Aviation Investigation Final Report

Location:	Northport, Washington	**Accident Number:**	WPR18LA222
Date & Time:	August 14, 2018, 15:00 Local	**Registration:**	N397AS
Aircraft:	Air Tractor AT802	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 Serious
Flight Conducted Under:	Public aircraft		

Analysis

The accident airplane was one of three public aircraft that were supporting firefighting operations. The three airplanes had made four successful water drops and had just scooped water from a river to make a fifth drop. The airplanes were in a climb en route to the drop location when the pilot of the accident airplane heard a “loud bang” followed by a total loss of engine power. The pilot made a forced landing to treetops in a heavily forested area.

During the on-site examination, a coat of oil was observed on the cowling and one of the wings. Damage was also observed to the engine. The engine examination revealed that a second-stage power turbine blade exhibited fatigue signatures, and molten debris was identified throughout the engine. The debris was subsequently identified as environmental particles, but the source of the debris was not determined from the available evidence for this investigation. The loss of engine power was likely due to the accumulation of foreign melted environmental debris on the engine’s hot section components, which resulted in the first- and second-stage power turbine blades fracturing from tensile overload.

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 during a climb due to an accumulation of molten environmental particles, the source of which could not be determined based on the available evidence, which resulted in a forced landing.

Findings

Aircraft	Turbine section - Failure
Environmental issues	Debris/dirt/foreign object - Effect on equipment
Environmental issues	Tree(s) - Contributed to outcome

Factual Information

History of Flight

Maneuvering-low-alt flying	Loss of engine power (total) (Defining event)
Landing	Collision with terr/obj (non-CFIT)

On August 14, 2018, about 1500 Pacific daylight time, an Air Tractor AT-802A, N397AS, was substantially damaged when it was involved in an accident near Northport, Washington. The pilot was seriously injured. The airplane was operated as a public use aircraft under the provisions of Title 14 *Code of Federal Regulations* Part 91.

According to the Washington State Department of Natural Resources, the airplane was operated under a call-when-needed contract as a single-engine air tanker.

The purpose of the flight was to support of firefighting operations in Colville National Forest, which is about 11 miles northwest of Northport. The accident airplane was one of three airplanes deployed to respond to the fire. The three airplanes had made four successful water drops and had just scooped water from the Columbia River for a fifth drop. The airplanes were climbing through an altitude of 4,600 ft mean sea level when two of the pilots heard the pilot of the accident airplane announce “mayday” and state that his airplane was losing engine power.

The pilot of the accident airplane stated that the engine was running nominally until he heard “a rather loud bang,” which was followed by a total loss of engine power. He stated that the compressor was running and was responsive to throttle inputs but that there was no noticeable thrust. The pilot was initially planning to land on an old logging road, but the landing area was too narrow and was lined with trees on both sides of the road. The pilot opted instead to stall the airplane to the treetops. After impact with the trees, the airplane came to rest upright at the base of the trees adjacent to the road.

A Federal Aviation Administration inspector responded to the accident site and reported that the entire airplane came to rest there. The inspector noted that the cowling and one wing were coated with oil and that the engine was damaged.

Examination of the accident site by the US Forest Service revealed that the airplane impacted trees adjacent to a fire road The fuselage came to rest upright on a magnetic heading of about 232° and at an elevation of 3,570 ft mean sea level. The first identified point of impact was a 50- to 75-ft tall tree that had damaged limbs near the top of the tree. The debris path was oriented on a magnetic heading of 143° and was about 345 ft in length. Various portions of airplane fragments were distributed throughout the debris path. Additionally, several trees were damaged along the debris path.

Postaccident examination of the engine revealed foreign melted debris in the engine combustion chamber with the molten mass stuck to the combustors, turbine vane rings, and turbine blades. The debris was identified as environmental particles, but the source of the debris was not identified.

A second-stage power turbine blade exhibited fatigue signatures. According to Pratt & Whitney Canada, the fatigue appeared to have initiated from several regions of "microshrinkage porosities." Pratt & Whitney Canada also stated that there was no foreign melted debris on the fracture surface of the second-stage power turbine blade. The fracture faces of the first and second stage power turbine blades exhibited overload signatures.

Inspections and functional tests were performed on the fuel pump, fuel control unit, flow divider valve, fuel oil heat exchanger, overspeed governor, and fuel nozzles. Additionally, the compressor bleed valve and propeller governor were disassembled and inspected. No mechanical anomalies were found that would have precluded normal operation.

Pilot Information

Certificate:	Commercial	**Age:**	43,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	Unknown
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	May 10, 2018
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 14, 2018
Flight Time:	(Estimated) 7658 hours (Total, all aircraft), 52 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Air Tractor	**Registration:**	N397AS
Model/Series:	AT802 A	**Aircraft Category:**	Airplane
Year of Manufacture:	2014	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	802A-0563
Landing Gear Type:	None; Float	**Seats:**	1
Date/Type of Last Inspection:	November 17, 2017 Continuous airworthiness	**Certified Max Gross Wt.:**	
Time Since Last Inspection:		**Engines:**	1 Turbo prop
Airframe Total Time:	559.1 Hrs at time of accident	**Engine Manufacturer:**	PW Canada
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-67F
Registered Owner:	Wells Fargo Bank Northwest Na Trustee	**Rated Power:**	1600 Horsepower
Operator:	Air Spray USA, Inc.	**Operating Certificate(s) Held:**	On-demand air taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KDEW,2205 ft msl	**Distance from Accident Site:**	65 Nautical Miles
Observation Time:	13:53 Local	**Direction from Accident Site:**	159°
Lowest Cloud Condition:	Clear	**Visibility**	4 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.99 inches Hg	**Temperature/Dew Point:**	28°C / 5°C
Precipitation and Obscuration:	Moderate - None - Haze		
Departure Point:	Deer Park, WA (DEW)	**Type of Flight Plan Filed:**	Company VFR
Destination:	Deer Park, WA (DEW)	**Type of Clearance:**	None
Departure Time:	12:00 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Serious	**Latitude, Longitude:**	48.980278,-118.01777(est)

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	Kevin J Marsac; Federal Aviation Administration; Spokane, WA Lori Clark; United States Forest Service; Boise, ID Ravi Saip; AirSpray Air Tankers; Chico, CA Kyle Schroeder; Air Tractor, Inc.; Olney, TX
Original Publish Date:	September 21, 2022
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98072