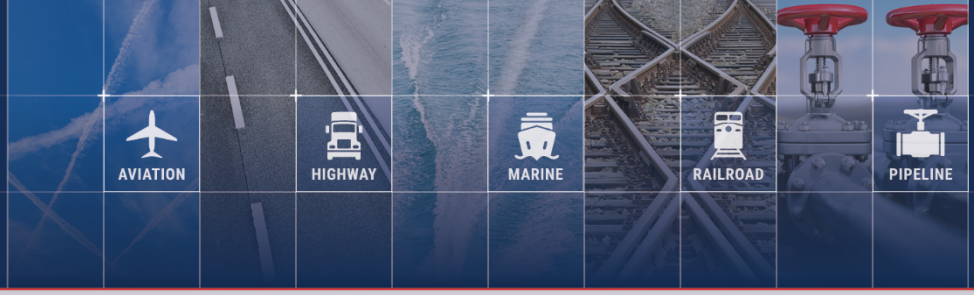

Aviation Investigation Final Report

Location:	Nekoosa, Wisconsin	**Accident Number:**	CEN11FA562
Date & Time:	August 4, 2011, 10:00 Local	**Registration:**	N4345S
Aircraft:	AIR TRACTOR INC AT-301	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Positioning		

Analysis

The pilot reported that the engine backfired and lost power during the initial climb after takeoff. The airplane sustained substantial damage to the fuselage and wings during the forced landing. An engine teardown examination revealed a separation of three gear teeth on an intermediate gear located in the accessory section. The gear teeth exhibited signatures of overload failure; no evidence of fatigue failure was observed. Accordingly, separation of the gear teeth likely occurred during the forced landing and not as a result of a preimpact failure. No failures or malfunctions consistent with a preimpact loss of engine power were observed. At the time of the accident, carburetor icing was not probable when the airplane was under takeoff power.

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 initial climb for undetermined reasons.

Findings

Not determined	(general) - Unknown/Not determined

Factual Information

History of Flight

Initial climb	Loss of engine power (total) (Defining event)
Emergency descent	Off-field or emergency landing

On August 4, 2011, about 1000 central daylight time, an Air Tractor AT-301 airplane, N4345S, was substantially damaged during a forced landing following a loss of engine power after takeoff near Nekoosa, Wisconsin. The pilot was not injured. The agricultural airplane was registered to and operated by Kafer Stone Applicator Service. The repositioning flight was being conducted under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed for the flight, which was not operated on a flight plan. The flight originated from a private airstrip near Nekoosa, Wisconsin. The intended destination was a private airstrip near Oshkosh, Wisconsin.

The pilot stated that the engine ran approximately 20 minutes prior to departure in order to warm up. The run-up and takeoff were normal. However, about 150 feet in the air, the engine backfired and completely lost power. He executed a forced landing to a field approximately 500 feet from the departure end of the runway. The pilot reported that his attempts to restore engine power prior to the forced landing were unsuccessful. The airplane sustained substantial damage to the fuselage and wings during the forced landing.

A Federal Aviation Administration Inspector conducted an on-scene postaccident inspection. The postaccident inspection did not reveal any anomalies consistent with a preimpact loss of engine power. Fluid consistent in appearance and odor to aviation fuel was observed in the carburetor. The spark plugs exhibited signatures consistent with normal operation.

The airplane was powered by a 600-horsepower Pratt & Whitney R-1340-AN-1 radial engine, serial number ZP-101988. An engine overhaul was completed in March 2000. An annual inspection was completed on June 20, 2011. At the time of the accident, the engine had accumulated about 7,382 hours total time, with approximately 566 hours since overhaul. About 17 hours had accumulated since the annual inspection.

The NTSB Investigator-in-Charge (IIC) supervised a full engine teardown examination. The teardown examination revealed the separation of three gear teeth on a 10:1 gear (part number 14951) located in the accessory section of the engine. The remaining gear teeth appeared to be intact and undamaged. No other anomalies were observed during the teardown examination. Metallurgical review of the fractured gear teeth noted the presence of overload failure signatures on the fracture surfaces. No indications of fatigue failure were observed.

A representative of the engine overhaul facility stated that the 10:1 gear (p/n 14951) identified

during the teardown examination functioned as an intermediate gear between the engine crankshaft floating gear and the supercharger impeller gear. Separation of several gear teeth is common in the case of a propeller strike event, such as during a forced landing. Failure of the gear in-flight commonly results in damage to the remainder of the gear.

Weather conditions at the Alexander South Wood County Airport (ISW), located about 5 miles northeast of the accident site, at 0954, were recorded as: wind from 130 degrees at 5 knots, clear sky, 10 miles visibility, temperature 25 degrees Celsius, dew point 18 degrees Celsius, and altimeter 30.02 inches of mercury. Federal Aviation Administration guidance indicated a possibility of engine carburetor icing only at glide power based on the recorded weather conditions.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	53,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 16, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	March 11, 2011
Flight Time:	885 hours (Total, all aircraft), 35 hours (Total, this make and model), 820 hours (Pilot In Command, all aircraft), 145 hours (Last 90 days, all aircraft), 55 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	AIR TRACTOR INC	**Registration:**	N4345S
Model/Series:	AT-301	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	301-0025
Landing Gear Type:	Tailwheel	**Seats:**	1
Date/Type of Last Inspection:	June 20, 2011 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	17 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	7382 Hrs at time of accident	**Engine Manufacturer:**	P&W
ELT:	Not installed	**Engine Model/Series:**	R-1340-AN-1
Registered Owner:	Kafer Stone Applicator Service Inc.	**Rated Power:**	600 Horsepower
Operator:	Kafer Stone Applicator Service Inc.	**Operating Certificate(s) Held:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ISW,1021 ft msl	**Distance from Accident Site:**	5 Nautical Miles
Observation Time:	09:54 Local	**Direction from Accident Site:**	45°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	130°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.02 inches Hg	**Temperature/Dew Point:**	25°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Nekoosa, WI (PVT)	**Type of Flight Plan Filed:**	None
Destination:	Oshkosh, WI (PVT)	**Type of Clearance:**	None
Departure Time:	10:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Private PVT	**Runway Surface Type:**	Grass/turf
Airport Elevation:		**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	2500 ft / 50 ft	**VFR Approach/Landing:**	None

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:**	44.3125,-89.904441(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Michael Batson; FAA – Milwaukee Flight Standards; Milwaukee, WI
Original Publish Date:	March 20, 2012
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=81453