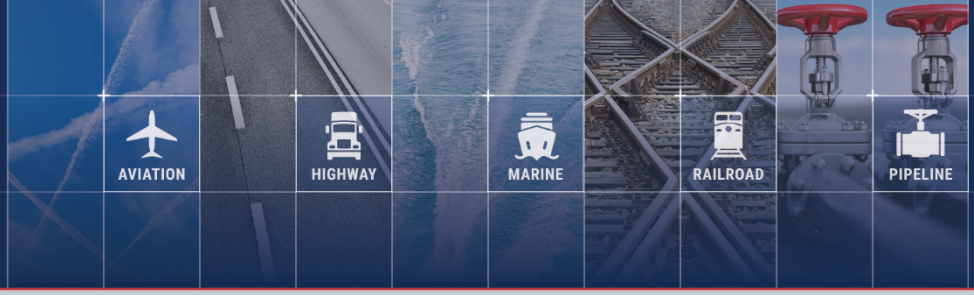

Aviation Investigation Final Report

Location:	Quinlan, Texas	**Accident Number:**	CEN15FA287
Date & Time:	July 1, 2015, 13:54 Local	**Registration:**	N6168P
Aircraft:	Piper PA 24-250	**Aircraft Damage:**	Destroyed
Defining Event:	Fuel contamination	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane, which was owned and operated by the private pilot, experienced a total loss of engine power shortly after takeoff, descended, and impacted a field. A fire erupted that consumed the majority of the airplane's cabin and the inboard sections of both wings. The wreckage distribution, ground scars, and crushing of the wing leading edges were indicative of a low-speed nose-down impact and consistent with an aerodynamic stall. Examination of the fuel system revealed the presence of rust and water in both electric fuel pumps and water in the engine carburetor bowl. The examination revealed no other engine or airframe anomalies that would have precluded normal operation. The rust found in the fuel pumps indicated that the fuel system had been contaminated with water for a long period of time. The airplane owner's handbook provided clear and explicit instructions on how to check before flight for fuel system contamination.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain control of the airplane following a loss of engine power during initial climb after takeoff, which resulted in the wing's critical angle-of-attack being exceeded and a subsequent aerodynamic stall. Also causal was the pilot's inadequate preflight inspection of the airplane's fuel system, which resulted in the loss of engine power due to water contamination.

Findings

Personnel issues	Preflight inspection - Pilot
Aircraft	(general) - Inadequate inspection
Aircraft	Fuel - Fluid condition
Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Capability exceeded

Factual Information

History of Flight

Prior to flight	Aircraft inspection event
Initial climb	Fuel contamination (Defining event)
Initial climb	Loss of control in flight
Initial climb	Aerodynamic stall/spin
Uncontrolled descent	Collision with terr/obj (non-CFIT)
Post-impact	Fire/smoke (post-impact)

HISTORY OF FLIGHT

On July 1, 2015, about 1354 central daylight time, a Piper PA-24-250 (Piper Comanche), N6168P, experienced a loss of engine power after takeoff from runway 18 (3,120 feet by 60 feet, turf) at Rockin M Airport (T14), Quinlan, Texas and impacted a field. The airplane was destroyed by impact forces and post-crash fire. Both private-rated pilots were fatally injured. The airplane was registered to and operated by the pilot under 14 Code of Federal Regulations Part 91 as a personal flight that was not operating on a flight plan. Visual meteorological prevailed at the time of the accident. The flight was originating at the time of the accident.

A witness stated that runway 18 at T14 was located about 250-300 yards from the back porch of his house, located west of the airport and slightly north of the runway 18. He said that he could not see the runway 18 due to trees and brush which blocked his view. He stated that he was working on his truck when he heard the airplane engine start and run for several minutes and then heard the airplane taxi to runway 18. The engine speed was run up and he heard the engine speed drop slightly as the magnetos were tested. The propeller was cycled three "distinct times" with the engine speed lowered and the propeller blades making a cutting sound as the propeller was cycled. The engine power was reduced and the engine was at idle. About 45 seconds later, he heard the airplane engine accelerate and about 2 seconds later he heard the engine go to what appeared to be full power. He stated that he could tell that the airplane was now moving away from him and the engine sound "sounded very strong." He heard that the airplane was climbing out and heard the engine power reduce and for about 2 seconds he heard what sounded like a cruise climb power setting. The engine sound then went away and he did not hear the engine speed drop off "slowly," he just did not hear anything at all. About 35-45 seconds later, he heard a "thud." He said that he was "impressed at the power" that the airplane was making.

PERSONNEL INFORMATION

The left seat pilot/airplane owner held a private pilot certificate with airplane multiengine land and airplane single-engine land ratings. This pilot reported flight experience that included 4,005 total and 55 hours in last six months as of his last airman medical exam, which was a third class medical certificate

and was dated March 7, 2015. The airman medical certificate had the following limitation(s): Must wear corrective lenses.

The witness stated that he had flown with the pilot/owner on numerous occasions and was impressed with the knowledge he had of the airplane and the ability to fly it.

The right seat pilot-rated passenger held a private pilot certificate with an airplane single-engine land rating and a mechanic certificate with an airframe and powerplant rating. He reported accumulating a total flight time of 250 hours and 10 hours in last six months as of his last airman medical, exam dated October 2, 2013, and was issued third class medical certificate with the following limitation(s): None.

AIRCRAFT INFORMATION

The 1959 Piper PA-24-250, serial number 24-1269, airplane was powered by a Lycoming O-540-A1A5, serial number L-1112-40 engine, and was registered to the left seat pilot on July 26, 2002.

Logbook entries show that the airplane and engine received their last inspection, dated August 1, 2014, at a tachometer time of 4,048.83 hours and a total time since major overhaul of engine, which was dated December 17, 2007, of 849.33 hours.

METEROLOGICAL INFORMATION

The Majors Airport (GVT) Greenville, Texas automated weather observing system located about 7 nautical miles of T14, recorded at 1355 the following: wind – 190 degrees at 12 knots, visibility – 10 statute miles, sky conditions – clear, temperature – 32 degrees Celsius, dew point – 30 degrees Celsius, altimeter setting 30.01 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane wreckage was about 0.32 nautical miles southeast of the runway center and oriented on a west-southwest airplane tail to nose heading and ground scarring that was approximately contained to approximately the planform of the airplane. The airplane was upright and exhibited crushing along the wing leading edges; the right wing was at about a 45-degree pitch downward angle. The empennage was inverted and along the left side of the fuselage. The landing gear jack screw extension equated to a fully extended landing gear, and the cockpit flap control handle was in the flaps fully extended position. The cockpit fuel selector was positioned to the right fuel tank. Engine control continuity to the cockpit controls was confirmed. The propeller blades did not exhibit S-shaped bending or chordwise gouges/scratches consistent with torsion.

On-scene examination of the engine revealed that air was expelled and drawn in through the top spark plug holes with rotation of the propeller with the top spark plugs removed. Engine drive and valve train continuity was confirmed when the propeller was rotated by hand.

Rotation of the left magneto produced sparking and the right magneto was unable to be rotated due to thermal damage from the accident.

Post-accident examination of the engine revealed a liquid consistent with water within the carburetor bowl, which when tested with Kolor Kut indicated the presence of water. Both fuel pumps exhibited

internal brown discoloration and brown material consistent with in color and quantity with long-term corrosion and a liquid consistent with water, which when tested with Kolor Kut indicated the presence of water.

The instrument panel was destroyed by impact forces and post-crash fire. The tachometer was destroyed.

MEDICAL AND PATHOLOGICAL INFORMATION

Autopsies for both pilots were performed by the Southwestern Institute of Forensic Sciences at Dallas Office of the Medical Examiner on July 2, 2015 and stated that cause of death for each pilot was blunt force injuries.

The Federal Aviation Administration (FAA) Final Forensic Toxicology Fatal Accident Report for the left seat pilot stated: no carbon monoxide was detected in blood, cyanide testing was not performed, no ethanol detected in urine, and no listed drugs detected in urine.

The FAA Final Forensic Toxicology Fatal Accident Report for the right seat pilot stated: carbon monoxide testing was not performed due to insufficient sample for analysis, cyanide testing was not performed, 42 (mg/dL, mg/hg) ethanol detected in urine, 19 (mg/dL, mg/hg) ethanol detected in vitreous, and no ethanol detected in blood. Putrefaction was present.

TESTS AND RESEARCH

The Piper Commanche Service Manual, Section 2-50, Draining Fuel Valve and Strainers, states in part:

"a …The fuel strainer should be drained regularly to check for water or dirt accumulations.

"b. The procedure for draining the right and left tanks and lines is to open the easy drain valve for a few seconds with the fuel tank selector valve on one tank. Then change the fuel selector to the opposite tank and repeat the process, allowing enough fuel to flow out to clear water from the fuel line as well as the fuel strainer. The same procedure will apply when auxiliary fuel cells are installed by simply selecting the right and left auxiliary fuel tank."

Section 2-51a, Fuel System Draining Procedures - Water Contamination. (PA-24-400)

a. Fuel cells should be kept full of fuel during storage and the aircraft refueled as soon as possible after each flight to prevent accumulation of moisture and deterioration of the cells.

b. When the aircraft has been exposed to below freezing temperatures or it is suspected that waster may have entered the tanks, fuel should be drained using the following procedure:

To drain main and auxiliary cells open the strainer quick drain for ten (10) to twelve (12) seconds with the fuel cell selector on the main cell, then change the selector to the auxiliary cell and repeat the process. Draining each cell for the recommended time should produce a half (1/2) pint or more of fuel per cell.

c. All fuel cells are equipped with fuel caps that periodically need to be inspected for proper sealing. In addition, each cell has a filler neck scupper drain tube for water that may collect around the filler neck.

These drains should be free flowing with no restrictions. The fuel cell filler cover plate gaskets must also be in good condition and show no evidence of aging, hardening or deterioration. By assuring that the fuel caps are sealing properly, there are no restrictions in the drains and if the cover plate gaskets are in good condition, water contamination of the fuel can be kept to a minimum.

d. In order to minimize water contamination of the fuel during cleaning operations avoid directing water into the vents, drain tubes, around sealed cover plates and filler cap access opening."

The Piper Comanche Service Manual, Section VIII, further discusses maintenance and cleaning of the fuel system.

The PA-24-250 Airplane Owner's Handbook, VI. Fuel System, states in part, "The fuel strainer, equipped with a quick drain, is mounted under the right forward section of the fuselage. The strainer should be drained regularly to check for water or dirt accumulations. The procedure for draining the right and left tanks and lines is to open the gascolator quick drain for a few seconds with the fuel selector on one tank. Then change the fuel selector to the opposite tank and repeat the process, allowing enough fuel to flow out to clear the line as well as the gascolator."

Section II, Operating Instructions, I. Preflight, state in part:

"Before each flight, visually inspect the airplane, and/or determine that:

(13) The fuel strainer and fuel lines are free of water and sediment by draining all fuel strainers once as day.

(14) The fuel tanks and carburetor bowls are free of water and sediment by draining sumps once a week."

Pilot Information

Certificate:	Private	**Age:**	54,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 7, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	4005 hours (Total, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	49,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	October 2, 2013
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	250 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N6168P
Model/Series:	PA 24-250	**Aircraft Category:**	Airplane
Year of Manufacture:	1959	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-1269
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	2899 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	LYCOMING
ELT:		**Engine Model/Series:**	O-540-A1A5
Registered Owner:	On file	**Rated Power:**	250 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	GVT,535 ft msl	**Distance from Accident Site:**	7 Nautical Miles
Observation Time:	13:55 Local	**Direction from Accident Site:**	11°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.01 inches Hg	**Temperature/Dew Point:**	32°C / 20°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Quinlan, TX (T14)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	13:54 Local	**Type of Airspace:**	

Airport Information

Airport:	ROCKIN M T14	**Runway Surface Type:**	Grass/turf
Airport Elevation:	473 ft msl	**Runway Surface Condition:**	Soft;Vegetation
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	3120 ft / 60 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	32.948055,-96.092781(est)

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	Kevin Taylor; Federal Aviation Administration; North Texas FSDO; Irving, TX Mike McClure; Piper Aircraft, Inc; Vero Beach, FL John Butler; Lycoming Engines; Williamsport, PA
Original Publish Date:	November 17, 2016
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=91481