Aviation Investigation Final Report

Location:	Goodland, Kansas	**Accident Number:**	CEN15LA117
Date & Time:	January 21, 2015, 07:54 Local	**Registration:**	N66906
Aircraft:	Piper PA-31-350	**Aircraft Damage:**	Substantial
Defining Event:	Fuel starvation	**Injuries:**	1 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The commercial pilot was conducting a cargo flight in the airplane. The operator reported that, during taxi and takeoff, the pilot noted no issues with the airplane. During cruise flight, the left engine lost total power. The right engine then also lost total power, but the pilot failed to complete any of the required engine failure emergency procedures. He chose to perform a forced landing, during which the airplane impacted power lines and then a field, which resulted in substantial damage to the airplane.

On-scene examination revealed that there was no apparent fuel smell nor fuel on the ground. During postaccident examination of the airplane, no useable fuel was found in the left and right outboard fuel tanks; however, 35 gallons of fuel were found in each of the two inboard fuel tanks. The fuel selectors were found in the "off" position. Further examination of the fuel system revealed that there was no fuel in the fuel lines leading to the left engine and that only about 2 teaspoons of fuel was present in the fuel inlet line to the right engine fuel strainer, indicating that the pilot had not properly managed the fuel, which led to fuel starvation to both engines. The examination revealed no mechanical anomalies that would have precluded normal operation.

Further, postaccident examination of the airplane revealed that the pilot had not feathered both propellers, which would have increased the airplane's glide distance, and that he had not extended the flaps, which would have resulted in a slower touchdown speed and lower impact energy during the forced landing. Therefore, the pilot did not properly configure the airplane for the forced landing, which resulted in its high-energy impact with power lines and terrain.

The pilot was on duty all night the day before the accident and had to reposition a flight at 0330, at which point he had been awake for about 15 hours. The pilot reported that, about 40 minutes into the flight, he was definitely starting to feel fatigued. Shortly later, the engine issues began. The pilot reported that he believed that a high level of fatigue, previous issues with another airplane he had flown that day, and a recent company airplane accident had "caused him to not think straight and not perform the proper emergency procedures for engine failure in flight."

Probable Cause and Findings

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

The pilot's improper fuel management and failure to conduct the engine failure emergency procedures and his improper conduct of the forced landing, which resulted in fuel starvation, a total loss of engine power, and the subsequent high-energy impact with power lines and terrain. Contributing to the accident was pilot fatigue.

Findings

Aircraft	Fuel - Fluid management
Aircraft	(general) - Not specified
Personnel issues	Incorrect action performance - Pilot
Personnel issues	Use of policy/procedure - Pilot
Personnel issues	(general) - Pilot

Factual Information

History of Flight

Enroute-cruise	Fuel starvation (Defining event)
Enroute-cruise	Loss of engine power (total)
Emergency descent	Loss of engine power (total)
Emergency descent	Attempted remediation/recovery
Landing	Collision with terr/obj (non-CFIT)

On January 21, 2015, at 0754 mountain standard time, a Piper PA-31-350, N66906, experienced a total loss of engine power of both engines during cruise flight. The pilot performed a forced landing to a field where the airplane impacted terrain about 10 miles west of Goodland, Kansas. The airplane sustained substantial damage. The pilot was uninjured. The airplane was operated by Key Lime Air as [Key Lime Air] LYM flight 169 under the provisions of Title 14 Code of Federal Regulations Part 135 as a cargo flight and was operating on an instrument rules flight plan. Visual meteorological conditions prevailed for the flight that originated from Denver International Airport (DEN), Denver, Colorado, and was destined to Shalz Field Airport (CBK), Colby, Kansas.

On February 1, 2015, the National Transportation Safety Board Investigator-In-Charge (IIC) requested that the pilot complete the required NTSB Pilot/Operator Accident/Incident Report, NTSB Form 6120.1 and return to the IIC within 10 days. Form 6120.1 was not received from the pilot, and the pilot stated that he provided a statement to the company.

After not receiving Form 6120.1 from the pilot, the IIC requested and received the Form 6120.1 from Key Lime Air, which had a Narrative History of Flight, the 'majority' of which was taken from the pilot's personal statement that he gave after the accident.

"On Tuesday, January 20th, the pilot woke up at 0330 and arrived at work at 0430 for his flight to Trinidad (LYM1961). That flight went without incident and the pilot was off duty at 0830. From 1000 to 1200, he was able to take a nap in the hotel where he was staying during the day. At 1745, he reported to work at [Perry Stokes Airport] (TAD), [Trinidad, Colorado]. During the preflight/run-up of aircraft N313RA, he discovered the battery was almost dead and the engines would not start. The airport did not have a [ground power unit] available to start the aircraft. Instead, the ground crew had two 12-volt car batteries that were linked together. The pilot unsuccessfully attempted to use these to help give the plane power. He then called Key Lime Air dispatch, told them of the problem, and called the [fixed base operator] for assistance. The pilot started the plane at 2100, and [proceeded] back to DEN. He blocked back in at 2222. When all post flight actions and maintenance write-ups were completed, he called dispatch to go off duty at 2300. Dispatch informed him that due to scheduling issues with his Wednesday morning flight, he would have to stay on duty all night and then reposition a plane from [Centennial Airport] (APA), [Denver, Colorado] to DEN at 0330. Once arriving home at 2345 on Tuesday night after the flight back to DEN, the pilot ate dinner. He decided that if he had to wake up at

0200 to drive to APA, two hours of sleep would make it difficult to wake up and he would have a good chance of oversleeping. He remained awake until it was time to drive to APA. On the drive there he realized that he was fatigued and had issues keeping his eyes open. Once arriving at the Key Lime ramp, he called the DEN ramp supervisor and said he was there but very tired. However, he did not use the word 'Fatigued.' The ramp supervisor asked if he was okay. The pilot replied that he was. The ramp supervisor told him to fly up to DEN, drink some coffee, and once done with the flight to CBK, he could nap before flying back to DEN. Once arriving at DEN and completing post-flight actions, the pilot realized that the nose wheel was losing air quickly. He assumed that it must have happened while taxiing to the UPS ramp. At this time, he wondered why he kept having issues when he got into a plane. He then conducted the preflight N66906 for the flight to CBK and noticed nothing unusual. While waiting for freight to be brought out, he walked towards another pilot's plane to talk to him, bumped a fire extinguisher, knocked the pin loose, and discharged the unit. He stated that he now felt jinxed and was going to cause an issue with the plane he was to fly to CBK. After the freight was brought out and loaded into N66906, he started up but realized both taxi and landing lights were inoperative. He turned back to the ramp and called maintenance. After roughly 45 minutes of troubleshooting maintenance could not find the cause of the issue and the lights were [a minimum equipment list item]. He then waited for daylight and taxied out for the flight. During taxi and takeoff there were no issues with the plane. Once he reached cruise altitude and configured the plane, he did not notice any issues and completed the aircraft trend, which read normal. After roughly 40 minutes into the flight, he stated that he was definitely starting to feel fatigued. Once 25-30 miles from the [Renner Field (Goodland Municipal Airport)] (GLD) [very high frequency omni-directional range navigation aid], he asked Denver Center to go direct to CBK to shorten the flight. Approximately five minutes later, he noticed the Left Boost Pump [Inoperative] light came on. He thought that turning on the Left Auxiliary Pump could fix the problem. However, soon after that the left engine failed. The pilot thought that it was a mechanical issue and radioed [air traffic control] (ATC) to report an engine failure. He then turned toward GLD. ATC reported the weather and asked what approach he wanted. The pilot stated that what he really should have been doing was troubleshooting the cause of the left engine failure. He believed the high level of fatigue, issues with the previous aircraft, and the fact that the company had just lost a pilot due to a crash a month ago caused him to not think straight and do the proper emergency procedures for engine failure in flight. He failed to complete any of the required emergency procedures and concentrated solely on getting to GLD. The Right Boost Pump [Inoperative] light then came on. The pilot turned on the Right Aux Pump but the engine started to fail. Now the pilot stated that he really started to feel stressed and that "his head was out of it." He thought he was not going to make it, and the fear of death clouded all decision making. He once again did not conduct the required emergency procedures and just thought of just getting to the airport. He was losing altitude quickly and told ATC he was not going to make it. ATC told him to find a road to put the plane down. At this time, the aircraft was roughly 2000 feet [above ground level]. The pilot located a gravel road (County Road 71). At roughly 1000 feet [above ground level], he put the landing gear in the down position, but did not get a chance to verify it was down. He was planning on landing to the left side of the road to avoid the power lines running along the south side of the road. At roughly 300 feet [above ground level], he saw a power line to the left (north) side of the road. At the last minute, he tried to pull up to miss the power line to the right but realized was going to hit it. The aircraft hit the power line. The pilot stated that he must have blacked out for the next few seconds. The next thing he knew was that he was stopped in a field to the north of County Road 71. Fearing an engine fire, he put the [fuel] tanks in the off position, pulled mixtures, turned off the [fuel] boost pumps"

According to a Federal Aviation Administration (FAA) Inspector from the Wichita Flight Standards District Office, the airplane was located in a field approximately 645 feet east of a second power line pole north of the intersection of County Road 10 and County Road 71. From the power line pole, in the direction of the aircraft, the left main gear torque links were at 50 feet, the left main landing gear door was at 72 feet, the initial impact of the airplane from the left main landing gear was at 236 feet, a left propeller strike at 267 feet, right propeller strike at 275 feet, nose landing gear impact at 269 feet, pieces of power line pole and power wires at 420 feet, left gear trunnion assembly and wheel at 440 feet, airplane at 645 feet. Approximately 6 feet of the power line was wrapped around the left gear trunnion assembly. Airplane antennas were found at various locations from the aircraft impact to where the airplane came to rest. The left and right propellers strikes were found to indicate they were rotating.

There was no damage to the primary flight controls with the exception of the left aileron. Flight control continuity was checked and all flight controls were able to fully travel, including the trim controls. All engine controls were checked for travel and the left and right engine controls were operational and checked at the engine compartment for continuity. All controls were fully functional.

At the airplane location, there was no apparent fuel smell or any indication of fuel found on the ground. The airplane was sitting at a slight left wing down angle. The left and right outboard fuel tanks were placarded for a 40 gallon capacity; no fuel was visible from looking into the tank from the fuel cap. Approximately two inches of fuel was found in the left inboard fuel tank, placarded for a 56 gallon capacity, and no fuel was visible in the right inboard fuel tank, also placarded for a 56 gallon capacity.

Cockpit switches and fuel selectors were found in the off position. When power was turned on, the left and right outboard fuel tank indicated empty when selected, the right inboard fuel tank indicated empty when selected and the left inboard fuel tank indicated half full when selected. All circuit breakers were found in and no other abnormalities were found in the cockpit. The left engine throttle control was found in the cutoff position and propeller in the feather position. The right engine throttle controls was found forward in the power position and the propeller control was found forward in the power position. The gear handle was found in the down selected position.

Following the airplane's recovery to a salvage facility, further examination of the airplane fuel system revealed that there was no fuel found in the fuel lines leading to the left engine, however there was approximately two teaspoon of fuel found in the inlet line to the fuel strainer for the right engine. Fuel was sumped from the left and right outboard fuel tanks; approximately one quart of fuel was found in each tank. The inboard fuel tanks were sumped; approximately 35 gallons of fuel was found in each tank. There was a very minute amount of water found in the left inboard tank sump and very minute dirt/contamination found in each sump. The fuel selector valves were checked for continuity from the cockpit, there was no abnormalities found, the selector would allow each tank position to physically be selected.

The FAA Inspector stated that at no point did the pilot indicate he tried to restart either engine, check fuel gauges, or check the fuel selector position.

The FAA Inspector stated that the airplane landing gear was extended, the flaps were fully retracted, and both propellers were not in the feathered position.

Pilot Information

Certificate:	Commercial	**Age:**	31,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	October 1, 2014
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	November 29, 2014
Flight Time:	1628 hours (Total, all aircraft), 88 hours (Total, this make and model), 1395 hours (Pilot In Command, all aircraft), 90 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N66906
Model/Series:	PA-31-350	**Aircraft Category:**	Airplane
Year of Manufacture:	1974	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	31-7405197
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	December 22, 2014 Condition	**Certified Max Gross Wt.:**	7000 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	19082.5 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TIO-540-J2BD
Registered Owner:	CBG LLC	**Rated Power:**	350 Horsepower
Operator:	Key Lime Air	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:		**Operator Designator Code:**	KY7A

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GLD,3657 ft msl	**Distance from Accident Site:**	10 Nautical Miles
Observation Time:	06:53 Local	**Direction from Accident Site:**	90°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	Broken / 9000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	320°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.23 inches Hg	**Temperature/Dew Point:**	-3°C / -5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Denver, CO (DEN)	**Type of Flight Plan Filed:**	IFR
Destination:	Colby, KS (CBK)	**Type of Clearance:**	IFR
Departure Time:		**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	39.446945,-101.803054(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Webster McKinley; Federal Aviation Administration; ICT FSDO; Wichita, KS
Original Publish Date:	April 26, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=90639