Collision with trees, Eastern Air Lines, Inc., Boeing 727-225, N8843E, Toledo, Ohio, April 10, 1973

Micro-summary: **This Boeing 727-225 collided with trees while executing a nonprecision approach.**

Event Date: **1973-04-10 at 1318 EST**

Investigative Body: **National Transportation Safety Board (NTSB), USA**

Investigative Body's Web Site: **http://www.ntsb.gov/**

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File No. 4-0012

AIRCRAFT INCIDENT REPORT

EASTERN AIR LINES, INC.

BOEING 727- 225, N8843E

Toledo, Ohio

April 10, 1973

Adopted: September 27, 1973

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D.C. 20591
REPORT NUMBER: NTSB-AAR-73-17

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NATIONAL TRANSPORTATION SAFETY BOARD
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AIRCRAFT INCIDENT REPORT

Adopted: September 27, 1973

EASTERN AIR LINES, INC.
BOEING 727-225, N8843E
TOLEDO, OHIO
APRIL 10, 1973

SYNOPSIS

An Eastern Air Lines Boeing 727-225 struck some trees while executing an instrument approach to Runway 25 on the Toledo Express Airport, Toledo, Ohio. The incident occurred at 1318 eastern standard time, April 10, 1973. Damage to the aircraft was limited to the leading edge and trailing edge flaps of the right wing. There were no injuries to the 30 passengers or to the 7 crewmembers aboard the aircraft.

The incident occurred as the aircraft passed through a snowshower which was situated near the approach path to the airport. The instrument approach was abandoned, and a second approach and landing were accomplished without further incident.

The National Transportation Safety Board determines that the probable cause of this incident was the failure of the flightcrew to adhere to established procedures, which resulted in a descent below the authorized minimum descent altitude and an impact with the trees.

As a result of this incident and accidents of a similar nature, the Safety Board made a recommendation to the Federal Aviation Administration emphasizing the importance of adherence to critical operational procedures such as altitude awareness.

INVESTIGATION

Eastern Air Lines, Inc., Boeing 727-225, N8843E, operating as Flight 322 on April 10, 1973, was a scheduled passenger flight from Pensacola, Florida, to Detroit, Michigan, with scheduled en route stops at Atlanta, Georgia; Charlotte, North Carolina; and Columbus and Toledo, Ohio. While executing a localizer back course instrument approach to Runway 25 on the Toledo Express Airport, Toledo, Ohio, the aircraft struck some trees. The incident occurred at 1318 eastern standard time.

According to the flightcrew, the flight was routine until it passed the final approach fix (FAF) inbound at Toledo. At that time the captain was at the controls, and he was abvised by the tower, ". . . snow storm is just moving across the approach end of Runway twenty-five, visibility to the east is -- ah -- about a mile and a half." Shortly thereafter, the flight entered the snowshower. During the descent from the FAF to the minimum descent altitude (MDA),[1/] the first officer made the required announcements at the 1,000-foot height above touchdown (HAT) and the 600-foot HAT, but he did not announce the 500-foot HAT or MDA, as required by company procedures. During subsequent flightcrew interviews, the captain, the first officer, and the second officer stated that they were not aware of the requirement to call out MDA until they were informed about it after this incident.

The first officer stated that he had made ground contact visually while the aircraft was approaching the 400-foot HAT shortly before emerging from the snowshower. He was looking for the runway when he heard the captain apply power, and he stated further that ". . . we were still descending and still increasing power. I started feeling uneasy about the captain not applying power any faster and I said, 'Captain do you see those trees.'" The captain replied to the effect, "I do now." The captain stated that he could not explain the reason for the descent below the prescribed altitude.

The flight data recorder disclosed no decrease in the rate of descent at MDA; in fact, it recorded an increase in the rate of descent after the aircraft passed through MDA.

A tower controller, who saw the aircraft emerge from the snowshower at treetop level in a slightly nosedown attitude, advised, "Three twenty two-ah-go-around!" According to the flightcrew, they had already initiated the go-around when they received this transmission from the tower.

After the aircraft struck the trees, the flight continued the missed approach without further incident. A second approach and landing on Runway 25 were accomplished. The remainder of the flight's schedule was then cancelled.

The trees struck by Flight 322 were located approximately 6,900 feet from the approach end of Runway 25 and approximately 110 feet to the right of the extended runway centerline. The ground elevation at

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1/ Minimum Descent Altitude - the lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach. Descent below MDA is not authorized unless the aircraft is in a position from which a normal approach to the runway of intended landing can be made, and the approach threshold of that runway or approach lights or other marking identifiable with the approach end of that runway are clearly visible to the pilot.

the tree strike was 653 feet mean sea level (m.s.l.), approximately 25 feet below the runway threshold elevation of 678 feet m.s.l. The trees were broken approximately 40 feet above the ground, or some 15 feet above the runway threshold elevation.

The instrument approach to Runway 25 2/ consists of a FAF located at the Holland Intersection (the intersection of the 249° localizer course and the 347° radial of the Waterville VOR). The published minimum altitude over the FAF is 2,200 feet m.s.l. (1,522 feet HAT). The distance from the FAF to the runway threshold, which is also the missed approach point, is 4.7 nautical miles. This approach is not equipped with a glide slope. The published straight-in minimums for category "C" aircraft are MDA 1,040 feet m.s.l. (362 feet HAT), visibility three-fourths of a mile.

According to company records, the flightcrew had successfully accomplished all required training. However, the 500-foot altitude and MDA callouts, required by company procedures, were not accomplished during the approach. The flight crewmembers stated that they were not aware of the requirement for an MDA callout.

The Toledo Express Airport surface weather observations at 1307 eastern standard time were reported as:

> "Partly obscured, 1,100 scattered, estimated 2,500 overcast, visibility 2 1/2 miles, light snow showers, wind from 290 degrees at 13 knots, gusts to 20 knots, altimeter setting 29.60 inches, snow obscuring 2/10 of the sky."

Runway 25, which is 8,700 feet long and 150 feet wide, is equipped with high-intensity runway lights. The runway lights were operating. No approach lights were installed for this runway. The runway end identifier lights for this runway, which are owned by the United States Air Force, were not operating.

The captain did not request that ground emergency equipment available at the airport stand by; nor did he advise ground personnel of the tree strike.

Tower personnel became aware of the tree strike after they had received inquiries from a local newspaper that had been advised of the incident by a passenger.

The aircraft was equipped with five altimeters: two servopneumatic barometric altimeters receiving altitude inputs from the Air Data Computer

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2/ The approach plate in use at the time of this incident was dated July 6, 1972.

and a radio altimeter installed on the captain's instrument panel; also, a conventional barometric altimeter and a radio altimeter installed in the first officer's panel.

The station agent provided the altimeter setting that would make the captain's No. 1 servopneumatic barometric altimeter and the first officer's barometric altimeter read zero on landing. The captain's No. 2 servopneumatic barometric altimeter was set to the station sea level pressure, to make it the same as m.s.l. elevation on landing. The captain could not recall which one of his servopneumatic barometric altimeters he had been monitoring.

Functional testing of all altimeters, including the station altimeter at Toledo Express Airport, disclosed no malfunctions pertinent to this incident. Although there were some small altimeter errors and a small error in the altimetry information provided by the station, the cumulative errors were minor. With the correct barometric pressure set into the altimeters, the captain's altimeter read 50 feet lower than the field elevation, and the first officer's altimeter read 20 feet lower.

ANALYSIS

Of primary concern in the analysis of this incident is the reason for the descent below the published MDA before visual contact was made with the airport environment. Since mechanical failures of the aircraft or operational emergencies were not in evidence, other reasons considered include: missetting or misreading of the altimeters, malfunction of the altimeters, failure of the crew to monitor altitude during the approach, and an intentional descent below the MDA in an attempt to establish and maintain visual reference to the ground. Each of these possibilities was considered in light of the information developed during the investigation. Missetting or misreading of the altimeters, as well as malfunction of the altimeters, were rejected for the following reasons:

1. Missetting or misreading of the altimeters.

According to statements made by the flightcrew, all altimeters were set properly and were cross-checked during the in-range portion of the approach. This procedure is in accordance with company practice. The crew also stated that no changes to these settings were made by them until just before deplaning. At that time, the first officer attempted a cross-check of the altimeter system and found no discrepancies. Misreadings of altimeters normally occur when changes of altitude of more than 1,000 feet are made. In nearly all cases, they involve reading errors of exactly 1,000 feet or 10,000 feet. In this case, the first officer made a callout at 600 feet, and shortly thereafter sighted the ground and the trees. Assuming that the captain checked his altimeter when the altitude callouts

were made, it would have been necessary for both pilots to have misread their altimeters identically for an error to have gone unnoticed.

The last altimeter reading which the captain could recall was 400 feet, which is closely associated with the MDA of 1,040 m.s.l. (362 feet above touchdown). However, he could not recall from which of his two altimeters he had obtained this reading.

If the captain had obtained this reading from the No. 2 altimeter, which was set for station sea level pressure, the aircraft would have been 278 feet below the airport elevation of 678 feet m.s.l. Therefore, the captain could not have read the 400 feet on the No. 2 altimeter because the aircraft would have impacted the ground at near a No. 2 altimeter reading of 678 feet. Furthermore, at the time the No. 1 altimeter, which is set to read zero altitude at touchdown, was reading 400 feet, the No. 2 altimeter should have been reading 1,078 feet m.s.l. These two readings are dissimilar in appearance are not compatible with misreading of altitude. It is concluded, therefore, that the captain did read the correct altimeter (No. 1); however, he did not take appropriate action to level the aircraft as prescribed in the approach procedures.

2. Malfunctions of the altimeters.

The three barometric altimeters were tested in the aircraft on the ramp at Toledo Express Airport, and all were found to be well within the allowable tolerances. The maximum differential between any two altimeters was 50 feet. Therefore, an altimeter malfunction was not considered to be in the causal area.

With the elimination of these possibilities, the Board must consider that the descent below MDA was caused by the failure of the flightcrew to monitor the altimeters adequately during the approach. Both pilots may have been intent upon making visual contact with the airport environment as soon as possible in order to avoid the necessity for a missed approach. This in no way relieved them of the responsibilities consistent with good crew discipline during an approach for a landing under instrument flight conditions.

The facts in this incident are well defined. There was no altimeter error or malfunction of enough magnitude to have caused the pilot to descend 349 feet below the MDA. In fact, if the MDA had been observed on the altimeters, the minimum altitude to which the aircraft would have been descended would have been 412 feet HAT, or 50 feet above MDA.

The Board must conclude, from this and other recent accidents and incidents of similar nature, that inadequate attention to critical operational procedures is a dominant causative factor. It is imperative that

the individual pilot recognize the onset of inattention in himself and in others of his crew. It may be combatted by the adherence to professional standards. These standards must be maintained by alertness, by cockpit discipline, by strict adherence to established procedures, and by prompt, positive correction of any deviation therefrom.

PROBABLE CAUSE

The national Transportation Safety Board determines that the probable cause of this incident was the failure of the flightcrew to adhere to established procedures, which resulted in a descent below the authorized minimum descent altitude and an impact with the trees.

RECOMMENDATION

The National Transportation Safety Board recommends that:

The Federal Aviation Administration transmit a copy of this report to all Part 121 and 135 operators, with an accompanying request that the management of each operator make a copy of the report available to their flightcrews and use every means to maintain an effective progrm of company communications, emphasizing the importance of adherence to critical operational procedures such as altitude callouts. (Aviation Safety Recommendation A-73-75).

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

September 27, 1973

CREW INFORMATION

Captain Thomas A. Woodward, aged 46, held Airline Transport Pilot Certificate No. 1150759. He held type ratings for the Convair 240/340/440 and the Boeing 727. His first-class medical certificate, dated January 30, 1973, listed no limitations. He had accumulated a total of 6,212 flight hours, of which 1,400 were in the Boeing 727.

First Officer James R. Sandusky, aged 41, held Airline Transport Pilot Certificate No. 1390701 with commercial privileges in aircraft, single- and multiengine land. His first-class medical certificate, dated March 19, 1973, listed no limitations. He had accumulated a total of 5,244 flight hours, of which 1,815 were in the Boeing 727.

Second Officer William B. Reese, aged 30, held Commercial Pilot Certificate No. 1587034 with single- and multiengine land, helicopter, and flight instructor privileges. He also held ratings as a Flight Engineer, both turbojet and turboprop. His first-class medical certificate, dated August 15, 1972, listed no restrictions. He had accumulated a total of 1,884 flight hours as a flight engineer, of which 1,659 were in the Boeing 727.

The three flight crewmembers were certificated and qualified in compliance with the applicable Federal Aviation Regulations.

AIRCRAFT INFORMATION

The aircraft was a Boeing 727-225, serial No. 2041, N8843E, operated by Eastern Air Lines, Inc. It had accumulated a total of 8,109 flight hours, including 250 hours since the last major inspection and 51 hours since the last line maintenance. The aircraft was certificated and maintained in accordance with applicable Federal Aviation Regulations and approved company maintenance manual.