



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Brawley, CA	<b>Accident Number:</b>	WPR16LA134
<b>Date &amp; Time:</b>	07/02/2016, 0230 PDT	<b>Registration:</b>	N6251G
<b>Aircraft:</b>	BELL OH 58A	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 137: Agricultural		

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## Analysis

The commercial pilot reported that, after departing for the agricultural flight, he maneuvered the helicopter to line up with the field to be sprayed. Shortly after lining up with the field, the engine started to surge, and he saw the torque meter needle "bouncing rapidly." The pilot initiated a precautionary landing to an open field. The helicopter landed hard, which resulted in substantial damage to the tailboom and tail rotor drive shaft.

A test run of the engine revealed that the bleed valve did not close at any speed and that the engine produced less than 250 horsepower (hp). The bleed valve was disassembled, and the diaphragm was found to have several holes and cracks, and the poppet valve located in the bleed valve assembly had radial play, consistent with worn bushings. The damaged bleed valve was replaced with an overhauled bleed valve, and during a subsequent test run, the engine produced about 380 hp, which is about 7% below minimum allowable power for a serviceable engine. Given these results, the excessive wear of the bleed valve likely prevented it from closing during the accident flight, which resulted in the engine's degraded performance.

According to the operator, the compressor, turbine, and bleed valve assemblies were overhauled about 2 years before the accident and then reassembled on the engine. The engine had operated about 766 hours since overhaul at the time of the accident. The engine manufacturer reported that the bleed valve assembly should be overhauled every 1,500 hours. No component log cards or historical information for the bleed valve was located during the investigation.

According to the engine manufacturer, the bleed valve exhibited wear that was not consistent with a bleed valve with comparable service time. Therefore, it is likely that the bleed valve was likely not overhauled 2 years before the accident as reported by the operator and that it was beyond the overhaul period of 1,500 hours, which resulted in the observed wear that ultimately prevented the engine from producing sufficient power during takeoff.

## Probable Cause and Findings

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

The engine's degraded performance due to excessive wear of the engine bleed valve, which prevented it from closing during the accident flight. Contributing to the accident was the operator's failure to overhaul the bleed valve within the manufacturer-recommended interval.

### Findings

<b>Aircraft</b>	Compressor bleed valve - Damaged/degraded (Cause) Scheduled maint checks - Not serviced/maintained (Cause)
<b>Personnel issues</b>	Scheduled/routine maintenance - Other/unknown (Cause)

## Factual Information

On July 2, 2016, about 0230 Pacific daylight time, a Bell OH-58A, single-engine, agricultural helicopter, N6251G, experienced a partial loss of engine power while in the vicinity of Brawley Municipal Airport (BWC), Brawley, California. The commercial pilot was not injured. The helicopter was substantially damaged during the precautionary landing to a cropped field. The helicopter was registered to the Bank of Utah, and operated by Farm Aviation, Inc., Brawley, California, as a Title 14 *Code of Federal Regulations* Part 137 aerial application flight. Night visual meteorological conditions were reported about the time of the accident. A flight plan was not filed for the local flight which departed shortly before the accident.

The pilot reported that after he departed BWC with a full chemical load, he maneuvered about 1/4 mile from the airport and made a 90° turn to line up on the field to be sprayed. Shortly after lining up, the engine started to surge, and the torque meter needle was "bouncing rapidly." The pilot then initiated a precautionary landing. The helicopter landed hard in an open field and came to rest in an upright position.

Examination of the helicopter, which was conducted by a representative from the Federal Aviation Administration (FAA), revealed that the tailboom and tail rotor driveshaft had sustained impact damage consistent with a main rotor strike as a result of the hard landing. The onsite examination of the airframe and engine revealed no anomalies.

Helicopter maintenance documentation was not available during the investigation. According to the pilot, the airframe had a total operating time of 13,688 hours at the time of the accident. The engine had a total operating time of 5,618 hours. The last 100-hour inspection was performed on June 15, 2016, about 74 hours prior to the accident flight.

The helicopter was moved to a secure location and the engine was shipped to a facility for further examination.

Examination of the engine was conducted at Aero Maritime in Phoenix, Arizona on July 28, 2016. An FAA inspector and a Rolls-Royce investigator were present for the examination. The engine was set up in a test cell and during the test run the engine's bleed valve did not close at any speed; the engine produced less than 250 horsepower. When the chip detectors were removed it was revealed that the lower detector had metal debris present and the upper detector had light amounts of metal debris present. When the bleed valve was replaced with an overhauled bleed valve, an additional test run resulted in increased performance rating of about 380 hp being produced (about 7% below minimum allowable power for a serviceable engine) before reaching the maximum specified operating temperature. After the engine test run, the engine was revealed to be unserviceable due to its low power production. No component log card or historical information for the bleed valve was found. According to the operator, the compressor, turbine and bleed valve assemblies were overhauled in July 2014, and assembled as an engine. According to Rolls-Royce, the overhaul period for the bleed valve assembly is 1,500 hours. No log cards were available for the bleed valve installed. The engine had 766 hours since overhaul at the time of the accident.

When the accident engine's bleed valve was disassembled it was found that the diaphragm had several holes and cracks. The poppet valve located in the bleed valve assembly, had radial play consistent with worn bushings. According to Rolls-Royce, the non-functioning bleed valve exhibited wear that was not consistent with a bleed valve with comparable service time.

## History of Flight

<b>Maneuvering-low-alt flying</b>	Loss of engine power (partial) (Defining event)
<b>Landing</b>	Off-field or emergency landing Hard landing

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	42, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Without Waivers/Limitations	<b>Last FAA Medical Exam:</b>	07/29/2015
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	05/30/2015
<b>Flight Time:</b>	7000 hours (Total, all aircraft), 1500 hours (Total, this make and model), 7000 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 50 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	BELL	<b>Registration:</b>	N6251G
<b>Model/Series:</b>	OH 58A NO SERIES	<b>Aircraft Category:</b>	Helicopter
<b>Year of Manufacture:</b>	1970	<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Restricted	<b>Serial Number:</b>	70-15444
<b>Landing Gear Type:</b>	Ski;	<b>Seats:</b>	1
<b>Date/Type of Last Inspection:</b>	06/15/2016, 100 Hour	<b>Certified Max Gross Wt.:</b>	3000 lbs
<b>Time Since Last Inspection:</b>	74 Hours	<b>Engines:</b>	1 Turbo Shaft
<b>Airframe Total Time:</b>	13688 Hours at time of accident	<b>Engine Manufacturer:</b>	AMA/EXPR
<b>ELT:</b>		<b>Engine Model/Series:</b>	UNKNOWN ENG
<b>Registered Owner:</b>	FARM AVIATION INC	<b>Rated Power:</b>	hp
<b>Operator:</b>	FARM AVIATION INC	<b>Operating Certificate(s) Held:</b>	Agricultural Aircraft (137)

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night
Observation Facility, Elevation:	KIPL, -58 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:	0853 UTC	Direction from Accident Site:	198°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	9 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	80°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29.77 inches Hg	Temperature/Dew Point:	29° C / 18° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Brawley, CA	Type of Flight Plan Filed:	None
Destination:	Brawley, CA	Type of Clearance:	None
Departure Time:	PDT	Type of Airspace:	Class G

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	32.994722, -115.518333 (est)

## Administrative Information

Investigator In Charge (IIC):	Andrew L Swick	Report Date:	04/13/2020
Additional Participating Persons:	Roger Messick; FAA FSDO; San Diego, CA Jack Johnson; Rolls-Royce Corp.; Indianapolis, IN		
Publish Date:	04/13/2020		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93515">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=93515</a>		

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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](#).