



Aviation Investigation Final Report

Location:	AVA, Missouri	Accident Number:	CHI97LA222
Date & Time:	July 19, 1997, 14:30 Local	Registration:	N500XM
Aircraft:	Morgan MINI-500	Aircraft Damage:	Substantial
Defining Event:		Injuries:	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot was completing a series of flight tests that involved transitions from cruise flight into a hover. The pilot reported the exhaust gas temperature (EGT) was higher in cruise flight than when hovering and that the EGT cooled rapidly when the helicopter went from cruise flight into the hovering maneuver. The pilot stated that approximately two miles from his destination, at 2,500 feet mean sea level (msl), he began a 200 to 300 foot/min descent to reach the airport's traffic pattern altitude. He said that as soon as the descent was initiated he experienced unusual engine noises and an abrupt loss of engine power. He lowered the collective and applied full power, but received no indication of engine power. He then initiated an autorotation to landing on a field with a 30-degree slope. Upon landing, the aircraft rolled over and came to rest on its port side causing the rotor to impact the tail boom. Examination of the engine showed evidence that the engine had seized during flight. Inspection of the fuel metering system showed that the accident airplane had not complied with Revolution Helicopter Service Information Letter number 042696, which requires the original factory carburetor jet setting to be adjusted to insure that the EGT be between 1,000 and 1,150 degrees Fahrenheit. No engine coolant was found in the coolant tank and the coolant hose tee was found to be deformed and leaking fluid.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Loss of engine power due to loss of engine cooling fluid. Related factors were maintenance service bulletin not complied with by the owner/pilot mechanic resulting in low output of the carburetor, and unsuitable terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER

Phase of Operation: DESCENT

Findings

1. (F) POWERPLANT - SEIZED
 2. (F) MAINTENANCE,SERVICE BULLETIN/LETTER - NOT COMPLIED WITH - OWNER/PILOT MECHANIC
 3. (F) FUEL SYSTEM,CARBURETOR - OUTPUT LOW
 4. (C) COOLING SYSTEM,LINES - LEAK
-

Occurrence #2: FORCED LANDING

Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: ROLL OVER

Phase of Operation: EMERGENCY LANDING

Findings

5. (C) TERRAIN CONDITION - NONE SUITABLE

Factual Information

On July 19, 1997, at 1430 central daylight time, a Morgan Mini-500 helicopter, N500XM, was substantially damaged during a forced landing following a loss of engine power, near Ava, Missouri. Visual meteorological conditions prevailed at the time of the accident. The personal flight was operating under the provisions of 14 CFR Part 91 and was not on a flight plan. The pilot reported no injuries. The flight departed Cabool Memorial Airport, Cabool, Missouri at 1305 and was en route to Ava/Bill Martin Memorial Airport (AOV), Ava, Missouri, at the time of the accident.

According to the pilot's written statement, the pilot was completing a series of flight tests that involved transitions from cruise flight into a hover. The pilot reported the exhaust gas temperature (EGT) was higher in cruise flight than when hovering and that the EGT cooled rapidly when the helicopter went from cruise flight into the hovering maneuver. The pilot stated that approximately two miles from AOV, at 2,500 feet mean sea level (msl), he began a 200 to 300 foot/min descent to reach the airport's traffic pattern altitude. The pilot reported that as soon as the descent was initiated he experienced unusual engine noises and an abrupt loss of engine power. The pilot stated that he lowered the collective and applied full power but received no indication of engine power. The pilot then initiated an autorotation to landing on a field with a 30-degree slope. The pilot stated that upon landing the aircraft rolled over and came to rest on its port side causing the rotor to impact the tail boom.

Examination of the accident aircraft was conducted by the Investigator-in-Charge and representatives from Revolution Helicopter Corporation, INC., on August 18, 1997. Examination of the engine showed evidence that the engine had seized during flight. Inspection of the fuel metering system showed that the accident airplane had not complied with Revolution Helicopter Service Information Letter Number 042696, which requires the original factory carburetor jet setting to be adjusted to insure that the EGT be between 1,000 and 1,150 degrees Fahrenheit. No engine coolant was found in the coolant tank and the coolant hose tee was found to be deformed and leaking fluid.

Pilot Information

Certificate:	Commercial	Age:	50, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Center
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 1 Valid Medical-w/ waivers/lim	Last FAA Medical Exam:	January 27, 1997
Occupational Pilot:	No	Last Flight Review or Equivalent:	
Flight Time:	2808 hours (Total, all aircraft), 23 hours (Total, this make and model), 2637 hours (Pilot In Command, all aircraft), 65 hours (Last 90 days, all aircraft), 46 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Morgan	Registration:	N500XM
Model/Series:	MINI-500 MINI-500	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental (Special)	Serial Number:	180
Landing Gear Type:	Skid	Seats:	1
Date/Type of Last Inspection:	May 20, 1997 AAIP	Certified Max Gross Wt.:	840 lbs
Time Since Last Inspection:	20 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	23 Hrs	Engine Manufacturer:	Rotax
ELT:	Not installed	Engine Model/Series:	582
Registered Owner:	JOHN WAYN MORGAN	Rated Power:	67 Horsepower
Operator:		Operating Certificate(s) Held:	None
Operator Does Business As:		Operator Designator Code:	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	Condition of Light:	Day
Observation Facility, Elevation:	SGS ,1267 ft msl	Distance from Accident Site:	37 Nautical Miles
Observation Time:	13:54 Local	Direction from Accident Site:	296°
Lowest Cloud Condition:	Clear	Visibility	7 miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	0°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	33°C / 21°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	CABOOL , MO (TVB)	Type of Flight Plan Filed:	None
Destination:	(AOV)	Type of Clearance:	None
Departure Time:	13:05 Local	Type of Airspace:	Class G

Airport Information

Airport:		Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	0	IFR Approach:	
Runway Length/Width:		VFR Approach/Landing:	Forced landing

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:	36.949077,-92.659812(est)

Administrative Information

Investigator In Charge (IIC):	Robbins, Wesley
Additional Participating Persons:	STEVE DAVIS; KANSAS CITY , MO
Original Publish Date:	January 28, 2000
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=10638

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).