



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: July 9, 2002

In reply refer to: A-02-13 and -14

Honorable Jane F. Garvey
Administrator
Federal Aviation Administration
Washington, D.C. 20591

On November 29, 2000, the flight crew of a McDonnell Douglas¹ DC-9-32, N826AT, operating as AirTran Airways flight 956, executed an emergency landing at Hartsfield Atlanta International Airport (ATL), Atlanta, Georgia. Shortly after departing ATL, the flight crew observed numerous circuit breakers trip and several annunciator panel lights illuminate and declared an emergency. After the landing, one of the flight attendants reported to the flight crew that smoke could be seen emanating from the left sidewall in the forward cabin; air traffic control personnel also notified the flight crew that smoke was coming from the airplane. The flight crew then initiated an emergency evacuation on one of the taxiways. Airport rescue and firefighting personnel assisted in subduing the fire. No serious injuries were reported, and the airplane sustained substantial damage.

Examination of the airplane revealed fire damage to the left forward areas of the fuselage and cargo compartment from fuselage stations (FS) 237 to 313 and damage to the cabin floor. Fire damage was concentrated in an area just aft of the electrical disconnect panel located at FS 237, which is a junction panel for seven wire bundles. The fuselage exterior also exhibited heat discoloration in an area beneath the lavatory service panel located between FS 237 and 256 and a soot trail that extended aft from the radio rack vent, located just aft of the lavatory service panel. Soot was also present throughout the forward cargo compartment and on the cabin outflow valve near the rear of the airplane. Further examination of the interior area between the forward cargo compartment and the fuselage revealed bluish stains (similar in color to lavatory rinse fluid) on sidewall insulation blankets and components near FS 237. No drip shield was installed above the FS 237 disconnect panel at the time of the accident, although support brackets for the drip shield were in place.²

¹ McDonnell Douglas Corporation is now known as Boeing, Douglas Product Division.

² To protect the connectors at the FS 237 disconnect panel from overhead fluid leakage, a drip shield was incorporated on DC-9 airplanes above the FS 237 disconnect panel beginning with fuselage line number 271, which

Damaged wiring was removed from the area around FS 237 and sent to the National Transportation Safety Board's laboratory for detailed examination. Beading was observed on the ends of many individual wires, which is consistent with heat damage from arcing. Each of the seven electrical connectors from the wire bundles was opened to determine its internal condition. One connector (P1/R5-1061) exhibited more thermal damage than the other six and contained light-blue and turquoise-green crystalline deposits on the mating surfaces of its two sides, as well as around nearly all of its pins. This connector also exhibited evidence of pin-to-pin shorts. Laboratory tests of the grommet material from this connector revealed elevated levels of sulfate (a basic chemical constituent in lavatory rinse fluid) as compared to undamaged grommet material.

Safety Board investigators examined the area around the FS 237 disconnect panel on another AirTran DC-9 and on two DC-9s of another operator. Although a drip shield was installed above the FS 237 disconnect panel on the AirTran DC-9, protecting the components directly beneath it, bluish dried stains were observed on many surfaces near the FS 237 disconnect panel on the AirTran DC-9, including the bulkhead at FS 218 and on the ducts, wiring, insulation blankets, and sidewall. Neither of the DC-9s from the other operator contained a drip shield over the FS 237 disconnect panel. Although no blue stains were observed on or near the area of the disconnect panels in these airplanes, many components were covered with a white, mottled substance, which suggests that a fluid other than lavatory rinse fluid may have leaked from above.

The Safety Board is aware of two incidents involving the military equivalent of the DC-9 that involved circumstances similar to the accident involving N826AT. On September 21, 1999, the flight crew of a U.S. Air Force C-9A observed the illumination of several warning lights followed immediately by numerous circuit breakers popping in succession. Details provided by the Air Force indicated that lavatory fluid had leaked beneath the lavatory floor, leading to shorting, arcing, and fire damage to electrical components in the area of the forward cargo compartment (a drip shield was installed above the FS 237 disconnect panel). The other C-9A incident occurred on May 26, 2001. As with the earlier event, the incident flight crew noticed several warning lights illuminate and heard circuit breakers popping. Investigation revealed damage to electrical components in the forward cargo compartment area due to shorting and arcing from fluid saturation (a drip shield was installed above the FS 237 disconnect panel on this airplane, as well).

According to Boeing's DC-9 maintenance manual, servicing the DC-9 lavatory waste disposal system consists of draining, washing, and flushing the waste tank and then recharging it by adding new rinse fluid. Boeing's DC-9 maintenance manual recommends that a minimum of 3.5 gallons of new fluid be added to waste tanks³ during lavatory servicing. AirTran's current servicing procedures, which were in place at the time of the accident, stipulate that at least 3.5 gallons but no more than 4.0 gallons of rinse fluid should be added when servicing the

included N826AT. N826AT was delivered with the drip shield installed, but it was not determined why the shield was not in place at the time of the accident. Of the first 271 DC-9s manufactured, 80 included a forward lavatory.

³ The forward waste tank, which is located above FS 237, has a capacity of 14 gallons. DC-9s also have an aft lavatory waste tank, which is not located above an electrical disconnect panel.

lavatory. However, at the time of the accident, neither Boeing's nor AirTran's procedures specified how to determine when the tank has been completely drained. Incompletely draining the tank can, over time, lead to an overflow of fluid onto the lavatory floor; the fluid can then migrate beneath the floor and onto components below, especially in areas where the floor panels are not properly sealed. Following the accident involving N826AT, AirTran revised its lavatory servicing procedures to emphasize the importance of completely draining the waste tank to avoid overflows.

As a result of the accident involving AirTran flight 956, Boeing issued Alert Service Bulletin (ASB) DC9-24A190 on July 31, 2001, to all operators of DC-9 airplanes. The ASB recommends that operators visually inspect the connectors at the FS 237 disconnect panel for evidence of lavatory rinse fluid contamination and that they install a drip shield over the disconnect panel. To prevent waste tank overflows, Boeing also issued Service Letter (SL) DC-9-SL-53-101 on March 22, 2002, to operators to stress the importance of properly sealing floor panels and adhering to lavatory servicing procedures specified in the DC-9 maintenance manual.

Findings in the Safety Board's investigation of the accident involving AirTran flight 956 highlight the hazards of lavatory fluid contamination of electrical components and the importance of shielding these components. Investigators' observations during their inspection of the area around the FS 237 disconnect panel on another AirTran DC-9 demonstrate that the connectors in this area would have been contaminated if not for the drip shield that was installed directly above them. Because all DC-9s are not equipped with a drip shield to protect the FS 237 disconnect panel from fluid contamination, the Safety Board believes that the Federal Aviation Administration (FAA) should require all DC-9 operators to visually inspect the electrical connectors at FS 237 for evidence of lavatory rinse fluid contamination and for the presence of a drip shield above the disconnect panel in accordance with Boeing ASB DC9-24A190. Connectors with internal contamination should be replaced.

In addition, to further address the hazards of fluid contamination due to improper lavatory servicing on DC-9 airplanes, the Safety Board believes that the FAA should issue a flight standards information bulletin to principal inspectors of DC-9 operators that discusses the circumstances of the accident involving AirTran flight 956 and stresses the importance of properly servicing and draining lavatory waste tanks and sealing floor panels in areas of probable fluid contamination, as indicated in Boeing SL DC-9-SL-53-101.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require all DC-9 operators to visually inspect the electrical connectors at fuselage station 237 for evidence of lavatory rinse fluid contamination and for the presence of a drip shield above the disconnect panel in accordance with Boeing Alert Service Bulletin DC9-24A190. Connectors with internal contamination should be replaced. (A-02-13)

Issue a flight standards information bulletin to principal inspectors of DC-9 operators that discusses the circumstances of the accident involving AirTran flight 956 and stresses the importance of properly servicing and draining lavatory waste tanks and sealing floor panels in areas of probable fluid contamination, as indicated in Boeing Service Letter DC-9-SL-53-101. (A-02-14)

Chairman BLAKEY, Vice Chairman CARMODY, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By: Marion C. Blakey
Chairman