



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Decatur, TX	<b>Accident Number:</b>	FTW01LA091
<b>Date &amp; Time:</b>	03/31/2001, 1215 CST	<b>Registration:</b>	N120BA
<b>Aircraft:</b>	de Havilland DHC-3	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	5 Serious, 13 Minor, 4 None
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Skydiving		

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## Analysis

The pilot and 21 jumpers were aboard the airplane for the local skydiving flight. The airplane took off to the north on the wet grass runway. Jumpers reported that during the initial takeoff climb, the aircraft assumed a "very steep angle of attack," and described the pilot "winding the wheel on the lower right side of the chair clockwise, frantically," and "busy with a wheel between the seats." The airplane impacted trees and terrain approximately 250 yards east of the runway. The pilot reported that the "airplane flew through a dust devil" and did not have enough altitude for a complete recovery. The pilot stated the winds were northerly at 6 to 8 knots with "extreme" turbulence. The nearest weather observation facility reported clear skies with calm wind. Takeoff weight and center of gravity (CG) were calculated at 9,118.05 lbs and 161.92 inches. The AFM listed the maximum gross weight at 8,000 pounds and the aft CG limit at 152.2 inches. Further, an AFM WARNING stated: C. G. POSITION OF THE LOADED AIRCRAFT MUST BE CHECKED AND VERIFIED PRIOR TO TAKE-OFF, AND APPROPRIATE TRIM SETTINGS SHOULD BE USED; OTHERWISE ABNORMAL STICK FORCES AND POSITIONS MAY RESULT. The elevator trim wheel is located on the right-hand side of the pilot's seat. Post-accident examination of the airplane revealed that there were 16 seatbelts in the cabin section and 2 seatbelts in the cockpit. Additionally, a placard installed in the cockpit stated, in part, THIS AIRPLANE IS LIMITED TO THE OPERATION OF NINE PASSENGERS OR LESS. Regarding the discrepancy between the placarded 9 passenger limit and the 21 jumpers aboard, the pilot stated that parachute jumpers are not considered to be passengers and therefore, he did not have to comply with the placarded limit.

## 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 aircraft control during the takeoff/initial climb. Contributing

factors were the pilot's exceeding aircraft weight and balance limits and the dust devil.

## Findings

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Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: TAKEOFF - INITIAL CLIMB

### Findings

1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (F) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
3. (F) WEATHER CONDITION - DUST DEVIL/WHIRLWIND

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Occurrence #2: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: DESCENT

### Findings

4. OBJECT - TREE(S)

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT

### Findings

5. TERRAIN CONDITION - GROUND

## Factual Information

On March 31, 2001 at 1215 central standard time, a DeHavilland DHC-3, single-engine airplane, N120BA, struck trees and terrain following a loss of control during the takeoff/initial climb from the north runway at the private Bishop Airfield near Decatur, Texas. The airplane was owned and operated by Bishop Aviation, Inc., of Decatur, Texas, under 14 Code of Federal Regulations Part 91. The airplane transport pilot and 4 passengers received serious injuries, 13 passengers received minor injuries, and 4 passengers were not injured. The airplane sustained substantial damage. Visual meteorological conditions prevailed for the sky diving flight, and a flight plan was not filed for the local flight.

According to local authorities and the FAA inspectors, who responded to the site, the airplane was carrying parachutists for a local sky-diving jump from 13,000 feet msl. The pilot reported that most of the jumpers were experienced instructors from the Skydive Texas Facility at Bishop Airfield.

The FAA inspectors, after interviewing the passengers, reported a total of 22 persons (1 pilot-in-command, 17 experienced jumpers, and 4 tandem jumpers) on board the aircraft at the time of the accident. One passenger told an FAA inspector that on "takeoff roll, the engine seemed to produce enough power." Further, he stated that the tail would normally rise first, but this time the aircraft assumed a "very steep angle of attack." He saw the pilot "winding the wheel on the lower right side of the chair clockwise, frantically." The pilot pushed forward and left on the control yoke. The tail of the airplane hit the ground. Another passenger told an FAA inspector that about 4-5 seconds after takeoff, the airplane "made a hard right and the pilot was busy with a wheel between the seats."

The FAA inspectors interviewed two witnesses at the airport. One witness stated "the airplane got up [and] made a sharp turn to the right." Subsequently, the "wing went perpendicular to the ground, tried to pull up and took a diagonal nose dive and hit the ground." The other witness observed the airplane climb to "about 300-500 feet with the nose of the plane pointed up." Subsequently, the airplane took a "90 degree turn to the right as the wing dipped down. The plane then seemed to level off and then headed in a downward direction" and struck the ground.

Passenger Statements (NTSB Form 6120.9) were sent to seventeen passengers. Five passengers returned their Passenger Statements to the NTSB investigator-in-charge (IIC). One passenger reported "the aircraft tilted to the right roughly 45 degrees." Subsequently, the aircraft "righted itself and then tilted back to the left 45 degrees. At no time did the aircraft actually stop at level flight, rather it continued rolling back to the left after the initial right tilt. This time the aircraft tilted to what felt like 90 degrees to the right." Another passenger reported that "5 to 10 seconds after liftoff I felt the [air]plane banking" at 200-300 feet agl. This passenger stated the "engine sounded fine during the entire event." Another passenger recalled that "seconds after leaving the ground the [air]plane started rolling to the right." This passenger felt the airplane "lose lift." The airplane "started to roll left and it felt leveled out" and then the airplane impacted.

During a telephone interview, conducted by the NTSB IIC, and on the Pilot /Operator Aircraft Accident Report (NTSB Form 6120.1/2), the pilot reported that the airplane was approximately 2,500 feet from the departure end of the runway and 200 feet agl, when the airplane "suddenly rolled to the right at an estimated 30 degrees per second, continued to the right, and reached a

90 degree angle to the ground." He stated that he "maintained control of the airplane," applied full left aileron and left rudder, pushed forward on the control "stick," and leveled the wings of the airplane. During the sequence, the pilot applied maximum power and continued the climb of the airplane. Subsequently, upon realizing that the airplane did not have enough altitude to clear the trees, the pilot reduced the power to idle. The tail of the airplane struck the ground, the left wing struck trees, and the airplane came to rest on an estimated heading of north.

The pilot further stated that he "originally thought there was an asymmetrical lift situation with a possible flap disconnect." However, he recalled "approximately 2 weeks ago that during the takeoff/initial climb the airplane had a bump, roll right, bump, roll left sequence when the airplane flew through a dust devil." An event, "so similar to this accident sequence," that he concluded that the "airplane flew through a dust devil." However, this time the airplane did not have enough altitude for a complete recovery. The pilot stated the winds were from 330-030 degrees at 6 to 8 knots with "extreme" turbulence. He further stated that a band of clouds associated with a front had passed through the area and was about one hour east of the drop zone. The pilot reported that the airplane had accumulated 169.6 flight hours since installation of the TPE-331-10-511C engine and the Hartzell HC-B4TN-5 propeller, and there was "nothing wrong with the airplane."

On the NTSB Form 6120.1/2, the pilot stated that a "better method of detecting whirlwind conditions. I.E. wind streamers mounted on poles along runway to show rotation prior to reaching [the] runway," could have prevented the accident.

At 1153, the weather observation facility at Alliance Airport (20 nautical miles southeast of the accident site) reported clear skies with calm wind.

The FAA inspectors found the airplane in a muddy bog, approximately 250 yards east of the wet grass runway. The left wing was found separated from the airframe, and additional structural damage existed throughout the airframe. The left side of the airplane was crushed and buckled inward. There were two seats installed in the cockpit and two benches installed along the sidewalls of the fuselage in the cabin. On the right side of the cabin, the inspectors found 9 seat belt assemblies of which 4 were fastened. On the left side of the cabin, they found 7 seat belt assemblies of which 4 were fastened. Three seat belts assemblies on the left side were pulled loose from the attachments points on the floor of the cabin. The engine controls were found in the full forward position.

The aircraft had been modified in accordance with Supplemental Type Certificate (STC) SA4345NM issued for the model DHC-3 aircraft. The accompanying Airplane Flight Manual (AFM) supplement stated "nine passenger or less seating configuration." The required placard, which was installed in the airplane, stated in part, "THIS AIRPLANE IS LIMITED TO THE OPERATION OF NINE PASSENGERS OR LESS."

The FAA inspectors conducted a personal interview with the pilot. In response to questions about the seating accommodations, seatbelt hookups, and certification of the airplane, the pilot stated that the seating configuration of 9 or less did not apply since the jumpers are not considered "passengers."

The FAA inspectors calculated the takeoff gross weight at 9,118.05 pounds with the center of gravity (CG) at 161.92 inches. The AFM listed the maximum allowable gross weight at 8,000 pounds at an aft CG limit of 152.2 inches. Further, an AFM WARNING stated: C. G. POSITION OF THE LOADED AIRCRAFT MUST BE CHECKED AND VERIFIED PRIOR TO TAKE-OFF,

AND APPROPRIATE TRIM SETTINGS SHOULD BE USED; OTHERWISE ABNORMAL STICK FORCES AND POSITIONS MAY RESULT."

According to the aircraft manufacturer, the elevator trim system is operated by a cable and pulley system from a handwheel on the right-hand side of the pilot's seat. The handwheel operates in the natural sense [clockwise/counter-clockwise] and is marked NOSE UP and NOSE DOWN. The pre-flight aircraft check states in part: ELEVATOR TRIM TO MEET CG REQUIREMENTS.

### Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Instructor; Flight Engineer	<b>Age:</b>	58, 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>	Seatbelt, Shoulder harness
<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>	No
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last Medical Exam:</b>	12/27/2000
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	01/22/2001
<b>Flight Time:</b>	33000 hours (Total, all aircraft), 169 hours (Total, this make and model), 31000 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 20 hours (Last 30 days, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	de Havilland	Registration:	N120BA
Model/Series:	DHC-3	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	115
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	Annual	Certified Max Gross Wt.:	8000 lbs
Time Since Last Inspection:		Engines:	1 Turbo Prop
Airframe Total Time:	6633 Hours	Engine Manufacturer:	Garrett
ELT:		Engine Model/Series:	TPE331-10-511
Registered Owner:	Thomas W. Bishop	Rated Power:	900 hp
Operator:	Thomas W. Bishop	Air Carrier Operating Certificate:	
Operator Does Business As:	Bishop Aviation, Inc.	Operator Designator Code:	O9BA

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	AFW, 722 ft msl	Observation Time:	1153 CST
Distance from Accident Site:	20 Nautical Miles	Direction from Accident Site:	150°
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	18° C / 13° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	Calm	Visibility (RVR):	
Altimeter Setting:	30.01 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	Decatur, TX (67TA)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	1215 CST	Type of Airspace:	Class E

## Airport Information

Airport:	Bishop (67TA)	Runway Surface Type:	Grass/turf
Airport Elevation:	800 ft	Runway Surface Condition:	Wet
Runway Used:	35	IFR Approach:	None
Runway Length/Width:	3800 ft / 200 ft	VFR Approach/Landing:	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Serious	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	4 Serious, 13 Minor, 4 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	5 Serious, 13 Minor, 4 None	<b>Latitude, Longitude:</b>	

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Joyce Roach	<b>Adopted Date:</b>	11/28/2001
<b>Additional Participating Persons:</b>	Arnold Thornmeyer; FAA Flight Standards District Office; Fort Worth, TX		
<b>Publish Date:</b>	12/10/2014		
<b>Note:</b>	The NTSB traveled to the scene of this accident.		
<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> .		

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.