File No. 1-0133

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: November 1, 1954 **Released:** November 4, 1954

DELTA-C&S AIR LINES, ATLANTA, GEORGIA
JUNE 15, 1954

The Accident

A Douglas DC-3, N 51359, owned and operated by Delta-C&S Air Lines, crashed immediately after taking off from the Atlanta Airport, Atlanta, Georgia, at approximately 1747, 1/ June 15, 1954. The two-man crew, the only persons on board, received minor injuries; the aircraft was substantially damaged.

History of the Flight

Delta-C&S Air Lines Flight 134X, was a scheduled cargo flight from Atlanta, Georgia, to Chicago, Illinois, with intermediate stops at Chattanooga, Tennessee, and Cincinnati, Ohio. On June 15, 1954, there was to be an additional stop at Knoxville, Tennessee. The crew consisted of Captain H. G. Farnsworth and First Officer R. C. Kammer, a reserve captain. The aircraft's gross weight at takeoff was 23,526 pounds (maximum allowable 25,200 pounds) and the load was properly distributed with respect to the center of gravity of the aircraft. Prior to departure a company flight plan was filed by the crew for a flight to Chicago to be made in accordance with visual flight rules (VFR) and the company's dispatcher then gave the flight its clearance.

At 1742 First Officer Kammer, who was seated in the left or captain's seat, taxied the aircraft from the ramp toward runway 21 in accordance with instructions from the control tower. While en route to this runway the tower controller advised the flight that it could take off from runway 33 if preferred as the surface wind was from the northwest 9 to 10 miles per hour. Captain Farnsworth replied that he would use runway 21 because of the proximity of a rain shower to the southeast end of runway 33. At that time there was a large thunderstorm approximately 8 to 10 miles south of the airport and numerous rain showers were in the area.

Upon reaching the runup area adjacent to runway 21 the prescribed takeoff check was accomplished, during which all components functioned in a normal manner. Upon completion of this check the captain asked the tower for permission to make a right turn after takeoff in order to avoid the approaching rain shower. This request was granted and the flight was cleared for takeoff at approximately 1745.

Before takeoff was started the first officer applied brakes and advanced the throttles to 40 inches of manifold pressure. The brakes were then released and a normal takeoff was accomplished with power application continued to 45 inches of manifold pressure and 2500 r. p. m. As the aircraft became airborne the landing

1/ All times referred to herein are eastern standard and based on the 24-hour clock.

gear was retracted. Light rain was encountered at this time. When the aircraft had climbed to 200 to 250 feet, power was reduced to 35 inches of manifold pressure and a shallow right turn was begun. Before a reduction in r. p. m. was made the aircraft began to settle and the airspeed was observed to decrease rapidly from above 105 to 80 knots. The nose was immediately lowered to level flight, the turn stopped, and full power applied. When this was done, the airspeed returned to about 100 knots and the settling appeared to lessen considerably. The increased airspeed with the attendant better flying characteristics was momentary, however, as the airspeed abruptly dropped to 60 knots and the airplane again began to settle. As the aircraft continued to settle and it became obvious that it was going to strike the ground, the first officer attempted to raise the nose. Upon feeling the aircraft strike the ground, both throttles were closed. The aircraft then skidded to a stop in a wooded area approximately 600 feet northwest of the far end of runway 21.

Investigation

The investigation revealed that as the aircraft neared the ground, it struck several small trees and first ground contact was made by the tail wheel just in front of and below a small knoll. The aircraft then struck the ground on the bottom of the fuselage while in a nose-up attitude with its wings nearly level. It then skidded, turned left 90 degrees, and slid a distance of 150 yards until it struck a large pine tree which split the right wing from tip to fuselage. The landing gear was retracted when the aircraft struck. The major portion of the airframe was damaged beyond practicable repair. The cargo was properly secured and did not shift.

Examination of the damaged airframe and control systems did not disclose any evidence of malfunctioning or failure prior to the accident.

The powerplants were examined at the scene and later in the Delta-C&S shops. A portion of the investigation consisted of a review of the maintenance and overhaul records of the powerplants. No irregularities of a nature that would have any bearing on the accident were found. Both engines were completely disassembled and given a detailed inspection and the propellers were inspected; there was no evidence of structural failure or malfunctioning prior to impact. The exhaust valve to rocker arm clearances of Nos. 7 and 9 cylinders of the right engine were .095" and .077" respectively. Although this would indicate a possible power loss it would not be of sufficient magnitude to affect the airplane's performance.

An elongated high pressure ridge extended from New England southwestward along the Atlantic Coast on the day of the accident. To the west of this ridge including the Atlanta-Chattanooga area there was a southerly flow of warm, moist and unstable air. No fronts or squall lines were in that area but local showers and thunderstorms developed due to the moist, unstable air and daytime heating. These storms became numerous in the afternoon with some in the vicinity of the Atlanta Airport when the subject aircraft took off.

Prior to takeoff, the dispatcher, in the company's office, briefed the crew of N 51359 on the weather conditions, both local and along their intended route.

The forecast for the area which included the route and times involved indicated that there would be thunderstorms, with ceilings lowering briefly in the storms to 1,000 feet, visibility 2 miles, and the tops of clouds 25,000 to 30,000 feet. The 1722 terminal forecast for Atlanta, which was available to the crew before departure, indicated scattered to broken clouds at 5,000 feet, ceilings possibly lowering to 800 feet, visibility 10 miles or better and lowering to 1 mile in moderate thundershowers. Investigation revealed that the thunderstorms and showers were localized and would not preclude a flight made in accordance with visual flight rules.

At the time of takeoff the surface wind was from the northwest 7 to 10 miles per hour. The wind officially reported at 1748, only a minute or so after the accident, was from the southwest at 30 miles per hour with gusts up to 64 miles per hour. The control tower where the wind is recorded is located on the north side of the airport. The unexpected nature of the rain shower is evident by the experience of a light plane operator whose place of business is at the northeast corner of the airport. He thought the shower of no consequence and as a result one of his airplanes, not tied down, was turned on its back by the strong wind and another was moved a considerable distance away. Other witnesses testified that when the subject rain shower was approaching the airport, it did not appear to be violent in nature and that it looked to them to be like many other inconsequential summer rain showers. Witnesses near the scene of the accident at the time it occurred testified that it was raining and that the surface wind was strong and gusty from an east or southeasterly direction.

Captain Farnsworth and First Officer Kammer were both well qualified pilots and each had several thousand hours in DC-3 aircraft. They stated that they had flown in and out of Atlanta for a considerable period of time and that during the summer months rain showers and thunderstorms were common in that area. They also said that on this occasion, when they were preparing for takeoff, there was a large thunderstorm some 8 to 10 miles south of the airport and what appeared to be an isolated rain shower near the southeast end of runway 33. The rain shower seemed like many such showers they had seen before which had little or no turbulence or wind. Their main concern was to avoid the larger storm farther away.

Both crew members said that during the pre-takeoff checks, all components functioned normally. After takeoff there was practically no turbulence. They were unable to explain the loss of airspeed or the settling of the aircraft. In trying to explain the settling they said that it was as if the engines were not producing sufficient power to sustain flight and yet they sounded normal and the instruments indicated a normal power output. They also said that the aircraft nose was never lowered below level position, in an effort to regain airspeed, because of insufficient altitude.

Analysis

It appears from the testimony of the crew and the examination of the aircraft and engines that this was a weather accident. What seemed to the crew and others to be a light rain shower actually contained a downdraft resulting in a localized area of strong, divergent, gusty winds at and near the surface. The aircraft's

contact with this wind pattern resulted in its settling to the ground.

A study of all available weather information, although not conclusive, indicates that the large thunderstorm to the south was being maintained by the continual development of new cells. One such cell, some distance ahead of the parent storm was the subject rain shower. Being a single cell, detached from the main precipitation area, a local heavy rain shower was produced. Within it a downdraft developed which fanned outward in all directions producing strong winds a short distance from the core. This shower was moving from the southeast toward the northwest diagonally across the runway. To further describe this condition let us consider the rain shower as being somewhat circular in shape with winds radiating from its perimeter.

A theory which could explain the action of the aircraft, as described by the pilots, was that on approaching the rain shower the aircraft encountered a strong southwesterly (head) wind. As the aircraft progressed into the core of the storm the headwind abruptly ceased and changed to a tail wind as the aircraft emerged from the opposite side. This sequence of events, occurring in a sufficiently brief period of time, could explain the abrupt speed changes reported by the pilots and the subsequent settling to the ground. The final speed of 60 knots reported by the pilots was 5 knots below the stalling speed of the aircraft considering its load.

Findings

On the basis of all available evidence the Board finds that:

1. The aircraft, the carrier and the crew were properly certificated.

2. The aircraft's gross weight at takeoff was under the maximum allowable weight and it was loaded properly with respect to the center of gravity.

3. During the prescribed pre-takeoff check all components functioned normally.

4. At the time of takeoff a large thunderstorm was 8 to 10 miles south of the airport and a local rain shower was approaching the southeast end of runway 33.

5. The aircraft took off from runway 21 and climbed to approximately 200 to 250 feet.

6. A portion of the rain shower was encountered which contained strong gusts.

7. While in the rain shower the aircraft lost airspeed and settled to the ground.

8. The cargo was properly secured and did not shift.

Probable Cause

The Board determines that the probable cause of this accident was a rapid loss of airspeed immediately following takeoff caused by unexpected, strong gusts or divergent winds accompanying a local rain shower

BY THE CIVIL AERONAUTICS BOARD:

/s/ HARMAR D. DENNY /s/ JOSH LEE

/s/ OSWALD RYAN /s/ JOSEPH P. ADAMS

Chan Gurney, Chairman, did not participate in the adoption of this report.

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board was notified of the accident at 1810, June 15, 1954, by CAA Communications, Atlanta, Georgia. An investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. A special investigation, ordered by the Board, was held in Atlanta, Georgia, July 8, 1954, and in Washington, D. C., August 6, 1954.

Air Carrier

Delta Air Lines, Inc., is a Louisiana corporation with general offices located at Municipal Airport, Atlanta, Georgia. At the time of the accident it was operating as an air carrier under currently effective certificates of public convenience and necessity, and air carrier operating certificates issued pursuant to the Civil Aeronautics Act of 1938, as amended. These certificates authorized the carriage of persons, property and mail over the route described in this report. By merger with Chicago & Southern Air Lines, Inc., on May 1, 1953, the Civil Aeronautics Board authorized Delta, the surviving corporation, to do business under the operating name of Delta-C&S Air Lines.

Flight Personnel

Captain Herbert G. Farnsworth, age 34, had been employed by the company since November 15, 1945. He held a currently effective airline transport pilot certificate with an appropriate rating for the subject aircraft. He had a total of 6,014 flying hours with the company of which 4,575 were in DC-3 type aircraft. His last CAA physical examination was taken February 15, 1954.

Captain Richard C. Kammer, age 35, had been employed by the company since May 5, 1946. He was promoted to reserve captain August 7, 1951. He held a currently effective airline transport pilot certificate with a rating for the DC-3 aircraft. He had a total of 6,803 flying hours with the company of which 6,800 were in DC-3 equipment. His last CAA physical examination was taken January 7, 1954.

The Aircraft

N 51359, a Douglas DC-3, was manufactured June 29, 1944. It was purchased by the company May 1, 1947. It had a total of 18,827 flying hours. The aircraft was equipped with two Wright GR-1820-202A engines and Hamilton Standard 23E50 propellers.