

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: March 29, 1950

Released March 30, 1950

**SLICK AIRWAYS, INC., NEAR CHEYENNE AIRPORT, CHEYENNE, WYOMING,
OCTOBER 9, 1949****The Accident**

A Slick Airways' C-46 airplane, NC-59485, crashed while making an approach to a landing at Cheyenne, Wyoming, at 1754,¹ October 9, 1949. The three occupants were killed and the aircraft was demolished.

History of the Flight

On October 9, 1949, Slick Airways' Trip 11-8, a scheduled cargo flight departed San Francisco, California, at 0912, for Newark, New Jersey, with stops scheduled enroute at Las Vegas, Nevada, and Denver, Colorado. The crew consisted of Captain Ralph Settle and First Officer Robert Seebers, Joseph Allen, a company employee, was riding as a passenger. At take-off the aircraft weighed 45,000 pounds which was within its certificated gross weight, and all disposable load was properly distributed so that the center of gravity of the aircraft was within the prescribed limits. The trip to Las Vegas was made under Visual Flight Rules.

At Las Vegas, Trip 11-8 remained on the ground 35 minutes. During this time, the crew obtained weather forecasts for the trip to Denver and had the aircraft serviced with 370 gallons of fuel. These forecasts indicated that between southwestern Utah and Denver there would be broken to overcast clouds with bases and tops ranging from 8,000 to 20,000 feet in altitude, and that below 8,000 feet there would be light rain showers with light snow showers above this level.

The flight was cleared under Instrument Flight Rules to cruise at 13,000 feet to Grand Junction, Colorado, 14,000 feet to Eagle, Colorado, and 16,000 feet to the Dupont Intersection, 5 miles

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

north of Denver, with Laramie, Wyoming, designated as the alternate airport. The computed elapsed time was three hours and five minutes with sufficient fuel aboard to fly five hours and five minutes. A forecast for Denver, at 1700, when the flight was estimated to arrive, indicated a ceiling of 700 feet with icing in the clouds above 8,000 feet. At Laramie, the chosen alternate airport, a ceiling of 2,000 feet occasionally lowering to 1,000 feet was forecast with light rain showers expected to change to light snow showers after dark.

At 1403, the flight departed Las Vegas, and two hours and two minutes later, at 1605, reported over Grand Junction at an altitude of 13,000 feet, climbing to 14,000. At this time the flight received from INSAC (Interstate Airways Communication) at Grand Junction the 1530 weather observations for Grand Junction, Denver, Eagle and Pueblo, Colorado. Denver was reported having a variable ceiling of 600 feet, overcast and lower broken clouds, visibility six miles, light rain and wind from the north-northwest at 12 miles per hour. When over Eagle, at 1637, the flight reported at an altitude of 14,000 feet and climbing to 16,000. Forty-five minutes later, at 1708, over the Dupont Intersection the flight reported to the Denver Tower and was given the Denver weather as ceiling 200 feet and visibility two miles. As the ceiling and visibility were expected to remain that way for several hours and as the company's landing minimums for Denver were ceiling 400 feet and visibility one mile, the crew requested a change of flight plan. Rock Springs, Wyoming, was chosen as the new alternate and permission was requested to land at Laramie, weather permitting. Denver Air Traffic Control approved and cleared the flight to

Rock Springs to maintain 14,000 feet. Twenty-five miles south of Laramie, at 1732, Trip 11 called the Cheyenne Tower and asked permission to change course and to proceed direct to Cheyenne. This was approved by Denver ATC and the crew was further advised by the tower that there was a squall line between Laramie and Cheyenne. The Cheyenne weather reported to the flight at that time was ceiling 3,500 feet, overcast, lower broken clouds and visibility 20 miles. At 1740, the flight reported over the Cheyenne range at 14,000 feet and a special Cheyenne weather report was given the crew which showed the ceiling had lowered to 900 feet and that there was light sleet, and a visibility of 12 miles. Proceeding out the east course of the Cheyenne range, the flight notified the tower that it was low on fuel, taking on ice, and having difficulty in maintaining altitude. A few minutes later clearance was given the flight to descend to 8,000 feet on the north course of Cheyenne range.² This was acknowledged and seconds later it encountered severe turbulence. At approximately 1750, an unreadable transmission was heard by the tower. There was definite hysteria in the voice making this transmission. The tower then called the flight several times but no answer was received. Two minutes later at 1752, the tower received the following transmission "We are O.K and are out of it now." About one-half minute later a noise believed to be caused by a surge of power of the aircraft's engines was heard northwest of the tower. Shortly after this a flash of light was seen about two miles northwest of the airport.

Investigation

The wreckage was located approximately two and one-half miles northwest of the airport on rolling terrain. Marks on the ground indicated that the aircraft struck the ground at an approximate angle of 45 degrees. First contact was made by the nose of the aircraft, the two engines and the leading edges of its wings. Parts of the aircraft were

² Cheyenne airport elevation is 6156 feet above sea level

strewn over the ground, forward of this point, a distance of 515 feet.

Impact forces were of such magnitude that the wings, the two engines and the left fuel tanks were torn from the aircraft. Most of the main wreckage, including the center section, the fuselage and the tail group, was found 120 feet forward of the point of impact. The forward section of the fuselage was demolished and the rearward sections were badly twisted and distorted. Although damaged, the tail group was fairly intact. The damaged landing gear was in the up position at the time of impact, the tail wheel was in the tail wheel well and the door was closed.

Both wings were severely damaged and fire destroyed a portion of the left wing in the fuel tank area. The flaps were set 1/4 down. The wings and tail surfaces were not equipped with de-icer boots.

The engines, when severed from the aircraft at impact, rolled forward a considerable distance, and parts of these engines were found over a distance of 515 feet. Both propellers were badly damaged. Anti-icing equipment had been installed on these propellers.

The rudder trim tab was in the neutral position and the elevator trim tab was set at six degrees nose down.

At the time of the crash, the ground temperature in the area was considerably above the freezing point. However, one piece of ice was found near, but not adhering to, the wreckage.

An aftercast of the weather indicated that on October 9, 1949, a stationary front extended in a southwesterly direction across Kansas and into Oklahoma. Here it joined a cold front which extended westward into southern Colorado and then southward across New Mexico. From a low center in northern New Mexico, a trough line extended northwestward along the Rocky Mountains west of Denver, Laramie, and Cheyenne. This portion of the trough caused upslope winds in the Denver, Laramie, and Cheyenne area which were conducive to the development of low ceilings. The freezing level of 8,000 feet was below the flight's assigned altitude and icing was indicated in the clouds. As the trough moved eastward accompanied by the advection of colder

air aloft, the lapse rate steepened and a squall developed along the trough line in southeastern Wyoming. At a point 25 miles south of Laramie the flight was in the squall and undoubtedly was encountering considerable turbulence and an increased icing condition. As the squall increased in intensity, it moved rapidly toward Cheyenne and had reached there when the flight was making its approach. During the approach the flight undoubtedly experienced severe turbulence and heavy icing.

At Cheyenne, both the east and west legs of the range are used for final approach. The flight first crossed over the range station at 14,000 feet and then proceeded out the east leg, maintaining this altitude. Later, instructions were given the flight to descend to 8,000 feet on the north leg. It was during this part of the instrument approach that the accident occurred.

Examination of the aircraft's records recovered at the scene of the accident disclosed that sometime after the flight departed San Francisco an oxygen tank regulator stuck open. The location of this tank was such that it would be used by the person occupying the jump seat, and since it was an integral part of the aircraft's oxygen system the entire oxygen supply would have been quickly exhausted if the regulator had remained open.

Analysis

Analysis of weather data for the route between Las Vegas and Denver and for the terminus Denver was available to the crew before departing Las Vegas. The weather at Denver shown on the 1330 weather sequence report was ceiling 1,000 feet, overcast, lower broken clouds, visibility 8 miles, and the wind from the north-northwest at 8 miles per hour. The weather forecast for western Colorado, between the hours of 0900 and 2100, indicated icing in the clouds above the freezing level of 8,000 feet. Two layers of clouds were in this area and the tops of the upper clouds were

estimated to be approximately 19,000 feet MSL.

The Company did not have personnel at points along the route through which to dispatch the flight and all decisions affecting the flight were left to the discretion of the captain. Since NC-59485 was not equipped with wing de-icer boots and known icing conditions existed along the route, the captain did not exercise good judgment in departing Las Vegas under these conditions.

As stated, when the flight was over the Dupont Intersection and was unable to land at Denver because of adverse weather, the captain requested Denver Air Traffic Control to clear the flight to Rock Springs with permission to land at Laramie, weather permitting. At this time the captain did not ask ATC to obtain information as to best weather alternate within his gas range nor did ATC advise FAWS (Flight Advisory Weather Service) of the change of flight plan. The captain, however, did have the latest weather for Rock Springs and Laramie. When FAWS learned of the flight's new course toward Laramie several minutes later, they gave ATC the Pueblo weather and asked that this be transmitted to the flight. At Pueblo the weather was steadily improving and the ceiling was approximately 6,000 feet. However, Denver ATC was unable to contact the flight.

Neither the Weather Bureau Airway Forecaster nor FAWS anticipated the rapid development and movement of the squall line which was at this time lying somewhat to the north and between Laramie and Cheyenne. Consequently they did not warn the flight of this condition.

The flight, when 25 miles south of Laramie, turned away from the squall line and toward Cheyenne. However the storm was moving with such rapidity that it reached Cheyenne before a landing could be accomplished. As heavy icing and severe turbulence accompanied this storm, it appears that during the approach, control of the aircraft was lost.

The surface temperature at the time and place of the crash, was above freezing and this, together with the heat from the ensuing fire and forces of impact, would have destroyed any evidence of ice adhering to the aircraft's structure before anyone could arrive at the scene.

Although the flight's record indicated a possible loss of oxygen caused by a faulty tank regulator, there is no evidence to indicate that the pilots were affected by a lack of oxygen. CAA communicators at Cheyenne stated that with the exception of the single hysterical sounding voice transmission all other transmissions received from the aircraft were clear and apparently made by persons in full command of their faculties.

Findings

1. The aircraft, carrier and crew were properly certificated.
2. There was no evidence of mechanical malfunctioning or structural failure of the aircraft prior to the accident.
3. Wings and tail surfaces of the aircraft were not equipped with deicing boots, however, anti-icing equipment had been installed on the propellers.
4. Forecasts issued by the U. S. Weather Bureau and available to the crew before departure from Las Vegas, indicated icing conditions would be encountered enroute to Denver.

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5 At the time the flight departed Las Vegas the weather at Denver was above the company's minimums and was expected to remain above these minimums until the arrival of the flight at Denver.

6. Being unable to land at Denver because of adverse weather conditions, the flight proceeded first to Laramie and then to Cheyenne where the weather had been reported as ceiling 3,500 feet, visibility 20 miles.

7. The front moved toward Cheyenne more rapidly than was anticipated by either the Weather Bureau or the captain, and it arrived at Cheyenne before a landing could be accomplished.

8. During the descent at Cheyenne, the flight encountered severe turbulence and heavy icing.

Probable Cause

The Board determines that the probable cause of this accident was the loss of control of the aircraft during an instrument approach to Cheyenne, Wyoming, under conditions of heavy icing and severe turbulence.

BY THE CIVIL AFRONAUTICS 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 on October 9, 1949, by the Civil Aeronautics Administration, 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. A public hearing was held in Cheyenne, Wyoming, October 27, 1949.

Air Carrier

Slick Airways, Inc., was incorporated under the laws of the State of Delaware with its principal office located at San Antonio, Texas. The company held a certificate of public convenience and necessity authorizing the carriage of air freight. This certificate was issued July 1949, and permitted operations between Los Angeles, San Francisco, Chicago and New York, with intermediate stops at Denver and other points. It also held an air carrier operating certificate issued by the Civil Aeronautics Administration.

Flight Personnel

Captain R. E. Settle, age 32, held a valid airman certificate with an airline transport rating. He had been employed

by the company since May 5, 1946. His total flying time was 5,514 hours, of which 2,654 were in C-46 type equipment. His last instrument check was accomplished September 14, 1949, and his last CAA physical was accomplished August 22, 1949.

First Officer R. W. Seebers, age 28, held a valid airman certificate with an airline transport pilot rating. He had been employed by the company since March 28, 1947. His total flying time was 4,583 flying hours of which 2,515 were in C-46 type equipment. His last instrument check was accomplished September 14, 1949, and his last CAA physical was accomplished July 8, 1949.

The Aircraft

NC-59485 was a Curtiss C-46E aircraft manufactured in 1945. The aircraft was currently certificated by the Civil Aeronautics Administration and had a total of 8,585 flying hours at the time of the accident. It was equipped with two Pratt & Whitney Model R2800-75 engines. No. 1 engine had a total of 2,339 hours and had 65 hours since overhaul. No. 2 engine had a total of 2,612 hours and had 775 hours since overhaul. The propellers were Hamilton Standard, Model 23E50, constant speed propellers.