

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

ACCIDENT INVESTIGATION REPORT

Adopted: April 4, 1947

Released: April 14, 1947

UNITED AIR LINES - CHEYENNE, WYOMING, OCTOBER 8, 1946

United Air Lines' Flight 28 of October 7, 1946, en route from San Francisco, California, to Chicago, Illinois, crashed during an approach for landing at the Cheyenne, Wyoming, Airport at 0433 MST* on October 8. The aircraft, a Douglas DC-4, NC 30051, was demolished, two passengers were killed and all other occupants were injured in varying degrees.

Flight 28 was scheduled to leave San Francisco at 2030 PST for Chicago, with an intermediate stop at Cheyenne. Due to the plane's late arrival at San Francisco, departure was not until 2220 PST. There were 43 passengers, including three infants, a crew of four, 3,959 pounds of cargo and 1,600 gallons of fuel aboard at takeoff. An instrument clearance was issued containing the 1950 PST and 2030 PST weather reports and the 2130 PST weather was given the crew before departure. Denver, Colorado, was specified as the alternate and the cruising altitude was 13,000 feet above sea level.

Flight 28 proceeded uneventfully with routine radio contacts. Over Salt Lake City, Utah, it was informed that Denver, Colorado (the alternate), had zero ceiling but that the weather at Rock Springs, Wyoming, approximately 166 miles ahead, was good. Both

* All times herein are based on the 24-hour clock and are MST unless specified otherwise.

altimeters were set to the Cheyenne pressure of 29.96 inches while the flight was near Sinclair, Wyoming, approximately 131 miles from Cheyenne. At 0357 the flight reported over Two Rivers, 55 miles from Cheyenne, at 13,000 feet. At that time Cheyenne broadcast its weather as an "indefinite ceiling of 500 feet, visibility 5 miles, light fog, clear to the west." First contact between Flight 28 and the Cheyenne Control Tower was at 0405 when the tower advised the flight it was cleared to land using Runway 26 and that the wind was 5 mph from the south. Flight 28 replied that an instrument let-down would be made. The let-down was started toward the Cheyenne Range Station and both Captain and First Officer stated that during this portion of the descent they could see lights on the ground and the glow from Cheyenne. At 0408 the flight reported over the Cheyenne Range Station at an altitude of 9,000 feet. (Elevation of Cheyenne Airport is 6,140 feet.)

In accordance with the Company's No. 1 let-down procedure for Cheyenne, the Captain proceeded out the east leg of the range and made a procedure turn at 8,000 feet, coming down to 7,000 feet headed west. However, the position identifying signal was not received from the Archer Fan Marker, located about 5 miles east of the airport, and when visual contact was established with the field, the aircraft was too high for a landing. The Captain then made a left turn, descending to about 6,500 feet (360 feet above the field), at which altitude he could occasionally see the ground. He then proceeded out the east leg again, climbing to 7,000 feet. This time

he received the position identifying signal from the Archer Fan Marker, made a wide turn and came back over the Marker still at 7,000 feet. He immediately started a descent and upon establishing visual contact with the ground, discovered that he was again too high to land. According to the Captain this was the last landing attempt from east to west; however, the First Officer and ground witnesses testified that the aircraft circled again to the left and that another landing attempt was made.

An approach from the west was then decided on by the Captain as visibility there had been fair. The First Officer contacted the tower and was cleared to land on Runway 12 (to the southeast). While headed west the Captain started a gradual left turn at the western boundary of the field, continued it for a short time and then entered a right turn in an attempt to line up with and land on Runway 12. This right turn was continued at an altitude of some 200 feet above the ground with wheels down, 15° of flap and airspeed of approximately 120 mph (once as low as 110 mph). The Captain instructed the First Officer, who occupied the right hand pilot seat, (on the low and field side of the turn) to "sing out" when he saw the field. When the First Officer did see it he said "There's the field at 2 o'clock" (at a relative bearing of 60°). The Captain then leaned to the right to see the field himself and during this momentary diversion from the instruments enough altitude was lost to permit the right wing tip to strike the ground. The site was on rolling prairie approximately 20 feet higher than, and about 1½ miles northwest of, the Cheyenne Airport, on the U. S. Military Reservation of

Fort Warren.

At the instant of impact the aircraft was still in a right turn, banked approximately 15° and headed northeast. It came to rest about 700 feet beyond the point of first impact. A gasoline fire developed on the ground along the crash path and the right wing, which had been torn from the fuselage, was partly burned. However, the main portion of the wreckage continued ahead of the fire and was not burned. Company and other personnel reached the scene quickly and removed occupants to the Fort Warren Military and Cheyenne Memorial Hospitals.

Investigation

No evidence of any malfunctioning of the aircraft or its components was found. No malfunctioning of any of the radio facilities was found by subsequent checking and radio reception was relatively static-free prior to the crash. Arrangement of the flight instruments of this aircraft had recently been changed; however, the Captain believed that this rearrangement did not impair his use of them in any way. Both altimeters were found set to within acceptable limits of the Cheyenne pressure which remained quite uniform for several hours before and after the crash. The subject flight was the first that the Captain and First Officer had made together. Investigation disclosed that approximately 15 minutes before reaching Cheyenne all passengers were seated with seat belts fastened and remained so until the accident.

CAA-approved Company weather minimums for night operation at Cheyenne are a 400-foot ceiling and two miles visibility. (These figures apply to both DC-3 and DC-4 aircraft.) Officially reported weather at Cheyenne at the time of the crash was: Visibility 5 miles, an indefinite ceiling of 400 feet and light fog. This condition had persisted substantially unchanged for about one hour prior to the accident with ceilings slightly higher at the start of this one-hour period. Due to fog, visibility decreased with elevation and was undoubtedly less than five miles at the altitude of the flight. Also, the actual ceiling encountered by the flight during the landing approaches must have been less than reported inasmuch as both the Captain and First Officer testified that they were unable to maintain visual contact with the ground while no higher than about 300 feet above the runway. The Company's missed-approach procedure, which was approved by the Civil Aeronautics Administration, was not instituted at any time.

The Company's operations manual, approved by the Civil Aeronautics Administration, is specific as to minimum altitudes. Under it, inasmuch as the ceiling had been given as "indefinite", the Captain could have descended to 400 feet above the airport (6,540 feet sea level). If at that altitude he had succeeded in establishing visual contact with the ground, he could then have descended another 50 feet, but no lower, during all subsequent maneuvering until the start of his final approach. During the passes across the field and during the final turn the Captain, by his testimony, was less than 400 feet above the ground, according to

his altimeter. In addition he frankly stated that ".....I made the fatal mistake of not making the turn with my eyes on the instruments....."

Rock Springs, only 231 miles away, had a 6,500-foot ceiling and 40-mile visibility for a period of several hours bracketing the time of the crash. There was ample fuel in the aircraft to have proceeded there.

Findings

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

1. The air carrier, the aircraft and the crew were properly certificated for the flight.
2. Until reaching Cheyenne the flight had been routine.
3. The Captain started a standard instrument approach to the Cheyenne Airport but did not follow through with the prescribed missed-approach procedure after descending below the minimum altitude.
4. During the final attempt to land the aircraft struck the ground with its right wing while in a right turn.

Probable Cause

The Board determines that the probable cause of this accident was a loss of altitude during a turn preparatory to a final approach while the pilot was maneuvering in an attempt to land.

BY THE CIVIL AERONAUTICS BOARD.

/s/ James M. Landis

/s/ Oswald Ryan

/s/ Harllee Branch

/s/ Josh Lee

/s/ Clarence M. Young

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board received notification of the accident about six minutes after it occurred and immediately initiated an investigation in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. An Air Safety Investigator of the Board's Denver, Colorado, office arrived at the scene about 0930 the same day and was later joined by other Safety Bureau personnel.

A public hearing was held at Cheyenne, Wyoming, on October 14, 1946.

Air Carrier

United Air Lines, a Delaware corporation with headquarters at Chicago, Illinois, was operating as an air carrier 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 authorized the company to fly persons and materials between various points in the United States including San Francisco, Cheyenne and Chicago.

Flight Personnel

Leonard L. Smith, age 43, of San Francisco, was Captain of the aircraft and had piloted 12,573 hours, including 2,425 in DC-4s. Jerome L. Buchman, age 32, of San Francisco, was First Officer and had piloted 3,551 hours, including 831 in four-engine aircraft. Both were properly certificated and the Captain was qualified over the route.

Aircraft

NC 30051, a Douglas Model DC-4 manufactured in December, 1944, and owned by United Air Lines, was equipped with four Pratt & Whitney Model R-2000-11 engines. At the time of the accident it had been flown 3,077 hours and all overhauls had been accomplished within required time limits. The gross weight at time of leaving San Francisco was 62,533 pounds, as against a maximum allowable of 65,076 pounds.

ACTION TAKEN

As a result of this and similar accidents, the scheduled airlines, through the Air Transport Association, are making a survey of the present let-down procedures and minimum ceilings and visibilities at each airport with which they are concerned to determine whether any changes should be made. This survey is taking cognizance of all operational factors including terrain, variations in speed and flight characteristics of different aircraft, and flight and landing facilities now in use. The Civil Aeronautics Administration has been requested to obtain and check the results of this survey.

In the immediate interest of safer operation, however, the Board has amended the Civil Air Regulations to eliminate any qualification of the word "ceiling". Effective January 8, 1947, Section 61.752 of the Civil Air Regulations, which read as follows:

"Approach limitations. No pilot shall, at any airport, let down below his latest approved cruising altitude or continue descent when he has received United States Weather Bureau information that the measured ceiling is below or the visibility is less than the authorized minimums prescribed in the air carrier operating certificate for landing at that airport."

was amended to read:

"Approach and landing limitations. No instrument approach procedure shall be executed or landing made at an airport when the latest United States Weather Bureau weather report for that airport indicates the ceiling or visibility to be less than that prescribed by the Administrator for landing at such airport."

This change of regulations was aimed at preventing the practice of "taking a look".