
		NTSB ID: NYC04LA035		Aircraft Registration Number: N999GC	
		Occurrence Date: 11/16/2003		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Nelsonia		State VA	Zip Code 23414	Local Time 1119	Time Zone EST
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility:		Direction From Airport:	
Aircraft Information Summary					
Aircraft Manufacturer Northam		Model/Series RAF 2000		Type of Aircraft Gyrocraft	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>On November 16, 2003, at 1119 eastern standard time, a homebuilt RAF 2000 gyroplane, N999GC, was destroyed when it struck the ground in Nelsonia, Virginia. The certificated airline transport pilot was fatally injured. Visual meteorological conditions prevailed for the personal flight that originated from Accomack County Airport (MFV), Melfa, Virginia. No flight plan had been filed for the local flight that was conducted under 14 CFR Part 91.</p> <p>Personnel at the departure airport reported that the pilot had initiated a takeoff, and then aborted the takeoff for unknown reasons. He pulled clear of the runway and stayed there for about 10 minutes with the engine idling. He then pulled back on the runway and departed about 1028. That was the last he was seen at the airport.</p> <p>The gyroplane was next observed by a witness, who was located about 2 miles northwest of the accident site. The witness reported that when she first observed the gyroplane, the nose was oscillating up and down. The oscillations smoothed out, and the gyroplane continued in straight and level flight to the southeast. Shortly after the gyroplane disappeared from view, she observed a rising column of black smoke coming from the direction the gyroplane was headed.</p> <p>Additional interviews of witnesses in the area revealed that three of the witnesses reported that the gyroplane was in level flight when it rolled left to the inverted position, and then descended in a nose down attitude and impacted the ground. One other witness thought that the gyroplane had first pitched up to a near vertical attitude, and then reversed course and impacted the ground in a nose down attitude. The witnesses agreed that the gyroplane burst into flames after the impact.</p> <p>The examination of the wreckage revealed that both main rotor blades had red paint transfer marks on the top and bottom side of the blades, 67 inches from the end of the blade straps, consistent with the location of the vertical stabilizer. In addition, there were strike marks on underside of both blade tension straps, consistent with the location of the engine propeller.</p> <p>One main rotor blade was straight, while the other was bent up about 20 degrees at the mid-span location. There was no evidence of rearward bending of the blades.</p> <p>A portion of the rudder was consumed in the fire. However, the upper portion of the rudder was separated from the aircraft and found outside of the burn area. There was impact damage on the left side of the separated piece.</p> <p>The gyroplane was equipped with a fixed incident, horizontal stabilizer, which had winglets that were canted 20 degrees outboard of vertical. The condition of the right winglet was consistent with a main rotor blade strike.</p> <p>Flight control continuity was not confirmed due to impact and fire damage.</p>					
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Narrative (Continued)

In addition, the main mast was separated below the rotor hub, and one propeller blade was found separated from the remainder of the blade.

Re-examination of the impact site revealed that all items found away from the main impact area were light items and subject to lateral movement from wind. The direction of movement of the objects did not match the flight path described by witnesses.

The gyroplane had been modified with the addition of a fixed incident horizontal stabilizer. This was not recommended by the kit manufacturer. However, the experimental airworthiness certificate of the gyroplane did not preclude additions, deletions, or modifications from the original kit design.

The pilot was reported to have accumulated about 70 hours in make and model. This included 20 hours of dual instruction in another RAF 2000, and then 50 hours in his own RAF 2000.

The pilot's flight experience was reported to be in excess of 14,550 hours. He held ratings for airplanes single and multi-engine, and instrument airplane. He did not possess a rotorcraft, gyroplane, category and class rating, nor was he required under existing rules from the Federal Aviation Administration (FAA).

Toxicological testing conducted by the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma, revealed the following:

17 mg/dl ethanol detected in urine
 2 mg/dl acetaldehyde detected in urine
 2 mg/dl n-propanol detected in urine
 86.36 ug/ml acetaminophen detected in urine
 452 ug/ml salicylate detected in urine
 No ethanol in lung
 No ethanol in brain

The toxicological report also noted that the samples were received in putrefied condition.

The toxicological report received from the State of Virginia reported an alcohol content of 0.01 percent ethanol by volume. In addition, ethanol was not detected in vitreous fluid.

On November 18, 2003, an autopsy was conducted by Wendy Gunther, MD, Assistant Chief Medical Examiner, Tidewater District, State of Virginia.

According to the FAA-H-8083-21 Rotorcraft Flying Handbook, Chapter 21, Gyroplane Emergencies, pilot induced oscillations (PIO) can occur in both the longitudinal and lateral axis. The publication further stated:

"...As with most other rotor-wing aircraft, gyroplanes experience a slight delay between control input and the reaction of the aircraft. This delay may cause an inexperienced pilot to apply more control input than required, causing a greater aircraft response than was desired. Once the error has been recognized, opposite control input is applied to correct the flight attitude. Because of the nature of the delay in aircraft response, it is possible for the corrections to be out of synchronization with the movements of the aircraft and aggravate the undesired changes in attitude. The result is PIO, or unintentional oscillations that can grow rapidly in magnitude...."

"...the stability of a gyroplane is greatly influenced by rotor force. If rotor force is rapidly removed, some gyroplanes have a tendency to pitch forward abruptly. This is often referred to as a forward tumble, buntover, or power pushover. Removing the rotor force is often referred to as

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Narrative (Continued)


unloading the rotor, and can occur if pilot-induced oscillations become excessive, if extremely turbulent conditions are encountered, or the nose of the gyroplane is pushed forward rapidly after a steep climb."

"A power pushover can occur on some gyroplanes that have the propeller thrust line above the center of gravity and do not have an adequate horizontal stabilizer. In this case, when the rotor is unloaded, the propeller thrust magnifies the pitching moment around the center of gravity. Unless a correction is made, this nose pitching action could become self-sustaining and irreversible. An adequate horizontal stabilizer slows the pitching rate and allows time for recovery."

"Since there is some disagreement between manufacturers as to the proper recovery procedure for this situation, you must check with the manufacturer of your gyroplane. In most cases, you need to remove power and load the rotor blades. Some manufacturers, especially those with gyroplanes where the propeller thrust line is above the center of gravity, recommend that you need to immediately remove power in order to prevent a power pushover situation. Other manufacturers recommend that you first try to load the rotor blades. For the proper positioning of the cyclic when loading up the rotor blades, check with the manufacturer."

"When compared to other aircraft, the gyroplane is just as safe and very reliable. The most important factor, as in all aircraft, is pilot proficiency. Proper training and flight experience helps prevent the risks associated with pilot-induced oscillation or buntover...."

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Landing Facility/Approach Information					
Airport Name	Airport ID:	Airport Elevation Ft. MSL	Runway Used NA	Runway Length	Runway Width
Runway Surface Type: Unknown					
Runway Surface Condition: Unknown					
Type Instrument Approach: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer Northam		Model/Series RAF 2000		Serial Number H2-02-13540	
Airworthiness Certificate(s): Experimental (Special)					
Landing Gear Type: Tricycle					
Homebuilt Aircraft? Yes	Number of Seats: 2	Certified Max Gross Wt.	1540 LBS	Number of Engines: 1	
Engine Type: Reciprocating	Engine Manufacturer: Subaru	Model/Series: EJ 22	Rated Power: 130 HP		
- Aircraft Inspection Information					
Type of Last Inspection Conditional	Date of Last Inspection 07/07/2003	Time Since Last Inspection 50 Hours	Airframe Total Time 50 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed? No	ELT Operated?	ELT Aided in Locating Accident Site?			
Owner/Operator Information					
Registered Aircraft Owner Richard A. Northam		Street Address			
		City Machipongo	State VA	Zip Code 23405	
Operator of Aircraft Same as Reg'd Aircraft Owner		Street Address Same as Reg'd Aircraft Owner			
		City	State	Zip Code	
Operator Does Business As:			Operator Designator Code:		
- Type of U.S. Certificate(s) Held: None					
Air Carrier Operating Certificate(s):					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 91: General Aviation					
Type of Flight Operation Conducted: Personal					

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First Pilot Information

Name Richard A. Northam	City Machipongo	State VA	Date of Birth On File	Age 51
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Sex: M	Seat Occupied: Left	Principal Profession: Civilian Pilot	Certificate Number: On File
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Certificate(s): Airline Transport; Flight Instructor; Commercial; Flight Engineer

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? No Current Biennial Flight Review? 03/19/2003

Medical Cert.: Class 1 Medical Cert. Status: Valid Medical--w/ waivers/lim. Date of Last Medical Exam: 09/29/2003

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	14550	70								
Pilot In Command(PIC)		70								
Instructor										
Last 90 Days										
Last 30 Days										
Last 24 Hours										

Seatbelt Used? Yes Shoulder Harness Used? Yes Toxicology Performed? Yes Second Pilot? No

Flight Plan/Itinerary

Type of Flight Plan Filed: None

Departure Point Melfa	State VA	Airport Identifier MFV	Departure Time 1028	Time Zone EST
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Destination Local Flight	State	Airport Identifier MFV	
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Type of Clearance: None

Type of Airspace: Class G

Weather Information

Source of Briefing:
No record of briefing

Method of Briefing: Unknown

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
WAL	1054	EST	40 Ft. MSL	10 NM	57 Deg. Mag.

Sky/Lowest Cloud Condition: _____ Ft. AGL Condition of Light: Day

Lowest Ceiling: Overcast 5000 Ft. AGL Visibility: 10 SM Altimeter: 30.23 "Hg

Temperature: 14 °C Dew Point: 6 °C Wind Direction: 180 Density Altitude: -355 Ft.

Wind Speed: 9 Gusts: Weather Conditions at Accident Site: Visual Conditions

Visibility (RVR): _____ Ft. Visibility (RVV) _____ SM Intensity of Precipitation: _____

Restrictions to Visibility: None


Type of Precipitation: None

Accident Information

Aircraft Damage: _____ Aircraft Fire: _____ Aircraft Explosion: _____

Classification: _____

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot					
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	1				1
Other Ground					
- GRAND TOTAL -	1				1

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Administrative Information

Investigator-In-Charge (IIC)

Robert L. Hancock

Additional Persons Participating in This Accident/Incident Investigation:

Arthur Munns
Aviation Safety Inspector
Federal Aviation Administration
Richmond, VA