



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	WOOLWICH, ME	<b>Accident Number:</b>	NYC96FA123
<b>Date &amp; Time:</b>	06/10/1996, 0600 EDT	<b>Registration:</b>	N916PA
<b>Aircraft:</b>	Beech E90	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Fatal

**Flight Conducted Under:** Part 91: General Aviation - Executive/Corporate

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## Analysis

The pilot took off on runway 7 and was cleared direct to the Wiscasset NDB, east of the airport. Shortly after takeoff, the airplane began turning to the left. The pilot then asked the controller, '... can you tell if I'm in a turn? I have a problem here.' Soon thereafter, the airplane collided with terrain in an uncontrolled descent, about 1.6 miles north of the airport. Investigation revealed that three days before the accident, a refueler had fueled the airplane's left wing with 840 pounds of fuel, then the fuel farm ran out of fuel. No further fueling was accomplished, and the pilot was not advised of the uneven fuel load. Procedures in the Beech E90 Pilot's Operating Manual (POM) included a check of the fuel tanks during preflight. The Beech C90 POM specified a maximum fuel imbalance of 200 pounds, but the E90 POM did not specify a maximum fuel imbalance. During examination of the wreckage, no preimpact malfunction or failure was found.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: failure of the pilot to maintain control of the airplane while climbing after takeoff, due to spatial disorientation, which resulted in an uncontrolled descent and subsequent collision with terrain. Factors relating to the accident were: the improper refueling (servicing of the aircraft) by FBO personnel, and failure of the pilot to note the excessive lateral imbalance of the airplane during preflight.

## Findings

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Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: CLIMB

### Findings

1. (F) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - IMPROPER - FBO PERSONNEL
2. (F) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (F) AIRCRAFT WEIGHT AND BALANCE - EXCESSIVE - PILOT IN COMMAND
4. LIGHT CONDITION - DAWN
5. WEATHER CONDITION - LOW CEILING
6. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
7. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

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Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

## Factual Information

### HISTORY OF FLIGHT

On June 10, 1996, about 0600 eastern daylight time, a Beech E90, N916PA, was destroyed after takeoff from the Wiscasset Airport, Woolwich, Maine, during an uncontrolled descent and collision with terrain. The certificated commercial pilot and passenger/owner were fatally injured. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan had been filed. The flight departed Wiscasset, Maine, about 0556, destined for Philadelphia, Pennsylvania. The corporate flight was conducted under 14 CFR Part 91.

The airplane departed runway 07 at the Wiscasset Airport, and was cleared direct to the Wiscasset NDB, located about 3 miles east of the airport. The pilot made initial contact with the air traffic controller, about 0556. At 0557, the pilot acknowledged an assigned altitude and asked, ". . .can you tell if I'm in a turn? I have a problem here." The controller advised the pilot that he was heading westbound, then southbound, followed by eastbound. No further transmissions were received from the pilot. A low altitude alert was issued by the controller, when the airplane was observed on radar below the minimum vectoring altitude.

A residence of the area stated that she heard the airplane circling overhead, followed by a loud whining noise just prior to impact.

The accident occurred during the hours of daylight about 43 degrees, 59 minutes north latitude, and 69 degrees, 43 minutes west longitude, at an approximate elevation of 168 feet.

### METEOROLOGICAL INFORMATION

The weather at the Wiscasset Airport, at 0553, was as follows: ceiling measured 100 feet overcast; visibility 3 1/2 miles with fog; temperature 53 degrees Fahrenheit; dewpoint 52 degrees Fahrenheit; winds calm; and altimeter 30.24 inches Hg.

A pilot who departed just prior to the accident flight stated, during a telephone interview, that 3/4 of the sky was obscured with fog through 2,000 feet. At 2,000 feet, there was an overcast layer of clouds that continued through about 3,000 feet.

### WRECKAGE INFORMATION

The airplane accident site was examined on June 10th and 11th, 1996. The wreckage was located about 1.6 miles north of the Wiscasset Airport, and was damaged by a post crash fire. All major components were located within the confines of the main wreckage. The airplane came to rest inverted on a magnetic heading of 340 degrees. Debris was strewn about 100 feet to the north of the main wreckage. Trees on the northeast side of the wreckage, 100 feet in front of the left wing, exhibited fire damage. The landing gear was found extended. The airplane was equipped with one aileron trim tab on the left aileron that was set at 5 degrees tab up. There was no evidence of preimpact anomalies with the airplane. The engines, two flight instruments, and annunciator panel were retained for further examination.

### PILOT INFORMATION

The pilot held a Commercial Pilot Certificate with ratings for airplane single and multiengine land, and instrument airplane.

His most recent Federal Aviation Administration (FAA) Second Class Medical Certificate was issued on June 9, 1995, with a limitation to wear corrective lenses for near and

distant vision.

A review of the pilot's log book revealed that he had accumulated a total flight experience of 10,516 hours, of which 1,138 were in make and model. The pilot had a total instrument flight experience of 712 hours, of which 584 were actual, and 132 were simulated. The pilot had logged 109 flight hours, of which 7 were actual instrument, in the previous 90 days, all in the accident airplane.

#### MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot, on June 11th and 12th, 1996, by Dr. Kristan Sweeney, Office of Chief Medical Examiner, State of Maine.

A toxicological test was performed by the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.

#### TESTS AND RESEARCH

On August 21st and 22nd, 1996, the engines were examined at Pratt and Whitney Canada, Quebec, Canada, under the supervision of the NTSB investigator-in-charge.

The following was observed on the left engine; The power turbine disc displayed circumferential gouges on the forward face of the disc. The compressor turbine shroud displayed circumferential gouges on the inside. The compressor section, first, second, and third stage disc blade butts were in the slots with a 45 degree lip facing toward the direction of rotation, and the blades broken off opposite the direction of rotation. The centrifugal impeller had blades bent opposite the direction of rotation.

The following was observed on the right engine; The power turbine disc displayed circumferential gouges on the forward face of the disc. The stators and axial impeller blades were bent opposite the direction of rotation. Both sides of the interstage baffle displayed circumferential scratches and gouges.

A pneumatic and electric gyroscopic attitude indicator, and annunciator panel were sent to the NTSB Office of Research and Engineering, Materials Laboratory Division, Washington, DC. In the NTSB Material Laboratory Factual Report, it stated:

"The housing of the pneumatic gyro contained impact damage and cracks. Visual examination with the aid of a bench binocular microscope showed circumferential scratches on the inside surface of the housing, indicating rotational contact between the weight and the housing. The electrical gyro showed circumferential scratches on the inside of the housing. . . .The annunciator panel as received was heavily deformed with indicator names missing as well as most of the indicator lenses. . . .Information obtained from Raytheon oriented the bottom of the annunciator panel where the part number plate was attached. The annunciator panel consisted of two rows of 15 indicators. . .the indicators were arbitrarily numbered [starting from top left to right, then bottom left to right]. . . ."

The report further stated that the number 18 bulbs, corresponding to be the left autofeather, had both envelopes broken and both filaments missing. The number 28 bulbs, corresponding to be the right autofeather, had both envelopes intact and both filaments broken and stretched.

#### ADDITIONAL INFORMATION

## Refueling

A refueler from a fixed base operator (FBO), at the Wiscasset Airport, stated that the airplane arrived on June 6, and the pilot requested that the main fuel tanks be topped off. The left main fuel tank was fueled first. During the refueling of the left tank, the fuel farm ran out of fuel, after 125.6 gallons were pumped. No further fueling was accomplished. The refueler advised the FBO owner of the incomplete fueling. Neither the refueler nor the FBO owner indicated that they advised the pilot that only one fuel tank received fuel.

During a telephone interview with the widow of the passenger/owner, she stated that when the flight arrived at Wiscasset that Thursday, June 6, she recalled hearing the pilot saying "we're on fumes" or "we're on empty." That Friday the pilot went to the FBO to return a rental car, and Saturday again to clean out the airplane. She further stated that the pilot would normally preflight the airplane the day before a planned flight; however, he did not for the accident flight.

In the Pilot's Operating Manual (POM), under FAA Normal Procedures, it stated to check the right and left auxiliary and main fuel tanks during the preflight. The Beech C90 POM specified a maximum fuel imbalance of 200 pounds. The Beech E90 POM did not specify a maximum fuel imbalance.

It was calculated that the left wing was refueled with 840 pounds of fuel, and the right wing received none.

## Radar Data

A review of the radar data provided by the FAA Air Traffic Manager, Boston Air Route Traffic Control Center, Nashua, New Hampshire, revealed the following:

0557:13 ; The airplane was at 800 feet heading north. 0557:25 ; The airplane was at 1,100 feet and turned left to the west. 0557:49 ; The airplane was at 1,900 feet and turned left to the south. 0558:01 ; The airplane was at 2,100 feet and turned left to the east. 0558:25 ; The airplane was at 2,600 feet and turned left to the north. 0558:49 ; The airplane was at 3,100 feet and turned left to the southwest. 0559:01 ; The airplane was at 3,200 feet and turned east. 0559:26 ; The airplane was at 1,800 feet, and radar contact was then lost.

## Simulator Flight

On September 13th, 1996, a Beech C90 simulator, at Flight Safety International, Wichita, Kansas, was flown, by the NTSB IIC, with two fuel imbalance scenarios, under visual conditions. One scenario was with fully fueled left wing tanks and minimum fuel in the right wing fuel tanks. The second was with about 900 pounds of fuel in the left wing fuel tanks and minimum fuel in the right wing fuel tanks. To continue level flight, opposite control inputs, within the control limits of the simulator, were needed to counteract a left wing down tendency.

## Aeromedical

In the Aeromedical Training for Flight Personnel, published by the Department of the Army, for spatial disorientation, it stated:

"Spatial disorientation is an individual's inaccurate perception of position, attitude, and motion relative to the center of the earth. When it occurs, pilots are unable to see, believe, interpret, or process the information on the flight instruments. Instead, they rely on the false information

their senses provide."

In the Instrument Flying Handbook, published by the FAA, for sensory systems for orientation, it stated:

". . .under IFR [instrument flight rules] conditions, aircraft attitude can only be determined accurately by observing and interpreting the flight instruments. In the absence of reliable visual information from the Earth's surface, we become more aware of information provided by our motion and position sensing systems. Unfortunately, the sensations of motion and position during various flight maneuvers are often quite misleading, and even tend to compel us to believe them rather than information from the flight instruments."

### Pilot Information

<b>Certificate:</b>	Flight Instructor; Commercial	<b>Age:</b>	63, 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>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	06/09/1995
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	10516 hours (Total, all aircraft), 1138 hours (Total, this make and model), 10119 hours (Pilot In Command, all aircraft), 109 hours (Last 90 days, all aircraft), 33 hours (Last 30 days, all aircraft)		

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Beech	<b>Registration:</b>	N916PA
<b>Model/Series:</b>	E90 E90	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	LW-313
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	7
<b>Date/Type of Last Inspection:</b>	04/24/1996, Continuous Airworthiness	<b>Certified Max Gross Wt.:</b>	10100 lbs
<b>Time Since Last Inspection:</b>	63 Hours	<b>Engines:</b>	2 Turbo Prop
<b>Airframe Total Time:</b>	6230 Hours	<b>Engine Manufacturer:</b>	P&W
<b>ELT:</b>	Installed	<b>Engine Model/Series:</b>	PT6A-28
<b>Registered Owner:</b>	RUMA ADVISORY CO INC	<b>Rated Power:</b>	550 hp
<b>Operator:</b>	RUMA ADVISORY CO INC	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Dawn
Observation Facility, Elevation:	IWI, 68 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	0553 EDT	Direction from Accident Site:	190°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	3.5 Miles
Lowest Ceiling:	Overcast / 100 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	12° C / 11° C
Precipitation and Obscuration:			
Departure Point:	WISCASSET, ME (IWI)	Type of Flight Plan Filed:	IFR
Destination:	PHILADELPHIA, PA (PHL)	Type of Clearance:	IFR
Departure Time:	0556 EDT	Type of Airspace:	Class G

## Airport Information

Airport:	WISCASSET (IWI)	Runway Surface Type:	Asphalt
Airport Elevation:	68 ft	Runway Surface Condition:	
Runway Used:	7	IFR Approach:	None
Runway Length/Width:	3400 ft / 75 ft	VFR Approach/Landing:	None

## Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	On-Ground
Total Injuries:	2 Fatal	Latitude, Longitude:	

## Administrative Information

Investigator In Charge (IIC):	RANDI-JEAN KUKLA	Report Date:	04/29/1997
Additional Participating Persons:			
Publish Date:			
Investigation Docket:	NTSB accident and incident docket 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> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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](#).