Aviation Investigation Final Report

Location:	Pearsall, Texas	**Accident Number:**	CEN14LA287
Date & Time:	June 12, 2014, 12:00 Local	**Registration:**	N8593S
Aircraft:	AIR TRACTOR INC AT 301	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The pilot reported that, while returning to the airport after spraying a cornfield, he noticed that the engine cylinder head temperature was high. After landing, he checked the engine cylinders for discrepancies and found none, so he decided to continue the spraying operations at the cornfield. As the pilot pulled up the airplane from a spray run, the engine started to vibrate and lose power. He subsequently made a forced landing in a nearby field, which resulted in the airplane sustaining substantial damage to both wings.

During postaccident examination, a considerable amount of metal was found in the oil drain. The No. 2 cylinder front spark plug was loose. After removing all of the spark plugs, an attempt was made to rotate the engine, but it seized. After removing the No. 1 cylinder, it was discovered that the piston rod had broken at the link pin; no other rods were broken. The No. 1 cylinder link pin was scored, and there was evidence of oil starvation at the rod bearing. According to the operator, the engine had accrued about 100 hours since it had received extensive maintenance, including the replacement of the crankshaft. It is likely that the oil cooler was not properly flushed when the crankshaft was replaced and that metal and other debris remained in the oil, clogged the drain, and caused the piston to fail.

Probable Cause and Findings

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

The failure of the No. 1 cylinder rod at the link pin. Contributing to the accident was oil starvation to the rod bearing due to the improper flushing of the oil cooler, which allowed metal and other debris in the oil to clog the drain and the led to the piston's failure.

Findings

Aircraft	Recip eng cyl section - Failure
Environmental issues	(general) - Contributed to outcome
Aircraft	Recip eng cyl section - Incorrect service/maintenance
Aircraft	Oil - Fluid level

Factual Information

History of Flight

Maneuvering	Loss of engine power (partial) (Defining event)
Emergency descent	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On June 12, 2014, about 1200 central daylight time, the pilot of an Air Tractor AT 301, N8593S, made a forced landing in a field near Pearsall, Texas, following a loss of engine power. The pilot, the sole occupant on board, was not injured. The airplane was substantially damaged. The airplane was registered to Matt Fitch and operated Smith Flying Service, doing business as Fitch Flying Service, of Pearsall, Texas, under the provisions of 14 Code of Federal Regulations Part 137 as an aerial application flight. Visual meteorological conditions prevailed at the time of the accident, and no flight plan had been filed. The local flight originated from Pearsall about 1140.

According to the pilot, he returned to the airport after spraying a corn field and noticed the cylinder head temperature was high. After landing the engine cylinders were checked for discrepancies; none were found, so he decided to continue spraying. He took off and returned to the corn field. As he pulled up from a spray run, the engine started to vibrate and lose power. He made a forced landing in a nearby field. Examination of the airplane revealed both wings had sustained substantial damage during the forced landing.

According to the operator, the engine had accrued about 11 hours since the engine received extensive maintenance, including the replacement of a crankshaft.

The engine was shipped to Tulsa Engines in Tulsa, Oklahoma, where, on September 3, it was partially disassembled and examined under the auspices of a Federal Aviation Administration inspector. According to the FAA inspector's report, there was a large amount of metal in the oil drain. It was noted that the number 2 cylinder front spark plug was loose. After removing all the spark plugs, an attempt was made to rotate the engine. It was seized. Numbers 4, 5, 6, and 7 cylinders had oil; number 4 cylinder had more oil. After some difficulty in removing the no. 1 cylinder, it was discovered that the piston rod had broken at the link pin. No other rods were broken. The link pin was scored and there was evidence of oil starvation of the rod bearing.

Pilot Information

Certificate:	Commercial	**Age:**	23
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	4-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	November 29, 2013
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 4, 2013
Flight Time:	472 hours (Total, all aircraft), 220 hours (Total, this make and model), 415 hours (Pilot In Command, all aircraft), 150 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 7 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIR TRACTOR INC	**Registration:**	N8593S
Model/Series:	AT 301 NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	301-0157
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	May 27, 2014 Annual	**Certified Max Gross Wt.:**	5000 lbs
Time Since Last Inspection:	11 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	8357 Hrs as of last inspection	**Engine Manufacturer:**	P&W
ELT:	Not installed	**Engine Model/Series:**	R 1340-AN-1
Registered Owner:	Matt Fitch	**Rated Power:**	600 Horsepower
Operator:	Smith Company Flying Service	**Operating Certificate(s) Held:**	Agricultural aircraft (137)
Operator Does Business As:	Fitch Flying Service	**Operator Designator Code:**	FQWG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KCOT,474 ft msl	**Distance from Accident Site:**	23 Nautical Miles
Observation Time:	11:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Clear	**Visibility**	9 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots / 18 knots	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	29.82 inches Hg	**Temperature/Dew Point:**	34°C / 22°C
Precipitation and Obscuration:			
Departure Point:	Pearsall, TX (T30)	**Type of Flight Plan Filed:**	None
Destination:	Pearsall, TX (T30)	**Type of Clearance:**	None
Departure Time:	11:40 Local	**Type of Airspace:**	Class G

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:**	28.879985,-99.089492(est)

Administrative Information

Investigator In Charge (IIC):	Scott, Arnold
Additional Participating Persons:	Victor H Lopez; FAA Flight Standards District Office; San Antonio, TX
Original Publish Date:	June 22, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=89431