Aviation Investigation Final Report

Location:	Audubon, Iowa	**Accident Number:**	CEN09LA534
Date & Time:	August 18, 2009, 18:30 Local	**Registration:**	N2065B
Aircraft:	WSK PZL MIELEC M-18A	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (partial)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Aerial observation		

Analysis

The pilot stated that he noticed the engine was “low on power” during the takeoff. However, there was not sufficient runway remaining to reject the takeoff. He added that “at lift off, the engine lost more power” and he was unable to remain airborne. The pilot landed in a corn field about 500 feet from the end of the runway. A teardown examination of the engine revealed that portions of the compressor turbine blades were separated and fragmented. Metallic deposits (“metal splatter”) were observed on the compressor turbine blades, shroud, and guide vanes. Metallurgical examination of the compressor turbine blades did not reveal any material anomalies. No evidence of blade creep was observed. The damage to the compressor turbine, in conjunction with a lack of any material defects, is consistent with a short term exposure to elevated operating temperatures. The reason for the exposure to elevated temperatures was not determined. Damage to the engine power turbine section was likely as a result of the accident sequence.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power due to failure of the compressor turbine resulting from exposure to elevated operating temperatures for undetermined reasons.

Findings

Aircraft	Compressor section - Failure
Aircraft	Compressor section - Not specified

Factual Information

History of Flight

Takeoff	Loss of engine power (partial) (Defining event)
Takeoff	Collision with terr/obj (non-CFIT)

On August 18, 2009, at 1830 central daylight time, a Wsk Pzl Mielec M-18A Dromader, N2065B, piloted by a commercial pilot, was substantially damaged during a forced landing immediately after takeoff from runway 32 (3,640 feet by 60 feet, concrete) at Audubon County Airport, Audubon, Iowa. The pilot reported a partial loss of engine power during the takeoff run. The aerial application flight was being conducted under 14 Code of Federal Regulations Part 137, without a flight plan. Visual meteorological conditions prevailed. The pilot was not injured. The local flight was originating at the time of the accident.

The pilot stated that he noticed the engine was “low on power” during the takeoff. However, there was not sufficient runway remaining to reject the takeoff. He noted that “at lift off, the engine lost more power” and he was unable to remain airborne. The pilot landed in a corn field about 500 feet from the end of the runway.

The airplane came to rest upright. The fuselage and empennage were substantially damaged during the impact sequence. The engine and propeller remained attached to the airframe. The propeller blades were bent and twisted, but remained secured to the propeller hub. The main landing gear collapsed. The exhaust duct was creased. The exhaust duct also exhibited outward dents consistent with internal impact from exiting debris.

A teardown examination of the Pratt & Whitney PT6A-45B engine revealed that portions of the compressor turbine blades were separated and fragmented. In general, the fragmented blade sections consisted of a triangular portion of the blade; approximately 0.5 inches from the root at the trailing edge to near the end of the blade at the leading edge. Metallic deposits (“metal splatter”) were observed on the compressor turbine blades, shroud, and guide vanes. Metallurgical examination of the compressor turbine blades did not reveal any material anomalies. In addition, no evidence of blade creep was observed.

The power turbine housing was separated from the exhaust duct and partially separated from the reduction gearbox rear housing. The first stage power turbine was dislocated and located in the gas generator case at the time of the examination. The blades were fractured at varying heights above the disc platform. The second stage power turbine remained installed in the power section. The blades were fractured near the disc platform.

The reduction gearbox exhibited a fracture of the rear housing and the second stage planet gear carrier. The remainder of the unit including all reduction gears appeared intact. The first

stage sungear remained engaged to the power turbine and mating reduction gears. Continuity was confirmed between the front housing accessory gears and the propeller shaft. The reduction and accessory gearbox chip detectors, as well as the oil filter, contained metallic debris.

Engine accessories tested, including the fuel pump and fuel control unit, did not exhibit any anomalies consistent with a pre-impact failure or malfunction.

Airplane maintenance records indicated that an annual inspection was completed on June 15, 2009, at 3,809 hours total airframe time. The engine was overhauled in October 2007 and subsequently installed on the airframe in February 2008. The pilot reported the airplane had been operated approximately 300 hours since the overhaul.

Pilot Information

Certificate:	Commercial	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	March 23, 2009
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	February 26, 2009
Flight Time:	14724 hours (Total, all aircraft), 300 hours (Total, this make and model), 14339 hours (Pilot In Command, all aircraft), 400 hours (Last 90 days, all aircraft), 200 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	WSK PZL MIELEC	**Registration:**	N2065B
Model/Series:	M-18A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	1Z024-18
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	June 15, 2009 Annual	**Certified Max Gross Wt.:**	
Time Since Last Inspection:	300 Hrs	**Engines:**	1 Turbo prop
Airframe Total Time:	3809 Hrs as of last inspection	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	Not installed	**Engine Model/Series:**	PT6A-45B
Registered Owner:	MILES FLYING SERVICE INC	**Rated Power:**	1070 Horsepower
Operator:	MILES FLYING SERVICE INC	**Operating Certificate(s) Held:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	ADU,1287 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	18:35 Local	**Direction from Accident Site:**	140°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	26°C / 18°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Audubon, IA (ADU)	**Type of Flight Plan Filed:**	None
Destination:	Audubon, IA (ADU)	**Type of Clearance:**	None
Departure Time:	18:30 Local	**Type of Airspace:**	

Airport Information

Airport:	Audubon County ADU	**Runway Surface Type:**	Concrete
Airport Elevation:	1287 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	32	**IFR Approach:**	None
Runway Length/Width:	3640 ft / 60 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	41.701389,-94.920555(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Daniel Michaelsen; FAA-Des Moines FSDO; Ankeny, IA Paul Crosby; Pratt & Whitney; Bridgeport, WV
Original Publish Date:	December 20, 2010
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=74556