
Uncontained engine failure, National Airlines, Inc., DC-10-10, N60NA, Near Albuquerque, New Mexico, November 3, 1973

Micro-summary: This McDonnell Douglas DC-10-10 experienced an uncontained engine failure in cruise, with components penetrating the fuselate.

Event Date: 1974-07-08 at 1640 MST

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

Investigative Body's Web Site: <http://www.nts.gov/>

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File No. 1-0013

AIRCRAFT ACCIDENT REPORT

NATIONAL AIRLINES, INC.

McDonnell - Douglas DC-10-10, N60NA

Near Tampa, Florida

July 8, 1974

Adopted: JULY 24, 1974

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D.C. 20591
REPORT NUMBER: NTSB-AAR-74-9

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20591

AIRCRAFT ACCIDENT REPORT

Adopted: July 24, 1974

NATIONAL AIRLINES, INC.
McDONNELL - DOUGLAS DC-10-10, N60NA
NEAR TAMPA, FLORIDA
JULY 8, 1974

SYNOPSIS

About 0940 e.d.t. on July 8, 1974, cowling from the aft section of the No. 1 engine of National Airlines, Inc., Flight 41, separated from the aircraft during climbout from Miami International Airport, Miami, Florida. The cowling tore large holes in the left wing leading edge and the upper wing surface before being ingested into the No. 2 engine.

The flightcrew made an immediate emergency landing at Tampa International Airport, Tampa, Florida, without further difficulty. There were no injuries.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of company maintenance personnel to complete the installation of mounting bolts in the inboard panel of the No. 1 engine core cowl. This failure resulted from non-compliance with established company maintenance procedures.

INVESTIGATION

National Airlines Flight 41, a McDonnell-Douglas DC-10-10, N60NA, was a scheduled, nonstop flight from Miami International Airport, Miami, Florida, to Los Angeles International Airport, Los Angeles, California.

The flight departed Miami at 0914 1/ on July 8, 1974. One hundred sixty passengers and twelve crewmembers were on board.

As Flight 41 was climbing through 25,000 feet, 2/ an explosion, accompanied by severe vibrations, shook the aircraft. The vibrations

1/ All times used herein are Eastern daylight based on the 24-hour clock.

2/ All altitudes are mean sea level unless otherwise noted.

were so severe that the flightcrew had difficulty interpreting the instruments. The captain, however, determined that there was a problem with the No. 2 engine and retarded the No. 2 throttle toward the "idle" position. Simultaneously the flight engineer noticed a complete loss of No. 2 hydraulic and oil systems pressure and the loss of the No. 2 electrical bus.

The captain immediately initiated an emergency descent. The first officer contacted the Miami Center and advised the center of the problem and of their decision to land as soon as possible at Tampa. Miami Center cleared Flight 41 for the descent and for contact with Tampa Approach Control.

Shortly after the descent was initiated, three separate No. 2 engine fire warning indications were observed by the flight engineer. After advising the captain, the flight engineer discharged one No. 2 engine fire bottle, and 30 seconds later discharged the other. The fire warning lights went out.

A visual descent and approach were made to the ILS final approach course to runway 36L at Tampa. A visual landing was made at 0951 with no further difficulty.

None of the 160 passengers and 12 crewmembers were injured. All occupants departed the aircraft through normal exits after it arrived at the passenger terminal.

Inspection of the aircraft revealed that the No. 1 engine core cowl was missing, the left wing leading edge had a hole approximately 9"x9" outboard of the No. 1 engine and the upper wing surface had a small hole approximately 6"x6". The No. 2 engine had been damaged extensively both externally and internally, a section of No. 2 engine cowl was missing, and the vertical stabilizer was dented.

The Safety Board investigation revealed that N60NA had been routed to maintenance on July 6, 1974, because of a pilot complaint that the No. 1 reverser lock light was on after landing at Miami. Line maintenance personnel had removed the No. 1 engine core cowl so that the No. 1 engine fan reverser could be removed and replaced.

After the reverser was replaced, the inboard section of the core cowl was set in place with only the center mounting bracket bolt inserted. The nut was not placed on this bolt. After verbally notifying the oncoming shift of the incomplete work, the off-going mechanics left. The personnel of the next maintenance shift did not go immediately to N60NA to complete the work on the fan reverser. Two other DC-10's required maintenance to meet flight schedules. Subsequently, when these maintenance personnel returned to N60NA, despite the information passed on

from the previous work shift, they assumed that all three inboard core cowl retaining bolts had been installed and secured properly, and proceeded to close and latch the core cowl assembly. No entry could be found in any maintenance forms to indicate the removal of the core cowl or fan reverser.

The aircraft repair had been supervised by line maintenance personnel for about five work shifts. The discrepancy was not corrected at the time as there was a need for the aircraft to be placed in passenger service. Consequently, the aircraft was dispatched for flight on July 8, 1974, with the complaint listed as an open item.

ANALYSIS AND CONCLUSIONS

The investigation revealed that the company had established procedures required by 14 CFR 121.369(b)(g), to ensure that inspections, maintenance, and alterations that were not completed at the end of a shift were completed properly before the aircraft was released to service. In this case, however, these procedures were not followed.

The National Airlines Maintenance Administration Manual clearly delineates areas of responsibility during shift turnover.

The National Airlines Base Check Manual, Section A(3) states, in part, "Such discrepancies must be investigated to the extent necessary to evaluate the effect on the continued airworthiness of the aircraft and normal operation of its systems. If necessary, plates and panels not ordinarily opened may be opened to insure a thorough evaluation. An item must be entered on the standard Maintenance Supplement (885-121) for any plate or panel so removed."

Although the manual clearly states that those plates and panels that were removed should be listed on the supplemental sheets, no such entries were made for the No. 1 engine core cowl.

Since there was only minor damage to the inboard core cowl mounting brackets, the Board determined that the inboard half of the core cowl separated first and that the resulting air loads on the separated portion tore the outboard panel from its mounting brackets.

Based on its investigation, the Safety Board concluded that the No. 1 engine core cowl separated in flight because it was not attached properly after it had been removed for maintenance work on the fan reverser.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of company maintenance

personnel to complete the installation of mounting bolts on the inboard panel of the No. 1 engine core cowl. This failure resulted from non-compliance with established company maintenance procedures.

RECOMMENDATIONS

As a result of the accident, the Safety Board on August 8, 1974, submitted Safety Recommendations A-74-59 and 60 to the Administrator, Federal Aviation Administration.

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

July 24, 1974

APPENDIX A

CREW INFORMATION

Captain A. J. McGlannan

Captain McGlannan, 55, holds Airline Transport Pilot Certificate No. 310639 with type ratings in DC-10, DC-8, DC-7, and DC-6 series aircraft, and Lockheed 1049, L188, and L18. At the time of the accident, he had accumulated about 24,000 flight hours, of which 1,300 hours had been in the McDonnell-Douglas DC-10. His last proficiency check in the DC-10 was completed satisfactorily on April 25, 1974. He possessed a current first-class medical certificate, dated January 23, 1974, with no limitations.

First Officer M. C. Wood

First Officer Wood, 37, holds Commercial Pilot Certificate No. 1764298 with airplane single-engine land and instrument ratings. At the time of the accident, he had accumulated about 9,500 flight hours of which about 500 hours had been in the McDonnell-Douglas DC-10. His last proficiency check in the DC-10 was completed satisfactorily on July 7, 1973. He possessed a current second-class medical certificate, dated September 19, 1973, with no limitations.

Flight Engineer D. J. DeFilippis

Flight Engineer DeFillippis, 49, holds Flight Engineer Certificate No. 1224303. He also holds Commercial Pilot Certificate No. 689096 with instrument rating and Mechanic Certificate No. 574292 with aircraft and powerplant ratings. At the time of the accident, he had accumulated about 8,500 flight hours, of which about 1,250 hours had been in the McDonnell-Douglas DC-10. His last check in the DC-10 was completed satisfactorily on October 23, 1973. He possessed a current second-class medical certificate, dated August 30, 1973, with no limitations.

Flight Attendants

The 9 flight attendants were qualified.

APPENDIX B

AIRCRAFT INFORMATION

Make and Model	McDonnell-Douglas DC-10-10
Registration	N60NA
Serial No.	46700
Date of Manufacture	November 1, 1971
Total Flight Hours	7,899:24
Engines	General Electric CF6-6D

ENGINES

No.	S/N	Total Time	Time Since Overhaul
1	451-258	2,132	635
2	451-140	5,496	486
3	451-422	1,943	1,943