

CIVIL AERONAUTICS BOARD
ACCIDENT INVESTIGATION REPORT

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REGINA CARGO AIRLINES, INC., TETERBORO, NEW JERSEY, MAY 27, 1950The Accident

A C-46-F aircraft, N 9406H, operated by Regina Cargo Airlines, Inc., crashed about one-half mile from the Teterboro, New Jersey airport, shortly after takeoff from the airport, at about 1729^x, May 27, 1950. There were but two occupants, captain and copilot; the former was killed, the latter was seriously injured and the aircraft was destroyed. There was no fire.

History of the Flight

The flight originated at Teterboro, New Jersey, for Detroit, Michigan, via Fort Wayne, Indiana. A visual flight rule plan was filed prior to takeoff. The aircraft had been fueled to a total of 1171 gallons, and the cargo consisted of 631 individual packages of miscellaneous materials totaling 13,666 pounds. Upon departure, the aircraft's gross weight was 50,076 pounds as against the maximum allowable gross weight of 45,000 pounds. The location of the center of gravity is not known.

At 1727 the aircraft was cleared to runway 19 for takeoff toward the south. The engines were run up to a manifold pressure of 45 inches of mercury and ignition was checked on both magnetos of each engine. Takeoff was then started and the manifold pressure was increased to 52 inches of mercury. Ground witnesses estimated that the takeoff run was somewhat longer than usual for this model aircraft. Tower personnel and several

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

ground witnesses saw puffs of black smoke coming from the left engine immediately after the takeoff. At an altitude estimated as 200-300 feet, the left engine started to misfire. The landing gear had been raised and was checked for position. The left engine continued misfiring and shortly became worse. The left propeller was feathered. Ahead, the terrain was flat, unobstructed and marshy. Full power was maintained on the right engine and a left turn was started as if to return to the airport. At this point the altitude was estimated to be 400-500 feet. During the turn the air speed fell to 85-90 MPH and the aircraft settled. This turning and settling continued until the aircraft neared the ground, when it was leveled laterally. It struck while about level, both laterally and longitudinally, and slid along the open ground in a generally northeasterly direction for some 620 feet where it struck some large trees and turned to the left about 180 degrees. Both captain and copilot were thrown clear of the wreckage. The weather was good and was not a factor in the accident.

Investigation

The aircraft was damaged to the point of destruction. Its right wing was torn off about half way out the span and the right stabilizer and elevator were torn loose. The left side of the fuselage nose was sheared away as was the left wing at a point just inboard of the left engine. Various parts of the left wing, including fuel tanks, were scattered over the ground immediately behind the main wreckage. A check of the control system disclosed no control failure or malfunctioning prior to the accident. At the time of takeoff the aircraft carried 1171 gallons of fuel distributed as follows: Left front tank 202 gallons; left rear tank 148 gallons; left center tank 237 gallons; right center tank 228 gallons, right front tank 20 gallons; and right rear tank 151 gallons.

The condition of the left engine and the reason or reasons for its malfunctioning were carefully investigated.

Two of the three propeller blades of that engine were bent and twisted in their barrel arms. The third was not bent and was in the feathered position.

The engine itself was not badly damaged and could still be completely rotated. All components of the engine were examined. There was no evidence of any malfunctioning of the various units of the carburetion system, valve springs and retainers, the impeller and its associated mechanisms, and the general structure of the engine. There was no evidence of faulty lubrication although the main oil screen was somewhat obstructed with sludge and partially collapsed.

However, the ignition system of this engine showed abnormalities. The spark plugs of this and of the right engine were of an approved type for this model engine. Four of the 36 spark plugs of the left engine could not be tested because of impact damage. Six of the remaining 32, No. 5 front, No. 6 front, No. 8 front, No. 16 front, No. 17 front, and No. 17 rear, proved defective, inasmuch as they fired either irregularly or not at all when tested in the condition in which they were removed from the engine. Furthermore, five other spark plugs exceeded the specified limits when tested for gas leakage. The electrode gaps of the 32 spark plugs varied from .014 inches to .023 inches, averaging .018 inches. (This model spark plug is installed when new or after overhaul with a gap setting of .012 inches). Company records indicated that these spark plugs had been in service for 92 hours and 55 minutes, which is 67 hours and 5 minutes less than the maximum allowable amount.

The breaker points of both magnetos of the left engine were burned and oily. Both of these magnetos were improperly timed, internally, the left one being two degrees late and the right one being five degrees late. When operationally tested, both magnetos fired intermittently at the tested speeds.

Examination of the right engine disclosed a number of ignition abnormalities but to a lesser degree than in the left engine. Aluminum chips, found in the nose section of this engine, were the result of rearward displacement of the propeller shaft by impact.

At the time of the takeoff, both engines were using 100-octane fuel from their respective center tanks. Both of these tanks had previously been nearly filled with that grade of fuel. The positions of the fuel selector valves were found to be on these tanks.

The company at the time of the accident was operating three aircraft, two C-47s and one C-46. Two full time certificated mechanics were employed to maintain these aircraft at the company's base in Teterboro. According to the company's maintenance manual which had been approved by the Civil Aeronautics Administration, the C-46 aircraft was to receive 40-hour, 80-hour and 160-hour inspections. The 160-hour inspection which also included all items covered in the 40 and 80-hour inspection was performed by Monarch Air Service, Newark Airport, New Jersey, and was last accomplished on December 28, 1949. The intermediate inspections were to be accomplished by the aforementioned mechanics. The 80-hour inspection by these mechanics included checking the magneto breaker points for opening. The sparkplugs normally were to be changed at the 160-hour inspection.

The records indicate that the next 40-hour inspection had been performed but that the 80-hour inspection had not been performed at the time of departure from Teterboro for Detroit on May 27. The company inspection sheets showed that the aircraft had accumulated 79 hours 40 minutes since the last 80-hour inspection. However, during the investigation log sheets for two previous flights were found in the pilot's briefcase, which was on board the aircraft. These had not been turned in to the company office and indicated an additional 13 hours 35 minutes of flight time. Thus at the time of the accident the aircraft had flown 92 hours and 55 minutes since the last 80-hour inspection.

One of the company mechanics was present and participated in the loading of the aircraft prior to departure. He stated that he checked the pilot complaint sheet for the previous flight on May 26 and there were no malfunctions indicated thereon. Prior to the departure of the flight involved, the mechanic further stated that he looked the airplane over, ran-up the engines which appeared to be operating satisfactorily and that he then assisted in the loading of the aircraft.

The company did not have a pilot flight training program; however, such a program was in the process of approval by the Civil Aeronautics Administration at the time of the accident. The company operations manual, a copy of which was on board the aircraft, included a comprehensive set of instructions on emergency procedures for C-46 aircraft including single-engine operation immediately after takeoff and while in flight. On November 1, 1949, Captain Sinaya was issued an airline transport

rating following a demonstration of proficiency in the subject aircraft of the company by a CAA air carrier agent. This test included single-engine operation.

No copy of a cargo manifest for the subject flight could be found in either the aircraft or the company's office and investigation disclosed that none had been prepared.

Analysis

The best single-engine speed of the aircraft, with maximum gross weight of 45,000 pounds, according to company's Operations Manual, is 125 miles per hour. At a gross weight of 50,000 pounds, this speed would be somewhat increased. At the time the left engine malfunctioned and was feathered, the air speed had reached an estimated 130-135 miles per hour. It is highly probable, although there was no conversation between the deceased captain and the surviving copilot on the subject, that the captain was attempting to return to the airport. At time of takeoff the aircraft gross weight was approximately 50,000 pounds, an overload of about 5,000 pounds. This was obtained from knowledge of the aircraft's basic weight, its known fuel load and by weighing the cargo subsequent to the accident. The copilot disclaimed all knowledge of both the aircraft's total weight and the location of the center of gravity. There is no evidence that the pilot was aware of either of these two

important facts. Had a flight manifest been prepared and the flight properly dispatched both the pilot and copilot should have been aware of this overload.*

The sustained misfiring of the left engine and the subsequent feathering appears to have resulted from the additive effects of three factors. First, the condition of the sparkplugs the abnormally wide range in the gaps of the sparkplug electrodes ranging from .014-.025 inches indicate that the plugs had been improperly gapped, and thus excessive erosion occurred prior to the normal replacement period of 160 hours. Second, the condition of the magnetos: as previously stated the breaker points of both magnetos were burned and oily and the magnetos were improperly timed. Thus, it is evident that both of these accessories were in a poor state of maintenance. Their accumulative effect apparently caused irregular firing. Third, that under takeoff conditions when manifold pressure was greater than that used during the run-up, as is

* Civil Air Regulations

§42.62 Flight manifest for large aircraft and passenger-carrying aircraft operating under IFR conditions. For all large aircraft, or any aircraft carrying passengers under IFR conditions, a flight manifest form shall be prepared and signed for each flight by qualified personnel of the air carrier charged with the duty of supervising the loading of the aircraft and the preparation of the flight manifest form. The form and contents of this manifest shall be in accordance with the instructions contained in the air carrier's operations manual and shall include the names and addresses of the passengers carried, points of departure and destination, the weight of the cargo and passengers, and the distribution of such weight in the aircraft in accordance with the weight control system prescribed in the operations manual. The weight of the passengers may be determined in accordance with a weight control system prescribed by the Administrator. In the event passengers are picked up at points other than the principal operations base or discharged at points other than as shown on the latest manifest, the pilot shall, before starting the flight, cause a duplicate copy of the revised manifest to be mailed to such base, unless other requirements are set forth in the carrier's operations manual.

normally the case, this misfiring would become more accentuated. These three factors appear to have caused a substantial loss of power whereupon the captain feathered the left engine and executed a left turn apparently in an attempt to return to the airport. It was during this turn that the aircraft's air speed was reduced to the point where single-engine flight was impossible.

The pilot's judgment in feathering the left engine may be open to some question, since it appears that a complete loss of power was not experienced, and particularly, if he knew the extent to which the aircraft was overloaded. As far as the right engine is concerned, there is no evidence to indicate any power interruption from the time of takeoff until the crash, although its condition indicated marginal maintenance.

In conclusion, the evidence clearly shows that the flight of May 28 should never have been dispatched from Teterboro. The company maintenance records on hand showed that the aircraft would have exceeded the 80-hour inspection period while en route to Detroit. The mechanic on duty testified that he was jointly responsible for the maintenance of the aircraft and the inspection records. The fact that he had checked the log of the aircraft's flight for the day previous to the accident certainly showed that he was aware that the recorded flight time was 79 hours and 40 minutes. Moreover, the captain's failure to deliver to the company office the flight logs of the two previous flights as required is indicative of the careless manner in which the company conducted its operations.

Thus, it is apparent that the aircraft was not properly maintained. Had the 80-hour inspection been conducted, the condition of the magneto breaker points would have been detected.

In reconstructing this accident it appears that a partial loss of power from the left engine was experienced due to inadequate maintenance, which caused the pilot to feather the left engine. Thereafter the pilot was unable to maintain altitude and a safe single-engine speed while attempting to return to the airport due to the overloaded condition of the aircraft. A secondary factor may have been a failure to obtain full rated power from the right engine due also to inadequate maintenance. Both the company and the pilot, as commander of the aircraft, are to be severely censured for permitting the flight to depart in its overloaded condition, without a flight manifest and with the 80-hour inspection overdue.

Findings

1. The company, the aircraft, and the crew were properly certificated.
2. The aircraft was loaded above its maximum gross weight by approximately 5,000 pounds.
3. The aircraft had been flown in excess of its 80-hour inspection period.
4. Both engines were inadequately maintained.
5. The ignition systems of both engines were found to be defective.
6. The left engine malfunctioned and its propeller was feathered shortly after takeoff at an air speed of 130-135 miles per hour.

7. A left turn was made and the air speed fell sharply to 85-90 miles per hour.

8. The aircraft settled to the ground in a near stalled condition.

Probable Cause

The Board determines that the probable cause of the accident was overloading of the aircraft due to faulty loading and dispatch procedures, coupled with engine malfunctioning due to inadequate maintenance.

BY THE CIVIL AERONAUTICS BOARD:

/s/ D. I. RENTZEL

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

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

Investigation and Hearing

The Civil Aeronautics Board received notification of the accident at 1827, May 27, 1950, from the Civil Aeronautics Communication Station at L. G. Wadsworth Field, 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 in New York, New York, on June 9, 1950.

Air Carrier

Regina Cargo Airlines, Inc., an irregular air carrier incorporated in New York, has its principal place of business at 7609 Fourth Avenue, Brooklyn, New York, and its principal operating base at the Teterboro Airport, Teterboro, New Jersey. At the time of the accident the company held Letter of Registration No. 1655, issued by the Civil Aeronautics Board, and operational certificate No. 1605, issued by the Civil Aeronautics Administration.

On June 1, 1950, the Civil Aeronautics Administration placed an emergency suspension against the air carrier operating certificate held by Regina Cargo Airlines, Inc. A proceeding to revoke this certificate was instituted by the Administrator of Civil Aeronautics by the filing of a complaint with the Civil Aeronautics Board on June 19, 1950. On August 24, 1950, the Board suspended the carrier's air carrier operating certificate pending the determination of the revocation proceeding.

Flight Personnel

Captain John A. Sinayi, age 30, held a flight airman certificate with an airline rating. His total flying time was 3,200 hours as of March 6, 1950, of which more than 200 hours had been in company aircraft of the subject type. He had had previous experience flying C-46 aircraft in the U. S. Air Force.

Copilot Ellis Lawson, age 23, held a valid commercial pilot certificate with appropriate ratings for the subject aircraft. His total flying time was 2,800 hours, of which 160 hours had been in aircraft of the subject type.

The Aircraft

The aircraft, a Curtiss Model C-46-F, N 9406H, had been manufactured in 1945 as a military transport. It was owned by the United States Government and was under lease to Regina Cargo Airlines, Inc., by the U. S. Air Force of the National Defense on June 24, 1949. It was equipped with two Pratt & Whitney Model 2800-75 engines and Hamilton Hydromatic Propellers Model 6491A-0. Both engines had been in use a total of 281 hours. The record does not give the aircraft time; it appears that the 281 hours is for the aircraft as well as the engines and that there had been no overhaul of either the aircraft or the engines.