Log 1706

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 12, 1984

Forwarded to:

Honorable Donald D. Engen
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-84-76 through -78

The National Transportation Safety Board has completed its investigation of the accident involving Air Canada Flight 797, which occurred on June 2, 1983, when an in-flight fire forced the flightcrew of the McDonnell Douglas DC-9 airplane to make an emergency landing at the Greater Cincinnati Airport. Upon landing, a flash fire occurred in the cabin. The five crewmembers and 18 passengers were able to evacuate the burning cabin; the remaining 23 passengers died in the fire. The Safety Board's investigation has determined that the fire propagated through the airplane's left rear lavatory, but was unable to identify positively the source of ignition.

The flight was en route from Dallas, Texas, to Montreal, Quebec, Canada, at flight level 330 (about 33,000 feet m.s.l.) when the captain and first officer became aware of an apparent electrical problem which had caused the three circuit breakers associated with the aft lavatory flushing motor to trip. The breakers would not reset, and the flightcrew took no further action immediately. About 10 minutes later, a passenger who was seated in the last row of the cabin asked a flight attendant to identify a strange odor. The flight attendant, believing that the odor was coming from the lavatory, opened the lavatory door a few inches. She saw that a light gray smoke had filled the lavatory but could not see flames. The smoke was sufficient to cause the flight attendant to become dizzy from inhalation, and she shut the door and immediately informed the flight attendant-in-charge. The flight attendant-in-charge proceeded aft with the CO_2 bottle and at the same time instructed another flight attendant to report the fire to the captain. The flight attendant's report to the captain, "Excuse me, there's a fire in the washroom at the back, they're just. . .went back to put it out," might not have accurately conveyed the severity of the problem and did not instill the level of concern in the flightcrew to cause them to take immediate emergency action. The captain apparently associated the report with the circuit breaker's tripping and this possibly misled him into believing that it was an overheated flush motor; however, the first officer, assuring himself that the circuit breakers were pulled, believed that the fire was probably in the trash receptacle. The crew properly agreed that the first officer should leave the cockpit immediately to evaluate the situation.

The flight attendant-in-charge had meanwhile opened the lavatory door and observed thick curls of black smoke coming out of the seams of the lavatory walls at the tip of the wash basin behind the vanity and at the ceiling. He did not see flames and he did not have protective breathing equipment immediately available to permit him to inspect the situation. Consequently, he discharged the CO_2 bottle, spraying it on the area from which the smoke was coming. He then closed the door and told the first officer, who was coming aft, that he had not been able to see the source of the smoke but did not believe that it was the trash receptacle and that he had discharged the CO_2 extinguisher and closed the door.

The first officer noting the smoke density went back to the cockpit to get smoke goggles and told the captain, "I can't go back now, its too heavy, I think we'd better go down." About 10 seconds later, however, the flight attendant-in-charge informed the captain, "You don't have to worry I think its gonna be easing up," and the first officer stated, "Okay, it's starting to clear now." The captain was not clearly told that the source of the fire had not been determined nor did he ask. Two subsequent reports from flight attendants, one of which indicated that the CO_2 bottle had been discharged and that the smoke seemed to be subsiding, probably added to the captain's belief that the situation was under control. About a minute and a half after this report, however, the first officer returned to the cockpit and told the captain, "I don't like what's happening, I think we better go down, okay."

About 4 minutes 30 seconds had elapsed between the time that the flightcrew was first alerted to the fire and their decision to begin an emergency descent. While an actual in-flight fire is an extremely rare occurrence, all reports of smoke in the cabin must be regarded as potentially serious. However, such reports often turn out to be smoke from waste ignited by a discarded cigarette in a trash receptacle designed to contain a fire, a condition which is normally identified and corrected by flight attendants without further consequence. Therefore, the Safety Board realizes that there is a desire to evaluate the situation before deciding upon the emergency action required. However, in this case, the time to make a decision appears to have been excessive given the circumstances. Most significantly, neither the flight attendant-in-charge nor the first officer was able to fix precisely the source of the fire or to assure that it had been extinguished. The Safety Board believes that a precautionary emergency descent should have been initiated as soon as it became evident that the fire had not been visually located and could not be attacked directly with extinguishant. This became known when the first officer came forward to get the smoke goggles, about 3 minutes before the decision to begin an emergency descent.

Further, the crew should have taken more positive action to gain access to the source of the fire. There was no attempt to use a portable oxygen bottle in conjunction with smoke goggles or mask or to use the crash ax in the cockpit to verify that the source of the smoke emanating from behind the lavatory vanity was, in fact, a fire which was under control. The flight attendant emergency procedures do refer to the use of the crash ax to penetrate panels to gain access to a cabin fire. Further, the flight attendant-in-charge stated that the proper method for using the ax had been demonstrated during training. However, the flight attendant also stated that he believed that he would have to destroy the whole lavatory and implied that he would be concerned about the proximity of essential airplane system components located behind interior panels. Any flight attendant training in the use of a crash ax should address the effects that its use might have on essential airplane system components. Further, those interior panels on which a crash ax could be used without risk should be readily identifiable to flightcrews and flight attendants.

The Safety Board was not able to determine the extent to which the flightcrew's delay in initiating an emergency descent for landing contributed to the accident consequences. However, an earlier decision could have resulted in the flight termination at Standiford Field, Louisville, Kentucky, about 3 to 5 minutes sooner than the landing at Cincinnati. The shortened exposure time of the passengers to the toxic environment in the cabin would undoubtedly have meant less degradation of their physical and mental capacity and would have enhanced their chances of successfully leaving the cabin before it was consumed by fire.

The Air Canada flightcrew and flight attendant training programs regarding response to cabin fires are typical of those of other air carriers, and this accident exemplifies the need to reassess the adequacy of those training programs.

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

> Require that Air Carrier Principal Operations Inspectors review the training programs of their respective carriers and if necessary specify that they be amended to emphasize requirements:
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> - for flightcrews to take immediate and aggressive action to determine the source and severity of any reported cabin fire and to begin an emergency descent for landing or ditching if the source and severity of the fire are not positively and quickly determined or if immediate extinction is not assured.
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> - for flight attendants to recognize the urgency of informing flightcrews of the location, source, and severity of any fire or smoke within the cabin.
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> - for both flightcrews and flight attendants to be knowledgable of the proper methods of aggressively attacking a cabin fire by including hands-on-training in the donning of protective breathing equipment, the use of the fire ax to gain access to the source of the fire through interior panels which can be penetrated without risk to essential aircraft components, and the discharge of an appropriate hand fire extinguisher on an actual fire. (Class II, Priority Action) (A-84-76)
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> Require that Airplane Flight Manuals, Air Carrier Flight Operations Manuals, and Flight Attendant Manuals be amended to include comprehensive discussions and illustrations showing the proper use of a fire ax and the locations in each model of aircraft operated where a fire ax can be used safely to gain access to a fire or smoke emission source. (Class II, Priority Action) (A-84-77)
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> Require that those interior cabin panels of transport category airplanes, including panels of the lavatories and galleys, which can be safely penetrated with a fire ax be identified by an acceptable and standardized means. (Class II, Priority Action) (A-84-78)

BURNETT, Chairman, GOLDMAN, Vice Chairman, BURSLEY, and GROSS, Members, concurred in these recommendations.

By: Jim Burnett
Chairman