File No. 2-0046

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: May 3, 1955 Released: May 6, 1955

LOCKHEED LODESTAR N 9201H, NEAR GLASTONBURY, CONNECTICUT, NOVEMBER 5, 1954

The Accident

A Lockheed model 18-56 Lodestar, N 9201H, owned by John Fox, publisher of the Boston Post, crashed nine miles southeast of Glastonbury, Connecticut, November 5, 1954, at approximately 1942.1/ Of the five persons on board, the copilot was killed, the pilot seriously injured, and the three passengers received minor injuries. The aircraft was destroyed by impact and fire.

History of the Flight

At approximately 1845, November 5, 1954, N 9201H departed La Guardia Airport, New York, on a VFR (Visual Flight Rules) flight to Logan Airport, Boston, Massachusetts. The crew consisted of Captain John K. MacKenzie and Copilot Whitney H. Welch. The passengers were Robert W. Mudge, Raymond J. Halloran, both airline pilots, and Mathew C. Abbott, an electrical engineer. Climbing to an altitude of 3,500 feet m. s. l. (mean sea level), the flight proceeded toward Boston.

Approximately 12 miles southeast of Hartford, Connecticut, the right engine became very rough and backfired frequently. The captain was unable to correct this condition and later feathered the right propeller when in the vicinity of Willimantic, Connecticut. A wide right turn was made from a northeasterly to a northwesterly heading toward Bradley Field, Windsor Locks, Connecticut. Communication was established with Bradley Field and the flight was cleared for a straight-in approach to runway 33

The aircraft descended to 2,500 feet m. s. l. during the turn and thereafter continued descending on a northwest heading until it struck trees and crashed. Nearby residents quickly reached the scene, gave assistance and notified authorities.

The Bradley Field 1930 weather was: Scattered clouds at 4,500 feet, visibility 15 miles plus, temperature 40 degrees, dewpoint 32, wind northwest 6 m. p. h. La Guardia weather at the time of departure was: Ceiling unlimited, visibility 15 miles plus. Conditions en route were clear with excellent visibility.

1/ All times herein are eastern standard and are based on the 24-hour clock.

Investigation

The accident occurred approximately 9 miles south-southeast of Glastonbury, Connecticut, and approximately 25 miles south-southeast of Bradley Field.2/ When N 9201H struck the tops of the trees it was on a northwesterly heading and in a descending right-wing-low attitude. Initial ground contact was at an elevation of 705 feet m. s. l. and about 500 feet from the first trees struck by the aircraft. The right wing tip struck first, then the right engine, nose of the aircraft, and left engine, followed by a 180-degree rotation of the aircraft to the right and a short skid rearward. The crew members and one passenger were thrown out of the aircraft. The other two passengers, with the help of the passenger who had been thrown clear, were forced to break the window of a jammed emergency exit in order to leave the aircraft.

While en route Captain MacKenzie invited the airline pilot-passengers to the cockpit to observe the flight operation. Mr. Mudge came forward first and noted during his visit that the aircraft was at 3,500 feet m. s. l. on a heading of approximately 65 degrees with an indicated airspeed of 180 m. p. h., 28 inches of manifold pressure, and 1,900 r.p. m.; mixture controls were in the auto-lean position with some left engine carburetor heat.

Shortly before the engine difficulty began Mr. Halloran went forward, took the left seat, and watched while Copilot Welch flew the aircraft. When the engine roughness developed Captain MacKenzie, who was then in the cabin, immediately went forward, and took the left seat and control of the aircraft and Mr. Halloran returned to the cabin. The right propeller was feathered after efforts to smooth the engine failed. Left engine and propeller controls were advanced to 31 inches manifold pressure and 2,100 r. p. m. with full rich mixture and no carburetor heat. Small advances of engine and propeller controls were made on the operative engine during the descending right turn and the last increase was to 36-37 inches manifold pressure and 2,300 r. p. m. This last advance was made at 1,500 feet m. s. l. but it gave no noticeable improved flight performance. Captain MacKenzie testified as to this sequence of events.

Mr. Mudge testified that he had moved to a position behind the crew and noted that the heading on the directional gyro was 300 degrees and that the aircraft was at an altitude of 2,500 feet, descending at a rate of 200 or 300 feet per minute. Also the manifold pressure was 32 inches and the airspeed was 140 miles per hour. At this time the town of Willimantic was a few miles to the right. The copilot acted upon the suggestion of Mr. Mudge and tuned one ADF receiver (automatic direction finder) to the Hartford low frequency range station. He was also advised of a field (Rentschler) just beyond the station. Captain MacKenzie agreed to the suggestion.

2/ See attachment "A".

When Mr. Mudge noted an altitude of only 950 feet (250 feet above the ground) and an indicated airspeed of 95 m. p. h. he "ran" to the cabin and took a rearward facing seat, realizing the crash was imminent.

Both engines were torn from the airframe and the aircraft nose section was demolished during impact. Although no witness observed fire in either engine on the ground, there was evidence of a small flash fire near the left engine. Sections of the right wing were found scattered beyond the main wreckage area. Fire destroyed the fuselage and right wing. All survivors testified that there was no fire until after ground impact. Examination of the structure revealed no evidence of fire in flight nor failure or malfunction of controls prior to impact.

Disassembly and examination of the two propellers revealed that the approximate blade angles of the left propeller were 25 degrees and the right propeller blade angles were 78 degrees, this latter being near the full feathered position. There were no indications of mechanical failure or malfunctioning of the two propellers or their control assemblies.

Disassembly of the right engine revealed that the rear throw clamping surface and the mating surface of the crank pin were severely galled and fretted from looseness and shifting of the crankshaft. Rollers and roller retainers of the main bearing were mutilated. The power section was severely damaged with all pistons either lodged in the heads of the cylinders or broken up and found in the power section.

Disassembly of the left engine revealed evidence that the cylinders, pistons, and valves had been operated at above normal temperatures. No. 1 cylinder exhaust valve was excessively burned; the guide and boss were missing and the bent valve stem and weakened valve spring gave evidence of excessive operating temperatures.

An airbox test of the carburetors revealed an abnormally lean mixture in the one for the left engine. Pilots and mechanics who had operated the engines stated it had been necessary to use carburetor heat for left engine smoothness. A flow bench test of the left carburetor revealed a normal fuel flow. Disassembly of the left carburetor AMC (automatic mixture control) revealed that the needle was extended beyond its normal position causing a lean mixture. A slight melting of the solder on top of the AMC bellows was noted.

The aircraft and engine logs were destroyed by the fire. The surplus engines installed on different dates in N 9201H were not supplied with logs when they were purchased "as is." The true amount of time on the engines since overhaul is unknown and cannot be determined. The engines were logged as zero time since overhaul, after a partial teardown and inspection was made following their purchase. Since then the left and right engines had 479 and 170 hours, respectively, at the time of the accident.

The gross weight of N 9201H at takeoff has been computed at 17,970 pounds, which is 530 pounds under the maximum allowable gross weight of 18,500 pounds. Fuel consumed during the flight to Glastonbury reduced the gross weight approximately 500 pounds.

Captain MacKenzie had flown approximately four years as copilot on the subject aircraft and one year as pilot in command. His command pilot time on the aircraft was about 200 hours. He stated, as did the former pilot in command of N 9201H, that they had simulated single-engine flight on several occasions. His record also reflects that he was either pilot or copilot on Lockheed aircraft during numerous ferry flights across the north Atlantic in World War II. It was testified that Copilot Welch had two short periods of employment as a copilot on DC-3 equipment before his employment as the Fox Lodestar copilot.

Analysis

The Lockheed Aircraft Corporation operating instructions for Lodestars state under the heading "Single-engine Emergency Operation: In the event of failure of one engine in climb, cruise, or descent, there is seldom need for maximum power from the operative engine unless the airspeed has decreased below approximately 90 m. p. h. (a) Set the mixture control in the auto-rich position, the propellers to give 2,500 r. p. m., and adjust the throttle to give a manifold pressure varying from 41.8 inches at sea level to 37.3 inches at 6,900 feet. ..... . (b) Feather the inoperative propeller and set the mixture control in idle-cutoff. (c) Set the carburetor heat adjustment to cold unless icing conditions exist. (d) Trim the airplane with rudder tab control. (e) Turn fuel system engine selector valve to operating engine only. (f) Correct selector for vacuum pump and turn and bank. (g) Reduce the manifold pressure to give a low power output as is consistent with safe operation."

This same instruction manual under "General Flight Data" states that "at 17,500 pounds the single-engine ceiling is 16,300 feet and the indicated airspeed for maximum rate of climb, one engine, sea level, is 117 m. p. h."

Further it is an accepted practice for a pilot, with an engine out to immediately use rated power on the remaining engine until single-engine flight with minimum loss of altitude is established. Power can then be reduced to optimum aircraft performance. As testified to by the pilot, and an observing passenger, power was only increased by small increments during the entire loss of altitude and airspeed. Even the last increase, immediately prior to the crash, was only to a power setting considerably below the initial setting specified for single-engine operation in the Lockheed manual. Had the accepted technique been used it is believed the aircraft could have been flown to an available airport.

It is apparent that there was ample opportunity for the captain to have become thoroughly familiar with correct single-engine procedure on this aircraft.

The condition of the right engine rear throw clamping surface indicated some fault in the installation of this part at a time prior to purchase of the engine.

The condition of the left engine as revealed by disassembly indicates that there was available to the pilot less than normal power at all settings. Although the left engine was not developing normal power for each power setting, it is believed that there was sufficient power remaining so that flight could have been maintained had the pilot used accepted single-engine procedures.

Had the pilot made a different turn at the time of the engine failure the resultant shorter distance might have enabled the aircraft to have safely reached Bradley Field despite the consistent loss of altitude.

Although a thousand feet of altitude was unnecessarily lost during the initial part of the emergency there was still sufficient time and altitude to establish correct single-engine performance. This was borne out by the fact that when the northwest heading was established the aircraft was still at 2,500 feet and descending at only 200-300 feet per minute. This rate of descent continued down to 200 feet above the ground at which time the indicated airspeed was only 95 m. p. h.

Findings

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

1. The crew and the aircraft were properly certificated.

2. There was no fire prior to impact.

3. Weather was not a factor in the accident.

4. A structural failure occurred in the power section of the right engine that necessitated feathering of the right propeller.

5. Failure to attain single-engine performance resulted in loss of altitude.

6. Mechanical difficulties in the left engine reduced power but remaining available power was sufficient for single-engine performance.

Probable Cause

The Board determines that the probable cause of this accident was that after failure of the right engine, accepted single-engine procedure was not followed, which resulted in the aircraft losing altitude and striking the ground.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ROSS RIZLEY
/s/ JOSEPH P. ADAMS
/s/ JOSH LEE
/s/ CHAN GURNEY
/s/ HARMAR D. DENNY

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

Investigation and Special Investigation

The Civil Aeronautics Board was notified of the accident at 2050, November 5, 1954. 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 special investigation was ordered by the Board and held in Glastonbury, Connecticut, on November 15, 1954; in Boston, Massachusetts, November 17 and 18, 1954, and January 18, 1955; and in Washington, D. C., January 17, 1955.

Flight Personnel

Captain John Kenneth MacKenzie, age 43, held airman certificate No. 38420 with commercial, flight instructor, single- and multi-engine land ratings. His pilot time was approximately 8,700 hours with at least 200 hours in the subject aircraft and many trans-Atlantic flights in similar Lockheed aircraft. He passed a first class medical examination on February 26, 1954, without limitations.

Copilot Whitney H. Welch, age 24, held airman certificate No. 1178677, with ratings of commercial, flight instructor, instrument, single- and multi-engine land. CAA records indicate a total pilot time of 1,600 hours with 600 hours flown in the six months preceding his last physical examination on March 18, 1954. He had been employed previously by several scheduled air carriers as a copilot.

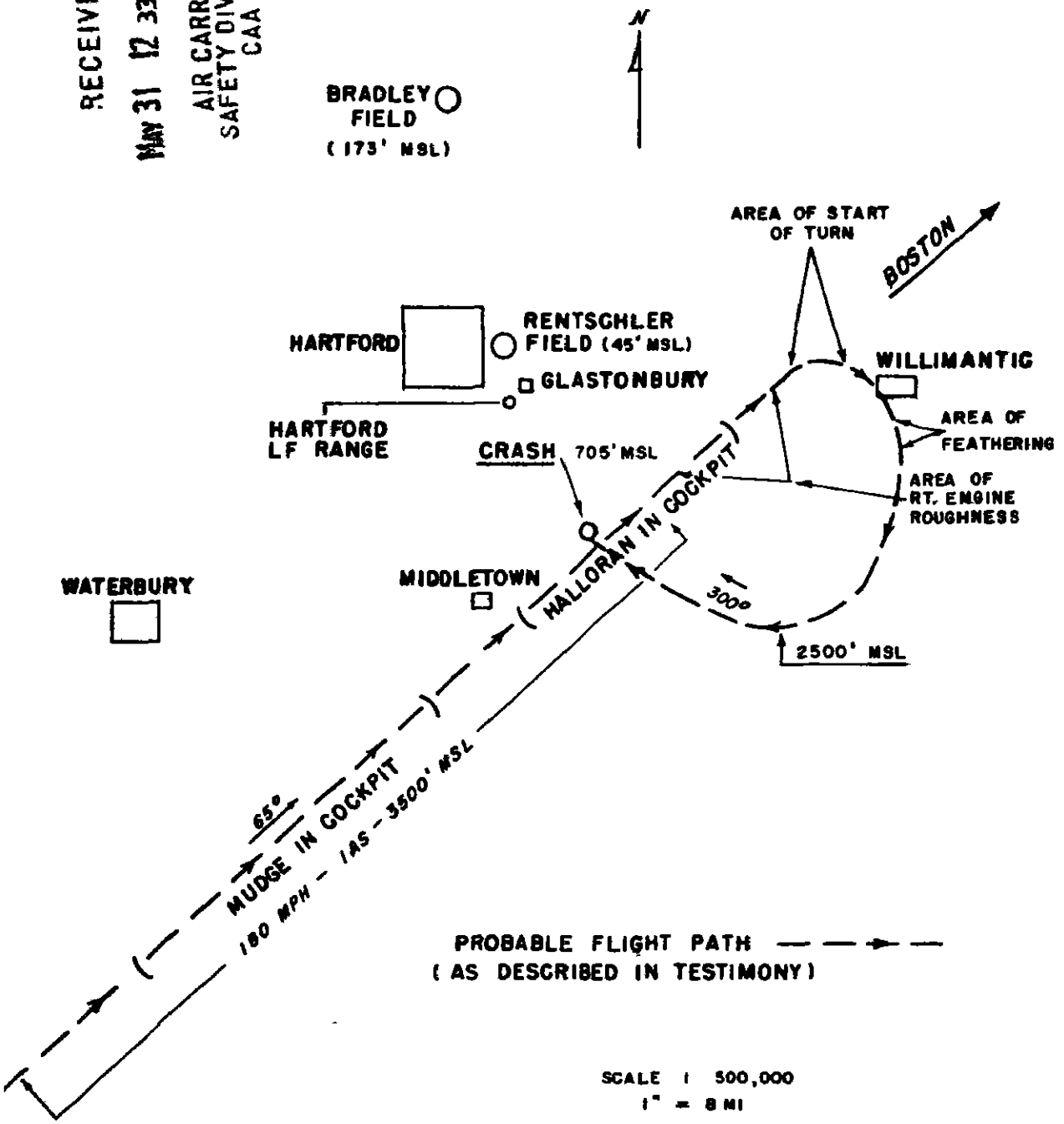
The Aircraft

The certificate of registration (Form ACA 500.1) for N 9201H was issued to John Fox, 89 State Street, Boston, Massachusetts. The last certificate of airworthiness was issued on February 12, 1954. The aircraft was converted from a U. S. Navy R5-O-5, manufacturer's serial number 2353, to a Lockheed Lodestar, model 18-56, on January 23, 1947. Total aircraft time at this date was approximately 1,500 hours. The Wright R1820-60 engines installed at the conversion were replaced, after accumulating approximately 1,000 hours each, by Navy surplus engines of the same type. At the time of the accident, the left engine, serial No. 157603, had approximately 479 logged hours. The right engine, serial No. 454481, had approximately 170 logged hours. The engines were equipped with Hamilton Standard model 23E50-471 propellers. Total time since overhaul on the propellers is unknown.

LOCKHEED LODESTAR N9201H

GLASTONBURY, CONN.

NOVEMBER 5, 1954



SOURCE: NEW YORK (U-9) SECTIONAL CHART