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.ntsb.gov/Docket?ProjectID=10638