Aviation Investigation Final Report

Location:	Yuma, Arizona	**Accident Number:**	WPR23LA107
Date & Time:	February 6, 2023, 21:35 Local	**Registration:**	N36FA
Aircraft:	Bell OH-58A	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	1 Minor
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot of the helicopter was conducting an agricultural application flight in dark night conditions. He stated that, after completing the chemical application, he landed on the load truck and the hopper was filled with 50 gallons of water to rinse out the applicator system. The pilot departed from the load truck toward an open field about 200 yards away. The pilot stated that, while maneuvering about 40 ft above ground level when the spray tank was almost empty, the helicopter began to “bounce and tilt in all directions,” then “fish-tailed” before the engine lost total power. The pilot stated that he was unable to judge the helicopter’s height above the ground, and the helicopter subsequently landed hard, during which the main rotor blades severed the tail rotor drive shaft.

Postaccident examination of the helicopter and engine revealed no anomalies or malfunctions that would have precluded normal operation. About 5 gallons of fuel was found in the fuel tank, 1.4 gallons of which was unusable. No engine abnormalities were found during an engine run on a test stand.

Based on the available information, the reason for the loss of engine power could not be determined.

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 for reasons that could not be determined.

Findings

Not determined	(general) - Unknown/Not determined
Organizational issues	Maintenance records - Maintenance provider

Factual Information

History of Flight

Maneuvering-hover	Unknown or undetermined (Defining event)

On February 6, 2023, about 2140 mountain standard time, a Bell OH-58A helicopter, N36FA, was substantially damaged when it was involved in an accident near Yuma, Arizona. The commercial pilot sustained minor injuries. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 137aerial application flight.

The pilot stated that he landed in night conditions on the load truck and the chemical hopper was filled with 50 gallons of water to rinse out the applicator system. The pilot departed from the load truck toward an open field about 200 yards away. While maneuvering about 40 ft above ground level, with a speed near effective translational lift, and about 80% transmission torque, the helicopter suddenly started to bounce and yaw. The pilot stated that, when the spray tank was almost empty, the helicopter began to “bounce and tilt in all directions,” then “fish-tailed” before the engine lost total power. The pilot arrested the helicopter’s forward movement by pulling back on the control stick and leveled the helicopterwhile lowering the collective. Unable to judge his height above the ground, the pilot alternately raised and lowered the collective to control the descent, and the helicopter landed hard in the dirt field, and a main rotor blade struck and severed the tail rotor driveshaft. The main rotor and blades assembly separated from the mast and landed about 100 ft from the upright helicopter, as shown in Figure 1.

Figure 1 - Main rotor yoke and blades (Photo courtesy of operator)

The airframe had accrued a total of 9,629.8 hours at the time of the accident; its most recent annual inspection was 8 months before the accident. Flight control continuity was established from the cyclic and collective control to the hydraulic servos and from the hydraulic servos to the non-rotating swashplate. Flight control continuity was established from the anti-torque pedals to the tail rotor pitch control rods. Continuity was established from the throttle twist grip to the fuel control, and from the collective to the fuel governor. The master fuel valve lever was observed in the ON position. Fuel was present from the airframe filter to the fuel spray nozzle. A visual assessment of the fuel remaining found approximately 5 gallons of clean and clear fuel in the fuel tank. The fuel quantity gauge, when energized, did not display an accurate depiction of the actual amount of fuel on board, registering near zero. The fuel supply hose from the airframe fuel filter canister to the engine fuel pump inlet was removed. Fuel dripped from the engine fuel pump after the hose was removed. The fuel pump was found operable when power was applied to it. A general visual inspection of the engine's various fuel, oil, air, and electrical connections, including B-nuts, indicated that they were tight and painted with torque stripe.

The helicopter was powered by an Allison M250-C20C (T-63-A720), a turbo-shaft, gas-coupled free-power turbine engine. The most recent engine replacement was annotated in the engine logbook and was completed on October 18, 2022, about 4 months before the accident flight. The most recent 100-hour inspection was completed on December 27, 2022, at an aircraft total time of 9,573.8 hours. During a postaccident test run, the engine produced sufficient power

and revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

Pilot Information

Certificate:	Commercial	**Age:**	66,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	4-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 17, 2022
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 1, 2022
Flight Time:	20770 hours (Total, all aircraft), 7800 hours (Total, this make and model), 20700 hours (Pilot In Command, all aircraft), 143 hours (Last 90 days, all aircraft), 65.7 hours (Last 30 days, all aircraft), 2.5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Bell	**Registration:**	N36FA
Model/Series:	OH-58A	**Aircraft Category:**	Helicopter
Year of Manufacture:	1968	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	68-16765
Landing Gear Type:	None; High skid	**Seats:**	2
Date/Type of Last Inspection:	June 2, 2022 Annual	**Certified Max Gross Wt.:**	3200 lbs
Time Since Last Inspection:	56 Hrs	**Engines:**	1 Turbo shaft
Airframe Total Time:	9629.8 Hrs at time of accident	**Engine Manufacturer:**	Rolls Royce
ELT:	Not installed	**Engine Model/Series:**	T63-A720
Registered Owner:	TRI ROTOR SPRAY & CHEMICAL	**Rated Power:**	420 Horsepower
Operator:	TRI ROTOR SPRAY & CHEMICAL	**Operating Certificate(s) Held:**	Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	KNYL,213 ft msl	**Distance from Accident Site:**	4 Nautical Miles
Observation Time:	20:57 Local	**Direction from Accident Site:**	237°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	7 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	16°C / -2°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Somerton, AZ (AZ25)	**Type of Flight Plan Filed:**	None
Destination:	Yuma, AZ	**Type of Clearance:**	None
Departure Time:	18:35 Local	**Type of Airspace:**	Class D

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	32.6895,-114.54555

Administrative Information

Investigator In Charge (IIC):	Johnson, Scott
Additional Participating Persons:	Ryan Armenta; Federal Aviation Administration; Scottsdale, AZ Daniel Gilligan; Federal Aviation Administration; Scottsdale, AZ
Original Publish Date:	November 14, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=106695

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, "accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties … and are not conducted for the purpose of determining the rights or liabilities of any person" (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available here.