CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: December 7, 1948 Released: December 8, 1948

VULTEE V-1A—NEAR SOMERSET, PENNSYLVANIA—MARCH 20, 1948

The Accident

At approximately 0812,[1] March 20, 1948, NC 22077, a privately-owned Vultee V-1A airplane, crashed nine miles northwest of Somerset, Pennsylvania. All eight occupants were killed, and the aircraft was destroyed.

History of the Flight

Aircraft NC 22077 departed from Providence, Rhode Island, for White Plains, New York, at about 0730 March 19, 1948. The aircraft carried the pilot, Herman F. Burlingame III, his wife Ruth L. Burlingame, their infant daughter Kathleen, and George H. Armitage, as well as four Chow dogs and personal baggage. Arriving at Westchester Airport, White Plains, one hour and 20 minutes later, aircraft NC 22077 was serviced with 118 gallons of fuel. At 0935 the aircraft departed from White Plains, the pilot telling airport officials that he intended to fly either to Hadley Field, New Brunswick, New Jersey, or Solberg-Hunterdon Airport, White House, New Jersey. Two hours and 31 minutes later the aircraft returned to White Plains, Mr. Burlingame telling airport officials that he had not landed at either of the alternative destinations. The aircraft was parked for the night, after being serviced with 85 gallons of fuel.

The following morning, March 20, 1948, at 0550 the flight departed from White Plains for St. Louis, Missouri. The aircraft carried an additional four persons who had joined the original group at White Plains. The take-off weight could not be precisely determined, but it was close to the maximum allowable. No flight plan was filed with CAA Airways Traffic Control, and though NC 22077 was equipped with two-way radio, no transmissions were received from the flight after its departure from White Plains. Consequently the exact route over which the flight proceeded is not known.

Shortly after 0800, witnesses in the vicinity of the west portal of the Laurel Hill Tunnel of the Pennsylvania Turnpike, approximately 45 miles southeast of Pittsburgh, Pennsylvania, observed an aircraft flying at a low altitude on a northwesterly heading. It was flying in and out of low-hanging cloud fringes, and therefore, was not continuously visible. However, the aircraft was observed to approach the tunnel, circle in front of the portal, and then disappear into the overcast. After losing sight of the aircraft, some of the witnesses stated that they heard a surge of engine power, followed by the sound of a crash. Others, more distant, noticed that sound from the aircraft ceased abruptly. Since no other aircraft was observed in the vicinity at that time, there is no doubt but what it was NC 22077 that these witnesses saw.

Investigation

The accident occurred in a mountainous, wooded area approximately four-tenths of a mile north-northeast of the west portal of the Laurel Hill Tunnel at an elevation of 2,650 feet. A wrist watch found in the wreckage had stopped at 0812.

The position of the wreckage indicated that the aircraft had struck the ground on a magnetic heading of about 120 degrees, and while in an inverted position. Its angle of descent had been approximately 75 degrees. The aircraft was completely destroyed by the impact, and no evidence of fire was found.

Examination of the wreckage showed that the control cables leading from the cockpit to the tail were intact. The magneto switch, which had been torn from its mounting, was in the "both on" position. The remaining cockpit controls as well as the instruments and instrument panel were so badly mutilated that nothing further

[1] All times referred to herein are Eastern Standard and based on the 24-hour clock.

could be determined from them. The fuselage had broken into several badly torn and twisted pieces. The condition of the safety belts, which were discovered intact, indicated that none were fastened at the time of impact. One propeller blade had broken off and lay at the point of initial contact, while the remaining blade, still attached to the hub, was nearby. Both propeller blade tips were bent and marked in a manner indicating that power was being applied at the time of impact. The engine was found nine feet behind the cockpit section of the fuselage.

Although most of the wreckage was grouped within a radius of 100 feet, the outer right wing panel was discovered 210 feet away. Its position and the manner in which the wing tip had been bent by contact with a six-inch tree indicated that its path of descent had been more nearly vertical than horizontal. Upon examination, fatigue failure was found to have occurred in the lower edge of the steel wrap-around plate of the steel lug attachment fitting connecting the rear spar of the outer right wing panel to the center wing panel. The right landing light lens was found about 90 feet from the main wreckage group, on a line between it and the right outer wing panel. The right aileron balance weight was located 76 feet from the main wreckage group.

The trees and terrain within a three-mile radius of the wreckage were examined, and there was no evidence that the aircraft had struck elsewhere than at the immediate vicinity of the accident.

The Vultee V-1A aircraft is a ten-place, low-wing land monoplane equipped with a Wright Cyclone engine of 735 horsepower. Aircraft NC 22077 was manufactured in February 1935. Its maintenance history has been traced from that date through the successive ownership of four parties to the date of the accident. Although many instances of poor maintenance were found, none of them can be considered material to the cause of this accident. During the period of January through March, 1948, aircraft NC 22077 received extensive repairs at Hillsgrove, Rhode Island, after which it was found airworthy and licensed. In the course of making these repairs, the wing-attachment members were examined visually, however, they were not subjected to magnetic inspection, which would have revealed a small fatigue fracture if it existed at that time. A magnetic inspection of the wing-attaching members of an aircraft is not customarily made unless a weakness is believed to exist.[2]

Mr. Burlingame, the pilot, age 31, held an airman certificate with a commercial pilot and flight instructor rating. He had logged approximately 3,200 hours at the time of the accident, but his record showed no instrument flight training or instrument flight time. He also held an A and E mechanics license. George H. Armitage, age 62, who presumably occupied the copilot's seat, held a ground school instructor rating, but no airman certificate.

Before the flight's departure from White Plains, the pilot was shown the 0530 weather reports, which indicated unlimited ceilings along the proposed route except for broken clouds at 2,300 feet over Pittsburgh. Although a forecast of weather conditions along the proposed route was available, Mr. Burlingame did not ask for such information. As the weather reports had indicated, from White Plains to Harrisburg, Pennsylvania, the visibility was good and the skies were clear except for a few strato-cumulus clouds. Below 5,000 feet there were west-northwesterly winds at 30 to 35 mph in the New York area, and at 45 to 50 mph from New York to Harrisburg. Above 5,000 feet wind velocities ranged from 50 to 65 mph. Turbulence was light to occasionally moderate, except over Pennsylvania, where sharp choppiness was likely around 5,000 feet. As the flight passed beyond Harrisburg and approached the scene of the accident, cloudiness increased to a broken sky condition, with cloud bases varying from 2,700 to 3,000 feet above sea level. Some of the mountains along the route reached almost to the cloud bases. At Boswell Station, 5 miles north of the accident scene and at the same elevation, the 0815 weather observation reported a measured ceiling of 700 feet, overcast, visibility of 2 miles, haze, dewpoint 45, temperature 46, and the wind northwest at 13 mph.

Discussion

As stated above, a fatigue failure occurred in the steel wrap-around sheet

[2] Only one aircraft of this model is presently flying under NC certification, and the owner has been notified by the Administrator of the desirability of such an inspection

of the bottom steel lug of the attachment fitting of the rear spar. When this sheet, as a result of the failure, split apart, the lower of the two steel bolts of the rear spar connection was separated from the wing panel. Then the upper bolt of this rear connection gave way, and the entire wing panel rotated upward and forward, splitting the lower inter-spar skin and stripping nuts from the bolts on the top skin. As the panel continued to rotate, the bolts of the front spar connection gave way and the wing panel was separated from the aircraft. It will be recalled that this panel was found 210 feet from the wreckage of the aircraft.

Investigation of the locality of the accident for any marks, either on the terrain or trees, revealed nothing to indicate a contact by the aircraft previous to its final impact. The concentration of nearly all of the wreckage in one spot showed that the aircraft struck the ground after a steep dive, rather than following a normal descent, or while in normal flight.

There is no evidence of loss of control by the pilot prior to the separation of the wing panel from the aircraft. As indicated by the lacerated propeller blades, the engine was developing substantial power at the time of impact and hence the aircraft did not descend because of power-plant failure.

Findings

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

1. The aircraft and pilot were properly certificated.

2. At the time of the accident weather conditions in the vicinity were a 700-foot overcast, visibility 2 miles, haze, and a northwest surface wind of 13 mph.

3. The aircraft struck the ground with power on, after a steep dive.

4. The bulk of the wreckage was concentrated within a radius of 100 feet, the right outer wing panel struck the ground 210 feet from the main wreckage group.

5. The lower edge of the steel wrap-around plate of the steel lug attachment fitting of the rear spar of the outer wing panel failed from fatigue.

6. Evidences of fatigue in a wing attaching member would not be disclosed in the course of the usual inspection.

Probable Cause

The Board determines that the probable cause of this accident was the failure from fatigue of the steel wrap-around plate of the steel attachment lower fitting at the rear spar of the right wing, causing the separation in flight of the right wing outer panel from the center panel.

BY THE CIVIL AERONAUTICS 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 Board was notified of the accident on March 20, 1948, and an investigation was immediately begun in accordance with Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. A public hearing was held at Hillsgrove, Rhode Island, June 2, 1948.

Flight Personnel

Pilot Herman F. Burlingame III, held an airman certificate with a commercial pilot and flight instructor rating for single-engine land aircraft. At the time of the accident he had flown a total of approximately 3,200 hours. His last CAA physical examination was on February 25, 1948. Mr. Burlingame also held aircraft and engine mechanic ratings.

The Aircraft

The Vultee V-1A, NC 22077, had been operated a total of approximately 3,500 hours since its manufacture in February, 1935. It was equipped with a Wright cyclone engine, Model SR-1820-F-2, of 735 horsepower, and a Hamilton standard propeller. A 100-hour inspection was completed February 28, 1948, on both the aircraft and the engine. The gross weight of the aircraft at take-off is not known, but examination of the wreckage indicates it to have been close to the maximum allowable of 8,500 pounds.