



National Transportation Safety Board Aviation Accident Final Report

Location:	HYANNIS, MA	Accident Number:	NYC95FA030
Date & Time:	11/18/1994, 2200 EST	Registration:	N402BK
Aircraft:	CESSNA 402C	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

THE AIRPLANE WAS ON AN ILS RUNWAY 15 APPROACH AND COLLIDED IN-FLIGHT WITH STATIC WIRES, APPROXIMATELY 2 MILES NORTH OF THE RUNWAY. THE WIRES WERE LOCATED IN THE AIRPLANE'S FLIGHT PATH, AND IN A DIRECT LINE WITH THE ILS FINAL APPROACH COURSE. AT THE TIME OF THE ACCIDENT THE LOCAL CONTROL TOWER WAS CLOSED. THREE OTHER AIRCRAFT MADE THE APPROACH PRIOR TO N402BK, AND THE PILOTS OF THOSE AIRCRAFT ALL AGREED THAT AT ABOUT 500 TO 700 FEET MSL, ON THE FINAL APPROACH COURSE, THEY ENCOUNTERED DOWNDRAFTS AND TURBULENCE. ALL THE PILOTS AGREED, THE DOWNDRAFTS CAUSED THEIR AIRPLANES TO FALL BELOW THE GLIDE SLOPE, AND THAT IN ORDER TO REJOIN THE GLIDE SLOPE, THEY HAD TO INCREASE POWER OR CHANGE THE AIRPLANE'S PITCH ATTITUDE. THE OTIS AIR NATIONAL GAURD BASE 2155 WEATHER OBSERVATION WAS; INDEFINITE CEILING 100 SKY OBSCURED, VISIBILITY 3/4 MILES, LIGHT RAIN AND FOG, TEMPERATURE 59 DEGREES F, DEW POINT 58 DEGREES F, WIND 170 DEGREES, 14 KNOTS, GUST TO 19, ALTIMETER 29.96 INCHES HG.

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 a proper glide path during an ILS approach, which resulted in a collision with power lines. Factors in this accident were; adverse weather conditions with turbulence, down drafts and fog.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: APPROACH - IAF TO FAF/OUTER MARKER (IFR)

Findings

1. (F) WEATHER CONDITION - DOWNDRAFT
2. (F) WEATHER CONDITION - TURBULENCE
3. (C) PROPER GLIDEPATH - NOT OBTAINED/MAINTAINED - PILOT IN COMMAND
4. (F) WEATHER CONDITION - FOG
5. (C) OBJECT - WIRE,STATIC

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

6. TERRAIN CONDITION - GROUND
7. TERRAIN CONDITION - WATER

Factual Information

HISTORY OF FLIGHT

On November 18, 1994, about 2200 eastern standard time, a Cessna 402C, N402BK, operated by Island Airlines Inc., as Island Airline Flight 402 (ISA402), collided in-flight with wires while on an ILS Runway 15 approach at Barnstable Municipal Airport, Hyannis, Massachusetts. The airplane was destroyed, and the pilot was fatally injured. Instrument meteorological conditions prevailed and an IFR flight plan had been filed. The flight was being conducted under 14 CFR Part 91. This flight was conducted as a non-revenue flight for the purpose of repositioning the airplane.

At 1827, the pilot of N402BK, called the Automated Flight Service Station (AFSS), Bridgeport, Connecticut. The pilot requested and received an update on a briefing he had obtained earlier.

The specialist provided the pilot the following weather information:

Hyannis...measured ceiling of six three thousand three hundred overcast with seven miles sixty-two fifty-seven...winds one thirty at fifteen with some occasional light rain...Nantucket...from right now [1828] on till ten o'clock [2200] tonight fifteen hundred scattered occasionally overcast...their ceilings of forty-five hundred broken visibility of better than six...I don't think you'll see them pick'em up again tonight...as far as an alternate I'd say you'd better go a little further inland...Bradley...is seven hundred and two and a half and their worse case scenario is nine hundred and three....

The pilot requested and received an IFR clearance from Nantucket to Hyannis. ISA402 departed Nantucket at 2122.

The pilot established communications with the Air Traffic Control (ATC) Specialist at the CAPE TRACON, Otis Air National Guard Base (ANGB), Massachusetts. The airplane was radar identified and given vectors towards Hyannis.

According to the ATC Transcript of Communications, at 2128:20, N402BK was located approximately 6 miles west of the airport, and at an altitude of 3,000 feet MSL. The pilot was told, "...he could expect an extended downwind...you're number four into the airport...." The specialist told the pilot, "...I'll need the IFR cancellation on everyone before...you can be cleared for the approach."

At 2141:41, the pilot was told, "...descend and maintain one thousand eight hundred," and the pilot complied.

The specialist told the pilot at 2142:00, "...you can expect your approach clearance when ACK (Nantucket Airlines, Cessna 402) six eight seven cancels."

The pilot asked the specialist to confirm "you do show me ah east of course," and the specialist answered "affirmative." The specialist told the pilot he was trying to "tighten it up a little bit," because he had to extend the downwind due to the other airplanes on the approach waiting to cancel on the ground.

At 2150:15, ISA402 was 5 miles from KENAD (initial approach fix) and cleared for the ILS Runway 15 approach. The specialist asked the pilot if he was "established now," and the pilot responded, "I'm established."

The specialist instructed the pilot to "[R]eport [his] IFR cancellation with Bridgeport Radio,"

on a frequency 126.425.

The pilot told the specialist, at 2152.05, "...Lifeguard Citation one two seven nine lima [is] trying to reach you." The specialist tried to ascertain what frequency the Lifeguard Citation was using, and if he was on the ground at Hyannis. The pilot of ISA402 confirmed for the specialist that the Lifeguard airplane was on the ground at Hyannis.

The specialist asked the pilot if he could relay a "squawk" to the Lifeguard pilot. The pilot replied, "I can relay him a squawk," and the specialist said, "...actually would you mind relaying a clearance."

The pilot responded at 2152:51:

Actually right now in this kind of weather I'm a little busier than that I would appreciate it if [I] can [have him]...just call Bridgeport.

The specialist agreed, and the Lifeguard pilot was told to contact Bridgeport radio. There is no record indicating that the pilot of ISA402 talked to the Lifeguard airplane again. The pilot of ISA402 was cleared to change to advisory frequency at 2153:15.

At 2156:23, ATC experienced a power failure and the tape ended (Note: When ISA402 struck the power lines, the entire area as far west as Otis ANGB lost electrical power).

The pilot of the airplane performing the ILS approach three aircraft ahead of ISA402 stated:

...decent [from] 1800 [feet] was normal to 700 feet where I encountered severe turbulence and had to increase power to approximately 36 inches MP [manifold pressure] to maintain 120 KIAS...DME indicated 78 knots air speed. At approximately 400 feet I saw the glow of the strobes directly ahead. At approximately 300 feet I lost all visual contact with [the] approach lights and initiated a missed approach and went around. Cape approach asked me if the lights were working. I replied in the affirmative...I realized that the reason I lost contact was due to the timed pilot controlled lighting having gone out. I was again vectored...for another approach...once again encountered severe turbulence and had to increase power....

The pilot of the airplane performing the ILS approach two aircraft ahead of ISA402 said, "At 500 feet [he] experienced moderate turbulence, down drafts, along with rain," and he saw the approach light at "...50 feet above minimums of 332 [feet]." This pilot said he had a "complete visual on the approach lights, then the runway lights from minimums until touchdown."

The pilot of the airplane (a Cessna 402) directly ahead of ISA402, wrote that he did not notice any "abnormalities in the ILS." He wrote:

Below approximately 700 feet I encountered moderate turbulence. Shortly after that I noticed a fly-up indication (below the Glide Slope) and corrected with pitch. I did not add power as I was light and had higher than normal power already and extra airspeed. I considered the pitch correction necessary to arrest the descent to be significant...at approximately 500 feet MSL I saw the approach lights and at 400 feet I had most of the runway and some of the airport in sight. I would estimate the weather as indefinite 400 obscured...2 miles visibility...wind...within 10-20 degrees of the runway at about 15 to 20 knots and gusting...after landing I told IA402 [ISA402] that I had landed...also told him that I broke out at 400 ft and at his request set the runway lights at mid step with 5 clicks of the microphone.

The accident occurred during the hours of darkness approximately 41 degrees, 40 minutes north, and 70 degrees, 17 minutes west.

PERSONNEL INFORMATION

Mr. Hans P. Sorensen held Airline Transport Pilot Certificate, No. 2392040, with mutiengine, single engine land, and instrument airplane ratings. Mr. Sorensen was also a flight instructor for airplane single and multiengine instruments airplane.

Mr. Sorensen was issued a First Class Airman Medical Certificate on June 26, 1994, with no limitations.

Company records showed Mr. Sorensen's total flight hours at the time of the accident were 3,350, of which 450 hours were in Cessna 402C aircraft. According to company records, Mr. Sorensen had flown 200 hours in the 90 days prior to the accident and 59 hours in the 30 days prior to the accident. In the 24 hour period prior to the accident, Mr. Sorensen, flew 4 hours. On March 30, 1994, Mr. Sorensen satisfactorily completed a proficiency check in a Cessna 402C, at Hyannis, Massachusetts.

On the day of the accident Mr. Sorensen reported to work at 1445, and his first flight of the day was at 1526. He had completed 6 trips prior to the accident for a total flight time of 1.6 hours. He had departed for Nantucket at approximately 2045.

METEOROLOGICAL INFORMATION

The weather observation facility at Hyannis was closed at the time of the accident. The nearest weather reporting facility was 10 miles west, at Otis ANGB, Falmouth, Massachusetts.

The Otis (ANGB) weather given to the pilot at 2140:20 was; indefinite ceiling 100 sky obscured, visibility 3/4 miles, light rain fog, temperature 59 degrees F, dew point 58 degrees F, wind 160 degrees, 10 knots, altimeter 29.95 inches Hg.

The Otis 2155 weather was; indefinite ceiling 100 sky obscured, visibility 3/4 miles, light rain fog, temperature 59 degrees F, dew point 58 degrees F, wind 170 degrees, 14 knots, gust to 19, altimeter 29.96 inches Hg.

AIDS to NAVIGATION

The ILS Runway 15 approach to the airport localizer frequency was 108.95. The Initial Approach Fix (IAF), KENAD Intersection, was determined by reference to the 237 degree radial of the Marconi VOR (114.7). The IAF was 4.5 nautical miles from the missed approach point (MAP) on the localizer course of 156 degrees. The glide slope angle from KENAD to runway 15 was 3 degrees.

The published decision height (DH), when the pilot was utilizing the Otis ANGB altimeter, was 332, which was 277 feet above ground level (55 feet airport elevation).

On November 19, 1994, the FAA conducted a flight inspection on the Hyannis, Runway 15, ILS Approach. According to the Flight Inspection Report the result of the inspection was: "facility operation found satisfactory."

At the time of the accident the control tower at Hyannis was closed.

AERODROME INFORMATION

The Barnstable Municipal Airport had two runways; 15/33, which was 5,249 feet long; and

runway 6/24, which was 5,430 feet long. Runway 15 was in use at the time of the accident. This runway was equipped with, high-intensity runway edge lights (HIRL), which were pilot controlled by microphone keying, on frequency 122.95. There are approach lights, runway end identification lights (REIL), and no visual approach slope indicator system (VASI).

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at the accident site on November 19-20, 1994. All the major components of the airplane were accounted for within the accident site.

Two broken static wires were found on the ground approximately 25 feet south of their support towers. These wires were the top two of a group of power lines suspended perpendicular to the ILS approach to runway 15 and about 2 miles from the runway.

The outboard right wing had separated from the airframe and was found near the power lines. The leading edge of the outboard section of right wing displayed wire strike marks. Additionally marks were placed on the vertical fin when the airplane was removed from the pond. No determination was made whether marks similar to wire strike marks found on the vertical fin were present as a result of contact with the power lines or from the cable of the crane used to remove the airplane.

The main wreckage came to rest partially submerged in a pond, located in a gravel pit, approximately 1200 feet from the broken wires. The nose of the airplane was heading in a westerly direction.

The landing gear and flaps were found in the down position. Flight control continuity was not established, due to impact damage, and additional damage caused to the airframe when it was removed from the pond.

The left engine was intact and had separated from the nacelle. The crankcase halves were intact and the cylinder cooling fins had moderate impact damage. All the accessories were attached except for those that had been mounted in the nacelle. The intake and exhaust pipes were damaged. The oil sump was crushed.

The left propeller had separated from the engine during the impact sequence. Blade one was loose in the hub and was twisted in the direction of rotation. Blade number two was bent approximately 80 degrees rearward, and slightly twisted in the direction of rotation. The third blade was twisted in the direction of rotation near the shank.

The left and right vacuum pumps had separated from the rear of their respective engines.

The right engine was intact and had separated from the nacelle. Both case halves and all of the cylinders displayed impact damage. The alternator and fuel control had separated from the engine. The oil sump was crushed.

The right propeller had separated from the engine. Blade number one of three was bent forward approximately 90 degrees and was twisted in the direction of rotation. Blade number two displayed "S" type bending. The third blade was bent about 20 degrees forward at the shank and twisted toward the direction of rotation.

Both engines were removed from the accident site for further examination.

TEST AND RESEARCH

The engines were examined on November 19-20, 1995, at the Hyannis Airport, under the

supervision of the Safety Board Investigator- In-Charge. The results of this examination were as follows.

Left Engine

The top spark plugs and valve covers were removed, and the crankshaft was rotated. Continuity was established to all the cylinders, and to the accessory gears at the rear of the engine. Compression was noted on all cylinders, except number six, by use of a thumb compression check. The piston and rocker arms on the number six cylinder moved as the crankshaft rotated.

The top spark plugs were observed and revealed some wear and carbon deposits on the electrodes.

Magnetos

Both magnetos displayed impact damage. The right magneto was partially separated from the mounts. Both magnetos were rotated by hand and spark was observed at all terminals.

Fuel System

The fuel pump was intact and no damage was observed. The pump rotated freely, and the drive coupling was intact. The fuel pump was disassembled and no internal damage was noted. No fuel was found in the pump.

The fuel manifold was disassembled. The spring and diaphragm were in place, and no damage was noted. The screen was clear and clean. Fuel was noted in the interior.

The main fuel screen was found clean and clear of particles or contaminants.

The oil filter element was also clean and clear. No metal deposits were noted in the oil or on the filter element.

Vacuum Pump

The vacuum pump was disassembled. The pump rotated freely, and the internal examination of the pump revealed no damage.

The turbocharger would not rotate. The compressor shroud was removed and the shaft rotated freely. Impact marks were noted on the shroud.

Right Engine

The top spark plugs and valve covers were removed and the crankshaft was rotated. Continuity was established to all the cylinders and the accessory gears at the rear of the engine. There was compression in all cylinders.

The top spark plugs revealed some wear and carbon deposits on the electrodes.

Magnetos

Both magnetos displayed some impact damage. They were rotated by hand and spark was observed at all terminals.

Fuel System

The fuel pump was intact, but displayed some impact damage. The aneroid was found partially crushed. The pump rotated, and there was no damage observed on the drive coupling. The

fuel pump was disassembled and no internal damage was noted. No fuel was found in the pump.

The fuel manifold was disassembled. The spring and diaphragm were in place, and no damage was noted. The screen was clear and clean. Fuel was noted in the interior.

The main fuel screen was examined and was clean and clear. Fuel was found in the unit.

Examination of the oil filter element revealed it was clean and clear. No metal deposits were noted in the oil or on the filter element.

Vacuum Pump

The vacuum pump had separated from the engine intact, and the driveshaft had remained in the rear of the engine. The vacuum pump was disassembled, and the internal examination revealed no damage.

The turbocharger displayed impact damage. The compressor shroud was removed and internal scoring was observed. The shaft rotated freely.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot, on November 20, 1994, at the Medical Examiner's Office, in Pocasset, Massachusetts, by Dr. James Weiner.

Toxicological tests were conducted at the Federal Aviation Administration's (FAA), Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma and revealed, "no drugs or alcohol."

ADDITIONAL INFORMATION

At the location on the final approach course where the glide slope intersected and crossed the wires, an airplane on the glide slope would clear the wires by 80 feet. The FAA required a clearance of not less than 50 feet, between the wires and the glide slope.

The static wires were suspended between towers that the company identified as towers #325, #326, and #327.

The broken wires were owned by the Commonwealth Electric Company Inc., Wareham, Massachusetts. They were suspended from towers, which were 100 feet AGL. The wires were broken approximately midway between towers #326 and #327, which were 585' apart. These wires were aluminum and steel, and measured 5/8 of an inch in diameter.

The airplane was released to Gregory Riley, Director of Maintenance, Island Airlines Inc., on November 21, 1994.

Pilot Information

Certificate:	Airline Transport; Flight Instructor; Commercial	Age:	29, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	07/26/1994
Occupational Pilot:	Last Flight Review or Equivalent:		
Flight Time:	3350 hours (Total, all aircraft), 450 hours (Total, this make and model), 3200 hours (Pilot In Command, all aircraft), 200 hours (Last 90 days, all aircraft), 59 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	Registration:	N402BK
Model/Series:	402C 402C	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	402C0223
Landing Gear Type:	Retractable - Tricycle	Seats:	10
Date/Type of Last Inspection:	11/16/1994, AAIP	Certified Max Gross Wt.:	6850 lbs
Time Since Last Inspection:	6 Hours	Engines:	2 Reciprocating
Airframe Total Time:	14178 Hours	Engine Manufacturer:	CONTINENTAL
ELT:	Installed, activated, did not aid in locating accident	Engine Model/Series:	TSIO-520VB
Registered Owner:	B&K LEASING INC.	Rated Power:	325 hp
Operator:	ISLAND AIRLINES, INC.	Operating Certificate(s) Held:	Commuter Air Carrier (135); On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	GULC

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FMH, 43 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:	2155 EST	Direction from Accident Site:	270°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	0.75 Miles
Lowest Ceiling:	Obscured / 100 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	14 knots / 19 knots	Turbulence Type Forecast/Actual:	/
Wind Direction:	170°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	15° C / 14° C
Precipitation and Obscuration:			
Departure Point:	NANTUCKET, MA (ACK)	Type of Flight Plan Filed:	IFR
Destination:	(HYN)	Type of Clearance:	IFR
Departure Time:	2122 EST	Type of Airspace:	Class D

Airport Information

Airport:	BARNSTABLE MUNICIPAL (HYA)	Runway Surface Type:	Asphalt
Airport Elevation:	100 ft	Runway Surface Condition:	Wet
Runway Used:	15	IFR Approach:	ILS
Runway Length/Width:	5249 ft / 150 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC):	ALAN J YURMAN	Report Date:	10/13/1995
Additional Participating Persons:	BARRY V OTTO; EAST BOSTON, MA RICHARD I BUNKER; BOSTON, MA JOHN T KENT; SEAGOVILLE, TX WILLIAM WELCH; WICHITA, KS		
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 pubinquiry@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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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](#).