



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	SOUTH CARVER, MA	<b>Accident Number:</b>	NYC96LA135
<b>Date &amp; Time:</b>	07/01/1996, 0600 EDT	<b>Registration:</b>	N444JB
<b>Aircraft:</b>	Bell 206B III	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 None
<b>Flight Conducted Under:</b>	Part 137: Agricultural		

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## Analysis

The pilot was doing aerial spraying of a cranberry bog, and had completed four passes before he executed a right turn to the north to begin the next run. After completing the turn, the helicopter began to spin to the right. After about three to four turns it stopped in a level hover, but then started spinning again to the right. After another three to four spins, it again stopped, and began a final spin to the right when it collided with the bog. Bell Helicopter Textron (BHT) published an Operations Safety Notice, in 1983, which dealt with unanticipated right yaw of the Bell 206 series. It stated that unanticipated right yaw could occur when maneuvering between hover and 30 MPH, and that a tail wind could reduce relative wind speed if a down wind translation occurred. It also stated that a loss of translational lift could result in a high power demand and an additional anti-torque requirements, which included high power demand situations such as low speed downwind turns. A local automated weather report indicated that the winds from were from 210 degrees at 6 knots. The pilot stated that the uncontrolled event initiated when he had completed a right hand application turn, and did not report a lateral cyclic displacement during the last application run.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain control of the helicopter during an aerial application maneuver. This put the helicopter in a low slow down wind, high power demand turn, where it encountered a loss of tail rotor effectiveness, and the subsequent collision with the marsh.

## Findings

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Occurrence #1: LOSS OF CONTROL - IN FLIGHT  
Phase of Operation: MANEUVERING - AERIAL APPLICATION

### Findings

1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. LOSS OF TAIL ROTOR EFFECTIVENESS - ENCOUNTERED - PILOT IN COMMAND

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Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

3. TERRAIN CONDITION - SWAMPY

## Factual Information

On July 1, 1996, at 0600 eastern daylight time, a Bell 206B III, a helicopter, N444JB, was substantially damaged during an uncontrolled descent to a marsh near South Carver, Massachusetts. The certificated commercial pilot was not injured. Visual meteorological conditions prevailed for the agriculture application flight that originated at the South Carver cranberry bog, about 0530. No flight plan had been filed for the flight conducted under 14 CFR Part 137.

In the NTSB Form 6120.1/2, the pilot stated:

"...departed a cranberry bog in South Carver with the first load of fertilizer of the day. After 4 passes over the bog, I began a 5th pass running south to north, which brought the aircraft over the pond on the north side of the bog. At the top of the turn I turned the aircraft to the right and at that point was unable to level or turn the aircraft to the left. At that point the aircraft banked and dove to the right and I attempted to relieve the right tank of the excess fertilizer and weight. I was unable to correct the situation and the aircraft continued to lose altitude and fly on it's right side. After several right hand turns the aircraft impacted the water. After impact I exited the aircraft and checked the right hopper and found approximately 300# [pounds] of fertilizer and only approximately 50# in the left hopper..."

Another helicopter pilot stated:

"...While being loaded...I saw...444JB spinning to the right with a slight nose low attitude with a moderate rate of turn. It made approximately three to four full turns before it stopped in which appeared to be a level hover. After approximately 2-3 seconds, the helicopter began a spin to the right with a nose low attitude once again. Again, after approximately 3-4 full turns to the right, [the pilot] stopped the spin in a somewhat level attitude only for 2-3 seconds before it began spinning again to the right. By this point, [the pilot's] altitude was getting low. From my vantage point, I could not see 44JB when it landed in the water..."

The helicopter was equipped with a lower mirror for the pilot to observe the chemical product as it was being dispensed.

A review of the operating limitations for the application system revealed that the maximum weight in each tank was limited to 400 pounds, and a single tank was limited to a maximum of 200 pounds lateral differential. Each chemical tank was equipped with a sensor connected to a warning light in the helicopter's cockpit. The warning lights were independent, and would illuminate when either tank was empty or not dispensing the product.

Bell Helicopter Textron (BHT) published an Operations Safety Notice, in 1983, which dealt with unanticipated right yaw of the Bell 206 series. It stated:

"...unanticipated right yaw may occur under certain conditions not related to a mechanical malfunction. These conditions may include high power demand situations while hovering, and/or when relative wind affects airspeed versus ground speed..."

It further stated:

"...When maneuvering between hover and 30 MPH: Be aware that a tail wind will reduce relative wind speed if a down wind translation occurs. If loss of translational lift occurs it can result in a high power demand and an additional anti-torque requirements. Be alert during

hover (especially OGE) and high power demand situations such as low speed downwind turns.

The pilot stated that a local AWOS indicated that the winds from were from 210 degrees at 6 knots. The pilot also stated that the uncontrolled event initiated when he had completed a right hand application turn. The pilot did not report a requirement for a lateral cyclic displacement during the last application run.

In the Federal Aviation Administration Inspector's statement he said:

"...The helicopter was at the end of a swath run and turning to the right with a left quartering tail wind and low indicated airspeed prior to entering the uncontrollable turns which led to the crash. This is a situation that could possible have lead to the loss of tail rotor effectiveness. The helicopter remained submerged in 5 feet of water for 8 hours prior to being inspected by [the FAA]. Any fertilizer that had been in the dispensing units had dissolved...

### Pilot Information

<b>Certificate:</b>	Flight Instructor; Commercial	<b>Age:</b>	32, Male
<b>Airplane Rating(s):</b>		<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Helicopter	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Valid Medical--no waivers/lim.	<b>Last FAA Medical Exam:</b>	06/10/1996
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	3300 hours (Total, all aircraft), 450 hours (Total, this make and model), 2410 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 40 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	Bell	Registration:	N444JB
Model/Series:	206B III 206B III	Aircraft Category:	Helicopter
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Restricted	Serial Number:	3258
Landing Gear Type:	Skid	Seats:	5
Date/Type of Last Inspection:	06/10/1996, 100 Hour	Certified Max Gross Wt.:	3200 lbs
Time Since Last Inspection:	44 Hours	Engines:	1 Turbo Shaft
Airframe Total Time:		Engine Manufacturer:	Allison
ELT:	Installed, not activated	Engine Model/Series:	250-C20
Registered Owner:	GROUP IV TRANSPORT	Rated Power:	420 hp
Operator:	JOE BRIGHAM INC.	Operating Certificate(s) Held:	
Operator Does Business As:		Operator Designator Code:	FTYG

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Day
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	4 Miles
Lowest Ceiling:	Overcast / 800 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	210°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	15° C / 12° C
Precipitation and Obscuration:			
Departure Point:	(NONE)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	0600 EDT	Type of Airspace:	Class G

## Wreckage and Impact Information

Crew Injuries:	1 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 None	Latitude, Longitude:	

## Administrative Information

**Investigator In Charge (IIC):** ROBERT L PEARCE **Report Date:** 02/01/1997

**Additional Participating Persons:** WILLIAM D WICKS; BEDFORD, MA

**Publish Date:**

**Investigation Docket:** 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 [pubinq@ntsb.gov](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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