Aviation Investigation Final Report

Location:	Starbuck, Washington	**Accident Number:**	WPR17LA014
Date & Time:	October 28, 2016, 12:40 Local	**Registration:**	N369BD
Aircraft:	Aerospatiale AS350	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The commercial pilot reported that, during the agricultural application flight in the helicopter, the fuel pressure warning light illuminated. The pilot scanned the instruments and noted that the fuel pressure was low and that the fuel quantity was indicating between 40% and 50%. Subsequently, the engine started to lose power. The pilot entered an autorotation and set up the helicopter for landing in the flattest area. Subsequently, the helicopter landed hard, which resulted in substantial damage to the tailboom and main rotor assembly.

Postaccident examination of the helicopter revealed that the fuel tank was intact, undamaged, and empty of fuel. Given this evidence, the engine likely lost all power due to fuel exhaustion.

Despite the lack of fuel, the fuel quantity gauge indicated that 42% of the fuel was remaining (or about 60 gallons). Disassembly of the fuel transmitter revealed that the float guide pin was separated from the float assembly at the tack weld. The separation of the float guide pin allowed the float to slide down the center torque shaft and prevented the potentiometer drive plate at the bottom from rotating when the fuel quantity changed, which led to the fuel quantity gauge displaying an incorrect fuel level.

A review of the airplane's maintenance records revealed that the fuel transmitter was overhauled about 11 months before the accident. Given the evidence, it is likely that, during the overhaul, maintenance personnel improperly welded the float pin guide to its mount and subsequently did not adequately inspect it, which led to its eventual separation from the assembly at the welded area.

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, which resulted from the pilot's reliance on the fuel gauge that was displaying an incorrect fuel amount due to the separation of the fuel transmitter float pin guide from the float.

Findings

Aircraft	Fuel quantity sensor - Failure
Aircraft	Fuel - Fluid level
Personnel issues	Repair - Maintenance personnel
Aircraft	Fuel quantity sensor - Incorrect service/maintenance

Factual Information

History of Flight

Maneuvering-low-alt flying	Miscellaneous/other
Maneuvering-low-alt flying	Fuel exhaustion
Maneuvering-low-alt flying	Loss of engine power (total) (Defining event)
Landing	Off-field or emergency landing
Landing	Hard landing

On October 28, 2016, about 1240 Pacific daylight time (PDT), a Eurocopter S.N.I.A.S. AS350B helicopter, N369BD, sustained substantial damage during a forced landing following a loss of engine power near Starbuck, Washington. The commercial pilot was not injured. The helicopter was registered to a private individual and operated by Leading Edge Aviation LLC under the provisions of Title 14 *Code of Federal Regulations* Part 137 as an aerial application flight. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight. The flight originated from a nearby staging area at 1137.

The pilot reported that during the flight as he was making his 6th pass, on the 5th application load, and traveling upslope from the west to the east, the fuel pressure warning light illuminated. The pilot scanned the instruments and noticed the fuel pressure was low, and the fuel quantity was indicating between 40-50%. About 3-4 seconds later the engine started to lose power. The pilot entered an autorotation and set up for a landing in the flattest area he could find in the canyon. During the approach the pilot extended the landing to make it to a more suitable site. The helicopter subsequently landed hard.

The helicopter sustained substantial damage to the tailboom and to the main rotor assembly. During the recovery it was noted that the helicopter fuel tank was intact, undamaged and void of fuel, but the fuel quantity gauge still indicated 42% fuel remaining, which converts to about 60-gallons.The helicopter was recovered from the accident site for further examination.

Examination of the fuel transmitter revealed that the float guide pin was separated from the float assembly at the tack weld. According to the manufacturer, the separation of the float guide pin would allow the float to slide down the center torque shaft and not allow the potentiometer drive plate at the bottom to rotate with changing fuel quantity. Maintenance records for the overhauled fuel transmitter stated that the float guide was replaced at the time of overhaul on November 23, 2015.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	36,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	Helicopter	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	January 1, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	4529 hours (Total, all aircraft), 862 hours (Total, this make and model), 4441 hours (Pilot In Command, all aircraft), 320 hours (Last 90 days, all aircraft), 128 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aerospatiale	**Registration:**	N369BD
Model/Series:	AS350 BA	**Aircraft Category:**	Helicopter
Year of Manufacture:	1983	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1675
Landing Gear Type:	Skid	**Seats:**	
Date/Type of Last Inspection:	October 27, 2016 100 hour	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	1.6 Hrs	**Engines:**	Turbo shaft
Airframe Total Time:	14004.8 Hrs at time of accident	**Engine Manufacturer:**	Honeywell
ELT:	C126 installed, activated, aided in locating accident	**Engine Model/Series:**	LTS101700D2
Registered Owner:	Jim D. Pope	**Rated Power:**	732 Horsepower
Operator:	Leading Edge Aviation LLC	**Operating Certificate(s) Held:**	Rotorcraft external load (133), On-demand air taxi (135), Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KALW,1205 ft msl	**Distance from Accident Site:**	30 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	193°
Lowest Cloud Condition:	Clear	**Visibility**	
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	330°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	16°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Starbuck, WA	**Type of Flight Plan Filed:**	None
Destination:	Starbuck, WA	**Type of Clearance:**	None
Departure Time:	11:37 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	LITTLE GOOSE LOCK AND DAM 16W	**Runway Surface Type:**	
Airport Elevation:	681 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

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:**	46.588333,-118.123054(est)

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Phil Griffis; Federal Aviation Administration; Spokane, WA
Original Publish Date:	April 13, 2020
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=94317