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CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT

ADOPTED: August 22, 1961

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AMERICAN AIRLINES, INC., LOCKHEED ELECTRA, L-188A,
N 6127A, LAGUARDIA AIRPORT, NEW YORK, N. Y.,
SEPTEMBER 14, 1960

SYNOPSIS

At approximately 0800 e. s. t., September 14, 1960, a Lockheed Electra, Model L-188A, N 6127A, owned and operated by American Airlines, Inc., struck a dike and crashed during an approach to a landing at LaGuardia Airport, New York, New York. Approximately half of the 76 persons on board suffered minor injuries or shock; no one was killed. The aircraft was severely damaged by impact forces and fire.

The Electra scheduled as Flight 361 departed Boston at 0716 e. s. t., with its destination St. Louis, Missouri, and with a planned intermediate stop at LaGuardia Airport. About ten minutes prior to departure a crew change was made when a check pilot boarded the aircraft to flight-check the flight engineer. This check pilot, by mutual agreement with the crew and in accordance with existing company policy, took over the left or pilot-in-command seat with the previously assigned captain moving to the jump seat.

The trip was routine until final approach at LaGuardia.

It is the Board's opinion that the pilot, in attempting to land as short as possible, did not properly plan the approach and as a consequence misjudged the height of the aircraft above the ground when crossing the dike.

As a result of this investigation and hearing, two recommendations were sent to the Federal Aviation Agency.

1. On September 22, 1960, it was recommended that the "Visual Glide Slope System," then undergoing tests by the FAA, be applied to LaGuardia Airport as soon as practicable.

2. On December 13, 1960, it was recommended in a letter to the Administrator, that the present procedures for providing illumination of passenger exit markings be reexamined.

Other factors of this investigation are being studied, one of which is the evacuation of an aircraft when upside down.

Investigation

American Airlines Flight 361 of September 14, 1960, a Lockheed Electra L-188A, N 6127A, was a scheduled passenger flight between Boston, Massachusetts, and St. Louis, Missouri, with an intermediate stop at LaGuardia Airport, New York, New York. The crew consisted of Captain Gordon E. Staples, First Officer Herbert E. Schleicher, Flight Engineer Kenneth F. Thoman, and Stewardesses Margaret Fleming and Donna Gilligan.

Prior to departure the crew was briefed on the available terminal and en route weather conditions as well as pertinent forecasts. The local Boston weather at 0600^{1/} was clear; visibility 15 miles plus; wind west-northwest 10 knots; altimeter 29.97.

Accordingly, a flight plan was prepared by the crew which specified a flight from Logan Airport, Boston, to LaGuardia Airport, in accordance with Visual Flight Rules (VFR), at a cruising altitude of 8,500 feet, true airspeed 260 knots, and an estimated time en route of 45 minutes.

Approximately ten minutes prior to departure, Supervisory Captain Sheldon E. Pangburn boarded the aircraft for the purpose of conducting a semiannual flight check of Flight Engineer Thoman. With Captain Staples' consent and in accordance with existing company policies, Captain Pangburn occupied the left pilot's seat and Captain Staples moved to the jump seat located immediately behind the captain's station.

The flight departed at 0705.

The gross takeoff weight at the time of departure was 91,367 pounds -- well under the maximum allowable gross takeoff weight of 99,250 pounds. Fuel on board weighed 17,600 pounds and estimated fuel burnoff on the Boston-LaGuardia leg of the flight was 3,600 pounds. There were 70 passengers on board.

At 0752, Flight 361 called LaGuardia approach control and reported it was over New Rochelle VFR. The flight was then given the following clearance: "American 361, LaGuardia approach control, at New Rochelle contact LaGuardia Tower 118.7, runway 31, wind west-northwest 18, altimeter 30.02, field information taxi eight closed, runway 31, 4,900 feet long, have you in radar contact.. " Flight 361 acknowledged and at 0755 reported to LaGuardia Tower that it was overhead and gave the wind as northwest 20 knots. In the landing pattern at this time were American Airlines Flight 518, No. 1 to land; and N 5AA, a Beechcraft Travelaire, No. 2 to land; Flight 361 was given the No. 3 position.

Just prior to the time Flight 518 landed, the tower advised another aircraft, N 16D, then approaching the outer marker that the wind was northwest 30. Flight 518 and N 5AA landed and reported clear of the runway respectively at 0758 and 0759. At 0800:27, in answer to a query from Flight 361, the tower advised "361 cleared to land." Flight 361 acknowledged, and this was the last radio transmission from the aircraft.

At 0800:50, N 16D called the tower and advised that an aircraft had crashed on the airport. Emergency equipment was immediately alerted. Tower personnel later stated that at the exact moment of the crash their attention was diverted from the American Electra by other local traffic.

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

LaGuardia Airport is bounded on three sides by water. Because the surface of the airport is located at a height nearly level with the water, a dike has been constructed around the water sides of the airport to prevent flooding. This dike is 161 feet from the approach end of runway 31 and stands approximately 8.2 feet above the runway surface and 13.7 feet above the mean water level. The dike is sodded and its top surface is somewhat irregular.

Investigation revealed that all four main landing gear tires had struck the upper portion of the wooden bulkhead on the waterside of the dike. In going over the top of the dike the left wheels trenched to a depth of 9-1/4 inches and the right wheels 5-3/4 inches, the difference being the result of the irregularity in the dike surface. Accurate measurements indicated that the aircraft was 0.2 degrees right wing down and that the main gear was 13 feet below the top of the dike at the time of initial contact.

After initial impact, Nos. 1 and 2 propellers struck the ground 131 feet farther on. The aircraft rolled to the left and pitched down. In so doing it became inverted and reversed in direction. The left wing was torn off partially by the force against the landing gear when it struck the dike and tore completely away on contact with the ground. Fire which started in the left wing immediately upon impact and in the right wing during the rollover was confined to the exterior of the aircraft until all passengers had evacuated. The aircraft was substantially damaged by impact forces, smoke, and fire. The aircraft came to rest approximately 1,000 feet from the dike and 150 feet to the left of the left edge of the runway and heading approximately 153 degrees.

When the aircraft stopped sliding, its occupants found themselves hanging upside down by their safety belts. To add to their confusion, the inside of the cabin was darkened by mud and soot on the outside window panes. The emergency lights in the cabin were not lighted. Some passengers were able to extricate themselves, others needed assistance. All on board turned to and did the job. The stewardesses, who were seated in the rear lounge, did an excellent job in allaying the fears of the passengers by quickly calling out the necessary instructions for debarkation. The lounge exit door was dislodged and partially open. The stewardesses and a passenger moved this heavy door sufficiently for it to be used as an exit. They immediately called to the passengers to come to the rear of the aircraft. A passenger attempted to open the buffet service door but was unsuccessful. Everyone questioned said there was no panic and that the evacuation was orderly.

Two airline mechanics witnessed the accident as they were working on a parked aircraft only a short distance away. They jumped on their tug and drove to the scene immediately. They were able to extinguish a fire by the buffet service door and open it. Passengers immediately began using this additional means of egress.

A male passenger (naval aviator) who was seated in the forward end of the aircraft opened an emergency window exit and left through it. As he ran around the nose of the aircraft in the direction of the hangar line he thought of the crew. They were still trapped in the cockpit, being unable to open the windows. This man located the external emergency cable release for the sliding window on the captain's side, actuated it, and helped the crew through the window to safety. Before leaving the accident scene the flight crew, stewardesses, and the two mechanics thoroughly checked the aircraft to be certain all passengers were out. All on board were saved from a situation which at first looked completely hopeless. All 70 passengers and the two stewardesses were able to leave the aircraft in approximately three minutes. Only three of the five available means of egress were used.

Three aircraft were awaiting takeoff clearances at the runway ramp of runway 31 when the accident occurred. The pilots of these aircraft said the approach appeared to be normal except that the aircraft was low when nearing the dike and appeared to settle. One of the pilots stated that he thought this aircraft was so low during the final portion of the approach that it might strike the dike and that he considered trying to warn the pilot by radio but decided against it.

The consensus of other witnesses was that the approach was normal in that it was neither a steep nor a low drag in approach.

Captain Pangburn testified that he was attempting to land short and that for this type of landing the approach was completely normal until in the last few seconds a downdraft was encountered and the aircraft sank perceptibly. The left wing dropped, and corrective aileron was immediately applied. He said there was insufficient time to correct this by applying power. He further said that the air on final approach was smooth. After turning on final approach, power and airspeed were gradually reduced to 200 horsepower per engine and 120 knots. This airspeed was the last called by the first officer just before striking the dike.

The L-188 operating manual recommended airspeed over the airport boundary is 119 knots for an Electra aircraft weighing approximately 90,000 pounds.

The investigation did not reveal any evidence of malfunction or failure of the aircraft or its components prior to ground impact. Company records indicated that this aircraft had been maintained in accordance with prescribed procedures and was in an airworthy condition prior to the accident. Measurements of the propeller blade angles disclosed that they were positioned at approximately 29 degrees. Data supplied by the powerplant manufacturers revealed that at this blade angle the engine would be developing 200 horsepower at 120 knots airspeed.

The crew was properly certificated.

Two pilots, whose aircraft landed a few minutes before N 6127A, differed in their statements with respect to turbulence encountered. One, flying a Convair aircraft, said that when approaching LaGuardia he lowered his flaps to 36 degrees instead of 39 degrees (the fully down position) because of turbulence. The other pilot, flying a Beechcraft Travelaire aircraft, said that, "The air was moderately turbulent, a little on the choppy side. It was not excessive turbulence. My only impression is that had my seat belt not been fastened, it wouldn't have made any difference. I never hit any bumps that would have jolted me off my seat." He further stated that just before reaching the dike his airspeed and manifold pressure dropped slightly, accompanied by a mushing feeling, and he applied power as corrective action.

On September 14, 1960, a high pressure area was centered 350-400 miles southwest of New York City. This area of high pressure resulted in a flow of air at the surface from a northwest or west-northwest direction from the Virginia-North Carolina border northward through the mid-Atlantic States. On this day there were no fronts affecting the New York City area and the skies were virtually cloudless. Visibilities were unrestricted, ranging from 12 to 15 miles or more. The surface temperature at

LaGuardia at the time of the accident was 57°F, and the water temperature approximately 68 degrees. During a period of ten minutes prior to and 15 minutes after the accident, the recorded straight-line surface wind varied from 17.4 to 21.7 knots. Instantaneous gusts are not shown on this type record. The wind measuring equipment is located on the roof of the control tower. The wind recording element (triple register) is located 86 feet above the ground, and the anemometer, which is connected to the direct reading dials in both the control tower and the U. S. Weather Bureau office, is located 83 feet above the ground. The local weather observation, required upon notification of an accident and recorded at 0814, indicated that the sky was clear; visibility 15 miles; and wind west-northwest 18 knots, with gusts to 24 knots. There were no pilot reports containing wind or turbulence information available for teletype or radio transmission prior to the accident.

Runway 13-31 is 5,347 feet long and 150 feet wide. The available length of this runway on the day of the accident was 4,899.5 feet. The decrease in length of 447.5 feet was necessary because of construction in progress on runway 4-22. The unusable portion was measured from the approach end of runway 13 and was marked by FAA approved marking criteria painted on the runway. Threshold lights were present on both sides of the paved runway surface. The approach plate, dated August 15, 1960, was in the pilot's flight manual and it showed the decreased runway dimensions.

The company's operations manual shows that for an Electra aircraft weighing approximately 87,767 pounds and landing on runway 31 under the conditions which prevailed September 14, 1960, the minimum effective runway length required is approximately 4,010 feet. This includes crossing the end of the hard surface at a height of 50 feet, flaps in landing position, four engines operating, propeller braking limited to ground idle power, and braking by means of wheel brakes. The above runway length of 4,010 feet includes a safety factor of 40 percent of this distance. The actual stopping distance required was estimated to be about 2,500 feet.

TSO-18 (Standards for Determining Obstructions to Air Navigation), a publication of the FAA, prescribes, for an airport the size of LaGuardia, that any obstruction intersecting a glide slope plane of 40-1, shall be identified and marked as an obstruction. Further, that the marking shall consist of red lights on top of the obstacle for night identification, and orange and white checkerboard painting for daytime marking. The manual does not state specifically to what height the daytime marking must extend. The dike near the approach end of runway 31 was marked accordingly; however, these marks lacked reaching the top by approximately three feet.

Analysis and Conclusions

Captain Pangburn said that he was attempting to land short on the runway and would have done so if he had not encountered downdraft approximately 400 feet horizontally behind the dike, and that this downdraft caused the aircraft to sink rapidly 60 to 80 feet to a position beneath the top surface of the dike, from which he could not recover. He further said that the aircraft was functioning in a normal manner when the accident occurred.

It is believed that only light turbulence was encountered by Captain Pangburn during the final approach and that a part of this may have been caused by surface wind flowing over the dike, producing a burble or eddy effect. Such an eddy effect, however, is not considered to have been significant in view of the height of the dike, wind velocity, type of aircraft involved, and the pilot's attested familiarity with this type of eddy.

The Board also recognizes that a mental hazard may have been created by the construction work in progress at the end of runway 31, and that this could have furnished the motive for a short landing. Also, the top of the dike was not clearly defined during daylight hours, and this might have provided a margin for error if a pilot were attempting to cross the dike as closely as possible.

Notwithstanding these conditions, the Board believes that a pilot possessing the knowledge and skill expected of an airline pilot should have considered all the existing conditions, allowed for them in planning the approach, and thus have avoided striking the dike by crossing it at a safer altitude.

As a result of this investigation and hearing, two recommendations were sent to the Federal Aviation Agency.

1. On September 22, 1960, it was recommended that the "Visual Glide Slope System," then undergoing tests by the FAA, be applied to LaGuardia Airport as soon as practicable.

2. On December 13, 1960, it was recommended, in a letter to the Administrator, that the present procedures for providing illumination of passenger exit markings be reexamined.

Probable Cause

The Board determines that the probable cause of this accident was the failure of the pilot to properly plan and execute the approach to a landing. Factors which may have contributed were the shortened runway and the unmarked upper portion of the dike.

BY THE CIVIL AERONAUTICS BOARD.

/s/ ALAN S. BOYD
Chairman

/s/ ROBERT T. MURPHY
Vice Chairman

/s/ CHAN GURNEY
Member

/s/ G. JOSEPH MINETTI
Member

/s/ WHITNEY GILLILLAND
Member

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

Investigation and Depositions

The Civil Aeronautics Board was notified of the accident immediately after it occurred. An investigation was immediately initiated, in accordance with the provisions of section 701(a)(2) of the Federal Aviation Act of 1958. Depositions were ordered by the Board and taken in New York, New York, October 19 and 20, 1960, and in Washington, D. C., November 21, 1960.

The Carrier

American Airlines, Inc., is a Delaware corporation with its principal office in New York, New York. The carrier holds a certificate of public convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to engage in air transportation of persons, cargo, and mail within the United States, including the route involved.

Flight Personnel

Captain Sheldon E. Pangburn, age 47, was employed by American Airlines on November 25, 1941. He held a currently effective airline transport pilot (airplane) rating certificate with the following ratings: single and multiengine land, DC-3, DC-4, DC-6, DC-7, CV-240, CV-340, CV-440, and L-188 aircraft. He had a total flying time of 14,082 flying hours of which 279 were in Lockheed Electra aircraft. He passed his last FAA first-class medical examination April 27, 1960. This medical certificate included a waiver specifying corrective lenses for near vision.

Captain Gordon E. Staples, age 47, was employed by American Airlines on July 11, 1940. He held a currently effective airline transport pilot (airplane) rating certificate with the following ratings: single and multiengine land, and DC-3, DC-4, DC-6, DC-7, CV-240, CV-340, CV-440, and L-188 aircraft. He had a total flying time of 18,310 hours of which 460 were in Electra aircraft. He passed his last FAA first-class medical examination March 14, 1960.

First Officer Herbert E. Schleicher, age 38, was employed by American Airlines on June 18, 1951. He held a currently effective airline transport pilot (airplane) rating certificate with the following ratings; single and multiengine land, CV-240, CV-340, and L-188 aircraft. He had a total flying time of 7,550 hours of which 300 were in Electra aircraft. His last FAA medical examination was successfully taken December 25, 1959.

Flight Engineer Kenneth F. Thoman, age 36, was employed by the company March 12, 1951. He held a currently effective flight engineer certificate. His total flying time was 7,600 hours of which 320 were in Electra aircraft. He passed his last FAA medical examination February 26, 1960.

Stewardesses Donna Gilligan and Margaret Fleming were properly qualified and each had accumulated 760 and 837 flying hours, respectively, in company service.

The Aircraft

The aircraft was a Lockheed Electra, model L-188, serial No. 1117. It was manufactured January 21, 1960, and had accumulated 1,573 flying hours. It was equipped with four Allison engines, model 501D13, and four model A-6441 FN-606 propellers manufactured by Aero Products, Inc.