

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted April 8, 1947

Released April 21, 1947

TRANSCONTINENTAL & WESTERN AIR, INC., WASHINGTON NATIONAL AIRPORT
MARCH 29, 1946

The Accident

Transcontinental & Western Air's Flight 955, NC-86510, a Lockheed Model 049, Constellation, failed to stop on the wet runway following a landing and crashed on the southwestern boundary of Washington National Airport at 1234^{*} March 29, 1946. Although the aircraft was extensively damaged, none of the crew of nine or the three passengers was injured.

History of the Flight

Flight 955 originated at Paris, France March 27, 1946 and made routine stops at Shannon, Eire, Gander, Newfoundland, and New York, New York, while en route to Washington, D C. The flight from Paris to New York had been entirely routine, and all but three passengers and the major portion of the cargo aboard were deplaned at New York.

The flight departed LaGuardia Field, New York at 1104 on an instrument flight rules clearance and cruised at 6,000 feet to Relay Intersection, approximately eight miles WNW of the Baltimore radio range station. Until reaching Relay the flight had been conducted clear of all clouds. In the vicinity of Baltimore strato-cumulus clouds were encountered which covered approximately 7/10 of the sky. The flight was instructed to hold at Relay at 6,000 feet because of weather in the area between Baltimore and Washington, and was advised that an instrument approach to Washington National Airport could not be expected before 1255.

While holding at Relay, the flight reported that it was "contact" and requested a visual flight rules clearance to Washington. This request was approved by the Washington center of Airway Traffic Control and the flight descended to an indicated altitude of 900 feet in the vicinity of Relay. At this altitude Flight 955 proceeded toward Washington. While approaching Washington the flight descended to an indicated altitude of 700 feet in order to remain below the base of cumulus clouds and in the vicinity of the City of Washington it became necessary to alter its course approximately 15 degrees to the left to avoid still lower clouds.

The flight was cleared to Washington National Airport by the Washington control tower and instructed to use Runway 21. However, because it had been

necessary to bear to the left when northeast of the airport to a position from which approach to Runway 21 was not practicable, the flight was asked by Washington Tower if it desired to use a right-hand pattern for Runway 36. The flight replied that it desired clearance for Runway 27, and, as the wind was calm, Washington Tower approved this request.

The flight approached the field from the northeast and while over the east bank of the Potomac River approximately 2/3 of a mile from the boundary of the airport, turned to the right and started a descent in final approach to Runway 27. According to the testimony of the pilots, initial contact was made with the runway between 800 and 1,000 feet from the approach end and the aircraft continued down the runway with less than normal deceleration. Approximately 600 feet from the far end of the runway the pilot attempted a turn to the right. After turning approximately 30 degrees, the aircraft rolled beyond the runway end and struck a concrete transformer housing. The aircraft whipped approximately 90 degrees to the right and came to rest across a drainage ditch with its empennage extending over the highway which adjoins the airport.

Investigation

Examination of the wreckage disclosed considerable damage to the forward portion of the fuselage, landing gear, and engine nacelles as a result of impact. No malfunctioning was disclosed in either the powerplant or aircraft structure prior to the accident. Examination of the brake system and subsequent bench tests of brake components indicated that this system was functioning properly. No evidence was disclosed to indicate malfunctioning of the aircraft controls or control systems. The flaps were found extended approximately 80% of their total travel and it is apparent that this was their position immediately prior to impact with the transformer housing.

The description by witnesses of the approach discloses the fact that the turn for final approach to Runway 27 was initiated at a point with respect to the airport which was considerably closer than normal and the descent to the field was described as being steeper than usual. A statement by one of the passengers, an official of the company, indicates that the flaps were not completely extended prior to initial touchdown and that they continued

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

to move rearward from the wing during the landing roll. The condition of the flaps indicates strongly that at no time were they extended more than 80%.

Runway 27 is 4,100 feet long and is the shortest of the runways at Washington National Airport. From the point of initial touchdown a maximum of 3,300 feet of runway remained in which to decelerate. However, testimony of witnesses who observed the approach and landing indicated that its speed at touchdown was higher than normal and that the aircraft did not appear to decelerate normally. The pilots stated that brakes were applied intermittently but no deceleration due to braking action was apparent to any of the crew. Tire marks were visible for the last 2,700 feet of the runway, no marks within the first 1,400 feet of the runway could be identified as having been made by Flight 955. Therefore, while it cannot be determined that no contact was made in this portion of the runway, it is nevertheless apparent that no deceleration due to braking action occurred in the first 1,400 feet. Inspection of scuff marks on the aircraft tires indicates conclusively that these tires had skidded for a considerable distance on the wet runway.

An aftercast of the weather between New York and Washington indicates that the flight at 6,000 feet from New York to the vicinity of Baltimore had been conducted under a high overcast. From Baltimore southward broken to overcast ceilings existed at 1,000 feet lowering to approximately 700 feet at Washington. This survey indicates conclusively that an unobstructed view of the ground in the vicinity of Washington could not be had above 700 feet. The visibility during this period was reported as 1-3/4 miles, moderate rain, light fog. The 34 miles of terrain between Relay and Washington is relatively flat and its elevation is approximately 200 feet above sea level.

DISCUSSION

It is apparent that the portion of the flight between Relay Intersection and Washington was conducted at an altitude of between 500 and 700 feet above the ground. In the vicinity of the airport, it appears that the crew chose to attempt a landing on Runway 27 regardless of the fact that the landing approach was started from a point closer to the airport than normal. In the short time remaining for a pre-landing check, routine cockpit procedures must have been excessively hurried. Furthermore, extension of the flaps was delayed to such an extent that they had not completely lowered during the early portion of the landing roll. It also appears that the flap control lever was not placed in the 100% position prior to initial touchdown. Because the maximum drag of this type flap is obtained in the last 30 degrees of flap extension, it is apparent that a considerable portion of the drag capacity of the wing flaps was not utilized in this instance. In the attempt to hurry the landing, the speed of the aircraft was not sufficiently reduced and complete deceleration on the runway was not effected.

A recent study has disclosed that several similar accidents have occurred during the past five years the causative factors in which have followed the same pattern. Investigation of the majority of

these accidents failed to disclose any malfunctioning of the brake system although a serious lack of adequate deceleration on wet runways was indicated. It is probable that the coefficient of friction at the speed at which Flight 955 made contact with the wet runway is only 20 or 30 percent of that on a similar dry runway.⁴ It was apparent in this instance, as in previous accidents, that the pilots involved were not completely aware of the ineffectiveness of rubber tires on wet runways as compared with dry runways.

Findings

On the basis of all available evidence the Board finds that

- 1 The company, aircraft and crew were properly certificated
- 2 Prior to departure from New York, the total weight of the aircraft was considerably less than the maximum allowable gross
- 3 After a routine flight from New York to the Relay Intersection, Flight 955 was cleared in flight to the Washington National Airport in accordance with visual flight rules
- 4 When in the vicinity of the airport, the flight was instructed to land on Runway 21.
- 5 Because of low clouds in the vicinity of Washington, the flight altered its course to the east of the airport in order to remain contact and was therefore not in position to use Runway 21
- 6 The pilot requested and received permission to use Runway 27, the shortest runway on the airport
- 7 The turn for final approach was made closer to the airport than normal and the subsequent descent was steeper than usual.
- 8 Contact with the wet runway was made at a speed higher than normal.
- 9 The flaps were still extending during the initial portion of the landing roll and at no time were they beyond the 80% position
- 10 The aircraft failed to decelerate sufficiently, overshot the runway and was extensively damaged in the subsequent crash

Probable Cause

The Board determines that the probable cause of this accident was the poor judgment of the flight crew in attempting to land from a position which did not afford sufficient time to accomplish a satisfactory approach. A contributing factor was the poor landing technique of the pilot in failing to reduce the airspeed sufficiently for a safe landing. A further contributing factor was the lack of knowledge on the part of the crew concerning the poor braking action of rubber tires on a wet runway.

BY THE CIVIL AERONAUTICS BOARD

/s/ J M Landis
 /s/ Oswald Ryan
 /s/ Harilee Branch
 /s/ Josh Lee
 /s/ Clarence M Young

⁴See sketch appended hereto

Supplemental Data

Investigation and Hearing

Air safety investigators of the Civil Aeronautics Board's Washington office were at the scene at the time the accident occurred and an investigation was immediately initiated in accordance with the provisions of section 702(a) (2) of the Civil Aeronautics Act of 1938, as amended. The Board ordered a public hearing which was held at Washington, D C April 8-10, 1946

Air Carrier

Transcontinental & Western Air is incorporated under the laws of the State of Delaware and maintains the headquarters of its International Division in Washington, D C. At the time of the accident Transcontinental & Western Air was operating under a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the Civil Aeronautics Act of 1938, as amended. These certificates authorize the company to transport persons, property and mail between various points in the United States and abroad, including Paris, France and Washington, D C.

Flight Personnel

Captain Samuel Lewis, age 34, of Washington, D C, had been employed by the company since August 1942. Until the date of the accident he had accumulated a total of 6,200 hours' flying time, of which approximately 3,100 hours had been obtained in 4-engine aircraft and 155 hours in the Model 049

Captain Lewis possessed an airline transport pilot rating and was acting in the capacity of check pilot. Captain Robert Lawrence Brown, age 34, of Washington, D C had been employed by the company since May 1942. Until the date of the accident he had accumulated a total of 11,000 hours' flying time, of which 3,000 hours had been obtained in 4-engine equipment and approximately 53 hours in Model 049 aircraft. Captain Brown possessed an airline transport pilot rating and was acting in the capacity of pilot of NC-86510. First Officer Jack B Conner, of Alexandria, Virginia, possessed an airline transport pilot rating and was the third pilot member of the flight crew. The remainder of the crew was composed of R Osterberg, Navigator, J K Burton, Radio Officer, R C Jones, Flight Service Officer, G P Mose, Flight Service Officer, and D Wilson, Hostess. Both Captains Lewis and Brown were qualified over the route.

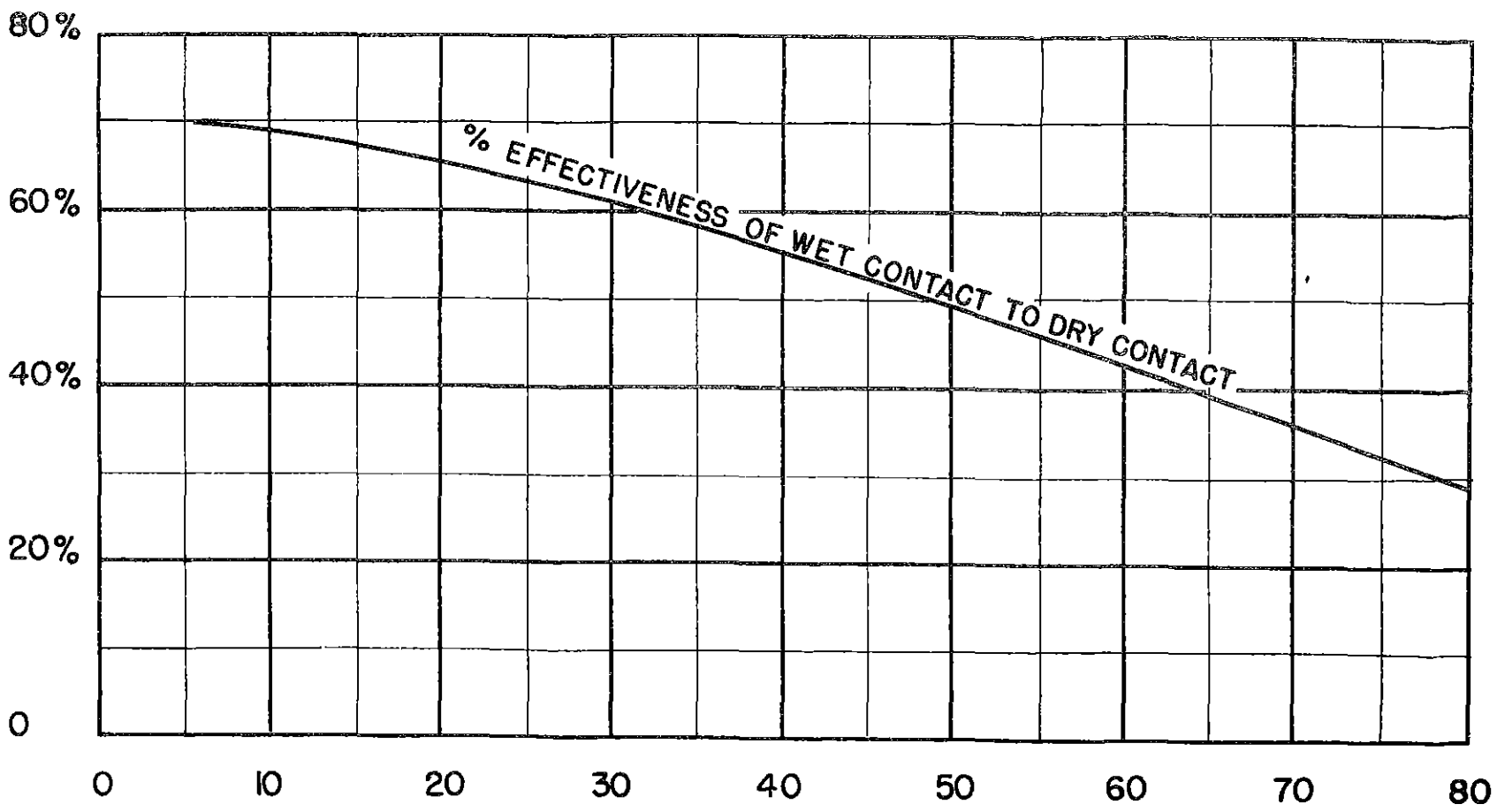
Aircraft

The Lockheed Model 049-51 Constellation, NC-86510, was properly certificated. Since original manufacture it had been operated a total of 489 hours. It was equipped with four Wright 739C-16BA-2 engines. No 1 engine had been operated a total of 36 hours since new and the remaining 3 were installed in the aircraft in the original manufacture. Hamilton Standard propellers were installed. At the time of departure from LaGuardia Field the total weight of the aircraft was less than the maximum gross and the load was distributed with respect to the center of gravity within approved limits.

COEFFICIENT OF FRICTION
RUBBER TIRES ON PORTLAND CEMENT

DATA BASED UPON BULLETIN #120
ENG EXPERIMENTAL STATION-IOWA STATE COLLEGE

% EFFECTIVENESS OF WET CONTACT TO DRY CONTACT



SPEED IN MILES PER HOUR

SKETCH

OF

EAST-WEST RUNWAY

WASHINGTON NATIONAL AIRPORT

TWA LOCKHEED CONSTELLATION, NC 86510

ACCIDENT MARCH 29, 1946

