File No. 1-0203

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: January 31, 1955 Released: February 3, 1955

NATIONAL AIRLINES, INC. - MIAMI, FLORIDA, NOVEMBER 12, 1954

The Accident

National Airlines Flight 38, a Lockheed Lodestar L18-50, N 19911, crashed while landing at the Miami International Airport, Miami, Florida, at approximately 1910E,[1] November 12, 1954. None of the 11 passengers or 3 crew members was injured. The aircraft was substantially damaged; there was no fire.

History of the Flight

National Airlines Flight 38 of November 12, 1954, was a scheduled nonstop flight from Meacham Airport, Key West, Florida, to the Miami International Airport, Miami, Florida. It was the return segment which concluded the airline's daily operation of three round trips between these cities. The last two round trips were made by the crew of Flight 38, with the exception of the stewardess who made only the last. The flight crew consisted of Captain S. P. Whittaker, Copilot R. E. Alderson, and Stewardess E. Gregory. Accumulated routing and holding delays during the entire day's IFR (instrument flight rules) operation resulted in Flight 38 departing Key West at 1802, 57 minutes behind schedule. The aircraft was loaded to a gross takeoff weight of 18,128 pounds, 1,372 pounds less than the maximum allowable; the load was properly distributed with relation to the center of gravity of the aircraft.

The flight was conducted in accordance with an IFR clearance which specified a flight altitude of 4,000 feet. Flight time to Miami was estimated to require 45 minutes via the Homestead, Florida, radio range (a holding point located 22 miles[2] south-southeast of Miami.) The alternate airport was designated as West Palm Beach, located 61 miles north of Miami.

The flight was made through intermittent rain and clouds which required about one-half of the trip to be flown under actual instrument conditions. Some turbulence was encountered which was of sufficient magnitude to require a reduction of airspeed for passenger comfort. At 1812, by en route report, the flight estimated that it would reach Homestead at 1845.

At 1822, 1829, and 1833 respectively, Miami special weather observations were given the flight by the company dispatchers over company radio. These all indicated short periods of heavy rain, visibility under one mile and precipitation ceiling between 600 and 1,100 feet at Miami. The reports were acknowledged by the flight.

1/ All times herein are eastern standard and based on the 24-hour clock.
2/ Mileage is designated in statute miles.

At 1850, Flight 38 reported over the Homestead range station and was cleared by the Miami Approach Control to hold south of this position. At 1855, it was further cleared to the Miami range station, located 5.7 miles west of the instrument runway, 9R. The flight was cleared to descend to 3,500 feet and thereafter to 2,500 feet while approaching the radio range from Homestead. At 1903, the flight reported over the Miami range and was cleared to descend to 1,500 feet west of the range station and to proceed inbound from the range at 1906 for an instrument approach.

Between 1904 and 1906 approach control cleared Flight 38 to land, requested that it report passing the range station inbound, and gave it the latest weather information; wind east-northeast 15 to 20 miles per hour, visibility one-half mile. The flight, at 1908, reported inbound and the approach controller again cleared it to land repeating the same wind and visibility information.

The local approach controller, positioned in the tower, which was 1-1/6 miles northeast of the approach end of runway 9R, was unable to see the approach because of the heavy rain. He waited a normal period required for the approach and called the flight to ascertain its position. Receiving no reply to several calls and seeing what appeared to be stationary lights on the runway he dispatched the emergency equipment as a precautionary measure. Shortly thereafter Captain Whittaker called the tower over the aircraft radio and stated, "I wiped the gear on landing."

Investigation

During the investigation the captain of Flight 38 stated that prior to Flight 35, his first trip to Key West, he had been briefed by the company dispatcher and U. S. Weather Bureau personnel on the anticipated weather conditions. While at the flight terminals additional current weather information was furnished and while en route special Miami observations were given them over the company radio facilities. The crew stated that they, having flown over the route four times that day, knew the weather was generally poor in variable conditions but except for brief periods they were wellabove the company night landing minimums, ceiling 200 feet, visibility one-half mile.

When approaching the Miami Range Station from the Homestead range both crew members and several passengers interviewed stated that they were able to see the airport lights, the full length of runway lights, and the city lights of Coral Gables and Miami. Captain Whittaker stated that at this time, under the existing conditions, he believed he could have properly cancelled his IFR clearance and proceeded visually for the approach and landing. Weather information for the airport given other flights by the tower personnel at approximately this time included an overcast ceiling at 2,200 feet, scattered clouds at 700 feet, and 3 miles visibility in rain.

Just before reaching the Miami range after descending to 1,500 feet west of the range the copilot and captain recalled that a weather report was given the flight by approach control but they did not recall the details. This report, according to the transcription, was the first one given the flight which indicated visibility at the tower was then one-half mile in rain. This report was given before the flight reported inbound for the approach from the range

station. Tower witnesses stated this information was prompted by heavy rain noted in all quadrants, the intensity of which had increased very rapidly. The tower gave the visibility report immediately upon the existence of this condition and pursuant to the tower's responsibility when visibility is observed to be below three miles.

Captain Whittaker, who was making the approach from his left seat position, stated that during the approach he maintained visual reference and conformed to the ILS (Instrument Landing System) glide path by cross checking the ILS instruments. At the outer marker (located 4.4 miles from the runway) Captain Whittaker stated he then could see the full length of runway lights. The approach was made at approximately 105 miles per hour, landing lights on, 60 degrees of flaps extended and the landing gear down and checked, a normal configuration for this type of aircraft. Some intermittent rain and turbulence were encountered. During the flare-out for a wheel type landing, at about 85 or 90 miles per hour, the flight suddenly encountered intense rain which the crew said reduced visibility to near zero. At this point the Captain said he heard the tower report one-half mile visibility. Simultaneously, the captain stated he felt the aircraft lifted by a strong gust or updraft and he then lowered the nose of the aircraft in a positive manner in order to stay as close to the runway as possible. At this time the closest runway lights were diffused in the water being pushed ahead of the windshield wipers and it was impossible for him to tell how high the aircraft was above the runway. Captain Whittaker said that because of the slow airspeed, normal to the flare-out, and with wheels and flaps extended he considered it unsafe to attempt a go-around. He then felt the effect of the gust or updraft decelerate and the aircraft begin to descend, at which time he added substantial power and pulled back on the control yoke to arrest the descent. The aircraft did not respond to this control movement before it contacted the runway in a nose-low attitude. Both crew members stated there was no resultant bounce and the impact did not seem unreasonably hard. Almost immediately the right side of the aircraft went down followed by the left. The propellers began striking the runway and the aircraft slid to a stop on its fuselage.

The captain ordered an immediate passenger evacuation which was done through the cabin door in an orderly manner requiring less than one minute. Copilot Alderson secured the cockpit. Captain Whittaker, after ascertaining that all passengers were safe and uninjured, checked the aircraft for fuel leaks and finding none called the tower and reported the accident.

Investigation, conducted at the scene, disclosed that the aircraft stopped near the right edge of the runway on a magnetic heading of 88 degrees, 2,241 feet east of the approach end. The aircraft was resting on its fuselage, the right engine nacelle and the blades of both propellers. Two parallel series of intermittent lateral propeller gouges made in the macadamized runway surface began near the center of the runway, 1,258 feet from the approach end. The left gouges led to the left propeller and the right series ended 37 feet beyond their starting point. Other runway scrapes and gouges identified as having been made by the sliding aircraft were found.

Investigation disclosed that the landing gear was down and locked at the time the aircraft contacted the runway.

Examination of the components of the right landing gear revealed it was extensively damaged and partially collapsed. It was toed out about eight degrees with the torque arm assembly twisted and the lower torque arm bolt sheared. The drag strut was buckled rearward distorting the lower attachment bolt and bushing and was separated into two parts at a point 15 inches from its lower attachment. The actuating cylinder was damaged by the down lock pin when it sheared. Other components of this gear sustained little or no damage.

The left gear was fully collapsed and its terminal assembly (axle, etc.) was torn away from the oleo piston with failure occurring through the oleo piston bolt holes. The lower torque arm was slightly twisted and the upper torque arm was twisted approximately 35 degrees in a wheel toe-out direction. The center bolt was bent with its nut stripped off. The lower bolt of the lower drag strut was sheared. The actuating cylinder was damaged by the hydraulic down lock pin when it sheared.

Examination of the failed components revealed that the failures resulted from impact forces in an upward and rearward direction with the aircraft in a nose-low attitude at impact. No evidence was found of fatigue failure.

Investigation of the airframe, propellers, engines, and instruments disclosed no evidence of malfunction or failure prior to impact. The crew also stated that they experienced no malfunction or failure, confirming this investigation.

The synoptic weather situation which existed during the evening of November 12 consisted of an extensive high pressure area centered in the Great Lakes extending southeast to northern Florida. An east-west pressure trough lay across the Caribbean to a low center located in the western portion of the Gulf of Mexico. The wind from the surface to 12,000 feet was from the northeast with a southwesterly wind flow above and overrunning it extending to a high altitude. The freezing level was at 11,000 feet. Potential instability of these air masses existed from the surface and as a result of the convergence of the wind fields shower activity ranging from light to heavy existed over the entire subject area. During the period between 1820 and 1920 several heavy showers occurred within the area of the airport. One airline captain who landed at 1905 stated that he encountered a heavy shower after landing which restricted his visibility to the extent his taxi operation was difficult. It cannot be determined from either the weather data or the shower reports whether there were several showers occurring simultaneously, or whether reports from different areas were the result of shower movement. Most witnesses however believed that the showers were moving from the northeast.

Analysis

The meteorological conditions which existed at the time of the accident were conducive to instability showers varying in intensity. Under the existing conditions it was impossible to anticipate their exact time and place of occurrence. The vertical air mass structure was such that once a buildup of cumulus started it would continue upward to between 20,000 and 30,000 feet.

It appears that heavy showers were generated above the freezing level in the southwest wind flow, therefore, although witnesses stated that they believed the showers were moving from the northeast, analysis indicates that they were moving from the southwest.

The heavy shower encountered by the flight could have moved onto the runway during the final portion of the approach or it may have been one that reached full development overhead and suddenly released its moisture. This shower also could have been distinct and separate from the shower which was then occurring in the area of the tower. Wind conditions show that there was a rush of air out of the storm producing northeast gusts in the area where the aircraft entered the rainstorm. This strong outflow was the result of a downdraft accompanying the rain within the storm.

It will be recalled the captain stated that when the flight encountered the heavy rain during the flare-out it also encountered a strong gust or updraft which caused the aircraft to lift. To arrest the ascent the captain lowered the nose of the aircraft in a positive manner and immediately thereafter encountered a loss of altitude which resulted in a hard nose-low landing. In order to produce updrafts or downdrafts of sufficient magnitude to affect the aircraft considerable vertical velocity is required which must be attained by vertical movement of the air mass. It is therefore improbable that an updraft occurred so near the surface. There were definite indications, however, that the flight encountered strong, gusty surface winds from the northeast as it reached the edge of the shower. These gusts could have beer produced by the horizontal outflow from the rain area. The effect of these conditions on the aircraft could be explained by the following theory. As the flight reached the edge of the heavy rain shower strong northeast gusts (headwinds) were encountered and as the flight progressed into the rain area the strong gusts abruptly ceased. This sequence of events would have resulted in a sudden increase in airspeed followed by an equally rapid loss of airspeed. The loss of airspeed would have resulted in a loss of lift and with the aircraft in a nose-low attitude account for its descent to the ground. Considering the low airspeed and altitude of the aircraft it is believed that there was insufficient time available for effective corrective action.

According to the tower transcription and the testimony of tower personnel the flight was advised twice of the visibility which existed from the tower. Captain Whittaker stated he heard the one-half mile visibility report only when he was flaring out for landing and was already in the intense rain. It is probable the captain was mistaken as to when he heard this report or was closer to the airport than to the range station when the flight reported inbound over that position. If the crew had heard the first tower visibility information it would have alerted them to the poor visibility in the area of the tower although not to the actual conditions encountered. This report would not have required them to abandon the approach because the reported visibility did not indicate conditions below company minimums.

Findings

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

1. The carrier, the crew, and the aircraft were properly certificated.

2. The flight was properly dispatched.

3. The gross weight of the aircraft was less than the maximum allowable for takeoff and the load was properly distributed with respect to the center of gravity of the aircraft.

4. The flight crew was briefed before and during the flight on the weather conditions.

5. The synoptic weather situation was conducive to rain showers the exact time, place, and intensity of which could not be anticipated.

6. Immediately before the flight began its instrument approach to runway 9R the crew was informed by the tower approach controller that one-half mile visibility existed from his position.

7. Over the outer marker inbound the full length of runway lights were visible, to the captain.

8. During flare-out for landing the flight encountered an intense rain shower and attendant gusts which caused the captain to lose visual reference and partial vertical control.

9. Strong northeast gusts accompanied the rain shower in the area where the aircraft was flying.

10. The aircraft contacted the runway in a nose-low attitude, the attitude and force of which caused impact failure of the landing gear.

Probable Cause

The Board determines that the probable cause of this accident was a rain shower of unexpected intensity and attendant gusts which caused the loss of visual reference to the runway and the aircraft to lose airspeed resulting in a hard nose-low landing which failed the landing gear.

BY THE CIVIL AERONAUTICS BOARD:

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

SUPPLEMENTAL DATA

Investigation and Hearing

The Civil Aeronautics Board was notified of the accident at 1930, November 12, 1954, by the National Airlines Flight Superintendent on duty. 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, ordered by the Board, was held in Miami, Florida. Accordingly, depositions were taken on November 17, 18, 19, 20, 22, 23, 1954, in Miami, and December 10, 1954, in Washington, D. C.

Air Carrier

National Airlines, Inc., is a Florida corporation with its general offices located in Miami, Florida. At the time of the accident it was operating as an air carrier under currently effective certificates of public convenience and necessity and an air carrier operating certificate issued pursuant to the Civil Aeronautics Act of 1938, as amended. These authorized the carriage of persons, property, and mail over the route described in this report.

Flight Personnel

Captain Sherrel P. Whittaker, age 39, was employed by the company February 5, 1948. He held a current airline transport pilot certificate with a rating for the subject aircraft. He had a total of 11,292 flying hours of which 2,093 hours were in L18-50 type aircraft. His last CAA physical examination was taken July 2, 1954.

Copilot Richard E. Alderson, age 33, was employed by National Airlines January 14, 1953. He held a current airline transport pilot certificate and had a total of 3,161 flying hours of which 568 hours were in the type of equipment involved. His last CAA physical examination was completed July 7, 1954.

Stewardess Elizabeth Gregory was employed by the company September 27, 1954, and completed training October 8, 1954.

The Aircraft

N 19911, a Lockheed L18-50, serial number 2545, was manufactured July 26, 1943. The aircraft was purchased from the U. S. Government and title passed to National Airlines January 29, 1946. It had accumulated 23,555 flight hours, 1,212 since overhaul. The aircraft was equipped with Wright Cyclone GR 1820-G202A engines and Hamilton Standard Model 23E50 propellers.