

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: April 27, 1956

Released: May 1, 1956

GULF OIL CORPORATION, LOCKHEED LODESTAR, N 33366,
NEAR LONDONDERRY, OHIO, DECEMBER 29, 1955

The Accident

A Lockheed 18-56, N 33366, owned and operated by the Gulf Oil Corporation, crashed about 4-1/2 miles northwest of Londonderry, Ohio, at approximately 1240, ^{1/} December 29, 1955. After impact the wreckage was partially burned by ground fire. The pilot and copilot, the sole occupants, were killed.

History of the Flight

Pilot Gordon Whewell Silva and Copilot-Flight Mechanic Lloyd Littleton Cotton, on December 28, prepared N 33366 (hereinafter referred to as N 366) for a nonstop flight from Tulsa, Oklahoma, to Pittsburgh, Pennsylvania.

After a study of the weather data Pilot Silva filed an IFR (Instrument Flight Rules) flight plan which called for a proposed departure at 0800 c. s. t. for Pittsburgh via Victor Airways 14, 72, and 12, with an estimated elapsed time of four hours. It also showed fuel for 6:15 hours, an en route altitude of 9,000 feet, destination Pittsburgh, and alternate Wheeling, West Virginia. The flight departed Tulsa at 1810 c. s. t. and routine position reports were made until over Dayton, Ohio, at 1200.

Starting with the Dayton position report in which the first mention of icing conditions was made, all of the entries in CAA station logs recording communications with N 366 are transcribed as follows:

"N 366 over Dayton 1200E 9,000 feet estimate over Columbus 1218E Adamsville. (Will make next report from Adamsville.) Request lower altitude light to moderate rime icing." This message was delivered at 1203 to the Indianapolis center who replied, "ATC advises unable approve lower altitude." This reply was delivered to N 366 at 1204. At 1221 CAA Columbus recorded the following from N 366, "Over Columbus 1220, 9,000 m. s. l. estimate over Adamsville 33 HLG (will make next report via Wheeling). Destination Pittsburgh requesting 5,000 feet m. s. l." At 1224 the following was transmitted to N 366 by Columbus, "ATC unable to approve 5,000 feet m. s. l. or 7,000 feet m. s. l." At 1227 Columbus received from N 366, "Rime ice request lower altitude as soon as possible." And at 1234 N 366 advised Columbus, "Over Adamsville 1233 9,000 feet m. s. l. Adena 47." The pilot was questioned

^{1/} All times herein are based on the 24-hour clock and are eastern standard unless otherwise stated.

about the Adena estimate and changed it to "Wheeling" (as next reporting point). Also in this communication he reported, "Difficulty maintaining altitude and airspeed request lower altitude." At 1237 Columbus CAA transmitted, "Clearance to descend and maintain 8,000 m. s. l." and the pilot replied, "Leaving 9,000 m. s. l. at 1237E."

All further attempts to communicate with N 366 were unsuccessful. At approximately 1240 witnesses observed the aircraft below the overcast; it was on a westerly heading and was descending although it appeared to be in a normal attitude. Several components were seen to separate from the aircraft before it struck the ground.

Investigation

The flight was for the purpose of ferrying N 366 from its base at Tulsa to company headquarters at Pittsburgh. On December 28, Pilot Silva had received notification from his company to make a passenger flight out of Pittsburgh on December 30. Pilot Silva, with Copilot Cotton, planned to fly non-stop to Pittsburgh on December 29.

Area forecasts applicable to this flight were issued at 0622 c. s. t. and were valid for the period 0700 to 1900 c. s. t. These indicated a cold front at the beginning of the period along a line from extreme northwest Indiana to Rantoul-St. Louis-Joplin, thence between Tulsa and Ft. Smith. This front was expected to move southeastward during the period at about 20 knots in the north portion to about 12 knots in the south portion. Behind (northwest of) this front the overcast was expected to have a ceiling of 800 to 1,200 feet and tops 6,000 to 8,000 feet m. s. l. Light icing was forecast in the clouds in the freezing levels and the base of the freezing level was expected to lower in the cold air to between 2,000 feet and the surface. Ahead of the front the ceiling was expected to range from 2,000 to 5,000 feet. Tops of the highest cloud layers were expected to range from 10,000 feet to 12,000 feet m. s. l. in Missouri and southern Illinois and as high as 18,000 feet in Indiana and southern Ohio. The freezing level was forecast to be from 10,000 to 12,000 feet m. s. l. with light icing in the clouds above that level in Missouri and southern Illinois and light to moderate in southern and central Indiana and in southern Ohio.

Pilot Silva visited the Weather Bureau at Tulsa on December 28, at which time he received a weather briefing for his proposed flight on the following day. He again visited the Weather Bureau on the morning of December 29 and the meteorologist on duty stated that he spent some time reviewing briefing material on display. This included current reports, upper air, and forecasts pertinent to his flight. His only request for advice from the meteorologist was in regard to the height of the top of the overcast in the Tulsa area. Silva did not request any weather advice while en route, either from the Weather Bureau or concerning reports from other pilots even after he was encountering ice. The forecast read by him before departing indicated icing above 10,000 feet in eastern Indiana and in Ohio, whereas pilot reports made while he was en route indicated icing in southern Ohio to as low as 8,000 feet.

Weather observations made nearest the time and place of the accident were: Wheeling (34 miles ESE of scene) 1230 - ceiling estimated 5,000 feet, overcast; visibility 6 miles; temperature 43; dewpoint 31; 1330 - ceiling estimated 5,000 feet, overcast; visibility 6 miles; smoke; temperature 43; dewpoint 32. Zanesville (35 miles SW of scene) 1230 - ceiling estimated 3,000 feet broken, 5,000 feet overcast, visibility 7 miles; temperature 45; dewpoint 36; 1330 - ceiling estimated 2,500 feet overcast; visibility 6 miles; very light rain showers temperature 44; dewpoint 38.

The area about the scene of the accident was free from snow; and no ice due to precipitation was present. In the immediate vicinity in which the separated components of the aircraft were found (these components were identified as members of the tail group) there were many ice chunks of such shape as those that build up on the surfaces of aircraft in flight and of such size as might have been broken from those surfaces. Before these pieces of ice were noticed the elapsed time and temperature could have reduced their size, which still was reported by witnesses to have been up to eight inches in length and up to two inches in thickness. As reported by the witnesses this ice was hard and milky in appearance and it was found only near the tail parts or between those parts and the main wreckage.

The aircraft was equipped for deicing of carburetor, windshield, and propeller blades with alcohol but there was no deicer equipment on the wings or tail surfaces. Chief Pilot Bruce Grove stated that it was found to be impracticable to maintain such equipment in working order because of cuts made by stones when operating from some of the airports used by company aircraft. Grove also stated that in the operations of its aircraft the company's policy is to avoid icing conditions as much as possible.

Statements in writing were taken from eight of the witnesses interviewed. All of them heard the engines of the aircraft and the sound of the ground impact. Five witnesses saw the airplane in flight; two saw parts separate from the airplane. However, none of them saw fire or smoke from the airplane before impact with the ground.

The last known course flown by N 366 was eastbound along V-12, which route is 84 degrees magnetic. In striking the ground the aircraft cut a swath through trees on a heading of 252 degrees magnetic and at a steep angle. The vertical surfaces of the tail group were recovered from a point 1 to 1-1/4 mile eastward (70 degrees magnetic) of the main wreckage. All of these parts were fragments of the vertical surfaces (fins, rudders, and tabs) above the horizontal stabilizer. Except for these parts all components of the aircraft were found within 160 feet of the center of the wreckage area. Some parts of the separated tail components had been carried away by souvenir hunters. At the request of investigators these parts were returned and all components of the aircraft were then in hand except the right vertical fin.

The manner in which the propeller blades were bent and broken from the hubs indicated that power was being developed by both engines at the time of impact.

Investigators found traces of smoke and fire on only those portions of the wreckage that had been exposed to ground fire.

So much of the wreckage was completely demolished by impact and fire that the most significant items of information gained from its examination were the attitude of the aircraft at time of impact, the direction of its movement, the presence of ice, and the separate location of the detached components.

Analysis

Two high pressure areas existed during the early morning of December 29, 1955. One was located in the Northern Plains States, the other along the Atlantic Seaboard. Between these two highs a trough of relatively low pressure with a cold front extended southwestward from eastern Lake Superior through Wisconsin, Illinois, Missouri, and Oklahoma. This cold front was moving southeastward and had passed Tulsa, Springfield, Missouri, and St. Louis previous to departure of the flight from Tulsa. The front reached Indianapolis about the same time the flight passed over that area. The cold air behind the front had deepened from the surface to about 6,000 feet m. s. l at Tulsa at take off time. Clouds and below freezing temperatures existed in that area from about 2,000 feet to 6,000 feet. The upper surface of the cold front was at 6,000 feet, above which clear air and above freezing temperatures existed upward to about 11,000 feet. This latter condition existed along the route to the northeast at 9,000 feet (cruising level) to near St. Louis where instrument conditions began. Below freezing temperatures, with icing likely, began at or soon after passing Indianapolis. Thence to Londonderry variable icing was indicated at 9,000 feet ranging from light to at times possibly heavy and as low as 8,000 feet in southern Ohio. Some light precipitation existed en route, mostly in the form of drizzle. Cloud tops were 12,000 feet and higher from St. Louis to southern Ohio ahead of the front, with ceilings of the lowest layers mostly 2,000 feet or better but locally as low as 500 feet.

The record of communications shows that in his position report over Dayton, Ohio, at 9,000 feet at 1200 (logged at 1203) the pilot reported light to moderate icing conditions and requested a lower altitude; that was his first mention of icing and his first request for lower altitude. He again mentioned icing and requested a lower altitude when 9,000 feet over Columbus at 1220, and at 1227 he reported rime ice and requested a lower altitude as soon as possible. Without wing and tail deicers he had no means of removing ice from those surfaces except by escape from the icing conditions, i. e. to another altitude.

Although icing was forecast for only the altitudes from 10,000 feet up, it actually occurred at altitudes as low as 8,000 feet. After flying in an icing condition in excess of 30 minutes, Pilot Silva received clearance to descend to 8,000 feet, and at 1237 he reported leaving 9,000 feet. This was his last communication.

As shown by his communications the pilot first reported icing conditions in the vicinity of Dayton. These conditions were not in accordance with the forecast he had received. He requested a change to 5,000 feet altitude but other traffic prevented the granting of that and other requests for a lower altitude assignment.

If icing conditions and the lack of wing deicers made his problem at that time an urgent one, he did not state that urgency nor did he request additional information on the weather ahead.

Findings

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

1. The aircraft and both members of the crew were properly certificated for the flight involved.
2. Company records indicate that the aircraft was loaded within allowable limits as to weight and center of gravity.
3. Pilot Silva was familiar with the forecasts of ice over the route involved, at altitudes of 10,000 feet and above, and he knew the limitations of the deicing equipment on his aircraft.
4. The flight encountered icing conditions at cruising altitude of 9,000 feet.
5. Traffic prevented ARTC from assigning a lower altitude when so requested several times by Pilot Silva.
6. After Pilot Silva reported difficulty in maintaining airspeed and altitude, ARTC assigned the 8,000-foot level and the pilot reported leaving 9,000 feet at 1237.
7. At low altitude the aircraft lost much of the vertical surface in its tail group and struck the ground at a steep angle.
8. No emergency was declared.

Probable Cause

The Board determines that the probable cause of this accident was the accumulation of enough ice to result in loss of control and the subsequent shedding of vertical surfaces from the tail group of the aircraft.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

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

Investigation

The Civil Aeronautics Board was notified of this accident at 1440, December 29, 1955. An investigation was immediately started in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended.

Aircraft Operator

Gulf Oil Corporation, Gulf Building, Pittsburgh, Pennsylvania, owned and operated the aircraft involved, which was used primarily for transportation of its management personnel on company business. It was one of two aircraft so owned, stationed at Tulsa, Oklahoma.

Flight Personnel

Pilot Gordon Whewell Silva, age 46, held a commercial pilot certificate and was rated to fly Douglas DC-3's and Lockheed 18's on instruments. He had accumulated an estimated 9,000 hours.

Copilot Lloyd Littleton Cotton, age 38, held an aircraft and engine mechanic license and also was licensed as a commercial pilot. He had logged 983:35 hours and was rated to fly single- and multi-engine land aircraft and to act as a flight instructor. He did not hold an instrument rating.

The Aircraft

Lockheed 18-56 (Lodestar), N 33366, manufactured in March 1943, was purchased by Gulf Oil Corporation in 1947 and had been flown 4,372 hours since that date. A major overhaul of the airframe was completed March 18, 1953, and the aircraft had been flown 1,656 hours since that date. Its two engines, Wright 1820-72, had 141:05 and 40:10 hours, and its propellers, Hamilton Standard 23E50-471, had 924 hours since overhaul.

On April 7, 1954, CAA approval was given to alteration consisting of removal of extensions (called bat wings) which had been attached to the trailing edges of the wings on November 9, 1947.

In August 1949, deicer boots, which had been installed on the wing and tail surfaces on January 21, 1948, were removed.

VERTICAL CROSS SECTION OF ROUTE TULSA, OKLAHOMA TO LONDONDERRY, OHIO
 SHOWING THE PROBABLE FLIGHT TRACK OF LOCKHEED LODESTAR N33366 AND THE WEATHER
 DECEMBER 29, 1966

