

5

*Instrument Approach*

File No.1-0011

CIVIL AERONAUTICS BOARD

AIRCRAFT ACCIDENT REPORT ✓

ADOPTED: October 5, 1959

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AMERICAN AIRLINES, INC., CONVAIR 240, N 94273,  
CHICAGO MIDWAY AIRPORT, MARCH 15, 1959

SYNOPSIS

An American Airlines cargo flight, a Convair 240, crashed in a railroad yard during an instrument approach to the Chicago Midway Airport on March 15, 1959, about 0053 c. s. t. 1/ Neither pilot was hurt although aircraft and cargo were destroyed.

At the time of the accident the company's prescribed cargo minimum ceiling of 300 feet existed; visibility was one mile in rain which was one-fourth mile more than cargo minimum. The flight missed one approach to runway 31, was again vectored into proper position, and started another. Descent continued below 300 feet until the aircraft struck the top of a 96-foot steel tower, crashed and burned.

Investigation disclosed no functional difficulty with the aircraft nor with any of its components nor with any ground aid. Descent below the minimum approach altitude, before the runway was definitely in sight, stands as the basic reason for the accident. The carrier has removed the captain from duty; the first officer was flight-checked and then returned to duty.

Investigation

American Airlines cargo Flight No. 2815 of March 14, 1959, originated at La Guardia Airport, N. Y., for Midway Airport, Chicago, Illinois. Captain Lawrence W. Larsen and First Officer Kenneth Warren Kinne were the only occupants. The Aircraft's gross weight was within limits as was the location of its center of gravity.

Departure from La Guardia was at 2145, approximately on schedule, with the flight cleared only to Detroit because of adverse weather conditions at Chicago. The flight proceeded uneventfully and, not receiving en route company release to Chicago, landed at Detroit.

At Detroit fuel was added and Captain Larsen talked by telephone with the company's dispatcher at Chicago relating to expected Midway weather at arrival time. The dispatcher, after consulting with the company meteorologist, advised the captain that the weather was not expected to go below minimums, although thunderstorm activity was likely at Midway. In reference to this weather information the captain testified, "At that point, I could see no reason to say 'No', so I went. I didn't want to, but I couldn't find a good reason not to." Accordingly,

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

- 2 -

the flight departed Detroit for Chicago with Cincinnati as the alternate. There is no evidence that the dispatcher urged Larsen to continue.

The flight proceeded to Chicago in continuous rain and was cleared to Surf intersection 12 miles east of Midway. The airport weather was reported at that time as ceiling 500 feet, visibility one mile. Runway 13, the instrument landing system runway, was then in use. Shortly thereafter, because of a change in wind direction, the active runway was changed to 31 and the flight was so advised. The ILS equipment for runway 31 differs from that for runway 13 in that runway 31 does not have a glide path or approach lights and the frequency of its localizer is 109.5 mcs. instead of 109.9 mcs.

Upon reaching the Surf intersection, the tower controller vectored the flight to the Kedzie fan marker, 3.3 miles from the active runway, and the final approach was started. During the approach the pilot reported to the tower that the localizer indicator in the aircraft was not functioning correctly. The controller then advised that the localizer frequency for runway 31 was 109.5 mcs. The captain changed from 109.9 mcs. to the proper frequency and the trouble was corrected. Captain Larsen explained later that he was using the wrong frequency because at that time he thought he was making a "back course" approach utilizing the runway 13 ILS. He said that the controller used the words "back course." This approach was discontinued at 600 feet above field elevation and the missed-approach procedure was started.

The first officer flew the airplane during a portion of the return to Kedzie while Captain Larsen studied the runway 31 ILS approach plate.

The landing gear was extended and the aircraft was trimmed for a rate of descent of 300 feet per minute. Both pilots stated that on this second attempt, according to their altimeters, they were never less than 400 feet above ground level 2/and never more than two dots deflection from the centerline on the ILS indicator. Captain Larsen testified that there was turbulence during this second approach and that he was checking power and attitude instruments as well as looking over the glareshield while making a decision to go around or continue. Directly under and ahead of the aircraft approaching runway 31 was a large railroad yard with well-lighted areas, and a heavily traveled and brightly illuminated highway lay only a short distance to the left of course. Captain Larsen stated that he did not see this lighted area but suddenly saw a steel tower through a break in the clouds, attempted to pull up, applied power, and ordered the landing gear up.

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2/ American Airlines Operations Specifications, paragraph 32 reads as follows:

"32. Limitations on Descent Below Authorized IFR Landing Minimums.

No aircraft shall descend below the minimum altitude for landing specified in the applicable Form ACA 511 unless clear of clouds. Thereafter, except when landing minimums of 1000-2 or better are authorized, no aircraft shall descend more than 50 feet below such altitude, unless (1) it has arrived at a position from which a normal approach can be made to the runway of intended landing, and (2) either the approach threshold of such runway or the approach lights or other markings identifiable with such runway are clearly visible to the pilot. If, at any time, after descent below the clouds the pilot cannot maintain visual reference to the ground, or lights, he will immediately execute the appropriate missed-approach procedure prescribed in the applicable Form ACA-511."

The first officer stated that he observed ground lights as the aircraft passed intermittently in and out of cloud bases and suddenly saw a red light on top of a transmission tower. Previously he had called out "minimum altitude" when his altimeter read 1,000 feet (400 feet above airport level) and then concentrated his attention to looking for the runway. He stated that he believes he started the gear up as ordered. Almost simultaneously the airplane struck the tower, was substantially damaged, and nosed down sharply. Up elevator was applied and descent was lessened somewhat as the aircraft plunged into a railroad yard. It skidded across tracks, coming to rest close to a moving freight train about 2,600 feet from the tower. Both pilots got out through the captain's window just ahead of a fast growing fire which consumed the aircraft and its cargo.

The steel tower is 96 feet higher than the airport, 6,350 feet from the approach end of runway 31, and approximately 3,000 feet to the left of the extended centerline of the runway.

Examination of the wreckage disclosed that both IIS receivers were at the proper frequency. Little could be learned from the remains of the ADF receivers because of fire damage, although Captain Larsen had been using both of them, apparently satisfactorily. Nothing whatever could be learned from the remains of the altimeters nor their static systems. The wing flaps were found at a setting of approximately 20 degrees, and the landing gear was down and locked.

Examination of the engines and propellers showed that they were operating in an approach condition at the time of impact. The right propeller governor was set to obtain 2,220 r. p. m. and the right propeller was at 31 degrees pitch. The left governor was set to obtain 2,310 r. p. m. and the left propeller was at 30 degrees pitch.

All ground radio navigational facilities utilized during the final approach were checked by the Federal Aviation Agency and found to be functioning normally. These included the approach radar although rain clutter had prevented tracking the Convair with it. Neither pilot suggested that there may have been any malfunctioning of any nature with the aircraft or any of its components, barring the altimeters, and none was found.

The correct altimeter setting was given the flight before the approach to Midway and the crew set their altimeters accordingly. Investigation also showed that the ground altimeters from which the setting was given were indicating accurately. Both of the aircraft's altimeters functioned properly and were cross-checked during the flight from La Guardia including the landing in rain at Detroit.

During the ten days preceding this accident, N 94273 had had 32 flights for a total of 59:24 hours. All of the mechanical irregularities written up on the log sheets had been corrected; among these were the removal and replacement of three altimeters for reported erroneous indications. On March 8, 1959, the captain's altimeter was reported to read lower than actual altitude and was replaced. On March 12, 1959, the first officer's altimeter was reported to read 200 feet higher than the captain's at 11,000 feet, and normal at sea level; it was replaced. On March 13, 1959, the first officer's altimeter was reported to read 180-200 feet higher than the captain's at 9,000 feet; it was replaced.

Tests of all three of these replaced altimeters showed that they functioned normally and within company and FAA tolerances. A comparison of all altimeter

replacements because of reported malfunctionings for a six-month period of American's Convairs, DC-6's, and DC-7's disclosed no pattern of consistent trouble. Investigation showed that American's Douglas and Convair aircraft have altimeter static systems that have proved to be satisfactory through years of operation and are regarded by American as virtually trouble-free.

Investigation disclosed that the reporting of the Midway weather to the flight was both accurate and current. Thunderstorm conditions prevailed in the general area and lightning flashes could be seen in the northwest and northeast quadrants. Nevertheless, there was no frontal passage at the time and place of the accident which could have caused wind changes of sufficient magnitude to have significant effect upon the approach path.

A scheduled flight of Delta Airlines, also a Convair, landed at Midway, using runway 31, about three minutes before this accident. Its captain stated that he missed his first approach and was vectored back over the Kedzie fan marker and into position for his successful approach. During neither approach did he experience any appreciable drift or turbulence. The weather conditions he encountered were substantially as reported to him, and all ground radio navigational facilities functioned properly.

Captain Larsen had not been flying regularly into Chicago. His last previous landing there had been about three weeks before this accident and the preceding one had been six months earlier. He and First Officer Kinne had flown together only once, some 16 months earlier. The captain testified that he was familiar with the Chicago area but had not studied the Chicago approach plate recently nor prior to the Detroit-Midway leg of the flight.

### Analysis

According to the approved approach procedure for an ILS/ADF approach to runway 31, the Kedzie fan marker should be crossed at an altitude of 900 feet above airport level, a gradual descent begun, and the descent continued until reaching minimum altitude at or near the middle marker six-tenths of a mile from the approach end of the runway. Upon reaching the middle marker or shortly thereafter, if the pilot does not have at least ceiling and visibility minimums, and the lights identifiable with the runway are not in sight, a missed-approach procedure must be started. The evidence clearly indicates that this procedure was not followed.

The captain's inability to execute the first approach properly stems from his failure to study the approach plate and his lack of knowledge of the procedure, even the frequencies involved. As he had studied the approach plate between the first and second approach, it is apparent that he must have been aware of the proper procedure during the second approach. A descent to a dangerously low altitude must have been made early in the second approach. Several facts point to this belief. The tower struck was only 96 feet high. It was located more than a mile from the approach end of the runway and it was 3,000 feet to the left of course. At impact the aircraft was in the approach configuration with respect to propeller governors and propeller blade pitch angles, and wing flaps with landing gear down and locked. It is evident that during the approach both the ILS and ADF pointers clearly indicated that the aircraft was off course to the left. In fact, the ILS pointer must have been fully deflected quite some time before impact. Since Captain Larsen was a well qualified instrument pilot

and would normally easily detect these discrepancies, this can only mean that he was not referring to his instruments during the final portion of the approach.

In regard to a possible erroneous altitude indication, there was no evidence found to indicate either a failure or a malfunction of the altimeters. With respect to the weather conditions at the time and place of the accident, it is believed that they could have varied to some extent from those reported at the airport. It must be remembered, however, that an air carrier aircraft made an uneventful instrument approach and a safe landing to the same runway within a few minutes of the accident. This pilot's landing minimums were higher and only moderate weather conditions were encountered.

### Conclusion

The Board concludes that this accident was brought about by the captain's disregard of the minimum altitude during instrument flight. It is evident that he was attempting visually to locate the runway while flying at a low altitude under conditions of restricted visibility.

### Probable Cause

The Board determines that the probable cause of this accident was the pilot's descent below his allowable minimum altitude and his inattention to flight instruments while attempting to locate the runway visually.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ G. JOSEPH MINETTI

## S U P P L E M E N T A L   D A T A

### Investigation and Taking of Depositions

The Civil Aeronautics Board was notified of this accident shortly after occurrence. An investigation was immediately initiated in accordance with the provisions of Section 702 (a) (2) of the Federal Aviation Act of 1958. Depositions were taken at Chicago, Illinois, on April 22 and 23, 1959.

### Air Carrier

Convair model 240, N 94273, was owned and operated by American Airlines, Inc., a Delaware corporation with general offices in New York, N. Y. It operates as an air carrier under currently effective certificates of public convenience and necessity issued by the Civil Aeronautics Board and under an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to transport persons and property by air over numerous routes including the one being flown in this instance.

### Flight Personnel

Captain Lawrence W. Larsen, age 34, held all requisite certification for the subject flight. He had been employed continuously by American since July 1950. His initial employment had been as a flight engineer trainee and he had become a flight engineer, then a first officer on Convairs, and then a Convair captain. At the time of this accident, Mr. Larsen had flown a total of 8,500 hours, of which 2,500 hours had been as a Convair captain.

During the 24 hours preceding this flight he had had 1 hour and 33 minutes of piloting time. During the preceding 30 days he had flown 49 hours and 37 minutes. His last instrument check was on January 12, 1959; the equipment used was a Convair and the check was standard. He had received a line check from La Guardia to Albany to La Guardia on November 26, 1958, and it also was standard. His last physical examination (first class) was on February 17, 1959, and was satisfactory.

First Officer Kenneth Warren Kinne, age 29, held all requisite certification for the subject flight. He had been first employed by American in February 1957, furloughed in December 1957, and recalled in February 1959. He was qualified by the company as a first officer on Convairs. Mr. Kinne had flown a total of 1,800 hours, of which 800 hours had been as first officer on Convairs. His last physical examination and his last instrument and route checks were current and satisfactory.

### The Aircraft

N 94273, Convair, model 240, was one of a fleet of about 50 such aircraft owned and operated by American Airlines. It had a total flying time of about 22,720 hours. All maintenance had been adequate and was current. The engines were Pratt and Whitney model R-280083 AM4-A. Their total times were 19,495 and 20,087 hours, with 969 and 1,075 hours since overhaul, for left and right, respectively. Propellers were Hamilton Standard both having 2,342 operational hours since the last hub overhaul or reassembly.