

C I V I L A E R O N A U T I C S B O A R D

AIRCRAFT ACCIDENT REPORT

Adopted: April 6, 1960

Released: April 11, 1960

CAPITAL AIRLINES, DC-3, N 44993,
CHARLESTON, WEST VIRGINIA,
AUGUST 26, 1959

SYNOPSIS

On August 26, 1959, at 2120 e.s.t. a Capital Airlines DC-3, N 44993, veered off the runway and crashed down a steep slope while attempting a landing at the Kanawha County Airport, Charleston, West Virginia. The aircraft received major damage but no fire occurred. None of the 15 passengers or 3 crew members aboard was injured.

Trip 587 operated normally from Pittsburgh, Pennsylvania, to the Charleston area and was cleared for a landing on runway 23. The copilot, who was flying the aircraft, made the approach. The aircraft bounced after first contact with the runway, continued straight for a short distance, and then veered to the left off the runway. It crossed one sod strip, a taxiway, a second sod strip, and then plunged over a steep embankment coming to rest in a ravine approximately 50 feet below the runway level.

This accident occurred as a result of a poorly executed landing. The initial touchdown was hard and the aircraft bounced. Following the bounce the copilot lost directional control of the airplane and it began to veer off the runway. Corrective action initiated by the captain did not prevent the airplane from going over the embankment.

Investigation

Flight 587 is a regular flight originating at Pittsburgh, Pennsylvania, and terminating at Charleston, West Virginia, with one intermediate stop at Wheeling, West Virginia. The crew for the trip of August 26, 1959, consisted of Captain Merle W. Black, Copilot David C. Walchli, and Hostess Irmgard Harms.

Routine preparations for the flight were made at Pittsburgh. It was conducted under an IFR (instrument flight rules) flight plan and clearance. The trip, including the en route stop at Wheeling, proceeded uneventfully and it arrived in the Charleston area on time.

The copilot, in the right seat, was handling the flight controls on the segment from Wheeling to Charleston. On arrival in the Charleston area, he received permission from Captain Black to make a practice ILS approach and proceeded to do so. Mr. Walchli stated that the approach was normal. He said he made the transition from instrument to visual flight after passing the middle marker beacon inbound to the field to complete the landing visually. He described the landing as smooth and slightly tail low but with a slight skip. He said both the captain and he immediately applied forward pressure on the control column and the aircraft appeared to stay on the ground. According to his statement, the flaps were then raised. The aircraft began an immediate sharp turn to the left and full right rudder was then applied by him and the captain simultaneously. Further, he stated that as the left turn continued, full throttle was used on the left engine and the right brake was applied.

Captain Black stated that the weather was substantially better than had been reported and that he could see the runway before crossing the outer marker, which is located 4.3 nautical miles from the approach end of runway 23. He said the approach speeds were normal and that the landing was a normal tail-low, power-off, skip-type landing with the wings level.

Captain Black also stated that on initial contact the plane veered about 30 degrees to the left and the wings remained level. He said he immediately "reached for right rudder" to straighten the aircraft on the runway but found that the copilot had applied full rudder. He said that as the aircraft touched the

second time he eased the flaps up, applied forward pressure on the control column, and applied full right brake. According to the captain, these corrective measures had no effect and he then applied full throttle on the left engine. Both the captain and copilot stated positively that the left brake was not used at any time during the landing.

All of the passengers who submitted statements to the investigators described the landing as hard and bumpy. Several stated that although it was a rough landing they did not consider it unusual. One who had considerable passenger experience described it as the hardest touchdown he had ever felt. Several other passengers who described the landing as hard and bumpy said that they felt two bounces and then the airplane veered suddenly to the left. In addition, the two tower operators on duty stated that they could see the landing lights of N 44993 during the approach and touchdown. Although they could not see the airplane, its lights appeared to tilt upward as in a bounce and then began to veer to the left.

It was impossible to determine the exact point of initial touchdown of the aircraft on the runway because of the heavy concentration of tire marks; however, both pilots stated that the first contact was approximately on the old runway numbers. ^{1/} The first tire mark that could be identified as being made by N 44993 began at a point 864 feet from the approach end of runway 23 and 51 feet from the left edge. The nature of the mark left by the tire showed definitely that there was braking action on the left wheel. The right tire mark was identified at a point 936 feet from the approach end of the runway. The mark made by this tire showed that there was braking action on this wheel also. From the point where the right tire mark was identified, both left and right tire marks showed braking by both wheels until the aircraft veered to the left off the runway about 1,250 feet from the approach end at an angle of approximately 30 degrees from the runway heading.

^{1/} A 400-foot extension had recently been added to the approach end of runway 23 and new numbers painted accordingly closer to the new threshold. The old numbers were still visible in their original location. The runway length including the new extension is 5,600 feet

Shortly after leaving the runway the turn was stopped with the aircraft still heading about 30 degrees from the runway heading. It continued across a sod strip 111 feet wide and a taxiway 50 feet wide. On the taxiway the aircraft began a right turn. After leaving the taxiway the aircraft crossed another sod strip 18 feet wide to the brink of a steep embankment. It paralleled this embankment for a distance of 58 feet, with the left gear hanging over the edge, and then plunged over, coming to a stop about 50 feet below the runway level. The aircraft came to rest in an upright position heading down the steep slope. There was no fire.

Investigation revealed that all damage to the aircraft occurred as a result of contact with trees and rough terrain as it proceeded over the embankment and down the steep slope. The flight control systems were examined and found to be capable of normal operation with some restriction due to impact damage of the left aileron. The wing flaps were fully retracted and the system was intact and capable of normal operation.

The right main tire, wheel, and brake assemblies were intact although the landing gear was damaged and folded rearward as a result of impact loads. The wheel axle and bearings were intact and well lubricated. The condition of the brake assemblies showed normal wear of both drums, all brake blocks, and related components. In addition, both drums were checked for an out-of-round condition and were found to be within tolerances.

The left main landing gear was completely separated from the airplane by impact. Its tire, wheel, and brake assemblies were also intact. The axle and wheel bearings were undamaged and well lubricated. The tire was undamaged except for a scrub mark one inch wide around its circumference at the extreme outboard edge of the tire tread. The brake assemblies showed a normal condition of both drums and all brake blocks. One brake clearance measurement was zero inches; however, the wheel turned easily with no binding. The brake drums were also checked for out-of-roundness and found to be normal.

The brake pressure control valve and the main hydraulic system accumulator were examined and found to operate properly.

The maintenance records for N 44993 indicated that all inspections and correction of maintenance discrepancies had been accomplished as required. There were no carry-over items and the records indicated that the airplane and powerplants were in an airworthy condition.

A special weather observation was taken immediately after the accident. The conditions at that time were: partial obscuration; 7,000 feet broken clouds, 12,000 feet, overcast; visibility, two miles in ground fog; wind south at eight knots.

It was learned that another aircraft, a Martin 404, was standing in runup position near the approach end of runway 23 as Flight 587 was landing. An investigation was made to determine whether propeller wash from this aircraft could have drifted into the approach or touchdown areas and adversely affected Flight 587. It was determined that the 404 was headed north and that its runup had been completed several minutes before Flight 587 made its approach.

Analysis

The investigation disclosed no structural or mechanical failures present in N 44993, prior to the crash, which could have contributed to this accident. All maintenance and inspections had been performed as required and there were no uncorrected or carry-over items. In addition, all witnesses said the aircraft's approach up to the time of touchdown appeared normal. Further, both pilots testified that the aircraft had operated normally throughout the flight. For these reasons the Board believes that no discrepancy, either structural or mechanical, existed in N 44993, and that it was being operated normally until just before the first contact with the runway.

Despite the descriptions by the crew that this was a normal skip-type landing, the Board believes that it was hard and that the airplane bounced. First, the tower operators saw the landing lights appear to tilt upward abruptly. Even though this observation was restricted and cursory, it is evident that the movement of the lights was unusual enough to create the impression of a bounce. Second, the passengers' statements describe a hard touchdown, a bounce, then a second contact with the runway.

The consensus of the passengers was that the aircraft appeared to roll straight with the runway for a short distance after the second contact with the runway, then swerve to the left. The copilot, in his written statement, corroborates this sequence of events. The only conflicting evidence to this order of happenings was the testimony of the captain and stewardess, who stated that the airplane touched down, skipped, and then swerved to the left immediately and before the second contact with the runway. The preponderance of evidence therefore is that the airplane did not begin to veer off the runway until after the second contact.

Both pilots stated that the weather was substantially better than had been reported. The visibility was good, there was no turbulence, and no noticeable wind effect on the final approach. It is therefore evident that weather was not a contributing factor in this accident.

Another factor considered and dismissed as a contributing cause to this accident was the possibility of propeller wash from the Martin 404 causing the DC-3 to veer off the runway. The Martin pilot had parked his aircraft with the tail (and therefore the propeller wash) pointing away from the landing runway. In addition, the pilot had completed his engine runup and was waiting for the Capital flight to land before taking the runway for departure. Further, since the landing was toward the southwest and the wind was from the south, any turbulent air mass would have been drifted away from the area where control was lost. It is obvious that the slipstream from the Martin would have no effect on the DC-3.

It is evident from the marks on the runway that left brake was applied during the landing. The physical examination of the brake systems showed that there had been no malfunction in these systems which could have caused a brake to drag or bind and cause this mark. It is therefore evident that the left brake pedal was depressed either by the pilot or copilot.

From all the evidence available, the Board believes that both brakes were applied during an attempted recovery from a poorly executed landing. It seems clear that the aircraft contacted the runway and bounced. Shortly after the second contact with the runway the crew lost control and the

aircraft started to veer off the runway. The effectiveness of the corrective action of right brake and right rudder was greatly reduced by the prior or simultaneous application of left brake. As a result, the rotational forces on the aircraft as it deviated from a straight course could not be overcome until it had veered from the runway.

After the proper corrective action was taken, insufficient distance remained to prevent the airplane from going over the embankment.

Conclusions

The Board concludes that there was no mechanical or structural failure to N 44993 which contributed to the cause of this accident. In addition, the propeller wash from the Martin 404 waiting at the end of the runway for takeoff clearance, could not have affected the control of the DC-3.

From all the evidence available, the Board's opinion is that this accident was solely the result of poor pilot technique. In attempting recovery when the aircraft began to veer to the left, following the hard landing, both wheel brakes were applied along with full right rudder. As a result, the only effective corrective measure was the rudder control and it was insufficient to prevent the aircraft from leaving the runway. After proper corrective action, i.e., power on the left engine, full right rudder, and right brake only, the airplane straightened out and began to turn back to the right. The distance remaining to the embankment toward which the airplane was heading was insufficient to allow the aircraft to be turned to prevent it from going over the bank.

Probable Cause

The Board determines that the probable cause of this accident was the loss of directional control following a poorly executed landing.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE
Chairman

/s/ CHAN GURNEY
Vice Chairman

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

/s/ ALAN S. BOYD
Member

S U P P L E M E N T A L D A T A

Investigation and Taking of Depositions

The Civil Aeronautics Board was notified of this accident at 2230 e.s.t., August 26, 1959. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958. Depositions ordered by the Board were taken at the Kanawha County Airport, Charleston, West Virginia, on September 1, 1959, and in the CAB offices in Washington, D. C., on September 22, and December 4, 1959.

Air Carrier

Capital Airlines, Inc., is a Delaware corporation and maintains its principal offices in Washington, D. C. The corporation holds a current certificate of public convenience and necessity issued by the Civil Aeronautics Board to engage in the transportation of persons, property, and mail. It also possesses a valid air carrier operating certificate issued by the Federal Aviation Agency (formerly Civil Aeronautics Administration).

Flight Personnel

Captain Merle W. Black, age 37, was employed by Capital Airlines October 16, 1950. He held a valid FAA airline transport pilot certificate and ratings for the DC-3, DC-3S, and DC-4. He had a total flying time of 7,813 hours, of which 4,815 were in DC-3 equipment. His last line check was accomplished satisfactorily January 26, 1959, and his last semianual proficiency check was passed on March 3, 1959. Captain Black was qualified as captain on the DC-3 July 19, 1956. He had made nine landings at the Kanawha County Airport in the 30 days preceding the accident, the last being made August 25, 1959. He passed his latest FAA first-class physical examination with no waivers on July 22, 1959.

Copilot David C. Walchli, age 28, was employed by Capital Airlines on September 20, 1957. He held a valid FAA commercial pilot certificate with airplane single-engine land and instrument ratings. Mr. Walchli had a total of 2,787 flying hours, of which 741 were in the DC-3. He completed his qualification and checkout as copilot on the DC-3 October 16, 1957. He had

made six landings at the Kanawha County Airport in the 30 days preceding the accident. His last copilot proficiency check and instrument certification was accomplished satisfactorily June 3, 1959. His latest FAA first-class physical examination was passed September 4, 1958, with no waivers.

Hostess Irmgard Harms, age 24, was employed by Capital Airlines February 18, 1959. She had received the Capital indoctrination course for all Capital aircraft. She had also received general emergency procedure training on all Capital aircraft February 12, 1959, and a general emergency procedure refresher training on May 20, 1959.

The Aircraft

N 44993, a Douglas DC-3, serial number 6260, was manufactured December 22, 1942. It was purchased October 25, 1945, by Capital Airlines and had accumulated a total of 40,861 flying hours. It had flown 148 hours since the last number 4 inspection and 50 hours since the last number 2 inspection. The aircraft was equipped with two Wright cyclone engines, model G-202, and Hamilton Standard propellers, model 23E50.