

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: August 24, 1979

Forwarded to:

Honorable Langhorne M. Bond
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-79-62 through 66

During the Safety Board's investigation of the United Air Lines DC-8 accident at Portland, Oregon, on December 28, 1978, 1/ several problems were discovered which affected adversely the survivability of the aircraft occupants. The Board believes that these problems are not limited to this particular air carrier or to this particular aircraft; thus they may affect persons involved in future accidents.

Exits

Passengers probably opened all of the four overwing exits. The exit markings for these exits were affixed to the exit hatches. Federal Aviation Regulations (14 CFR 25.811) specify that exit markings must be recognizable from a distance equal to the width of the cabin; be visible to occupants approaching along the main passenger aisle(s); and be conspicuously marked. Although the intent of this regulation may have been met when the overwing exit hatches were in place, the opened exits were no longer marked after the hatches were removed and placed on the floor. Fortunately, the cabin emergency lighting system reportedly provided adequate illumination and there was no smoke inside the cabin to interfere with vision. However, had there been a failure of the cabin emergency light or had smoke been present, the occupants might have experienced difficulties in locating these four opened exits. The Safety Board believes that all cabin exit signs must be visible whether the exits are opened or closed.

Child Restraint

Among the 181 passengers and 8 crewmembers aboard this aircraft, there were 6 "infants-in-arms" (24 months or younger) and 6 children

1/ For more detailed information read "Aircraft Accident Report -- United Air Lines, Inc., N80820, Portland, Oregon, December 28, 1978, NTSB-AAR-79-7, June 7, 1979."

ranging in age from 25 months to 8 years. Two crewmembers and eight passengers, including two infants and one child, located in the forward portion of the aircraft were killed at impact.

The two fatally injured infants and the child probably would not have survived the accident regardless of the means of restraint because they were located in the destroyed section of the aircraft. However, one infant who was located in the forward left cabin was ejected during the crash and miraculously escaped injury. We know of no injuries to any of the remaining infants and small children on this aircraft. Nevertheless, the lack of adequate restraint for infants and small children on passenger-carrying aircraft is of great concern to the Board.

The Safety Board is encouraged to learn that the FAA is examining methods to restrain infants and children in order to prevent or to minimize injuries in survivable accidents. The recently issued report by the FAA's Civil Aeromedical Institute ^{2/} on the inadvisability of using automotive infant seats in aircraft vividly illustrates that much work remains to be done to develop a practical method of protecting infants and small children in survivable accidents. The Safety Board urges close cooperation between the FAA, the aviation and auto industries, and other Federal agencies in developing an effective, economical, integrated restraint system which will be compatible for use in surface vehicles as well as in aircraft.

Public Address System

There was no preimpact warning given to the passengers via the aircraft's public address system. Just before the aircraft struck the ground, the senior flight attendant was seen talking into the handset and then seen saying words to the effect that there was no power. Fortunately, other flight attendants looked outside and noted the airplane's proximity to the ground; they shouted to the passengers to assume the preimpact brace positions. However, it is not known whether all passengers heard these warnings.

The Safety Board's special study "Safety Aspects of Emergency Evacuations from Air Carrier Aircraft" dated November 13, 1974 (NTSB-AAS-74-3) contained a recommendation (A-74-111) to the FAA that the public address system be capable of operating on a power source independent of the main aircraft power supply.

^{2/} FAA AM-78-12 "Child Restraint Systems for Civil Aircraft," R. F. Chandler and E. M. Trout, Civil Aeromedical Institute, Federal Aviation Administration, Oklahoma City, Oklahoma, March 1978.

On September 11, 1975, the FAA, in NPRM 75-31, proposed to amend 14 CFR 121.318 to require after a certain date that public address systems be capable of being operated from a power supply independent of the main aircraft power supply. However, this proposed rule change was withdrawn, and it subsequently was submitted as proposal No. 452 in the FAA's Biennial Operational Review Program Notice No. 13 which solicited comments on proposed changes to 14 CFR 121.318. It is not known what form these proposed rules will take nor if the intent of the Safety Board's 1974 A-74-111 recommendation will be followed. The Safety Board urges early release of this Notice so that a suitable rule may be implemented as soon as possible.

Passenger Manifest

Just before the accident the flightcrew, on three separate occasions, discussed the total number of persons on board in response to queries from Portland Approach. The numbers that were discussed and those that were relayed to the ground were incorrect.

It was not until several days after the accident that the total number of passengers was known and a list of passenger names was made available. One problem which contributed to the delay was that infants were not considered as ticketed passengers and were not included in the passenger count. This same problem of determining the total number of passengers on board was also experienced following the American Airlines DC-10 accident at Chicago, Illinois, on May 25, 1979. The Safety Board believes that it is vital that fire/rescue personnel be provided with an accurate number of persons on board the aircraft so that their search for survivors will be timely.

The Safety Board notes that 14 CFR 249.13(e)(2) of the Civil Aeronautics Board's rules specifies that passenger lists shall be preserved by air carriers for a set period of time. Since these lists are required to be maintained, the Board believes that air carriers must make every effort to assure that they are accurate, whether or not the passenger is ticketed.

Our staff has learned that the FAA will soon issue a rule to require domestic and flag air carriers to maintain passenger lists like those currently required of supplemental air carriers and commercial operators by 14 CFR 121.693. We believe that the FAA and the Air Transport Association should jointly examine methods to develop a system that can be used by air carriers to record accurately the number of ticketed and nonticketed passengers onboard their aircraft and further, to develop a means to provide those numbers to fire/rescue personnel as expeditiously as possible following an accident.

Crew Coordination

The Safety Board determined that the landing gear malfunctioned about 1712 P.s.t. The surviving flight attendants recounted that shortly after the malfunction they began to review on their own initiative emergency procedures contained in their manuals. More than 1/2 hour later, at about 1745, the captain and the senior flight attendant discussed preparing the cabin and passengers for a possible emergency evacuation at Portland International Airport. Shortly thereafter, the captain requested via the public address system that the passengers pay attention to the flight attendants' instructions. About 1757, the second officer visited the cabin for a second time (he had done so earlier to observe the landing gear indicators in each wing). He returned to the cockpit about 1801 and informed the captain that the cabin preparations would be completed in 2 or 3 minutes. About 1803, the captain informed Portland Approach Control that they would be ready in 3 to 5 minutes; about 1806, the senior flight attendant came to the cockpit and told the captain, "Well, I think we're ready." Almost simultaneous with this comment the second officer said, "I think you just lost number four engine." The accident occurred about 1815. Thus, more than 20 minutes elapsed between the time that the captain discussed with the senior flight attendant preparations for the landing and the time he was informed that the preparations were completed.

The captain testified that he did not specify to the senior flight attendant a time when the prelanding preparations had to be completed, nor did he ask her how long the preparations would take. He said he thought that the preparations would take from 10 to 15 minutes and that some of the procedures could be completed during the aircraft's final approach to the airport. The senior flight attendant did not ask the captain how much time remained to complete the preparations. These omissions by the captain and the senior flight attendant were contrary to procedures contained in the flightcrew and flight attendant manuals.

The subject of communication and coordination between cockpit and cabin crews has been discussed by the Safety Board in previous accident reports. 3/ A recent FAA report also cites the lack of

3/ Aircraft Accident Reports:

"Overseas National Airlines, Inc., DC-9, St. Croix, Virgin Islands, May 2, 1970" (NTSB-AAR-71-8).

"Jugoslovenski Aerotransport (JAT), B-707, New York, New York, August 13, 1972" (NTSB-AAR-73-7).

"Overseas National Airlines, Inc., DC-8, Bangor, Maine, June 20, 1973" (NTSB-AAR-74-1).

"Continental Air Lines, Inc., B-727, Denver, Colorado, August 7, 1975" (NTSB-AAR-76-14). (Cont'd on P. 5)

communications and coordination as a problem during emergencies. 4/

The Safety Board on June 9, 1976, recommended (A-76-74) that the FAA issue an Air Carrier Operations Bulletin to require Principal Operations Inspectors to review emergency evacuation programs to insure that adequate emphasis is placed on crew coordination, team effort, and awareness of individuals' responsibilities as leaders of an evacuation. An Operations Notice was issued on October 1, 1976, which directed that training programs be surveyed and deficiencies corrected; this Notice was canceled on April 1, 1977. In view of the deficiencies uncovered in this accident, the Board believes that the necessity for each crewmember to understand unequivocally his/her mutually supportive role during emergencies is not being emphasized strongly in training. The Board believes that the FAA should issue an Air Carrier Operations Bulletin on this subject as was originally recommended in Safety Recommendation A-76-74. Likewise, accidents in which crew coordination and communication were deficient should be discussed by crewmembers during training sessions.

In view of the foregoing, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Issue an Air Carrier Maintenance Bulletin clarifying the content of 14 CFR 25,811(d) regarding the conspicuity of passenger emergency exit signs when exits are open and the requirement for exit signs to be relocated in aircraft which have signs affixed on the exit closure. (Class II, Priority Action)(A-79-62)

Expedite research with a view toward early rulemaking on a means to most effectively restrain infants and small children during in-flight upsets and survivable crash landings. (Class II, Priority Action)(A-79-63)

3/ (Cont'd)

Special Studies:

"Passenger Survival in Turbojet Ditchings (A Critical Case Review)," April 5, 1972 (NTSB-AAS-72-2).

"In-Flight Safety of Passengers and Flight Attendants Aboard Air Carrier Aircraft," March 15, 1973 (NTSB-AAS-73-1).

"Safety Aspects of Emergency Evacuations from Air Carrier Aircraft," November 13, 1974 (NTSB-AAS-74-3).


4/ D.W. Pollard, "Injuries in Air Transport Emergency Evacuations," Civil Aeromedical Institute, Federal Aviation Administration, Oklahoma City, Oklahoma, February 1979.

Expedite the release of Operations Review Program Notice No. 13 containing the Safety Board's 1974 recommendation regarding a power source for public address systems independent of the main aircraft power supply in passenger-carrying aircraft. (Class II, Priority Action) (A-79-64)

Include in the anticipated new rule a requirement for domestic and flag air carriers to maintain passenger lists with the proviso that both ticketed and nonticketed passengers' names be provided. (Class II, Priority Action) (A-79-65)

Issue an Air Carrier Operations Bulletin which will provide guidance and criteria to FAA Inspectors in determining the scope, quality, and effectiveness of training programs with respect to communication and coordination among crewmembers. (Class II, Priority Action) (A-79-66)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and GOLDMAN, Members, concurred in these recommendations. BURSLEY, Member, did not participate.


By: James B. King
per Chairman