

C I V I L A E R O N A U T I C S B O A R D
ACCIDENT INVESTIGATION REPORTAdopted: April 22, 1957Released: April 25, 1957CONTINENTAL AIR LINES DC-3A, N 33315, AND CESSNA 170B,
N 8143A, BARTLESVILLE, OKLAHOMA, SEPTEMBER 9, 1956The Accident

At 1432, ^{1/} September 9, 1956, a Continental Air Lines Douglas DC-3A, N 33315, and a Cessna 170B, N 8143A, collided in flight approximately two miles southeast of the Phillips Airport, Bartlesville, Oklahoma. Both aircraft, substantially damaged, were landed safely at that airport. There were no injuries to the passengers or crew of either aircraft.

History of the Flight

On September 9, 1956, Continental Air Lines Flight 190 was scheduled between El Paso, Texas, and Kansas City, Missouri, with planned intermediate stops among which were Tulsa and Bartlesville, Oklahoma. The crew consisted of Captain Bennes M. Richards, First Officer John R. Deshurley, and Hostess Jonette Weist. Departure from El Paso was at 0718 and the flight was routine to Tulsa. At Tulsa the aircraft was serviced and it departed there at 1418. The flight to Bartlesville was planned and operated in accordance with visual flight rules at an altitude of 2,000 feet and the elapsed time was estimated to be 16 minutes. The gross take-off weight of the aircraft from Tulsa was within approved

^{1/} All times referred to herein are central standard and based on the 24-hour clock. All altitudes are mean sea level unless otherwise stated.

limits, the load was properly distributed, and there were 14 passengers.

Ten minutes after leaving Tulsa and in the vicinity of Ochelata, Oklahoma, the captain advised his company that the aircraft was in range of Bartlesville. He was then given the altimeter setting, 30.29, and advised to change to Bartlesville Radio frequency. During a call to Bartlesville Radio he was advised that the active runway was 17 and the wind from the south at 10 knots. Some time after the captain initiated his first radio call the first officer began the "in-range" cockpit check. This check took approximately 30 seconds and just as it was completed the collision occurred. At the time of collision the DC-3 was continuing north and about to enter the downwind leg of the airport traffic pattern on a reciprocal heading to the intended landing on runway 17.

James L. Folk, owner and pilot of Cessna N 8143A, took off from Dewey, Oklahoma, Hi-Way Airport ^{2/} at approximately 1417. The flight was a sightseeing trip for Mr. Folk's four passengers whose ages were between eight and sixteen years. Pilot Folk flew from Dewey to Bartlesville and from an altitude of about 1,000 feet above the ground pointed out the homes of some of his passengers.

As the Cessna completed a 45-degree right turn to the northwest the two aircraft collided. Both aircraft were landed safely at the Bartlesville Airport.

^{2/} Dewey Hi-Way Airport is located three miles northeast of Bartlesville Airport.

The weather at the time of the accident was clear, visibility 15 miles, wind south 10 knots.

Investigation

DC-3 damage. The right aileron lower fabric covering was cut a distance of 13 inches by the propeller of the Cessna. This cut began one-half inch in from the leading edge and extended diagonally inboard toward the trailing edge at an angle of 45 degrees from the lateral axis of the aircraft. This cut also damaged the seventh aileron rib and the spar lower cap. A second cut paralleled the first approximately 1-1/2 inches outboard from it. This cut began about two inches rearward from the inboard end of the first cut and extended in the same direction through the trailing edge cutting both lower and upper surfaces. The fracture of the trailing edge metal strip tore the fabric both top and bottom adjacent to the cut.

The right horizontal stabilizer and elevator were severed diagonally at an angle of 43 degrees with the fore and aft axis, inboard and rearward from the stabilizer tip through the elevator trailing edge. Both surfaces were cut upward and the lower surface of the tip contained red paint similar to that on the propeller hub spinner of the Cessna. The outboard elevator hinge bracket was broken and the lead counterweight was severed upward. The elevator torque tube and four ribs were cut and broken upward. All severed parts were recovered.

Cessna damage. The leading edges of both metal propeller blades were scarred, nicked, and abraded and one tip was curled forward. The propeller hub spinner was crushed and torn and the upper left nose cowl was crushed rearward. The upper left engine cowling was torn free along the center hinge line and the upper engine baffling on that side was crushed. Sparkplugs from cylinders Nos. 4 and 6 were torn from the cylinders and broken. The right side of the windshield was scuffed and cracked as if struck by the cowling when it left the aircraft. At a point about eight feet outboard from the root, the leading edge of the left wing was flattened somewhat for a distance of 10 inches and there were abrasion marks and scratches sloping inward at an angle of 25 degrees. There was no evidence of fire having occurred in either aircraft.

The collision. The impact between the two aircraft occurred about 1,000 feet over the southwest section of Bartlesville. Relatively small severed pieces (right elevator and stabilizer tip from the DC-3 and engine cowling from the Cessna, etc.) fell to the ground but caused no injury to persons or damage to property. A group of witnesses on the ground, several with aeronautical experience, observed both aircraft prior to and at the time of collision. The consensus of their observations was that the Cessna was proceeding westward and then turned to the northwest just before the impact, and that the DC-3 was proceeding level laterally and longitudinally almost due north. The statements of the Cessna pilot and the

DC-3 crew are in substantial agreement with regard to the headings of both aircraft when the collision occurred. Both pilots gave accurate estimates of their airspeeds at the time.

Computations, using the angles of the propeller cuts on the DC-3 aileron and tail surfaces, the Cessna propeller r. p. m. and diameter, and the furnished airspeeds, produce the following results: Angle of convergence of the two aircraft - 44 degrees; rate of closure - 98 m. p. h. (144 feet per second); viewing angle of Cessna from DC-3 - 52 degrees to the right; viewing angle of DC-3 from Cessna - 84 degrees to the left.

At 1430, September 9, 1956, the altitude of the sun (angular elevation above the horizon) at Phillips Airport was 48 degrees. The azimuth of the sun (measured eastward from zero north) was 229.3 degrees. This placed the sun in front of the Cessna while it was on its westward heading.

The pilot of the Cessna had been visiting friends living in the southwest portion of Bartlesville. The purpose of the flight from Hi-Way Airport, Dewey, Oklahoma, three miles north of Bartlesville, was to take four children for a short trip over Bartlesville. After taking off, the Cessna proceeded about four miles due south and then turned westward at an altitude above the ground of 1,000-1,100 feet. According to the pilot, who was in the left front seat, after reaching a point where the home he had been visiting was seen to the right by occupants of the Cessna, a 45-degree turn was made to the northwest. While coming out of this turn, the collision

occurred. The Cessna pilot stated that he did not intend to land at Phillips Airport and was not aware that he was nearing the airport traffic pattern. His two-way radio was not turned on. The pilot also stated that the visibility was unlimited and that the sun did not interfere with his vision when on a west heading.

Testimony of the DC-3 flight crew disclosed that shortly after making the in-range report approximately ten miles south of Bartlesville the copilot, seated on the right side, started the in-range cockpit check. This portion of the cockpit checklist consists of seven items, the last being a check of hydraulic fluid which requires that the copilot turn left towards the rear of the cockpit in order to see the fluid quantity indicator. The collision occurred at this time. The captain's scope of vision, from his seat on the left, is hampered by the compass and radio installation located over the center of the instrument panel and at the bottom center of the windshield. The in-range checklist usually takes about 30 seconds to accomplish. The DC-3 crew also testified that, although the bright sun did not hamper their vision, the form of haze present at low altitudes, coupled with the variegated background of the populated area of Bartlesville over which they were flying, would make it difficult to spot the small, aluminum-colored aircraft. They were at the correct altitude to enter the downwind leg of the airport traffic pattern.

The airport at Bartlesville is operated by the Phillips Petroleum Company. Local traffic rules stipulate left-hand turns on two patterns - a larger, circular pattern for large aircraft to be flown at 1,000 feet, and a smaller, rectangular pattern for small aircraft to be flown at 500 feet, for all aircraft in flight below 1,500 feet above the surface (2,215 feet m. s. l.) within a three-mile radius of the airport. Straight-in approaches may be made, providing Bartlesville Radio is in operation. This airport is classified as uncontrolled, i. e., there is no control tower.

Bartlesville Radio (BVO) is owned and operated by the Phillips Petroleum Company, and is in operation between 0600 and 1800. The radio operator is not licensed by the CAA as an airport traffic control operator - nor is he required to be - and only limited advisory service, to be used at the pilot's discretion, is furnished to flights operating into the airport. The radio room is located on the second floor of the Administration Building and its windows provide visibility on the west, north, and south sides only. It does not serve as a control tower.

Analysis

The sole purpose of the Cessna flight over Bartlesville was a sightseeing trip for the young passengers. It is apparent that the attention of the Cessna pilot was largely directed to his right as he approached over the area of his hosts' and passengers' homes. While the Cessna was proceeding

westward, 60 seconds before the collision,^{2/} the DC-3 was three miles away and about 45 degrees to the left of the forward view from the Cessna. Thirty seconds before the collision the DC-3 was 1-1/2 miles away at the same bearing. The altitudes of both aircraft could not have differed more than 100-200 feet during this time. Regardless of the sun's position and the reported haze, it seems that regular scanning of the horizon by the Cessna pilot during the last minute or so before the collision would have revealed the DC-3.

This applies equally to the copilot of the DC-3 seated in the right-side pilot seat. If 30 seconds, ending at the time of collision, was required to complete the in-range cockpit checklist, there was at least a prior minute when the Cessna would have been visible on a bearing of about 45 degrees to the right and near the altitude of the DC-3. The compass at the bottom center of the windshield would restrict the captain's field of vision to the right but a small movement of his body to either side would again place this area in his view. It is possible that the Cessna was in this sector during the minute or so before the collision. (See attachment.) Other than the cockpit check there were no duties requiring attention inside the aircraft at that time, according to crew testimony.

Although the 1420 Bartlesville weather report of September 9, 1956, gave 15 miles visibility, the kind of haze mentioned by the DC-3 crew may have contributed, in a small

^{2/} See attachment.

degree, to the failure of all three pilots to see the other aircraft.

The Board is of the opinion that the DC-3 flight crew were aware of all restrictions to cockpit visibility and the necessity for continual outside scanning. Such a scanning is necessary even though it requires a break or interruption in cockpit duties. Both aircraft were flying VFR under weather conditions far better than VFR minimums. Consequently, the Board believes that the entire responsibility for observing and avoiding other aircraft rested on the pilots of the two aircraft involved in the accident.

Findings

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

1. The carrier, the aircraft, and the pilots were properly certificated.
2. Both aircraft were in airworthy condition and operating without mechanical difficulty prior to the collision.
3. At the time of the accident, the weather was clear and the visibility was 15 miles.
4. The DC-3 was maintaining a straight course in a slight descent, preparatory to entering the downwind leg of the airport traffic pattern.
5. The Cessna pilot was not aware of being near the airport traffic pattern, and made a 45-degree right turn just prior to the collision.

6. The pilots of both aircraft had ample opportunity to see and avoid the other aircraft for at least a minute before the collision.

Probable Cause

The Board determines that the probable cause of this accident was the failure of the pilots of both aircraft to observe and avoid the other aircraft.

BY THE CIVIL AERONAUTICS BOARD.

/s/ JAMES R. DURFEE

/s/ CHLHN GURNEY

/s/ HERMAN D. DENNY

/s/ G. JOSEPH MINETTI

Member Louis J. Hector did not take part in the adoption of this report.

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

Investigation and Depositions

The Civil Aeronautics Board was notified of the accident at approximately 1645, September 9, 1956. An investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. Depositions, ordered by the Board, were taken at Kansas City, Missouri, on September 28, 1956; at Bartlesville, Oklahoma, on September 30 and October 1, 1956; and at El Paso, Texas, on October 25, 1956.

Air Carrier

Continental Air Lines, Inc., a Nevada corporation, is a scheduled air carrier with its principal offices at Denver, Colorado. The company possesses a currently effective certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration which authorize the carriage of persons, property, and mail over the route described in this report.

Flight Personnel (DC-3)

Captain Bennes M. Richards, age 35, was employed by Continental Air Lines on January 4, 1946. He held a valid airman certificate with an airline transport rating and type rating for DC-3 aircraft. Captain Richards had, according to company records, a total of 11,235 flight hours, of which 5,415 were acquired in DC-3 equipment. His last first-class physical examination was passed on July 25, 1956. The date of his last route check was November 4, 1955.

First Officer John R. Deshurley, age 28, was employed by Continental Air Lines on August 13, 1951. He held a valid airman certificate with an airline transport rating and type rating for DC-3 aircraft. Pilot Deshurley had, according to company records, a total of 3,856 flight hours, of which 3,024 were acquired in DC-3 equipment. His last first-class physical examination was passed on February 17, 1956. The date of his last route check was September 7, 1956.

Stewardess Jonette Weist was employed by Continental Air Lines on June 4, 1956. Her training was completed June 16, 1956, and assignment to flight duty was June 26, 1956.

Pilot (Cessna)

James L. Folk, age 48, Carthage, Texas, was the owner of Cessna N 8143A. He held a valid airman certificate with a private pilot rating. According to his statement, he had a total of 3,200 flight hours, of which 50 were acquired in Cessna 170B aircraft.

Aircraft

Douglas DC-3, serial No. 4978, N 33315, was manufactured on October 13, 1942, and converted to a DC-3A on May 10, 1946. Total time on the airframe was 35,501 hours, with 10,169 hours since last major overhaul. The aircraft was equipped with two Pratt and Whitney R1830-92, SIC3G engines, and Hamilton Standard model 23E50 propellers with 6353A blades. Total time on the left and right engines was 17,037 and 15,462 hours, respectively. Time since overhaul on the left and right engines was 190 and 465 hours, respectively.

Cessna 170B, serial No. 20995, N 8143A, was manufactured August 18, 1952. Total flying time of the aircraft, per the recording tachometer, was 514 hours. The aircraft was equipped with a Continental model C-145-2, 145 n. p. engine with a McCauley propeller, serial No. 55401, design 1A170.

CAL DC-3 N33315 AND CESSNA N8143A
 BARTLESVILLE, OKLA
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