Aviation Investigation Final Report

Location:	McVeytown, Pennsylvania	**Accident Number:**	ERA12LA541
Date & Time:	September 1, 2012, 09:00 Local	**Registration:**	N70415
Aircraft:	JOHNSTON DOUGLAS S SAFARI	**Aircraft Damage:**	Substantial
Defining Event:	Fuel exhaustion	**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

A witness who spoke with the pilot before the flight reported that the pilot had checked the fuel before departure and intended to "make a couple of laps" before proceeding to a local airport to purchase more fuel. Another witness observed the helicopter perform two 180-degree turns before it descended and impacted the ground. Examination of the accident site confirmed a vertical impact, and the helicopter damage was consistent with low or minimal rotor speed at the time of impact. Inspection of the fuel system revealed no fuel in the right fuel tank and about 2 pints of fuel in the left fuel tank. No contamination was observed in the fuel on board, and no obstructions were observed in the fuel system.

The experimental amateur-built helicopter was constructed from a kit and received its airworthiness certificate in 2003. The pilot purchased the helicopter about 4 months before the accident through the kit manufacturing company, which was brokering the sale of the helicopter for the builder’s estate. The pilot did not hold a pilot certificate and did not register the helicopter with the FAA. Examination of the pilot's logbook revealed that about 2 years before the accident, he had received 3.2 hours of helicopter instruction. Interviews revealed that when the pilot acquired the helicopter, he flew an additional 15 hours with the owner of the helicopter kit manufacturing company (in the accident helicopter and another company helicopter). However, these flights were limited to hover practice.

It is likely that while the pilot was maneuvering the helicopter at a low altitude, it experienced a loss of engine power due to fuel exhaustion. At this point, the pilot needed to immediately enter an autorotation. However, given the pilot’s limited flight training and his lack of pilot certification (he would have had to demonstrate an autorotation in order to become a

certificated helicopter pilot), he almost certainly was not proficient in performing autorotations. The helicopter's vertical impact with low rotor rpm is consistent with the pilot failing to make the control inputs necessary to enter an autorotation.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's lack of proficiency and certification, which resulted in his failure to enter an autorotation when the engine lost power. Contributing to the accident was the pilot's inadequate fuel planning, which resulted in fuel exhaustion and a subsequent loss of engine power.

Findings

Personnel issues	Qualification/certification - Pilot
Personnel issues	Total experience - Pilot
Personnel issues	Fuel planning - Pilot
Aircraft	Fuel - Fluid level

Factual Information

History of Flight

Maneuvering-low-alt flying	Fuel exhaustion (Defining event)
Maneuvering-low-alt flying	Loss of engine power (total)
Maneuvering-low-alt flying	Loss of control in flight
Uncontrolled descent	Collision with terr/obj (non-CFIT)

HISTORY OF FLIGHT

On September 1, 2012, at 0900 eastern daylight time, N70415, experimental amateur-built Safari helicopter was substantially damaged when it impacted the ground while maneuvering in McVeytown, PA. The non-certificated pilot was fatally injured. Visual meteorological conditions prevailed for the personal, local flight that was conducted under the provisions of 14 CFR Part 91.

According to a witness, he observed the helicopter flying away from him, and then made a 180-degree turn toward the hangar it was kept in. The helicopter then made another 180-degree turn and "started to go down." The witness observed a puff of smoke as the helicopter disappeared from his view.

PERSONNEL INFORMATION

A review of the Federal Aviation Administration (FAA) database revealed the pilot did not hold a pilot certificate.

According to a pilot logbook provided by the pilot's wife, he logged three flights on: August 14, 2010, August 21, 2010, and October 9, 2010. The total flight time for these flights was 3.2 hours.

AIRCRAFT INFORMATION

The helicopter was built from a kit, by the previous owner, and received its first airworthiness certificate on April 10, 2003. It was equipped with a Lycoming O-320, 160-horsepower engine.

The accident pilot purchased the helicopter in March 2012; however, there was no evidence that he attempted to acquire an airworthiness certificate or register the helicopter with the FAA.

A review of the helicopter and engine logbooks revealed the most recent condition inspection was completed on June 30, 2011 by the previous owner/builder. No anomalies were noted in

the entry, and a tachometer time of 395 hours was noted.

The tachometer time at the accident site was 442 hours.

According to the kit manufacturer, they brokered the sale of the helicopter between the accident pilot and the widow of the previous owner/builder. After the accident pilot purchased the helicopter, the kit manufacturer performed some maintenance on it to assure it was in a flyable condition. The work they performed included: replacing the main rotor spindle, and performing an annual condition inspection. This work was completed on May 11, 2012.

METEOROLOGICAL INFORMATION

The weather recorded at the nearest airport, at 0853, included wind from 280 degrees at 7 knots, 10 miles visibility, a broken cloud layer at 7,000 feet, temperature 23 degrees C, dew point 19 degrees C, and altimeter setting 30.13 inches mercury.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site confirmed the helicopter impacted the ground in a vertical attitude with minimal forward speed. Inspection of the main rotor blades and tail rotor blades revealed damage consistent with low or minimal rotor speed (RPM) impact with terrain. Main and tail rotor control system continuity was confirmed from the cockpit to the control surfaces. Inspection of the fuel system revealed no fuel in the right fuel tank and approximately 2 pints in the left fuel tank. A sample of fuel from the left tank was found to be free of contamination and consistent with 100LL aviation fuel. The carburetor bowl drain was opened and fuel was observed. No obstructions were noted in the fuel system, or the air induction system. The fuel selector was in the ON position.

The engine crankshaft was rotated at the propeller flange and thumb compression and valve train continuity was confirmed on all four cylinders. No mechanical anomalies were noted during the engine examination. [Additional information regarding the on-scene helicopter examination can be found in the FAA Inspector Statement located in the public docket.]

MEDICAL AND PATHOLOGICAL INFORMATION

The Mifflin County Coroner performed an autopsy on the pilot on September 1, 2012. The cause of death was listed as blunt force trauma.

The FAA Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma conducted toxicological testing on the pilot. No drugs or alcohol were noted in the testing.

ADDITIONAL INFORMATION

A witness who spoke with the pilot prior to the flight reported that the pilot had "five and a half inches" of fuel in the helicopter prior to departure. He reported the pilot intended to "make a couple of laps," and then they were going to fly to the local airport to purchase more fuel.

According to the kit manufacturer, when the pilot arrived at their facility to acquire the helicopter in May 2012, the owner of the kit manufacturing company flew with the pilot for about 15 hours (both in a company helicopter and in the accident helicopter). The purpose of these flights was for the pilot to practice hovering the helicopter. Because the pilot did not have a pilot's license and was not familiar with this type of helicopter, the company owner told him not to lift the helicopter more than 2 feet off the ground, once he arrived home, until he received instruction in it.

According to the pilot's wife, she believed the pilot flew the helicopter for the first time after it arrived at their home from the manufacturer's facility, on July 4, 2012. She estimated the pilot flew approximately every other weekend since then (three times in July and two in August).The pilot's wife believed the flights only included the pilot practicing lifting the helicopter off the ground and setting it back down again. He may have circled the field where he kept the helicopter, but she believed that would have been the longest duration of a flight. The pilot's wife was not aware that he intended to fly the helicopter on the day of the accident.

A review of the Height-Velocity diagram contained in the Safari Helicopter Flight Manual revealed that operations below an altitude of 400 feet and below airspeeds of 50 knots should be avoided.

According to the FAA Rotorcraft Flying Handbook, FAA-H-8083-21, the height/velocity (H/V) diagram depicts critical combinations of airspeed and altitude should an engine failure occur. Operations in crosshatched or shaded areas of the H/V diagram may not allow enough time for the critical transition from powered flight to autorotation.

Pilot Information

Certificate:	None	**Age:**	61,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 18 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	JOHNSTON DOUGLAS S	**Registration:**	N70415
Model/Series:	SAFARI	**Aircraft Category:**	Helicopter
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:		**Serial Number:**	0442N
Landing Gear Type:	Skid	**Seats:**	2
Date/Type of Last Inspection:	June 30, 2011 Condition	**Certified Max Gross Wt.:**	1500 lbs
Time Since Last Inspection:	47 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	442 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320
Registered Owner:	Ken Smith	**Rated Power:**	160 Horsepower
Operator:	Ken Smith	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	UNV,1239 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	08:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	10 miles
Lowest Ceiling:	Broken / 7000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	280°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	23°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	McVeytown, PA	**Type of Flight Plan Filed:**	None
Destination:	McVeytown, PA	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	40.45111,-77.826385(est)

Administrative Information

Investigator In Charge (IIC):	Demko, Jill
Additional Participating Persons:	Jim Pool; FAA/FSDO; Harrisburg, PA
Original Publish Date:	April 10, 2013
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84877