Accident Rpt# CEN14LA221 04/21/2014 1422	**Regis# N481HY**	**Peyton, CO**	**Apt: Meadow Lake FLY**
Acft Mk/Mdl AMERICAN AA 1-UNDESIGNAT	**Acft SN AA1-0048**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320-A2B	**Acft TT 3735**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PILOT	**Opr dba:**		**Aircraft Fire: GRD**
			AW Cert: STN

Narrative

On April 21, 2014, at 1422 mountain daylight time, an American AA-1, N481HY, veered off runway 15 and impacted runway signs and terrain at Meadow Lake Airport (FLY), Colorado Springs, Colorado. The airplane was destroyed by a postcrash fire. The airline transport pilot was uninjured. The airplane was registered to and operated by the pilot under 14 CFR Part 91 as a maintenance test flight. The flight was not operating on a flight plan. Visual meteorological conditions prevailed for the flight that originated at FLY about 1422 and was to remain in the airport traffic pattern for the flight.

The pilot, who was also the airplane owner, stated he performed preflight and pre takeoff checks of the airplane prior to a post owner-assisted annual inspection test flight. He departed from runway 15 for the first takeoff and remained in left closed traffic for touch and go landings. He performed the first landing to a full stop to test the airplane brakes and then taxied back to runway 15. He did not notice any anomalies with the airplane and tried to stay off the brakes during the taxi. He rechecked the magnetos and completed takeoff checks prior to a second takeoff on runway 15. During the second takeoff, the airplane accelerated on the main landing gear with the tail wheel off the ground. The airplane "aggressively veered left," and he applied full right rudder. The airplane struck a runway/taxiway sign before he was able to reduce the engine throttle. The airplane bounced and impacted terrain between runway 15 and a parallel taxiway while striking additional airport signs. The airplane came to a stop in a drainage ditch between the runway and taxiway and immediately caught fire. The airplane exploded about one minute after he evacuated the airplane.

The pilot said that he did not know what caused the post-accident fire, but that the fuel tanks were ruptured during the collision with the airport signs/terrain.

The pilot stated that the brake calipers were not removed during the owner-assisted annual inspection and when asked by the National Transportation Safety Board Investigator-In-Charge what maintenance work was performed, he said that he replaced the landing gear wheel bearings, tire tubes, and tires. He then said that the calipers were removed when asked if the calipers had to be removed to perform the maintenance items related to the wheel bearings, tire tubes, and tires. The brake fluid was last changed when he purchased the airplane about January 2011. He said that the annual inspection was performed in the hangar belonging to the mechanic with inspection authorization that certified the inspection. He said that the mechanic was present while the inspection work was performed.

The airplane, serial number 0048, was powered by a Lycoming O-320-A2B, serial number L-49225-27A, engine. The airplane underwent an owner-assisted annual inspection that was performed by the pilot. The airplane logbook entry for the annual inspection was made by an airframe and powerplant mechanic with inspection authorization at American Aviation Inc., Peyton, Colorado, and was dated April 2, 2014. The entry stated:

"Aircraft inspected IAW FAR 43 Appendix D. Replaced vacuum regulator filter B3-5-1. Stop drilled 2 small cracks on top canopy. Checked controls for travel and condition. Checked sears, belts and rails. C/W AD 72-06-02 on rudder and elevator control cables by inspection. No broken strands noted. C/W AD 72-07-10 on elevator bungee by inspection. C/W AD 75-09-07 mixture control wire by inspection. Replaced ELT Battery, next change date March 2016. C/W FAR 207D and checked good. See owners entries for cowl, wheels, brakes, tires, etc. Returned to service. Applicable AD's thru 04-02-14."

According to the Federal Aviation Administration inspector from the Denver Flight Standards District Office, the logbook entry for the inspection was not in accordance with regulatory requirements because there were no additional entries relating to "See owners entries for cowl, wheels, brakes, tires, etc." The inspector stated that all maintenance work must be entered and the authorizing mechanic must ensure that such entries are made.

Post-accident fire damage of the airplane precluded examination of the brake and landing gear systems.

Accident Rpt# WPR12LA109B 02/19/2012 1845 PST	**Regis# N433JC**	**Antioch, CA**	**Apt: Byron C83**
Acft Mk/Mdl BEECH 35-A33	**Acft SN CD-351**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR IO-470 SERIES	**Acft TT 4830**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: RONALD A GAWER	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: STN

Summary

The helicopter and airplane collided midair. Both aircraft sustained minimal damage during the impact but substantial damage during the subsequent forced landings. The airplane pilot was performing a local flight and was not in contact with air traffic control (ATC) before the collision. The helicopter pilot was receiving visual flight rules flight following services from ATC throughout the flight.♂♂The helicopter pilot transitioned between two ATC sectors before the accident. On multiple occasions, the controllers for each sector misidentified the last three digits of the helicopter's call sign. Additionally, the controller in the accident sector issued a traffic advisory using the wrong call sign. Further, an aircraft with the same last three digits as the helicopter's incorrect call sign made radio contact with the controller shortly before the collision, which increased the confusion.♂♂Audio data revealed that the air traffic controller provided multiple traffic advisories to the helicopter but did not issue an alternate or immediate course of action in accordance with ATC procedures despite the fact that the aircraft's converging flightpaths had triggered the radar conflict alert system. Radar playback also revealed that, at that time, the controller was receiving a visual alert on the radar console. This alert was also observed by a controller in an adjacent approach sector who called the radar assist controller warning of the threat. The assist controller responded, "yeah, we're givin' him traffic." A few seconds later, the radar targets merged.♂♂The helicopter pilot stated that she received and complied with the traffic advisories by performing a visual scan but that, based on her communications with the air traffic controller, she did not perceive the situation to be urgent. Radar data revealed that the helicopter descended 600 feet before the collision but that the pilot did not inform the air traffic controllers about the descent. Further, as the airplane got closer and the traffic advisories were issued, the helicopter pilot began turning north, which brought the helicopter directly into the path of the approaching airplane while simultaneously placing the airplane behind her immediate field of vision. Shortly after, she sighted a silhouette of the airplane and propeller at her 4-o'clock position. She performed an evasive maneuver to the left but then felt the helicopter being struck.

Neither the airplane pilot nor the occupant observed another aircraft near the airplane before the collision. Although the airplane pilot was not receiving traffic advisories from ATC, it was still the pilot's responsibility to maintain a proper visual lookout to avoid other aircraft in the area. The helicopter's left navigation light was inoperative when tested after the accident; however, this most likely did not affect the outcome because the left side of the helicopter would not have been visible to the airplane pilot at any point during the flight.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of both pilots to see and avoid each other during cruise flight, which resulted in a midair collision. Contributing to the accident was the failure of air traffic control personnel to issue the helicopter pilot a prompt and appropriate alternate course of action upon receiving a conflict alert.

Events

1. Enroute-cruise - Midair collision
2. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Psychological-Attention/monitoring-Monitoring other aircraft-Pilot - C
2. Personnel issues-Action/decision-Action-Lack of action-ATC personnel - F

Narrative

HISTORY OF FLIGHT

On February 19, 2012, about 1845 Pacific standard time, a Beech 35-A33 airplane, N433JC, and a Robinson R22 Beta helicopter, N7508Y, collided midair near Antioch, California. The airplane was owned and operated by the private pilot under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 as a local flight. The helicopter was registered to Spitzer Helicopter Leasing Company and operated by the commercial pilot under the provisions of Title 14 CFR Part 91 as a solo cross-country flight in preparation for obtaining her helicopter rating. None of the aircraft occupants were injured. The helicopter was receiving flight following at the time of the accident, and departed Hayward Executive Airport, Hayward, California, about 1815, with a planned destination of Sacramento Executive Airport, Sacramento, California. The airplane departed Byron Airport, Byron, California, about 1835. Night visual meteorological conditions prevailed, and neither aircraft filed a flight plan.

The airplane pilot stated that he performed an uneventful preflight inspection during which he confirmed all lights were operational. They departed Byron with

the intention of performing three night landings, and 30 minutes of flight over Antioch and the Sacramento Delta area. After departure, they climbed to 2,500 feet mean sea level (msl), on a west heading. The pilot pointed out the local power station below to the passenger, and then discussed aircraft lights that he could see above and far into the distance; a few seconds later they felt a collision. Neither occupant observed another aircraft in close proximity prior to the collision, and the pilot was concerned that they may have struck a tower or bird. The airplane immediately began to shudder, and roll to the right. The pilot looked to the right wing and could see a hole, and a piece of tubing protruding from the leading edge. He established airplane control, and began a 180-degree climbing left turn to 3,000 feet. He confirmed that his landing lights were on throughout the flight. Although his transponder was switched on and set to 1200, he had not established radio contact with any air traffic control facility prior to the collision.

The pilot elected to return to Byron Airport. While en route, he established radio contact with Northern California Terminal Radar Approach Control (NORCAL), who told him he had struck a helicopter. He maintained straight and level flight by utilizing continuous left aileron and rudder control inputs. During the final approach segment, the propeller speed began to decrease and he was unable to maintain altitude. As the airplane began to slow down, it began to pitch to the right despite his left control inputs. The airplane subsequently landed hard in a field short of the runway.

The helicopter pilot stated that she departed Hayward with a route that was to follow highways to Concord, Antioch, and ultimately Sacramento. She contacted NORCAL Approach for flight following once she had reached Dublin, and was issued a discreet transponder code. Once over Concord, the approach controller transferred her to Travis Air Force Base Radar Approach Control. She continued the flight, and stated that a short time later she received a traffic advisory from the Travis controller. She turned on the helicopter's landing lights to increase her visibility, and began looking for the traffic (she further reported that she may have turned off the light a short time later.) She stated that based on her communication with air traffic controllers, she did not perceive the situation to be urgent. She thought she received two traffic advisories in total. The flight continued and she initiated a left turn to the north, while relaying this information to the controller. A short time later, she caught site of the silhouette of an airplane and propeller at her 4 o'clock position. She performed an evasive maneuver to the left, and then felt the helicopter being struck. She did not know the extent of the damage, and elected to immediately perform a precautionary landing. The area below was unlit and dark, and she was aware that it included significant areas of water. She therefore selected a road as her emergency landing spot. During the approach she could see multiple automobiles and diverted to a spot adjacent to the highway. She raised the collective control between 50 and 75 feet above ground level, the helicopter landed hard, and rolled onto its left side.

TESTS AND RESEARCH

Radar and Audio

Radar data and audio recordings for the accident were provided by the Federal Aviation Administration (FAA) and United States Air Force (USAF), and reviewed by an Air Traffic Control Specialist in the NTSB Operational Factors division. A complete report is included in the public docket.

The data revealed that the pilot of helicopter N7508Y initially attempted to make contact with NORCAL approach about 1821. The controller did not reply, and about 3 minutes later she made a second attempt. The controller replied utilizing the incorrect call sign of "Helicopter 7508W" and the pilot, utilizing the "08Y" call sign, requested flight following to Sacramento Executive Airport via Concord and Antioch. The controller again responded with "08W", and provided an altimeter setting. The pilot restated her call sign, and the controller responded now utilizing "08Y", expounding that her transmissions were, "fairly scratchy and hard to read." She was provided with a transponder code and the flight continued uneventfully for the next 6 minutes, after which time the controller asked her to contact Travis approach.

At approximately 1832, the pilot made contact with Travis approach utilizing the call sign "Helicopter 7508Y." The controller replied with the call sign of "08W", while asking her to verify altitude. The pilot responded with an altitude of 3,000 feet and restated her call sign as "08Y", and again the controller replied with the incorrect call sign. The pilot retransmitted the correct call sign and over the next few exchanges the discrepancy was resolved, and the controller responded with the correct call sign.

At 1838, the controller, once again utilizing the incorrect call sign of "08W", provided a traffic advisory to the helicopter pilot regarding a twin Cessna airplane. The pilot replied stating, "is that for 08Y?" and the controller replied in the affirmative, now utilizing the "08Y" call sign. Ninety seconds later, the controller gave a second advisory, stating that the Twin Cessna was at her 12 o'clock position, southwest bound and at 3,900 feet. A few seconds after that, the controller reported that the traffic was no longer a factor, and the helicopter continued uneventfully.

Approximately 1840, a target appeared on radar approximately 11 miles southeast of N7508Y transmitting a beacon code of 1200, and an indicated mode C

altitude of 1,200 feet. This aircraft was not in communication with air traffic control, and was later determined to be N433JC. About 1842, the controller asked N7508Y how much further east she would be flying, and the pilot responded, "We'll be over Antioch Bridge but be turning [.]bound soon, zero eight yankee." The radar controller responded "roger traffic one o'clock 6 miles northbound altitude indicates two thousand six hundred appears level," and the pilot replied, "zero eight yankee." Fifty seconds later, the controller advised the pilot that the target was now turning northwest bound at a range of 4 miles, and the pilot replied that she was turning northbound. Immediately following this response, an airplane with the call sign Cherokee 9808W, called the approach controller requesting visual flight rules (VFR) flight following. The controller confirmed contact, and asked the Cherokee to standby. Over the course of the next 73 seconds the controller corresponded multiple times with the Cherokee (utilizing the call sign "Cherokee 08W" and "08W") and a Piper Tomahawk (call sign 11T). Audio data revealed a beeping sound during the controller's transmissions, which was consistent with an automatically generated aural conflict alert. Radar playback data also revealed that at that time the controller was also receiving a visual alert on the radar console. During that period the Travis Approach Radar Assist controller (Radar Associate Position) received a land-line interphone call from a NORCAL approach controller who had also received the alert, and was concerned about the proximity of N7508Y and N433JC. The assist controller responded, "yeah, we're givin' him traffic." Radar data indicated that the helicopter and N433JC were now at the same altitude of 2,600 feet, within 1 mile of each other and closing. The Travis Approach controller then transmitted, "Zero eight yankee traffic now twelve o'clock less than a mile east, correction, westbound two thousand six hundred indicated." A few seconds later the radar targets merged, and the pilot of N7508Y transmitted, "MAYDAY MAYDAY HELICOPTER GOING DOWN."

Examination of the radar data revealed that the helicopter's mode C reported altitude varied between 2,600 and 3,300 feet during the period it was receiving flight following. No other targets were observed in close proximity to the two aircraft leading up to the collision.

Interpretation of the voice recordings revealed that although the helicopter pilot always reported her correct call sign, background noise and the inflection of her voice often resulted in the last digit, "yankee" sometimes sounding like "whiskey."

Airframe Examinations

Postaccident examination of the airplane revealed that a forward portion of helicopter's right skid had become lodged in the leading edge of the right wing, midspan. A 6-inch-long section of one propeller blade tip was missing, and the spinner sustained crush damage and a black paint transfer next to the back plate. During the forced landing the airplane sustained substantial damage to the wingtips, firewall, and the fuselage just aft of the left wing trailing edge.

The helicopter sustained damage during the collision sequence limited to the forward right skid, and the center section of the left skid, which was not recovered. The helicopter did not sustain damage during the collision, which would have prevented normal flight. The helicopter rolled over during the landing, most likely because of the separated landing gear skids. As it rolled, the tailcone came away from the fuselage, and the forward cabin struck the ground. The landing light switch was found in the "OFF" position following the accident, and subsequent testing revealed that the lamp was operational. The rear (white) and right (green) navigation lamps illuminated when tested, however, the left (red) lamp did not light. Examination of the filament revealed that it had broken away completely at both posts.

Additional Information

FAA Order JO7110.65U prescribes air traffic control procedures and phraseology for use by persons providing air traffic control services. According to the order, "Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it." The order contains the following applicable excerpts:

"Section 2-1-1, ATC SERVICE:

The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic, and to provide support for National Security and Homeland Defense. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by many factors, such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers must provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required when the work situation permits."

Section 2-1-2, DUTY PRIORITY:

Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment must be used in prioritizing all other provisions of this order based on the requirements of the situation at hand."

2-1-6, SAFETY ALERT:

Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller. NOTE-

1. The issuance of a safety alert is a first priority (see para 2-1-2, Duty Priority) once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.

2. Recognition of situations of unsafe proximity may result from MSAW/E-MSAW/LAAS, automatic altitude readouts, JO 7110.65U 2/9/12
.....

b. Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.

c. When an alternate course of action is given, end the transmission with the word "immediately."

Section 2-4-15, EMPHASIS FOR CLARITY:

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

b. Notify the operations supervisor-in-charge of any duplicate flight identification numbers or phonetically similar-sounding call signs when the aircraft are operating simultaneously within the same sector."

Accident Rpt# ERA14CA213 04/29/2014 1342 EDT	**Regis# N6756X**	**Fort Pierce, FL**	**Apt: St Lucie County International FPR**	
Acft Mk/Mdl BEECH 76	**Acft SN ME-346**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING LO-360	**Acft TT 12489**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: ARI BEN AVIATOR INC	**Opr dba: AVIATOR COLLEGE OF AERONAUTICAL SCIENCE & TECHNOLO**		**Aircraft Fire: NONE**	
			AW Cert: STN	

Summary

The instructor of the multiengine airplane reported that he and the student pilot had intentionally shutdown and secured the right engine for training purposes; however, they were unable to get it restarted. The instructor then flew the airplane back to the departure airport and extended the landing gear while on a 2-mile left base leg of the airport traffic pattern for runway 14. After the landing gear was extended, the instructor noticed a high descent rate and subsequently raised the landing gear, which arrested the descent. At that point, the tower controller reported that the wind was from 130 degrees at 20 knots, gusting to 35 knots. The instructor extended the landing gear again when the airplane was established on final approach at the proper glidepath, but the descent rate again increased and the wind started to gust on short final approach. The airplane subsequently touched down prior to the approach end of runway 14, in a grass drainage basin of a perpendicular runway. During the landing, the right wing struck the ground and the nosegear collapsed before the airplane came to rest upright in the basin. With the exception of the inability to restart the right engine, the instructor did not report any preimpact mechanical malfunctions with the airplane. Examination of the airplane by a Federal Aviation Administration inspector revealed substantial damage to the right wing and fuselage. The inspector did not observe any preimpact mechanical malfunctions.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The instructor's failure to obtain the proper touchdown point in a multiengine airplane, during a single-engine approach in a strong gusty headwind.

Events

1. Enroute-cruise - Miscellaneous/other
2. Landing - Landing area undershoot
3. Landing - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Instructor/check pilot - C
3. Environmental issues-Conditions/weather/phenomena-Wind-High wind-Effect on operation
4. Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Effect on operation

Narrative

The instructor of the multiengine airplane reported that he and the student pilot had intentionally shutdown and secured the right engine for training purposes; however, they were unable to get it restarted. The instructor then flew the airplane back to the departure airport and extended the landing gear while on a 2-mile left base leg of the airport traffic pattern for runway 14. After the landing gear was extended, the instructor noticed a high descent rate and subsequently raised the landing gear, which arrested the descent. At that point, the tower controller reported that the wind was from 130 degrees at 20 knots, gusting to 35 knots. The instructor extended the landing gear again when the airplane was established on final approach at the proper glidepath, but the descent rate again increased and the wind started to gust on short final approach. The airplane subsequently touched down prior to the approach end of runway 14, in a grass drainage basin of a perpendicular runway. During the landing, the right wing struck the ground and the nosegear collapsed before the airplane came to rest upright in the basin. With the exception of the inability to restart the right engine, the instructor did not report any preimpact mechanical malfunctions with the airplane. Examination of the airplane by a Federal Aviation Administration inspector revealed substantial damage to the right wing and fuselage. The inspector did not observe any preimpact mechanical malfunctions.

Accident Rpt# ERA12LA503	**07/27/2012 1535 EDT**	**Regis# N1572S**	**Homerville, GA**	**Apt: Homerville Airport HOE**
Acft Mk/Mdl BEECH 95-A55		**Acft SN TC-316**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR I0-470 SERIES		**Acft TT 4890**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: SPREAD YOUR WINGS LLC		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On July 27, 2012, about 1535 eastern daylight time, a Beechcraft 95-A55, N1572S, sustained substantial damage during a forced landing near Homerville, Georgia. The private pilot and passenger were not injured. The airplane was registered to and operated by Spread Your Wings LLC., under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed for the flight from Douglas Municipal Airport (DQH), Georgia to Flying Ten Airport (0J8), Archer, Florida. The flight originated from DQH at 1500.

The pilot reported that while in cruise flight at 5,000 feet mean sea level, approximately five nautical miles from Homerville Airport (HOE), Homerville, Georgia, there was a sudden loss of power in the left engine. The pilot reported no indication of a loss in oil pressure or increased engine temperature prior to the loss of power. The pilot feathered the left propeller and began a descent into HOE. Although the left propeller was feathered, the airplane could not maintain altitude. The pilot realized he would not be able to make it to HOE and decided to make a forced landing on a road. During the landing roll out the airplane veered off the road into a ditch.

Examination of the airplane by a Federal Aviation Administration inspector on scene confirmed structural damage to the fuselage, wings, and empennage. The airplane was defueled and no debris was found within the fuel prior to the aircraft recovery.

During the examination of the left engine a test run was conducted. It was noted that the engine would only run when the airframe electric fuel boost pump was in the on position. When the boost pump was turned off the engine would stop running. The engine driven fuel pump was removed and examined. The drive coupling was intact and not damaged, and the fuel pump drive shaft rotated freely. The engine driven fuel pump was removed and sent to Continental Motors Incorporated (CMI) Analytical Department for examination. The engine driven fuel pump was flow tested and disassembled by CMI under the supervision of a NTSB investigator. During the examination, debris was found blocking the vapor return jet in the fuel pump. Once the debris was removed, the fuel pump flowed correctly. A review of the left engine logbook revealed that the fuel line from the firewall to engine driven fuel pump was replaced the day prior to the accident.

Accident Rpt# WPR12LA443	**09/28/2012 1430 PDT**	**Regis# N6278V**	**Torrance, CA**	**Apt: Zamperini Field TOA**
Acft Mk/Mdl BEECH V35A		**Acft SN D-8602**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR IO-520-B2A		**Acft TT 2823**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: GERALD R STEPHENS		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On September 28, 2012, about 1430 Pacific daylight time, a Beechcraft BE-V35A, N6278V, taxied into a parked vehicle at Zamperini Field, Torrance, California. The pilot, who owned the airplane, was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. The certified flight instructor, the sole occupant, was not injured; the airplane sustained substantial damage. The personal local flight departed El Monte Airport, El Monte, California about 1400 with a planned destination of Torrance. Visual meteorological conditions prevailed and no flight plan had been filed.

In a written statement, the pilot reported that he landed and received a clearance to taxi to his hangar. During taxi, he attempted to make a left turn and found that despite inputting full left pedal, the airplane would not turn. The airplane veered off the taxiway surface into the dirt median and continued onto the main ramp area. The pilot could not stop the airplane prior to its left wing colliding with a parked vehicle that was located on the ramp.

A Federal Aviation Administration (FAA) inspector and aviation mechanic performed a postaccident examination of the airplane. The FAA inspector stated that the ruddervator system was examined from the cockpit to the ruddervators and there was no evidence of mechanical malfunctions or failures. The nose wheel steering was also inspected and operationally checked while the airplane was on jacks and no abnormalities were discovered. The inspector found no anomalies with the airplane that would have precluded normal operation.

Accident Rpt# ERA14CA118 02/09/2014 1500 EST	**Regis# N103KW**	**Sussex, NJ**	**Apt: N/a**	
Acft Mk/Mdl BELLANCA 7KCAB	**Acft SN 512-75**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-320-E2A	**Acft TT 2500**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: AVIATION CLUB OF SUSSEX LLC	**Opr dba:**		**Aircraft Fire: NONE**	
			AW Cert: STA	

Narrative

The pilot stated that he did not verify the quantity of fuel in the airplane's fuel tanks prior to departure. About 15 minutes into the flight, the engine began to "sputter," then experienced a total loss of power. After looking at the airplane's fuel gauges, the pilot determined that the airplane had "run out of fuel." The pilot subsequently conducted a forced landing to a snow-covered field. Upon touchdown, the airplane nosed over and came to rest inverted, resulting in substantial damage to the right wing. The pilot reported there were no mechanical malfunctions or anomalies that would have precluded normal operation of the airframe or engine.

Accident Rpt# WPR14FA183 05/07/2014 855 MDT	**Regis# N8236F**	**Santa Clara, UT**	
Acft Mk/Mdl CESSNA 150 - F-F	**Acft SN 15064336**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim Prob Caus: Pending**
		Fatal 2 Ser Inj 0	**Flt Conducted Under: FAR 091**
Opr Name: ABOVE VIEW AVIATION	**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 7, 2014, about 0855 Mountain daylight time, a Cessna 150F airplane, N8236F, sustained substantial damage following impact with remote mountainous terrain while maneuvering about 3 nautical miles (nm) west of Santa Clara, Utah. The airplane was owned and operated by Above View Aviation, Saint George, Utah. The certified flight instructor, who occupied the right cockpit seat, and the pilot receiving instruction, who occupied the left cockpit seat, were fatally injured. Visual meteorological conditions prevailed for the local instructional flight, which was being operated in accordance with 14 Code of Federal Regulations Part 91. A flight plan was not filed. The flight had departed the Saint George Municipal Airport (SGU), Saint George, Utah, about 0800.

In a statement provided to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) by local law enforcement personnel, a witness reported that he and a family member were riding the Rim Trail when they observed the airplane overhead proceeding west. The witness stated that after a few minutes he heard the airplane "sputter", and the nose diving, then lost sight of it when it went behind a hill; he didn't hear anything and couldn't confirm that it had gone down. The witness reported that about an hour and a half later while riding on the Barrel Roll Trail, he came upon the airplane wreckage, and reported it to local authorities

On the morning following the accident, the NTSB IIC, accompanied by representatives from the Federal Aviation Administration, Lycoming Engines, and Cessna Aircraft, were assisted in accessing the accident site by local law enforcement personnel and search and rescue (SAR) volunteers. An examination of the accident site revealed that the airplane had come to rest on the side of a mountain in an upright position, oriented facing down slope on an incline of about 27 degrees. The airplane's at rest magnetic heading was 350 degrees; a relative impact heading could not be definitively determined. A survey of the accident site revealed that both wings had remained attached to the fuselage at all attach points, and that their respective flaps and ailerons had also remained attached to the respective trailing edge of the wings. The fuselage aft of the cockpit/cabin area was intact, but almost entirely severed from the empennage/tail section. The rudder, vertical stabilizer, left and right horizontal stabilizers, and both elevators sustained moderate impact damage. The underside of the cockpit/cabin area sustained significant deformation due to severe impact damage with the rock-laden terrain. A survey of the airplane revealed that all components necessary for flight were accounted for at the accident site. The airplane was recovered to a secured storage facility for further examination.

At 0835, the SGU automated weather reporting facility, located 10 nm east-southeast of the accident site, reported wind calm, visibility 10 miles, overcast clouds at 8,000 feet, temperature 13 degrees Celsius (C), dew point 0 degrees C, and an altimeter reading of 29.75 inches of mercury.

Accident Rpt# WPR12LA430	**09/17/2012 1030 PDT**	**Regis# N8130F**	**Snohomish, WA**	**Apt: Harvey Field Airport S43**
Acft Mk/Mdl CESSNA 150F		**Acft SN 15064230**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR O-200 SERIES			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: STEVENSON LARRY A		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On September 17, 2012, about 1030 Pacific daylight time, a Cessna 150F airplane, N8130F sustained substantial damage after it collided with a fence during the landing roll at Harvey Field Airport, Snohomish, Washington. The private pilot, the sole occupant of the airplane, sustained minor injuries. The airplane was registered to the pilot, and operated as a visual flight rules (VFR) cross-country flight under the provisions of 14 Code of Federal Regulations (CFR) Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the flight that originated from Martin Field Airport, College Place, Washington, about 3 hours and 30 minutes before the accident.

The pilot reported that when he applied wheel brakes during the landing roll the airplane veered left. The airplane exited the hard surfaced runway and collided with a fence. The pilot reported that after the accident he discovered a crack in the right brake hydraulic fluid line and that brake fluid was leaking from the crack.

Postaccident examination of the airplane's right side brake assembly and associated brake line by representatives from National Transportation Safety Board and the Federal Aviation Administration, revealed 2 small cracks in the rigid portion of the hydraulic brake line. The cracks were about 1-inch below a clamp that attached the hydraulic brake line to the gear leg. Both cracks were seeping red fluid consistent with hydraulic fluid. The exam also revealed structural damage to the right wing spar.

The pilot/operator failed to submit a Pilot/Operator Aircraft Accident Report (NTSB Form 6120.1/2).

Accident Rpt# CEN13LA342	**06/10/2013 800 CDT**	**Regis# N6412G**	**Morrilton, AR**	**Apt: Morrilton Municipal Airport BDQ**
Acft Mk/Mdl CESSNA 150K		**Acft SN 15071912**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL O-200A		**Acft TT 2672**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: FLIGHT INSTRUCTOR		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On June 10, 2013, about 0800 central daylight time, a Cessna 150K, N6412G, nosed-over and impacted terrain during landing on runway 27 at Morrilton Municipal Airport (BDQ), Morrilton, Arkansas. The airplane veered off the left side of the runway while the student pilot was attempting a touch-and-go landing during a first solo flight. The flight instructor told the student pilot to perform the touch and go landings instead of full stop landings. The airplane sustained substantial damage to the empennage. The student pilot received minor injuries. The airplane was registered to and operated by the flight instructor under 14 Code of Federal Regulations Part 91 as an instructional flight that was not operating on a flight plan. Visual meteorological conditions prevailed for the local flight that originated from BDQ about 0730.

The student pilot stated that she studied Gleim FAA Test Preparation since her first flight and believed that her flight instructor's "diligent" flight training along with the Gleim material
prepared her for her first solo.

During a telephone interview, the student pilot stated that her flight instructor told her to perform touch-and-go landings for her first student solo flight. She performed one touch-and-go landing and her flight instructor told her over the radio that the landing was "great." She then attempted a second touch-and-go landing, during which the accident occurred. The student pilot stated that she did not remember if her flight instructor was talking to her over the radio during landing rollout.

The student pilot said that she never lost consciousness during the accident, and she did not remember what occurred during the accident sequence. She said she received a black eye, blood was running from her nose while the airplane was inverted, and the left side of her face sustained injures. She did not have any broken bones. The student pilot said that the airplane was not equipped with a shoulder harness and that her flight instructor had ensured that the airplane was in good condition.

The student pilot said that she will continue flying and wants to continue taking lessons from the flight instructor. The student pilot said her flight instructor is a "great" instructor, and the ground training she received from him was "great." She said that she talked to her flight instructor's students and they were "happy" with the flight instruction they received from him. When the student pilot was asked what maneuvers she performed during her flight training, she said that she did not know what the maneuvers were called. The student pilot said she performed two stalls, one of which was a "major stall," and she did not remember what the configuration of the airplane was when those stalls were performed. She was asked if she had performed ground reference maneuvers during her flight training and said she did not know what a ground reference maneuver was and asked what it was. An example of a turn about a point, such as a tree or road intersection at a lower altitude, was provided and she said that she had not performed that maneuver. She said she performed a simulated engine-out during her flight training. The student pilot was asked if she had performed emergency procedures and she said that they had only discussed emergency procedures. When the student pilot was asked if she performed go-arounds during her flight training, she responded by asking what a go-around was. When a go-around maneuver was described to her, she said she had performed go-arounds.

The flight instructor stated that when the airplane landed, he talked to her using a portable radio to tell her the second landing (the accident landing) was "perfect" and to perform one final landing. The student pilot acknowledged "ok," and then the airplane veered off the left side of the runway.

Examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed that the airplane nosed-over. The flaps were fully retracted, and flight control continuity was confirmed.

According to The Flight Instructor's Manual, Third Edition, by William K. Kershner, Shooting Take-and Solo, states, in part, "Never have the student shoot touch-and-go's on the first solo."

A review of the student pilot's logbook revealed a total of 14 entries that began on May 13, 2013 and ended on June 10, 2013. The total flight time was 12.5 hours, excluding the accident flight. The fifth entry was dated May 18, 2013, which was preceded by an entry dated May 23, 2013. The May 18, 2013, entry

was the first entry that cited takeoff and landings and was followed by eight subsequent entries for takeoff and landings. The logbook entries did not cite all of the pre-solo maneuvers that the student pilot was required to have received instruction under Part 61.87, Solo Requirements for Student Pilots. The maneuvers/procedures in Part 61.87 include:

1. Proper flight preparation procedures, including preflight planning and preparation, powerplant operation, and aircraft systems
2. Taxiing or surface operations, including runups
3. Takeoffs and landings, including normal and crosswind
4. Straight and level flight, and turns in both directions
5. Climbs and climbing turns
6. Airport traffic patterns, including entry and departure procedures
7. Collision avoidance, windshear avoidance, and wake turbulence avoidance
8. Descents, with and without turns, using high and low drag configurations
9. Flight at various airspeeds from cruise to slow flight
10. Stall entries from various flight attitudes and power combinations with recovery initiated at the first indication of a stall, and recovery from a full stall
11. Emergency procedures and equipment malfunctions
12. Ground reference maneuvers
13. Approaches to a landing area with simulated engine malfunctions
14. Slips to a landing
15. Go-arounds

According to the FAA inspector, the student pilot was not certificated because she had only applied received a medical certificate, and a student pilot certificate was not issued. The flight endorsed the back of the student pilot's medical certificate for the solo flight.

According to the FAA inspector, the flight instructor renewed his flight instructor certificate after he attended a 2-day flight instructor refresher clinic in February 2013. The flight instructor's pilot logbook revealed no entries showing compliance with Part 61.57, Recent Flight Experience: Pilot in command, for three take off landings in the previous 90 days. The flight instructor was unable to provide a flight instructor logbook during review by the FAA inspector. The flight instructor last reported 27,110 hours of total flight time. The total time of instruction given by the flight instructor was unknown because the flight instructor could not produce a flight instructor logbook. In the last two years, he endorsed three airman for a pilot certificate examination and those airman had a 100 percent pass rate. These airman were examined by a designated pilot examiner (DPE), who became inactive on July 24, 2012. The DPE's pass rate could not be determined.

Accident Rpt# WPR14CA075 12/24/2013 1330 MST	**Regis# N5533B**	**St. Ignatius, MT**	**Apt: St Ignatius 52S**	
Acft Mk/Mdl CESSNA 152-NO SERIES	**Acft SN 15283896**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-235 SERIES		**Fatal 0 Ser Inj 1**	**Flt Conducted Under: FAR 091**	
Opr Name: ROBERT WILLIAMS	**Opr dba:**		**Aircraft Fire: NONE**	

Summary

During a pleasure flight, the non-certified pilot attempted twice to land at the accident airport. On the first attempt, the pilot stated that the approach was too fast and too high, so he performed a go-around. On the accident landing, the airplane landed farther down the 2,610-foot runway than he anticipated. The airplane did not slow down, and as the end of the runway approached, the pilot applied the brakes. The airplane subsequently veered to the left and right, and then back to the left again, which allowed the right wing to contact the runway. The nose of the airplane impacted a snow berm, and the airplane came to rest inverted, which resulted in substantial damage to the wing and fuselage. An examination of the airplane revealed no mechanical malfunction or failure that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The non-certified pilot's failure to maintain a stabilized approach for landing that resulted in a long landing and subsequent runway overrun.

Events

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

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - C
2. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C

Narrative

During a pleasure flight, the non-certified pilot attempted twice to land at the accident airport. On the first attempt, the pilot stated that the approach was too fast and too high, so he performed a go-around. On the accident landing, the airplane landed farther down the 2,610-foot runway than he anticipated. The airplane did not slow down, and as the end of the runway approached, the pilot applied the brakes. The airplane subsequently veered to the left and right, and then back to the left again, which allowed the right wing to contact the runway. The nose of the airplane impacted a snow berm, and the airplane came to rest inverted, which resulted in substantial damage to the wing and fuselage. An examination of the airplane revealed no mechanical malfunction or failure that would have precluded normal operation.

Accident Rpt# CEN14LA134 01/26/2014 1717 CST	**Regis# N4VN**	**Milan, IL**	**Apt: Quad City International Airpor MLI**	
Acft Mk/Mdl CESSNA 172K	**Acft SN 17258242**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360-A1A L-14253-36A	**Acft TT 4571**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: PILOT	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

On January 26, 2014, at 1717 central standard time, a Cessna 172K, N4VN, experienced a total loss of engine power when the pilot applied carburetor heat during a visual approach to Quad City International Airport (MLI), Moline, Illinois. The pilot performed a forced landing to a field near Milan, Illinois. The airplane sustained substantial damage to the right wing. The commercial pilot and passenger were uninjured. Visual meteorological conditions prevailed at the time of the accident. The 14 CFR Part 91 personal flight was not operating on a flight plan. The flight originated from Davenport Municipal Airport, Davenport, Iowa, at 1615 and was destined to MLI.

The pilot stated that he applied carburetor heat after the MLI air traffic control tower issued a landing clearance for runway 31 after receiving a special visual flight rules clearance to the airport. When he applied carburetor heat about one mile from the runway, the engine quit. He performed a forced landing to a field and touched down at 10-15 mph.

The Federal Aviation Administration (FAA) Dupage Flight Standard District Office, West Chicago, Illinois, did not send an FAA maintenance inspector to examine the airplane on-scene following the accident. The National Transportation Safety Board Investigator-In-Charge (IIC) then requested that the airplane owner provide the carburetor and maintenance logbook copies for examination, which were provided by the owner. The airplane owner stated the mechanic who had performed that last annual inspection also installed the carburetor and then removed it for the post-accident examination. The airplane owner stated that during the post-accident removal of the carburetor, there were no mechanical anomalies with the carburetor heat system. The pilot stated that there was an engine rpm decrease when he checked the operation of carburetor heat during an engine run-up prior to departing on the accident flight.

The MLI Automated Surface Observing System (ASOS) recorded the following observation:

At 1715; special (unscheduled) report; wind - 340 degrees at 11 knots, gust - 21 knots; visibility - 1 statute mile; runway 9 runway visual range - 6,000 feet; weather phenomena - light frozen precipitation; sky condition - broken at 2,700 feet mean sea level, broken at 4,000 feet, overcast at 4,900 feet; temperature - -1 degree Celsius; dew point - -5 degrees Celsius; altimeter - 29.55 inches of mercury.

The pilot stated that the airplane did not enter any of the snow showers that were approaching MLI during the accident flight. He said that the snow showers arrived at MLI about 30 minutes after the accident.

Special Airworthiness Bulletin, CE-09-35, Carburetor Icing Prevention, includes a graph that shows the probability of carburetor icing for various temperature and relative humidity conditions. At a temperature and dew point as recorded by the MLI ASOS, there was a probability of icing in glide and cruise power.

The received carburetor was a Marvel Schebler MA-4-5, part number 10-3676, serial number MS820601, carburetor. Logbook copies included an Authorized Release Certificate, FAA Form 8130-3, which stated the carburetor was overhauled by Marvel-Schebler Aircraft Carburetors, LLC. The date of FAA Form 8130-3 was July 25, 2013.

Copies of logbook entry dated June 25, 2013, at a tachometer time of 4,571 hours, stated that an annual inspection was performed. An entry dated October 21, 2013, at a tachometer time of 4,626 hours, stated that the carburetor was [removed and replaced] with an overhauled carburetor, referencing Form 8130-2. The airplane owner said that the tachometer time at the time of the accident was 4,669 hours.

Post-accident disassembly examination of the airplane under the supervision of the IIC and an FAA inspector from Dupage Flight Standard District Office revealed that the fuel screen did not contain contaminant, the idle screw was extended about 2 « turns, and the throttle valve and float had clearances from the carburetor body that were within service manual specifications. All of the carburetor retaining hardware was in place and secure.

Accident Rpt# WPR14CA125 02/04/2014 830 PST	**Regis# N78330**	**Eastsound, WA**	**Apt: Orcas Island ORS**	
Acft Mk/Mdl CESSNA 172K	**Acft SN 17257567**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES	**Acft TT 4230**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: GORDON BANRY	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

The pilot reported that during landing, the airplane encountered a wind gust, landed hard and bounced several times. The nose gear collapsed and the airplane skidded to a stop, which resulted in substantial damage to the engine firewall.

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

Accident Rpt# WPR14CA074	**12/23/2013 1530 PST**	**Regis# N80238**	**Fullerton, CA**	**Apt: Fullerton Muni FUL**
Acft Mk/Mdl CESSNA 172M-M		**Acft SN 17266466**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: FELLER GERALD A		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The operator stated that the student pilot had amassed over 40 flight hours and was performing a local area practice flight. During landing, the airplane touched down hard and bounced several times down the runway surface. During the accident sequence, the airplane incurred substantial damage to the firewall. The operator reported no pre impact mechanical malfunctions or failures that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's inadequate landing flare, which resulted in a bounced landing.

Events

1. Landing-flare/touchdown - Hard landing

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Aircraft control-Student/instructed pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Incorrect use/operation - C

Narrative

The operator stated that the student pilot had amassed over 40 flight hours and was performing a local area practice flight. During landing, the airplane touched down hard and bounced several times down the runway surface. During the accident sequence, the airplane incurred substantial damage to the firewall. The operator reported no pre impact mechanical malfunctions or failures that would have precluded normal operation.

Accident Rpt# ERA12LA294	**04/19/2012 1600 EDT**	**Regis# N28BC**	**Richmond, KY**	**Apt: Madison Airport I39**
Acft Mk/Mdl CESSNA 172R		**Acft SN 17280901**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360-L2A		**Acft TT 6040**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: EASTERN KENTUCKY UNIVERSITY		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The flight instructor reported that, after getting in the airplane, he asked the student pilot how much fuel was in each tank. The student pilot replied that 21.5 gallons of fuel were in one tank and 20 gallons of fuel were in the other tank. The student pilot reported dipping a "fuel stick" into the fuel tanks during the preflight to check the fuel levels. Although the flight instructor noticed that the fuel quantity indicators showed that 20 gallons of fuel were in one tank and 15 gallons of fuel were in the other tank, he did not question the fuel discrepancy. A review of security camera video revealed that the flight instructor did not supervise the student pilot's preflight inspection nor conduct a walk-around inspection.

After departure, the student pilot flew the airplane to another airport for a short- and soft-field training lesson. After 45 minutes of training, they departed for their home airport. Although the flight instructor noticed that the fuel gauges were reading low, he chose to continue the flight. Five miles north of the airport, the engine began sputtering, and the flight instructor took control of the airplane. He turned on the fuel pump and richened the fuel mixture, and the engine started running normally. He then decided to climb to get as much altitude as possible while continuing to fly to the airport. One minute later, the engine lost power. The flight instructor then unsuccessfully attempted to restart the engine. When he realized that the airplane would not make the runway, he decided to land in a field. During the approach and landing roll, the airplane struck power lines, and the right wing struck a tree and was substantially damaged.

Examination of the fuel tanks revealed that they were empty and that neither of them was breached. No evidence of fresh fuel staining or leakage was found above or below the wings or on the belly of the airplane. After adding 5 gallons of fuel to the left wing tank, the engine was started, and it ran normally. Examination of the fuel sticks used by the operator revealed that they did not have aircraft registration markings on them to verify if the correct fuel stick was onboard the correct aircraft and that one of the airplanes in the fleet with 20-gallon tanks had a 26.5-gallon fuel stick in the cockpit. It could not be determined whether the student pilot used the proper fuel stick during the preflight inspection. Examination of the operator's fueling pad and parking ramp revealed that they were significantly sloped. Examination of its fueling and parking procedures also revealed that the airplanes were being parked and serviced with the fuel selector valves in the "both" position. According to the airplane manufacturer, the airplane should be parked in a wings-level, normal ground attitude with the fuel selector in the "left" or "right" position to ensure maximum fuel capacity and minimize cross-feeding when refueling.

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Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power due to fuel exhaustion. Contributing to the accident was the flight instructor's failure to supervise the student's preflight inspection, his inadequate fuel management and preflight and in-flight fuel planning, and the operator's inadequate fueling policies and procedures.

Events

1. Prior to flight - Preflight or dispatch event
2. Enroute-cruise - Fuel exhaustion
3. Enroute-cruise - Loss of engine power (total)
4. Emergency descent - Off-field or emergency landing
5. Landing-landing roll - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid management - C
2. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Instructor/check pilot - C
3. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C
4. Organizational issues-Management-Policy/procedure-Adequacy of policy/proc-Operator - F
5. Aircraft-Fluids/misc hardware-Fluids-Fuel-Inadequate inspection - F
6. Personnel issues-Task performance-Inspection-Preflight inspection-Student/instructed pilot - F
7. Personnel issues-Task performance-Inspection-Preflight inspection-Instructor/check pilot - F
8. Personnel issues-Task performance-Planning/preparation-Fuel planning-Instructor/check pilot - F

Narrative

HISTORY OF FLIGHT

On April 19, 2012, at 1600 eastern daylight time, a Cessna 172R, N28BC, operated by Eastern Kentucky University (EKU), was substantially damaged after

impacting a tree during landing roll, after a forced landing in Richmond, Kentucky. The certificated flight instructor and student pilot were not injured. Visual meteorological conditions prevailed and no flight plan had been filed for the instructional flight, which was conducted under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91, between Hisle Field Airport (75KY), Winchester, Kentucky, and Madison Airport (I39), Richmond, Kentucky.

According to the flight instructor, earlier that day before departing I39 for 75KY he watched his student perform the preflight on airplane, and watched his student "dip" the fuel tanks with a "fuel stick" to visually check the fuel level in the fuel tanks.

Upon getting in the airplane for their one hour long training flight he asked the student how much fuel was in each tank. His student advised him that they had 21.5 gallons of fuel in one tank and 20 gallons in the other.

Once the airplane was started the flight instructor then verified the fuel level by looking at the fuel gauges. Both tanks were "registering" 20 gallons on the fuel gauges prior to departure.

After departing I39 they flew to 75KY which was located approximately 20 miles northeast of I39 to conduct a short field and soft field training lesson on the grass runway which was located there. After 30 or 45 minutes of training they departed 75KY for I39.

On the way back to I39, the flight instructor noticed that the fuel gauges were reading low. They continued however on a direct course to I39. When they were approximately 5 miles to the north of I39, the engine started to sputter, and the flight instructor took over control of the airplane. He then turned on the fuel pump and richened the mixture, and the engine started running normally again. At this point he decided to climb and get as much altitude as possible while maintaining a direct course for I39. Approximately 1 minute later, while climbing through 3,500 feet above mean sea level, the engine lost power. The flight instructor then performed the "emergency procedures" and attempted to restart the engine without result. He then realized that they would be unable to make the runway so he decided to make an off airport landing. He chose a field and then proceeded with an emergency landing. The emergency landing was uneventful and the airplane touched down in the grass covered field in slightly uphill terrain.

During the landing rollout as the airplane came to the crest of the hill he saw a tree immediately in front of them. He put in full control input to the left to try and miss the tree but, he could not get the airplane to turn to the left fast enough, and the right wing impacted the tree.

PERSONNEL INFORMATION

Flight Instructor

According to Federal Aviation Administration (FAA) and pilot records, the flight instructor held a commercial pilot certificate with ratings for airplane single-engine land and instrument airplane. He also held a flight instructor certificate with a rating for airplane single engine. His most recent FAA first-class medical certificate was issued on July 21, 2011. He reported that he had accrued 453 total hours of flight experience, 351 hours of which were in the accident airplane make and model, 321 hours as pilot in command, and 157 hours as a flight instructor.

Student Pilot

According to FAA and pilot records, the student pilot held a student pilot certificate. His most recent FAA first-class medical certificate was issued on January 13, 2012. He reported that he had accrued 17 total hours of flight experience.

AIRCRAFT INFORMATION

The accident aircraft was a high wing, strut braced, four place, single engine airplane of conventional construction. It was powered by a 160 horsepower, four cylinder, fuel injected engine.

It was certificated for flight in instrument meteorological conditions and was equipped with analog instruments with all of the flight instruments contained in a single panel located in front of the pilot.

These instruments were designed around the basic "T" configuration. A fuel quantity indicator was located just to the left of the flight instruments and a

multi-function annunciator was located above the altimeter. It provided caution and warning messages for fuel quantity, oil pressure, low vacuum, and low voltage situations.

According to FAA and airplane maintenance records, the airplane was manufactured in 2000 and was delivered to an owner in Canada, where it carried the Canadian registration of C-GGPN.

On September 27, 2002 it was removed from Canadian registry and imported into the United States after being purchased by a company headquartered in Texas. On July 9, 2003 it was sold to the owner who was in possession of the airplane at the time of the accident.

On April 30, 2007, it was involved in a previous accident in Livermore, California (SEA07CA120), when the airplane impacted a runway in a nose low attitude and incurred substantial damage to the firewall.

The airplane's most recent annual inspection was completed on March 20, 2012. At the time of the inspection, the airplane had accrued approximately 6,040 total hours of operation.

METEOROLOGICAL INFORMATION

The reported weather at I39, at 1555, included: winds 060 degrees at 3 knots, 10 miles visibility, sky clear, temperature 22 degrees C, dew point 05 degrees C, and an altimeter setting of 30.01 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that during the emergency landing the airplane struck powerlines before touching down in a field of knee high grass. After touchdown, the airplane traveled approximately 510 feet on an approximate 180 degree magnetic heading before cresting a hill, impacting a tree with the right wing, pivoted 180 degrees, traveling backward down the hill and coming to rest 670 feet from where it touched down. Evidence of braking was visible for approximately the first 40 feet.

Examination of the wreckage by an FAA inspector revealed no evidence of any preimpact mechanical failures or malfunctions of the airplane or engine that would have precluded normal operation, and that the airplane was substantially damaged.

The right wing outboard of the right fuel tank was crumpled back and the leading edge was torn away. The right aileron was torn at the hinge point, the right inboard flap was jammed into the fuselage above the rear window, the window was broken, and the top of the fuselage was crumpled.

The right horizontal stabilizer was bent and the right elevator trim tab was bent down. The left horizontal stabilizer was bent and the left elevator was bent downward.

The right door was also jammed shut, and the right window had popped open and was unable to be closed.

Both fuel tank caps were closed. The fuel tanks were devoid of fuel, and neither was breached. There also was no fresh fuel staining above or below the wings, or on the belly of the airplane. With electrical power both off and selected on, the fuel quantity indicator read "0" for both fuel tanks. The fuel selector was in "BOTH" and the fuel shut off valve was open.

Fuel was present in the fuel strainer but, no fuel was found in the fuel line from the fuel strainer to the engine driven pump.

Engine Run

Both magnetos produced spark and 7 quarts of oil was present in the engine. After adding 5-gallons of 100LL aviation gasoline to the left wing tank, the electric fuel pump was turned on and the engine was started. Starting was normal and the engine was accelerated up to 1,800 rpm before the airplane began to slide on the long grass of the field. A magneto check was then performed and both magnetos dropped approximately 100 rpm. The fuel selector was then switched between the "LEFT" and "BOTH". During the engine run, no fuel leakage was observed.

Re-Examination

On April 20, 2012 the airplane was moved to I39 where fuel staining was observed on the lower fuselage just aft of the firewall by EKU personnel. As a result, on April 25, 2012, a reexamination was conducted. During the reexamination, the fuel strainer was reexamined and no leakage or anomalies were noted. The floor and wings were also opened up and no evidence of leakage or staining was discovered. Examination of the fuel stains revealed that it was light in color indicating that it had been exposed to the elements and had been present for a considerable period of time.

Review of the airplane's discrepancy log also indicated that the staining may have occurred prior to March 21, 2012, when a fuel leak was discovered coming from the small drain valve on the bottom of the fuel strainer. The leak had been reported to EKU's maintenance provider at that time. The drain valve was removed, the small O-ring at the bottom of the fuel strainer was replaced, and the drain valve was reinstalled. The larger O-ring in the top of the bowl had been replaced the day before and the maintenance provider inspected it once again, found it to be serviceable, and reinstalled it. When the fuel selector was turned on, no leaks were detected and the airplane was released for service. No log book entry, however, was made indicating that this maintenance action had occurred.

TESTS AND RESEARCH

Fuel System

The airplane's fuel system consisted of two vented 28 gallon integral fuel tanks (one tank in each wing), a three-position fuel selector valve, auxiliary fuel pump, fuel shutoff valve, fuel strainer, engine driven fuel pump, fuel/air control unit, fuel distribution valve, and fuel injection nozzles.

Fuel would flow by gravity from the two wing tanks to a three position selector valve, labeled "BOTH", "RIGHT", and "LEFT" and on to the reservoir tank. Then from the reservoir tank, fuel flowed through the auxiliary fuel pump, past the fuel shutoff valve, then through the fuel strainer to the engine driven fuel pump.

From the engine driven fuel pump, fuel was delivered to the fuel/air control unit, where it was metered and directed to a fuel distribution valve (manifold) which distributed it to each cylinder. Fuel flow into each cylinder was continuous and flow rate was determined by the amount of air passing through the fuel/air control unit.

Fuel Indicating

Fuel quantity was measured by two float type fuel quantity transmitters (one in each tank) and indicated by an electrically operated fuel quantity indicator on the left side of the instrument panel. The gauges were marked in gallons of fuel. An empty tank was indicated by a red line and the number "0". When an indicator showed an empty tank, approximately 1.5 gallons remained in each tank as unusable fuel. According to Cessna Aircraft, the indicators should not be relied upon for accurate readings during skids, slips, or unusual attitudes.

Each fuel tank also incorporated warning circuits which could detect low fuel conditions and erroneous transmitter messages. Anytime fuel in the tank would drop below approximately 5 gallons (and remained below this level for more than 60 seconds), the amber "LOW FUEL" message would flash on the annunciator panel for approximately 10 seconds and then remain steady amber. The annunciator could not be turned off by the pilot. If the left tank was low, the message would read "L LOW FUEL". If the right tank was low, the message would read "LOW FUEL R".

In addition to low fuel annunciation, the warning circuitry was designed to report failures with each transmitter caused by shorts, opens, or transmitter resistance. If the circuitry detected any one of these conditions, the fuel level indicator needle would go to the "OFF" position (below the "0" mark on the fuel indicator), and the amber annunciator would illuminate. If the left tank transmitter failed, the message would read "L LOW FUEL". If the right tank transmitter failed, the message would read "LOW FUEL R". If both tank transmitters failed, the message would read "L LOW FUEL R".

Fuel System Limitations

According to Cessna Aircraft, to ensure maximum fuel capacity and minimize cross-feeding when refueling, the airplane should be parked in a wings level, normal ground attitude, with the fuel selector in the "LEFT" or "RIGHT" position and warned that failure to operate the airplane in compliance with fuel

limitations may further reduce the amount of fuel available in flight.

Additionally, they also advised that when securing the airplane, the fuel selector valve should be placed in the "LEFT" or "RIGHT" position to prevent cross feeding.

Fueling Information

According to the student that had flown the airplane on the flight before the accident flight, during his preflight he noticed that the airplane only had 11 gallons of fuel onboard. However before they departed he had the airplane fueled up to "48 gallons". He and his instructor then taxied out and did 8 takeoffs and landings. During their flight they noted no abnormalities with the airplane.

Student Pilot Interviews

According to the student pilot who was on the accident flight, the flight instructor was physically present and watched him perform the preflight on the airplane, and watched him dip the fuel tanks with the fuel stick to visually check the fuel level. He stated that each tank had about 20 gallons. The fuel gauges also showed about the same. After departing I39, they flew to 75KY to practice soft field landings. After performing two landings at 75KY, on the third landing he noticed the fuel gauges were down to about 5 gallons each tank. Additionally, he commented to his instructor concerning the condition of the field, specifically that it was pretty rough. At that point the decision was made to return to I39. They looked out the windows but could not see any indication of fuel leaking from the airplane. He stated that about 5 miles out, the engine began to run rough and lose power. The instructor then took control and executed the forced landing.

After the forced landing, the student pilot stated that he exited the aircraft and got up on each wing. He stated that he could not see any fuel in either tank and that there was no indication of fuel on the dipstick. He stated that he thought that he had left one and possibly both fuel caps off while checking the fuel. When asked if he was talking about before the airplane departed I39 or after the forced landing, the student pilot stated that he meant after the forced landing. After being told that both fuel caps were found to be closed by the FAA when they arrived at the accident site, he was asked if he knew who had reinstalled them and he said he did not know. When asked if he remembered any low fuel annunciations from the annunciator panel he stated that he did not remember any.

When asked if the airplanes were parked with the fuel selector on "BOTH" he advised that they were.

Flight Instructor Interviews

The flight instructor was asked how he knew that there was 20 gallons of fuel in each tank. He stated that his student had stuck the tanks and had told him there was 20 gallons a side when he went out to the aircraft. He was then asked if he had verified the quantity. He said that when he got into the aircraft, he noticed that the fuel gauges read 20 in one and 15 in the other. He stated that he had performed a walk-around and then got in the aircraft. He also mentioned that he always watched his student do the entire preflight, which is how he knows his student stuck the tanks. He made a point to say that he always does this and doesn't do anything else when the student is preflighting the aircraft.

He was asked if he noticed if the fuel-flow gauge had showed an increase in flow. He said that it was reading normal, around 10gph, "That is where we lean it to." He was then asked if there was a fluctuation in the Exhaust Gas Temperature (EGT). He advised that no, the EGT was normal, and that they had leaned the aircraft out in cruise to the "needles" on the EGT.

When asked when he noticed that there was a problem. He said that on their way back to the airport, he noticed that the fuel gauges were lower than normal. About 5 to 6 miles north of the airport around 3000 feet above mean sea level (msl) the engine sputtered. He stated that he took control of the aircraft and turned the fuel pump on, enriched the mixture and the engine ran normally for about a minute. He climbed to an altitude of about 3500 feet msl, where the engine totally quit. The propeller continued to windmill. This occurred approximately 4 miles north of the airport. He pitched for best glide speed of 65 knots indicated airspeed and attempted the restart procedure, while turning directly towards the airport. He noticed around 700 feet above ground level that he wasn't going to make the runway, so he picked the field to make an emergency landing.

After discovering that a non-approved checklist for the airplane was in the cockpit, the flight instructor was asked what checklist he used for the engine failure. He then mentioned that "he always uses the pilot operating handbook (POH), as he doesn't trust anything but." However, when asked where the POH was located; he stated that it was in the back of the airplane.

He was asked if during the flight he had any smell of fuel. He said that there was no odor and he didn't notice any spray. He stated that during the preflight he had not noticed any abnormalities due to fuel leakage, and he had done a walk around. He was also asked if the student mentioned to him any abnormalities concerning fuel leakage. He stated that he was notified about any fuel issues noticed on the preflight.

Fueling Records

Review of EKU fueling records revealed that no specific records were recorded by aircraft registration number making it impossible to determine exactly how many gallons were uploaded to a particular aircraft or to do trend analysis of fuel consumption on a per aircraft basis.

Security Camera Video

Review of security camera video from multiple cameras revealed that at 1304 the airplane was tugged from the maintenance hangar to the fuel facility where the airplane appeared to be refueled.

At 1309, the airplane was then tugged to a tiedown position on the parking ramp.

At 1316, the instructor from the previous flight was observed to walk out to the airplane where he was joined by his student.

At 1320, the airplane was seen to exit the ramp.

At 14:15, the airplane was seen to reenter the parking ramp where it was parked in its previous position. The student and instructor from the flight previous to the accident flight were observed to exit the airplane and walk back to the main hangar.

At 14:40, the student from the accident flight was observed walking from the main hangar to the airplane, where he then began his preflight inspection while his instructor was engaged in conversation with another student at the entrance to the Madison Terminal.

At 14:48:55, the student was observed climbing up on the right wing to examine the right fuel tank.

At 14:51, the student was observed climbing up on the left wing, to examine the left fuel tank.

At 1458, the instructor was observed to leave the main hangar, walk out to the airplane, and get in it.

At 15:02:07, the airplane's engine was observed to start.

At 15:04 the airplane was observed to exit the parking ramp turning south on taxiway "A".

Parking Ramp

Review of satellite imagery of the parking ramp at I39 revealed that the parking ramp at I39 was not level and that the pavement sloped downward towards the east. Further review revealed that the west end of the parking ramp was approximately 8 feet higher in elevation than the east end.

Review of satellite imagery of the fueling pad also revealed that it sloped downward towards the east and an approximate difference in elevation of 1 foot existed between the east side of the fueling pad and the west side of the fueling pad.

Fuel Sticks

The fuel sticks used by EKU were purchased from a commercial manufacturer and were a combination of factory calibrated fuel sticks (19 gallons for the Cessna172Ps and 26.5 for all of the Cessna 172Rs), and universal fuel sticks for all of the Cessna 172RGs and the Piper Seneca.

During the investigation it was revealed that the fuel sticks did not have aircraft registration markings on them to determine if the correct fuel stick was onboard the correct aircraft, and it was discovered that one of the airplanes in the fleet with 20 gallon tanks had a 26.5 gallon fuel stick in the cockpit.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

In 1984, EKU offered its first aviation courses, and in 1989, was granted approval for a minor in aviation. In 1991, EKU was approved to offer a baccalaureate degree program in aviation.

Students, who earn their degree in professional flight, also obtain a private pilot certificate, commercial pilot certificate, and an instrument rating. They also can earn a flight instructor certificate with ratings for airplane single engine, airplane instrument, and airplane multi-engine.

The flight program was administered by two associate professors, the director of aviation/chief pilot, and an assistant chief pilot, and all training was conducted in accordance with 14 CFR Part 141. Before graduation students would accrue approximately 250 to 300 flight hours.

Fueling operations were administered by the airport manager, and maintenance operations were administered by an aircraft maintenance manager/ instructor pilot.

ADDITIONAL INFORMATION

In order to increase safety, Eastern Kentucky University (EKU) took the following actions:

1. On April 20, 2012, EKU's fixed base operation's fuel processes were modified to track fuel purchase by aircraft registration number allowing them to determine the actual amount of fuel uploaded to each individual aircraft.

2. The owner of the university's aircraft assured that the correct dipsticks, i.e., 19 gallon factory-calibrated dipsticks for all of their Cessna 172Ps, factory-calibrated 26.5 gallon dipsticks for all their Cessna 172Rs, and universal dipsticks for their C172RGs and their Piper Seneca were provided to EKU. They also assured that the universal dipsticks were calibrated using the factory-provided calibration cards and instructions. All of the dipsticks have also been marked with the corresponding registration number and placed in their respective aircraft.

3. The maintenance provider modified their standard operating procedures to require their maintenance personnel to track maintenance actions on both the aircraft's discrepancy log and the aircraft logbooks.

4. A comprehensive process for determining whether or not a soft field is safe for operations or too soft has been developed by EKU. Additionally, the EKU Aviation operations SOP will be modified to amplify soft field training. It will reinforce the requirement that all soft field maneuvers will be demonstrated and practiced on a hard surface before introducing actual soft field approaches, landings, and takeoffs to a soft field.

5. On April 19, 2012, EKU stood down from all flight operations. Before returning to an operational status, the EKU chief flight instructor conducted safety stand down meetings with both maintenance personnel and all flight instructors. Additionally, all instructors were directed to re-review emergency landing procedures with all of their students on their very next flight.

6. On May 18, 2012, EKU held an "all hands" safety stand down for students and instructors to discuss the accident.

7. The EKU chief flight instructor developed an emergency landing pattern (ELP) for EKU's Cessna 172s and Seneca III aircraft based on the U.S. Navy's Precautionary Emergency Landing (PEL) procedure. Altitudes to cross high key (perpendicular to the runway centerline) and low key (high abeam) have been developed, practiced, and taught as another method of dealing with rough running engine versus entering the airport pattern on a 45-degree angle or on the downwind leg of the traffic pattern.

Accident Rpt# CEN14LA217	**04/25/2014 1330 CDT**	**Regis# N9373F**	**Llano, TX**	**Apt: Llano Muni AQO**
Acft Mk/Mdl CESSNA 172R		**Acft SN 17280160**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360			**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: GENESIS FLIGHT ACADEMY		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: STN

Narrative

On April 25, 2014, about 1330 central daylight time, a Cessna 172R airplane, N9373F, collided with trees following a loss of engine power while departing the Llano Municipal Airport (KAQO), Llano, Texas. The private pilot and two passengers were not injured. The airplane was substantially damaged. The airplane was registered to Dirty Side Down Aviation LLC and operated by Genesis Flight Academy under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which operated without a flight plan. The flight was originating at the time of the accident.

According to a statement provided by the pilot, the airplane was fueled with 24-26 gallons of fuel. Shortly after takeoff the engine sputtered and experienced a total loss of power when the airplane was between 100-200 feet above ground level. The pilot attempted to land on the remaining runway, but landed in the overrun area. The airplane bounced before landing hard.

The airplane was retained for further examination.

Accident Rpt# CEN14CA191	**04/08/2014 1350**	**Regis# N5306U**	**Albuquerque, NM**	**Apt: Double Eagle Ii AEG**
Acft Mk/Mdl CESSNA 172S		**Acft SN 172S9264**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360-L2A		**Acft TT 6718**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: THOMAS DENTON		**Opr dba:**		**Aircraft Fire: NONE**
				AW Cert: STN

Summary

The student pilot reported that he was on a solo flight practicing full stop landings. The airplane bounced on touchdown resulting in one tip of the propeller striking the runway. The examination of the airplane revealed that there was substantial damage to the firewall. The student pilot reported that there was no malfunction or system failure of the airplane before the accident.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The student pilot's improper flare that resulted in a bounced landing.

Events

1. Landing-flare/touchdown - Hard landing

Findings - Cause/Factor

1. Personnel issues-Action/decision-Action-Incorrect action performance-Student/instructed pilot - C
2. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Landing flare-Not attained/maintained - C

Narrative

The student pilot reported that he was on a solo flight practicing full stop landings. The airplane bounced on touchdown resulting in one tip of the propeller striking the runway. The examination of the airplane revealed that there was substantial damage to the firewall. The student pilot reported that there was no malfunction or system failure of the airplane before the accident.

Accident Rpt# CEN14FA071	**11/29/2013 750 MST**	**Regis# N3087Y**	**Delta, CO**	**Apt: Blake Field KAJZ**
Acft Mk/Mdl CESSNA 182E		**Acft SN 18254087**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR O-470 SERIES		**Acft TT 6347**	**Fatal 1 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: RAY VEATCH AGENCY INC		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

HISTORY OF FLIGHT

On November 29, 2013, about 0750 mountain standard time, a Cessna 182E airplane, N3087Y, impacted terrain near Delta, Colorado. The student pilot, the sole occupant, was fatally injured and the airplane was destroyed. The airplane was registered to Ray Veatsch Agency Inc. and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as an instructional flight. Day instrument meteorological conditions existed at the time of the accident and no flight plan was filed. The flight departed from Blake Field Airport (KAJZ), Delta, Colorado at 0748 and was destined for Crawford Airport (99V), Crawford, Colorado.

The student pilot scheduled his private pilot practical test with a designated examiner (DE) located at 99V, about 20 nautical miles east of KAJZ. According to the DE, the student pilot called him on the morning of the accident and informed him there was a cloud deck at KAJZ. The DE told the student pilot the cloud deck was likely a thin layer that would burn off and to fly to 99V after the weather cleared up.

An airport surveillance camera captured the accident airplane departing from Runway 3 at KAJZ. No witnesses observed the accident.

PERSONNEL INFORMATION

The student pilot, age 36, had accumulated a total of 98 flight hours, including 63 hours with a flight instructor and 6.4 hours during the three days preceding the accident. All of the student's recorded flight time was in the accident airplane. The student's recorded simulated instrument flight time was 0.6 hours. The Federal Aviation Administration (FAA) requires 3 hours of simulated instrument flight training prior to the private pilot practical test.

On September 21, 2011, the student pilot was issued a Class 3 medical and student pilot certificate, with a limitation to wear corrective lenses. No significant issues were identified by the pilot or aviation medical examiner during this examination.

AIRCRAFT INFORMATION

The accident airplane was manufactured in 1962 and registered with the FAA on a standard airworthiness certificate. The logbooks showed a total of 6,347 hours as of the last annual inspection, which was conducted on November 12, 2012.

The airplane was equipped with a Continental Motors O-470-R engine (serial number 131740-5-R), which had accumulated a total of 2,895 hours as of the last annual inspection and 1,853 hours since last major overhaul. The propeller was installed on September 1, 2000, with no maintenance entries in the propeller log since installation.

METEOROLOGICAL INFORMATION

The weather observation station at KAJZ reported the following conditions at 0755: wind calm, visibility 4 miles, overcast clouds at 600 feet, temperature 0 degrees Celsius (C), dew point negative 1 degrees C, altimeter setting 30.39.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted about two miles off the departure end of Runway 3 on the extended runway centerline. The initial impact point included ground impressions from all three landing gear and was 440 feet from the furthest piece of wreckage. The debris path was oriented on a 340 degree heading.

The engine and wings separated from the fuselage. The fuselage was broken into three large sections; the instrument panel with forward floor assembly, the aft

seats with floor assembly, and the empennage. The fuselage sections remained loosely connected via the flight control cables. The engine came to rest 60 feet in front of the fuselage. Control cable continuity was established for all flight control surfaces through tension overload separations in the front door posts and at the wing roots.

Both propeller blades displayed twisting, S-bending deformation, and chordwise scratches. The sparkplugs exhibited normal wear when compared to the Champion Aviation Check a Plug Chart AV-27 and both magnetos were capable of producing spark. The crankshaft was rotated by hand and thumb compression was established on all cylinders. Drive train continuity was established throughout the engine. The cylinders were borescope inspected and no anomalies were noted. The oil filter element was inspected, with no contaminates noted.

Examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

On December 2, 2013, an autopsy was performed on the pilot at the Montrose Memorial Hospital, Montrose, Colorado. The examination determined the cause of death to be due to multiple traumatic injuries. The FAA's Civil Aeromedical Institute in Oklahoma City, Oklahoma, performed a toxicology test on the pilot. The test was negative for carbon monoxide and ethanol and drugs, with the exception of Acetaminophen (Tylenol).

ADDITIONAL INFORMATION

The flight instructor (CFI) who flew most of the student's training flights characterized him as having very high achieving and performance traits. He thought the student had a "go-go-go" type personality and led a fast-paced life, due to a hectic schedule managing a telecommunications business. He was aware that his student was an accomplished motorcycle racer and avid motorcycle enthusiast.

The CFI stated the student intended to utilize the accident airplane to accomplish trips in support of his telecommunications business and was concerned that he might try to "push too hard" with respect to weather conditions, fatigue, or airplane maintenance to accomplish a business trip. He attempted to instruct the student on "not getting over his head" with respect to flight conditions.

As the annual inspection on the accident airplane approached expiration, the CFI told the student that the timeline for the flight practical should not be controlled by the expiration of the annual inspection. Following the accident, the CFI learned that the pilot was under additional personal and business stressors.

During preparation for the private pilot practical, the student recorded 0.6 hours of simulated instrument flight time with a vision restricting device. The CFI stated he never flew with the accident pilot in actual instrument meteorological conditions.

Accident Rpt# WPR12LA365 08/20/2012 1115	**Regis# N735KV**	**Mccall, ID**	**Apt: N/a**
Acft Mk/Mdl CESSNA 182Q	**Acft SN 18265493**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR O-470 SERIES	**Acft TT 3175**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: KRAUCH WILLIAM KARL TRUSTEE	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The flight instructor reported that, as he and the pilot-rated passenger flew through a canyon, the airplane gained airspeed and altitude. As they continued toward their destination, the flight instructor directed the pilot to turn right at a branch in the canyon. Shortly after, the terrain elevation increased, and it exceeded the airplane's climb performance, and the airplane subsequently impacted trees. The density altitude for the area was calculated to be about 8,524 feet, which would have affected the airplane's climb performance. A postaccident examination of the engine revealed no evidence of mechanical malfunctions or failures that would have prevented normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The flight instructor's selection of the wrong route while flying in mountainous terrain at a high-density altitude, which resulted in the airplane impacting terrain when the increase in elevation exceeded the airplane's climb performance.

Events

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

Findings - Cause/Factor

1. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Instructor/check pilot - C
2. Aircraft-Aircraft oper/perf/capability-Aircraft capability-Climb capability-Capability exceeded - C
3. Environmental issues-Physical environment-Terrain-High elevation-Contributed to outcome
4. Environmental issues-Conditions/weather/phenomena-Temp/humidity/pressure-High density altitude-Contributed to outcome - C
5. Personnel issues-Task performance-Planning/preparation-Flight planning/navigation-Instructor/check pilot - C

Narrative

On August 20, 2012, about 1115 mountain daylight time, a Cessna 182Q, N735KV, sustained substantial damage when it impacted trees and terrain during climb in rising mountainous terrain near McCall, Idaho. The flight instructor and his commercial pilot-rated student both received minor injuries. The owner/pilot was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the instructional cross-country flight, which had originated from Mackay Bar Airport, Dixie, Idaho, about 15 minutes before the accident. The flight instructor said the intended destination was McCall; a flight plan had not been filed.

The flight instructor said they departed Mackay Bar Airport (elevation 2,172 feet) and flew down the Salmon River while gaining speed and altitude. At Warren Creek they turned south while still climbing. They came to a "Y" in the canyon and he directed the pilot receiving instruction to take the right branch. Soon thereafter the increase in terrain elevation exceeded the airplane's climb performance. The airplane impacted trees and struck the ground. The elevation of the accident site was about 6,593 feet. The nearest weather reporting station reported the temperature was 65 degrees Fahrenheit and 30.15 inches of mercury pressure, which calculated to a 8,524-foot density altitude.

The engine was shipped to Continental Motors, Inc., and on March 27, 2013, it was examined in the presence of a National Transportation Safety Board investigator. No evidence of any pre-impact mechanical discrepancies was found with the engine that would have prevented normal operation.

Accident Rpt# WPR12LA384	**08/31/2012 1610 MST**	**Regis# N5458N**	**St. Johns, AZ**	**Apt: St Johns Industrial Air Park SJN**
Acft Mk/Mdl CESSNA 182R		**Acft SN 18267729**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR IO-470 SERIES		**Acft TT 2359**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BRUCE D. LISLE		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot reported that the airplane was high and fast on final approach for landing, so he lowered the flaps to 40 degrees and raised the nose to slow down. The pilot then decided to go around, so he applied full power and raised the flaps to 30 degrees. The airplane began to climb, but then it started descending. The pilot reduced the engine power, landed the airplane, and applied heavy braking. The airplane subsequently overran the end of the runway and went through the perimeter fence. After he exited the airplane, the pilot found the flaps fully retracted. The airplane's Pilot Operating Handbook stated that go-arounds should be performed with the flaps at 20 degrees. Further, the pilot should have performed a go-around when he first noticed that the airplane was too high and fast on the final approach.♂

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's delay in executing a go-around, which resulted in a runway overrun. Contributing to the accident were the pilot's failure to establish the proper glidepath and airspeed on final approach and his improper use of flaps during the go-around.

Events

1. Landing-landing roll - Runway excursion

Findings - Cause/Factor

1. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
2. Personnel issues-Task performance-Use of equip/info-Use of policy/procedure-Pilot - F
3. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Descent/approach/glide path-Not attained/maintained - F

Narrative

On August 31, 2012, about 1610 mountain standard time, a Cessna 182R, N5458N, sustained substantial damage during a runway overrun while landing at St. Johns, Arizona. The private pilot, the sole occupant, received minor injuries. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the personal cross-country flight, which had originated from Dalhart, Texas, about 3 hours before the accident. A flight plan had not been filed.

The pilot said that he started his traffic pattern higher than recommended due to his high density altitude concerns. He said his final approach was longer than normal and his speed was fast. He put the flaps down full and raised the nose to bleed off more airspeed. A witness on the ground said the airplane passed the midfield intersection and was still quite high off the runway. The witness said the accident pilot appeared to be performing a go-around. But then the airplane descended to the runway and touched down with about 3/4 of its length behind him.

The pilot said that he realized that the airplane was high, fast, and long for a normal landing. He decided to go around. He applied full power; he reduced flaps by 10 degrees, and the airplane started to climb. However, the airplane then began to descend; "it was sort of mushing out of the sky." He reduced the engine power, landed, and began heavy braking. A witness on the ground said that he observed black smoke coming from the main landing gear tires after the airplane touched down. The airplane departed the end of the runway and went through the airport's perimeter fence. The airplane came to rest on its nose with the right wing strut bent, and both wings bent and wrinkled. After he exited the airplane, the pilot discovered that the flaps were fully retracted.

The airplane's manufacturer published a Pilot's Operating Handbook, which states that after the throttle is moved to full power for a go-around, the wing flaps shall be retracted from 40 to 20 degrees. The pilot stated that he had just purchased this particular airplane 4 days earlier. He said he practiced two full stop landings and takeoffs, but he did not practice any go-arounds. The pilot stated that the accident might have been avoided if he had practiced go-arounds with incremental raising of the flaps, or stopped the approach and exited the traffic pattern when he realized he was too high.

Accident Rpt# CEN13LA258 05/02/2013 1127	**Regis# N2012Y**	**Delta, CO**	**Apt: Grand Junction Regional Airpor AJZ**
Acft Mk/Mdl CESSNA 182T	**Acft SN 18281770**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-540-AB1A5	**Acft TT 1652**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: COLORADO FLIGHT CENTER	**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 2, 2013, at 1127 mountain daylight time, a Cessna 182T, N2012Y, experienced a loss of propeller control during cruise flight. The pilot performed a forced landing on a highway after the airplane was unable to maintain altitude. The airplane impacted power lines and terrain during a forced landing near Delta, Colorado. The airplane sustained substantial damage to the fuselage. The private pilot was uninjured. The airplane was registered to Janair LLC and operated by Colorado Flight Center under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed and a flight plan had not been filed for a local flight that originated from Grand Junction Regional Airport (GJT), Grand Junction, Colorado, at 1045 and was returning to GJT.

The pilot stated that he performed touch and go landings at Montrose Regional Airport, Montrose, Colorado, and was returning to GJT during the accident flight. During the return flight to GJT, he reduced manifold pressure to 19 inches of mercury and began to reduce propeller speed from 2,400 rpm to 2,250 rpm shortly after the airplane leveled off at a cruise altitude of 8,000 feet mean sea level. While adjusting propeller speed, the propeller speed "dropped abruptly" to about 2,100 rpm while he was turning the propeller speed control knob. He then pushed the propeller speed control knob full in, but there was no change in propeller speed. He then pushed the throttle control in to full power. The airplane airspeed was about 110 knots indicated airspeed (KIAS), but was decreasing. The pilot descended the airplane to 7,500 feet msl at which point the airspeed stabilized at 85 KIAS, and the manifold pressure was 20.9 inches Hg. After a few miles, the propeller speed became erratic, ranging from 2,150 rpm to 2,040 rpm. The pilot tried to adjust the propeller speed again by cycling the propeller and returning the propeller control knob to the full in position, but the propeller speed remained erratic, above and below 2,100 rpm. The pilot said that shortly after diverting the flight to Blake Field Airport, Delta, Colorado, he heard a clunking sound from the front of the airplane. He said that is was not a ringing or rapping sound, but a heavy muffled clunking sound. The airplane lost all thrust, and he performed a forced landing with no flaps extended in attempt to attain a landing to a highway. The pilot turned to airplane to fly between power lines, but the airplane struck the power lines while in the turn. The airplane touched down on the highway and went off the right shoulder after the right main landing gear had separated.

The last inspection of the airplane was an annual inspection with an airplane logbook entry date of March 8, 2013, at a total airframe tachometer times of 1,627.0 hours. The entry stated that the propeller governor was overhauled. The next entry was dated April 17, 2013, and stated that an overhauled propeller was installed. The propeller was a McCauley 83D36C431-C/80VSA-1, serial number 051726, three-blade propeller with a total time since new of 1,643.7 hours, and a time since overhaul of 0 hours.

On-scene examination of the airplane by a Federal Aviation Administration (FAA) inspector revealed that the flaps were retracted, the fuel selector was in the off position, the cockpit mixture and throttle controls were at their forward stop, the cockpit propeller control was at the aft stop, and the fuel boost pump switch was in the off position. Propeller control continuity was confirmed prior to removal of the propeller and propeller governor.

The propeller and propeller governor were removed by the operator's maintenance personnel and sent to McCauley Propeller Systems, Wichita, Kansas. On July 19, 2013, the propeller and governor were tested and examined under the supervision of a National Transportation Safety Board (NTSB) Air Safety Investigator. The number 1 propeller blade was part number I-80VSA-1 and serial number ZJ26152; the number 2 blade was part number I-80VSA-1 and serial number ZL26036; the number 3 blade was part number I-80VSA-1 and serial number ZL26038. The propeller hub was part number B3D36C431-C and serial number 051726. All three propeller blades were able to be rotated by hand pressure while within the hub. The blades did not exhibit bending/twisting. The number 1 blade had two leading edge dings/gouges located near the outboard 1/4 span. The number 2 blade had a ding/tear near the tip. The number 3 blade had a dent/gouge located near 1/4 span. The blades were removed from the hub and all three pitch change links were fractured, and the fracture features were consistent with overstress. No other internal components exhibited damage. A liquid consistent with water along with oil was present when the piston assembly was removed from the cylinder.

The governor, part number DC290 D1F/T8, serial number 051824 was missing four of its cap screws. Oil drained from the governor did not contain liquid consistent with water. Four cap screws were installed onto the governor in preparation for a bench test. The test results indicated that the maximum governor speed was 2,350 rpm (specification limit was 2,275 rpm). The pressure relief valve regulated pressure to 305 psi.

Flow testing of governor revealed an input oil pressure of 50 psi and an output oil pressure of 124 psi. The flow value was 5.9 quarts/minute (minimum limit was 5.0 quarts/minute, no maximum limit value). An internal leakage rate test revealed the leakage rate was 2 quarts/hour (maximum limit was about 10 quarts/hour).

On March 6, 2013, the NTSB Investigator-In-Charge presented questions to the McCauley party coordinator regarding test and examination following receipt of the McCauley Teardown Inspection Report dated March 3, 2014. The report stated that recovery personnel indicated that rain likely entered the propeller during its storage in a truck bed with the propeller mount flange uncovered. Four of the six propeller governor cap screws were missing, and the remaining two screws were finger tight.

In response to the question of whether the propeller blades/actuating piston were sticking, the party representative stated that shimming was in place on each propeller blade, which was shimmed properly and could be rotated freely and smoothly. When asked the condition of the piston seal, the representative stated that the seal was undamaged and engine oil in the cylinder dome and the red oil in the propeller were not intermixed. When asked if a compression test was performed of the propeller dome, the representative stated that all the actuation links were broken in tension during the propeller strike and a pressure check of the cylinder dome would not have rotated the blades; a pressure check was not performed. When asked what the low and high pitch stop settings were, the representative stated that the pitch stops were set with shim washers on the propeller, which were in place. The angle verification of the stops was not performed due to breakage of all the actuation links that connect the piston to the blades; the stack heights did not appear unusual. The representative also stated that the top cover of the governor had been removed; therefore, control arm clocking/travel could not be verified.

The engine was overhauled at a repair facility following the airplane's recovery. Maintenance personnel from the facility stated that the engine underwent a pressure differential test across the front nose bearing per Lycoming Service Instruction 1462A. At a delivery pressure of 35 psi, the indicated pressure was 18 psi (the limits was 6 to 35 psi). There was no obstruction in the front main bearing for oil delivery. The fuel pump and fuel servo (Bendix RSA-5AD1, part number 2576544-3, serial number 70A72401) were tested and noted to be within test limits.

The mechanic from the overhaul facility stated that engine oil travel travels down the left hand case half that eventually feeds the propeller governor. The propeller governor receives the oil and amplifies the pressure and then transfers the oil through a passage down to the center of the front main bearing. It then travels through the cavity in the front bearing to where it passes through the transfer tube in the crankshaft exits the propeller hub. He said that it was a closed system from the governor to the propeller hub.

Accident Rpt# WPR12LA023	**10/28/2011 1350 PDT**	**Regis# N520YH**	**Prineville, OR**	**Apt: Bend Municipal Airport BDN**
Acft Mk/Mdl CESSNA 185		**Acft SN 18503619**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl TELEDYNE CONTINENTAL IO-550		**Acft TT 8131**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: TIMOTHY TURNBULL		**Opr dba:**		**Aircraft Fire: NONE**

Summary

During the descent to the destination airport, when the airplane was about 10 miles out and descending through about 6,500 feet, the engine experienced a total loss of power. In response to the power loss, the pilot manipulated the throttle, mixture, and propeller controls, but the engine did not regain power. When the pilot recognized that the airplane would not be able to reach the destination airport, he conducted a forced landing on an unpaved road. During the landing roll at a groundspeed of about 10 mph, the airplane struck some vegetation, and it then nosed over onto its back. ♂♂The pilot reported that, at the time of the engine power loss, the electronic fuel flow instrument indicated that 16 gallons of usable fuel was remaining, which he believed was sufficient fuel for about 1 more hour of flight and to reach the destination airport. During recovery, the fuel tanks were observed to contain about 16 gallons of total fuel, and the fuel selector handle was found set to the left tank. However, it was determined that some fuel had migrated from the fuller right tank to the nearly empty left tank via the tank vent line while the airplane was inverted. The pilot stated that his typical habit was to operate the airplane with the fuel selector set to the "both" position, but that, at some point during the flight, he had moved the fuel selector to the left tank to correct a fuel imbalance with the intention of resetting it to the "both" position once the imbalance had been corrected. The pilot reported that he realized that he had forgotten to reset the fuel selector to the "both" position and that this caused the power loss. The pilot reported that he did not manipulate the fuel selector handle after the power loss because he did not believe that he had a fuel problem and that he did not refer to any emergency checklists. The Pilot's Operating Handbook contained an engine failure during flight checklist, which included the step to place the fuel selector valve in the "both" position, which the pilot did not do.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A total loss of engine power due to fuel starvation, which resulted from the pilot inadvertently leaving the fuel selector set to the left tank. Contributing to the accident was the pilot's deviation from his normal habit pattern and his failure to refer to the in-flight engine failure checklist after the engine power loss.

Events

1. Enroute-descent - Loss of engine power (total)
2. Enroute-descent - Off-field or emergency landing

Findings - Cause/Factor

1. Aircraft-Fluids/misc hardware-Fluids-Fuel-Incorrect use/operation - C
2. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
3. Personnel issues-Task performance-Use of equip/info-Use of checklist-Pilot - F
4. Personnel issues-Task performance-Use of equip/info-Use of policy/procedure-Pilot - F
5. Aircraft-Fluids/misc hardware-Fluids-Fuel-Fluid level - C

Narrative

HISTORY OF FLIGHT

On October 28, 2011, about 1350 Pacific daylight time, a Cessna 185, N520YH, was substantially damaged during an off-airport forced landing near Prineville, Oregon, following a complete loss of engine power. The owner/pilot and the two passengers were not injured. The personal flight was operated under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the flight.

According to the pilot, the flight originated from a private airstrip in central Idaho, and was destined for Bend Municipal Airport (BDN), Bend, Oregon. The pilot estimated that the departure fuel quantity was 57 gallons. The cruise portion of the flight was conducted at an altitude of 10,500 feet, in accordance with visual flight rules, without air traffic control services.

About 2.5 hours after takeoff, the pilot began a cruise descent for BDN by reducing power to 20 inches of manifold pressure, and adjusting mixture as required to keep the engine temperature values within the desired ranges. When the airplane was approximately 10 miles from BDN, and descending through about 6,500 feet, the engine suddenly ceased developing power. At the time of the engine power loss, the electronic fuel flow instrument indicated that there was sufficient fuel for about one more hour of flight.

In response to the power loss, the pilot manipulated the throttle, mixture, and propeller controls, but the engine did not resume developing power. The pilot did

not manipulate the fuel selector handle, or activate the fuel boost pump. The pilot decided that he was committed to a forced landing off-airport, and selected an unpaved road in a wilderness area for the landing. The landing was uneventful until the airplane was nearly stopped. During the rollout, at a speed that the pilot estimated to be 10 mph, the airplane struck some vegetation, and it nosed over onto its back. The pilot shut down the airplane, and he and the two passengers exited through the pilot's door. The pilot telephoned for assistance using his mobile phone.

PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate with instrument airplane and single- and multi-engine land ratings. He reported a total flight experience of about 3,800 hours, including about 830 hours in the accident airplane make and model. His most recent FAA third-class medical certificate was issued in July 2008, and his most recent flight review was completed in October 2011.

AIRCRAFT INFORMATION

According to FAA information, the airplane was manufactured in 2006, and was equipped with a Teledyne Continental Motors IO-550 series engine. Pilot-provided information indicated that as of its most recent annual inspection in November 2010, the airplane had accrued a total time in service of 8,131 hours. The pilot estimated that the engine had accumulated about 200 hours in service since it had been overhauled.

The airplane was equipped with an electric fuel boost pump that was to be used for starting the engine, and was normally kept off for cruise flight. It was also equipped with a JPI-brand fuel flow indicator and JPI engine monitor.

The engine monitor was extracted from the airplane, and was sent to the NTSB Recorders Laboratory in Washington, DC, for data download. The accident flight data was successfully downloaded, and review of the data did not indicate any operational abnormalities. Review of the data revealed that about 2 minutes and 10 seconds before the end of the data, the exhaust gas temperature (EGT) values rose temporarily, and then the EGT and cylinder head temperature values began rapid, smooth, and continuous decreases. The temporary EGT rise preceding the decrease was consistent with engine shutdown by fuel starvation.

METEOROLOGICAL INFORMATION

The 1355 automated weather observation at an airport located about 10 miles west-southwest of the accident location included winds from 210 degrees at 9 knots; visibility 10 miles; clear skies; temperature 17 degrees C; dew point minus 12 degrees C; and an altimeter setting of 30.07 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest inverted on the unpaved two-track road that was used for the forced landing. The cowl, right wing strut, vertical stabilizer, and rudder were damaged by the nose-over. No fuel leaks were observed on site. The four-position (LEFT, RIGHT, BOTH, OFF) fuel selector handle was found set to the left tank. When the airplane was righted the day after the accident, the left fuel tank was found to contain about 6 gallons, and the right tank contained about 10 gallons. The two wing tanks were interconnected with a vent line located near the top of the tanks, which could permit fuel to migrate from the fuller tank to the other tank when the airplane was inverted.

ADDITIONAL INFORMATION

According to the pilot's written statement regarding the accident, just prior to the engine power loss, the fuel flow device indicated that 58 gallons had been consumed since the previous refueling, which left about 16 gallons of usable fuel remaining. At that time, the pilot estimated that the airplane was about 5

minutes from its destination, and therefore he had more than sufficient fuel to reach the destination. When the engine quit, the pilot was of the mindset that he "did not have a fuel problem." He did not refer to any emergency procedures checklists subsequent to the power loss.

The third entry in the "Engine Failure During Flight" checklist in the Emergency Procedures section of the airplane manufacturer's Pilot's Operating Handbook was "Fuel Selector Valve - BOTH."

The pilot stated that it was his habit pattern to operate the airplane with the fuel selector set to the BOTH position. When the airplane was righted the day after the accident, and the pilot saw that the fuel selector was set to the left tank, he recalled that at some point during the flight, he had moved the fuel selector from BOTH to LEFT in order to correct a fuel imbalance, with the intention of resetting it to BOTH once the imbalance had been corrected. The post-accident sight of the selector handle, coupled with the engine failure, prompted the pilot to realize that he had likely forgotten to reset the selector to the BOTH position, and that that was the likely cause for the power loss.

Accident Rpt# ANC13LA029	**03/06/2013 1730 AST**	**Regis# N1704U**	**Bethel, AK**	**Apt: N/a**	
Acft Mk/Mdl CESSNA 207		**Acft SN 20700304**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR IO 520 SERIES		**Acft TT 31641**	**Fatal 0**	**Ser Inj 0**	**Flt Conducted Under: FAR 135**
Opr Name: FLIGHT ALASKA INC.		**Opr dba: YUTE AIR ALASKA**			**Aircraft Fire: NONE**

Narrative

On March 6, 2013, about 1730 Alaska standard time, a Cessna 207 airplane, N1704U, sustained substantial damage during a forced landing on snow-covered tundra about 16 miles northeast of Bethel, Alaska. The airplane was operated as Flight 595, by Yute Air Alaska, Anchorage, Alaska, as a visual flight rules, scheduled passenger/cargo flight under the provisions of 14 Code of Federal Regulations Part 135. The airline transport pilot and the two passengers were not injured. Visual meteorological conditions prevailed at the time of the accident, and the airplane was operating on a company VFR flight plan. The flight had departed Bethel about 1718, en route to Kalskag, Alaska.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge on March 6, the director of operations for Yute Air Alaska reported that the flight originally departed Bethel destined for Kalskag. The pilot reported that about 15 minutes after departure, the engine made a "very loud and unusual whining" noise, which was followed by a partial loss of engine power. He reported the problem to his dispatcher via the company radio frequency, and began a turn toward a frozen pond for an emergency landing. During the turn, all engine power was lost. He then selected a closer area of snow-covered terrain, with small trees, as a forced landing site. Just prior to touchdown, the left stabilizer struck the tops of the trees, resulting in substantial damage to the horizontal stabilizer. After touchdown, the nose tire and fork broke free of the airplane.

The airplane was equipped with a Continental Motors IO-520 series engine. A preliminary examination of the engine by company maintenance personnel revealed a crack in the crankcase.

The airplane was recovered to a company facility where the engine was removed and shipped to Alaska Aircraft Engines, Anchorage for further examination. The engine was subsequently crated and shipped to Continental Motors, Inc. Analytical Department, Mobile, Alabama for disassembly and inspection.

On May 15, 2013 under the supervision of an FAA District Office MIDO Safety Inspector, the engine was disassembled and examined at Continental Motors.

The examination revealed that most of the engine's major internal damage was associated with the number one piston assembly.

According to a report prepared by the manufacturer's investigator, the number one piston was fractured at the piston pin bore, releasing the number one rod and piston pin assembly at the small end. The unsupported number one rod and piston pin assembly caused damage to the rear section of the crankcase and camshaft. The number one rod had released from the crankshaft, and exhibited extreme mechanical damage. The number one rod was found in the oil sump. There were no signs of lubrication distress. Portions of the piston skirt were recovered from the oil sump and inspected in the CMI lab. The number one cylinder, piston, rod, and sump contents were retained in bonded storage.

The number one piston assembly, connecting rod, and associated pieces were shipped to the National Transportation Safety Board Materials Laboratory, Washington, DC.

An examination of the number one piston assembly at the NTSB laboratory on February 12, 2014, revealed fatigue fractures in both connecting rod retaining bolts. Damage to the piston and wrist pin were consistent with damage following the release of the connecting rod from the crankshaft. A copy of the NTSB laboratory report is in the public docket for this case.

Incident Rpt# ERA12IA550	**08/31/2012 1630 EDT**	**Regis# N769EA**	**Nantucket, MA**	**Apt: Nantucket Memorial Airport ACK**
Acft Mk/Mdl CESSNA 402C		**Acft SN 402C0303**	**Acft Dmg: MINOR**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL MOTORS, INC.		**Acft TT 28075**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 135**
Opr Name: HYANNIS AIR SERVICE INC		**Opr dba: CAPE AIR**		**Aircraft Fire: NONE**

Summary

While on approach for a full-stop landing, the pilot extended the landing gear and performed the Before Landing checklist. The airplane landed on its main landing gear, and then, as the pilot lowered the nose, it continued to lower until it contacted the runway. ♂♂Postincident examination of the airplane revealed that the nose landing gear drag bracefailed near the nose landing gear actuator attachment lug due to a fatigue crack. A review of maintenance records revealed that a crack in the nose landing gear drag brace was repaired in June 2011 and that, following the repair, the drag brace had been installed on two other company airplanes. In July 2012, the nose landing gear drag brace was removed from the second airplane for inspection, during which, a 1/8-inch-long shallow crack was found near the actuator attachment lugs. The crack was blended in accordance with Cessna Service Bulletin MEB91-11, Revision 1, and then a fluorescent dye penetrant inspection of the area was performed. The inspection did not detect any further cracks; however, it is likely that, at this time, some portion of the crack remained. After the drag brace was returned to service, it was installed on the incident airplane on August 3, 2012. Subsequently, the nose landing gear drag brace was visually inspected in-situ twice; however, neither inspection identified the fatigue crack. ♂♂At the time of the incident, the airplane had been operated for about 286 cycles since the crack repair in July 2012, which exceeded the 250-cycle inspection interval specified by MEB91-11R1. It is likely that, if the nose landing gear drag brace had been inspected after 250 landings in accordance with the manufacturer's service instructions, the crack would have been detected at that time. Additionally, if the operator had incorporated into its maintenance program Supplemental Inspection 32-20-00, which stated, in part, that the nose landing gear drag braces should be inspected using visual and eddy current inspections and that repair or modification of cracked nose landing gear drag braces was not allowed, it is likely that the nose landing gear drag brace would have been removed from service in July 2012.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: Company maintenance personnel's failure to comply with the airplane manufacturer's service instructions by not removing the cracked drag brace from service nor inspecting the repaired drag brace at the appropriate interval, which resulted in the failure of the nose landing gear drag brace due to fatigue cracking and collapse of the nose landing gear during the landing roll. Contributing to the failure of the nose landing gear drag brace was the failure of the repair station to detect a remaining portion of a crack following repair.

Events

1. Landing-landing roll - Sys/Comp malf/fail (non-power)
2. Landing-landing roll - Landing gear collapse

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Nose/tail landing gear-Fatigue/wear/corrosion - C
2. Aircraft-Aircraft systems-Landing gear system-Nose/tail landing gear-Incorrect service/maintenance - C
3. Personnel issues-Task performance-Inspection-Post maintenance inspection-Maintenance personnel - C
4. Personnel issues-Task performance-Inspection-Scheduled/routine inspection-Maintenance personnel - C
5. Organizational issues-Management-Scheduling-Maintenance scheduling-Operator - C

Narrative

On August 31, 2012, about 1630 eastern daylight time, a Cessna 402C, N769EA, registered to and operated by Hyannis Air Service, Inc., dba Cape Air, as Flight 775, experienced collapse of the nose landing gear during the landing roll at Nantucket Memorial Airport (ACK), Nantucket, Massachusetts. Visual meteorological conditions prevailed at the time and a visual flight rules flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 135, scheduled domestic passenger flight from Barnstable Municipal Airport-Boardman/Polando Field (HYA), Hyannis, Massachusetts, to ACK. The airplane sustained minor damage and there were no injuries to the airline transport pilot or 9 passengers. The flight originated from HYA about 1608.

The pilot stated that on approach to ACK he extended the landing gears and performed the Before Landing Checklist with normal indications (3 Green, no red, no gear warning horn). He landed on the main landing gears, and as he lowered the nose, it continued down until contact with the runway. He notified air traffic control and evacuated the passengers.

Post incident inspection of the nose landing gear revealed the nose landing gear drag brace part number (P/N) 5142002-5, was fractured near the actuator attachment lug.

Examination of the nose landing gear drag brace was performed by the NTSB Materials Laboratory located in Washington, D.C. The results of the examination revealed the drag brace was fractured aft of the actuator attachment clevis. The rod end fitting for the actuator was also fractured, while the bearing end of the end fitting remained attached to the drag brace. The fracture features of the rod end fitting were matte gray and rough consistent with ductile overstress fracture. A portion of the fracture surface of the nose landing gear drag brace revealed the extent of the fatigue crack was approximately 40 percent of the cross section. The fatigue features originated from the upper inboard corner, which was in the area that was reworked during a repair made in July 2012; however, no tightly curving crack arrest features consistent with an origin were observed adjacent to the surface. The blend radius at the aft side of the lug measured 0.12 inch. Additionally, no evidence of paint was observed on the fracture surface. A copy of the NTSB Materials Laboratory Factual Report is contained in the NTSB public docket.

A representative of the airplane manufacturer reported the date of manufacture of nose landing gear drag brace part number (P/N) 5142002-5, could not be determined. The representative also reported the part is not serialized at manufacture, and the date and to whom the part was shipped after manufacture could not be determined.

According to the information provided by the operator, the first historical documentation associated with nose landing gear drag brace P/N 5142002-5 was Federal Aviation Administration (FAA) Form 8130-3, associated with a repair by a FAA Certificated Repair Station (FAA CRS) dated June 19, 2011.

Review of the FAA Form 8130-3 Form associated with the June 19, 2011, repair revealed the part was cleaned, repaired, inspected and was approved for return to service by the FAA CRS. The form also indicates that the nose landing gear drag brace was ". Inspected and Repaired [in accordance with] MEB 91-11 Rev 1 as supplied by customer. Replaced four bearings. Identified crack repaired I.A.W. Above MEB. Unit ID spotted to alert compliance with MEB. Painted and returned unit to service." At this repair the part was identified with serial number (S/N) T35119. A copy of the FAA Form 8130 is contained in the NTSB public docket.

Following the repair, the nose landing drag brace was installed in another airplane (N68391) on June 29, 2011, and removed from that airplane on November 11, 2011, after accruing 473.4 hours. On December 22, 2011, the drag brace was installed onto N26514, and was removed from that airplane on July 24, 2012, after accruing approximately 530 hours since installation, or a total of 1,003 hours since being reworked in June 2011. A copy of the installation and removal records is contained in the NTSB public docket.

The nose landing gear drag brace was then sent to the same FAA CRS that performed the repair in June 2011, and according to documents provided by the facility, a 1/8 inch long shallow crack was noted near the actuator attach lugs. The crack was blended in accordance with Cessna Service Bulletin MEB91-11, Revision 1, and a Fluorescent Dye Penetrant inspection of the area was then performed. No further crack was detected so the part was painted and returned to service on July 26, 2012. A copy of the records from the repair station is contained in the NTSB public docket.

According to the airplane maintenance records, during a routine Phase 5 inspection, on August 3, 2012, at airframe total time of 27,968.1 hours, nose landing gear drag brace P/N 5142002-5, T35119 was installed onto the incident airplane. Since installation, the nose landing gear drag brace was visually inspected in-situ twice during a special inspection of the rod end area for condition and security. The first occurred during a Phase 6 inspection performed on August 15, 2012, at airframe total time of 28,025.6 hours, and the second occurred during a Phase 1 inspection performed on August 27, 2012, at airframe total time of 28,074.6 hours. The airplane total time at the time of the incident was reported to be 28,098.6 hours.

The airplane had been operated for approximately 131 hours and approximately 218 cycles (based on the 2012 average utilization of 0.6 hour per cycle) since the repaired nose landing gear drag brace was installed. Since actual cycles is not tracked by the operator, they were asked by NTSB to determine the actual number of cycles since installation of the nose landing gear drag brace; they reported it was 286. The operator also reported that the nose landing gear drag brace total time since June 2011 was approximately 1,134 hours.

At the time of the incident, the operator was removing the nose landing gear drag brace every 400 hours to comply with Cessna Multi-Engine Service Bulletin MEB91-11R1.

Cessna Multi-Engine Service Bulletin MEB91-11, Revision 1, dated February 24, 2003, indicates reports of cracking of the nose landing gear drag brace near the actuator attach lugs, which could result in a drag brace failure and inability of the nose landing gear to lock in the down position. The bulletin indicates that airplanes that have a nose landing gear drag brace that was shipped from Cessna Parts distribution on or after July 2, 2002, are exempt from the bulletin. Additionally, the bulletin indicates that for airplanes with the P/N of drag brace installed (5142002-5), shall be inspected within the next 250 landings or 12

months whichever occurs first, and upon reaching 2,000 landings or for drag braces with over 2,000 landings, this inspection shall be repeated every 250 landings for drag braces that have been reworked to remove a crack per the requirements of this Service Bulletin.

On April 1, 2009, Cessna Aircraft Company incorporated Supplemental Inspection Number 32-20-00 (SI 32-20-00) into the maintenance manual. The supplemental inspection pertained to the nose landing gear drag brace and specified a visual and Fluorescent Liquid Penetrant Inspection, and if a repair for cracks(s), corrosion, or damage is required for a repair that is not available in the Model 402C maintenance manual, to contact Cessna Customer Service for possible repair instructions or replace the part. On September 30, 2011, SI 32-20-00 was revised indicating that the required inspection method of the nose landing gear drag braces is visual and eddy current, that repairs or modification of cracked nose landing gear drag braces was not allowed, and the document supersedes MEB91-11. The operator did not incorporate SI 32-22-00 into their maintenance program and were not complying with it; therefore, they were still complying with MEB91-11R1 at the time of the incident.

A review of FAA Service Difficult Reports (SDR's) pertaining to nose landing gear drag brace P/N 5142002-5 revealed that from 1995 to March 12, 2014, excluding the SDR submitted for the incident event, there were a total of 13 reported issues involving either cracking or failure of the nose landing gear drag brace (1 duplicate entry was noted). Of the 13 reports, 5 were submitted by the operator. Between 2002 and March 12, 2014 (SDR run date), excluding the SDR submitted for the incident event, there were 3 reports involving either cracking or failure of nose landing gear drag brace P/N 5142002-5, of which 2 were submitted by the operator. Of the 2 reports submitted by the operator, 1 related to finding the nose landing gear drag brace cracked at regular scheduled inspection and the other in May 2010, which was the only one submitted in 2010, related to collapse of the nose landing gear due to failure of the nose landing gear drag brace. In 2011, and in 2012 (excluding the incident event), the operator or the FAA CRS who was inspecting the nose landing gear drag braces for the operator did not submit any Malfunction or Defect Report concerning cracking of the nose landing gear drag braces. A copy of the SDR's is contained in the NTSB public docket.

According to records generated by the FAA CRS that last inspected the failed nose landing gear drag brace, between 2002 and 2012, the operator submitted to them a total of 1,216 nose landing gear drag braces for MEB91-11R1 inspection. Of those, a total of 1,102 were repaired and 114 were cracked beyond the allowable repair limit of MEB91-11R1. Specifically, in 2010, a total of 161 nose landing gear drag braces were inspected per MEB91-11R1, of which 24 were found to be cracked beyond the allowable repair limit of the bulletin. In 2011 and 2012, a total of 687 nose landing gear drag braces were inspected per MEB91-11R1, of which 51 were found to be cracked beyond the allowable repair limit of the bulletin. A copy of the drag brace inspection list is contained in the NTSB public docket.

A review of 14 CFR Part 135.415 titled Service Difficulty Reports, revealed that each certificate holder is required to report the occurrence or detection of each failure, malfunction, or defect in an aircraft concerning in part an unwanted landing gear retraction. Additionally, each certificate holder shall report any other failure, malfunction, or defect in an aircraft that occurs or is detected at any time, if, in its opinion, the failure, malfunction, or defect has endangered or may endanger the safe operation of the aircraft.

A review of 14 CFR Part 145.221 titled Service Difficulty Reports, pertaining to FAA Certificated Repair Stations, revealed that a repair station must report to FAA within 96 hours after it discovers any serious failure, malfunction, or defect of an article. The regulation also indicates that a certificated repair station may submit a service difficult report for a 14 CFR Part 135 certificate holder, provided the report meets the requirements of Part 135. However, the certificated repair station and Part 135 certificate holder must not report the same failure, malfunction, or defect. If the certificated repair station submits a SDR, it is required to submit a copy to the certificate holder.

Accident Rpt# WPR14CA073 **12/22/2013 1145 PST** **Regis# N185CY** **Carson City, NV** **Apt: Carson Airport CXP**

Acft Mk/Mdl CESSNA A185F-F **Acft SN 18502839** **Acft Dmg: SUBSTANTIAL** **Rpt Status: Factual** **Prob Caus: Pending**

Fatal 0 **Ser Inj 0** **Flt Conducted Under: FAR 091**

Opr Name: NYE WILLIAM J **Opr dba:** **Aircraft Fire: NONE**

AW Cert: NON

Summary

The pilot reported that after an approximate one-hour flight, he returned back to the departure airport, which is where the airplane was based. He configured the airplane for a three-point landing and touched down about 300 feet after the runway threshold. Upon touchdown, the airplane immediately began to veer to the right. The airplane continued off the runway surface and nosed over, coming to rest inverted. During the accident sequence, the vertical stabilizer and rudder were substantially damaged.

The pilot reported no pre impact mechanical malfunctions or failures 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 during landing which resulted in the airplane veering off the runway and nosing over.

Events

1. Landing-landing roll - Loss of control on ground

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

Narrative

The pilot reported that after an approximate one-hour flight, he returned back to the departure airport, which is where the airplane was based. He configured the airplane for a three-point landing and touched down about 300 feet after the runway threshold. Upon touchdown, the airplane immediately began to veer to the right. The airplane continued off the runway surface and nosed over, coming to rest inverted. During the accident sequence, the vertical stabilizer and rudder were substantially damaged.

The pilot reported no pre impact mechanical malfunctions or failures that would have precluded normal operation.

Accident Rpt# WPR11FA430	**09/04/2011 1125 PDT**	**Regis# N7WJ**	**Tehachapi, CA**	**Apt: N/a**
Acft Mk/Mdl CESSNA P210-N		**Acft SN P21000374**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL MOTORS TSIO-520			**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: WALTER L JOHNSON TRUSTEE		**Opr dba:**		**Aircraft Fire: GRD**

Narrative

HISTORY OF FLIGHT

On September 4, 2011, at 1125 Pacific daylight time, a Cessna P210N, N7WJ, collided with trees near Tehachapi, California. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The pilot and one passenger sustained fatal injuries; the airplane was destroyed from impact forces and a post-crash fire. The local personal flight departed Cable Airport, Upland, California, at 1023. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot called a friend who had a home near Tehachapi, and indicated that he would fly over the home later that morning on a pleasure flight.

A witness at the Mountain Valley Airport in Tehachapi possessed commercial pilot certificates for airplane single-engine and multiengine land, as well as an instrument rating. He was working on a glider rating at Mountain Valley and was familiar with the surrounding area. He noticed an airplane approaching the airport from the southeast on a northwesterly heading. The airplane was low over the wind turbines in the area, and after clearing the ridge line that they were on, began a 360-degree turn in a 45- to 60-degree angle of bank. He noticed that two landing gear were down, and from his vantage point thought that the airplane had a tail wheel. The airplane descended a couple of hundred feet during the turn. He noted that it was below the tree line at that point, and it continued the turn to a southwesterly heading. It started up a valley between two ridgelines and disappeared from his sight behind the nearest one. He stated that he had encountered downdrafts in that area on occasion, and didn't think that this was an area where one should fly low. He estimated that the airplane flew about 500 yards out of his sight; about 20 seconds after it disappeared, he saw white, then gray, then black smoke.

The pilot's friend, who is also a pilot, observed the airplane slowly flying around his home, and stated that he recognized it as his friend's airplane. He noted that the landing gear and partial flaps were down, and he observed a hand wave out the pilot's window. Shortly thereafter, the airplane turned to the west, and the gear began to retract. He returned to his previous activities, and within seconds heard a "whump" followed by silence. He moved to a better vantage point and observed smoke in the direction of his last observation of the airplane.

PERSONNEL INFORMATION

A review of Federal Aviation Administration (FAA) airman records revealed that the 72-year-old pilot held a private pilot certificate with ratings for airplane single-engine land, multiengine land, and instrument airplane. He held a third-class medical certificate issued in July 6, 2010, with the limitation that he must wear corrective lenses for near and distant vision.

No personal flight records were located for the pilot. The IIC obtained the aeronautical experience listed in this report from an insurance application dated November 10, 2010. The pilot reported a total time of 2,218 hours with 1,422 hours in the make and model.

AIRCRAFT INFORMATION

The airplane was a Cessna P210, serial number P21000374. Logbooks were not recovered for the airframe or engine. An insurance application dated November 10, 2010, indicated a tachometer time of 509.0 hours and a Hobbs meter time of 592.2 hours. The oil filter on the airplane had markings dated April 23, 2011, that indicated a tachometer time of 2,411.1 hours and a Hobbs meter time of 1,936.4 hours.

The engine was a Continental Motors, Inc. (CMI) TSIO-520-P(5), serial number 278637-R.

METEOROLOGICAL CONDITIONS

An automated surface weather observation at Tehachapi Municipal Airport (KTSP (elevation 4,001 feet msl) was issued at 1115 PDT. It indicated wind from

140 degrees at 15 knots gusting to 20 knots, 10 miles or greater visibility, clear sky, temperature at 23 degrees C, dew point 09 degrees C, and an altimeter setting at 30.10 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The National Transportation Safety Board investigator-in-charge (IIC), an FAA inspector, and investigators from Cessna and CMI examined the wreckage at the accident site. The coordinates of the main wreckage were 35 degrees 04.08 minutes north latitude and 118 degrees 26.007 minutes west longitude. The debris path was along a magnetic heading of 215 degrees. The airplane came to rest upright on a northerly heading; the engine was inverted, and pointing about 90 degrees clockwise from the main wreckage.

The first identified point of contact (FIPC) was broken limbs near the top of a 20-foot tree. At the base of the tree were broken limbs and the red and white left wing tip fairing containing a red navigation lens. About 10 feet further into the debris path was a second tree with upper branches broken; near the base of this tree was the outboard rib and about 2 feet of skin from the left wing. Another 10 feet into the debris path was another tree with topped branches. The debris path was about 200 feet long from the FIPC to the main wreckage, and some separated pieces were about 120 feet from the debris path centerline. The next point of contact was the principle impact crater (PIC), which began about 20 feet before the final resting place of the main wreckage. Fire consumed the majority of the airframe skin and structure. Investigators identified remnants of all flight controls and airframe structure.

MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination was conducted by the Kern County Coroner; the cause of death was multiple blunt force injuries.

The FAA Forensic Toxicology Research Team, Oklahoma City, Oklahoma, performed toxicological testing of specimens of the pilot. The analysis contained no finding for ethanol in urine; they did not perform tests for carbon monoxide or cyanide.

The report contained the following findings for tested drugs: Tamsulosin detected in Liver; Terazosin detected in urine, and Terazosin detected in Liver.

TESTS AND RESEARCH

Investigators from the NTSB, FAA, Cessna, and Continental Motors, Inc. (CMI), examined the wreckage at Aircraft Recovery Service, Littlerock, California, on September 7, 2011. A detailed report is part of the public docket for this accident. A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

The elevator trim actuator was extended 1.7 inches, which equated to 5 degrees tab up. The elevator trim cable was continuous from the tail to the chain in the cabin.

The flap actuator measured 4.7 inches; which indicated that 4.4 inches is the retracted position.

Accident Rpt# WPR11LA311	**07/05/2011 1900 PDT**	**Regis# N7392X**	**Hesperia, CA**	**Apt: Hesperia L26**
Acft Mk/Mdl CESSNA R182		**Acft SN R18200096**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-540-J3C5D		**Acft TT 4159**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: CHRIS E WAGGENER		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The airplane's engine stopped making sufficient power to maintain a climb, so the pilot decided to turn back toward the airport. However, after he flew into a valley, he realized that the airplane would not make it back to the airport. After seeing power lines along the airplane's flightpath, he turned the airplane toward an open field. The airplane subsequently hit the ground hard and then hit a tree, which separated the right wing from the airframe. During the postaccident engine examination, the muffler was disassembled. One internal baffle cone was found separated from the end plate and was blocking the opening of the muffler. Upon shaking the muffler, the baffle cone was free to move around within the muffler assembly. The other baffle cone had a hole eroded in its center. Internal engine failures can cause partial or complete engine power loss by restricting the flow of the exhaust gases. If pieces of the internal baffling break loose and partially or totally block the flow of exhaust gases, an engine failure can occur. It is likely the exhaust gas was partially or totally blocked by the separated baffle cone during the flight, which resulted in a loss of engine power.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The separation of the end baffle cone inside the muffler, which blocked airflow through the engine after takeoff and resulted in a loss of engine power and an off-airport landing into obstacles.

Events

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

Findings - Cause/Factor

1. Aircraft-Aircraft power plant-Engine exhaust-Noise suppressor-Damaged/degraded - C
2. Environmental issues-Physical environment-Object/animal/substance-Tree(s)-Effect on equipment

Narrative

HISTORY OF FLIGHT

On July 5, 2011, about 1900 Pacific daylight time, a Cessna R182, N7392X, collided with a tree during an off airport forced landing following a loss of engine power during climb to cruise altitude after takeoff from Hesperia, California. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The private pilot and one passenger sustained minor injuries; the airplane sustained substantial damage from impact forces. The personal cross-country flight departed Hesperia about 1855 with a planned destination of Adelanto, California. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot stated that he had flown to Hesperia from Adelanto earlier that evening, and purchased about 29 gallons of fuel. During the climb to cruise, the airplane was unable to climb, and the pilot turned back toward the airport. He flew into a valley, and realized that the airplane would not make it back to the airport. He saw power lines in his flight path, and turned toward an open field. The airplane hit the ground hard, and then a tree, which separated the right wing from the airframe. Fuel spray from the wing set a car on fire. The airplane spun around, and came to rest with the nose on the ground, and the left wing and tail resting against a house.

TESTS AND RESEARCH

Investigators examined the wreckage at Aircraft Recovery Service, Littlerock, California, on July 14, 2011. A detailed report is part of the public docket for this accident.

Examination of the airframe and engine revealed no anomalies that would have precluded normal operation.

Investigators disassembled the muffler, and noted that one cone-shaped baffle had separated from the end plate, and was blocking the end opening of the muffler. Upon shaking the muffler, the cone was free to move around within the muffler assembly. The other cone had a hole eroded in its center.

ADDITIONAL INFORMATION

The FAA Publication Aviation Maintenance Technician Handbook - Powerplant, Volume 1, Chapter 3, describes induction and exhaust systems. One section of that chapter discusses internal muffler failures. It states that internal failures (baffles, diffusers, etc.) can cause partial or complete engine power loss by restricting the flow of the exhaust gases. If pieces of the internal baffling break loose and partially or totally block the flow of exhaust gases, engine failure can occur.

Accident Rpt# WPR14FA186	**05/10/2014 1545 MST**	**Regis# N7311U**	**Page, AZ**	**Apt: Page Muni PGA**
Acft Mk/Mdl CESSNA T207A		**Acft SN 20700395**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL MOTORS INC.			**Fatal 1** **Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: AMERICAN AVIATION INC		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 10, 2014, about 1545 Mountain standard time, a Cessna T207A, N7311U, was substantially damaged when it impacted terrain during landing at the Page Municipal Airport (PGA), Page, Arizona. The airplane was registered to and operated by American Aviation, Page, under the provisions of Title 14 Code of Federal Regulations Part 91. The airline transport pilot and four passengers sustained minor injuries, one passenger sustained serious injuries, and one passenger was fatally injured. Visual meteorological conditions prevailed and a company flight plan was filed for the local sightseeing fight. The flight originated from PGA about 20 minutes prior to the accident.

The pilot reported that about half way into a 40-minute sightseeing flight, he noticed reduction in engine power. Despite the pilot's attempts, he was unable to correct the power reduction and initiated a turn towards the airport. The pilot stated that he entered the airport traffic pattern for runway 15 about 1,000 feet above ground level, and applied 10-degrees of flaps just prior to turning base. After turning onto final for the runway, the airplane suddenly descended abruptly, impacted terrain, and nosed over. The pilot reported that he thought the airplane experienced a downdraft on final prior to impact with the ground.

Multiple witnesses located adjacent to the accident site reported observing the accident airplane on final for runway 15 and suddenly descend rapidly into terrain in a normal approach to landing attitude.

Examination of the accident site revealed that the airplane impacted soft terrain about 390 feet short of the approach end of runway 15, slightly left of the runway. All major structural components of the airplane were located within about 30 feet of the main wreckage. The wreckage was recovered to a secure location for further examination.

Accident Rpt# WPR12LA414	**08/17/2012 1425 PDT**	**Regis# N6493N**	**Bakersfield, CA**	**Apt: Meadows Field Airport BFL**
Acft Mk/Mdl CESSNA T210N		**Acft SN 21063067**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR TSIO-520 SER		**Acft TT 3950**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: EAGLE CAP LEASING INC		**Opr dba:**		**Aircraft Fire: IFLT**

Narrative

HISTORY OF FLIGHT

On August 17, 2012, about 1425 Pacific daylight time, a Cessna T210N, N6493N, experienced an in-flight fire shortly after departing from Meadows Field Airport, Bakersfield, California. The airplane was substantially damaged by the fire. The pilot was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certified flight instructor and two passengers were not injured. The local personal flight was departing at the time of the accident with a planned destination of Redlands Municipal Airport, Redlands, California. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot reported that following departure, he banked the airplane to adjoin the right crosswind of the traffic pattern for runway 30R. The pilot observed smoke entering the cockpit and the engine began to only produce partial power. The pilot elected to return back to the airport and configured the airplane for landing on runway 30R. With the degradation of power, he was unable to make it to the runway and landed in a field outside the airport's perimeter.

The pilot further stated that the fire was a result of a clamp failure on the turbocharger which is where the origin of the fire appeared to be. The firewall was damaged by fire.

AIRCRAFT INFORMATION

The Cessna T210N, serial number (s/n) 21063067, was manufactured in 1978. The airplane was equipped with a Teledyne Continental Motors TSIO-520R9B engine. A review of the maintenance logbooks revealed that the last annual inspection was dated as having being completed on May 1, 2012 at a tachometer time of 3,931.0 hours.

TESTS AND RESEARCH

The turbocharger clamp pieces were collected and sent to the National Transportation Safety Board Material laboratory for further examination. The V-band exhaust clamp had a 2-segment retainer ("V" portion of the clamp) and was installed on the turbocharger exhaust gas outlet on the accident airplane. The band (flat outer strap) was fractured near the end of the wrap for the t-bolt assembly. Two circumferential cracks were also observed in the retainer extending from the gap opposite from the t-bolt. Each retainer segment contained one circumferential crack. The clamp was generally covered in oxides and sooty deposits.

The fracture occurred at the edge of a spot weld attaching the band to the retainer and the fracture surface was on slant planes. Slant-plane fracture features were observed from the edges of the spot weld out to the edges of the band and were consistent with ductile overstress fracture. Reduced width of the band associated with necking deformation was observed adjacent to the fracture. In addition, the edges of the band were deformed radially inward. Similar necking deformation with edges deformed radially inward was observed at the mirror opposite side of the band.

In the vicinity of the spot weld, fracture occurred in part in a flat transverse plane. However, slant-plane fracture was also observed at this location. The flat plane fracture was located near the middle of the thickness, and a slant fracture was observed near the outer surface. Slant fracture was also observed at the inner edge of the band across most of the spot weld except for an area near the middle of the weld that appeared to have a granular appearance but was not in the transverse plane.

A piece of the band containing the t-bolt side of the fracture was separated from the rest of the clamp by cutting the band at the wrap for the t-bolt assembly. The flat fracture region had an intergranular appearance mixed with ductile tear ridges. A piece of the band away from the fracture was cut to facilitate hardness testing. The testing did not reveal any anomalies.

No part number or identifying information was found on the v-band clamp. According to the Parts Catalog for the Cessna model 210 and T210 airplanes, one of two part number clamps may be used.

an airsafety.com e-product
Prepared From Official Records of the NTSB By:
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Accident Rpt# ANC13FA054 06/04/2013 1531 AKD	**Regis# N616W**	**Petersburg, AK**	**Apt: N/a**	
Acft Mk/Mdl DEHAVILLAND BEAVER DHC-2 MK.1	**Acft SN 1290**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl P&W R-985 SERIES	**Acft TT 34909**	**Fatal 1 Ser Inj 2**	**Flt Conducted Under: FAR 135**	
Opr Name: PACIFIC WINGS LLC	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

HISTORY OF FLIGHT

On June 4, 2013, about 1531 Alaska daylight time, a float-equipped de Havilland DHC-2 (Beaver) airplane, N616W, sustained substantial damage when it collided with mountainous, tree-covered terrain, about 14 miles east of Petersburg, Alaska. The airplane was being operated by Pacific Wings LLC, as a visual flight rules (VFR) sightseeing flight under the provisions of 14 Code of Federal Regulations, Part 135, when the accident occurred. Of the seven people on board, the certificated airline transport pilot and three passengers sustained minor injuries, two passengers sustained serious injuries, and one passenger was fatally injured. Visual meteorological conditions prevailed, and company flight following procedures were in effect. The flight originated at the Lloyd R. Roundtree Seaplane Facility, at the Petersburg Harbor, Petersburg, about 1519.

The flight was a sightseeing flight for cruise ship passengers, and the passengers cruise ship was docked in Petersburg.

As part of their company flight following procedures, Pacific Wings incorporates Spidertracks, which provides company management personnel with a real-time, moving map display of the airplane's progress.

During an interview with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on June 6, the operator's director of operations reported that after returning from a flight, he was alerted that the flight track for the accident airplane had stopped transmitting along the anticipated route to LeConte Glacier. Inquiring of the company flight follower, and unable to establish radio contact with the pilot, he initiated a search for the missing airplane. He said the 45 minute tour flight had a standard route, but pilots were allowed to alter that route based on weather conditions.

About 1547, approximately 16 minutes after the accident, the United States Coast Guard (USCG) Alaska received a 406 Mhz emergency locator transmitter (ELT) signal assigned to the accident airplane. At approximately 1614, after being notified of an overdue airplane, and after learning about reports of an emergency locator transmitter (ELT) signal along the accident pilot's anticipated flight route, search and rescue personnel from the U.S. Coast Guard Air Station Sitka, began a search for the missing airplane.

About 1816, the crew of a U.S. Coast Guard HH-60 helicopter located the airplane's wreckage in an area of mountainous, tree-covered terrain. A rescue swimmer was lowered to the accident site and discovered that one of the airplane's occupants died at the scene, and six others had survived the crash. The six survivors were hoisted aboard the HH-60 helicopter, and then transported to Petersburg.

During an interview with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on June 6, the pilot stated that the accident flight was his fourth flight of the day, and his third tour flight that day. He said that weather conditions had deteriorated throughout the day with a ceiling of approximately 2,000 feet, light rain, and fog along the mountain ridges. He had departed from the Petersburg harbor en route to LeConte Glacier, via Horn Cliffs. He reported that while approaching a mountain pass, en route to LeConte Glacier he initiated a climb by adding a "little bit" of flap, approximately 1 pump of the flap handle actuator, but did not adjust the engine power from the cruise power setting. He noted his airspeed at 80 knots, with a 200 feet per minute climb on the vertical speed indicator. He was having difficulty seeing over the cowling due to the nose high attitude as he entered the pass, when he noticed trees in his flight path. He initiated an immediate left hand turn; the airplane stalled, and began to drop, impacting the mountainous terrain. The pilot stated that there were no preaccident mechanical anomalies that would have precluded normal operation.

During a telephone conversation with the NTSB IIC, on June 7 a passenger reported that they received a preflight safety briefing when they boarded the airplane. After departure they headed out across the water towards LeConte Glacier. He said that the airplane made a left turn, stalled, and then made a sharp left turn right before impact. He said that the weather conditions at the time of the accident consisted of tufts of low clouds, and good visibility. They did not enter the clouds at any time during the flight. He stated that the airplane seemed to be operating fine, and he heard no unusual sounds, other than the engine speed seemed to increase significantly just before impact.

PERSONNEL INFORMATION

The pilot, age 39, held an airline transport pilot certificate with an airplane muilti-engine land rating, and commercial privileges for single-engine land and single-engine sea. He also held a type rating for a Hawker Siddeley HS-125 airplane. His most recent first class medical certificate was issued on April 24, 2013, with the limitation not valid for any class after October 24, 2013.

According to the Pilot/Operator Aircraft Accident Report, (NTSB Form 6120.1) submitted by the operator, his total aeronautical experience was about 4,841 flight hours, of which about 1,465 were in same make and model as the accident airplane. In the preceding 90 and 30 days prior to the accident, the pilot flew a total of 114.1 and 45.7 flight hours.

His most recent CFR Part 135.293 check ride was on February 5, 2013. A Federal Aviation Administration (FAA) operations inspector from the Juneau Flight Standards District Office (FSDO) administered the check ride in an amphibious float-equipped Cessna 185 airplane.

AIRCRAFT INFORMATION

The airplane was a 1958 model year, de Havilland DHC-2 MK1 (Beaver). At the time of the accident the airplane had a total time in service of 34,909.3 flight hours. A review of the maintenance records revealed that the most recent annual inspection of the airframe and engine was on January 22, 2013, 76.1 flight hours before the accident.

The airplane was equipped with a Pratt and Whitney R-985 radial engine that was rated at 450 horsepower.The engine was overhauled 1,015.6 hours before the accident.

The airplane was equipped with Edo 4930 floats.

According to the performance information section of the airplane's FAA approved flight manual, the stall speed for a DHC-2 airplane configured with the flaps in the up position, operating at 5,057 pounds (the estimated gross weight of the airplane at the time of the accident), ranges between 60 and 105 miles per hour, depending on bank angle.

METEOROLOGICAL INFORMATION

The closest weather reporting facility was Petersburg Airport, approximately 14 miles west of the accident site. At 1536, an aviation routine weather report (METAR) at Petersburg, Alaska, reported wind, calm, visibility, 2 1/2 statute miles with light rain and mist, scattered clouds at 500 feet, broken clouds at 1,300 feet, overcast clouds at 1,800 feet, temperature, 52 degrees F; dewpoint 48 degrees F; altimeter, 30.03 inHG.

WRECKAGE AND IMPACT INFORMATION

Assisted by the United States Coast Guard, and two volunteers from Juneau Mountain Rescue, the NTSB IIC, along with an Alaska State Trooper, reached the accident site on the afternoon of June 5.

The on-scene examination revealed that the airplane impacted in a near vertical attitude, on a tree covered 37 degree slope, at an elevation of about 912 feet mean sea level. The nose of the airplane was on approximately a 30 degree heading, and uphill (All headings/ bearings noted in this report are magnetic). The average heights of the trees surrounding the accident site were in excess of 200 feet tall.

All of the airplanes major components were found at the main wreckage site.

An area believed to be the initial impact point was marked by a broken treetop approximately 80 feet from the main wreckage site. Approximately 4 feet of the outboard section of the right wing was found at the base of the tree.

The airplane's right wing separated into 3 sections, with the largest section remaining attached to the aft wing attach point, but separating from the forward wing attach point. Extensive spanwise leading edge aft crushing was present. The wing's flight control surfaces separated from their respective attach points.

The airplane's severed left wing was suspended in the tall trees almost directly above the main wreckage site, and exhibited spanwise leading edge aft crushing, with multiple elliptical impact areas. The wing's flight control surfaces remained attached to their respective attach points. The left wing lift strut remained attached to the wing, but separated at the fuselage.

The airplane impacted on its nose and the tips of both floats. The tips of both floats showed impact damage, and the float support structure collapsed.

Extensive impact damage was evident to the airplane's firewall and right side of the cockpit area. The forward right-hand door remained attached to its attach points, but the door post and forward fuselage exhibited crushing damage.

The empennage was bent to the right, approximately 90 degrees just forward of the horizontal stabilizer. The left horizontal stabilizer exhibited leading edge aft crushing with two elliptical impact areas. The right horizontal stabilizer was relatively undamaged.

The left elevator separated at the outboard attach point but remained attached at the inboard attach point. The right elevator remained attached to its respective attach points.

The cowling was crushed upwards and aft.

The engine assembly separated from the engine firewall and had impact damage to the front and underside.The exhaust tube had malleable bending and folding, producing sharp creases that were not cracked or broken along the creases.

The propeller and hub remained attached to the engine crankshaft. Two of the three propeller blades exhibited extensive bending and torsional "S" twisting. The third propeller blade exhibited extensive leading edge gouges, substantial torsional "S" twisting and chordwise scratching.

Due to impact damage, control continuity could not be established at the accident site.

The on-scene examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Accident Rpt# WPR14CA138	**03/15/2014 1100 PDT**	**Regis# N624RM**	**Wrightwood, CA**	**Apt: Crystal 46CN**	
Acft Mk/Mdl DG FLUGZEUGBAU GMBH DG 1000S-NO		**Acft SN 10-129S82**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
		Acft TT 1680	**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: SOUTHERN CALIFORNIA SOARING ACADEMY INC		**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

The pilot stated that the purpose of the flight was for him to take his cousin, the sole passenger, around the local ski area. After departure, the glider was towed to about 9,000 feet mean sea level (msl) and adjacent to the ski area. The pilot maneuvered the glider in a 300-degree turn to the right and realized that he was at a lower altitude than the ridge. He continued toward the ridge in an effort to gain lift off of the canyons. As the glider continued to lose altitude, it descended below 6,000 feet msl and the pilot began to look for terrain that would be favorable for an off-airport landing. After deciding on a location, the pilot deployed the airbrakes and with the glider about 10 to 15 feet above ground level (agl), he intentionally stalled. The glider mushed into the ground with little horizontal speed. During the accident sequence the glider incurred substantial damage to the tail boom and wings.

The pilot reported no pre impact mechanical malfunctions or failures with the glider that would have precluded normal operation.

Accident Rpt# ERA14FA231	**05/09/2014 1940 EDT**	**Regis# N3016Z**	**Ruther Glen, VA**	**Apt: N/a**
Acft Mk/Mdl EAGLE C-7		**Acft SN EE207203**	**Acft Dmg: DESTROYED**	**Rpt Status: Prelim** **Prob Caus: Pending**
			Fatal 3 **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: KIRK DANIEL T		**Opr dba:**		**Aircraft Fire: IFLT**
				AW Cert: STB

Narrative

On May 9, 2014, about 1940 eastern daylight time, an Eagle C-7 Balloon, N3016Z, was destroyed by fire after a landing attempt to a field and subsequent impact with powerlines near Ruther Glen, Virginia. The commercial pilot and two passengers were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local personal flight that departed from Meadow Event Park, Doswell, Virginia, approximately 3.75 miles to the south of the accident location. The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

Multiple eyewitnesses reported that the accident balloon approached a field from the south where another balloon had just landed. As the accident balloon approached the landing site, the pilot engaged the burner; however, the balloon struck powerlines, which resulted in a spark. Subsequently, the balloon basket and a section of the envelope caught fire. The balloon began an accelerated climb and drifted out of sight.

The debris path was approximately 1.75 miles in length and was oriented on a 025 degree heading from the attempted landing field. Two stainless steel propane fuel tanks, a hand-held fire extinguisher, the instrument panel, and various pieces of the charred envelope fabric, associated with the lower portion of the balloon envelope, were recovered along the debris path. Both propane fuel tanks were intact but exhibited thermal and impact damage. The balloon crown, crown ring, deflation port, the burner, and two other propane fuel tanks were not recovered.

The balloon was equipped with four propane tanks, a wicker basket, and a 78,133 cubic foot envelope. The most recent annual inspection on the balloon was performed on August 5, 2013, and at that time it had accumulated 270.4 hours of total time.

A Garmin 12 handheld global positioning system and three cellular phones were located, removed, and sent to the NTSB Recorder Laboratory for download.

Accident Rpt# ERA13LA433	**09/27/2013 1938 EDT**	**Regis# N631DP**	**Bloomsburg, PA**	**Apt: N/a**	
Acft Mk/Mdl ENSTROM F-28C		**Acft SN 492-2**	**Acft Dmg: MINOR**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING HIO-360-E1AD		**Acft TT 2198**	**Fatal 1**	**Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: HERITAGE ROTORS LLC		**Opr dba:**			**Aircraft Fire: NONE**

Narrative

On September 27, 2013, at 1938 eastern daylight time, an Estrom F-28C, N631DP, received minor damage when a relieved pilot, who was walking from the helicopter, was fatally injured after coming into contact with a rotating main rotor blade, near Bloomsburg, Pennsylvania. The airline transport pilot, seated at the controls in the helicopter, was the sole occupant and was not injured. The helicopter was registered to and operated by Heritage Rotors, LLC, under the provisions of Title 14 Code of Federal Regulations Part 91 as a local sightseeing flight at a local fair. Day visual meteorological conditions prevailed, and no flight plan had been filed. The flight was originating at the time of the accident.

According to the pilot/owner's written statement in the NTSB Pilot/Operator Aircraft Accident/Incident Report, he "approached the left side of the helicopter and rested on the seat and looked into the helicopter. [he] was looking down onto the pilot seat considering the location of the pilot seat belt, the headset, and the general condition of the interior. At this point, nothing in the cockpit was touched and was exactly as [the relieved pilot] had left it. It was at this moment that [the pilot] heard a 'thud.'"

According to local law enforcement personnel, the pilot/owner seated in the left front seat of the helicopter had just taken over from the pilot who was walking away from the helicopter when the accident occurred. The pilot in the helicopter stated to local law enforcement immediately after the accident that he saw the previous pilot walking away, thought he had walked beyond the main rotor blades, and looked down to fasten his seatbelt. While he was fastening his seatbelt, he heard the main rotor blades strike something, looked up, and saw the relieved pilot on the ground.

The local law enforcement report stated that the relieved pilot was located between the 10 and 11 o'clock position forward of the helicopter. In addition, the helipad was located in a level, grassy area near the entrance to the fair grounds.

According to Federal Aviation Administration records, the relieved pilot held a commercial pilot certificate for airplane single-engine and multiengine land, airplane single-engine sea, instrument airplane and helicopter, glider, and rotorcraft helicopter. He reported on his last insurance application that he accumulated 3,900 hours of total flight time, of which, 600 hours were in the same make and model as the accident helicopter. His most recent second-class medical certificate was issued in December 2012. At that time, the pilot reported a height of 71 inches. According to the helicopter flight manual, the main rotor could droop to a minimum height of 72 inches.

According to the FAA records, the helicopter was manufactured in 1980 and registered to the operator in 2010. According to the pilot/owner, the most recent annual inspection was performed on July 2, 2013. At the time of the accident, the helicopter had accumulated 2198 hours of total flight time. According to the helicopter manufacturer training guide, the helicopter was equipped with a crew compartment that consisted of "pilot and passenger/co-pilot seating, instrument panel, radio console, and pilot and co-pilot flight controls mounted to the aluminum floor structure and enclosed in the fiberglass cabin shell. The co-pilot controls are removable and a seat cushion for the third passenger is inserted into the space vacated when the co-pilot collective is removed."

The pilot/owner, reported that there were no mechanical anomalies or malfunctions with the helicopter that would have precluded normal operation prior to the accident. He further reported that he and the relieved pilot both "conducted every aspect of [the] operation purposely for our safety and that of our patrons and neighbors." In addition, he stated that when exiting the helicopter, it is the company's practice to "disengage the rotor drive system and secure the collective control by means of the friction lock.In this condition, the rotor blades 'droop' below the normal height. This drooping is non-symmetrical and most pronounced in the 9 - 12 o'clock position of the rotor [disk]."

In the Operator/Owner Recommendation section of the NTSB Pilot/Operator Aircraft Accident/Incident Report, the pilot/owner stated that he "cannot conceive why [the relieved pilot] would knowingly approach the aircraft in a position he knew well to be the lowest point of the rotor system. This was not our practice and absolutely not his habit."

The weather conditions reported at an airport about 26 nautical miles northwest of the accident location around the time of the accident included calm wind.

According to the helicopter manufacturer representative, the main rotor height can vary depending on how the helicopter landing gear was serviced. In addition, depending on the position of the cyclic, the main rotor can descend lower than six feet when the main rotor is operating.

According to the FAA Helicopter Flying Handbook, "The cyclic pitch control is usually projected upward from the cockpit floor, between the pilot's legs or between the two pilot seats in some models. This primary flight control allows the pilot to fly the helicopter in any direction of travel: forward, rearward, left, and right.The purpose of the cyclic pitch control is to tilt the tip-path plane in the direction of the desired horizontal direction. The cyclic controls the rotor disk tilt versus the horizon, which directs the rotor disk thrust to enable the pilot to control the direction of travel of the helicopter. The rotor disk tilts in the same direction the cyclic pitch control is moved. If the cyclic is moved forward, the rotor disk tilts forward; if the cyclic is moved aft, the disk tilts aft, and so on."

Accident Rpt# CEN14CA215	**04/19/2014 815 MDT**	**Regis# N15095**	**Security, CO**	**Apt: N/a**
Acft Mk/Mdl FIREFLY 8B-15		**Acft SN F8B-2027**	**Acft Dmg: NONE**	**Rpt Status: Factual Prob Caus: Pending**
			Fatal 0 Ser Inj 1	**Flt Conducted Under: FAR 091**
Opr Name: HOWES SKIP		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot reported the wind was from the north-northwest at 6 knots when they departed and the balloon traveled to the southeast as expected. When they descended to land the wind velocity increased to 20 plus knots and the wind changed 90 degrees in direction moving them to the west. The pilot attempted to land twice and aborted both landings due to the wind and terrain conditions. The pilot briefed the passenger, who was very familiar with balloon operations, that they were going to make a high wind landing. The passenger stated he crouched down in the basket for the landing and as the triangular basket touched down and turned to its flat side, he felt his ankle roll. The basket lay down and once the balloon stopped they crawled out of the basket. The passenger stated he knew he injured his ankle and a couple days later he was diagnosed with a fractured tibia.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: An unexpected increase in wind velocity which resulted in a hard landing and the subsequent passenger injury.

Events

1. Enroute - Other weather encounter
2. Landing-flare/touchdown - Hard landing

Findings - Cause/Factor

1. Environmental issues-Conditions/weather/phenomena-Wind-High wind-Effect on operation - C

Narrative

The pilot reported the wind was from the north-northwest at 6 knots when they departed and the balloon traveled to the southeast as expected. When they descended to land the wind velocity increased to 20 plus knots and the wind changed 90 degrees in direction moving them to the west. The pilot attempted to land twice and aborted both landings due to the wind and terrain conditions. The pilot briefed the passenger, who was very familiar with balloon operations, that they were going to make a high wind landing. The passenger stated he crouched down in the basket for the landing and as the triangular basket touched down and turned to its flat side, he felt his ankle roll. The basket lay down and once the balloon stopped they crawled out of the basket. The passenger stated he knew he injured his ankle and a couple days later he was diagnosed with a fractured tibia.

Accident Rpt# WPR11LA306	**07/05/2011 1050 PDT**	**Regis# N1334R**	**Yacoit, WA**	**Apt: N/a**	
Acft Mk/Mdl GRUMMAN AMERICAN AVN. CORP. AA-5		**Acft SN AA5-0734**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320-C2G		**Acft TT 2926**	**Fatal 0 Ser Inj 2**	**Flt Conducted Under: FAR 091**	
Opr Name: STEVEN L EMERSON		**Opr dba:**		**Aircraft Fire: NONE**	

Summary

The pilot reported that the airplane was climbing to cruise altitude up a valley in mountainous terrain when he felt a "small bump" and that the airplane subsequently began descending. While maintaining a low altitude to avoid overlying controlled airspace, he initiated a left turn to avoid rising terrain ahead, but a wing collided with a tree. The airplane came to rest in a gravel pit. The pilot reported 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 pilot's failure to maintain clearance from terrain.

Events

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

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Altitude-Not attained/maintained - C
2. Personnel issues-Action/decision-Action-Incorrect action performance-Pilot - C
3. Environmental issues-Physical environment-Terrain-Mountainous/hilly terrain-Awareness of condition

Narrative

On July 5, 2011, about 1050 Pacific daylight time, a Grumman AA-5, N1334R, collided with a tree and then terrain near Yacoit, Washington. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The commercial pilot and one passenger sustained serious injuries; the airplane sustained substantial damage from impact forces. The personal cross-country flight departed Grove Field, Camas, Washington, about 1040, with a planned destination of Grant County Regional/Ogilvie Field, John Day, Oregon. Visual meteorological conditions prevailed, and a visual flight rules (VFR) plan had been filed.

The pilot reported that he departed straight out from runway 25, and opened his flight plan. He contacted Portland Approach Control for VFR flight following. Approach Control instructed him to remain clear of the class C airspace until they had positive radar identification. The pilot reversed his course, and the airplane was back abeam Grove Field. He remained on an easterly heading, and climbed to 2,400 feet. He observed rising terrain to the east. He decided to head back to the west, and maintained a reduced power setting and 100 miles per hour (mph) airspeed.

Portland Approach contacted the pilot and stated that they had radar contact, and queried when he could accept a clearance to continue on course. He replied that he could proceed on course immediately, and indicated that his position was about 4 miles from the Gymme intersection, which was the first waypoint on his planned route of flight. He requested to cruise at 9,500 feet mean sea level (msl). He added full power, and began a climbing left turn to proceed on course. The pilot stated that he did not lose adequate terrain clearance at any time during the course reversal.

The airplane was at full power climbing about 400-500 feet per minute. About 3,000 feet msl, he felt a small bump, and noted that the airspeed dropped to 80 mph. He verified that the throttle was in full, and then noticed that the airspeed dropped to 60 mph, which he said was 2 mph above the clean stall speed. While maintaining 60 mph with full power, the airplane began descending.

At this point, the pilot noticed that a large fir tree was in the airplane's path; he stated that the airplane had about 1,000 feet of clearance above the tree's elevation prior to the bump. He started a gentle 4-degree bank turn to avoid the tree. The airplane descended until the right wing collided at midspan with a smaller unseen tree. The airplane came to rest in a gravel pit. Both the pilot and passenger sustained broken legs and lacerations; the pilot sustained broken fingers on his right hand as well, which he attributed to his maintaining the full throttle position until touchdown.

The pilot stated that his preflight forecast was for calm conditions to 6,000 feet, and he did not encounter any turbulence during the flight.

The Federal Aviation Administration (FAA) accident coordinator interviewed a bystander who came to the aid of the airplane's occupants. The bystander arrived about 5 minutes after the crash; he observed one person with a shattered ankle standing by the left side of the airplane, and one person still in the right seat.

He noted that he saw a small fuel leak from under the left wing, and there was a fuel odor.

Two FAA inspectors examined the airplane on scene. They observed a 5-gallon bucket under the left wing with about 1/2 inch of fuel in it. They opened the fuel caps on each wing tank, but could not determine if any or how much fuel was in the tanks.

The FAA accident coordinator interviewed the pilot. The pilot indicated that he was maintaining a low altitude to avoid the controlled airspace above him. The pilot initiated a left turn to avoid rising terrain ahead, and could not estimate the altitude above ground level (agl). The pilot did not think that winds were a factor, but that the airplane might have been too low at the intuition of the turn.

The FAA accident coordinator interviewed the passenger. The passenger stated that he was looking around enjoying the flight and the scenery as they were heading up a valley. He did recall looking at the engine gauges as this time, and the engine rpm was in the green operating range. The engine sounded good up until the end. As he looked back to the front of the airplane, he and the pilot almost simultaneously stated that they were not going to make it. The pilot indicated that they would be all right if they could get between two trees. The airplane hit one of the trees, and then the ground. The passenger was not sure what direction the airplane was headed or if it was turning. He felt that all changes to the airplane's flight path were controlled at all times, and did not think that there were air pockets, updrafts, or downdrafts that affected the airplane's flight path.

Accident Rpt# CEN12LA265 04/29/2012 1300	**Regis# N555AP**	**Clines Corner, NM**	**Apt: N/a**
Acft Mk/Mdl JONKER SAILPLANES CC JS 1B	**Acft SN 1B-024**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
	Acft TT 100	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: PALA ANGEL E	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: SPE

Summary

While in soaring flight, the pilot heard a loud metallic sound come from the area near the rudder pedals and subsequently lost contact between his feet and the pedals, which resulted in a temporary loss of glider control. Although the pilot regained control of the glider, it was descending. When the glider had descended to about 10,000 feet mean sea level, the pilot chose to bail out with a parachute due to the descent rate and the unfavorable terrain for landing. The glider subsequently impacted a mesa and sustained substantial damage.

Subsequent examination of the adjustable rudder pedal system revealed that the right rudder cable had fractured at the forward opening of the S-tube on the right rudder pedal. Examination of the rudder pedal design configuration revealed that full-forward deflection of the rudder pedal forced the cable to sharply bend at the point where it exited the forward opening of the S-tube, which was confirmed by a corresponding wear pattern on the accident glider's S-tube. The repeated bending during normal operation resulted in the fatigue failure of 92 percent of the individual right rudder cable wires and, subsequently, final overstress failure of the remaining wires. After the accident, the owner of another glider of the same design examined the rudder cable on his glider and found similar damage to the cable. Subsequently, he conducted ground testing, which confirmed that repeated operation of the rudder pedals resulted in further damage to the rudder cables, indicating a progressive failure. Therefore, it is likely that the right rudder cable failed during the flight and resulted in the loss of rudder control. The glider manufacturer subsequently issued service bulletins and service letters to address the rudder pedal system deficiencies discovered during the accident investigation.

Flight testing conducted by the manufacturer in an exemplar glider confirmed that the glider would have been controllable if the pilot had not chosen to bail. However, the flight testing was conducted under controlled conditions, and the test pilot was fully aware of the modifications made to the exemplar glider to simulate the cable failure. Further, despite these modifications, the test pilot was still able to fully control the rudder, if necessary, during the flight test. Since the accident pilot did not have knowledge of the nature of the control problem and did not have the ability to gain full rudder control, his decision to bail out of the airplane was understandable.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The fatigue failure of the rudder cable due to the inadequate design of the rudder pedal system.

Events

1. Enroute-cruise - Sys/Comp malf/fail (non-power)

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Flight control system-Rudder control system-Failure - C
2. Aircraft-Aircraft systems-Flight control system-Rudder control system-Design - C

Narrative

HISTORY OF FLIGHT

On April 29, 2012, about 1300 mountain daylight time, a Jonker Sailplanes model JS 1B glider, N555AP, collided with terrain following an in-flight loss of control near Clines Corner, New Mexico. The pilot bailed out of the glider and received minor injuries during his parachute landing. The glider sustained damage to the fuselage and both wings. The aircraft was registered to and operated by the pilot under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight originated from the Moriarty Airport (0E0), Moriarty, New Mexico, about 1230.

The pilot reported that while in-flight at about 11,300 feet above mean sea level (msl), he heard a loud metallic noise from the area near the rudder pedals and lost contact between his feet and the rudder pedals. The pilot stated that he thought that the pedal adjustment mechanism had given way and attempted to adjust the pedals through the use of the adjustment handle. When he pulled on the adjustment handle it had no tension and did not retract as designed. - He maintained partial control of the glider using aileron and elevator control; however, the glider was descending in a right yaw condition. When the glider had descended to about 10,000 feet msl, the pilot elected to bail out because the surrounding terrain was unfavorable for a forced landing.

The glider was equipped with a Clear Nav global positioning system (GPS) receiver. The data downloaded from the receiver depicted the entire accident flight. The data showed the glider was heading north-northeast when it made a climbing left turn of about 360 degrees. During the 40-second turn, the average rate of climb was calculated to be 388 feet per minute. After the completion of that turn, at 1904:40, the glider was about 11,538 feet GPS altitude. As the glider

continued to turn left, the altitude dropped during the next approximately 90-degrees of turn and at 1904:52 the glider was about 11,171 feet pressure altitude. The calculated descent rate during this portion of the turn was 1,835 feet per minute. The glider continued in the left turn and climbed back up during the next approximately 90 degrees of turn where it was about 11,414 feet pressure altitude at 1905:08. After this point, the glider began a descending right turn. During the next 21 seconds the glider's average rate of descent was calculated to be 2,437 feet per minute. The glider then began an abrupt descent to the ground. During the 59-second descent, the glider's course varied, but was predominately in an easterly direction. The glider's average rate of descent was 4,044 feet per minute during this time period.

The pilot stated that the glider was in a right turn when the mishap occurred, but the GPS data showed the glider in a left turn. In subsequent telephone conversations, the pilot could not explain why his recollection is different from the recorded data.

PERSONNEL INFORMATION

The 68-year old pilot held a commercial pilot certificate with an airplane single-engine land, airplane multi-engine land, instrument airplane, and glider ratings. The pilot reported having 7,000 total flight hours, including 100 hours in the accident glider. He reported that his most recent flight review as required by 14 CFR 61.56 was completed on March 20, 2011. He was issued a third-class airman medical certificate, with a restriction for corrective lenses, on January 12, 2012.

AIRCRAFT INFORMATION

The accident glider was a Jonker Sailplanes model JS-1B, serial number 24. It was a single-seat, high-performance sailplane, constructed mainly of composite materials. Registration data indicated that the glider was manufactured in 2011 and was issued an airworthiness certificate on July 27, 2011. The pilot reported that the airframe had accumulated approximately 100 hours total time in-service at the time of the accident.

METEOROLOGICAL CONDITIONS

Weather conditions recorded by the 0E0 Automated Weather Observing System (AWOS), located about 22 miles south-southwest of the accident site, at 1255, were: wind from 230 degrees at 6 knots, visibility 10 miles, scattered clouds at 7,500 feet agl, temperature 21 degrees Celsius, dew point 1 degree Celsius, and altimeter 30.04 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The glider impacted a mesa in rural New Mexico 23 miles and 23 degrees from 0E0. Examination of the glider on-scene revealed that the empennage was partially separated from the tail boom at a point near the leading edge of the vertical stabilizer. The tail boom had a longitudinal split from the point of separation with the tail running forward toward the cockpit. The forward fuselage had crushing damage in the cockpit area. The wings were predominately intact. The left wing had a split in the composite structure on the bottom skin that started from the joint between the removable wing tip running inboard.

The control system was intact except for a break in the right rudder cable at a point where the cable exited the forward exit of the "S"-tube on the adjustable rudder pedals. The rudder pedal assembly and cables were removed for further examination.

ADDITIONAL INFORMATION

Examination of the design configuration revealed that the rudder pedals were mounted on the rudder pedal assembly by sliding the lower pivot tube of the pedal itself onto a smaller diameter tube on the adjustment assembly. The pedal was retained laterally by a large diameter washer and a nut. The retaining nut was an "acorn" style nut and did not have any internal locking capability, nor was any other locking device installed.

Examination of the rudder pedal system from N555AP was conducted by the NTSB Materials Laboratory. The right rudder cable was found to be severed at a location corresponding to the forward exit of the S-tube on the adjustable rudder pedal assembly. The cable was composed of 7 strands, each of which had 19 wires. Eleven (8 percent) of the wires exhibited signatures consistent with overstress failure, and the remaining wires (92 percent) exhibited signatures consistent with fatigue failure due to bending stress. The left rudder cable was also examined and 22 wires were found to be broken. All of the breaks were similar to the fatigue fracture breaks found when examining the right rudder cable.

The exit of the S-tube where the right rudder cable break was located had wear damage consistent with the diameter and location of the rudder cable. The S-tube was welded to the side of the rudder pedal and had cut ends that were not flared. A mockup of the rudder system revealed that with the rudder deflected fully forward, the cable was forced to make a sharp bend at the forward exit of the S-tube. Additionally, the wear pattern noted on the S-tube was consistent with the position of the cable during full deflection.

After the accident, the owner of an exemplar glider, N60VR, examined the rudder control cables on his glider and found that the cables had damage in the same location as on N555AP. The owner of N60VR elected to conduct ground based testing to determine the progressive nature of the rudder cable damage. While in a normal seating position wearing a backpack parachute, the rudder pedals were cycled in one minute intervals, with an observation period between cycles. The study was concluded after two cycles of one minute each, , followed by one cycle of three minutes (a total of five minutes) and it was believed that further cycling would have completely severed the right rudder cable. During the three minute cycle, an increasing lateral movement of the rudder pedals on the rudder pedal shaft was noted. Observation revealed the right side securing nut on the shaft had backed off allowing the rudder pedal to slide laterally on the pivot tube. The owner of N60VR provided documentation of the testing performed including photographs taken during the testing.

The glider manufacturer conducted flight testing to evaluate the flight characteristics of the glider with a simulated break of the right rudder cable. The method employed to simulate the break was to remove the rudder pedal return spring on the right rudder pedal of an exemplar glider, which would allow the rudder to deflect fully to the left if the pilot removed foot pressure from both pedals. If necessary, the test pilot could regain full rudder control at any time by re-applying foot pressure to the rudder pedals. The testing included side-slip and spin evaluations. The spin testing confirmed that the glider could be placed into spin in either direction and recovery accomplished using only control stick movements while the rudder was fully deflected due to the simulated cable break. The exemplar glider was subsequently flown from the testing area to an airport for landing. The glider was reportedly controllable with minimal difficulty with the simulated cable failure. A complete traffic pattern was flown with the simulated failed cable and rudder was only used during the final portion of the landing due to crosswinds at the airport.

In the wake of the accident, Jonker Sailplanes issued one Service Bulletin (SB.JS-007) and three Technical Notes (TN.JS-009, TN.JS-010 and TN.JS-011) pertaining to the rudder control system cables and locking mechanism.

SB.JS-007 specifies regular cable and rudder pedal mechanism inspection intervals and techniques. It refers to TN.JS-009 and TN.JS-010 for instructions in replacing the rudder cables and pedal locking mechanism, respectively.

Finally, TN.SJ-010 specifies the availability of a refined rudder pedal S-tube design, to reduce wear damage to the rudder cables. The new pedal S-tubes exhibit four wear reducing changes:

1) Redesign of the S-tube geometry to reduce the distance from the lower S-tube opening to the pedal axis of rotation
2) Flanges at both openings of the S-tube
3) No cutoff at the lower S-tube opening
4) A tubular nylon lining between the S-tube and the cable

Accident Rpt# WPR14FA188 05/06/2014 1200	**Regis# N6704U**	**Cody, WY**	**Apt: Yellowstone Rgnl COD**	
Acft Mk/Mdl MOONEY M20C	**Acft SN 2436**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360 SERIES		**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: ZIMMERMAN ROBERT LEE	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

On May 6, 2014, about 1200 mountain daylight time, a Mooney M20C, N6704U, collided with mountainous terrain near Cody, Wyoming. The airplane was registered to, and operated by, the owner under the provisions of 14 Code of Federal Regulations Part 91. The private pilot/owner and private pilot rated passenger were presumed to have sustained fatal injuries. The airplane sustained substantial damage to the forward fuselage and both wings. The cross-country personal flight departed Yellowstone Regional Airport, Cody, about 1140, with a presumed destination of Twin Falls, Idaho. Instrument meteorological conditions prevailed at the accident site, and no flight plan had been filed.

Both occupants were brothers, and had departed from Fayetteville, North Carolina, on April 28, in the accident airplane, with the intention of touring the country to visit friends and relatives. Their ultimate destination was the Seattle area, where they had planned on arriving by May 11.

Family members became concerned when they had not heard from both occupants by May 8, and initiated a series of exchanges with various local law enforcement agencies and airport managers throughout the Cody and Twin Falls area. On May 10, still unable to locate the occupants, family members contacted Lockheed Martin Flight Services, and an Alert Notice (ALNOT) was issued. Utilizing radar data provided by the Air Force Rescue Coordination Center, search and rescue personnel from the Park County Office of Homeland Security were able to visually locate the airplane by helicopter in the Shoshone National Forest.

As of the publication of this report, due to the inhospitable nature of the terrain, the accident site was inaccessible to both NTSB and search and rescue personnel.

Accident Rpt# WPR12LA382	**08/31/2012 1050 PDT**	**Regis# N132PC**	**Chelan, WA**	**Apt: N/a**
Acft Mk/Mdl MOONEY M20J		**Acft SN 24-0541**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO360 SER		**Acft TT 3140**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: HARSHMAN MAX M		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot reported that, after departure and during the climb, the engine suddenly stopped producing power. During the forced landing to a paved road, the right wing tip struck a pole and was substantially damaged. Fuel was found onboard the airplane. A postaccident examination of the airplane and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: A loss of engine power during climb for reasons that could not be determined because postaccident examination did not reveal any anomalies that would have precluded normal operation.

Events

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

Findings - Cause/Factor

1. Not determined-Not determined-(general)-(general)-Unknown/Not determined - C
2. Aircraft-Aircraft power plant-Engine (reciprocating)-(general)-Not specified
3. Environmental issues-Physical environment-Object/animal/substance-Pole-Contributed to outcome

Narrative

On August 31, 2012, about 1050 Pacific daylight time, a Mooney M20J, N132PC, sustained substantial damage during a forced landing following a loss of engine power near Chelan, Washington. The commercial pilot, the sole occupant, sustained minor injuries. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the personal local flight, which had originated from Chelan about 20 minutes before the accident. A flight plan had not been filed.

The pilot reported that, after departure, he climbed to about 5,000 feet when the airplane's engine suddenly stopped producing power. He performed a forced landing to a road, and the airplane's right wing impacted a power pole during the gear-up landing. The right wing's outer 4 feet was substantially damaged and nearly separated from the wing.

Postaccident examination of the airframe and engine by a Federal Aviation Administration inspector, and an airframe and power plant mechanic, revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Accident Rpt# CEN14LA234	**05/10/2014 1305 CDT**	**Regis# N563JK**	**San Antonio, TX**	**Apt: Stinson Municipal Airport SSF**
Acft Mk/Mdl MOONEY AIRPLANE CO INC M20TN		**Acft SN 31-0107**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl CONT MOTOR TSIO-550-G			**Fatal 0** **Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name:		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 10, 2014, about 1305 central daylight time, a Mooney M20TN, N563JK, sustained substantial damage during a forced landing after a reported loss of engine power while landing at the Stinson Municipal Airport (SSF), San Antonio, Texas. The private pilot received serious injuries. The airplane was registered to the Chaparral Equipment Leasing LLC and operated by the pilot under the provisions of the 14 Code of Federal Regulations Part 91 as a personal flight. Visual meteorological conditions prevailed at the time of the accident, and a visual flight rules flight plan was filed. The flight departed SSF about 1250 on a local flight.

At 1253, the surface weather observation at SSF was wind variable at 3 knots; sky clear; temperature 30 degrees Celsius (C); altimeter 29.84 inches of mercury.

Accident Rpt# ERA14CA140	**03/01/2014 1750 UTC**	**Regis# N929SC**	**Mayaguez, PR**	**Apt: Eugenio Maria De Hostos TJMZ**
Acft Mk/Mdl PIPER PA 18-150		**Acft SN 18-7909002**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360-C1G			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: YELLOW MEDIA GROUP INC		**Opr dba:**		**Aircraft Fire: NONE**

Summary

According to a written statement provided by the pilot to a Federal Aviation Administration inspector, he performed a three-point landing in the tailwheel equipped airplane. The airplane "bounced two times," and then it veered to the right. According to a written statement from the passenger, the "approach was normal, [but the] problems started after touchdown." The airplane turned to the right, the pilot initiated a go around; however, the left wing rose up, and the airplane "lost control" to the right. The airplane came to rest in the grass on the right side of the runway, and incurred substantial damage to the firewall and fuselage. A postaccident examination of the airplane revealed 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 pilot's loss of directional control of the airplane during landing, which resulted in a runway excursion.

Events

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

Findings - Cause/Factor

1. Aircraft-Aircraft oper/perf/capability-Performance/control parameters-Directional control-Not attained/maintained - C
2. Personnel issues-Task performance-Use of equip/info-Aircraft control-Pilot - C

Narrative

According to a written statement provided by the pilot to a Federal Aviation Administration inspector, he performed a three-point landing in the tailwheel equipped airplane. The airplane "bounced two times," and then it veered to the right. According to a written statement from the passenger, the "approach was normal, [but the] problems started after touchdown." The airplane turned to the right, the pilot initiated a go around; however, the left wing rose up, and the airplane "lost control" to the right. The airplane came to rest in the grass on the right side of the runway, and incurred substantial damage to the firewall and fuselage. A postaccident examination of the airplane revealed no preimpact mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Accident Rpt# WPR14CA109	**01/25/2014 1700 MST**	**Regis# N9683P**	**Willcox, AZ**	**Apt: N/a**
Acft Mk/Mdl PIPER PA 18-150-A150		**Acft SN 18-7509026**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual** **Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES		**Acft TT 3830**	**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: JOHN SMITH		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot reported that he and his father had flown to the accident location to camp and hunt. They made three passes over an open area to find a suitable landing spot. The pilot stated that the grass appeared to be knee-to-hip height, but he believed it was safe to land. He set up for landing, and on the landing rollout, about 20-30 knots, the left main landing gear wheel struck an unseen, large embedded boulder that collapsed the left main landing gear. The airplane's wing sustained substantial damage. The pilot reported 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 pilot's decision to land off airport on unsuitable terrain that resulted in a collision with hidden objects.

Events

1. Landing-landing roll - Collision with terr/obj (non-CFIT)
2. Landing-landing roll - Landing gear collapse

Findings - Cause/Factor

1. Personnel issues-Action/decision-Info processing/decision-Decision making/judgment-Pilot - C
2. Environmental issues-Physical environment-Terrain-Mountainous/hilly terrain-Contributed to outcome
3. Environmental issues-Physical environment-Object/animal/substance-Hidden/submerged object-Contributed to outcome

Narrative

The pilot reported that he and his father had flown to the accident location to camp and hunt. They made three passes over an open area to find a suitable landing spot. The pilot stated that the grass appeared to be knee-to-hip height, but he believed it was safe to land. He set up for landing, and on the landing rollout, about 20-30 knots, the left main landing gear wheel struck an unseen, large embedded boulder that collapsed the left main landing gear. The airplane's wing sustained substantial damage. The pilot reported no preimpact mechanical malfunctions or failures with the airplane that would have precluded normal operation.

Accident Rpt# WPR14CA152 03/30/2014 1015	**Regis# N1952P**	**Wheatland, WY**	**Apt: N/a**
Acft Mk/Mdl PIPER PA 18A-105SPECIAL	**Acft SN 18-4178**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES	**Acft TT 2022**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ROBERT SHEPARD	**Opr dba:**		**Aircraft Fire: NONE**

Narrative

The flight instructor/owner and pilot rated passenger departed the local airport in a tailwheel-equipped airplane, to inspect ranch property and livestock. The flight instructor was in the rear seat of the tandem cockpit airplane. The pilots planned to land in a pasture to check on livestock, and the pilot in the front seat was on the controls. They agreed on a suitable landing area, and during the approach the instructor's forward visibility was limited, and he failed to see that they were carrying excess airspeed and had progressed too far down the airstrip for a normal landing. The front-seat pilot, seeing the end of the airstrip approaching rapidly, applied the brakes sharply. The instructor directed the pilot to "relax" and allow the tail to settle. The brakes abruptly grabbed a second time and the tail came up sharply, causing the propeller to strike the ground. The airplane slid on its nose, veered left, and flipped onto its back. The airplane sustained substantial damage to the fuselage and both wings.

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

Accident Rpt# WPR14LA061 12/05/2013 1500 PST	**Regis# N6595P**	**Fair Oaks, CA**	**Apt: N/a**	
Acft Mk/Mdl PIPER PA 24-250-250	**Acft SN 24-1717**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-540-A1A	**Acft TT 3550**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: MCBRIDE MARK R	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

On December 5, 2013, about 1500 Pacific standard time, a Piper PA-24 airplane, N6595P, sustained substantial damage during an off-airport forced landing within the city limits of Fair Oaks, California. The airplane was being operated by the pilot as a visual flight rules (VFR) personal cross-country flight, under the provisions of 14 Code of Federal Regulations Part 91. The solo pilot received minor injuries. Visual meteorological conditions prevailed, and the pilot was participating in air traffic control (ATC) flight following. The airplane departed the Salinas Airport (KSNS), Salinas, California, about 1400, and was bound for the Auburn Municipal Airport (KAUN), Auburn, California.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on December 9, the pilot stated that he departed Salinas for his home airport in Auburn. He said that he has made the flight on numerous occasions. Typically he departs Salinas Airport, climbs to 6,500 feet above sea level (msl), and requests flight following services. When he gets close enough to see his destination, he requests a descent to 3,500 feet msl, and continues to the destination airport.

The pilot said the flight proceeded normally until he requested the descent to 3,500 feet msl. After being granted the descent, he throttled the engine back to 2,100 rpm, and applied full carburetor heat, and enriched the mixture. Upon reaching 3,500 feet, he pushed the carburetor heat off, and the engine quit. He said he reapplied the carburetor heat, but the engine did not restart. He advised ATC of the situation, and received a heading to Sacramento Mather Airport (KMHR), the closest airport to his position. He said he made the nearly 180 degree turn toward the airport, and continued attempts to restart the engine.

Unable to restart the engine, and apparent that he was not going to reach the airport, the pilot attempted to land in soccer fields at Phoenix Park, Fair Oaks. He did not extend the retracted landing gear. During the landing, the airplane collided with a car, trees and terrain.

The airplane sustained substantial damage to the wings and fuselage. The pilot said he had not experienced any mechanical problems with the airplane prior to the accident.

On December 6, the airplane was examined at the accident site by an FAA air safety inspector, and no mechanical anomalies were found.

An examination of the airplane's maintenance logbooks did not reveal any anomalies or unresolved discrepancies.

An examination of the recovered wreckage was conducted March 28, 2014 by an NTSB air safety investigator. The examination of the engine did not reveal any evidence of any preexisting mechanical malfunction that would have precluded normal operation. A copy of the examination report is contained in the public docket for this accident.

Given the weather conditions at the time of the event, and consulting a Carburetor Icing Chart, it is unlikely carburetor ice was responsible for the engine's loss of power.

Accident Rpt# CEN14CA227	**05/02/2014 1700 CDT**	**Regis# N7308P**	**New Braunfels, TX**	**Apt: N/a**
Acft Mk/Mdl PIPER PA 24-250-250		**Acft SN 24-2483**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual** **Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-540 SERIES			**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ANDERSON AVIATION		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

The pilot with three passengers planned to depart and return on a cross-country flight. The pilot stated that the airplane's left fuel tank was filled to an inch below the collar, and the right fuel tank was filled to two inches below the collar. He estimated that the airplane had 40-45 gallons of fuel on board, with a planned en route time of 57 minutes, and about a 10 knot tailwind. Once at a cruise altitude of 7,500 feet, he set the manifold pressure at 21 inches and engine rpm at 2,300 for a fuel burn of 12.3 gallons/hr per the pilot operating handbook. The pilot reported for the return leg he again visually checked the fuel level in each tank. He estimated 12-15 gallons in the left tank and 10 in the right, for a total of 22-25 gallons. The pilot added that fuel burn seemed normal and he decided not to add fuel, he also stated that estimations are not an accurate science and that a fuel stick was not provided to confirm the fuel level. After departing for the return flight, he switched fuel tanks from the left side to the right side. About 15 minutes later, the pilot noticed a reduction in power and switched back to the left side fuel tank. Engine power was restored, and the pilot stated that he did not feel that the fuel had been exhausted from the right side based on his calculations. A few minutes later, the engine lost power and the pilot preformed a forced landing to a construction site. A post-crash examination of the airplane revealed substantial damage to the airplane's fuselage and left wing during the forced landing. Additionally, the Federal Aviation Administration inspector reported that the fuel tanks were empty and were not breached in the accident.

Accident Rpt# CEN14CA209 04/21/2014 730 EDT	**Regis# N405S**	**Put In Bay, OH**	**Apt: N/a**
Acft Mk/Mdl PIPER PA 28-181-181	**Acft SN 2890015**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O&VO-360 SER	**Acft TT 8599**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 135**
Opr Name: GRIFFING FLYING SERVICE	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot and three passengers were on a short cross-country flight. As they approached their destination airport and while on final approach, the airplane collided with a goose. The pilot was able to land the airplane uneventfully. Examination of the airplane revealed substantial damage to the outer section of the right wing.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: An inflight collision with a goose while on an approach.

Events

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

Findings - Cause/Factor

1. Environmental issues-Physical environment-Object/animal/substance-Animal(s)/bird(s)-Not specified - C

Narrative

The pilot and three passengers were on a short cross-country flight. As they approached their destination airport and while on final approach, the airplane collided with a goose. The pilot was able to land the airplane uneventfully. Examination of the airplane revealed substantial damage to the outer section of the right wing.

Accident Rpt# CEN14LA245 05/19/2014 930 MDT	**Regis# N9631C**	**Yuma, CO**	**Apt: Yuma Municipal Airport 2V6**
Acft Mk/Mdl PIPER PA 28-181-181	**Acft SN 28-7890431**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360		**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: HEARTLAND AVIATION INC.	**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 19, 2014, about 0930 mountain daylight time, a Piper model PA-28-180 airplane, N9631C, was substantially damaged when it departed the runway during takeoff at Yuma Municipal Airport (2V6), Yuma, Colorado. The student pilot was not injured. The airplane was registered to and operated by Heartland Aviation Incorporated under the provisions of 14 Code of Federal Regulations Part 91 without a flight plan. Day visual meteorological conditions prevailed for the student solo cross-country flight that was destined for Alliance Municipal Airport (AIA), Alliance, Nebraska.

The student pilot reported that after referencing the airport windsock, he decided to takeoff using runway 16 (4,200 feet by 75 feet, concrete). He stated that before achieving rotation speed, the airplane encountered a wind gust that raised the right wing. He was unable to correct for the wind gust before the airplane departed the left side of the runway and descended into a drainage ditch. The airplane lower fuselage and engine mount sustained substantial damage when the nose gear collapsed. The pilot reported no preaccident mechanical malfunctions or failures with the airplane that would have precluded normal operation.

At 0932, a local weather station, located in Yuma, Colorado, reported the wind direction was from 001 degrees at 18 knots, with 26 knot gusts.

The nearest aviation weather reporting station was at the Wray Municipal Airport (2V5), located about 25 miles east of the accident site. At 0935, the 2V5 weather observing system reported: wind from 340 degrees at 18 knots, gusting 24 knots; 10 miles visibility; clear sky conditions; temperature 23 degrees Celsius; dew point 10 degrees Celsius; and an altimeter setting of 29.70 inches-of-mercury.

Accident Rpt# WPR11LA318	**07/08/2011 1315 PDT**	**Regis# N4901Z**	**Frazier Park, CA**	**Apt: N/a**	
Acft Mk/Mdl PIPER PA-22-108		**Acft SN 22-8486**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-235-C1B		**Acft TT 5325**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: JOHN THOMASON		**Opr dba:**		**Aircraft Fire: NONE**	

Summary

The pilot reported that, during the flight, he was following an interstate highway and that he then turned west to intercept a state highway and head toward his destination. He was flying about 1,000 feet above mountainous terrain when he became lost and disoriented while trying to navigate using maps and GPS. He then thought that the airplane was losing altitude. Subsequently, he concentrated on the terrain rather than direction, decided to make an off-airport landing, and landed the airplane in a dry river bottom. During the landing roll, the nosewheel dug into soft dirt, and the airplane nosed over. Postaccident engine and airframe examinations revealed no evidence of preimpact mechanical malfunctions or failures that would have precluded normal operation.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's geographic disorientation, which resulted in an off-airport precautionary landing in soft terrain and a subsequent nose over.

Events

1. Landing-landing roll - Off-field or emergency landing
2. Landing-landing roll - Nose over/nose down

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Use of charts-Pilot - C
2. Personnel issues-Psychological-Perception/orientation/illusion-Geographic disorient (lost)-Pilot - C
3. Environmental issues-Physical environment-Runway/land/takeoff/taxi surface-Soft-Contributed to outcome

Narrative

On July 8, 2011, about 1315 Pacific daylight time, a Piper PA-22-108, N4901Z, nosed over during an off airport precautionary landing near Frazier Park, California. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The private pilot and one passenger were not injured; the airplane sustained substantial damage from impact forces. The personal cross-country flight departed Los Banos, California, about 1030, with a planned destination of Lompoc, California. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot stated that he had been following Interstate 5, and then turned to the west to intercept Highway 166 to Santa Maria, California. He thought that the airplane was losing lift, and decided to land in a dry river bottom. During the landing roll, the nose wheel dug into soft dirt, and the airplane nosed over.

In a subsequent statement, the pilot stated that he was flying about 1,000 feet above the mountainous terrain. He thought that the engine was running fine, but not producing the power needed for the airplane to maintain altitude. He concentrated on the terrain rather than direction. The mixture was in the full rich position; he did not lean it, and did not recall using carburetor heat. He decided to make an off airport landing. The pilot circled a road, but was not comfortable with landing on it, and decided to land in a dry river bottom next to the road.

The Ventura County Sheriff responded to the accident site. The pilot told the responding deputy that he became lost and disoriented over Lockwood Valley using maps and a global positioning satellite system (GPS) to navigate. The pilot stated that the engine began to fail, and he attempted to make an emergency landing when the engine finally quit. The pilot attempted to land on Lockwood Valley road, but was unable to do so and he landed in the river bed.

Investigators examined the wreckage at Aircraft Recovery Service, Littlerock, California, on July 11, 2011. Detailed examination notes are part of the public docket. Postaccident examination of the engine and airframe revealed no evidence of preimpact mechanical malfunction for failure that would have precluded normal operation.

Accident Rpt# CEN12FA164	**02/20/2012 1936 CST**	**Regis# N7147P**	**Albany, TX**	**Apt: N/a**
Acft Mk/Mdl PIPER PA-24-250		**Acft SN 24-2312**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-540 SERIES		**Acft TT 4857**	**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: DALE L PHILLIPS JR		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

HISTORY OF FLIGHT

On February 20, 2012, about 1936 central standard time, a Piper PA-24-250 single-engine airplane, N7147P, impacted terrain near Albany, Texas. The private pilot and passenger were fatally injured. The airplane was substantially damaged. The airplane was registered to Baga Air, Inc., and operated by a private individual under the provisions of 14 Code of Federal Regulations Part 91 as a personal flight. Dark night visual meteorological conditions prevailed and no flight plan was filed. The flight departed Abilene Regional Airport (ABI), Abilene, Texas, at 1920, and was destined for the University of Oklahoma Westheimer Airport (OUN), Norman, Oklahoma.

The airplane had climbed to cruise altitude and was level at 9,500 feet mean sea level (msl). About three minutes later the pilot made a radio call that he needed to return to ABI because he had lost suction and his attitude indicator. The controller cleared the airplane to return to ABI. Radar data showed the airplane made a climbing turn to the right and the airplane then descended rapidly. Radar and radio contact was lost about 1936.

The wreckage was found the next morning. Ground and airplane impact signatures showed evidence of a nearly vertical nose down collision with terrain. The outboard section of the right wing and the right aileron were found about one mile southeast from the main wreckage.

PERSONNEL INFORMATION

The pilot, age 48, held a private pilot certificate with a rating for airplane single land which was initially issued on April 10, 2007. He was most recently issued a third class airman medical certificate, with limitations, on May 10, 2010.

The pilot's logbook showed entries beginning on June 7, 1994, with the last entry on February 1, 2012. An endorsement showed a flight review was completed on July 25, 2011, and a high-performance endorsement was entered on December 4, 2008. A review of the logbook showed that that pilot had logged 502.0 hours of total flight experience in single engine airplanes, with about 186 hours of flight experience in Piper PA-24 airplanes.

The pilot had logged 68.0 hours of night flight experience. During the previous 15 flights logged between ABI and OUN, 12 of the flights were logged as night flights.

The pilot had logged a total 3.6 hours of flight instruction in simulated instrument conditions. The logbook did not contain a listing of any instrument flights more recently than December 31, 2006.

AIRCRAFT INFORMATION

The four-seat, low-wing, retractable landing gear, single engine airplane, serial number (s/n) 24-2312, was manufactured in 1960. It was equipped with a 250-horsepower Lycoming model O-540-E4B5 engine, s/n L-20394-40A, which drove a Hartzell, model HC-C3YR-1RF, 3-blade metal alloy propeller, s/n DY-4365-A.

A review of the airframe logbooks and engine logbooks showed an entry dated July 4, 2011, which certified that an annual inspection had been completed at 4,800.1 total aircraft hours.

The most recent airframe logbook entry was made on December 15, 2011, at an aircraft total time of 4854.4 hours, when engine, s/n L-20394-40A, was installed on the accident airplane. At that time, the engine had accumulated 2794.8 hours, with 636.8 hours since its most recent overhaul.

Engine logbook entries showed that engine, s/n L-20394-40A had previously been installed on N33033, a Piper PA-32-260 airplane, until N33033 was damaged

by a hurricane about October 19, 2005. The damaged airplane was later sold as scrap. Maintenance records for N33033 showed that an overhauled vacuum pump, Airborne part number 211CC, s/n 1706, which was overhauled on December 16, 1999, was installed on engine serial number L-20394-40A on January 21, 2000. There were no other airframe logbook entries or engine logbook entries for N33033 which mentioned a vacuum pump. Based on a review of the maintenance records for N33033 and the engine logbook entries, the total hours of operation of vacuum pump, s/n 1706, were estimated as about 636 hours, for the period from January 21, 2000 until October 19, 2005

At the time of the accident N7147P had been operated an additional 3.2 hours following the engine installation on December 15, 2011. This estimate was based on a review of the pilot's logbook which showed a flight of 1.4 hours on January 29, 2012, a flight of 1.5 hours on February 1, 2012, and an estimated 0.3 hours of operation during the accident flight on February 20, 2014.

At the time of the accident the airplane had an estimated aircraft total time of 4857.6 hours, and vacuum pump, s/n 1706, had been operated for more than 12 calendar years and an estimated total of about 639 hours since overhaul.

The accident airplane was also equipped with an S-TEC System 60 two axis autopilot with an optional electric pitch trim actuator, and a vacuum driven attitude gyro and vacuum driven directional gyro.

METEOROLOGICAL INFORMATION

At 1852, the automated weather observation station at ABI reported wind from 300 degrees at 12 knots, visibility 3 miles in haze and blowing dust, skies clear below 12,000 feet, temperature 14 degrees Celsius (C), dew point temperature -11 degrees C, altimeter 30.03 inches of Mercury.

Data from the United States Naval Observatory indicated that Sunset occurred at 1827, and Moonset occurred at 1734. At the time of the accident both the Sun and the Moon were more than 14 degrees below the horizon and provided no illumination.

A pilot report in the general area showed the reported cloud tops were as high as 12,000 feet msl with the dust tops to 12,000 feet msl.

A pilot operating his aircraft in the vicinity indicated that flight visibility was marginal at best, and indicated that the area was impacted with blowing dust with an estimated in-flight visibility of 1 to 3 miles. The pilot indicated that he could only faintly see ground lights, but at times could not distinguish between ground and sky.

A medical helicopter pilot operating in the area at the time of the accident reported that he was operating with his night vision goggles due to the dark nighttime conditions, and that even with the night vision goggles the dust and lack of surface lights restricted his view of any sense of horizon and made flying under visual meteorological conditions very difficult.

COMMUNICATIONS AND RADAR

Following is a timeline of selected communications between the pilot of N7147P and Federal Aviation Administration (FAA) Air Traffic Control (ATC). A summary of the FAA ATC radar contacts is included.

1920: the controller cleared N7147P cleared for takeoff from runway 35L at ABI

1921:31: N7147P reported he was at 2,600 feet and was climbing to 9,500 feet

1931:38: radar showed N7147P was at a transponder reported altitude of 9,500 feet

1933:49: radar showed N7147P was at a transponder reported altitude of 9,700 feet and began a slight change in flight track to the right.

1933:55: N7147P requested to return to Abilene

1934:04: N7149P reported "we've lost our suction and our attitude indicator"

1934:20: the controller responded and gave clearance to return to Abilene

1934:52: radar showed that N7147P's rate of right turn increased.

1935:10: radar showed that N7147P was at 9,300 feet and the remainder of the radar returns showed an erratic flight path

1935:30: radar showed N7147P was at a transponder reported altitude of 10,300 feet, and it then began descending

1935:38: the controller asked N7149P to verify that he was "VFR"

1935:43: N7147P reported "affirmative we are v f r but we are having trouble four seven ." (there was a change in the sense of urgency noted in the voice of the pilot and the end of the transmission was cut off)

1935:46: the controller responded giving the location of the nearest airport, however there were no further communications received from N7147P

1936:14: radar showed N7147P was at a transponder reported altitude of 5,300 feet

1936:23: the last radar return showed N7147P was at a transponder reported altitude of 3,600 feet

Radar contact was then lost.

WRECKAGE AND IMPACT INFORMATION

The main wreckage impacted on a rock exposed area in remote rolling terrain at an estimated elevation of 1,507 feet above mean sea level (msl). The impact crater and damage to the airframe was consistent with a nearly vertical impact angle. There was evidence of a fuel spill at the scene; however there was no postimpact fire.

The airframe was compressed from the engine aft to the empennage area with extensive fragmentation of many of the parts. The attitude of the airframe at the time of impact was also confirmed by an impact depression of the left wing and wingtip in the ground. Evidence of ground impact was noted on the stabilator balance tube displacing the balance weight aft on the tube and cutting one of the primary cables. All major components at the main wreckage showed evidence of impact crushing damage.

The left wing was fragmented and was found at the main crash site with the left flap and aileron. The leading edge displayed compression impact damage along the entire leading edge that penetrated aft to the trailing edge of the wing.

The position of the flap, as indicated by the wing trailing edge impression on the flap, was consistent with a retracted position. The aileron control and balance cables were both secure to the bellcrank, but the attach fitting was impact broken and the cables were pulled inboard. The balance cable was continuous to the right side and the control cable was continuous to the forward cockpit where it had been impact separated. The control wheel chain was broken and fragmented. The flap control cables were secure to the bellcrank, but the bellcrank was impact broken and the cables were pulled inboard.

The landing gear was observed in the retracted position.

The separated outboard section of the right wing, including the aileron, balance weight and bellcrank assembly, was found about one mile southeast from the main crash site. Examination of the separation surfaces showed a positive, or upward direction, overload separation with no evidence of preimpact corrosion or fatigue.

The right aileron was partially attached and the center mounted balance weight was in place. The control rod was separated. The aileron bellcrank was in place and both control cable attach points were broken off. The cable ends, with the bellcrank parts, were found with the inboard section of the wing.

The inboard section of the right wing was found with the main wreckage. The wing displayed impact compression damage from the leading edge aft to the flap area. The flap displayed impact damage from the upper wing skin which was consistent with a retracted flap position at the time of impact. The flap control cables were secure to the bellcrank but the bellcrank was impact broken and the cables were pulled inboard.

The empennage section was found on top of the fuselage and displayed impact compression damage. There were impact signatures consistent with ground impact most notably to the right side vertical stabilizer which also separated the right side of the stabilator. The stabilator torque tube and horn assembly were in place and secure. The balance tube was secure but displayed impact damage to the front end and the balance weight had been displaced to the aft. The lower stabilator control cable had been impact separated from the attach fitting at the balance bar. The upper stabilator control cable was secure to the balance bar. Both stabilator cables were continuous to the forward cockpit area behind the instrument panels. The right side of the stabilator was not identified at the crash site.

The stabilator trim drum upper extension measured about 0.6 inches, which corresponds to a nose up setting of about 3 degrees of the available 13 degrees of nose up trim.

The fuselage was substantially compressed and fragmented. The engine had penetrated aft into the forward cabin area and most of the cockpit instruments had extensive impact damage.

The flap handle was broken and bent. The nose gear was in the retracted position. The landing gear emergency extension mechanism was broken and the electric drive motor gear separated. The emergency locator transmitter (ELT) was separated from the mount, fragmented and did not operate. The ELT switch was in the "ARM" position.

The engine was impact damaged and was fragmented. About 10 inches of the crankshaft remained secure to the propeller hub. The sump was fragmented and no data plate was recovered. The engine s/n observed on the top front portion of the case was L-20394-40A.

The propeller was mostly buried in the impact crater beneath the engine with one blade exposed. During wreckage retrieval the propeller was examined. Propeller blade A was secure in the hub and was bent aft from the root about 20 degrees with S bending along the full length of the blade. The leading edge had numerous substantial dents and gouges and the front of the blade displayed numerous chordwise scratches. Blade B was secure in the hub and bent aft from the root area about 10 to 15 degrees. The blade tip was separated about 10 inches from the tip and was found adjacent to the blade in the impact crater. The blade displayed substantial leading edge dents and gouges as well as chordwise scratches. Blade C was separated from the propeller hub at the blade root. The blade was bent aft and also showed twisting toward low pitch. The blade displayed leading edge dents and gouges as well as chordwise scratches.

A handheld GPS device, an engine driven vacuum pump, and two gyroscopic instruments were removed for laboratory examination. The on-scene examination of the remaining components from the airframe, engine, and propeller revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Tarrant County Medical Examiner in Fort Worth, Texas. The cause of death was listed as "Massive blunt force trauma of body due to light aircraft crash (PILOT)".

Forensic toxicology was performed on specimens from the pilot by the Federal Aviation Administration (FAA), Aeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma.

The toxicology report stated: NO DRUGS detected in Liver.

FAA records showed the pilot's most recent Third-Class Limited Medical Certificate was issued on May 10, 2010, with a restriction: "must wear corrective lenses, possess glasses for near / intermediate vision". At that time the pilot reported that he was taking no medications.

TESTS AND RESEARCH

Handheld GPS Device:

A fragmented and impact damaged Garmin Aero handheld GPS device was removed from the wreckage and was examined at the NTSB vehicle recorder division in Washington, DC

The flash memory device was missing and no data was recovered.

Vacuum Pump:

The vacuum pump and drive spline assembly were removed from the wreckage and examined at the NTSB materials laboratory in Washington, DC. Within the vacuum pump drive spline assembly, the internal shear coupler, which connects the internal spline drive with the external spline drive, exhibited thermal damage such as melting. The thermal damage to the coupler material was consistent with continued engine rotation after the coupler fractured.

A fracture initiation location was found along an area where the reduced section of the inner coupler shaft meets a flange. Under magnification, some areas of flat fracture features were also noted, that were consistent with a fatigue fracture; however, missing material and the thermal damage to the existing shaft material, prevented a definitive determination of the failure mode.

Directional Gyro and Attitude Gyro:

Portions of the directional and attitude gyros were removed from the wreckage and examined at the NTSB materials laboratory in Washington, DC.

The directional gyro did not exhibit circumferential scoring. The inside of the gyro contained impressions on the case.

The attitude gyro exhibited circumferential scoring on both the case and gyro.

ADDITIONAL INFORMATION

According to FAA Advisory Circular 60-4A "Pilot's Spatial Disorientation," "Surface references and the natural horizon may at times become obscured, although visibility may be above visual flight rule minimums. Lack of natural horizon or surface reference is common on over-water flights, at night, and especially at night in extremely sparsely populated areas or in low visibility conditions. A sloping cloud formation, an obscured horizon, a dark scene spread with ground lights and stars, and certain geometric patterns of ground lights can provide inaccurate visual information for aligning the aircraft correctly with the actual horizon. The disoriented pilot may place the aircraft in a dangerous attitude."

". tests conducted with qualified instrument pilots indicated that it can take as long as 35 seconds to establish full control by instruments after a loss of visual reference of the earth's surface. AC 60-4A further states that surface references and the natural horizon may become obscured even though visibility may be above VFR minimums and that an inability to perceive the natural horizon or surface references is common during flights . at night, in sparsely populated areas, and in low-visibility conditions".

According to the FAA "Instrument Flying Handbook", FAA-H-8083-5B, "One possible cause of instrument failure is a loss of the suction or pressure source. This pressure or suction is supplied by a vacuum pump mechanically driven off the engine. Occasionally these pumps fail, leaving the pilot with inoperative attitude and heading indicators . that can fail progressively. As the gyroscopes slow down, they may wander, which, if connected to the autopilot . can cause incorrect movement or erroneous indications (which) the pilot may misinterpret . and transform a normally benign situation into a hazardous situation ... with the potential to lead the unsuspecting pilot into a dangerous unusual attitude that would require a partial panel recovery. It is important that pilots practice instrument flight without reference to the attitude and heading indicators in preparation for such a failure".

"An obscured horizon . a dark scene spread with ground lights and stars . can provide inaccurate visual information, or false horizon, for aligning the aircraft correctly with the actual horizon. The disoriented pilot may place the aircraft in a dangerous attitude".

"In moderate unusual attitudes, the pilot can normally reorient by establishing a level flight indication on the attitude indicator. However, the pilot should not depend on this instrument if . its upset limits may have been exceeded or it may have become inoperative due to mechanical malfunction ... As soon as the

unusual attitude is detected, the recommended recovery procedures . should be initiated by reference to the ASI, altimeter, VSI, and turn coordinator".

According to the FAA "Airplane Flying Handbook", FAA-H-8083-3A, "The pilot should remember, that unless (instrument flying) tasks are practiced on a continuing and regular basis, skill erosion begins almost immediately. In a very short time, the pilot's assumed level of confidence will be much higher than the performance he or she will actually be able to demonstrate should the need arise".

"A VFR pilot is in IMC conditions anytime he or she is unable to maintain airplane attitude control by reference to the natural horizon, regardless of the circumstances or the prevailing weather conditions. (This situation) must be accepted by the pilot involved as a genuine emergency, requiring appropriate action".

Service Letter Number: 52A, issued on March 23, 2006, by the Nichols Airborne Division - Parker Hannifin Corporation, stated that Airborne air pumps with any model number beginning with 200 through 216 must not be operated beyond the mandatory replacement time of "500 aircraft hrs. or 6 years from date of manufacture, whichever comes first". The service letter continued with the following caution: "WARNING: Failure of the air pump will result in the loss of the pneumatically powered gyro flight instruments."

Service Letter Number: 66, issued on January 21, 2007, by the Nichols Airborne Division - Parker Hannifin Corporation, stated that Airborne air pumps with any model number beginning with 200 through 216 must not be overhauled or repaired. The service letter continued with the following caution: "SAFETY WARNING: . FAILURE OF AN OVERHAULED OR RECONDITIONED PARKER/AIRBORNE PNEUMATIC COMPONENT ESPECIALLY WHILE FLYING IN INSTRUMENT METEOROLOGICAL CONDITIONS (IMC) CAN LEAD TO SPATIAL DISORIENTATION OF THE PILOT AND SUBSEQUENT LOSS OF AIRCRAFT CONTROL RESULTING IN DEATH, BODILY INJURY OR PROPERTY DAMAGE. OVERHAULED OR RECONDITIONED PARKER/AIRBORNE PNEUMATIC COMPONENTS MUST NOT BE USED AND MUST BE REPLACED IMMEDIATELY... "

Service Letter Number: 72, issued on February 15, 2008, by the Nichols Airborne Division - Parker Hannifin Corporation, stated "All Parker/Airborne Engine Driven Air Pumps are beyond their Mandatory Replacement time and must be removed from service".

Accident Rpt# CEN14LA203	**04/19/2014 1236 EDT**	**Regis# N38240**	**Kalamazoo, MI**	**Apt: Newman's Airport 4N0**
Acft Mk/Mdl PIPER PA-28-140		**Acft SN 28-7725271**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-320-E2D			**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ROBERT I. GOODWIN		**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot said he was attempting to land on runway 18 "in variable crosswinds with gusty conditions. [There] may have been wind shear or tailwinds involved." He said the airplane stalled at low altitude (5 to 8 feet above the runway) and landed hard on the overrun for runway 36. The pilot reported no mechanical issues with the airplane. The fuselage was buckled, the empennage was bent down, and the left wing upper skin was deformed.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: An inadvertent stall during gust crosswind conditions.

Events

1. Approach-VFR pattern final - Loss of control in flight
2. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
2. Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Contributed to outcome
3. Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Contributed to outcome

Narrative

The pilot said he was attempting to land on runway 18 "in variable crosswinds with gusty conditions. [There] may have been wind shear or tailwinds involved." He told a Federal Aviation Administration (FAA) inspector that the airplane stalled at low altitude (5 to 8 feet above the runway) and landed hard on the overrun for runway 36. The pilot reported no mechanical issues with the airplane. The FAA inspector reported the fuselage was buckled, the empennage was bent down, and the left wing upper skin was deformed.

Accident Rpt# WPR13LA262 06/04/2013 930 PDT	**Regis# N5808U**	**Burlington, WA**	**Apt: Skagit Regional Airport BVS**	
Acft Mk/Mdl PIPER PA-28-140	**Acft SN 28-26637**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES	**Acft TT 3479**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: MORRISSEY WILLIAM T TRUSTEE	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

On June 4, 2013, at about 0930 Pacific daylight time, a Piper PA-28-140, N5808U, was substantially damaged when it struck an airport sign following a loss of directional control during landing roll at Skagit Regional Airport, Burlington, Washington. The private pilot, the sole occupant, was not injured. The pilot/owner was operating the airplane under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the personal cross-country flight, which had originated from Friday Harbor, Washington, approximately 20 minutes before the accident. A flight plan had not been filed.

The pilot said that while on landing roll, he applied left rudder to straighten the airplane, with no response. He said he attempted to correct the right veering tendency with left braking action, and that was ineffective as well. The airplane departed the right side of the runway and impacted an airport sign and a ditch, which damaged the right wing.

Postexamination of the left rudder control bar found that it had failed. Examination of the rudder control bar at the NTSB Materials Laboratory found a fatigue crack, which originated from the edge of a weld. There was a rusted brown oxidized area near the middle of the crack, and the surface of this area had topography and crack patterns consistent with slow growth fatigue progressing from the exterior surface radially through the tube wall.

The airplane was manufactured in 1970, and according to the owner, it had an airframe total time of 3,479 hours when the accident occurred. The most recent annual inspection was completed on May 25, 2013.

A review of the Piper Aircraft's periodic inspection checklist, maintenance manual, and Service Letter No. 671 dated October 5, 1973, indicated that the rudder bar assembly should be inspected every 100 hours specifically for cracks in the area where the airplane's rudder bar failed. Further, the Service Letter stated that these periodic inspections could be discontinued if two reinforcement doublers were fabricated and welded to the rudder bar in the affected area. There were no reinforcement doublers on the airplane's rudder bar.

Accident Rpt# CEN14CA203	**04/19/2014 1236 EDT**	**Regis# N38240**	**Kalamazoo, MI**	**Apt: Newman's Airport 4N0**
Acft Mk/Mdl PIPER PA-28-140		**Acft SN 28-7725271**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-320-E2D		**Acft TT 4154**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: ROBERT I. GOODWIN		**Opr dba: ADVENTURE AIR AVIATION**		**Aircraft Fire: NONE**

Summary

The pilot said he was attempting to land on runway 18 "in variable crosswinds with gusty conditions. [There] may have been wind shear or tailwinds involved." He said the airplane stalled at low altitude (5 to 8 feet above the runway) and landed hard on the overrun for runway 36. The pilot reported no mechanical issues with the airplane. The fuselage was buckled, the empennage was bent down, and the left wing upper skin was deformed.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: An inadvertent stall during gust crosswind conditions.

Events

1. Approach-VFR pattern final - Loss of control in flight
2. Uncontrolled descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Action/decision-Action-Delayed action-Pilot - C
2. Environmental issues-Conditions/weather/phenomena-Wind-Crosswind-Contributed to outcome
3. Environmental issues-Conditions/weather/phenomena-Wind-Gusts-Contributed to outcome

Narrative

The pilot said he was attempting to land on runway 18 "in variable crosswinds with gusty conditions. [There] may have been wind shear or tailwinds involved." He told a Federal Aviation Administration (FAA) inspector that the airplane stalled at low altitude (5 to 8 feet above the runway) and landed hard on the overrun for runway 36. The pilot reported no mechanical issues with the airplane. The FAA inspector reported the fuselage was buckled, the empennage was bent down, and the left wing upper skin was deformed.

Accident Rpt# ERA12LA355B 05/22/2012 2200 EDT	**Regis# N602FT**	**Melbourne, FL**	**Apt: Melbourne International MLB**
Acft Mk/Mdl PIPER PA-28-161	**Acft SN 2841196**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-320-D3G	**Acft TT 17077**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: F I T AVIATION LLC	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot of N602FT reported that, while holding short of the runway waiting for departure, he noticed another airplane stop behind his airplane. A few seconds later, the airplane was struck from behind by N47749. N602FT's position, landing, and strobe lights were illuminated when the accident occurred. ♂

The pilot of N47749 reported that he was number three for departure behind N602FT. While the pilot was looking at the tachometer, the airplane slowly moved forward, struck N602FT, and severed the outer 2 feet of the left outboard portion of N602FT's horizontal stabilator. The pilot realized after the collision that he had not set the parking brake. He thought that his feet were on the brake pedals but that he did not put "much pressure" on them before the crash.

Postaccident examination of N47749's brake system did not reveal evidence of any preimpact failure or malfunction that would have precluded normal operation. When actuated, both the toe brakes and the parking brake were functional.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of the pilot of another airplane to set the parking brake and to maintain a proper visual lookout, which resulted in an on-ground collision.

Events

1. Standing-engine(s) operating - Ground collision

Findings - Cause/Factor

1. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot of other aircraft - C
2. Personnel issues-Action/decision-Action-Incorrect action performance-Pilot of other aircraft - C
3. Personnel issues-Psychological-Attention/monitoring-Task monitoring/vigilance-Pilot of other aircraft - C

Accident Rpt# ERA12LA355A 05/22/2012 2200 EDT	**Regis# N47749**	**Melbourne, FL**	**Apt: Melbourne International MLB**
Acft Mk/Mdl PIPER PA-28-161	**Acft SN 28-7816131**	**Acft Dmg: MINOR**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING 0-320-D3G	**Acft TT 7174**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: FIT AVIATION LLC	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot of N602FT reported that, while holding short of the runway waiting for departure, he noticed another airplane stop behind his airplane. A few seconds later, the airplane was struck from behind by N47749. N602FT's position, landing, and strobe lights were illuminated when the accident occurred. ♂
The pilot of N47749 reported that he was number three for departure behind N602FT. While the pilot was looking at the tachometer, the airplane slowly moved forward, struck N602FT, and severed the outer 2 feet of the left outboard portion of N602FT's horizontal stabilator. The pilot realized after the collision that he had not set the parking brake. He thought that his feet were on the brake pedals but that he did not put "much pressure" on them before the crash. Postaccident examination of N47749's brake system did not reveal evidence of any preimpact failure or malfunction that would have precluded normal operation. When actuated, both the toe brakes and the parking brake were functional.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The pilot's failure to set the parking brake and to maintain a proper visual lookout, which resulted in an on-ground collision with another airplane.

Events

1. Standing-engine(s) operating - Loss of control on ground
2. Standing-engine(s) operating - Ground collision

Findings - Cause/Factor

1. Aircraft-Aircraft systems-Landing gear system-Landing gear brakes system-Incorrect use/operation - C
2. Personnel issues-Task performance-Use of equip/info-Use of equip/system-Pilot - C
3. Personnel issues-Action/decision-Action-Incorrect action performance-Pilot - C
4. Personnel issues-Psychological-Attention/monitoring-Task monitoring/vigilance-Pilot - C

Narrative

HISTORY OF FLIGHT

On May 22, 2012, about 2200 eastern daylight time, a Piper PA-28-161, N602FT, was substantially damaged when it was struck from behind by a Piper PA-28-161, N47749, while holding short on taxiway Alpha behind another airplane, at Melbourne International Airport (MLB), Melbourne, Florida. Both airplanes were operated by FIT Aviation LLC. The certificated flight instructor and certificated private pilot in N602FT, and the certificated private pilot in N47749 were not injured. Night visual meteorological conditions prevailed, and no flight plans were filed for the instructional flights operated under Title 14 Code of Federal Regulations (CFR) Part 91.

According to the flight instructor in N602FT, he and his student were stopped behind a Cessna who was holding short of runway 9R on taxiway Alpha. The flight instructor noticed another airplane stop behind them while they were waiting for departure. A few seconds later they were struck from behind. Their position lights, landing light, and strobe lights were illuminated when the accident occurred.

According to the private pilot in N47749, he was "dispatched" about 2120 eastern daylight time. He had completed his takeoff and landing data card and then did a preflight inspection of N47749. After entering the airplane and starting the engine, he then taxied to the designated run-up area where he performed the "Ground Check" checklist. Upon contacting ground control he received instructions to taxi to runway 9R via taxiway Charlie and Alpha. He then began to taxi N47749 to the assigned runway. He was number three for departure behind N602FT, which was stopped behind a Cessna which was also operated by the flight school and was first for departure. He stopped behind N602FT and set the parking brake and then looked at the tachometer to set 1,000 revolutions per minute (rpm). The airplane then slowly moved forward and struck N602FT.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) and FIT Aviation records, the private pilots in both airplanes were enrolled in FIT Aviation's commercial pilot

certification course. The flight instructor in N602FT was employed by FIT Aviation.

The private pilot in N47749, held a private pilot certificate with a ratings for airplane single-engine land, and instrument airplane. His most recent FAA second-class medical certificate was issued on June 30, 2011. He reported 137 total hours of flight experience, 46 of which were in the accident airplane make and model.

The private pilot in N602FT, held a private pilot certificate with a ratings for airplane single-engine land, and instrument airplane. His most recent FAA second-class medical certificate was issued on July 6, 2011. He reported 155 total hours of flight experience, 76 of which were in the accident airplane make and model.

The flight instructor in N602FT held a commercial pilot certificate with ratings for airplane single-engine land, multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single-engine and instrument airplane. His most recent FAA first-class medical certificate was issued on June 1, 2011. He reported 782 total hours of flight experience, 738 of which were in single engine airplanes.

AIRCRAFT INFORMATION

Both airplanes involved in the accident were single-engine, four seat, low-wing monoplanes, of conventional metal construction. They were powered by carbureted, 160 horsepower, four cylinder, air cooled, direct drive, engines.

Their wings were of an all-metal, stressed-skin, fully cantilevered design, consisting of two wing panels bolted to a spar box assembly in the fuselage. The ailerons were controlled through cables and pushrods, and were dynamically balanced. The trailing edge wing flaps were manually operated.

Their empennages consisted of a vertical stabilizer; rudder, dynamically balanced stabilator, and stabilator trim tabs.

Their tricycle type landing gear was of a fixed type and consisted of shock absorbing air-oil type oleo struts.

Their two main landing gear wheels were equipped with a single disc hydraulic brake assembly which was actuated by individual cylinders attached to each rudder pedal, or by a hand lever. The hand lever also doubled as a parking brake.

According to FAA and maintenance records, N47749 was manufactured in 1977. The airplane's most recent 100 hour inspection was completed on April 30, 2012. At the time of the inspection, the airplane had accrued 7,174 total hours of operation.

According to FAA and maintenance records, N602FT was manufactured in 1989. The airplane's most recent 100 hour inspection was completed on April 30, 2012. At the time of the inspection, the airplane had accrued 17,077 total hours of operation.

METEOROLOGICAL INFORMATION

The reported weather at MLB, at 2127, included: winds 190 degrees at 9 knots, 10 miles visibility, sky clear, temperature 26 degrees C, dew point 21 degrees C, and an altimeter setting of 29.93 inches of mercury.

According to the United States Naval Observatory on the day of the accident, sunset occurred at 2010, and the end of civil twilight occurred at 2036. The phase of the Moon was a waxing crescent with 3 percent of the Moon's visible disk illuminated. Moonset was at 2145.

AIRPORT INFORMATION

Melbourne International Airport, was a towered public use airport, located 2 miles northwest from the city of Melbourne, Florida.

Aircraft operations averaged 366 per day of which, 54 percent were transient general aviation, 40 percent were local general aviation, 3 percent were commercial, 1 percent were air taxi, and 1 percent were military.

There were 248 aircraft based at the field of which, 190 were single-engine airplanes, 40 were multi-engine airplanes, 6 were helicopters, and 1 was military.

The airport had three runways:

- 9R/27L
- 9L/27R
- 05/23

At the time of the accident, runway 9R was in use. Review of published information and images of taxiway "A" which was the parallel taxiway for runway 9R, and the runup area at the approach end of runway 9R, revealed that there were no taxiway edge markings. The taxiway centerline markings were in good condition, the enhanced taxiway centerline markings prior to the runway holding position markings were in good condition, and the holding position markings were in good condition. The taxiway edge lighting was functional, the taxiway location signs were functional, the runway location signs were functional, and the runway safety area (hold short) signs were functional.

WRECKAGE AND IMPACT INFORMATION

Postaccident examination of N47749 revealed that it had sustained minor damage. The propeller exhibited chordwise scratching and leading edge gouging on its blades where they had come into contact with the left side of N602FT's stabilator. Minor scratching was also present on the right wing where it had come in to contact with the right side of N602FT's stabilator.

Postaccident examination of N602FT revealed that it had sustained substantial damage where the propeller from N47749 had come into contact with the left side of the stabilator. Multiple prop strike marks were present, and approximately 2 feet of the left outboard section had been severed from the stabilator.

TESTS AND RESEARCH

Application of Parking Brake in N47749

According to the private pilot in N47749, when he stopped at the runup area at the end of taxiway "A" there was approximately one aircraft length between his airplane and the airplane in front of him (N602FT). He thought he had set the parking brake because "immediately" after he stopped he "grabbed" the parking brake handle and pulled it back. He advised however that it was not set. He realized this after he struck N602FT. At the time he had been trying to set 1,000 rpm on the tachometer. At the time he thought that his feet were on the brake pedals. He "figured out" that "I did not put so much pressure on the brake pedals" before the "crash." When he heard the "crash" he thought that the airplane in front of him had "moved back" and he "immediately grabbed" the parking brake and set it.

N47749 Brake System Examination

Postaccident examination of N47749's brake system did not reveal evidence of any preimpact failure or malfunction that would have precluded normal operation of the brake system. When actuated, both the toe brakes, and the parking brake were functional.

Brake Servicing and Maintenance Records

The brake system was filled with MIL-H-5606, hydraulic brake fluid. The fluid level would be checked periodically and replenished when necessary. If the entire system had to be refilled, it would be filled with fluid under pressure from the brake end of the system.

No adjustment of the brake clearances was necessary. If after extended service the brake blocks became excessively worn, they were replaced with new segments.

Review of maintenance records indicated that the brake pads had been replaced on July 1, 2011, and the left brake disc had been replaced on August 9, 2011. Further review also did not reveal any recent failures or malfunctions that would have precluded normal operation of the brake system

Brake Operation

The brakes were actuated by toe brake pedals which were attached to the rudder pedals or by a hand lever and master cylinder located below and behind the center of the instrument sub panel. Hydraulic cylinders were located above each rudder pedal and adjacent to the hand brake lever. A brake fluid reservoir was installed on the top left front face of the fire wall.

The parking brake was incorporated in the master cylinder and was actuated by pulling back on the hand lever and depressing the knob attached to the left side of the handle.

The parking brake was released by pulling back on the hand lever to disengage the catch mechanism and allow the handle to swing forward.

Review of the toe brake installation indicated that that if a pilot did not place his feet in the proper position, and his toes were allowed to protrude over the toe stops on the rudder pedals, that full braking may not be available, as they would come into contact with the torque tube that the rudder pedal assembly was attached to.

Review of the parking brake installation also indicated that once the parking brake was applied that in order to obtain additional braking effort, the hand lever had to be released before once again operating the toe brakes or hand lever.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

Florida Institute of Technology (FIT) was founded in 1958 to provide advanced education for professionals working in the space program at what is now the Kennedy Space Center. They offered educational programs in numerous disciplines including aeronautics.

The college of aeronautics offered both undergraduate, and master's degree programs. As part of these programs, FIT Aviation, LLC which was a wholly owned subsidiary of FIT, provided both ground and flight training for FIT students, and the general public under 14 CFR Part 141.

ADDITIONAL INFORMATION

Approximate Hours of Operation

In 2012 the FIT aviation fleet of 45 airplanes accrued approximately 38,000 total hours of operation.

Including the PA-28-161s, 42 of those airplanes incorporated a braking system similar to the accident airplane's braking system. Each flew approximately 5 to 7 flights per day. Review of the accident airplane's checklists revealed, that the parking brake was being operated at least 6 times per flight, which indicated that the parking brake was being operated on each airplane approximately 30 to 42 times per day.

Safety Actions

In order to increase safety FIT Aviation took the following actions:

1. FIT Aviation revised their Flight Operations Manual (FOM) to include a section on use of the parking brake, and including expanded guidance on the use of the parking brake in the sections of the FOM concerning aircraft startup, aircraft runup, and aircraft parking. FIT Aviation also added precautions in the FOM to not rely solely on the parking brake to keep the aircraft stationary with the engine running.

2. FIT Aviation revised their lesson plans to include emphasis on not relying solely on the parking brake to keep the aircraft stationary with the engine running.

Accident Rpt# ERA14LA227	**05/07/2014 1107 CDT**	**Regis# N4506W**	**Covington, TN**	**Apt: Covington Muni M04**
Acft Mk/Mdl PIPER PA-28-181		**Acft SN 28-8090028**	**Acft Dmg: DESTROYED**	**Rpt Status: Prelim** **Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O&VO-360 SER		**Acft TT 7945**	**Fatal 0** **Ser Inj 1**	**Flt Conducted Under: FAR 091**
Opr Name: DAYTON PILOTS CLUB INC		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On May 7, 2014, at 1107 central daylight time (CDT), a Piper PA-28-181, N4506W, operated by the Dayton Pilots Club, Inc, was destroyed when it collided with wooded terrain during a forced landing following a total loss of engine power on approach to Covington Municipal Airport (M04), Covington, Tennessee. The certificated private pilot was seriously injured. Visual meteorological conditions (VMC) prevailed, and an instrument flight rules (IFR) flight plan was filed for the flight that departed Dayton-Wright Brothers Airport (MGY), Dayton, Ohio, about 0710 CDT. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Preliminary air traffic control information from the Federal Aviation Administration (FAA) revealed that the airplane was at an altitude of 6,000 feet and 8 miles northeast of M04 when the pilot reported the destination airport in sight, and cancelled his IFR clearance. The controller then issued the airplane a frequency change to the M04 common traffic advisory frequency (CTAF). There were no further communications from the accident airplane.

In a telephone interview, the airport manager stated he was monitoring the CTAF when the accident pilot announced he was 7.5 miles from the airport, and in-bound for landing. The manager recognized the pilot's voice, as they had spoken by telephone the previous day, and was aware of the pilot's plans upon arrival. He advised the pilot that parking, fueling of his airplane, and ground transportation had been arranged.

Approximately 2 minutes later, the pilot announced over the radio that he was "out of fuel, and putting [the airplane] down short of the airport." The manager stated there were no further radios transmissions from the accident airplane.

The pilot held a private pilot certificate with ratings for airplane single engine land and instrument airplane. His most recent FAA second class medical certificate was issued March 26, 2014. According to club records, the pilot had accrued approximately 242 hours of flight experience, of which 178 hours were in the accident airplane make and model.

According to FAA records, the airplane was manufactured in 1979. Its most recent annual inspection was completed December 9, 2013, at 7,945 aircraft hours.

At 1050, the weather conditions reported at Millington Regional Jetport (NQA), 20 miles southwest of M04, included few clouds at 2,500 feet,10 miles of visibility, and winds from 180 degrees at 9 knots. The temperature was 35 degrees C, the dew point was 17 degrees C, and the altimeter setting was 29.98 inches of mercury. An NTSB meteorologist observed that the winds aloft at the airplane's cruising altitude of 6,000 were from about 225 degrees at 20 to 25 knots. Throughout the flight, the airplane maintained an approximate ground track of 225 degrees.

Examination of photographs revealed the airplane came to rest in standing water among wooded terrain. The cockpit and cabin areas were destroyed by impact, and had also been cut by first responders. The empennage appeared separated from the fuselage, but still attached by cables. The left wing appeared to have separated before the airplane came to rest.

According to detectives of the Tipton County Sheriff's Office, there was no odor of fuel, no evidence of fuel in the airplane, and no evidence of fuel spillage at the scene. The Chief of Detectives stated she did not order any environmental remediation of the crash site due to fuel spillage because "there was nothing to remediate."

Incident Rpt# ERA13IA396	**08/31/2013 1345 EDT**	**Regis# N2091W**	**Chesapeake, VA**	**Apt: Hampton Roads Executive PVG**
Acft Mk/Mdl PIPER PA-28RT-201		**Acft SN 28R-7918076**	**Acft Dmg: NONE**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-360-C1C6		**Acft TT 6106**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: CCM INC.		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On August 31, 2013, about 1345 eastern daylight time, a Piper PA-28RT-201, N2091W, experienced a pitch control failure during takeoff at Hampton Roads Executive Airport (PVG), Chesapeake, Virginia. The airplane was undamaged and the two pilots were uninjured. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight, which was operated under the provisions of Title14 Code of Federal Regulations Part 91.

According to the pilots, the purpose of the flight was to familiarize themselves with the airplane. During takeoff, as they increased the angle of attack to become airborne, they heard a loud "pop" and lost pitch control. The airplane became airborne momentarily and then touched down on the runway in a three point attitude. Neither of the pilots was injured, and the airplane was undamaged.

Examination of the airplane revealed that the aft lower stabilator flight control cable's turnbuckle assembly had broken at the aft cable terminal fitting. Examination of the turnbuckle and aft cable terminal fitting by the NTSB Materials Laboratory revealed that the cable terminal had fractured in the shank region about 0.25 inches from the wrench flats. Areas of the turnbuckle were covered with a white crystalline material, and the shank adjacent to the fracture exhibited reddish orange deposits. Examination of the fractured region with a 5X to 50X binocular zoom stereomicroscope also revealed that the fracture surface was rough with crack branching, which was consistent with stress corrosion cracking. Cleaning of the terminal in the area of the wrench flats and adjacent shank areas using acetone and a scouring pad comparable to a Scotch-Brite general purpose green scouring pad also revealed that some of the reddish orange deposits remained in some of the crevices on and adjacent to the wrench flats. Isolated areas of small pits were also observed on the turnbuckle shanks with a higher density of pits being observed on the outer diameter at the wrench flats. Additionally, a longitudinal crack was discovered at the end of the terminal adjacent to the cable. The area around the crack was also cleaned using acetone and a paper towel, and reddish orange deposits remained adhered to the surface after cleaning.

Review of Federal Aviation Administration (FAA) records revealed that the turnbuckle assembly was the subject of FAA Airworthiness Directive (AD) 2013-02-13, which was prompted by reports of cable assembly failures that led to failure of the horizontal stabilator control system and resulted in loss of pitch control. This AD required inspection of the stabilator control system and replacement of parts as necessary.

According to FAA and airplane maintenance records, the airplane was manufactured in 1979. The airplane had recently been purchased and was going to be placed in a local operator's fleet for rental and use in their pilot training program. As part of the purchase it had undergone an annual inspection on July 21, 2013. At the time of the inspection, the airplane had accrued 6,100.3 total hours of operation. At the time of the incident the airplane had 6,106 total flight hours.

According to the airframe and powerplant mechanic's logbook entry for the annual inspection, Airworthiness Directive (AD) 2013-02-13 (effective March 11, 2013) had been complied with during the annual inspection by inspecting the cables in accordance with Piper Service Bulletin (SB) 1245A. The inspection as described in SB 1245A required that the mechanic disassemble the turnbuckle assembly and clean it using a solvent such as acetone. Use of a Scotch-Brite general purpose green scouring pad was also permitted for cleaning. A 10x magnifier, a mirror, and a suitable light source were then required to be used to inspect the turnbuckle, terminal, and adjacent segment of cable. Any evidence of cracks, cable fraying, or corrosion that remained after the cleaning was cause for replacement.

Accident Rpt# ERA14LA103 01/18/2014 1200 EST	**Regis# N3668N**	**Zephyrhills, FL**	**Apt: Zephyrhills Muni ZPH**	
Acft Mk/Mdl PIPER PA12	**Acft SN 12-1919**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Prelim**	**Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-320 SERIES	**Acft TT 1282**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**	
Opr Name: CONNORS SEAN P	**Opr dba:**		**Aircraft Fire: NONE**	

Narrative

On January 18, 2014, about 1200 eastern standard time, a Piper PA-12, N3668N, was substantially damaged following a hard landing at Zephyrhills Municipal Airport (ZPH), Zephyrhills, Florida. The private pilot and one passenger were not injured. The airplane was 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, and no flight plan was filed. The flight originated from Tampa North Aero Park (X39), Tampa, Florida, about 1130.

The pilot reported that he was number two of a formation flight of two and was landing on runway 4. He reported surface winds at the time to be from 275 degrees at 15 knots with gusts to 25 knots. The approach to landing was normal and the airplane touched down "a little long past the numbers due to the tailwind." A gust of wind then lifted the left wing high while he already had full left aileron controls in. He added power while attempting to recover, the left wing descended, and the left main landing gear collapsed as the airplane landed hard. The airplane ground looped around the failed gear and came to a stop.

An inspector with the Federal Aviation Administration responded to the accident site and inspected the wreckage. He reported that the left main gear collapsed, resulting in structural damage to the lower fuselage. Structural damage was also observed on the left wing.

The pilot reported that the main gear safety cable failed and cut the landing gear bungees during the hard landing. The safety cable was subsequently removed by the pilot and was forwarded to the NTSB Investigator-in-Charge for further examination.

Accident Rpt# ERA14CA240	**05/14/2014 0**	**Regis# N32002**	**Norfolk, VA**		
Acft Mk/Mdl PIPER PA28 151			**Acft Dmg:**	**Rpt Status: Prelim**	**Prob Caus: Pending**
			Fatal 0	**Ser Inj 0**	
Opr Name:		**Opr dba:**		**Aircraft Fire:**	

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Accident Rpt# ERA12LA537 **08/30/2012 1612 EDT** **Regis# N2481P** **Ocala, FL** **Apt: N/a**

Acft Mk/Mdl QUAD CITY ULTRALIGHTS CHALLENGER **Acft SN** **Acft Dmg: SUBSTANTIAL** **Rpt Status: Factual** **Prob Caus: Pending**

Eng Mk/Mdl ROTAX 503 **Fatal 2** **Ser Inj 0** **Flt Conducted Under: FAR 091**

Opr Name: GILBERT C. AND CATHERINE A. JENNINGS **Opr dba:** **Aircraft Fire: NONE**

Narrative

HISTORY OF FLIGHT

On August 30, 2012, about 1612 eastern daylight time, a Quad City Ultralights Challenger II, N2481P, registered to and operated by a private individual, crashed in a field surrounded by trees near Ocala, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 Code of Federal Regulations (CFR) Part 91 personal flight from Morriston, Florida, to Leeward Air Ranch Airport (FD04), Ocala/Belleview, Florida. The airplane sustained substantial damage, and the private pilot and one passenger were fatally injured. The flight originated from Morriston, Florida, about 7 minutes earlier.

The purpose of the flight was to reposition the airplane to a nearby airport for an intended annual inspection.

The son of both occupants reported to either the Federal Aviation Administration (FAA) inspector-in-charge or the NTSB investigator-in-charge that he and his father, who is not a certificated pilot, inspected the airplane before he (the son) started the engine. The son stated that he asked his father how much fuel was on-board and he replied 13 gallons; the son later reported that was more than adequate to complete the intended flight. With his father seated in the front seat, the son started the engine and reported the engine started, "right up." After the engine was started a fuel leak at the carburetor was noted, smoke was noted coming from the engine, and it did not develop static maximum red line rpm. This was attributed to the choke that was left on. His mother then boarded the airplane, and it was taxied to the runway where an engine run-up lasting 5 minutes was performed. The son reported the engine sounded OK, and no discrepancies were reported. After takeoff the son reported that his mother performed a low pass then the flight departed to the southeast.

The son also reported that personnel from the airport where his parents had intended flying arrived at the departure airstrip and inquired about his parents. Law enforcement was then notified of the overdue airplane and a search was initiated.

There were no known witnesses to the accident, which occurred during daylight hours. The wreckage was located about 2000 hours the same day.

PERSONNEL INFORMATION

The pilot, age 50, seated in the rear seat, was the holder of a private pilot certificate with airplane single engine land rating issued on April 23, 2012. On the application for the private pilot certificate she listed a total time of 47.3 hours. She held a third class medical certificate with a restriction to have available glasses for near vision issued October 25, 2011.

The front seat occupant was not a FAA certificated pilot.

The son of both occupants was asked if his parents performed aerobatic maneuvers and he reported they never did. He reported they fly straight and level from point A to B.

AIRCRAFT INFORMATION

The airplane was built from a kit manufactured by Quad City Ultralight Aircraft Corporation. On January 13, 1992, the kit was sold to a company in Florida, and was built as model Challenger II, and was designated serial number CH20192-0779B. It was powered by a 52 horsepower Rotax 503 dual carburetor dual ignition engine and equipped with a wooden fixed pitch propeller. An operating Light Sport Aircraft Special Airworthiness Certificate was issued on January 7, 2008. On the application for U.S. Airworthiness Certificate, the airframe total time was listed at 300 hours.

According to FAA records, the pilot and front seat occupant purchased the airplane on August 21, 2011.

The FAA-IIC reported that the maintenance records were not located; however, the son of both occupants reported the airplane was always kept in great

shape.

METEOROLOGICAL INFORMATION

A surface observation weather report taken at Ocala International Airport-Jim Taylor Field (OCF), Ocala, Florida, at 1550, or approximately 22 minutes before the accident indicates the wind was from 180 degrees at 3 knots. The visibility was 10 statute miles, and scattered clouds existed at 4,000 and 5,500 feet. The temperature and dew point were 32 and 23 degrees Celsius, respectively, and the altimeter setting was 30.04 inches of mercury. The accident site was located approximately 4 nautical miles and 301 degrees from OCF.

WRECKAGE AND IMPACT INFORMATION

The accident site consisted of an open field surrounded by trees. The main wreckage was located at 29 degrees 12 minutes 26.02 seconds North latitude and 082 degrees 17 minutes 24.47 seconds West longitude, while the outer section of the right wing was located at 29 degrees 12 minutes 24.46 seconds North latitude and 082 degrees 17 minutes 28.46 seconds West longitude, or about about 390 feet and 245 degrees from the main wreckage location.

The main wreckage came to rest nearly inverted in a field with the outer 3 foot section of the right wing and outer portion of the right flaperon separated. Also located away from the main wreckage along an energy path were a wing inspection panel, a hat, splintered pieces of the propeller, 2 pieces of ribs from the inboard section of the right wing, and Dacron fabric covering. There was no evidence of tree contact on the leading edge of the right wing, nor on any of the observed components. The horizontal and vertical stabilizers remained attached, and all remaining flight control surfaces remained attached. Extensive impact damage was noted to the left wing, fuselage, and cockpit. The wreckage was recovered for further examination.

Examination of the elevator, rudder, and flaperon flight control system revealed no evidence of preimpact failure or malfunction.

Examination of the right wing revealed the main and aft spars fractured just outboard of the lift strut attach point. Closely matching the fracture surfaces of the main and aft spars but not allowing them to touch revealed the outer portion of the right wing was displaced up approximately 45 degrees. Additionally, the main spar of the right flaperon was displaced up about 7 degrees beginning at a splice joint, and the inboard hinge of the flaperon was bent up approximately 30 degrees. The fracture surfaces of the main and aft spars of the right wing were labeled as to location and direction, and were cut out and retained for further examination by the NTSB Materials Laboratory. Additionally, the mating sections of the left wing were also sent to the NTSB Materials Laboratory for comparison purposes.

Examination of the cockpit revealed the airspeed indicator and tachometer were off scale low, both needles of the cylinder head temperature gauge were at or just below the low end marking. The exhaust gas temperature of one cylinder was indicating 1,200 degrees Fahrenheit, while the other was indicating off scale low.

Examination of the engine which remained attached to its attach points on the airframe revealed the drive belt was in place and the engine rotated freely by hand. Power train continuity was confirmed. The exhaust was removed and no evidence of scoring was noted on the sides of the pistons. Inspection of the carburetors revealed 1 bowl had some debris, while the bowl of the other carburetor contained some fuel. Inspection of the fuel pump revealed no evidence of preimpact failure or malfunction.

Examination of the wooden propeller which remained attached to the engine revealed one blade was fractured; three pieces were recovered along the debris field. The other blade

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations of the pilot and passenger were performed by the District 5 Medical Examiner's Office, Leesburg, Florida. The cause of death for both was listed as "Multiple blunt force injuries due to airplane crash."

Forensic toxicology was performed on specimens of the pilot by the FAA Bioaeronautical Sciences Research Laboratory (FAA CAMI), Oklahoma City, Oklahoma, and also by Wuesthoff Reference Laboratory (Wuesthoff), Melbourne, Florida. The toxicology report by FAA CAMI indicated testing for carbon monoxide, and cyanide was not performed. No volatiles were detected in the vitreous fluid and no tested drugs were detected in the liver specimen. The

toxicology report by Wuesthoff indicated the results were negative for volatiles, and tissue immunoassay screen. Unquantified amount of caffeine was detected, and the carboxyhemoglobin saturation was 0.62 percent. Iron (470 mcg/g) was detected, and was above the reporting limit of 1.9 mcg/g. Additionally, the following was detected in the vitreous fluid (18.2 mg/dL urea nitrogen, 0.53 mg/dL creatinine, 138 mEq/L sodium, 15.4 mEq/L potassium, 121 mEq/L chloride, and less than 10 mg/dL glucose.

Forensic toxicology testing was performed on specimens of the passenger by Wuesthoff. The results were negative for volatiles, and urine immunoassay screen, and unquantified amounts of caffeine and ibuprofen were detected in the urine specimen. Additionally, the following was detected in the vitreous fluid (18.1 mg/dL urea nitrogen, 0.55 mg/dL creatinine, 140 mEq/L sodium, 14.5 mEq/L potassium, 121 mEq/L chloride, and less than 10 mg/dL glucose. The carboxyhemoglobin saturation was 0.69 percent. Iron (420 mcg/g) was detected, and was above the reporting limit of 1.9 mcg/g.

TESTS AND RESEARCH

Examination of the fractured right wing pieces was performed by the NTSB Materials Laboratory located in Washington, DC. The results of the examination revealed the outboard portion the forward spar at the fracture area was deformed up relative to inboard portion, while the outboard portion of the aft spar at the fracture area was deformed forward and slightly up relative to the inboard portion. Bench binocular microscope examination of the forward and aft spar pieces for the right wing revealed the fractures faces exhibited slant fractures with coarse features consistent with overstress separation with no evidence of fatigue cracking. The aft spar contained a through hole in the area above the trailing edge wing strut. Examination revealed the fracture in the aft spar intersected the center portion of this hole, exposing the outboard and inboard side of the hole. The inboard face of the hole was severely deformed consistent with ground impact damage, whereas, the mating half of the hole for the most part did not show evidence of deformation damage.

Accident Rpt# ERA13FA186	**04/03/2013 1600 EDT**	**Regis# N3101H**	**Miami, FL**	**Apt: Kendall Tamiami Executive Airp TMB**
Acft Mk/Mdl ROBINSON R44		**Acft SN 1610**	**Acft Dmg: DESTROYED**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-540-F1B5		**Acft TT 760**	**Fatal 2 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BRAVO HELICOPTERS LLC		**Opr dba:**		**Aircraft Fire: GRD**

Narrative

HISTORY OF FLIGHT

On April 3, 2013 about 1600 eastern daylight time, Robinson R44, N3101H, had components separate in flight and the helicopter impacted the ground shortly after takeoff from Kendall Tamiami Executive airport (TMB), Miami, Florida. The helicopter was registered to and operated by Bravo Helicopters, LLC, of Miami, Florida. The commercial pilot and pilot-rated mechanic incurred fatal injuries. The maintenance test flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed and no flight plan was filed for the local flight that departed a few minutes before the accident.

Multiple witnesses in the vicinity of the crash site reported hearing a loud "pop" noise and seeing parts separate from the helicopter as the helicopter flew overhead. Witnesses were also consistent in reporting that the empennage section of the helicopter then departed the aircraft before impact with the ground. One witness, standing about 20 feet from the impact, stated that the helicopter was inverted over the industrial buildings before it impacted two palm trees about 25 feet above ground level, a pickup truck, and then the ground. Another witness stated that the postcrash fire started after the pilot and passenger were extracted from the helicopter or about 5 minutes after the initial impact. He also stated that the helicopter was inverted over the industrial buildings.

PERSONNEL INFORMATION

According to Federal Aviation Administration (FAA) records, the pilot held a commercial pilot certificate with ratings for helicopter and airplane single-engine land, issued on October 23, 2003. The pilot was issued a mechanic certificate on October 23, 2003, with ratings for airframe and power plant. The pilot was issued a first-class medical certificate on February 25, 2013, with the medical restriction "must wear corrective lenses for distant and possess glasses for near vision." FAA records also indicated that in February of 2013, the pilot reported 6,840 total flight hours and 76 flight hours in the previous 6 months. The pilot's logbooks were not retrieved.

AIRCRAFT INFORMATION

The four-seat, skid-type landing gear helicopter, serial number 1610, was manufactured in 2006. The helicopter was powered by a Lycoming O-540-F1B5, 225 horsepower engine, serial number L-26556-40A. Review of the aircraft and engine logbooks revealed the last annual inspection was conducted on December 04, 2012 at an hour meter time of 749.4 total hours of operation. The hour meter was located at the crash site and read 760.2 hours. According to FAA records, the helicopter was issued a standard airworthiness certificate on October 21, 2011.

According to the helicopter logbook, the manufacturer's order form indicated that both spindle bearings were replaced, refurbished, and installed on the new rotor blades. When this was completed, the new rotor blades automatically incurred a reduced service life when installing used spindles. The remaining time on the new rotor blades was reduced from 2,200 hours or 12 years, whichever comes first, to match the used spindles which had about 1,439 hours or 5 years remaining, whichever came first. The rotor blades and spindles expire as a pair.

The mechanic was hired to conduct the re-installation of the main rotor blades on the helicopter on April 3, 2013. The course of the day was spent installing the blades, making adjustments to the pitch change links, and performing a track and balance procedure that adjusts the rotor blades for the smoothest operation on the rotor system. An approximate, uneventful 1 hour test flight was conducted prior to the accident flight.

METEOROLOGICAL INFORMATION

The TMB 1553 weather observation, located 1.5 miles west of the accident site, reported wind from 120 degrees at 12 knots, gusting to 18 knots, visibility 10 statute miles, scattered clouds at 3,000 feet above ground level, temperature 29 degrees Celsius, dew point 20 degrees Celsius, and an altimeter setting of 30.00 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The helicopter was located upright in a parking lot on the corner of southwest 128th street and southwest 122nd avenue in Miami, Florida, and came to rest on a heading of 105 degrees magnetic (M). The debris field was 110 degrees at a distance of about 500 feet. A postcrash fire had consumed a majority of the wreckage. Several helicopter components were located on the roofs of several industrial buildings.

The red main rotor blade exhibited thermal damage about 7 feet from the hub outward towards the rotor tip, and the entire blade was upside down. The red main rotor blade data plate was missing and the alternate number was found on the inside of the tip cap as blade 3043. There was a paint scuff on the top surface of the spindle adjacent to the hub. There were impact marks on the hub from the pitch horn boot and impact marks from the pitch horn to the hub leading edge face with the leading edge, 60 degrees upward from normal orientation. The spindle was torn and there was deformation of the leading edge of the spindle bolt hole. There was a fracture from the leading edge aft, to 2.7 inches with the aft face having a journal impression. The pitch horn was fractured and deformed with impact marks immediately adjacent to the fracture surface. The pitch change link assembly remained attached to the pitch horn by the appropriate hardware. There was a torque stripe on one side of the pal nut. The rod end at the opposite end of the link assembly was unremarkable. The blade was cut 13 feet 7 inches inboard of the rotor tip for recovery. The spindle was connected and rotated roughly.

The blue main rotor blade exhibited thermal damage from the hub outward about 8 feet towards the rotor tip and the entire blade was bowed down. The data plate was found installed on the blade as number 3034. Blade delamination was consistent with thermal damage. There was impact damage 4 feet 6 inches, 6 feet 6 inches, and 10 feet 10 inches from the blade tip. The blade was cut 13 feet inboard of the rotor tip for recovery. The blade tip cover and weight was in place with no chord wise scoring noted from the tip inboard on the lower surface. There was compression wrinkles on the lower surface 1 foot 7 inches inboard from the rotor tip. The blade was displaced aft about the mid span and was bowed up 3 feet inboard from the tip. There was a compression wrinkle on the upper surface 6 feet 8 inches inboard from the rotor tip. The leading edge of the upper surface exhibited chord wise scratches from the tip inboard to 7 feet that corresponded to a ground scar in the asphalt at the crash site. The upper skin was delaminated from the root of the rotor to 9 feet outboard. Upward bending started 14 feet inboard of the blade tip. The spindle was connected and rotated roughly.

The upper swash plate fork remained connected to the swash plate. The yolk remained connected to the fork by the dog bone. The yolk was connected to the dog bone on both sides. The yolk was fractured on the weighted sides and was recovered from the roof top of a building. The weights were in place but damaged due to impact with the gravel roof of the industrial park building.

The tail boom exhibited a vertical scuff with white paint transfer 25.25 inches forward of the aft bulkhead, adjacent to the tail rotor blade tip arch. The intermediate flex coupling was deformed slightly, but still connected. There was rotational contact by the flex coupling with the upper frame. The tail cone was severed by the main rotor system between bays five and six during flight and came to rest 275 M about 300 feet from the initial impact point. The empennage remained attached to a 32-inch section of the tail boom, and exhibited damage to the trailing edge of the horizontal stabilizer. The tail rotor blades remained attached to the tail rotor gear box with one blade partially severed 9 inches outboard from the attachment point. The tail rotor rotated freely. There was fragmentation of bays five, six, and seven, at the left side where the danger sticker was adhered. This was consistent with a leading edge strike from a main rotor blade.

The tail rotor driveshaft was cut 8 inches aft of the flex coupling. The tail rotor gearbox rotated freely with no abnormal noise. Tail rotor flight control continuity was examined from the pedals to the tail rotor. Several separations were noted due to overload and fire damage with no connections compromised. Main rotor flight control continuity was examined from the cyclic and collective to the main rotor blades. Several separations were noted due to overload and fire damage with no connections compromised, with the exception of the pitch link to swash plate connection for blade number 3043. The pitch link/horn departed the helicopter and was found 260 degrees M and 90 feet from the initial impact point.

The instrument panel showed crushing damage and was ripped out of the helicopter during rescue operations. All canopy screens were destroyed and fragments were found at the beginning of the debris path, on the roof of four buildings, and at the initial impact point.

The carburetor mixture knob was full rich and the carburetor heat was unlocked and on. All crew and passenger seats were destroyed by postcrash fire. The pilot and passenger restraints were cut to recover the victims and were intact before the postcrash fire ensued. All restraint system harnesses were destroyed due to postcrash fire with the buckles fire damaged

The alternator was attached to the engine and fire damaged. The alternator belt was consumed by fire. The starter was fire and impact damaged and remained attached to the engine. No vacuum pump was installed on the engine. The magnetos and ignition harness were fire damaged. The top and bottom spark plugs were removed and exhibited light gray combustion deposits and a normal wear condition with one covered in oil. The engine was rotated by hand and compression and suction was noted on all cylinders. Crankshaft and valve train continuity were confirmed to the rear gears. All cylinders were examined using a lighted bore scope and no anomalies were noted.

The carburetor was destroyed by impact and fire. The carburetor fuel inlet screen was removed, fire damaged, and absent of debris. All fuel lines were fire damaged. The fuel line between the fuel valve and gascolator was compromised due to impact as was the fuel inlet fitting to the carburetor. The gascolator bowl and screen were clear of debris. No fuel was observed.

The lower swash plate interrupter was attached to the swash plate. The slider tube was sheared from the mount and was ripped around to the top. The swash plate rotated roughly by hand.

The swash plate assembly for the blue blade exhibited a pitch link that was bent in the center section and at the lower rod end. The upper rod end fractured in a bending overload at the threaded area and remained safety wired.

The swash plate assembly for the red blade exhibited a disconnected lower rod end from the swash plate and the upper rod end remained attached to the pitch horn, which was fractured and the attached bolt was bent. The attaching hardware for the lower rod end was not recovered. There was no visible deformation damage to the pitch link mounting hole.

A detailed report of the airframe, systems, and power plant examination is contained in the NTSB public docket.

MEDICAL AND PATHOLOGICAL INFORMATION

Postmortem examinations were performed on the pilot and pilot-rated mechanic by the Miami-Dade Medical Examiner's office. The cause of death for each was reported as blunt force injuries.

The FAA's Civil Aerospace Medical Institute performed forensic toxicology on specimens from the pilot and pilot-rated mechanic. The tests were negative for carbon monoxide, cyanide, drugs, and ethanol.

TESTS AND RESEARCH

Several components from the rotor head system were harvested from the wreckage and sent to the NTSB Materials Laboratory in Washington, D. C. for further examination. The examination revealed that all fractures were consisted with overstress and no preexisting cracking was noted. The examination also revealed that the pitch change link attachment hole for the red blade appeared intact, free of damage, and was covered with black sooty deposits. The pitch link attachment hardware was missing from the attachment to the red blade side of the swash plate. A detailed report of the examination is contained in the NTSB public docket.

ADDITIONAL INFORMATION

According to a pilot-rated witness, who was at the hangar during the maintenance procedure, the pilot was upset during the course of the day. The pilot had conducted conversations with the helicopter manufacturer over the installation of the refurbished spindles that were installed on the new blades and that it was costing him $10,000 a month in lost revenues due to the helicopter not being in service. The pilot witness, who had flown the helicopter numerous times, stated that he observed the mechanic make adjustments to the pitch change rods on the rotor system during the maintenance procedure. He also stated that the mechanic told him that the owner of the helicopter was upset that the helicopter manufacturer installed refurbished spindles onto the new blades.

Accident Rpt# WPR12LA109A 02/19/2012 1845 PST	**Regis# N7508Y**	**Antioch, CA**	**Apt: Byron C83**
Acft Mk/Mdl ROBINSON HELICOPTER R22 BETA	**Acft SN 3757**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-360 SERIES	**Acft TT 3787**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: TRACY ZEDECK	**Opr dba:**		**Aircraft Fire: NONE**
			AW Cert: STN

Summary

The helicopter and airplane collided midair. Both aircraft sustained minimal damage during the impact but substantial damage during the subsequent forced landings. The airplane pilot was performing a local flight and was not in contact with air traffic control (ATC) before the collision. The helicopter pilot was receiving visual flight rules flight following services from ATC throughout the flight.♂♂The helicopter pilot transitioned between two ATC sectors before the accident. On multiple occasions, the controllers for each sector misidentified the last three digits of the helicopter's call sign. Additionally, the controller in the accident sector issued a traffic advisory using the wrong call sign. Further, an aircraft with the same last three digits as the helicopter's incorrect call sign made radio contact with the controller shortly before the collision, which increased the confusion.♂♂Audio data revealed that the air traffic controller provided multiple traffic advisories to the helicopter but did not issue an alternate or immediate course of action in accordance with ATC procedures despite the fact that the aircraft's converging flightpaths had triggered the radar conflict alert system. Radar playback also revealed that, at that time, the controller was receiving a visual alert on the radar console. This alert was also observed by a controller in an adjacent approach sector who called the radar assist controller warning of the threat. The assist controller responded, "yeah, we're givin' him traffic." A few seconds later, the radar targets merged.♂♂The helicopter pilot stated that she received and complied with the traffic advisories by performing a visual scan but that, based on her communications with the air traffic controller, she did not perceive the situation to be urgent. Radar data revealed that the helicopter descended 600 feet before the collision but that the pilot did not inform the air traffic controllers about the descent. Further, as the airplane got closer and the traffic advisories were issued, the helicopter pilot began turning north, which brought the helicopter directly into the path of the approaching airplane while simultaneously placing the airplane behind her immediate field of vision. Shortly after, she sighted a silhouette of the airplane and propeller at her 4-o'clock position. She performed an evasive maneuver to the left but then felt the helicopter being struck.

Neither the airplane pilot nor the occupant observed another aircraft near the airplane before the collision. Although the airplane pilot was not receiving traffic advisories from ATC, it was still the pilot's responsibility to maintain a proper visual lookout to avoid other aircraft in the area. The helicopter's left navigation light was inoperative when tested after the accident; however, this most likely did not affect the outcome because the left side of the helicopter would not have been visible to the airplane pilot at any point during the flight.

Cause Narrative

THE NATIONAL TRANSPORTATION SAFETY BOARD DETERMINED THAT THE CAUSE OF THIS OCCURRENCE WAS: The failure of both pilots to see and avoid the other aircraft during cruise flight. Contributing to the accident was the failure of air traffic control personnel to issue the helicopter pilot with a prompt and appropriate alternate course of action upon receiving a conflict alert.

Events

1. Enroute-cruise - Midair collision
2. Emergency descent - Collision with terr/obj (non-CFIT)

Findings - Cause/Factor

1. Personnel issues-Psychological-Attention/monitoring-Monitoring other aircraft-Pilot - C
2. Personnel issues-Action/decision-Action-Lack of action-ATC personnel - F

Narrative

HISTORY OF FLIGHT

On February 19, 2012, about 1845 Pacific standard time, a Beech 35-A33 airplane, N433JC, and a Robinson R22 Beta helicopter, N7508Y, collided midair near Antioch, California. The airplane was owned and operated by the private pilot under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91 as a local flight. The helicopter was registered to Spitzer Helicopter Leasing Company and operated by the commercial pilot under the provisions of Title 14 CFR Part 91 as a solo cross-country flight in preparation for obtaining her helicopter rating. None of the aircraft occupants were injured. The helicopter was receiving flight following at the time of the accident, and departed Hayward Executive Airport, Hayward, California, about 1815, with a planned destination of Sacramento Executive Airport, Sacramento, California. The airplane departed Byron Airport, Byron, California, about 1835. Night visual meteorological conditions prevailed, and neither aircraft filed a flight plan.

The airplane pilot stated that he performed an uneventful preflight inspection during which he confirmed all lights were operational. They departed Byron with

the intention of performing three night landings, and 30 minutes of flight over Antioch and the Sacramento Delta area. After departure, they climbed to 2,500 feet mean sea level (msl), on a west heading. The pilot pointed out the local power station below to the passenger, and then discussed aircraft lights that he could see above and far into the distance; a few seconds later they felt a collision. Neither occupant observed another aircraft in close proximity prior to the collision, and the pilot was concerned that they may have struck a tower or bird. The airplane immediately began to shudder, and roll to the right. The pilot looked to the right wing and could see a hole, and a piece of tubing protruding from the leading edge. He established airplane control, and began a 180-degree climbing left turn to 3,000 feet. He confirmed that his landing lights were on throughout the flight. Although his transponder was switched on and set to 1200, he had not established radio contact with any air traffic control facility prior to the collision.

The pilot elected to return to Byron Airport. While en route, he established radio contact with Northern California Terminal Radar Approach Control (NORCAL), who told him he had struck a helicopter. He maintained straight and level flight by utilizing continuous left aileron and rudder control inputs. During the final approach segment, the propeller speed began to decrease and he was unable to maintain altitude. As the airplane began to slow down, it began to pitch to the right despite his left control inputs. The airplane subsequently landed hard in a field short of the runway.

The helicopter pilot stated that she departed Hayward with a route that was to follow highways to Concord, Antioch, and ultimately Sacramento. She contacted NORCAL Approach for flight following once she had reached Dublin, and was issued a discreet transponder code. Once over Concord, the approach controller transferred her to Travis Air Force Base Radar Approach Control. She continued the flight, and stated that a short time later she received a traffic advisory from the Travis controller. She turned on the helicopter's landing lights to increase her visibility, and began looking for the traffic (she further reported that she may have turned off the light a short time later.) She stated that based on her communication with air traffic controllers, she did not perceive the situation to be urgent. She thought she received two traffic advisories in total. The flight continued and she initiated a left turn to the north, while relaying this information to the controller. A short time later, she caught site of the silhouette of an airplane and propeller at her 4 o'clock position. She performed an evasive maneuver to the left, and then felt the helicopter being struck. She did not know the extent of the damage, and elected to immediately perform a precautionary landing. The area below was unlit and dark, and she was aware that it included significant areas of water. She therefore selected a road as her emergency landing spot. During the approach she could see multiple automobiles and diverted to a spot adjacent to the highway. She raised the collective control between 50 and 75 feet above ground level, the helicopter landed hard, and rolled onto its left side.

TESTS AND RESEARCH

Radar and Audio

Radar data and audio recordings for the accident were provided by the Federal Aviation Administration (FAA) and United States Air Force (USAF), and reviewed by an Air Traffic Control Specialist in the NTSB Operational Factors division. A complete report is included in the public docket.

The data revealed that the pilot of helicopter N7508Y initially attempted to make contact with NORCAL approach about 1821. The controller did not reply, and about 3 minutes later she made a second attempt. The controller replied utilizing the incorrect call sign of "Helicopter 7508W" and the pilot, utilizing the "08Y" call sign, requested flight following to Sacramento Executive Airport via Concord and Antioch. The controller again responded with "08W", and provided an altimeter setting. The pilot restated her call sign, and the controller responded now utilizing "08Y", expounding that her transmissions were, "fairly scratchy and hard to read." She was provided with a transponder code and the flight continued uneventfully for the next 6 minutes, after which time the controller asked her to contact Travis approach.

At approximately 1832, the pilot made contact with Travis approach utilizing the call sign "Helicopter 7508Y." The controller replied with the call sign of "08W", while asking her to verify altitude. The pilot responded with an altitude of 3,000 feet and restated her call sign as "08Y", and again the controller replied with the incorrect call sign. The pilot retransmitted the correct call sign and over the next few exchanges the discrepancy was resolved, and the controller responded with the correct call sign.

At 1838, the controller, once again utilizing the incorrect call sign of "08W", provided a traffic advisory to the helicopter pilot regarding a twin Cessna airplane. The pilot replied stating, "is that for 08Y?" and the controller replied in the affirmative, now utilizing the "08Y" call sign. Ninety seconds later, the controller gave a second advisory, stating that the Twin Cessna was at her 12 o'clock position, southwest bound and at 3,900 feet. A few seconds after that, the controller reported that the traffic was no longer a factor, and the helicopter continued uneventfully.

Approximately 1840, a target appeared on radar approximately 11 miles southeast of N7508Y transmitting a beacon code of 1200, and an indicated mode C

altitude of 1,200 feet. This aircraft was not in communication with air traffic control, and was later determined to be N433JC. About 1842, the controller asked N7508Y how much further east she would be flying, and the pilot responded, "We'll be over Antioch Bridge but be turning [.]bound soon, zero eight yankee." The radar controller responded "roger traffic one o'clock 6 miles northbound altitude indicates two thousand six hundred appears level," and the pilot replied, "zero eight yankee." Fifty seconds later, the controller advised the pilot that the target was now turning northwest bound at a range of 4 miles, and the pilot replied that she was turning northbound. Immediately following this response, an airplane with the call sign Cherokee 9808W, called the approach controller requesting visual flight rules (VFR) flight following. The controller confirmed contact, and asked the Cherokee to standby. Over the course of the next 73 seconds the controller corresponded multiple times with the Cherokee (utilizing the call sign "Cherokee 08W" and "08W") and a Piper Tomahawk (call sign 11T). Audio data revealed a beeping sound during the controller's transmissions, which was consistent with an automatically generated aural conflict alert. Radar playback data also revealed that at that time the controller was also receiving a visual alert on the radar console. During that period the Travis Approach Radar Assist controller (Radar Associate Position) received a land-line interphone call from a NORCAL approach controller who had also received the alert, and was concerned about the proximity of N7508Y and N433JC. The assist controller responded, "yeah, we're givin' him traffic." Radar data indicated that the helicopter and N433JC were now at the same altitude of 2,600 feet, within 1 mile of each other and closing. The Travis Approach controller then transmitted, "Zero eight yankee traffic now twelve o'clock less than a mile east, correction, westbound two thousand six hundred indicated." A few seconds later the radar targets merged, and the pilot of N7508Y transmitted, "MAYDAY MAYDAY HELICOPTER GOING DOWN."

Examination of the radar data revealed that the helicopter's mode C reported altitude varied between 2,600 and 3,300 feet during the period it was receiving flight following. No other targets were observed in close proximity to the two aircraft leading up to the collision.

Interpretation of the voice recordings revealed that although the helicopter pilot always reported her correct call sign, background noise and the inflection of her voice often resulted in the last digit, "yankee" sometimes sounding like "whiskey."

Airframe Examinations

Postaccident examination of the airplane revealed that a forward portion of helicopter's right skid had become lodged in the leading edge of the right wing, midspan. A 6-inch-long section of one propeller blade tip was missing, and the spinner sustained crush damage and a black paint transfer next to the back plate. During the forced landing the airplane sustained substantial damage to the wingtips, firewall, and the fuselage just aft of the left wing trailing edge.

The helicopter sustained damage during the collision sequence limited to the forward right skid, and the center section of the left skid, which was not recovered. The helicopter did not sustain damage during the collision, which would have prevented normal flight. The helicopter rolled over during the landing, most likely because of the separated landing gear skids. As it rolled, the tailcone came away from the fuselage, and the forward cabin struck the ground. The landing light switch was found in the "OFF" position following the accident, and subsequent testing revealed that the lamp was operational. The rear (white) and right (green) navigation lamps illuminated when tested, however, the left (red) lamp did not light. Examination of the filament revealed that it had broken away completely at both posts.

Additional Information

FAA Order JO7110.65U prescribes air traffic control procedures and phraseology for use by persons providing air traffic control services. According to the order, "Controllers are required to be familiar with the provisions of this order that pertain to their operational responsibilities and to exercise their best judgment if they encounter situations that are not covered by it." The order contains the following applicable excerpts:

"Section 2-1-1, ATC SERVICE:

The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic, and to provide support for National Security and Homeland Defense. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by many factors, such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers must provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required when the work situation permits."

Section 2-1-2, DUTY PRIORITY:

Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment must be used in prioritizing all other provisions of this order based on the requirements of the situation at hand."

2-1-6, SAFETY ALERT:

Issue a safety alert to an aircraft if you are aware the aircraft is in a position/altitude which, in your judgment, places it in unsafe proximity to terrain, obstructions, or other aircraft. Once the pilot informs you action is being taken to resolve the situation, you may discontinue the issuance of further alerts. Do not assume that because someone else has responsibility for the aircraft that the unsafe situation has been observed and the safety alert issued; inform the appropriate controller. NOTE-

1. The issuance of a safety alert is a first priority (see para 2-1-2, Duty Priority) once the controller observes and recognizes a situation of unsafe aircraft proximity to terrain, obstacles, or other aircraft. Conditions, such as workload, traffic volume, the quality/limitations of the radar system, and the available lead time to react are factors in determining whether it is reasonable for the controller to observe and recognize such situations. While a controller cannot see immediately the development of every situation where a safety alert must be issued, the controller must remain vigilant for such situations and issue a safety alert when the situation is recognized.

2. Recognition of situations of unsafe proximity may result from MSAW/E-MSAW/LAAS, automatic altitude readouts, JO 7110.65U 2/9/12
.....

b. Aircraft Conflict/Mode C Intruder Alert. Immediately issue/initiate an alert to an aircraft if you are aware of another aircraft at an altitude which you believe places them in unsafe proximity. If feasible, offer the pilot an alternate course of action.

c. When an alternate course of action is given, end the transmission with the word "immediately."

Section 2-4-15, EMPHASIS FOR CLARITY:

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

b. Notify the operations supervisor-in-charge of any duplicate flight identification numbers or phonetically similar-sounding call signs when the aircraft are operating simultaneously within the same sector."

Accident Rpt# WPR13LA295 06/27/2013 1930	**Regis# N7187B**	**Fielding, UT**	**Apt: N/a**
Acft Mk/Mdl ROBINSON HELICOPTER R44-ASTRO	**Acft SN 0517**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING O-540 SERIES	**Acft TT 3085**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: WHIRLYBIRD HELICOPTERS	**Opr dba:**		**Aircraft Fire: NONE**

Narrative

On June 27, 2013, about 1930 mountain daylight time, a Robinson R44 helicopter, N7187B, was substantially damaged following impact with terrain while maneuvering near Fielding, Utah. The student pilot, the sole occupant of the helicopter, was not injured. The helicopter was registered to AMW Aerospace LLC, and operated by Whirlybird Helicopters, located in Ogden, Utah. The instructional flight was conducted in accordance with 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the flight, and a flight plan was not filed. The helicopter departed the Brigham City Airport (BMC), Brigham City, Utah, about 1830, with its destination being Ogden-Hinckley Airport (OGD), Ogden, Utah.

In a statement submitted to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), the 44-hour student pilot reported that as he entered a canyon, he climbed to about 5,600 feet mean sea level (msl), which was 100 feet above his profile altitude of 5,500 feet msl. Upon entering the mouth of the canyon he slowed to between 70 to 75 knots, as there had been turbulence going through the canyon the day before with his instructor. The pilot stated that about halfway through the canyon the helicopter dropped about 100 feet, at which time he observed the [main rotor] revolutions per minute (rpm) were between 80 to 85 percent. The pilot reported that he then lowered the collective and rolled on throttle, maintained 70 knots, and turned towards a field. During the turn the rpms came up to about 90 percent, and after leveling out the rpms dropped back to between 80 to 85 percent. The pilot said that after he cleared a set of wires, he set up to land in the field. The pilot added that he did a "baby flare" at the bottom, then a full flare before adding a little pitch and setting the helicopter down. The pilot stated that after setting down ".it felt like my front skid caught, which tipped me and the helicopter onto its [left] side." As a result of the rollover, the helicopter's structure sustained substantial damage. The pilot reported no preimpact mechanical malfunctions or failures with the helicopter that would have precluded normal operation.

A postaccident inspection of the engine was performed by a Federal Aviation Administration airworthiness inspector. The inspector stated that prior to performing an engine run the sparkplugs for cylinders #1, #3, and #5 were removed and drained of oil; the inspector speculated that the oil contamination had occurred during the shipment of the helicopter to the examination/testing facility. The inspector reported that to accommodate the engine run, a cylinder head temperature probe was installed at the #2 cylinder position. The oil pressure fitting to the oil pressure gauge was also replaced, as the original fitting was damaged as a result of the accident. The engine was then installed on an engine test stand, with a test club propeller installed. The inspector reported that the engine started with "no hesitation or stumbling." The inspector further reported that during the magneto drop test at 1,800 rpm, the right magneto (serial number E06DA051) was observed to create stumbling symptoms produced by the engine, with a drop between 400 to 425 rpm. The left magneto (serial number E08GA072R) dropped about 90 rpm when the engine was run up at 1,800 rpm. There was no hesitation or stumbling observed from the engine. The engine was then shut down. No other anomalies with either the airframe or engine were reported by the inspector that would have precluded normal operation.

Under the supervision of the NTSB IIC, a subsequent examination of the right magneto (serial number E06DA051) was performed at the facilities of Aircraft Magneto Service, Bainbridge Island, Washington, on August 15, 2013. The technician reported that although he observed minimal oil in the magneto housing, this would not have resulted in operational difficulties of the magneto. He then assembled the magneto from the parts provided, and noted that the breaker point opening and internal timing was untouched. The technician briefly test ran the magneto and found it to function normally.

At 1956, the weather reporting facility at the Logan-Cache Airport (LGU), Logan, Utah, which is located about 11 nm east of the accident site, reported wind variable at 3 knots, visibility 10 miles, sky clear, temperature 36ø Celsius (C), dew point 7ø C, and an altimeter setting of 30.20 inches of mercury. The density altitude at the time of the accident was calculated to be 8,830 feet.

Accident Rpt# CEN14CA223	**04/25/2014 1315 CDT**	**Regis# N32VB**	**Liberty, MO**	**Apt: Roosterville 0N0**
Acft Mk/Mdl ROBINSON HELICOPTER COMPANY R44		**Acft SN 10636**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl LYCOMING IO-540		**Acft TT 1217**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: EID-CO		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

Upon arrival at the destination airport, the pilot hovered the helicopter about 2 feet above the ground and prepared to land. The pilot noted that during the hover while the nose of the helicopter was pointed east, the wind shifted direction and gusted from the west. The helicopter's tail section raised and the nose lowered, which allowed the main rotor blades to strike the ground. The helicopter rolled over on its left side and sustained substantial damage to the main rotor blades and fuselage. The Federal Aviation Administration inspector responded to the scene; an examination of the helicopter was conducted and did not reveal any evidence of mechanical malfunctions or failures that would have precluded normal operation. The pilot noted that if he had kept the helicopter's nose pointed into the wind then the accident might not have occurred.

Accident Rpt# ERA14CA220 05/04/2014 0	**Regis# N777LR**	**Monroe, GA**		
Acft Mk/Mdl SCHLEICHER ASW 20		**Acft Dmg:**	**Rpt Status: Prelim**	**Prob Caus: Pending**
		Fatal 0 **Ser Inj 0**		
Opr Name:	**Opr dba:**		**Aircraft Fire:**	

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Accident Rpt# ANC14CA017	**03/02/2014 1415 AST**	**Regis# N2542K**	**Alegnagik, AK**	**Apt: N/a**
Acft Mk/Mdl SILVAIRE LUSCOMBE 8E		**Acft SN 5269**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual** **Prob Caus: Pending**
Eng Mk/Mdl CONTINENTAL C85		**Acft TT 4236**	**Fatal 0** **Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: NELSON RUSSELL STUART		**Opr dba:**		**Aircraft Fire: NONE**

Narrative

The pilot reported that he had just landed his tail wheel-equipped airplane on a frozen lake. During the taxi to his cabin, both of the airplane's main landing gear wheels broke through overflow ice, and the airplane nosed over, sustaining substantial damage to the fuselage. The pilot reported that there were no preaccident mechanical anomalies with the airplane that would have precluded normal operation, and that the accident could have been prevented had he called a local lodge owner to check the conditions of the ice before landing.

Accident Rpt# WPR14CA103 01/25/2014 1401 PST	**Regis# N188L**	**Renton, WA**	**Apt: Renton Muni RNT**
Acft Mk/Mdl WACO CLASSIC AIRCRAFT YMF F5C	**Acft SN F5C-8-136**	**Acft Dmg: SUBSTANTIAL**	**Rpt Status: Factual Prob Caus: Pending**
Eng Mk/Mdl JACOBS R-755A2M	**Acft TT 45**	**Fatal 0 Ser Inj 0**	**Flt Conducted Under: FAR 091**
Opr Name: BENEFIT AVIATION LLC	**Opr dba:**		**Aircraft Fire: NONE**

Summary

The pilot reported that during the landing roll in the tailwheel equipped airplane, as the rudder lost effectiveness, the airplane veered to the right and then ground looped off of the runway. Subsequently, the left wing struck the ground, which resulted in substantial damage.

The pilot reported that he thought he may have inadvertently applied minor application of the right brake due to his foot placement.

The pilot reported no 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 pilot's failure to maintain directional control of the airplane during landing.

Events

1. Landing-landing roll - Loss of control on ground

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

Narrative

The pilot reported that during the landing roll in the tailwheel equipped airplane, as the rudder lost effectiveness, the airplane veered to the right and then ground looped off of the runway. Subsequently, the left wing struck the ground, which resulted in substantial damage.

The pilot reported that he thought he may have inadvertently applied minor application of the right brake due to his foot placement.

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

Accident Rpt# ERA14CA201 04/12/2014 0	**Regis# N2297L**	**Blountstown, FL**	
Acft Mk/Mdl WSK PZL MIELEC M 18A		**Acft Dmg:**	**Rpt Status: Prelim** **Prob Caus: Pending**
		Fatal 0 **Ser Inj 0**	
Opr Name:	**Opr dba:**		**Aircraft Fire:**

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