SA-217 File No. 1-0106

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: May 22, 1951 Released: May 23, 1951

ROBINSON AIRLINES, NEAR UTICA, NEW YORK, SEPTEMBER 4, 1950

The Accident

At approximately 1410,[1/] September 4, 1950, a Robinson Airlines, ~~Inc.~~ CORPORATED, aircraft, a DC-3, N-18936, Flight 32, crashed 1.5 miles southeast of the Oneida County Airport, Utica, New York. Of the twenty-three occupants, sixteen were fatally injured, including the three crew members. The aircraft was destroyed.

History of the Flight

Flight 32 departed Ithaca, New York, at 1131, on September 4, 1950, for Newark, New Jersey, via Syracuse and Utica, New York. A flight plan was filed specifying a flight according to visual flight rules. The flight proceeded in a routine manner and arrived at Utica at 1343. The crew made no report of any mechanical difficulties at Utica.

At 1408, the flight departed from Utica with a crew consisting of Harold L. Carter, captain; Frank A. Llewellyn, first officer; and Merwin L. Kindig, Jr., steward. On board were twenty passengers and no cargo, total aircraft weight was 23,454 pounds, which was within the maximum permissible take-off weight, and the load was distributed so that the center of gravity was within approved limits.

Prior to take-off, the engines were given a pre-flight check, following which the take-off roll was commenced. The flaps were in the "full up"

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

position for the take-off. The aircraft became airborne in a normal manner approximately 1500 feet down the runway and climbed to an altitude of approximately 50 feet and leveled off. At this time, the landing gear was retracted and the air speed was estimated to be 105 to 110 miles per hour 2/ by qualified observers. Approximately 3000 feet from the point of take-off, parts were observed falling from the left engine and the aircraft made a shallow turn to the left. At this time, the left propeller appeared to be fully feathered. The flight continued in a left turn, slowly losing altitude until it struck a grove of trees 1.5 miles southeast of the airport. The elevation of the terrain at this point was 480 feet (MSL) which is 256 feet below the elevation of the airport. The tree tops were 80 feet above the ground. First impact with the trees was made on a heading of approximately 60 degrees and as the aircraft descended through the trees, it turned anti-clockwise 180 degrees to the original heading. Following impact with the trees, the fuel tanks ruptured causing a fire which consumed the fuselage. Sixteen of the occupants were fatally injured and seven seriously injured. The survivors escaped either through broken windows on the right side, or the right rear escape hatch.

Investigation

During the descent through the trees, the left wing separated from the fuselage and the left engine broke free from the engine mount. The right wing and engine remained attached to the fuselage. The tail section separated at impact. Fuel from the ruptured center section tanks spilled

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2/ The best single engine climb speed was calculated from the company aircraft operating manual to be 104 miles per hour.

over the forward part of the fuselage and was probably ignited by severed electrical wiring in the radio compartment. The fire that followed completely destroyed the fuselage, including the pilot's compartment. Examination of the cockpit control quadrant showed that the left engine propeller control was in the full high pitch position, the right engine propeller control in the full low pitch position, both throttles fully forward, and both mixture controls in automatic rich. The landing gear and flaps were found in the retracted position. There was no evidence of structural failure of any components of the aircraft's structure or engines with the exception of the left engine and left engine cowling.

An examination of the left engine and propeller at the scene of the accident disclosed that the propeller was in the full feathered position, also, that the entire engine cowling and No. 9 cylinder had separated from the engine and fallen near the runway, approximately 3200 feet from the point of take-off. When the left engine was disassembled, it was found that the inside of the crank case main section was badly mutilated as a result of the movement of broken parts. The primary cause of the loss of power of the left engine was due to the cracking of the No. 1 piston pin. The failure occurred in the inside diameter and approximately midway longitudinally of the piston pin. The inside diameter of the pin was not case hardened or carburized and was, therefore, more susceptible to fatigue.[3/] When the piston pin cracked, it began a rocking motion which imposed excessive loads on the master rod and piston pin bushing. The pin then separated from the master rod and broke into several pieces.

3/ Since the accident, Robinson Airlines has installed carburized piston pins in all of its aircraft which will tend to prevent this type of failure.

Following the separation of the pin, the master rod began a whipping motion in the area of the No. 1, 2, and 9 cylinders, which resulted in pushing the No. 9 cylinder away from the crank case which broke the engine cowling retaining cables. As a result, the No. 9 cylinder and engine cowling separated completely from the engine.

The right engine suffered no impact damage and was still attached to the wing. The propeller dome was removed and the propeller blade pitch position was found to be 45 degrees, or the full high pitch position. The right engine was removed from the aircraft for functional tests, and was found capable of normal operation. During these tests the right engine developed approximately 575 brake horsepower with the propeller set at the full high pitch location. The approved take-off power rating of the engine is 1100 brake horsepower.

All of the sparkplugs from both engines, with the exception of the No. 4 rear sparkplug of the left engine which was not located in the wreckage, were tested and found to be satisfactory.

The weather at the time Flight 32 departed from Utica was: Ceiling 3000 feet, broken clouds, visibility 10 miles, wind from the west-northwest at 15 miles per hour.

Analysis

As previously stated, the left engine failed due to a cracked piston pin and the propeller was feathered; however, the aircraft did not maintain single engine flight, notwithstanding the fact that the right engine was found to be capable of normal operation.

It is probable that at the time the left engine failed, the aircraft had attained single engine climb speed and normally could have continued

to climb at the rate of approximately 460 feet per minute, but since the left engine was uncowled, the normal rate of climb would be reduced to approximately 160 feet per minute.[4] However, the aircraft did not have a positive rate of climb and continued to lose altitude; therefore, another factor must have contributed to the loss of altitude.

The most reasonable explanation for the loss of altitude is that the right engine was not developing the rated take-off horsepower because the propeller was set in the high pitch position. With the propeller in high pitch and the left engine uncowled, the rate of climb would be approximately minus 200 feet per minute.[5] It is improbable that impact forces would have moved the propeller from the low pitch position to the high pitch position, so that it is reasonable to conclude that the right propeller was at this position during the flight. The Board has no evidence of when or how the right propeller was set in the high pitch position, but conceivably it could have been done inadvertently at the time of the emergency but the condition not recognized in time to take the necessary corrective action.

Findings

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

(1) The company, the aircraft, and the crew were properly certificated.

(2) The aircraft made a normal take-off and leveled off at an altitude of 50 feet.

(3) The left engine failed and the cowling separated from the engine shortly after the aircraft had been leveled off and its propeller was feathered.

4/ See Appendix I
5/ See Appendix I

(4) The failure of the left engine resulted from a cracked piston pin in the No. 1 cylinder.

(5) A shallow left turn was made and during the turn, the aircraft lost altitude.

(6) The right engine was found capable of normal operation.

(7) The right propeller was found in the high pitch position.

(8) The aircraft, in the above configuration, would have a rate of approximately climb of/minus 200 feet per minute.

Probable Cause

The Board determines that the probable cause of the accident was the failure of the left engine shortly after take-off, coupled with increased drag due to loss of left engine cowling and reduced power output of the right engine because the right propeller was in the high pitch position.

BY THE CIVIL AERONAUTICS BOARD:

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

Donald W. Nyrop, Chairman, did not participate in the adoption of this report.

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board received notification of the accident at 1515 on September 4, 1950, from Robinson Airlines, Ithaca, New York, and immediately initiated an investigation in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. As part of the investigation a public hearing was held at Utica, New York, on September 21, 1950.

Air Carrier

Robinson Airlines, a certificated air carrier, is a New York corporation organized on December 5, 1946, to engage in scheduled airline transportation of persons, property and/or mail. The principal place of business of the organization is located at Ithaca, New York. On June 28, 1948, Robinson Airlines was granted a three-year temporary certificate of public convenience and necessity to operate between the terminal point New York, New York-Newark, New Jersey and the terminal point Albany, New York, via designated intermediate points, and also between the terminal point New York, New York-Newark, New Jersey, and the co-terminal points of Buffalo, New York, and Niagara Falls, New York, via intermediate points. Operations were commenced over this route, designated as AM 94, on September 19, 1948. By authority of the Civil Aeronautics Board, dated May 23, 1950, Robinson Airlines was granted exemption authority to serve Utica-Rome, New York, through the Oneida County Airport. Service was inaugurated at Utica-Rome on August 30, 1950. At the time of the accident, the company held a valid air carrier operating certificate issued by the Civil Aeronautics Administration.

Flight Personnel

Harold Leland Carter, captain, age 28, held a valid airman certificate with an airline transport pilot rating number 433958. He had logged approximately 4431 flying hours, of which 1900 hours had been obtained in DC-3 type equipment. He had been employed by Robinson Airlines since May 1947, and was promoted to captain as of November 8, 1948. He had had a rest period of 17 hours prior to the subject flight. His last CAA physical examination was accomplished August 29, 1950.

Frank Albert Llewellyn, first officer, age 29, held a valid airman certificate and a commercial single-multi engine and instrument rating number 538923. He had logged approximately 3600 flying hours, of which 2273 hours had been obtained in DC-3 type equipment. He had been employed continuously by Robinson Airlines since December 19, 1949. He had had a rest period of 17 hours prior to the flight. His last CAA physical examination was accomplished December 2, 1949.

Merwin M. Kindig, steward, age 25, had been continuously employed by Robinson Airlines since June 12, 1950.

The Aircraft

N-18936, a Douglas DC-3, had been purchased from Pan American Grace Airways by Robinson Airlines on June 27, 1947. It was manufactured October 13, 1937, and had a total flying time of 19,023 hours. It was equipped with two Wright Model R-1820-G102A engines and two Hamilton Standard propellers. The left engine had a total time of 19,110 hours, of which 461 were since the last overhaul. The right engine had a total time of 13,669 hours and had accumulated 45 hours since the last overhaul. The left propeller had 1672 hours since overhaul and the right propeller, 45 hours since the last overhaul.

APPENDIX I

PERFORMANCE DATA OF DC-3 AIRCRAFT

At gross weight of 23,500 pounds, landing gear retracted, propeller on inoperative engine feathered, and standard sea level conditions, the single engine rates of climb are approximately as follows:

	Rate of Climb feet per minute
DC-3 with take-off power on operative engine	460
DC-3 with take-off power on operative engine and cowling missing from inoperative engine	160
DC-3 with propeller of operative engine in high pitch and cowling missing from inoperative engine	-200

Source: CAA Flight Engineering Report #9

Douglas Aircraft Company