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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: February 7, 1974

Forwarded to:

Honorable Alexander P. Butterfield
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-74-7 thru 11

The National Transportation Safety Board's continuing investigation of the National Airlines DC-10 accident near Albuquerque, New Mexico, on November 3, 1973, has disclosed unsafe conditions in the passenger oxygen system, portable oxygen system, and cabin pressurization system. The Board believes that these unsafe conditions merit your immediate attention and the attentions of all air carriers which operate aircraft with this equipment.

When the aircraft lost a cabin window and the passenger cabin decompressed, many of the passenger's oxygen-generating units were activated. Three oxygen canisters came out of their mountings in the seatback oxygen compartment and fell onto passenger seat cushions. Two of these canisters, which become very hot when operating, scorched the cushions and burned fingers when seat occupants tried to remove them. The third reportedly caused a small fire. The canisters came out of their mounting brackets because of the pulling force exerted on either the initiation lanyard of the canisters or the oxygen supply hose. The Safety Board believes that these canisters constitute a potential fire and injury hazard when they are not retained properly in their mountings.

A subsequent inspection of a similar DC-10 aircraft at National Airlines' maintenance base in Miami, Florida, also revealed improperly mounted canisters. The improper mountings were a result of a slight distortion of the base plate and short mounting studs on the canister. Also, some of the oxygen supply hoses and the masks were improperly packaged. The Board

found that shortcomings exist in both the design of the mounts of these oxygen units and related maintenance and servicing practices.

Another unsafe condition exists in the storage and availability of the portable oxygen equipment aboard the DC-10 aircraft. Portable oxygen bottles are contained in enclosed cabinets near the cabin attendants' stations. The regulator assemblies were covered with cellophane-type wrapping which was held by an elastic band. K-S disposable oxygen masks and supply tubing were sealed separately in plastic bags and stored with, or near, the portable oxygen bottles.

Paragraph (4) of 14 CFR 25.1447 "Equipment Standards for Oxygen Dispensing Units" requires that portable oxygen equipment be immediately available for each cabin attendant. The Board questions the "immediate availability" of such equipment when it must be unwrapped and assembled before it can be used, considering the reduced time of useful consciousness at flight level altitudes.

A third condition which the Board believes merits your attention is the distinct possibility that separate pressure losses of different magnitudes may occur on the DC-10. Preliminary estimates suggest that the lower lobe galley and the adjacent cargo compartment of the subject aircraft decompressed faster than the main passenger cabin or the cockpit area. This theory is reinforced by the fact that the two cabin attendants in the lower lobe galley lost consciousness almost immediately after the decompression.

The Board's concern about the third unsafe condition is twofold:

1. The aneroid device, which detects unacceptable cabin pressure altitudes in the aircraft and causes the oxygen dispensing units to be deployed automatically in such cases, is located in the ceiling of the forward passenger cabin. It controls the deployment of oxygen masks in the entire aircraft. Therefore, if decompression occurred in the lower lobe of the aircraft, it might not be sensed by the aneroid device in the passenger cabin, and supplemental oxygen would not be available to the

occupants in the lower galley. This apparently occurred in the subject accident, and both cabin attendants in this section of the aircraft lost consciousness as they attempted to retrieve the portable oxygen bottles. The Board believes that such a situation can seriously threaten the safety of occupants of the lower galley.

2. Two portable oxygen units which were located in the lower lobe galley of the aircraft were stowed on the forward wall of the galley and outboard of the escape ladder. One bottle was fitted with a "full-face" smoke mask, which was sealed in a plastic container. The other bottle was the type which must be fitted with a supply hose and a K-S disposable mask before it may be used. Not only is the Board concerned about the time required to unpack parts for these units and assemble them, but it also believes that their location makes them virtually inaccessible when service carts are in their storage place in the galley.

Our staff has learned informally that some of the problems delineated above are being assessed by Flight Standards personnel of the FAA's Western Region to determine whether shortcomings in design and servicing exist.

The Safety Board is continuing its investigation and may make further recommendations regarding this accident. However, it believes that the safety of the traveling public requires immediate steps to prevent recurrence of the problems outlined above.

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

1. Require all operators of aircraft which contain individual chemical oxygen-generating units to inspect these installations to ensure that canisters are correctly installed in the mounts and that approved packing procedures have been followed for the supply hoses and oxygen masks.

2. Issue an Airworthiness Directive to require changes in the method of mounting these oxygen-generating units to eliminate the possibility of improper installation and inservice failures.

3. Issue a maintenance bulletin to verify operator compliance with the provision of 14 CFR 25.1447 regarding the immediate availability of portable oxygen units and the necessity of having supply hoses and masks attached to these units.

4. Issue an Airworthiness Directive to require aircraft certificated under 14 CFR 25, that each occupiable area, which is separated from others to such an extent that significantly different decompression rates can occur, is equipped with an aneroid device to detect pressure losses in that area.

5. Require a more accessible location for the portable oxygen units in the lower lobe galley of all DC-10 aircraft and relocate portable oxygen units in all other aircraft, where required, to ensure accessibility of portable oxygen units and compliance with the FAR's.

Personnel from our Bureau of Aviation Safety offices will be made available if any further information or assistance is desired.

REED, Chairman, McADAMS, and HALEY, Members, concurred in the above recommendations. THAYER and BURGESS, Members, were absent, not voting.

By: John H. Reed
Chairman

THESE RECOMMENDATIONS WILL BE RELEASED TO THE PUBLIC ON THE ISSUE DATE SHOWN ABOVE. NO PUBLIC DISSEMINATION OF THE CONTENTS OF THIS DOCUMENT SHOULD BE MADE PRIOR TO THAT DATE.