Aviation Investigation Final Report

Location:	Joliet, Illinois	**Accident Number:**	CHI05LA004
Date & Time:	October 14, 2004, 19:54 Local	**Registration:**	N85MM
Aircraft:	Malone VANS RV-6A	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation		

Analysis

The amateur-built airplane was destroyed during a forced landing shortly after takeoff in night visual meteorological conditions. A witness reported that the pilot landed about 1930 cdt and taxied to the fuel pumps, but no fuel was available until the next morning. The witness offered to drain 5 gallons of fuel from an airplane nearby. The pilot declined the offer of fuel and told the witness that he intended to fly to another airport located about 10 miles away, and obtain fuel there. The witness reported that the pilot "didn't seem concerned about fuel" and the he "didn't say anything about his flight plan." Another witness reported that he observed the airplane depart. He reported that the pilot taxied the airplane about 150 yards from the fuel pumps to runway 12. He reported that the pilot did not do an engine run-up or magneto check before departing. He reported that the airplane became airborne within the first one-third of the runway. The airplane climbed to 500 - 700 feet above ground level and about the time that it cleared runway 12, the engine backfired twice and quit. He reported that the airplane made a right hand turn and impacted the terrain about 5 - 7 seconds after the engine stopped running. The witness did not report hearing the engine running after it backfired. Witnesses who live near the accident site reported hearing the airplane's engine prior to impact. One witness reported observing the airplane "spiraling" down. A lieutenant of the police department reported that there was no evidence of a fuel spill at the accident site. He reported that the fire department did not wash down the accident site with water since there was no evidence of fuel. Inspection of the accident site revealed the following conditions: 1) No fuel odor apparent in or around the aircraft. 2) No signs of a fuel spill or fuel leaking in the vicinity of the crash site. 3) No fuel in the left or right fuel tank. 4) No signs of a fuel fire. The airplane's fuel tanks held a total of 38 gallons. Pages from a maintenance form used for recording engine performance parameters, such as altitude, rpm, manifold pressure, fuel flow, cylinder head temperature, and exhaust gas temperature, were found in the airplane following the accident. The recordings indicated the average fuel flow was about 12.2 gph at 4,500 feet mean sea level at 2,700 rpm. Flight control continuity was established between the cockpit controls and their respective flight control surfaces. The propeller was broken free of the engine at the

propeller flange. Both propeller blades exhibited leading edge gouging, chordwise scratching, and blade twist. The data downloaded from the pilot's Garmin GPS 296 indicated that the airplane departed Erie, Pennsylvania, about 1751 eastern daylight time, and arrived at Joliet, Illinois, about 1940 central daylight time, a distance of 437 nautical miles traveled in 2 hours and 49 minutes. The pilot started to taxi at 1952 cdt and departed on the accident flight.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The total loss of engine power due to fuel exhaustion as a result of the pilot's inadequate preflight and inadequate fuel consumption calculations, also causal was the pilot's failure to maintain aircraft control during the forced landing. A factor was the night condition.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
2. (C) FUEL CONSUMPTION CALCULATIONS - INADEQUATE - PILOT IN COMMAND
3. (C) FLUID,FUEL - EXHAUSTION

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

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
5. (F) LIGHT CONDITION - NIGHT

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On October 14, 2004, at 1954 central daylight time, an amateur-built Malone VANS RV-6A, N85MM, was destroyed when it impacted terrain after takeoff from runway 12 (2,937 feet by 100 feet, asphalt), at the Joliet Regional Airport (JOT), Joliet, Illinois. The private pilot received fatal injuries. The 14 Code of Federal Regulations Part 91 business flight was departing JOT and was en route to the Lewis University Airport (LOT), Romeoville, Illinois, to refuel. Night visual meteorological conditions prevailed at the time of the accident. No flight plan was filed.

A witness reported that the pilot landed at JOT about 1930 and taxied to the fuel pumps. The witness reported that the pilot asked him if fuel was available. The witness explained to the pilot that the airport had recently changed to its winter hours of operation, and the fuel pumps would not be operating until the next morning. The witness offered to drain 5 gallons of fuel from an airplane nearby. The pilot declined the offer of fuel and told the witness that he intended to fly to LOT, located about 10 miles away, and obtain fuel there. The witness reported that the pilot "didn't seem concerned about fuel" and that he "didn't say anything about his flight plan." The witness reported that the pilot departed on runway 12.

Another witness reported that he observed the airplane depart JOT. He reported that the pilot taxied the airplane about 150 yards from the fuel pumps to runway 12. He reported that the pilot did not do an engine run-up or magneto check before departing. He reported that the airplane became airborne within the first one-third of the runway. The airplane climbed to 500 - 700 feet above ground level (agl), and about the time that it cleared runway 12, the engine backfired twice and quit. He reported that the airplane made a right hand turn and impacted the terrain about 5 - 7 seconds after the engine stopped running. The witness did not report hearing the engine running after it backfired.

Witnesses who live near the accident site reported hearing the airplane's engine prior to impact. One witness reported observing the airplane "spiraling" down.

The airplane impacted a street in a residential area just beyond the JOT airport boundaries in Joliet, Illinois.

The scene was secured by the Joliet Police Department. A lieutenant of the Joliet Police Department reported that there was no evidence of a fuel spill at the accident site. He reported that the fire department did not wash down the accident site with water since there was no evidence of fuel.

Inspectors from the Federal Aviation Administration arrived at the accident site the following

morning. The inspectors noted the following conditions: 1) No fuel odor apparent in or around the aircraft. 2) No signs of a fuel spill or fuel leaking in the vicinity of the crash site. 3) No fuel in the left or right fuel tank. 4) No signs of a fuel fire.

PERSONNEL INFORMATION

The pilot held a private pilot certificate with a single-engine and instrument airplane ratings. He held a Third Class medical certificate and his last examination date was September 21, 2004. He had about 2,232 total flight hours that included about 240 hours of night flight. According to the pilot's brother, the pilot had flown about 1,000 hours in the accident airplane. The pilot's logbook indicated he had 32 hours of flight time in the accident aircraft within the last 90 days.

The pilot had built the accident aircraft but did not hold a FAA Repairman's Certificate.

AIRCRAFT INFORMATION

The airplane was an amateur-built Malone Vans RV-6A, serial number 20034. It seated two in a side-by-side seating arrangement. The maximum gross weight was 1,850 pounds. The two wing fuel tanks held a total of 38 gallons of fuel. The engine was a 175 horsepower modified Lycoming 320-A1B engine. The airplane received its Special Airworthiness Certificate on May 25, 1998. The aircraft logbook indicated that the airplane's last recorded annual maintenance inspection was completed on July 28, 2003. The recorded tachometer time was 812.7 hours. The last recorded entry in the engine logbook was made on December 28, 2003, and it indicated a tachometer time of 904.7 hours.

The pilot's brother reported that work had been done on the engine in the later part of September 2004. The mechanic who helped the pilot work on the engine reported that the engine's crankcase was cracked. He helped the pilot take the engine off the airframe, replace the cracked crankcase, and then helped reassemble and install the engine. He reported that the pilot did not ask him to make any entry in the engine logbook. He reported that the engine seemed to be working "pretty good" except one cylinder was running hot. He also reported that the pilot had the "whole avionics panel out of the airplane" at the same time the engine work was being done.

The pilot's brother reported that the pilot had complained about the number 4 cylinder running hotter than the other cylinders. He reported that the pilot ran the engine cooler by burning a richer fuel mixture that increased the fuel consumption about 1 - 1.5 gallons per hour (gph).

The pilot's brother reported that the pilot had flown the airplane to Bloomington, Illinois, on Sunday, October 10, 2004. The timing of the magnetos was not right and the pilot had it repaired. The brother reported that the pilot had told him on Monday that the airplane was "doing fine," and that on Thursday, October 13, 2004, the pilot reported that the airplane was still "working fine."

Pages from a maintenance form used for recording engine performance parameters, such as altitude, rpm, manifold pressure, fuel flow, cylinder head temperature, and exhaust gas temperature, were found in the airplane following the accident. The recordings made on October 1, 2004, indicated the fuel flow was 12.4 gph at 4,500 feet mean sea level (msl) at 2,600 rpm. The recordings made on October 4, 2004, indicated the fuel flow was 11.9 gph at 4,500 feet msl at 2,600 rpm. The recordings made on October 10, 2004, indicated the fuel flow was 10.9 gph at 9,500 feet msl at 2,600 rpm. The recordings made on October 11, 2004, indicated the fuel flow was 11.4 gph at 7,500 feet msl at 2,600 rpm.

METEOROLOGICAL INFORMATION

At 1955, the surface observation at JOT was: Winds 050 degrees at 5 knots, 7 statute miles visibility, light rain, scattered cloud layer at 3,300 feet agl, scattered cloud layer at 4,800 feet agl, overcast 5,500 feet agl, temperature 10 degrees C, dew point 9 degrees C, altimeter 29.48 inches of mercury.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the edge of a driveway at 460 Springwood, Joliet, Illinois, and skidded across Springwood street about 50 feet before coming to rest on its belly on a neighborhood sidewalk. At the initial impact point, an impression was found in the asphalt of the driveway that was consistent in shape with the leading edge of a propeller blade. Airplane debris, including the nose landing gear and canopy, was found along the wreckage path from the initial impact point to the main wreckage.

The right wing exhibited leading edge crush on the outboard 1/2 of the wing, and the outboard 1/2 of the right wing was buckled aft. The right wingtip was separated from the right wing and found about 20 feet to the right of the main wreckage. The right fuel cap had separated from the fuel tank. The right fuel cap was found in the "secured" position and it exhibited no deformation.

The left wing did not exhibit leading edge crush or aft buckling of the wing. The left fuel cap remained secured to the left wing fuel tank.

The tailcone was buckled aft of the baggage compartment. The empennage remained intact but with no leading edge damage to the vertical stabilizer, the left horizontal stabilizer, or the right horizontal stabilizer.

The engine was broken free of its engine mounts and was found at the front of the cockpit. The propeller was broken free of the engine at the propeller flange. Both propeller blades exhibited leading edge gouging, chordwise scratching, and blade twist. Both blades exhibited a "ram's horn" type of curling of the propeller blades.

Flight control continuity was established between the cockpit controls and their respective flight control surfaces.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Will County morgue, in Crest Hill, Illinois, on October 15, 2004.

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical Institute. The results were negative for all substances tested.

TESTS AND RESEARCH

The pilot's Garmin GPS 296, serial number 67006534, was found in the main wreckage of the airplane. It was sent to Garmin, the manufacturer of the unit, for inspection and data downloading. Garmin reported that data was extracted from the unit using a USB interface cable. Garmin reported the following:

"Upon examination of the unit, it was being last used to navigate a direct GOTO to KLOT. The unit contains 1,901 trackpoints from the 14/15 of October 2004. The track log named "Active Log 172" contains 18 trackpoints. This log begins at 00:52:03 UTC on October 15, and terminates at 00:54:36 UTC on October 15."

The data downloaded from the GPS 296 indicated that the airplane departed Erie, Pennsylvania, about 1751 eastern daylight time, and arrived at JOT about 1940 central daylight time, a distance of 437 nautical miles traveled in 2 hours and 49 minutes.

The data downloaded from the GPS 296 indicated that the airplane started to taxi and departed JOT about 1952:03 and impacted the terrain at 1954:36.

ADDITIONAL INFORMATION

On October 13, 2004, the pilot landed at the Greater Binghamton Airport (BGM), Binghamton, New York, about eastern daylight time. At 0930 eastern daylight time on October 14, 2004, the pilot had the airplane topped off with 8.7 gallons of fuel. The pilot departed BGM and landed at the Erie International Airport (ERI), Erie, Pennsylvania. He had the airplane topped off at ERI with 17 gallons of fuel.

The data downloaded from the GPS 296 indicated that the airplane departed BGM about 1025 eastern daylight time and arrived at ERI about 1158 eastern daylight time, a distance of 228 nautical miles traveled in 1 hour and 33 minutes.

The parties to the investigation were the Federal Aviation Administration and Textron Lycoming.

Pilot Information

Certificate:	Private	**Age:**	50,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Front
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	September 21, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2232 hours (Total, all aircraft), 2168 hours (Pilot In Command, all aircraft), 145 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Malone	**Registration:**	N85MM
Model/Series:	VANS RV-6A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	20034
Landing Gear Type:	Tailwheel	**Seats:**	2
Date/Type of Last Inspection:	July 28, 2003 Annual	**Certified Max Gross Wt.:**	1850 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	813 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-A1B
Registered Owner:	Mark S. Malone	**Rated Power:**	175 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	JOT,581 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	20:05 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Scattered / 3300 ft AGL	**Visibility**	5 miles
Lowest Ceiling:	Broken / 4800 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	50°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	28.47 inches Hg	**Temperature/Dew Point:**	10°C / 9°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Joliet, IL (JOT)	**Type of Flight Plan Filed:**	None
Destination:	Romeoville, IL (LOT)	**Type of Clearance:**	None
Departure Time:	19:52 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Joliet Regional Airport JOT	**Runway Surface Type:**	
Airport Elevation:	581 ft msl	**Runway Surface Condition:**	
Runway Used:	12	**IFR Approach:**	None
Runway Length/Width:	2937 ft / 100 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	41.518333,-88.175003

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Dennis Cmunt; FAA-DuPage FSDO; West Chicago, IL Greg Erikson; Textron Lycoming; Wayne, IL
Original Publish Date:	October 27, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=60336