microbursts, moderate to extreme turbulence (including CAT), and light to severe icing.

PHRASEOLOGY- WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES, or (number) MILE BAND OF

WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix).

b. Inform any tower for which you provide approach control services of observed precipitation on radar which is likely to affect their operations.

c. Use the term "precipitation" when describing radar-derived weather. Issue the precipitation intensity from the lowest descriptor (LIGHT) to the highest descriptor (EXTREME) when that information is available. Do not use the word "turbulence" in describing radar-derived weather.

1. LIGHT. 2. MODERATE. 3. HEAVY. 4. EXTREME.

PHRASEOLOGY - AREA OF (Intensity) PRECIPITATION BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES, MOVING (direction) AT (number) KNOTS, TOPS (altitude). AREA IS (number) MILES IN DIAMETER.

EXAMPLES

1. "Area of extreme precipitation between eleven o'clock and one o'clock, one zero miles moving

east at two zero knots, tops flight level three niner zero."

2. "Area of heavy precipitation between ten o'clock and two o'clock, one five miles. Area is two

five miles in diameter."

3. "Area of heavy to extreme precipitation between ten o'clock and two o'clock, one five miles.

Area is two five miles in diameter."

Weather Information

FAA Pilot Handbook of Aeronautical Knowledge, Chapter 11, "Weather Theory," states the following:

".if an aircraft enters a thunderstorm, the aircraft could experience updraft and downdraft that exceed 3,000 ft per minute.a good rule of thumb is to circumnavigate thunderstorms by at least 5 nautical miles.if flying around a thunderstorm is not an option, stay on the ground until it passes."FAA Pilot Handbook of Aeronautical Knowledge - Chapter 11, "Weather Theory"

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FAA Safety Team FAA-P-8740-12 - AFS-8 (2008) "Thunderstorms - Don't Flirt.Skirt 'Em"

Pilots should observe the following rules for any flight routed even potentially near actual or possible thunder-storm activity:

- Avoid all thunderstorms.

- Never get closer than 5 miles to any visible storm cloud with overhanging areas, and strongly consider increas-ing that distance to 20 miles or more. You can encounter hail and violent turbulence anywhere within 20 miles of very strong thunderstorms.

- Do not attempt flight beneath thunderstorms, even when visibility is good, because of the destructive potential of shear turbulence in these areas.

- At the first sign of turbulence, reduce airspeed immediately to the manufacturer's recommended airspeed for turbulent air penetration for a specific gross weight (design maneuvering speed).

• If the aircraft inadvertently penetrates the thunderstorm, maintain a straight and level altitude on a heading that will take you through the storm area in the minimum time.

Accident Rpt# CEN17LA092 01/30/2017 1000 CST	**Regis# N1971C**	**Jennings, LA**	**Apt: Jennings 3R7**	
Acft Mk/Mdl ZENITH CH750 STOL	**Acft SN 75-10246**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320-A2B	**Acft TT 10**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: CHRIS M. BRAMMER, JR.	**Opr dba:**		**Aircraft Fire: NONE**	

Events

1. Approach-VFR pattern final - Loss of engine power (total)

Narrative

On January 30, 2017, about 1000 central standard time, the pilot of a Zenith CH750 STOL, N1971C, made a forced landing in a field 3 miles east of Jennings, Louisiana, after the engine lost power. The pilot, the sole occupant on board, received minor injuries. The airplane was substantially damaged. The airplane was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations (CFR) Part 91 as a personal flight. Visual meteorological conditions (VMC) prevailed at the time of the accident, and no flight plan had been filed. The local flight originated from Jennings, Louisiana, Airport (3R7) about 0900.

The pilot had recently completed building the airplane and had logged about 10 hours. He was having fuel flow issues; specifically, fuel was not flowing evenly from the wing tanks. The Zenith CH750 is a high wing airplane and the fuel tanks, each holding 15 gallons, are in each wing. Fuel is gravity-fed to the carburetor and engine. Early tests showed a fuel flow of 2.5 gallons per minute via gravity feed, and 1.5 gallons per minute with the auxiliary fuel pump on. The vented fuel caps were plumbed together with a T-fitting above and behind the pilot seats. Fuel flowed down to an ON/OFF selector valve before travelling to a gascolator, an in-line fuel filter, an auxiliary fuel pump, and the carburetor. Sitting on the ramp, the fuel level in each tank evened out to within ¬-gallon of each other within minutes.

Because of the uneven fuel flows, Zenith - the airplane kit manufacturer -- suggested that the pilot add snorkels to each vented cap. The pilot did so and the next test flight revealed fuel was being pushed out of one tank and draining from the opposite tank. The pilot tried several combinations before closing the vented caps completely and using only snorkels.

On the morning of the accident, the pilot departed 3R7 with 7 gallons of fuel in one tank and 8 gallons in the other. He flew for about one hour, performing several full power climbs as per the Phase 1 certification protocol. Returning to the airport, he noted the left fuel tank gauge was reading low and the right fuel tank gauge was reading high. Zenith had told him that once the fuel level in one tank reached 1 to 2 gallons, the other tank would continue to supply fuel. He was aligned with the runway and on a 3-mile final approach and 1,800 when the engine lost power. Realizing he could not glide to the airport and was approaching a fence line with trees and a power line, he elected to make a forced landing in a field. When the airplane touched down, the nose gear dug into the soft ground and the airplane nosed over. The pilot said, "The cause of the crash. . .was fuel starvation due to the left tank running empty and the right tank not flowing to the engine."