



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Peachtree City, GA	<b>Accident Number:</b>	MIA03LA035
<b>Date &amp; Time:</b>	01/01/2003, 1655 EST	<b>Registration:</b>	N559LJ
<b>Aircraft:</b>	Lonnie Johnson RV6A	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Minor

**Flight Conducted Under:** Part 91: General Aviation - Personal

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## Analysis

The flight departed with full fuel tanks from the Waycross-Ware County Airport, en route to the Peachtree City Airport. About 1 hour into the flight the pilot noticed a slight rpm drop, he applied throttle to compensate for the rpm decrease. The pilot started the pre-descent procedures; he turned the auxiliary fuel pump on, applied carburetor heat, then reduced power, at this time the engine quit completely. The pilot repositioned the fuel selector, switched the auxiliary fuel pump off and on, turned carburetor heat on and off, all actions were unsuccessful in restoring engine power. The pilot established best glide airspeed, lowered full flaps, and while descending, the airplane contacted a raised sewer access. The airplane then impacted the ground and came to rest inverted. A witness reported observing black smoke trailing the airplane and heard the engine running rough. Examination of the airplane following recovery by an FAA inspector revealed the fuel tank vent lines were clear of obstructions. There was fuel found in the left wing and the right fuel tank was leaking fuel, the fuel boost pump operated electrically post accident. Fuel samples from the right wing and gascolator showed no fuel contamination. All spark plugs and inside ends of both exhaust pipes were found sooted. The carburetor heat system which consists of a 5 inches long by 2 inches in diameter pipe secured to the exhaust crossover pipe, a "Carb Heat Connector" which is secured to the filtered air box forward of the air filter, and a scat hose that connects the two. Additionally, a control in the cockpit activates an alternate air door located on the filtered air box forward of the carb heat muff inlet. The carburetor heat was able to function post accident and the engine was run to idle power setting; damage precluded operation at a higher rpm setting. Bench testing of the carburetor by the manufacturer with FAA oversight revealed the carburetor was not within service limits, at comparable to idle power settings the fuel flow in terms of pounds-per-hour (pph) was 0.6 pph below service limits. At the remaining four test points the fuel flow in pph was greater than the established rich limits. At the last test point which equated to full throttle, the fuel flow was 18.5 pph above the established rich service limit. The pilot reported verbally that approximately 50 flight hours earlier, when he was taxiing to takeoff, the engine quit just like it did during the accident flight. The carburetor and engine driven fuel pump were replaced. The engine quit again in a similar fashion, and the auxiliary fuel pump and all fuel lines were replaced. Additionally, the fuel selector valve was disassembled and rebuilt. The overhauled carburetor had been operated 54.5 hours since

installation at the time of the accident. The temperature and dew point at Peachtree city, two hours past the time of the accident, indicates serious carburetor icing at any power setting. Flight testing of a RV6A airplane equipped with the same carburetor heat system, same model engine, and same model carburetor as the accident airplane but with a temperature probe revealed that with the engine operating at 75 percent power and carburetor heat applied, the temperature rise was 1/2 degree Fahrenheit above the temperature with carburetor heat off. According to the general manager of Van's Aircraft, they offer 2 different types of carburetor heat systems, and they have not done any heat rise testing on any of the various carburetor heat systems that can be installed on RV type airplanes. With respect to carburetor heat muffs, a section of the builders manual states that each builder is responsible for evaluating his/her own installation based on the likelihood of carburetor ice in his/her intended operating environment.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot to activate carburetor heat control during cruise flight after experiencing a loss of engine rpm, inadequate carburetor heat system by the builder, and the unsuitable terrain encountered by the pilot-in-command during the forced landing following the total loss of engine power. A factor in the accident was the weather conditions ( temperature and dew point) which were susceptible to carburetor icing during cruise flight and descent.

## Findings

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Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL  
Phase of Operation: CRUISE

### Findings

1. (F) WEATHER CONDITION - CARBURETOR ICING CONDITIONS
2. (C) CARBURETOR HEAT - NOT SELECTED - PILOT IN COMMAND
3. THROTTLE/POWER CONTROL - ACTIVATED - PILOT IN COMMAND

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Occurrence #2: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL  
Phase of Operation: DESCENT - NORMAL

### Findings

4. (F) WEATHER CONDITION - CARBURETOR ICING CONDITIONS
5. CARBURETOR HEAT - ACTIVATED - PILOT IN COMMAND
6. (C) AIRCRAFT/EQUIPMENT INADEQUATE - OWNER/BUILDER
7. EMERGENCY PROCEDURE - PERFORMED - PILOT IN COMMAND

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Occurrence #3: FORCED LANDING  
Phase of Operation: DESCENT - EMERGENCY

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Occurrence #4: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: EMERGENCY DESCENT/LANDING

### Findings

8. OBJECT - OTHER
9. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND

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Occurrence #5: NOSE OVER  
Phase of Operation: EMERGENCY DESCENT/LANDING

## Factual Information

### HISTORY OF FLIGHT

On January 1, 2003, about 1655 eastern standard time, a homebuilt RV6A, N559LJ, registered to a private individual, crashed approximately 715 feet south-southeast of the approach end of runway 31 at the Peachtree City Airport-Falcon Field, Peachtree City, Georgia. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 CFR Part 91 personal flight from the Waycross-Ware County Airport, Waycross, Georgia, to the Peachtree City Airport-Falcon Field, Peachtree City, Georgia. The airplane was substantially damaged and the private-rated pilot, the sole occupant, sustained minor injuries. The flight originated about 1540 from the Waycross-Ware County Airport.

The pilot stated the fuel tanks were filled before departure; no fuel contamination was noted during the preflight. The flight departed and approximately 45 minutes into the flight, he repositioned the fuel selector to the right tank. The flight continued and approximately 15 minutes later, he noticed a slight rpm drop. He applied throttle input to compensate for the rpm decrease and switched to the UNICOM frequency. He elected to perform a practice localizer approach to runway 31 and after crossing the localizer, he turned on the auxiliary fuel pump, applied carburetor heat, then reduced power. At that time, the engine quit completely like a normal shutdown using the mixture control. He repositioned the fuel selector to the left tank which was unsuccessful in restoring engine power. He also turned off the auxiliary fuel pump, and turned it back on after engine power was not restored. Additionally, he removed and reapplied carburetor heat which was also unsuccessful in restoring engine power. Thereafter the propeller stopped and he established best glide airspeed of 75-80 miles-per-hour. After clearing a railroad embankment he turned left to avoid approach lights, and recognizing that he was unable to land on the runway, he lowered full flaps, and slowed to just above stall speed. The wheel pants of both main landing gears made contact with an elevated concrete sewer access, followed by ground contact approximately 20 feet later. The airplane came to rest inverted; the pilot evacuated the airplane by cutting a portion of the canopy with a survival tool.

A witness reported hearing the engine running rough and observed black smoke trailing the airplane. The same witness reported that the engine stopped, ran for 5 seconds, then quit again. A second witness also heard the engine running rough, it then ran fine for a while, before it finally quit.

### AIRCRAFT INFORMATION

The airplane was equipped with a Lycoming O-320-E2D engine, and a fixed pitch propeller. The airplane was not equipped with a primer, nor was it equipped with a carburetor temperature probe and/or gauge. The installed carburetor heat system consists of an approximate 5-inches long by two-inches diameter pipe listed in the Van's 2003 Accessory Catalog as "Carb Heat Muff" P/N "EA Carb Heat Muff", which is secured to the exhaust crossover pipe, a "Carb Heat Connector" P/N "Vent DL-07" which is attached forward of the air filter on the filtered air box, and a scat hose that connects the two. A control in the cockpit activates an alternate air door located on the filtered air box forward of the Carb Heat Muff inlet. With carburetor heat applied, air flows through the Carb Heat Muff into the filtered air box, through the air filter, then into the venturi of the carburetor.

## METEOROLOGICAL INFORMATION

The temperature and dew point at 2,420 feet mean sea level for the Peachtree City Airport-Falcon Field area taken approximately 2 hours after the accident were each recorded to be 7 degrees Celsius, which equates to 44.6 degrees Fahrenheit.

Review of an icing probability chart revealed that at the above listed temperature and dew point, the conditions were favorable for serious icing at any power setting.

## WRECKAGE AND IMPACT INFORMATION

Examination of the airplane by the FAA inspector revealed damage to the vertical and left horizontal stabilizer, rudder, nose gear, and bottom portion of the firewall. The fuel tank vent lines were checked and found to be clear of obstructions. Fuel was found in both wings; fuel was leaking from the right wing. Fuel samples taken from the right wing and the gascolator showed no contaminants. The fuel boost pump operated postaccident. The spark plugs and inside ends of both exhaust pipes were found sooted. The carburetor heat system was found operable post accident. The engine was started and operated only to idle power setting; vibration prevented operation at a higher power setting. The carburetor was removed for further examination.

## TESTS AND RESEARCH

Bench testing of the carburetor at the manufacturer's facility with FAA oversight revealed the fuel flow rate at idle was .6 pounds-per-hour (pph) less than the specified amount, and at the four remaining test points, was flowing greater than the rich limit at all points. At the last test point which equates to full throttle, the carburetor was flowing 18.5 pph above the rich service limit. Disassembly of the carburetor revealed a curved sliver of material adhering to the exterior surface of the fuel inlet screen. Additionally, the main metering nozzle was flow tested and found to be approximately 7 percent above the rich limit.

The pilot reported verbally that approximately 50 flight hours earlier, when he was taxiing to takeoff, the engine quit just like it did during the accident flight. The carburetor and engine driven fuel pump were replaced. The engine quit again in a similar fashion, and the auxiliary fuel pump and all fuel lines were replaced. Additionally, the fuel selector valve was disassembled and rebuilt.

Review of the engine logbook revealed that on September 8, 2002, an overhauled carburetor and a new engine driven fuel pump were installed. The engine had accumulated 54.5 hours since then at the time of the accident.

According to the General Manager of Van's Aircraft, Inc., "I checked with our engineering staff and we have never done any heat rise testing through any of the various [carburetor] heat systems that can be installed on an RV." He additionally stated "We currently offer an 8" sealed heat exchanger that can be used to supply heated intake air to the [carburetor]. We also offer a shorter [carburetor] heat exchanger that mounts on the crossover pipe directly above the alternate air door...It is about 5" in length."

Review of Section 11 of the builders manual titled, "Engine and Propeller Selection and Installation" revealed a subsection titled, "[Carburetor] and Cabin Heat Muffs." Review of that subsection revealed that each builder will have to evaluate his/her own installation based on the likelihood of carburetor ice in his/her intended operating environment.

Flight testing was performed with a RV6A airplane equipped with the same type of carburetor heat system as the accident airplane (approximate 5-inches long by 2-inches diameter pipe attached to the exhaust crossover pipe), same model carburetor as the accident airplane but with an installed temperature probe, and same model engine with slightly higher horsepower as the accident airplane. The testing revealed that at the flight test altitude of 5,500 feet with the engine operating at an estimated 75 percent power and carburetor heat applied, the temperature rose 1/2 degree Fahrenheit above the temperature with carburetor heat off.

#### ADDITIONAL INFORMATION

The airplane minus the retained carburetor was released to the airplane owner on November 13, 2003. The retained carburetor was released to the airplane owner on February 23, 2004.

#### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	70, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 Expired	<b>Last FAA Medical Exam:</b>	02/19/1999
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	6565 hours (Total, all aircraft), 149 hours (Total, this make and model), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Lonnie Johnson	<b>Registration:</b>	N559LJ
<b>Model/Series:</b>	RV6A	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	Yes
<b>Airworthiness Certificate:</b>	Experimental	<b>Serial Number:</b>	25559
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	02/25/2002, Condition	<b>Certified Max Gross Wt.:</b>	1650 lbs
<b>Time Since Last Inspection:</b>	206.3 Hours	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	298.2 Hours at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	O-320-E2D
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	150 hp
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual Conditions	<b>Condition of Light:</b>	Dusk
<b>Observation Facility, Elevation:</b>	KFFC, 808 ft msl	<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>	1653 EST	<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 Miles
<b>Lowest Ceiling:</b>	Overcast / 2300 ft agl	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	270°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.82 inches Hg	<b>Temperature/Dew Point:</b>	11° C / 9° C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Waycross, GA (KAYS)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	, GA (KFFC)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	1540 EST	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	Peachtree City Airport (KFFC)	<b>Runway Surface Type:</b>	Unknown
<b>Airport Elevation:</b>	808 ft	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>		<b>IFR Approach:</b>	Localizer Only; Practice
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	Forced Landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Minor	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Minor	<b>Latitude, Longitude:</b>	33.351111, -84.563889

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Timothy W Monville	<b>Report Date:</b>	06/30/2004
<b>Additional Participating Persons:</b>	Thomas R Curran; FAA Flight Standards District Office; College Park, GA William D Shinn; FAA Flight Standards District Office; Renton, WA Peter Nielson; Precision Airmotive Corporation; Marysville, WA		
<b>Publish Date:</b>			
<b>Investigation Docket:</b>	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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).