



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	Hildale, Utah	Accident Number:	WPR24LA161
Date & Time:	May 27, 2024, 08:00 Local	Registration:	N57948
Aircraft:	Aerospatiale SA315B	Aircraft Damage:	Substantial
Defining Event:	Loss of engine power (total)	Injuries:	3 Minor, 1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was conducting a local flight with passengers when, shortly after takeoff, the engine “felt sluggish” and lost power. He subsequently performed an autorotation to a road. The helicopter landed hard; the main rotor blades impacted the tail boom and the right skid splayed outward. A witness-provided video of the flight showed flames emanating from the exhaust tailpipe within a few seconds of the helicopter taking off and continuing until the helicopter impacted the ground.

The engine uses two thermocouples to provide a signal to the Exhaust Gas Temperature (EGT) gauge in the cockpit. During a postaccident examination of the engine, the lower thermocouple was found to be hanging loose from its boss on the exhaust section and not exposed to the engine exhaust. The upper thermocouple was found tight but not safety wired. The upper probe was found with thermal damage that melted the probe wire in the gas path. The lower probe did not exhibit any damage. Severe thermal damage was observed on all three stages of turbines and the 2nd and 3rd nozzle guide vanes. No additional pre-impact anomalies were noted with the engine or airframe.

The engine turbine section had been replaced 3.4 flight hours before the accident. The replacement would have required the removal and reinstallation of the engine exhaust section and both thermocouples. A periodic inspection of the engine was also completed at that time. The mechanic who performed the turbine replacement and periodic inspection stated he checked the installation of the thermocouples as part of his post-maintenance procedures. Postflight maintenance checks and pilot preflight checks specified checks of the engine, including the exhaust section where the thermocouples are located. According to the pilot, the EGT during startup was at least 100° cooler than before the turbine replacement and

temperatures during hover and flight remained about 50° below the limit for continuous operation.

Although the mechanic stated that he checked the thermocouples after maintenance, the accident is consistent with maintenance personnel not securing the thermocouples properly. This resulted in lower EGT temperatures being presented to the pilot than what were being generated by the engine during operation. It is therefore likely that the pilot unknowingly exceeded the engine’s operating temperature limits, resulting in a catastrophic overtemperature event and total loss of engine power.

Probable Cause and Findings

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

Maintenance personnel’s failure to properly secure the EGT thermocouples, which resulted in catastrophic overtemperature of the engine and a total loss of engine power.

Findings	
Personnel issues	Installation - Maintenance personnel
Aircraft	EGT/TIT - Incorrect service/maintenance
Aircraft	Combustion section - Damaged/degraded
Aircraft	Altitude - Attain/maintain not possible

Factual Information

History of Flight

Prior to flight	Aircraft maintenance event
Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing

On May 27, 2024, at 0800 mountain daylight time, an Aerospatiale SA-315B, N57948, was substantially damaged when it was involved in an accident near Hildale, Utah. The pilot and two passengers received minor injuries and one passenger was uninjured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot stated he was flying family members and friends around a relative’s residence. He completed one local flight of 15-20 minutes with four passengers, landed, and shut down to clean his windscreen. Three passengers then boarded the helicopter for a second local flight. The pilot said that the second takeoff was normal, but shortly after takeoff the engine “felt sluggish.” He estimated the helicopter was about 50 ft above the ground at an airspeed of about 50 knots when he saw the rotor speed was diminishing and engine rpm was nearly gone, so he proceeded to perform an autorotation to a road. The helicopter landed hard; the main rotor blades impacted the tail boom and the right skid splayed outward. A witness-provided video of the flight showed flames emanating from the exhaust tailpipe within a few seconds of the helicopter taking off and continuing until the helicopter impacted the ground.

Postaccident examination revealed external thermal damage corresponding to the exhaust pipe inlets and piping; the exhaust pipe had been crushed consistent with impact from the accident sequence. The exhaust pipe was removed to examine the three stages of turbines. Severe thermal damage was observed on all 3 stages of turbines and the 2nd and 3rd nozzle guide vanes.

The engine uses two thermocouples to provide a signal to the EGT gauge in the cockpit. Upon external examination of the engine, the lower thermocouple was found to be hanging loose from its boss on the exhaust section (Figure 1). A review of photographs taken onsite showed that the lower thermocouple was in the same loose condition immediately following the accident (Figure 2). The upper thermocouple was found tight but not safety wired. The engine maintenance manual states that the thermocouple retention nut should be secured using stainless steel wire during installation. The upper probe was found with thermal damage that melted the probe wire in the gas path. The lower probe did not exhibit any damage. No additional preimpact anomalies were noted with the engine or airframe.



Figure 1 – Loose Thermocouple



Figure 1 – Engine and Loose Thermocouple (Courtesy of Hildale Police Dept.)

A review of the engine logbook revealed the turbine section was replaced on May 9, 2024, which would have required the removal and reinstallation of the engine exhaust section and thermocouples. A periodic inspection of the engine was also completed on that date. The engine and airframe accumulated 3.4 hrs between the time of the turbine section replacement and the accident.

The pilot told investigators that he thought he flew about 6 flights after the turbine section replacement. He stated that following the maintenance, the EGT ranged from 350-400°C during startup and was about 450°C at hover/flight. He said, “startup is at least 100° cooler than it had been running for the previous 1.5 years.” The helicopter flight manual states that the maximum operating tailpipe temperature (EGT) is 550°C for 5 minutes and 500°C for continuous operation.

The mechanic who replaced the turbine section of the engine stated he is a full-time mechanic and has operated his current business since 2017. He employs one non-mechanic employee to assist him with manual labor and often relies on friends who are qualified mechanics to perform quality control and check his work. He stated the pilot and owner of the helicopter,

who is not a certified mechanic, assisted him with some of the work on the engine. He recalled that he checked the security of the thermocouples following maintenance checks.

The EGT value presented at the EGT indicator (gauge) in the cockpit initiates from the two thermocouples located in the engine exhaust (T4) section. The thermocouples deliver an electromotive force proportional to the T4 temperature at each thermocouple to an automatic control box, where they are summed together and subjected to a preset resistance at a fixed level before being received at the EGT indicator. It operates such that if one thermocouple is subjected to a lower temperature than the other thermocouple, its electromotive force will be lower and the sum of the electromotive forces from both thermocouples will be lower. Subsequently, the EGT indicator in the cockpit will show a lower engine exhaust temperature.

Chapter 5 of the engine maintenance manual, "Inspection – TBO and Life Limits – Special Checks," contains the procedure for the "Check after last flight of the day." That procedure includes steps to check the exhaust section of the engine.

The pilot's operating handbook normal procedures states that the first pilot check concerning the preflight external checks is to ascertain that the inspection of the last flight of the day has been completed. The POH also demonstrates the proper methodology for conducting a walkaround before flight, which includes inspection of the exposed engine.

A National Transportation Safety Board Pilot/Operator Aircraft Accident/Incident Report Form 6120.1 was not received from the pilot.

Pilot Information

Certificate:	Commercial	Age:	39, Male
Airplane Rating(s):	None	Seat Occupied:	Right
Other Aircraft Rating(s):	Helicopter	Restraint Used:	
Instrument Rating(s):	Helicopter	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	June 27, 2024
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	540 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Aerospatiale	Registration:	N57948
Model/Series:	SA315B	Aircraft Category:	Helicopter
Year of Manufacture:	1982	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	2628
Landing Gear Type:	Skid	Seats:	5
Date/Type of Last Inspection:	May 9, 2024 Annual	Certified Max Gross Wt.:	
Time Since Last Inspection:	3.4 Hrs	Engines:	1 Turbo shaft
Airframe Total Time:	4077.8 Hrs as of last inspection	Engine Manufacturer:	Turbomeca
ELT:		Engine Model/Series:	Artouse IIIB
Registered Owner:	PERCO ROCK	Rated Power:	563 Horsepower
Operator:	On file	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	KAZC, 4874 ft msl	Distance from Accident Site:	4 Nautical Miles
Observation Time:	07:55 Local	Direction from Accident Site:	176°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	/	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.18 inches Hg	Temperature/Dew Point:	21°C / 0°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hildale, UT	Type of Flight Plan Filed:	None
Destination:	Hildale, UT	Type of Clearance:	None
Departure Time:		Type of Airspace:	Class G

Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	2 Minor, 1 None	Aircraft Fire:	In-flight
Ground Injuries:		Aircraft Explosion:	None
Total Injuries:	3 Minor, 1 None	Latitude, Longitude:	37.021896,-113.0189(est)

Administrative Information

Investigator In Charge (IIC):	Baker, Daniel
Additional Participating Persons:	Mike Stone; FAA; Las Vegas, NV Bryan Larimore; Safran Engines Sett Buttner; Airbus Helicopters; TX Bernard Boudaille; BEA
Original Publish Date:	April 24, 2025
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=194321

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