

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: December 1, 1949

Released December 2, 1949

COLONIAL AIRLINES, INC.—BURLINGTON, VT., SEPTEMBER 20, 1948**The Accident**

A Douglas DC-3, NC 17335, operated by Colonial Airlines, Inc., as Flight 3, overshot the runway at Burlington Airport, Burlington, Vt., at 1144,¹ September, 20, 1948, and crashed into trees. The aircraft received major damage. Of the 14 passengers and 3 crew members, 1 passenger and the stewardess were slightly injured.

History of the Flight

Flight 3 was scheduled between Montreal, Canada, and New York, N Y, with an intermediate stop at Burlington, Vt. It departed Montreal at 1112 and was cleared to Burlington by the Civil Aeronautics Air Route Traffic Control to proceed in accordance with visual flight rules. A message was received from the aircraft, by the Colonial radio at Burlington, indicating that it was over the Grand Isle Fan Marker, approximately 25 miles northwest of Burlington at 1135. Colonial radio acknowledged the report and transmitted the latest local weather ceiling 800 feet, visibility 1 mile in heavy rain. This report was acknowledged. Nearing the airport, light rain was encountered. The flight asked Burlington Tower for its existing traffic, and being in the approach control area, further asked permission to make an approach from its present position. After checking with Boston Air Route Traffic Control, establishing that no traffic was in the area, the aircraft was cleared to approach VFR. The windshield wipers were turned on and simultaneously with passing over the range station at an altitude of approximately 700 feet and sighting the airport, the tower called and stated that it had the ship in sight and that the flight was cleared to land.

Flight 3 previously had been informed that the surface wind was west, variable to northwest, 5 mph, and due to a heavy rain occurring east of the airport, the pilot elected to use Runway 1. The aircraft headed southwest in order to widen the pattern and establish a downwind leg at a suitable distance from the runway. During the turn to final approach the flaps and landing gear were extended, and descent was made toward the airport aligned with Runway 1.

Investigation

Tower personnel observed the flight on final approach for a north landing when it was south of the field. The airplane was beneath the overcast and remained visible to ground observers while making a sharp descent toward the field. Because of an air speed which was higher than normal, it remained airborne for several hundred feet. The airplane touched down slightly more than half way down the runway, and in a tail-high attitude. There was no apparent deceleration and as it continued toward the far end of the runway, power was applied in an attempt to take off. The airplane became airborne but there was not sufficient distance remaining and it crashed into trees just north of the airport. Power to both engines was reduced just prior to impact. All the passengers were evacuated without difficulty.

The aircraft came to rest in a heavily wooded area, approximately 300 feet from the end of the runway and headed about 90 degrees to the left of its takeoff direction. Both the right and left wings were damaged extensively due to impact with the trees. The right engine was found to be twisted and almost torn loose from its mountings due to sideways motion of the aircraft on the ground. The left engine was found to be in its normal position on the aircraft and apparently had incurred

¹All times referred to herein are Eastern Standard and based on the 24-hour clock.

only minor damage. Inspection of the blade settings of both propellers revealed them to be normal and up against the low pitch stops. The blades of both propellers were bent slightly rearward, indicating that little power was being developed at time of impact. No malfunctioning or failure was observed in the control systems, and no damage to the aircraft and engines was disclosed other than that caused by impact with obstacles beyond the runway. The brakes were removed, bench checked and found to be in normal serviceable operation. Further brake tests were conducted by installing them on another aircraft when it was found that they operated satisfactorily. Examination of both tires revealed scuff marks that coincided with the wheel marks on the runway and also with the pilot's statement of his application of the brakes on the runway. The flaps were found to be fully retracted.

An inspection of the maintenance records of this aircraft indicated that it was in an airworthy condition at the time of departure from Montreal. The pilot and copilot testified that no difficulty with the aircraft or aircraft equipment was experienced during the flight from Montreal to Burlington.

Weather briefing of the flight was by Canadian Meteorologists at Dorval Field, Montreal. The briefing indicated that a front existed across the route between Montreal and New York in a pressure trough that extended westward into the the Mississippi River Valley. Wave development was occurring on the front. The wave development which had a direct bearing on weather conditions encountered by the flight had its apex in a secondary low center located between Utica and Canton, N. Y. From this apex a cold front extended westward to Lake Erie and a warm front southeastward from the apex to extreme western Connecticut thence across Long Island into the Atlantic. Showers and thundershowers were occurring near the warm front, but these had been forecast not to reach Burlington before flight arrival time. A high broken to overcast condition along the route was indicated with periods of lower broken clouds ranging from about 1,000 to 5,000 feet.

At Burlington the ceiling dropped from unlimited to 1,800 feet with a rain shower during the period of 0847 to 0905. This information was available at Montreal

so that the pilot had evidence that the shower condition had already extended to Burlington before his departure from Montreal. The ceiling again became unlimited after the rain shower but with some lower scattered clouds. At 1053 it became 900 feet followed by 1,100 feet and 4 miles at 1102, 800 feet and 3 miles, light rain shower at 1122, 800 feet and 1 mile, heavy rain shower at 1128; 1,000 feet and 2 miles, light rain shower at 1142 and 1,500 feet and 2 miles, light rain shower at 1202. At the time of the landing the heavy rain had moved east of the field.

Runway 1 at the Burlington Airport is 3,600 feet in length and is surfaced with asphalt or macadam material. Investigation disclosed that Runway 1, including the approach thereto, was well within the limits prescribed by the pertinent Civil Air Regulations, and that the Administrator of Civil Aeronautics had approved the airport for scheduled air carrier operation in DC-3 type aircraft.

Examination of the runway from the point of first touchdown and subsequent tire tracks was not made until after the Board's investigator arrived at Burlington. Although markings were not very discernible, a local airport engineer who observed the aircraft landing made some calculations, and subsequently prepared a sketch for the Board. This sketch shows that the point of assumed touchdown was 1,875 feet from the approach end of the runway, leaving 1,725 feet for the landing, and that the aircraft was airborne only 175 feet from the end of the runway on the attempted go-around. The distance from the last assumed discernible track of the right wheel to where the aircraft came to rest was 740 feet. Other witnesses who saw the aircraft land corroborate substantially the observations made by the airport engineer. Both airport traffic controllers stationed in the tower stated the approach appeared to be high and the glide appeared to be fast, and that the touchdown was approximately half way down the runway.

Analysis

The investigation of this accident shows that Flight 3 elected to land on Runway 1, although the tower had suggested using the 5,000-foot Runway 33, due to the direction from which it was approaching the airport. Weather conditions were improving as the flight

approached from the northwest, and at 1142 the ceiling and visibility were reported as 1,000 feet and 2 miles, which was above the approved minimums (600 - 1), and since the surface wind was westerly, variable, 5 mph, it would appear that a routine approach and landing could have been made on either runway. The captain stated that he had the airport in sight at all times and that the visibility did not prevent a normal circle pattern and final approach to the runway. There was testimony presented at the hearing that because of the terrain south of the airport, the normal tendency was to approach Runway 1 rather high and that when landing, the normal point of touchdown is approximately 1,000 feet up the runway, however, regardless of such tendencies, the aircraft, including the approach to Runway 1, was within the limitations required for DC-3 operations and approved by CAA. During the approach and letdown for landing it appears that minimum ceiling and visibility, or above, existed, and that the flight was in only light rain as the descent was made after aligning with Runway 1. Due to the heavy rain that had just ended, it is very likely that the accretion of water on the runways had not had time to drain off and it is highly probable the amount of water on the runway was considerable.

Captain Burke had logged 2,537 hours on DC-3 aircraft, 950 hours of which had been since May 1947 when he was made a captain by the carrier. He had been flying into Burlington since June 1945, and was thoroughly familiar with the airport runways and the terrain features surrounding the airport. Mr. Nowak, the copilot, had 1,517 hours on DC-3's, and had been operating into Burlington for 2 1/2 years. Captain Burke stated that although he and other company pilots considered some of the approaches to the Burlington runways presented a mental hazard, "it doesn't usually result in any difficulty in landing in the first third" of the runway. He further stated while flying over the vicinity of the airport on the downwind leg, he observed the wet condition of the runway.

Captain Burke knew that the runway was wet and he, therefore, should have used more than the usual care in landing, had he done so the aircraft could have been brought to a stop by the use of brakes within the limits of the runway despite the existing landing conditions.

Two days after the accident Colonial Airlines published a bulletin entitled "Accidents Resulting from Overshooting Runways." Information contained in this document had been furnished by the Civil Aeronautics Board's Bureau of Safety Investigation to the Air Transport Association for distribution to its members and dissemination to pilots. The subject matter contained therein was predicated on a study of 32 scheduled air carrier accidents which had occurred since 1940 resulting from overshooting runways. Throughout this series of mishaps, the common factor in all 32 accidents was wet or slippery runways with, in some cases, the contributing causes of indefinite ceilings and limited visibilities. It was further shown that the coefficient of friction of rubber tires on wet runway surfaces is very low at high speeds and that poor traction from braking action resulted in the aircraft skidding.

On August 4, 1948, this information was furnished the Civil Aeronautics Administration with a request that deceleration tests be conducted by its Technical Development Branch during varying conditions of wet runways. The CAA concurred and offered its support and cooperation in making the tests, and stated that every effort would be made to initiate such a project dependent on the necessary funds becoming available.

Findings

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

1. The air carrier, the aircraft, and the crew were properly certificated.
2. At the time of departure from Montreal the aircraft was properly loaded with respect to its maximum permissible gross weight, and its center of gravity was within approved limits.
3. The flight was routine until its arrival over Burlington.
4. A VFR clearance was authorized for the approach to Burlington.
5. The 1142 U. S. Weather Bureau report for Burlington was ceiling 1,000 feet, visibility 2 miles, light rain, the accident occurred at 1144. The runway surface was wet with standing water.
6. The captain elected to land on Runway 1, approximately 3,600 feet in length, the surface wind being west variable, northwest 5 m.p.n.
7. Touchdown was at a distance of 1,875 feet from the approach end of the

runway, followed by no perceptible deceleration of the aircraft.

8. The aircraft again became airborne only 175 feet from the end of the runway, and as a result struck trees adjacent to the airport.

Probable Cause

The Board determines that the probable cause of this accident was the pilot's

action in landing too fast and too far down the wet runway following a high approach.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JOSEPH J O'CONNELL, JR

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ HAROLD A. JONES

/s/ RUSSELL B ADAMS

Supplemental Data

Investigation and Hearing

The Civil Aeronautics Board was notified of the accident at 1200, September 20, 1948. An investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended, and investigators of the New York region arrived at the scene on the same date. The aircraft was placed under guard immediately following the accident and was maintained under guard until inspection of the wreckage was completed. A public hearing was ordered and was held at Burlington, Vt., October 8, 1948.

Air Carrier

Colonial Airlines is incorporated in the State of Delaware as an air carrier operating under a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the provisions of the Civil Aeronautics Act of 1938, as amended. These certificates authorized the company to transport persons, property and mail in scheduled air carrier operations throughout various points in the United States and Canada, including Montreal, Canada, and Burlington, Vt.

Personnel

Ricnard W. Burke, age 27, of Hempstead, Long Island, N Y., was captain of

the aircraft. Mr. Burke possessed a valid airline transport pilot rating and until the time of the accident had accumulated a total of 3,727 hours of flying time, of which 2,537 hours had been obtained in DC-3 equipment. Edward Nowak, age 29, of Rochelle, N J., was copilot. Mr. Nowak possessed a valid commercial pilot certificate and commercial rating, and until the date of the accident had accumulated a total of 5,417 hours, of which 1,517 hours had been obtained in DC-3 equipment. Miss Pauline S Howe, of Jackson Heights, N Y, was stewardess.

Aircraft

The Douglas DC-3, NC 17335, owned by Colonial Airlines, Inc, was currently certificated. It had been operated a total of 34,238 hours, of which 415 hours had been accumulated since the last major overhaul. It was equipped with two Wright G-102 engines on which Hamilton Standard hydromatic propellers were installed. The left and right engines had been operated a total of 2,851 hours and 11,879 hours respectively, of which 415 hours had been on each since the last major overhaul. At departure from Montreal, Canada, the total weight of the aircraft was approximately 309 pounds less than the allowable gross limits, and the load was distributed with respect to the center of gravity within approved limits.