Aviation Investigation Final Report

Location:	Festus, Missouri	**Accident Number:**	CEN18FA384
Date & Time:	September 20, 2018, 22:30 Local	**Registration:**	N7152S
Aircraft:	Cessna 150	**Aircraft Damage:**	Substantial
Defining Event:	Fuel exhaustion	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The commercial pilot and his son were conducting a cross-country flight from New York to Missouri. Before the final fuel stop, they communicated to the pilot's fiancée via text message that the airplane was experiencing a "small electrical problem." The pilot refueled the airplane about 275 miles from the destination airport and continued on the final leg of the flight into dark night conditions.

The passenger subsequently messaged the pilot's fiancée and asked her to stand at the end of the runway with a flashlight to help direct the airplane toward the runway for landing. He stated that they would attempt to use a handheld radio onboard to activate the runway lights but were unsure if the radio would have sufficient battery. The passenger also indicated that they had "picked up a head wind" during the flight.

The pilot's fiancée reported that the airplane attempted to land, but she was unsure if it touched down on the runway due to the night conditions and the fact that the airplane was "blacked out" and did not have any exterior lights on. The last text message from the passenger stated, "keep light on." The airplane impacted terrain about 1/4 mile from the departure end of the runway in a nose-down attitude consistent with an aerodynamic stall. The two intact fuel tanks contained no usable fuel, and the propeller blades lacked chordwise scratches or torsional deformation, consistent with a loss of engine power. No preimpact mechanical malfunctions or failures with the airframe and engine were noted during the examination, with the exception of the voltage regulator, which was found to be inoperable.

Manufacturer guidance stated that, following an electrical system failure, the pilot should land the airplane as soon as practical; however, the pilot chose to both initiate and continue the flight into dark night conditions with a known electrical problem to an airport that required him to activate the runway lights. Though the extent of the pilot's preflight and inflight fuel planning could not be determined, it is possible that the airplane consumed more fuel than planned, as the passenger indicated that the airplane had encountered a headwind inflight, and it is likely that the absence of a fuel quantity indication contributed to the fuel exhaustion.

Based on the location of the airplane relative to the runway, it is likely that the pilot initiated a go-around following the first landing attempt. During the go-around, the airplane experienced a total loss of engine power and the pilot subsequently failed to maintain airspeed and exceeded the airplane's critical angle of attack, which resulted in an aerodynamic stall and impact with terrain.

Probable Cause and Findings

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

A total loss of engine power due to fuel exhaustion and the pilot's subsequent exceedance of the airplane's critical angle of attack, which resulted in an aerodynamic stall. Contributing to the accident was the pilot's decision to initiate and continue the flight into dark night conditions with a known electrical problem.

Findings

Personnel issues	Fuel planning - Pilot
Aircraft	Fuel - Fluid management
Aircraft	Fuel - Fluid level
Personnel issues	Aircraft control - Pilot
Aircraft	Airspeed - Not attained/maintained
Aircraft	Angle of attack - Capability exceeded
Personnel issues	Decision making/judgment - Pilot
Aircraft	(general) - Inoperative
Environmental issues	Dark - Effect on operation

Factual Information

History of Flight

Prior to flight	Preflight or dispatch event
Prior to flight	Electrical system malf/failure
Approach-VFR go-around	Fuel exhaustion (Defining event)
Approach-VFR go-around	Loss of engine power (total)
Approach-VFR go-around	Aerodynamic stall/spin
Approach-VFR go-around	Loss of control in flight
Approach-VFR go-around	Collision with terr/obj (non-CFIT)

On September 20, 2018, about 2230 central daylight time, a Cessna 150H, N7152S, sustained substantial damage when it was involved in an accident near Festus, Missouri. The pilot and passenger sustained fatal injuries. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot and his son were relocating the airplane from New York to Festus Memorial Airport (FES), Festus, Missouri. Fuel receipts showed that the pilot refueled the airplane three times during the trip. The first stop was Chautauqua County/Dunkirk Airport (DKK), Dunkirk, New York, about 19 miles from the departure airport, where the pilot obtained 13.4 gallons of fuel. The second refueling stop was about 226 miles away, at Knox County Airport (4I3), Mount Vernon, Ohio, where the airplane was fueled with 16.56 gallons. The third refueling stop was about 174 miles away at Greensburg Municipal Airport (I34), Greensburg, Indiana, where the airplane was fueled with 13.62 gallons at 1906. The distance from I34 to FES was about 275 miles.

The pilot and passenger communicated with the pilot's fiancée via text message during the trip. They told her that the airplane was experiencing a "small electrical problem" and stated that their estimated time of arrival (ETA) would be determined "at the next fuel stop… just before dark." After their fuel stop at I34 they estimated their ETA at FES would be about 2215. They then asked her to stand on the end of the runway with a flashlight to help guide the airplane in for landing.

They also stated that they would attempt to activate the airport lighting system with a handheld radio, but they were unsure if the radio had enough battery power to perform the task. During the last leg of the flight, they indicated that they had "picked up a head wind" and further extended their ETA until 2220.

The pilot's fiancée reported that she went to the end of the runway with the flashlight on, and the pilot attempted to land, but she was unsure if the airplane touched down on the runway due to the dark night conditions. She further reported that the airplane was "blacked out" and did not have any exterior lights on.

The last text message from the pilot stated, "keep light on." After several minutes of not seeing or

hearing the airplane, she tried contacting the pilot multiple times with no response before contacting law enforcement. The wreckage was located the following morning in a tree-covered swamp about 1/4 mile southeast of the departure end of runway 19.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	56,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Waiver time limited special	**Last FAA Medical Exam:**	April 26, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	August 24, 2018
Flight Time:	(Estimated) 6733 hours (Total, all aircraft), 1122 hours (Total, this make and model), 6162 hours (Pilot In Command, all aircraft), 217 hours (Last 90 days, all aircraft), 45 hours (Last 30 days, all aircraft)		

At the time of the accident, the pilot was employed as an airline pilot. He previously worked as a helicopter air ambulance pilot and a military helicopter pilot. The pilot held a mechanic certificate with airframe and powerplant ratings. According to the pilot's employer, the pilot's most recent flight with the company was on September 19, 2018. The pilot's last check ride occurred on August 24, 2018.

According to Federal Aviation Administration (FAA) records, while the passenger held a FAA third class medical certificate, he did not hold any airman certificates, and did not have any reported flight time on the date of his examination.

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N7152S
Model/Series:	150 H	**Aircraft Category:**	Airplane
Year of Manufacture:	1968	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	15067852
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:	August 10, 2018 Annual	**Certified Max Gross Wt.:**	1600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2066.2 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	C91 installed, not activated	**Engine Model/Series:**	O-200-A
Registered Owner:		**Rated Power:**	100 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The Cessna 150H pilot's operating handbook (POH) stated that the maximum capacity for both fuel tanks was 26 gallons total (13 gallons in each tank). The POH further stated that the usable fuel amount for all flight conditions was 22.5 gallons total, and the unusable fuel amount was 3.5 gallons total.

The Textron Aviation Pilot Safety and Warning Supplements discussed electrical power failures. This document states in part:

The pilot should maintain control of the airplane and land when practical if an electrical power loss is evident.

If an electrical power loss is experienced, continued flight is possible, but should be terminated as a soon as practical. Such things as fuel quantity and engine temperature indicators and panel lights may no longer work.

Review of the maintenance records revealed no evidence of uncorrected mechanical discrepancies with the airplane.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	KCPS,413 ft msl	**Distance from Accident Site:**	25 Nautical Miles
Observation Time:	03:53 Local	**Direction from Accident Site:**	25°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	27°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Greensburg, IN (I34)	**Type of Flight Plan Filed:**	None
Destination:	Festus, MO (FES)	**Type of Clearance:**	None
Departure Time:	20:15 Local	**Type of Airspace:**	Class G

According to information from the U.S. Naval Observatory, sunset at FES on the day of the accident occurred at 1902, and the end of civil twilight was 1928. Moonrise was 1656, and the moon transit was 2206. The phase of the moon was listed as waxing gibbous with 83% of its visible disk illuminated.

Airport Information

Airport:	FESTUS MEMORIAL FES	**Runway Surface Type:**	Asphalt
Airport Elevation:	433 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	19	**IFR Approach:**	None
Runway Length/Width:	2202 ft / 49 ft	**VFR Approach/Landing:**	Forced landing;Go around

The airport lighting system at FES was comprised of runway edge lights (medium intensity runway lights) and runway end identifier lights. A pilot could activate the lighting system while airborne by keying the aircraft's microphone on the airport's common traffic advisory frequency. The FES runway lighting system could also be manually activated by a switch on the outside of the main hangar.

A review of FAA Notices to Airmen for the day of the accident found no malfunctions or failures of the airport lighting system listed for FES.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	38.189998,-90.384445(est)

The wreckage was situated about one quarter of a mile south east of the departure end of runway 19 and about 440 ft above mean sea level.

Flight control continuity was established for the airframe. All structural components of the airplane were located at the accident site. The airplane sustained substantial damage to both wings, the fuselage, and the empennage. Both wings sustained substantial impact damage from contact with trees. The fuel tanks remained intact, and a total of about 2.25 gallons of fuel were extracted from the two fuel tanks. The propeller blades did not exhibit chordwise scratches or torsional deformation

The alternator and the voltage regulator were examined and functionally checked. The alternator performed normally with no malfunctions or failures; the voltage regulator was inoperable. The voltage regulator was manufactured around 1976. There was no life limit or replacement interval specified. Review of the airplane's maintenance records did not indicate how long the voltage regulator had been installed on the accident airplane.

With the exception of the voltage regulator, no preimpact mechanical malfunctions or failures with the airframe and engine were noted.

Figure 1 - View of the fuel being extracted to a five-gallon plastic bucket (courtesy of Continental Motors).

Medical and Pathological Information

The Jefferson County Office of the Regional Medical Examiner, St. Charles, Missouri, conducted an autopsy of the pilot. The cause of the death was attributed to "craniocerebral trauma."

The FAA's Forensic Sciences Laboratory performed toxicology tests on specimens from the pilot; testing was negative for carbon monoxide, ethanol, and drugs. A test for cyanide was not performed.

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Norman Loftsgard; FAA St. Louis FSDO; St. Ann, MO Jennifer Barclay; Textron Aviation; Wichita, KS Christopher Lang ; Continental Motors; Mobile, AL
Original Publish Date:	September 23, 2020
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98329

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.