

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

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ISSUED: January 20, 1982

Forwarded to:

Honorable J. Lynn Helms  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

SAFETY RECOMMENDATION(S)

A-82-1 through -3

The National Transportation Safety Board has completed its investigation of an in-flight accident involving a World Airways, Inc. DC-10-30 aircraft en route from Baltimore-Washington International Airport, U.S.A., to Gatwick International Airport, U.K., on September 19, 1981.

Evidence indicates that a flight attendant was leaning over and probably attempting to remove a service cart from the personnel lift in the lower galley when the lift started moving upward. The flight attendant became trapped between the top of the service cart in the galley personnel lift and the ceiling of the lower galley and as a result sustained fatal injuries.

On the basis of preliminary information, the Safety Board issued four (4) safety recommendations, A-81-124 through -127. As the investigation continued, additional safety hazards were identified which are discussed herein. 1/

Cart Retention Devices

Interviews with World Airways flight attendants and discussions with flight attendant associations revealed a serious problem with the cart retention system in the lifts. Numerous comments were received complaining of difficulties in releasing service carts from the restraining spool (mushroom) which is attached to the floor of both the personnel and cart lifts. At least two (2) incidents (both documented in the World Airways accident report) have occurred which resulted in serious injuries to flight personnel while they were attempting to free stuck carts from these mushroom devices. The Safety Board believes that the method for assuring retention of the carts, particularly in galley lifts, should assure freedom from jamming and ease of release by flight attendants.

1/ For a more detailed discussion, read Aircraft Accident Report—"World Airways, Inc., DC-10-300F, N112WA, Over North Atlantic Ocean, September 20, 1981" (NTSB-AAR-82-1).

### Lift Command Switches

There are three control panels which contain the up/down/stop command switches. The panels are positioned one each in the lower (lobe) galley, the service center, and inside the personnel lift.

The design of the circuitry for the lift command switches in the DC-10 allows a hazardous situation to result if the switches are used improperly. Proper operation is similar to the operation of elevator switches; depress then release. When the up or down command switch is properly operated, then depression of the stop switch will stop movement of the lift. However, if either the up or down switch is held in the depressed position, then operation of the stop switch has no effect and the lift will continue to move. While it would be reasonable for flight attendants to assume that the "stop" switch would override any up or down command to facilitate an emergency stop, the circuitry does not provide this safeguard.

The lift controls on other aircraft were also examined. The L-1011 lift control system is very similar to the DC-10 except its stop switch has priority over the directional control switches regardless of whether these switches are held depressed or not. The B-747 has no stop switch; only directional switches and they must be depressed and held in to maintain movement of the lift. Some carriers operate both DC-10's and B-747's with flight attendants who are qualified on both aircraft. In that case, there is a particular potential for the improper operation of the command switches in the DC-10. The Board learned that at least one carrier, after recognizing the potential danger of the standard DC-10 lift control circuitry, engineered changes to accord the stop switch priority over all other command switches. The Board believes that a similar change must be made in all DC-10 aircraft.

### Lift Door Interlock Switches

There are two (2) door interlock switches per door which are designed to prevent operation of the lift with the door open. Each switch is wired into an independent drive circuit. Normally both circuits operate; however, if loss of electrical power occurs in one of the two circuits, the lift can continue to operate at half (or partial) speed thus allowing continuation of food service. However, the system is not properly safeguarded. Present circuitry will allow the lift to operate at half speed even if one interlock switch is in the unactivated (door open) position. The Board believes that a door open signal from any interlock switch should be sufficient to prevent operation of the lift.

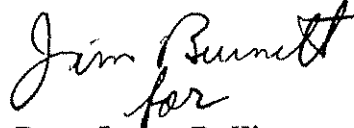
Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require the replacement of the "mushroom" cart restraint devices in the personnel and cart lifts in the DC-10 aircraft galley lift system with a nonjamming cart restraint system. (Class II, Priority Action) (A-82-1)

Require the modification of the switch circuitry in the DC-10 aircraft galley lift system to accord the "Stop" switch function priority over all other control switch functions. (Class II, Priority Action) (A-82-2)

In addition to requiring the relocation of the personnel and cart lift door interlock switches in the DC-10 aircraft galley lift system (A-81-126), require modification of the interlock circuitry to preclude energizing the drive system motors until both interlock switches on each of the galley lift doors have been actuated. (Class II, Priority Action) (A-82-3)

KING, Chairman, and McADAMS, GOLDMAN, BURSLEY, and BURNETT, Members, concurred in these recommendations.

A handwritten signature in cursive script that reads "Jim Burnett" with the word "for" written below it.

By: James B. King  
Chairman

