



Aviation Investigation Final Report

Location:	KNOXVILLE, Tennessee	Accident Number:	ATL97LA104
Date & Time:	July 16, 1997, 12:45 Local	Registration:	N52120
Aircraft:	Cessna 177RG	Aircraft Damage:	Substantial
Defining Event:		Injuries:	3 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot stated that he did a preflight inspection and found no discrepancies. During his takeoff climb, the engine started running rough, and subsequently, it stopped running. The pilot initiated an emergency landing into a field, and the airplane encountered rough terrain, which resulted in substantial to the airplane. Visual examination of the airplane revealed that the oil dipstick was loose. Isolated areas of oil wetness were found in the vicinity of the #2 cylinder base and around the right rear accessory section. Oil was also found on the lower right hand windshield, on the nose landing gear doors, and down 50% of the belly of the fuselage.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's inadequate preflight by failing to ensure the oil filler cap was secured during his preflight inspection, and loss of engine oil (oil exhaustion), which resulted in subsequent engine failure. A factor relating to the accident was: the lack of suitable terrain for a successful forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (C) LUBRICATING SYSTEM,OIL FILLER CAP - NOT SECURED

2. (C) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (C) FLUID,OIL - EXHAUSTION
4. (C) POWERPLANT - FAILURE

Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER

Phase of Operation: EMERGENCY LANDING

Findings

5. (F) TERRAIN CONDITION - NONE SUITABLE

Factual Information

On July 16, 1997, about 1245 eastern daylight time, N52120, a Cessna 177RG, owned and operated by the private pilot, sustained substantial damage after impacting rough terrain about two miles west of the departure end of runway 23, at the McGhee Tyson Airport, Knoxville, Tennessee. The pilot and two passengers were not injured. Visual meteorological conditions existed and a visual flight rules (VFR) flight plan was filed. The flight was conducted under the provisions of Title 14 CFR Part 91, with an intended destination of Farmington, Missouri.

The pilot stated to the FAA that he did a preflight inspection and found no discrepancies. He said that shortly after takeoff the engine started running roughly and subsequently stopped. The pilot initiated an emergency landing into an open field, and encountered rough terrain. Visual examination of the airplane by a FAA Inspector revealed the oil dipstick to be loose and isolated areas of oil wetness in the vicinity of the #2 cylinder base and around the right rear accessory section. Oil was also found on the lower right hand windshield and on the nose landing gear doors and down 50% of the belly of the fuselage. Attempted rotation of the crankshaft was limited to approximately 90 degrees of travel, the #3 and #4 pistons were not moving, continuity to the rear accessory section was not established. The engine was subsequently removed from the aircraft for closer examination. All fluid carrying hoses and lines were intact and secure. The oil cooler was not damaged. The oil drain was closed. Upon removal of the engine baffles, epoxy adhesive was noted at the forward crankcase thru-stud on the lower left side, and at the #2 cylinder hold-down nut, bottom forward position. Additional epoxy adhesive was also noted on the top rear section of the crankcase split. The engine was subsequently boxed and shipped to Textron Lycoming for further examination.

On November 19, 1997, an engine teardown and examination was accomplished at the Textron Lycoming facility in Williamsport, Pennsylvania. Present were representatives from the FAA and Lycoming. Visual inspection of the engine assembly revealed a crack located at the #4 cylinder mount pad, between the lifter bosses was attributed to secondary internal damage. All engine accessory components were removed and inspected, no anomalies were noted. The propeller system governor contained ferrous metal particles; the spline drive was intact. The rear accessory section was removed which revealed a broken tooth on the crankshaft gear; correspondingly there were two broken teeth on the left-hand idler gear. The oil pump was inspected and exhibited signs of hard object passage while in operation. The pump gears and shaft were still intact. The oil suction screen was partially obstructed with various size ferrous metals. The oil filter element was inspected and contained small size ferrous particles. No objects foreign to the engine were identified.

Disassembly of the engine power section revealed heat damage emanating progressively from the rear of the engine toward the front. The aft section of the crankshaft at the rear connecting rod assemblies was highly distressed and exhibited severe heat damage. The #4 and #3

connecting rods were detached, the yoke portion of both rod assemblies were fragmented and destroyed, the affected parts were blackened from heat. Damage to the #2 connecting rod was moderate to severe; bearing material was distressed and extruded. The #1 connecting rod was slightly damaged from heat. The main crankshaft bearing surfaces were basically not affected. However, the main bearing surfaces did exhibit slight metal particle embedment. The distribution of damage directly corresponded with the direction of oil flow, within the lubrication system. The oil passages from the origin of the oil pump to the crankshaft main and rod journals were checked and found clear of obstructions.

Pilot Information

Certificate:	Private	Age:	45, Male
Airplane Rating(s):	Single-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	None	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	October 3, 1995
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	935 hours (Total, all aircraft), 34 hours (Total, this make and model), 864 hours (Pilot In Command, all aircraft), 35 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N52120
Model/Series:	177RG 177RG	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	177RG1173
Landing Gear Type:	Retractable - Tricycle	Seats:	4
Date/Type of Last Inspection:	May 17, 1997 Annual	Certified Max Gross Wt.:	2800 lbs
Time Since Last Inspection:	20 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	2600 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	IO-360-A1B6D
Registered Owner:	DAVID W. TAYLOR	Rated Power:	200 Horsepower
Operator:		Operating Certificate(s) Held:	None
Operator Does Business As:	TAYLOR FUNERAL SERVICES, INC	Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	TYS ,981 ft msl	Distance from Accident Site:	3 Nautical Miles
Observation Time:	11:53 Local	Direction from Accident Site:	230°
Lowest Cloud Condition:	Clear	Visibility	10 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	20°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	28°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(TYS)	Type of Flight Plan Filed:	VFR
Destination:	FARMINGTON (FAM)	Type of Clearance:	VFR
Departure Time:	12:45 Local	Type of Airspace:	Class C

Airport Information

Airport:	MCGHEE TYSON TYS	Runway Surface Type:	Asphalt
Airport Elevation:	981 ft msl	Runway Surface Condition:	Dry
Runway Used:	23L	IFR Approach:	None
Runway Length/Width:	9000 ft / 150 ft	VFR Approach/Landing:	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	2 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	36.100269,-87.630355(est)

Administrative Information

Investigator In Charge (IIC):	Wilson, Butch
Additional Participating Persons:	JIM MATHEWS; NASHVILLE , TN EDWARD ROGALSKI; WILLIAMSPORT , PA
Original Publish Date:	May 21, 1998
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=3875

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).