



# National Transportation Safety Board Aviation Accident Factual Report

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<b>Location:</b>	Weirsdale, FL	<b>Accident Number:</b>	MIA05LA021
<b>Date &amp; Time:</b>	11/03/2004, 1230 EST	<b>Registration:</b>	N955DC
<b>Aircraft:</b>	J.D. Calhoun, Inc. Vans ACFT RV6A	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Fatal, 1 Serious
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## HISTORY OF FLIGHT

On November 3, 2004, about 1230 eastern standard time, a homebuilt JD Calhoun, Inc., Vans ACFT RV6A, N955DC, registered to J.D. Calhoun, Inc., nosed over during the landing roll at Love Field Airport, Weirsdale, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 CFR Part 91 personal, local flight. The airplane was substantially damaged and the private-rated pilot was fatally injured while the private-rated passenger sustained serious injuries. The flight originated about 1200, from Love Field Airport.

The pilot-rated passenger stated that 2 days before the accident she flew the airplane as pilot-in-command (PIC) on a 2-leg flight, and during both landings, she felt "...some roughness and skipping occurred." Following the second landing which occurred at the airport where the airplane is based, her husband who was in the airplane suggested she perform another landing but she declined because she wanted to mentally review her procedures. She suggested to her husband to fly the next day but they were busy and elected to fly on the day of the accident.

The pilot-rated passenger further reported that on the accident date, she took off from runway 18 and performed "...two rough landings much the same as I did on Monday." A wind shift to the east occurred and she entered the traffic pattern for runway 09. On touchdown, she again "...encountered some roughness at touchdown again." While taxiing towards their hangar her husband advised he wanted to fly the airplane so she secured the airplane, her husband exited it and walked to the front of it where he inspected the "...nose strut and wheel." Her husband got into the airplane, started the engine, taxied to runway 09, departed, but remained in the traffic pattern. His "...pattern and landing were perfect, but when he touched down there was roughness and bounce." Her husband announced that he was going around and she reported his landing was perfect again. After touchdown the airplane became airborne, and the next thing she remembers was "...opening her eyes, being very confined and uncomfortable, upside down, and seeing dirt and grass in the broken canopy." The next thing she recalled was being airlifted to the hospital.

Two witnesses reported to local law enforcement personnel that they were in an airplane at the

intersection of the north/south and east/west runway and were waiting for the accident airplane to land before they departed. One witness reported observing the go-around and subsequent approach and airspeed looked good. He reported that the airplane landed downhill, and it was a, "...perfect touch down nothing hard, firm about it." Then during the landing roll, the nose came up 1.5 to 2.0 feet and the nose then came down "not firm." The nose gear leg then folded and dropped to the right. The airplane then nosed over and slid to rest. He further reported there was, "...nothing violent about any of his landing or anything, he did ah, a perfect job...", and the radio calls were made by the male pilot. The other witness in the airplane reported the downhill landing was "beautiful" and that he has seen a lot of landings but the pilot did a good job landing and he did not see anything abnormal prior to the airplane nosing over. They taxied towards the accident site, advised on their aircraft's radio for someone to call 911, and after arrival at the airplane, assisted with the rescue.

## PERSONNEL INFORMATION

The pilot was the holder of a private pilot certificate with airplane single engine land rating. He was issued a third class medical certificate on September 1, 2004, with a limitation, "Must wear corrective lenses." A review of a provided copy of the pilot's logbook that contained entries from September 11, 2002, to November 3, 2004, revealed he logged a total time of 819 hours, with 210 hours logged in the accident make and model airplane. He logged 210 hours as PIC in the accident airplane, since the first flight on September 31, 2002. In the last 90 days he logged 25 hours, of which 11 were in the accident airplane. In the last 30 days, he logged 5 hours, all of which were in the accident airplane.

The pilot-rated passenger seated in the right seat holds a private pilot certificate with airplane single engine land rating. She was issued a third class medical certificate on April 12, 2004, with the limitation, "Must wear corrective lenses." A review of a provided copy of her pilot logbook that contained entries from October 5, 2001, to the last entry dated November 2, 2004, revealed she logged a total time of 259.9 hours, with 16 hours logged in the accident make and model airplane. She logged 14 hours as PIC in the accident airplane with the first flight logged April 28, 2004. In the last 90 days she logged 8 hours, of which 4 were in the accident airplane. In the last 30 days, she logged 7 hours, of which 3 were in the accident airplane.

## AIRCRAFT INFORMATION

The experimental, Vans ACFT RV6A tricycle gear airplane was built by the pilot, pilot-rated passenger, and another individual, with a date of manufacture listed as September 20, 2002. The airplane was designated serial number 60196, and was equipped with a Lycoming O-320-B2C engine rated at 160 horsepower, and a Sensenich fixed pitch propeller. A special airworthiness certificate in the experimental category was issued by a FAA designated airworthiness representative (DAR) on September 27, 2002.

A review of a provided copy of the "Aircraft Log" that contained entries from September 27, 2002, to the last entry dated September 26, 2003, revealed an entry dated December 12, 2002,

which indicates the prescribed flight test hours were completed and the airplane is, "...controllable throughout its normal range of speeds and throughout all maneuvers to be executed, has no hazardous operating characteristics or design features, and is safe for operation." The last recorded condition inspection occurred on September 26, 2003. The airplane total time at that time was recorded to be 119.2 hours.

A review of the NTSB "Pilot/Operator Aircraft Accident Report" form submitted by the pilot's wife indicated the last condition inspection occurred on September 17, 2004. There was no record of the September 2004 condition inspection in the permanent maintenance records. The airplane total time at the time of the accident was reported to be 190 hours.

#### METEOROLOGICAL INFORMATION

A surface observation weather report from Ocala International Airport-Jim Taylor Field (KOCF), issued on the day of the accident at 1235, or approximately 5 minutes after the accident, indicates the wind was from 100 degrees at 3 knots, the visibility was 10 statute miles, and clear skies existed. The temperature and dewpoint were 28 and 17 degrees Celsius, respectively, and the altimeter setting was 30.06. The accident site was located approximately 131 degrees and 21.4 nautical miles from KOCF.

#### AIRPORT INFORMATION

The Love Field Airport is equipped with 2 separate grass runways designated 18/36 and 09/18. Runway 09 is approximately 2,600 feet long and 100 feet wide. A 300 foot-long displaced threshold is located on the approach end of the runway 09, which slopes down from the approach end of it to near the midpoint of the runway.

#### WRECKAGE AND IMPACT INFORMATION

Examination of the accident site by an FAA inspector revealed the airplane came to rest inverted on a magnetic heading of approximately 200 degrees on runway 09, located at 28 degrees 57.948 minutes North latitude and 081 degrees 53.593 minutes West longitude. A fresh furrow in the grass measuring approximately 100 feet in length associated with the nose landing gear was noted. Approximately 50 feet down the furrow, 3 slash marks associated with the propeller were noted. Portions of the nose landing gear fairing were noted along the length of the furrow.

Examination of the airplane where it came to rest revealed the canopy bubble was shattered, and the F-631 frame behind the pilot and co-pilot's seats was crushed down. A channel brace (F-632A), which attaches to the F-631 frame and the F-606 bulkhead, was separated from the F-606 bulkhead. The tip of the vertical stabilizer and the outer portions of both wings were impact damaged. The airplane was recovered for further examination which revealed flight control continuity for elevator, and aileron. The rudder flight control was noted to be jammed. The nose landing gear was displaced aft. Components of the nose landing gear were retained

for further examination.

## MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was performed by the District 5 Medical Examiner's Office. The cause of death was listed as cervical spinal cord laceration, caused by blunt impact injury to the head and neck.

The FAA Toxicology and Accident Research Laboratory (CAMI), located in Oklahoma City, Oklahoma, and Wuesthoff Reference Laboratory (Wuesthoff) located in Melbourne, Florida, performed toxicological analysis of specimens from the pilot. The results of analysis by CAMI was negative for carbon monoxide, cyanide, volatiles, and tested drugs. The results of analysis by Wuesthoff was negative for volatiles, carbon monoxide, immunoassay screen, and negative for drugs in the urine screen. Caffeine was detected in the submitted urine specimen.

## SURVIVAL ASPECTS

The airplane was equipped with lap belts and shoulder harnesses at both seat locations. As previously discussed in the "Wreckage and Impact" section of this report, the channel brace (F-632A), that attaches to the F-631 frame and F-606 bulkhead, was separated at the F-606 bulkhead. Additionally, the F-631 frame was displaced down at the center point of the frame and was also displaced forward. The amount of downward and forward displacement was not determined. The F-631 frame is described in the builder's manual as "...a structural member, of 'box' cross-section which is curved like a basket handle. It serves both as a mounting framework for the rear windows and as a roll bar support in case of a nose-over ground accident. It is meant to be a strong component and thus should be carefully constructed and installed."

## TESTS AND RESEARCH

Examination of pictures provided by FAA to NTSB revealed that three of the five rivet holes located on the aft end of the channel brace (F-632A) appeared to be torn out of the aft edge, and the remaining two rivet holes had zero edge margin (distance from the aft diameter of the hole to the aft edge of the channel brace). The three rivet holes with the torn aft edge exhibited minimal edge margin though the exact amount was not determined by the FAA. Based on provided photographs of the channel brace, and the known width of it, the edge margins of the three rivet holes with the torn aft edge were estimated to be no greater than .050 inch. A 90-degree angle remained attached to each aft side of the channel brace (F-632A); the faying surface of each 90-degree angle extended approximately .235 inch beyond the end of the channel brace. Examination of photographs of the upper center portion of the F-606 bulkhead (forward side) revealed the F-632B angle remained secured to the bulkhead; the vertical portion of the F-632B angle had 3 rivets securing the angle to the F-606 bulkhead. The horizontal portion of the F-632B angle had five rivet holes near the bend radius. Further examination of the forward side of the F-606 bulkhead revealed three vertically oriented rivet holes on each side of the installed F-632B angle were pulled; the middle rivet hole on the left

side was extremely elongated.

A review of Advisory Circular 43.13-1B Change 1 dated September 27, 2001, revealed that single row rivets, the "Rivet edge", which is the distance from the center of the rivet hole to the nearest edge of the sheet, must not be less than 2 times the diameter of the rivet. As previously reported in this section, two of the five rivet holes near the aft edge of the channel brace had zero edge margin, and the remaining three rivet holes had an estimated edge margin less than .050 inch. The rivets required to secure the channel brace were 4/32 inch in diameter. Based on the requirement to have a rivet edge at least 2 times the diameter of the rivet, and the designed rivet diameter of 4/32 inch (.125 inch), the minimum rivet edge margin for the five rivets in the channel brace should be no less than .1875 inch, or 3/16 inch.

A review of Vans Aircraft drawing 39, titled "Cabin Frame" revealed that the center of each of the five rivet holes near the aft end of the channel brace (F-632A), are to be located approximately .31 inch forward of the aft end. Additionally, the faying surface of each 90-degree angle is designed to extend approximately .039 inch beyond the aft end of the channel brace (F-632A). With respect to the F-632B angle, the five rivet holes in the horizontal portion of the angle are to be located approximately 5/8 inch aft of the forward edge of the angle, or approximately 3/8 inch forward of the aft faying surface of the angle; "AN426AD4-6" rivets are to be used. The spacing and location of the three rivets in the vertical portion of the F-632B angle did not coincide with the spacing and location specified in the drawing.

The attorney who represents the estate of the pilot reported that during the construction of the airplane, specifically related to the channel brace (F-632A), and the F-632B angle, the pilot had questions about the attachment to the F-606 bulkhead. The pilot made a call or calls to a representative of the designer of the airplane and reportedly completed as instructed the attachment of the F-632A channel brace and F-632B angle to the F-606 bulkhead. The attorney also indicated that during the construction process, the airplane designer issued a recall of the originally provided nose gear leg, and requested it be returned, which was complied with. A replacement nose gear leg was provided, which was the one installed at the time of the accident. A review of a drawing titled "Nose Wheel, Wheel and Gear Leg Fairings" provided by the attorney, revealed the specified P/N for the nose gear leg is U-603-2.

According to a representative of the airplane designer, they do not keep a log specific to an airplane to document the reason(s) a builder would call and ask for guidance. Additionally, the channel brace (F-632A) supplied to the builder measures 19.25 inches long.

A review of section 11 of the airplane builder's manual titled "Engine and Propeller Installation" revealed that RV-6/6A airplanes are designed to use "...Lycoming O-320 (150 & 160 HP) and O-360 (180 HP) engines...." As previously discussed in the "Aircraft Information" section of this report, the engine installed at the time of the accident was a 160 horsepower Lycoming O-320-B2C engine.

Examination of the nose wheel fairing which was comprised of 2 pieces, the nose gear leg, and the nose wheel and tire assembly with attached fork was performed by the NTSB Materials

Laboratory located in Washington, D.C. The result of the examination of the nose gear leg revealed no cracks or fractures. The nose gear leg was bent in a "general curvature to the rear..." with a further local bend to the left near the caster. Hardness measurements on the nose gear leg were performed and found to average 42 HRC which, "...were within the required hardness range specified by the kit supplier (Vans)." Further examination of nose landing gear tire and tube revealed no penetrations and no obvious damage; folds in the tube were noted. The tube was checked for leaks; no leaks were found.

Weight and balance calculations were performed using the latest empty weight and empty weight moment of the airplane (1,023.5 pounds and 71,018.5), respectively, the weight of the pilot per the autopsy report (230 pounds), the provided weight of the passenger (145 pounds), the provided weight of baggage that was located behind the seats (8 pounds), and the provided weight of fuel in the airplane at the time of the accident (30 gallons). The calculations indicate the gross weight and center of gravity location were 1,586.5 pounds and 73.954 inches aft of datum. The design gross weight and center of gravity (C.G.) range of the airplane are 1,700 pounds, and 68.7 to 76.8 inches aft of datum, respectively.

## ADDITIONAL INFORMATION

The NTSB retained possession of components of the nose landing gear on May 22, 2006, which was acknowledged by L. Edward McClellan, an attorney who represents the pilot's estate. All NTSB retained components were also released to L. Edward McClellan, on October 10, 2006.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	71, Male
<b>Airplane Rating(s):</b>	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>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	09/01/2004
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	11/01/2003
<b>Flight Time:</b>	819 hours (Total, all aircraft), 210 hours (Total, this make and model), 723 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	J.D. Calhoun, Inc.	Registration:	N955DC
Model/Series:	Vans ACFT RV6A	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	Yes
Airworthiness Certificate:	Experimental	Serial Number:	60196
Landing Gear Type:	Tricycle	Seats:	2
Date/Type of Last Inspection:	09/01/2004, Condition	Certified Max Gross Wt.:	1700 lbs
Time Since Last Inspection:		Engines:	1 Reciprocating
Airframe Total Time:	190 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed	Engine Model/Series:	O-320-B2C
Registered Owner:	JD Calhoun, Inc.	Rated Power:	160
Operator:	Henry D. Craig	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	KOCF, 89 ft msl	Distance from Accident Site:	21 Nautical Miles
Observation Time:	1253 EST	Direction from Accident Site:	311°
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	3 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	100°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.06 inches Hg	Temperature/Dew Point:	28°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Weirsdale, FL (97FL)	Type of Flight Plan Filed:	None
Destination:	Weirsdale, FL (97FL)	Type of Clearance:	None
Departure Time:	1200 EST	Type of Airspace:	

## Airport Information

Airport:	Love Field (97FL)	Runway Surface Type:	Grass/turf
Airport Elevation:	80 ft	Runway Surface Condition:	Dry
Runway Used:	09	IFR Approach:	Unknown
Runway Length/Width:	2500 ft / 100 ft	VFR Approach/Landing:	Traffic Pattern

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Serious	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal, 1 Serious	<b>Latitude, Longitude:</b>	28.948889, -81.893056

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Timothy W Monville
<b>Additional Participating Persons:</b>	Billy J Meadows; FAA Flight Standards District Office; Orlando, FL Brian Murphy; NTSB; Washington, DC
<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> .