



National Transportation Safety Board Aviation Accident Final Report

Location:	FORT GAINS, GA	Accident Number:	MIA99LA041
Date & Time:	12/01/1998, 1600 EST	Registration:	N6630Q
Aircraft:	Grumman-Schweizer G-164B	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

The flight was loaded with fertilizer and had taken off, when the engine lost power. The pilot made a forced landing, and the airplane's landing gear went into a ditch and separated. The pilot had made 3 previous takeoffs under similar load conditions without incident. The pilot said, 'initially during the takeoff roll the aircraft accelerated normally.' However, immediately after breaking ground, during the initial climbout, the engine began to lose power, and the aircraft began to lose lift. The airplane continued to sink with partial power until impact. Examination of the engine revealed no exterior damage. The engine teardown revealed that improper atomization of the fuel resulted in a non-atomized fuel stream at the first-stage turbine rotor. The subsequent atomization and ignition of this fuel resulted in a localized area of increased temperature and non-uniform thermal damage to the second- and third-stage turbine stators. The localized area of increased temperature resulted in thermal damage to the second- and third-stage turbine rotors, and increased second- and third-stage turbine rotor blade tip clearance, rendering the engine incapable of producing full power. There was no evidence that the engine control system components contributed to the loss of engine power reported during the accident flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: a power loss due to internal damage to the second- and third- stage turbine rotor blades, due to thermal heat, rendering the engine incapable of producing full power, resulting in a forced landing, and subsequent impact with the terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF

Findings

1. TURBINE ASSEMBLY - OVERTEMPERATURE
2. TURBINE ASSEMBLY - FAILURE,PARTIAL

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings

3. TERRAIN CONDITION - DITCH

Factual Information

On December 1, 1998, about 1600 eastern standard time, a Grumman-Shweizer G-164B, N6630Q, registered to Ag Pilots Inc., impacted with a ditch during a forced landing near Fort Gains, Georgia. Visual meteorological conditions prevailed at the time, and no flight plan was filed for the 14 CFR Part 137 aerial application flight. The airplane was substantially damaged. The commercial-rated pilot reported no injuries. The flight was originating at the time.

The flight was loaded with fertilizer and had taken off, when the engine lost power. The pilot made a forced landing, and the airplane's landing gear went into a ditch and separated. According to the pilot, "...I had made 3 previous takeoffs under similar load conditions. I had taken on fuel, about 3/4 of a tank, the previous load, and took off without incident....initially during the takeoff roll the aircraft accelerated normally. However, immediately after breaking ground, during the initial climbout, the engine began to loose power, and the aircraft began to loose lift. Because of the terrain, at the departure end of the runway, I was forced to make [a] right turn of approximately 20 degrees, to avoid [a] collision with tall trees. The aircraft continued to sink with partial power until impact...."

According to the FAA inspector's statement, "...about 100 feet the pilot experienced a power loss...[he] veered 20 degrees to the right and landed in a field over-grown with weeds. The aircraft struck a small ditch and sheared off the left main landing gear. The right gear folded and the aircraft skidded on its belly to a stop about 100 feet from the impact point. The upper left wing was ruptured and leaking fuel."

The FAA inspectors examined the engine and according to their statement they found the following, "...oil quaintly checked normal. The engine had no exterior damage...found what appeared to be a fertilizer residue build up obstructing the first stage compressor intake air flow. The buildup was hard and had not dislodged during the crash impact forces; nor, during the aircraft transportation to the storage sight. The shut down solenoid is electrically and mechanically controlled. It normally should open and close electrically; however, it [would] only close mechanically by a lever available to the pilot. Inspection found the 'electric closed' wire to have been cut. The aircraft powerplant shut-down was reportedly done with the use of the mechanical handle. Additionally, the fuel heat system had been deactivated. Lines were capped off. The start enrichment system had been deactivated. One end had been capped and the other end crimped.

According to the FAA, examination of the airplane's fuel system revealed, "...the main fuel filter was removed for inspection, and found to be contaminated with a substantial amount of what appeared to be dirt, scalant (sic); or rust."

On April 1, 1999, the engine from N6630Q was examined under the supervision of the FAA at Allied Signal's facilities Phoenix, Arizona. Examination of the engine revealed that improper atomization of the fuel resulted in a non-atomized fuel stream at the first-stage turbine rotor. The subsequent atomization and ignition of this fuel resulted in a localized area of increased temperature and non-uniform thermal damage to the second- and third-stage turbine stators. The localized area of increased temperature resulted in thermal damage to the second- and third-stage turbine rotors, and increased second- and third-stage turbine rotor blade tip clearance, rendering the engine incapable of producing full power. It was determined that the thermal damage to the turbine components occurred prior to the accident flight based on oxidation found on the second-stage turbine rotor, and the oxidation found on all damaged

surfaces of the turbine components. The ITT (inlet turbine temperature) thermocouple assembly was cable of providing an accurate indication of inter-stage turbine temperature to the aircraft indication system. There was no evidence that the engine control system components contributed to the loss of engine power reported during the accident flight (Excerpts of Allied Signal's teardown report are attachments to this report).

The FAA concurred with the Allied Signal teardown report, and were in agreement that the second- and third-stage turbine rotor and stators displayed thermal damage.

Pilot Information

Certificate:	Commercial	Age:	47, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Center
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	08/04/1998
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	11000 hours (Total, all aircraft), 600 hours (Total, this make and model), 300 hours (Last 90 days, all aircraft), 100 hours (Last 30 days, all aircraft), 8 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Grumman-Schweizer	Registration:	N6630Q
Model/Series:	G-164B G-164B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	154B
Landing Gear Type:	Tailwheel	Seats:	1
Date/Type of Last Inspection:	07/18/1998, Annual	Certified Max Gross Wt.:	6075 lbs
Time Since Last Inspection:	316 Hours	Engines:	1 Turbo Prop
Airframe Total Time:	6055 Hours	Engine Manufacturer:	Garrett
ELT:		Engine Model/Series:	TPE331-6-252M
Registered Owner:	AG PILOTS	Rated Power:	750 hp
Operator:	THRASH AVIATION INC	Operating Certificate(s) Held:	None
Operator Does Business As:		Operator Designator Code:	JITG

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Clear / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	None / 0 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	13 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	140°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	24° C / 13° C
Precipitation and Obscuration:			
Departure Point:		Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1600 EDT	Type of Airspace:	

Airport Information

Airport:	FORT GAINS (7J0)	Runway Surface Type:	Grass/turf
Airport Elevation:	500 ft	Runway Surface Condition:	Dry
Runway Used:	1	IFR Approach:	None
Runway Length/Width:	/ 77 ft	VFR Approach/Landing:	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	ALAN J YURMAN	Report Date:	04/20/2000
Additional Participating Persons:	GEORGE GUNN; ATLANTA, GA		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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