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Safety Study - Airline Passenger
Safety Education: A Review of Methods
Used to Present Safety Information

(U.S.) National Transportation Safety Board
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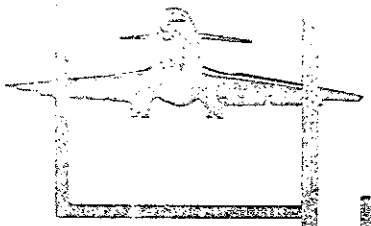
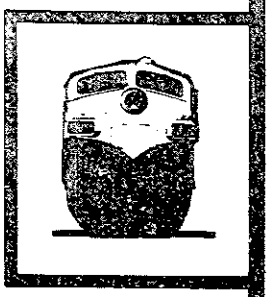


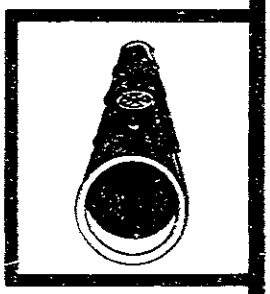
NATIONAL TRANSPORTATION SAFETY BOARD



WASHINGTON, D.C. 20594

SAFETY STUDY

AIRLINE PASSENGER SAFETY EDUCATION: A REVIEW OF METHODS USED TO PRESENT SAFETY INFORMATION



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16. Abstract

The Safety Board has had a long standing concern that some passengers onboard air carrier airplanes have contributed to their own injuries or deaths because they were not prepared to respond appropriately to emergencies. Safety Board accident reports, special studies, and related safety recommendations have shown that past and present means of conveying information on the use of safety equipment are not entirely effective. The preparation of passengers for emergencies depends mainly on flight attendant oral briefings and demonstrations before takeoff, the information contained on the printed briefing cards, videotaped safety briefings, and other instructions, sometimes given under the duress of the emergency itself.

This study provides a comprehensive review of accidents, Safety Board recommendations, earlier studies, the chronology of FAA rulemaking actions, and attempts by the industry to improve the passenger safety information. Additionally, the flight attendant oral briefings, demonstrations, safety cards and videotaped briefings are compared to FAA and industry recommended guidelines to determine how well these guidelines are being followed. This study represents a systematic review and comparison of the four briefing methods and makes subjective observations as to the apparent efficacy of each method. Twelve new recommendations are made to the FAA, and three to the airline industry.

Three previous recommendations are reiterated to the FAA.

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WASHINGTON, D.C. 20594

SAFETY STUDY

Adopted: October 25, 1985

AIRLINE PASSENGER SAFETY EDUCATION
A REVIEW OF METHODS USED
TO PRESENT SAFETY INFORMATION

INTRODUCTION

Federal Aviation Regulations require that oral safety briefings be given to passengers before all flights of U.S. air carriers and commuter/air taxis, and that safety briefing cards be available to all passengers. International Civil Aviation Organization Annex 6 Standards extend these same requirements to international flights. Videotaped safety briefings may be used in lieu of oral safety briefings and demonstrations.

Passengers often do not pay attention to the flight attendant's oral briefing and accompanying demonstrations, or to the video briefings, or they do not avail themselves of the safety cards. Accident experience has shown that, unless passengers make an effort to pay attention to pre-takeoff safety briefings and read safety cards, they are ill-prepared to act properly if an emergency situation arises. Airline passengers must be given effective safety information in a form that will invite their attention and that can be understood easily and used, so that they can be prepared to react properly to emergency situations such as turbulence and decompressions in flight and emergency evacuations following a crash.

As a result of the 1970 ditching of an air carrier turbojet airplane in the Carribbean Sea in which 23 of the 63 persons on board died, the Safety Board recommended that the Federal Aviation Administration:

> Collaborate with the Air Transport Association in the development of more effective methods for conveying safety information to passengers. Research should be conducted in the application of communication techniques, behavioral sciences, and optimum learning situations. The recent advances in audio-visual techniques should also be explored. (A-72-68)

Safety Recommendation A-72-68 prompted some actions, including the limited evaluation of a video presentation on cabin safety procedures for passengers aboard Federal Aviation Administration (FAA) airplanes. However, neither independent research nor government regulations resulted in significant or innovative changes to the basic methods of conveying safety information to passengers on air carrier airplanes.

The Safety Board's belief that the continued incidence of passenger education problems in accidents is of serious concern has led to this safety study. As an outgrowth of its participation in an air taxi/commuter accident investigation and in a foreign accident investigation, the Safety Board in 1983 again attempted to prompt increased activity regarding briefings within the FAA and industry by recommending that the FAA:

Sponsor a government/industry task force open to foreign participants made up of representatives from the airplane manufacturers air carrier and commuter operators, researchers, flight attendants, and consumers (1) to identify the type of safety information that is most useful and needed by passengers, (2) to identify and develop improved instructional concepts for conveying the safety information, and (3) to recommend appropriate changes to the operating requirements regarding passenger oral briefings and information briefing cards. (A-83-45)

This study provides a comprehensive review of Safety Board investigations, studies, and recommendations, Civil Aeronautics Board (CAB) studies and recommendations; the chronology of FAA rulemaking actions; and attempts within the industry to improve safety briefing methods. Each of these reviews provides a different perspective on the four methods of imparting safety information to passengers, i.e., oral briefings, demonstrations, safety cards, and videotaped briefings. These methods of passenger indoctrination are also reviewed with respect to such instructions as seatbelt and oxygen mask use and the location of emergency exits. Throughout, FAA and industry recommended guidelines are compared to determine how well these guidelines are being followed.

As part of this study, a survey was conducted of airlines, employee associations, and passenger groups to elicit their suggestions on ways to improve upon passenger acceptance of safety information briefings as well as ways to improve upon the manner of presentation and content of the information. Views also were sought on the merits of training passengers who fly frequently on air carriers to form a cadre of persons who could assist the airplane crew in the event of an emergency.

The study identifies problem areas, inconsistencies, and shortcomings in current methods. However, it does not attempt to present an indepth assessment of the adequacy of each method. Rather, it reports subjective observations as to the apparent efficacy of each method.

This study presents for the first time a systematic review of the efforts to improve the content and methods of providing safety information to passengers and places into historical perspective what has been done, what is presently being done, and what needs to be done to cause improvements.

The Safety Board believes that the findings of this study can reinforce further the need for a concerted government-industry appraisal of the methods of conveying safety information to passengers. Further, the Safety Board is more firmly convinced of the validity of its earlier recommendations to the FAA and that an appraisal should be initiated without further delay for both Part 121 and 135 operations.

Forty-six safety cards were examined. Variances were found in the style, content, and manner of presenting pictorial and printed information. Variances also were found in 10 videotaped safety briefings with regard to the type and the degree of detail of the information presented. In some instances, inaccurate information was given on cards and video briefings. Comparisons of 13 flight attendant oral safety briefings showed that, except for very few airlines, most briefings contain only the minimum information required by the FAA.

Three previous recommendations are reiterated to the FAA, twelve new safety recommendations are made to the FAA, and three new recommendations are made to the airline industry. These recommendations include researching passenger motivation, improving the understandability of safety information, publishing definitive guidance on the development of the safety cards and videotaped briefings, improving flight attendant training, and improving the training of FAA inspectors who are responsible for approving air carrier safety briefings.

BACKGROUND

Accident experience has demonstrated that apparent passenger indifference to safety information has led to improper action by some passengers during emergencies. Safety Board special studies have focused on maladaptive passenger behavior in emergencies as a result of (1) inappropriate or inaccurate information having been given to passengers; (2) passenger indifference to safety information; (3) the apparent belief by some passengers that they are somehow immune to injury; and (4) the rather universally held fatalistic belief that airplane accidents are not survivable and that passengers have no influence on whether they will survive an accident.

Since 1962, the Civil Aeronautics Board (CAB) and its successor, the National Transportation Safety Board (NTSB), have issued recommendations to the Civil Aviation Agency (CAA) and its successor, the FAA, addressing these problems. In the intervening 22 years, there have been few improvements by FAA or the airlines in the manner of presentation or in the effectiveness of passenger safety information. The exception to this is the relatively recent development of safety cards developed in accordance with human behavioral principles and the development of videotaped safety briefings.

Beginning in 1976, in testimony before subcommittees of the U. S. House of Representatives, the Safety Board has described the need for passengers to be more mindful of emergency procedures, as well as the need to bring home to passengers the message that they are responsible for their own survival if the cabin crewmembers are unable to assist during an evacuation or other emergency. Similar testimony also has been presented by the FAA, the airlines, airline employee associations, and industry experts on passenger safety briefings. In spite of experience in accidents, Safety Board recommendations, testimony before the Congress, and privately developed protocols to test and develop improvements in briefing methods, advances have been very limited.

Douglas Aircraft Company, the Society of Automotive Engineers (SAE), the FAA, and the International Air Transport Association (IATA) have published general guidelines for oral briefings, safety cards, and video briefings. These documents recommend <u>what</u> information should be included in the briefings, but, except in a few instances, do not recommend in great specificity, <u>how</u> the information is to be presented or portrayed. Further, these documents do not recommend (except in the case of the well documented Douglas controlled experiments) how to measure the effectiveness of the communication of information to demonstrate that naive subjects can understand the information and that once they understand, can use it correctly in an emergency.

A 1984 Gallup poll commissioned by the Air Transport Association (ATA) found that 70 percent of adult Americans (or about 117 million persons) had flown on commercial airliners in 1984 as compared to about 66 percent (or about 110 million persons) in 1983. The poll found also that 52 percent of all passenger trips were for pleasure or personal reasons, an increase of 3 percent over 1983. A second 1984 Gallup poll reported by Newsweek found that 65 percent of Americans who flew as passengers have no fear of flying, whereas 11 percent were frightened all the time, 3 percent most of the

time, and 21 percent only sometimes. 1/ The poll also found that 74 percent of passengers would accept higher fares to support the cost of additional safety features. Further, in response to the question whether persons would favor or oppose "more extensive safety instructions-even if it adds to flight time," 72 percent "definitely" favored it, 16 percent "probably" favored, 10 percent were opposed, and 2 percent did not know. The results of these polls show clearly that about 35 percent or about 41 million first-time and regular air passengers have some fear of flying, and that the majority of passengers favor better safety information even if it increases flying time and fares. The Safety Board believes that these figures demonstrate that passengers want airlines to improve the safety information briefings provided by airlines so that they are better prepared to act correctly in emergency situations.

The foregoing description of the problems associated with passenger acceptance and comprehension of safety information clearly showed that this study had to address several major issues, namely: previous efforts to improve briefing methods; human behavioral research into passenger acceptance of safety information; and, an examination of current methods of conveying safety information. This study had as its objective the compilation and review of previous efforts by the FAA and the airline industry to research and develop methods to improve safety information systematically. Although safety briefing methods used on Part 135 airplanes were not subjected to detailed examination in this study, the principles of conveying safety information to passengers are common to both Part 121 and Part 135 operations. Accordingly, the scope and findings of this study apply equally to all air carrier operations.

OVERVIEW OF SAFETY BOARD EFFORTS TO IMPROVE SAFETY BRIEFINGS

Accident Investigations and Safety Recommendations

Between 1962 and 1984 the Safety Board (and its predecessor, the CAB) investigated 21 accidents in which it was shown that the passenger safety information briefing was a factor influencing the survival of passengers. (See appendix A.) In these investigations, there were cases in which passengers were required to perform novel tasks in a short period of time during extremely stressful situations, i.e., inflight decompressions, evacuations following crashes both with and without fire, evacuations following planned water ditchings or unplanned water landings, and encounters with inflight turbulence. For example, 50 persons died from the effects of a post-impact fire in a DC-10 accident in Malaga, Spain in September 1982. The 50 fatalities were all seated in the aft section of the cabin and failed to use the right side aisle to move forward to available exits. The surviving passengers who were questioned indicated that the written and oral safety information was of little or no use to them during the emergency. They stated that the oral briefing was hard to hear and difficult to understand. In another incident a B-707 crashed short of the runway at Pago Pago, American Samoa in 1974. None of the crewmembers survived and only four of the 91 passengers survived. "Passenger inattentiveness to the pre-takeoff briefing and passenger information pamphlet" was cited by the Safety Board as one of the three major post-crash survival problems. In addition, problems with finding, donning, and inflating life vests have been identified in many accident investigations, including a B-727 unplanned water landing in Escambia Bay, Florida on May 8, 1978 and an L-1011 near-ditching off the coast of Florida in May of 1983.

1/ "Can We Keep The Skies Safe?" Newsweek, January 30, 1984.

Passengers' risk from injury or death in these accidents could have been reduced had they (1) paid attention to the flight attendant's oral safety briefings and demonstrations; (2) read the safety card to familiarize themselves with the location and operation of safety equipment; and (3) been better motivated and thus better prepared to act correctly during an emergency situation. The 12 accident case histories contained in appendix A vividly illustrate some of the more typical, recurring problems the Safety Board has found with passenger safety information. A review of these case histories has shown that not only were passengers ill prepared to act correctly, but that, in many cases, their actions were inappropriate or even contrary to instructions provided during flight attendant oral briefings-demonstrations and explained on safety cards.

From 1962 to 1985, the Safety Board issued 33 safety recommendations which addressed the content, accuracy, and effectiveness of the methods used to convey safety information to passengers. Of these, 28 were made to the FAA and the airline industry and the other 5, which concerned public address systems specifically, were made to the FAA. (See appendix B.) A recommendation issued in 1983 requested that the FAA sponsor a government-industry task force to examine the issue of passenger safety information and to take action to correct shortcomings. In response to these recommendations, the FAA informed the Safety Board that the Federal Aviation Regulations adequately addressed the issue, that a 1979 FAA sponsored research report adequately addressed passenger attentiveness, that two Advisory Circulars provided adequate guidance for safety briefings, that FAA inspectors who inspect and approve safety information had been provided with sufficient guidance to carry out their responsibilities, and that the Society of Automotive Engineers had published suitable guidance for safety briefings. In 1983 (and again in 1985) the Safety Board informed the FAA that nonetheless there was a problem, and that the FAA was not being responsive to the recommendation. The Safety Board believes that the FAA should be the catalyst for research on why passengers do not pay attention to safety information and if they do, why passengers may not understand and retain all the information which is presented. Furthermore, the Safety Board believes that the FAA should develop criteria and tests which can demonstrate that persons who represent typical airline passengers actually can perform in a timely manner the tasks which are described, such as donning life preservers, activating oxygen systems, and opening exits.

On March 22, 1984, in response to the Board's recommendation, the FAA informed the Safety Board that it was sponsoring a cabin safety seminar to be conducted by the Flight Safety Foundation to examine all issues which pertain to cabin safety, and specifically the topics of passenger safety information, briefings and the training of frequent air travellers to enable them to assist during emergencies. The Safety Board concluded that the FAA reply was not responsive, and reaffirmed its earlier classification of the recommendation as "Open—Unacceptable." A description of the FAA's cabin safety seminar which was held from December 11 to 14, 1984 appears later in this report.

The Safety Board's 1985 safety study titled Air Carrier Overwater Emergency Equipment and Procedures (NTSB/SS-85-102) recommended that the FAA amend 14 CFR 121,125, and 135 to include a demonstration of the correct life preserver donning procedures for all flights and not just "extended overwater" flights. (See appendix B.)

Special Studies and Special Investigations

Between 1966 and 1976, the CAB and the Safety Board published five special studies and special investigation reports on occupant survival (appendix C):

- "A Study of United States Air Carrier Accidents Involving Fire, 1955-1984"
- "Passenger Survival in Turbojet Ditchings: A Critical Review"
- "Inflight Safety of Passengers and Flight Attendants"
- "Safety Aspects of Emergency Evacuations from Air Carrier Aircraft"
- "Chemically Generated Supplemental Oxygen Systems in DC-10 and L-1011 Aircraft."

These CAB and Safety Board special studies showed that recurring problems had been encountered regarding safety information briefings which had impacted various kinds of mishaps or emergencies, i.e., inflight turbulence, decompression, evacuation, or water landings. While the circumstances of each incident varied, a common theme ran throughout--passengers often were ill-prepared to react properly either by their own choosing, because they had no information, or because the information they had was incomplete.

While some improvements have resulted from the special studies, most notably with regard to the use of supplemental oxygen systems and the use of life preservers, there remained unresolved the Safety Board's recommendation to the FAA and the industry for a systematic examination of the entire issue of passenger safety briefings. Thus, it is clear that the several attempts by the Safety Board since 1962 to cause the FAA and the airline industry to improve safety briefings have not resulted in measurable progress to improve passenger attention to safety briefings or to improve the content and presentation of the briefings.

Safety Board Survey

In a questionnaire dated June 7, 1984, the Safety Board requested Part 121 and 135 U.S. air carriers, airline employee associations, and passenger organizations to provide comments and suggestions on present briefing techniques, the training of frequent air travellers in emergency procedures, and improvements in briefing methods. (See appendix D for letter.)

Out of 93 questionnaires mailed, 12 responses were received. They included the Air Transport Association (ATA) and the International Air Transport Association (IATA), who replied on behalf of 135 major air carriers worldwide, 5 airline employee associations, 1 international passenger association, 1 ATA and 1 non-ATA member airline, 2 regional-commuter airlines, and 2 aviation safety consulting firms.

Comments received in response to the questionnaire included the following: the present oral briefings are adequate, but passenger attention is lost because of the length of the briefing; the briefing is inadequate because passengers do not listen. One employee association responded that it "recognizes that some passengers do not pay attention to the briefing" but it is their belief that "many passengers do not want to think about accidents and choose to ignore this possibility."

To the question "should passengers be made more familiar with emergency equipment?" some responded that this might make passengers think they were responsible for their own safety, causing a loss of discipline in the cabin and thus endangering the

safety of other passengers, and that such familiarization could not be achieved without operational and economic penalties. To the question "should passengers be trained in safety procedures?" some responders felt that passengers should be trained because flight attendants have become incapacitated during accidents and passengers have had to open exits; that an elective training course for passengers might be appropriate; and that non-flying airline employees could be trained since they are frequent travelers. Others believed that evacuation procedures should be left to an adequate staff of professionals, i.e., flight attendants. Although there was little enthusiasm among most responders for training frequent air travellers in cabin safety, there was a positive reaction generally for more effective passenger education.

Several suggestions were made for improving passenger briefings. These included the following: advise passengers to count the number of seat rows between exits; design universal or more explicit briefing cards; provide videotaped safety briefings in the boarding lounges or onboard the airplane; conduct a pre-landing briefing; place greater emphasis on the location and operation of exits and overwater equipment; use passengers on an impromptu basis during the briefing to hold the attention of passengers; and conduct periodic surveys to determine if passengers adequately understand briefings. Most responders agreed that if the passengers' attention could be held during the briefing, their involvement would be broadened.

Responders agreed that specialized briefings for the handicapped are not only needed, but are required by the FAA, and that presently there are specialized techniques for briefing handicapped passengers. The question regarding improvements of briefings for non-English speaking passengers brought out two points: these passengers should be identified to the flight attendants, and they should be pre-boarded.

CONGRESSIONAL HEARINGS ON THE ISSUE OF PASSENGER SAFETY INFORMATION

Since 1976, Subcommittees of the U.S. House of Representatives have explored many facets of commercial air carrier safety and, in particular, the interrelationship of the many factors which can affect the postcrash survival of crew and passengers. 2/

2/ Hearings before the Subcommittee on Investigations and Review of the Committee on Public Works and Transportation, U.S. House of Representatives:

a. 94th Congress, Second Session, February 3, 4, and 5, 1976. Volume II "Aircraft Cabin Environment."

b. 95th Congress, First Session, July 12, 13, and 14, 1977. "Aircraft Passenger Education - The Missing Link in Air Safety."

c 96th Congress, First Session, April 25 and 26, 1979. "Interior Compartment Materials."

d. 96th Congress, Second Session, June 3, 4, and 5, and September 10, 1980. "Cabin Safety: SAFER Committee Update - Aircraft Passenger Seat Structural Design."

e. 98th Congress, Second Session, July 26, August 1, 2, 1984: "Legislation to Improve Airline Safety."

During a 1978 hearing the Director of the FAA's Civil Aeromedical Institute (CAMI) testified that CAMI did not have the expertise to conduct research on passenger behavior or to evaluate the adequacy of safety briefings. The FAA's Director of Flight Standards Service testified that as a result of the FAA's First Biennial Operations Review in 1975, Notices of Proposed Rulemaking (NPRM) had been issued addressing improvements in passenger safety information. 2/ Seven NPRMs eventually were issued and three resulted in amendments to 14 CFR 121 in regard to operation and demonstration of seatbelts and location and operation of flotation equipment. (See appendix E.)

At a 1977 hearing the Safety Board testified that approximately 30 percent of the persons killed in survivable or marginally survivable accidents between 1967 and 1976 could have survived had they been provided adequate crash protection. The Board pointed out that post-accident survival depends upon the passengers' knowledge and ability to use unobstructed escape routes and their ability to retain and act upon safety information provided during briefings and demonstrations and on safety cards. The Board testified that it sensed a reluctance by the industry to provide safety briefings in the most effective manner, and that strong leadership by the FAA was necessary to bring about improvements. 2/

The FAA Administrator testified at the 1977 hearing that safety briefings and safety cards are evaluated and approved before they are used in service, and that FAA inspectors continually review the cards and flight attendant's oral briefings during their enroute inspections. The FAA Administrator reassured the subcommittee that they continually examine the "adequacy and the correctness" of the information contained on safety cards. He also stated that a January 1977 review of air carrier training programs had resulted in the issuance of an Advisory Circular which provided guidance on information to be placed on safety cards, and that a second Advisory Circular had been issued on safety briefings for handicapped passengers.

The Subcommittee was told that the FAA had considered videotaped safety briefings in a trial program at some gates at its Washington National Airport; however, providing general safety information for several different kinds of airplanes proved difficult and some airlines had resisted the idea. Because the FAA lacked the airlines' cooperation for the trial program, videotaped briefings were not instituted.

In 1979, the Safety Board testified regarding accidents in which persons, even though they were uninjured, did not escape from burning airplanes. The Safety Board expressed its concerns about inadequate passenger briefings and passenger preparedness to cope with emergencies. During these same hearings, the FAA Administrator testified that more attention had to be devoted to help people survive such accidents and that the FAA had undergone organizational changes which "should bolster our efforts to improve cabin safety." 2/

House Committee hearings in 1980, 1983, and 1984 again addressed passenger briefing in varying degrees. During these hearings, the Safety Board reiterated its concern about the adequacy and the effectiveness of current safety briefing methods and the lack of meaningful initiatives by the FAA and the airline industry to find methods of improving the attentiveness of passengers to the briefings, the content of the briefings, and the manner in which the briefings are presented.

In 1984, the Safety Board testified that the FAA had failed to act favorably on its recommendation to convene a government/industry task force. The Board pointed out that current research and technological advances indicated that new instructional design

[illegible] experiences had [illegible] and that significant problems [illegible] in passenger [illegible] awareness were not improved. The Board identified that the problems associated with passenger safety education had to be addressed in a systematic program to determine exactly what and how much information needs to be presented to and can be assimilated by the flying public, and how best to present the information to improve comprehension and retention. 2/

BEHAVIORAL CONSIDERATIONS FOR CONVEYING SAFETY INFORMATION TO PASSENGERS

Behavior of Passengers

As early as 1952, the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders listed the term "Civilian Catastrophic Reactions," under the heading of "Gross Stress Reactions." At that time it was determined that the key feature of gross stress reaction was a temporary personality disorganization wherein the individual was, for the time being, overwhelmed and incapable of gathering his/her resources together to cope with a situation. The most acute and disrupting reactions were likely to occur when the victims had a history of instability or immaturity, when prior traumas had made them sensitive to anxiety-provoking experiences, or when catastrophic events took place with little or no warning or preparation. 3/

In 1956, the National Academy of Sciences found that, although stress reactions varied widely from person to person, significant common behavior was seen in which persons failed to react to an emergency. This finding then led to defining a three-stage "disaster syndrome." 4/ It also was found that "reducing the novelty of passenger responses necessary to evacuate an airplane and/or increasing leadership during emergency situations on board airplanes," modified the "disaster syndrome" behavior and passengers could be motivated to escape. 5/

Experiments by Berkum et. al. presented briefing card information to three groups of subjects. Subjects in group 1 took off in an aircraft, were informed during the flight that they would have to perform an emergency ditching operation, and were then tested in flight on the briefing card information. Subjects in group 2 took off in an aircraft, were not informed of any emergency, but were tested inflight on the same information. Subjects in group 3 remained on the ground but also were tested. Time between information presentation and testing was the same for all groups. Results showed that group 1 performed significantly worse than group 2, and group 2 performed significantly worse than group 3. Essentially, the group who would most need the information was the least able to recall it. 6/

3/ "The Encyclopedia of Human Behavior," R. M. Goldenson, ed., Vol. I, Doubleday and Company, New York, New York, Page 211, 1970.

4/ "Emergency Medical Care in Disasters: A Summary of Recorded Experiences," Disaster Study No. 6, J. W. Roher, A.F.C. Wallace, J.F. Raymer, National Academy of Sciences, National Research Council, Publication 457, Washington, D.C., 1956.

5/ "Just In Case: A Passengers Guide to Airplane Safety and Survival," D.A. Johnson, Plenum Press, NY, 1984.

6/ "Experimental Studies of Psychological Stress in Man", M.M. Berkum, H.M. Bialek, R.P. Kern, Psychological Monograms of General and Applied Psychology, Vol. 76, No. 15, 1962.

concepts could be employed to enhance communication and retention of safety information; that accident experience had illustrated the inadequacy of current methods used to brief passengers; and that significant problems would continue if passenger briefings and awareness were not improved. The Board testified that the problems associated with passenger safety education had to be addressed in a systematic program to determine exactly what and how much information needs to be presented to and can be assimilated by the flying public, and how best to present the information to improve comprehension and retention. 2/

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6/ "Experimental Studies of Psychological Stress in Man", M.M. Berkum, H.M. Bialek, R.P. Kern, Psychological Monograms of General and Applied Psychology, Vol. 76, No. 15, 1962.

During the 1970's the Douglas Aircraft Company (Douglas) of the McDonnell-Douglas Corporation examined several maladaptive behaviors which had been exhibited by passengers during emergency situations as well as practical methods to modify these behaviors. One study conducted by Douglas found no data to refute or to support the apparent assumptions that if safety instructions are read or listened to, passengers will understand them, or that even if the instructions are understood, the flying experience itself may have a negative or inhibiting effect on remembering and following the instructions. 7/ Douglas found that little prior research had been conducted to examine what precedes or causes behavioral inaction, under what condition it occurs, who is likely to manifest it, or how it can be controlled.

Douglas research of accounts of surviving passengers showed that the four common responses to an extremely stressful situation are (1) strengthening of resources, (2) attacking the threat, (3) avoiding it, or (4) remaining inactive. In the case of aircraft emergencies, the most common of these four responses is inaction. To explore this type of maladaptive behavior, experiments were designed to gain insight into possible ways to correct this behavior by testing the reaction of subjects in a simulated emergency situation with emotional and physical stressors. 8/ Experiments indicated that the subjects' inaction did not result from the induced stressors (noise and pain), the situation itself, or combinations of stressors and situational environment, but was caused by the novel responses the subjects had to perform in the shortest possible time. This finding agreed with much earlier behavioral research by others which showed a relationship of behavioral inaction to the lack of leadership provided to the subjects as well as to the subjects' lack of education (information) of their expected appropriate actions.

In Douglas' experiments safety cards, videotaped briefings and flight attendant oral briefings were tested to determine how well naive persons could understand the information and then perform the tasks in an emergency situation. Based on its finding that passengers must be provided emergency information which is easily understood and readily remembered, Douglas proposed three methods that passengers' maladaptive behavior can be corrected or inhibited: (1) by trial and error, (2) by training or providing instruction, or (3) by crewmember situational leadership.

An example of trial and error would be repeated attempts by naive passengers to don life jackets, or to try to start the flow of supplemental oxygen and then to don their oxygen masks. The trial and error method obviously is not appropriate when time-critical responses are necessary. Correcting maladaptive behavior by training or providing passengers information for the correct behavior response relies upon passengers paying attention to oral briefings and demonstrations, reading and understanding the safety card, and reading and understanding the instructional placards and signs placed throughout the cabin and on emergency equipment. This form of passenger education increases the awareness of passengers and thus increases the probability of their acting quickly and appropriately in an emergency situation.

7/ "Behavior of Aircraft Passengers Following Survivable Aircraft Accidents: Behavioral Classifications," McDonnell-Douglas Report JO874, June, 1971.

8/ "Behavioral Inaction Under Stress Conditions Similar to the Survival Aircraft Accident," D.A. Johnson, Ninth Annual SAFE Symposium, September, 1971.

The third method, crewmember situational leadership in an emergency situation, is not always possible and may rely upon passengers to be aware of the correct behaviors so that they are prepared to act correctly without assistance. Douglas found that crewmember leadership combined with passenger information is more effective than either of the two methods alone.

Given the typical behavioral response of passengers to emergency situations, it is evident that the content of the briefing material must be clarified to the greatest extent possible, so that passengers know what is expected of them in an emergency. In aircraft emergencies passengers must (1) be prepared to act in the face of the confusion which exists in a post-accident setting, (2) perform novel responses, such as opening emergency exits, and (3) act under conditions which may pose physical threat for incorrect responses or inaction. 9/ Additionally, while passengers must respond under extreme stress, the stress itself acts as an inhibitor to memory. 10/

In an airplane environment passengers are passive participants who, for the most part, are unaware of "why" the safety information that they are given is important. As accident investigations have pointed out, the pre-takeoff briefing is often the only safety information they will receive in the event that there is an accident. Further, during the pre-takeoff briefing, passengers are advised to seek out and read the briefing card.

A 1970 study found that persons believed that safety information need only be assimilated during an actual emergency situation. This belief may be reinforced by the introduction of some briefings which began with statements, such as "In the unlikely event of an emergency . . ," or "The FAA requires us to tell you . . ." The study concluded that more research must be aimed at finding ways to encourage the passenger to pay attention to the flight attendant's briefings and to read the emergency instruction card. Methods, such as stronger, more positive directives from the flight attendant (or perhaps the captain) may increase the passengers' attention. The study suggested that it would be beneficial if passengers thought it was socially acceptable to read the card and pay attention to the emergency briefings, and socially unacceptable to do otherwise. 11/ In 1971, the McDonnell-Douglas study 12/ reported that the assumption that explicit emergency evacuation instructions in a preflight briefing would cause anxiety among passengers was contrary to fact. Rather, a large majority of passengers said that they would like to be told of emergency equipment and procedures, and that the standard emergency briefing did not adequately provide this information. Thus, the current practice of trying not to make the passengers anxious may have actually been a deterrent to motivating passengers. It also was shown that persons become anxious when they are placed in fear-producing situations that have not been explained to them. To allay passenger fears, safety precautions, if explained properly, can reduce anxiety. While some percentage of passengers may become anxious when safety information is presented, research has found that a little anxiety can be beneficial because it increases the persons' attention and the attractiveness of the information. Further, passengers have probably reached a very low level of anxiety already just by being on the airplane. They can thus be more attentive to receiving safety messages. 13/

9/ "Passenger Emergency Briefing Cards: Recommendations for Presentation Style," H.B. Altman, D.A. Johnson, D.I. Blom, Eighth Annual SAFE Symposium Proceedings, Vol. 2, pp. 455-474, 1970.
10/ Op. cit. footnote 5.
11/ Op. cit. footnote 9.
12/ Op. cit. footnote 7.
13/ Op. cit. footnote 2.

Research and Briefing Methods

A 1970 study found that safety cards should have a minimum number of descriptive words and where a sequence of actions is required, two or more numbered pictures of good quality should be used with large print. The study further found that an oral briefing with accompanying demonstrations "can produce better retention than the (safety) card alone." 14/ Also, a passengers' understanding of the safety information can be maximized when they are told what not to do as well as when they are told what to do. 15/ It was further shown that passengers must know four basic behaviors regardless of the model of airplane they are in: use of the seatbelts, use of the oxygen system, use of the life vests, and use of the brace positions.

Two firms develop safety cards for airlines in a systematic manner to improve their understandability; however, some airlines continue to develop their own cards which contain confusing and incomplete information. The Interaction Research Corporation (IRC), which was founded in 1973, provides safety cards to many U.S. and foreign airliners. Pentastar Aviation, Inc., a subsidiary of the Chrysler Corporation, has developed safety cards for several corporate and air taxi/commuter aircraft. These firms develop safety cards using an iterative process whereby naive subjects are shown prototype cards and then are asked to explain their interpretation or understanding of the information presented. After it has been shown that the instructions are understood, the subjects are further tested on their ability to carry out the instructions. Depending upon the behavior of the subjects, the safety cards may be revised further and the instructions again tested until an optimum card is developed. Sometimes the addition of color or close-up illustrations can be used to gain a significant improvement in the effectiveness of the information as well as in the subjects' understanding. IRC found improvements in understanding of certain safety equipment, such as the oxygen system and lifevests, with the use of color illustrations. The Safety Board believes that this kind of systematic method of designing safety cards is far preferable to cards which may be developed by airlines and which, although they may be technically accurate, may present information which a passenger may not comprehend entirely.

Altman et. al. reported the findings of two studies to improve briefing cards. 16/ One study examined presentation methods used by airlines to determine the most and least preferred styles for each topic on the cards. The second study validated the ranking method used in the first study. As a result, the following guidelines for the design of emergency information cards were presented:

1. A picture accompanied by a minimum number of descriptive words is preferable to a picture with a large number of descriptive words, a picture by itself, or words by themselves.

2. A realistic, understandable (self-explanatory) picture of good quality is preferable to an abstract drawing.

14/ "Experimental Evaluation of Aircraft Emergency Information Card Content and Presentation Format," McDonnell-Douglas Report JO 0735, April 1970.
15/ "The Design of Effective Safety Information Placards," McDonnell-Douglas Report HFE-022, August, 1980.
16/ Op. cit. footnote 9.

3. Where a sequence of actions is called for, two or more numbered pictures are desirable.

4. A simple, uncluttered, systematically organized card format enhances acceptance by the reader.

He concluded that "further studies should be aimed at determining the information passengers need to know and the best educational approach in the delivery, such that retention of required information is enhanced. In addition, methods must be established which increase the passenger's acceptance of emergency information."

Other research into the design and empirical evaluations of safety cards showed that when pictorial illustrations were used, two significant variables were present: color versus no color and photographs versus artist illustrations. No statistical difference was found between color photographs and color illustrations and both were more effective than if they had been black and white. Black and white photographs were more effective than black and white illustrations. Color was found to be especially important for certain kinds of instructions, such as operation of the supplemental oxygen system, donning and inflating life vests, and the direction to which exit door handles were to be turned.

With regard to the donning of life preservers, Douglas found no significant difference between the use of photographs and color illustrations. However, the illustrations were slightly more understandable and effective because the illustrator was able to highlight certain important features which was not possible with photographs. Color photographs which showed persons donning life preservers were better than black and white photographs.

A slight but less obvious change in safety cards, combined with flight attendant verbal instructions, markedly improved on the use of emergency evacuation slides. Tests were conducted to determine if safety card improvements would increase the flow of persons per slide and thus decrease the time to evacuate the airplane. It was shown by Douglas that the evacuation rate could be increased by adding the instructions "JUMP, DON'T SIT" to the safety card and by having the flight attendant shout "JUMP" at each exit. These instructions were effective in preventing persons from sitting at the top of the slide, and subsequently have been incorporated on safety cards and in flight attendant evacuation instructions.

Oral safety instructions must be clear, concise, readily understood, and unambiguous. It is well known from the behavioral aspects of communications that sometimes what is said by one person is totally misunderstood by another. The speaker may intend the message to convey one thing and the listener may hear the message clearly, but, because almost all words can have many different meanings, the intent of the message can be misinterpreted; this behavior is referred to as "bypassing." 17/ Relaying clear, concise instructions can be particularly critical during the pre-flight safety briefing since many instructions are given in a short time, and at a time when passengers are subject to many distractions in the cabin.

17/ "The Fatal Gap: Bypassing," Human Factors Bulletin published by the Flight Safety Foundation, March-April, 1975.

As for oral announcements during inflight emergencies, a 1976 study found that automatically activated, tape-recorded verbal messages would be effective in instructing passengers how to use the supplemental oxygen system after a decompression. 18/

At the 1977 Congressional hearing, IRC reported that it had not conducted any systematic research into passenger acceptance of the effectiveness of videotaped safety briefings and mockups of emergency equipment in airline terminal boarding areas. IRC acknowledged that the briefings would need to include possibly several makes and models of airplanes because different airplanes may use a single boarding gate. 19/ Studies conducted by Douglas of videotaped safety briefings for use in airplane cabins showed that video instructions for the donning of life vests were 40 percent more effective in reducing the time to don vests than either safety briefing cards or flight attendant oral instructions accompanying a demonstration. Close-up and "zoom" camera techniques provided much more information than was possible with safety cards or demonstrations. 20/ Douglas also found that it was not necessary to explain to the passengers the reasons for the safety briefing during the video briefing in order for them to understand the safety instructions. The importance of this finding was that comprehensive video briefings could be produced in less time than if such reasons had to be provided. 21/

Crewmember Behavior

Paramount to a passenger's acceptance of safety information is the passenger's degree of belief in and acceptance of a flight attendant's professionalism. 22/ The term "professionalism" implies that a flight attendant exudes, by virtue of behavior, deportment, attitude, and appearance, the attitudes which can cause a passenger to accept with credibility the safety information provided. This is true not only in emergency situations but also during routine tasks, such as boarding passengers, overseeing that cabin carry-on luggage is properly stowed, and presenting pre-takeoff safety briefings. It is clear that flight attendants, probably more than any airline employee, have a direct influence on passenger acceptance of safety information and that they provide leadership on cabin safety matters. Establishing this leadership role can take place as soon as passengers board the airplane by establishing eye-to-eye contact with each passenger and maintaining it during the safety briefing/demonstration. Also, during boarding and pre-departure cabin inspections, the flight attendants can note the location of able bodied passengers, off duty crewmembers, and other airline employees who would be assigned duties during non-routine or emergency situations. Some flight attendant training programs include assertiveness training to assist in developing leadership skills which may be necessary during non-routine situations or emergencies. However, most air

18/ "Effectiveness of Spoken Instructions on Passenger Use of Oxygen Masks," McDonnell-Douglas Report JO 7098, February 1976.
19/ Op. cit. footnote 2.
20/ "Effectiveness of Video Instructions of Life Jacket Donning," McDonnell-Douglas Report J5936, April 1973.
21/ "Video Tape Presentations of Passenger Safety Information," McDonnell-Douglas Report 6393, October 1975.
22/ "Cabin Crew Safety Bulletin" published by the Flight Safety Foundation, July-August, 1984.

carrier flight attendant training programs do not provide leadership training or training in passenger behavior; this is unfortunate because these topics could be most beneficial and result in more effective safety briefings by the flight attendants, as well as helping them identify those passengers who could assist during emergencies. 23/

During 1974 and 1975 in a series of Flight Safety Foundation (FSF) articles by Mason, 24/ various personalities of passengers were classified to illustrate to flight attendants the wide range of behaviors which must be considered when any kind of safety instructions are given to passengers, as well as the behaviors which may be exhibited by passengers in emergency situations. Human behaviorists have suggested that variations in human behavior also could be included in flight attendant training to further prepare them to recognize those passengers who may be of assistance and those passengers who may exhibit maladaptive behaviors in stressful situations. This type of training may also serve to illustrate some reasons why passengers may or may not pay attention to safety briefings and thus provide insight to flight attendants and airline managers into possible methods of improving the passengers' attentiveness to the briefings.

The pre-takeoff oral briefing is most commonly performed by the senior flight attendant or the purser, irrespective of the person's public speaking abilities or talents. Thus, in some cases, the person with the least command of a language or the poorest comportment in front of an audience may be designated to present the briefing, which may not be in the best interest of the passengers. An additional consideration in this method of designating who will perform the briefing lies in the attitude which often results from having to perform a repetitive task. Enthusiasm for the briefing may diminish, particularly since passenger attentiveness in the form of positive or reinforcing feedback, is often lacking during the presentation. This practice can also result in attendants memorizing the announcements and thus possibly forgetting information or presenting information occasionally out of sequence and causing the accompanying demonstrations to be misplaced and out of sequence. This situation can lead to or further reinforce passenger perception that the attitude among the flight attendants is uncaring or unprofessional. This, of course, is not to say that the presentation is necessarily the only cause of passenger inattentiveness since there are many distractions for passengers during preparation for takeoff.

Flight attendant oral briefings can be minimally effective when the briefings are hurried because of short taxi distances and expedited takeoff clearance, and thus, cockpit crewmembers should be sensitive to the time required to complete the briefings. 25/ The cockpit crewmembers also should be aware that their professionalism and attitude can be a determining factor in whether passengers accept positively safety announcements. One suggestion that was made in 1975 by a senior airline captain was that the captain should make an announcement, preferably before takeoff so that the passengers can identify his/her voice as the captain and may thus be "more likely to follow instructions" in the event of an emergency. 26/

23/ Op. cit. footnote 2.
24/ "Problem Passengers 'A through Z'," Cabin Crew Safety Bulletin, published by the Flight Safety Foundation, 1974 through 1975.
25/ Op. cit. footnote 2.
26/ "Safety Management from the Cockpit," Flight Safety Foundation, September/October 1975.

OVERVIEW OF INDUSTRY EFFORTS TO IMPROVE SAFETY BRIEFINGS

Society of Automotive Engineers

The Society of Automotive Engineers (SAE) in 1955 formed the S-9 Cabin Safety Provisions Committee to explore and to develop guidelines for improvements in seat restraints, emergency evacuations, and decompressions. The S-9 Committee has issued numerous Aerospace Recommended Practices (ARP) to guide, on a voluntary basis, airframe manufacturers, suppliers, and airlines on the design and operation of cabin and flight deck emergency equipment and of other systems related to the survival of airplane occupants.

In 1976, the S-9 Committee issued ARP 1384, entitled "Passenger Safety Information Cards"; the ARP was subsequently revised in September 1983. The ARP is intended to aid in providing information on designing standardized safety cards for commercially operated airplanes. It includes information on the design and content of the cards, and sets forth nine minimum standards for portraying the location and operation of equipment and four additional standards which apply to cards carried on airplanes used for extended overwater flights. (See appendix F.) Although the ARP is available to U.S. and non-U.S. air carriers, it is not known how widely it is used in guiding the development of safety cards. However, the FAA used the ARP and other materials as a basis for its Advisory Circular (AC-121-24), "Passenger Safety Information Briefing and Briefing Cards." (See appendix G.)

A draft of an Aerospace Information Report (AIR) which would have provided guidance on testing safety cards was rejected by the S-9 Committee. The AIR proposed that persons, representative of typical air carrier passengers (that is, those unfamiliar with the airplane or equipment) be tested to demonstrate first, that they understood the information portrayed on safety cards, and second, that they could perform successfully such tasks as opening exits and donning oxygen masks. The major objections to the proposed AIR, which presumably came from SAE's Aerospace Council, centered on the design and validity of the tests, who would administer and score the tests, and the amount of testing which would have been necessary each time a safety card was revised. The Safety Board believes that had the AIR been issued, it would have caused improvements in the content and presentation of safety cards.

Flight Safety Foundation

For over 30 years, the Flight Safety Foundation (FSF) has published and distributed, nationally and internationally, aviation safety articles based upon research, accident investigations, and crewmember experiences, which have addressed the need to improve the methods of presenting safety information to passengers. As early as 1955, FSF publications cited problems in safety information dissemination and reported on early attempts to improve the content and presentation of information. A 1955 FSF Air Safety Digest summarized a CAA report on the donning of passenger oxygen masks. It was found that the reaction time of persons in donning and adjusting oxygen masks was poor and that "42 percent of the unindoctrinated subjects failed to don the disposable-type mask correctly, while only 15 percent failed with the oronasal-type mask. When a continuous or single-piece adjustment strap was provided on a mask, the time interval was reduced by as much as 50 percent, compared to that required for a buckle adjustment

strap. 27/ Although the single strap design is now standard equipment on this type of oxygen mask, experience has shown that passengers still have problems donning and adjusting the mask for a tight fit.

The safety briefing card for a corporate jet was the topic for a 1961 FSF article. The laminated, two-sided card showed exit routes, operation of exits, location of emergency equipment, and instructions for activating supplemental oxygen. 28/ An examination and comparison of the 1961 vintage safety card with cards presently used for this model airplane, which still is in use in corporate fleets, showed that few changes had been made in the last 24 years.

In 1955, the FSF reported on a joint U.S Air Force and Civil Aeronautics Agency (CAA) report entitled "Emergency Escape Procedures." One of the most cogent findings presented in the report in the area of passenger preparedness was the erroneous assumption by passengers that there would be sufficient time between the recognition of an emergency and the accident or landing to permit a passenger briefing and the initiation of emergency procedures. 29/

During the same year, the FSF described a non-U.S. air carrier's use of tape recorded oral briefings that were broadcast simultaneously with the flight attendant demonstrations. 30/ An innovative approach to training "frequent flyer" passengers was cited by FSF in 1955, following CAA and U.S. Navy demonstrations of evacuations following water ditchings. A suggestion was made ". . . that airlines, by their records, can single out repeat travelers and offer them a training course in ditching and evacuation similar to that received by the flight crew." 31/

In December 1984, the FSF conducted a Cabin Safety Conference and Workshop under the sponsorship of the FAA. The purpose of the conference and workshop was to provide a free exchange of views on the present status of cabin safety and to elicit recommendations on future improvements. The 4-day conference and workshop attracted over 370 participants from U.S. and non-U.S. airlines, manufacturers, employee and industry associations, government agencies, and the public, who took part in three working groups to discuss occupant safety, cabin safety, inflight occupant protection, crash and fire protection, emergency evacuations, and economic and regulatory considerations of cabin safety.

The conference's keynote address by the Safety Board's Chairman illustrated the need for improving passenger safety information, thusly: "A basic lesson that we have learned over the years is that any delay--even a few seconds--can have terrible consequences in the crucial moments after a crash. When a passenger does the wrong thing, that person may jeopardize not only his or her own life, but also those of many

27/ "Air Safety Digest," published by the Flight Safety Foundation, July/September 1955.
28/ "Business Pilots' Safety Bulletin 61-201," published by the Flight Safety Foundation, February 15, 1961.
29/ "Background and Principles in the Development of Procedures for Emergency Escape," published by the Flight Safety Foundation in Accident Prevention Bulletins 55-22 and 55-26, September and November, 1955.
30/ "Accident Prevention Bulletin 55-21," published by the Flight Safety Foundation, September 21, 1955.
31/ "Accident Prevention Bulletin 55-20," published by the Flight Safety Foundation, September 10, 1955.

others." With regard to passengers who do not avail themselves of safety cards and who pay no attention to flight attendant briefings, the chairman proposed: "approaches to solving the problem might include presentation of safety information at the departure gate, onboard films combining safety with a promotional message, or the use of passenger volunteers in the demonstrations. More brainstorming and evaluation is needed." 32/

The 8-hour workshop on Evacuation and Survival discussed several topics among which were safety cards, oral briefings and demonstrations, and videotaped briefings. Discussion, both pro and con, centered on flight attendants using innovative techniques to gain and then maintain the passenger's interest during oral briefings and demonstrations. Some persons maintained that while innovation may increase passenger attentiveness to briefings, the manner of being innovative may offend some passengers and may reduce the flight attendants' professional image as well as the attendants' attitude toward safety in the eyes of some passengers. Discussions also were held on problems with standardizing oral briefings among all air carriers as well as standardizing briefings for all the different airplanes which may be operated by one carrier. It was pointed out that standardization for its own sake may be detrimental because passengers would become so accustomed to hearing the same briefing on all air carriers that they would soon become bored and not listen. There was some general agreement that the use of a tape recorded announcement with instructions for the use of supplemental oxygen would be beneficial following a decompression since flight attendants, while wearing oxygen masks, would be unable to provide oral instructions to passengers.

Airlines

One airline, in 1955, issued to each of its non-aircrew employees booklets with information on the use of exits and evacuation slides, the location and use of fire extinguishers, and illustrations of cabin layouts and emergency instructions for each crewmember. The intent of these booklets was to bring to the attention of its employees "safety procedures and provide them with information which could be valuable in case of an emergency while traveling, so that they could assist the flightcrew and passengers if requested." 33/

During the 1984 FSF Cabin Safety Conference, a major U.S. air carrier reported that its flight attendant briefings are changed each year in the belief that flight attendants will maintain their interest and thus give a better delivery of the briefing, and that passengers who frequently travel on this airline will not become accustomed to hearing the same briefing each year.

The oral briefings conducted aboard at least one U.S. airline and some non-U.S. airlines provide the seat row numbers where each emergency exit is located. This practice has also been adopted by some Part 135 carriers.

Several major U.S. carriers that operate wide-bodied airplanes have produced videotaped briefings on their own initiative with the assistance of professional television production companies. In spite of the absence of published guidelines, these video

32/ Keynote address by Jim Burnett, Chairman, National Transportation Safety Board, at the Flight Safety Foundation's Conference and Workshop on Cabin Safety, Arlington, Virginia, December 12, 1984.
33/ "Air Safety Digest," published by the Flight Safety Foundation, October - December, 1955.

[illegible] sign language for deaf passengers on both their [illegible] and [illegible] [illegible] However, there is a wide variation in how each airline chooses to present visual and oral instructions in these videotaped briefings.

Some air carriers request that their pilots and flight attendants who may be flying as passengers pick up and read the safety card before takeoff to serve as an example for other passengers. Still other carriers have sought assistance in developing improved safety cards. Other carriers have, with varying degrees of success, developed their own cards without assistance from specialists who have expertise in developing safety cards.

Air carriers train their flight and cabin crewmembers on the use of public address (PA) systems to convey safety information to passengers. Crews are instructed and critiqued on their ability to speak slowly and clearly and to articulate announcements in a professional manner designed to gain and maintain the attention of passengers. Unfortunately, the quality and the fidelity of PA systems on some airplanes and the location of the audio speakers can negate even the best crew announcement both on the ground during the pre-takeoff briefing and during flight. This study does not include an assessment of the problems the Safety Board has found with PA systems and the inability of both cabin crew and passengers to hear and understand critical safety announcements; nonetheless, the fidelity of some public address systems remains a concern of the Safety Board. (See appendix B for previous Safety Recommendations on this issue.)

Both U.S. and foreign carriers have opted for audio tape recorded announcements for their wide-bodied airplanes. These announcements can be automatically broadcast during decompressions and they can be used for more "routine" announcements, such as pre-takeoff briefings, or to advise passengers to remain seated because of turbulence. The advantages of prerecorded announcements are that an additional flight attendant is available in the cabin to perform safety demonstrations, and that the announcement is presented in a clear, slow manner and, in the case of international flights, permits multi-lingual briefings. One major foreign carrier reportedly spent considerable effort to research the most effective voice in terms of passenger appeal and acceptance, for use in audio taped safety briefings. The carrier now uses this particular voice for all of its taped audio briefings.

The Safety Board is gratified that the FAA now permits infants and children to occupy certain automotive safety seats in air carrier aircraft. We believe that the use of the seats is long overdue and that they will afford marked protection from injury and death during inflight turbulence and crashes. In spite of the FAA's guidance contained in Advisory Circular 91-62 entitled "Use of Child Infant Seats in Aircraft" and a pamphlet entitled "Child/Infant Safety Seats Acceptable for Use in Aircraft," some gate agents, flight attendants, and passengers are confused about the acceptability and use of the seats. The Safety Board believes that airlines should ensure that their employees as well as their passengers are provided standard guidance, that the guidance could be included in safety cards and in airline magazines, and that the FAA pamphlet could be made available at airline ticket counters.

Other Efforts

In 1984, Johnson, a behavioral researcher experienced in the design and presentation of safety information, published a book in an attempt to alert passengers of survival issues. The book includes discussion of the various types of maladaptive behaviors that

briefings for the most part contain good instructions to passengers on a wide range of safety topics. In fact, one non-U.S. carrier uses a videotaped pre-takeoff briefing which includes sign language for deaf passengers on both their L-1011 and B-767 aircraft. However, there is a wide variation in how each airline chooses to present visual and oral instructions in these videotaped briefings.

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have been exhibited by passengers during emergencies, such as panic, panic-flight, and behavioral inaction. The book cites four basic precautions which passengers can take to better prepare themselves for emergency situations: pay attention to the flight attendant briefing and demonstrations, read the safety card, note the location of emergency exits and the routes to the exits, and question the flight attendants on any safety instructions which are not understood. 34/

The University of Southern California conducted the First Annual International Aircraft Cabin Safety Symposium in 1984. Over 300 persons from more than 23 countries attended the symposium. Several panelists and participants commented on the ability of passengers to act correctly during emergency situations. One panelist proposed the following announcement as one possible way to gain the attention of passengers for the pre-takeoff safety briefing: "Ladies and gentlemen, please put down your reading material, and give your attention to the flight attendant in the front of your cabin. These next few minutes can make the difference in case of an emergency." The panelist cautioned, however, that an innovative introduction to the safety briefing may result in a reprimand to the flight attendant because it would not be part of the airlines' published announcement. 35/

Another panelist noted that the content, design, style, and presentation of safety information can vary widely and can confuse passengers who fly on the same model airplane which is operated by different carriers. One conference participant suggested that airlines could provide some emergency training to their employees and their families who, when travelling for pleasure, could form a nucleus of persons who could assist the cabin crew.

Another panelist pointed out that accident experience has shown that even passengers who had been seriously injured were able to escape because they had the initiative; they preplanned their escape, they had a desire to survive, and they paid attention to the safety briefing. 36/

The International Air Transport Association (IATA) proposed guidelines for the content and format for flight attendant oral briefings-demonstrations, and for safety cards. (See appendix H.) The guidelines, which have not yet been approved by the member airlines, were prepared by IATA's Safety Advisory Committee and closely agree with FAA guidelines, except that IATA recommends that flight attendants demonstrate how to remove a life preserver from its protective pouch. IATA proposed further that a pre-landing safety announcement include the location of the airplane's emergency exits, that passengers refer to the safety card, and that flotation equipment be referred to if the approach is made overwater. Videotaped safety briefings are not addressed.

The IATA Committee recognized the passengers' needs to have adequate knowledge of safety and emergency procedures, their differences in capacity for understanding technical matters, and the desirability of differentiating between information and instruction while imparting safety messages.

34/ Op. cit. footnote 5.
35/ "Emergency Evacuation Problem Areas," C. M. Gage, First Annual International Aircraft Cabin Safety Symposium, Los Angeles, California, February 7-9, 1984.
36/ "Aircraft Accident Investigations: Determining the Survival Factor," M. M. McCormick, First Annual International Aircraft Cabin Safety Symposium, Los Angeles, California, February 7-9, 1984.

FEDERAL AVIATION ADMINISTRATION

Federal Aviation Regulations

Prior to the establishment of the Federal Aviation Regulations, Air Carrier Operations were governed by Civil Air Regulations (CAR) Parts 40, 41, and 42. Part 40 pertained to Scheduled Interstate Air Carriers, Part 41 pertained to Scheduled Air Carrier Operation Outside the Continental Limits of the United States and Part 42 pertained to Nonscheduled Air Carriers.

Part 41, effective June 27, 1945, required that "Passengers shall be acquainted with the location of emergency exits, with emergency equipment provided for individual use, and with the procedure to be followed in the case of an emergency landing on the water."

Part 40, effective May 31, 1956, required an oral briefing on the operation of lifevests, a demonstration of the donning and inflating of vests, operation of emergency exits, and the location of liferafts for carriers who were engaged in extended overwater operations.

Part 42 had no requirement for a passenger safety briefing until November 28, 1955, when it was amended to require oral briefings for extended overwater operations. The briefing was required to include information on the location and method of operating life vests and emergency exits and on the location of liferafts. A demonstration of the method of donning and inflating a life vest was required to accompany the briefing. On November 11, 1963, Part 42 was again amended to require that passengers be briefed orally concerning smoking, the use of seatbelts, the location of emergency exits, emergency evacuation procedures, and the location and operation of the supplemental oxygen system in the event of a cabin depressurization. The requirements for briefings for extended overwater operations remained the same.

After the CAR's were recodified into the FAR's in 1964, subsequent amendments to Part 121 included additional briefing requirements. A June 7, 1965 amendment made uniform the provisions for briefing passengers with respect to rules formerly contained in Parts 40, 41, and 42 of the CAR'S as revised. Also this amendment required an oral briefing on the location and operation of emergency exits on air carrier passenger-carrying airplanes. A May 1, 1972 amendment required that passengers be instructed to keep their seatbelts fastened while seated. On April 7, 1977, an amendment was adopted which required individual briefings of handicapped passengers, and an amendment on May 15, 1978 required a demonstration of the use of seatbelts and a description of the location and use of required flotation equipment. An Airworthiness Directive (AD) which became effective on August 16, 1974 required that an announcement be made when the "No Smoking" sign is extinguished informing the occupants that smoking is prohibited in the lavatories.

As part of its Operations Review Program in 1975, the FAA invited interested parties to submit proposals to change the FAR's. The FAA received 5,000 proposed changes in 123 submissions, and a conference was held December 1-5, 1975 to discuss the views of concerned parties on these proposals. The proposals and related conference discussions resulted in 12 Notices of Proposed Rulemaking (NPRM). The Safety Board, the Association of Flight Attendants (AFA), the Airline Pilots Association (ALPA), and the FAA suggested 10 proposals dealing with passenger education. Three proposals subsequently were incorporated into the Federal Aviation Regulation. (See appendix E.)

[illegible]

[illegible] air carrier Principal Operations Inspectors are required to review and approve flight attendant oral briefings and safety cards. The inspectors are provided with guidance material in the "Air Carrier Operations Inspector Handbook," four Air Carrier Operations Bulletins (ACOB), and two Advisory Circulars (AC) to assist them in their duties. The Advisory Circulars are intended to provide guidance to airlines for the development of flight attendant oral briefings and safety cards to fulfill the safety briefing requirements of 14 CFR 121 and 135.

New FAA inspectors receive 12 hours of training on cabin safety topics during their indoctrination training, which focuses on the requirements of FAA regulations, Advisory Circulars, and Air Carrier Operations Bulletins. During the inspectors' periodic update training classes, regulatory changes are reviewed. Principal Operations Inspectors are given a suggested checklist to assist them in their review of safety cards and flight attendants' oral briefings.

FAA inspectors who perform en route cabin inspections must complete FAA Form 8430.16(2-77) "Air Carrier En Route Cabin Inspection." (See appendix H.) Inspectors are required to ensure that passenger information cards are convenient to each passenger and pertinent to the type and model of aircraft on which they are used. The flight attendants' oral safety briefings and demonstrations are monitored to ensure that they include the "required information including location and use of required flotation equipment, and if applicable, demonstrations of the use of overwater and/or oxygen equipment." Whenever possible the quality and volume of the public address announcements also should be monitored in all parts of the cabin, and if problems are found, the inspector should determine if they are the result of the PA system or "crew technique."

Air Carrier Operations Bulletin (ACOB) No. 3-76-3, dated October 20, 1976, suggested that DC-9-10 safety cards contain a warning about the danger from sharp-edged, wing-mounted vortex generators to persons who use overwing exits during an evacuation. ACOB No. 1-76-17, dated October 20, 1976, recommended that the flight attendants' briefing announcement include a statement that smoking is not permitted in the lavatories. ACOB No. 1-76-23, dated November 18, 1982, provided information about "Brace for Impact Positions" for adult passengers on aircraft which have both low-density and high-density seating configurations. These brace positions were based on crash injury research performed at the FAA Civil Aeromedical Institute. This ACOB discouraged the use of pillows and blankets in the brace positions since they do not provide significant energy absorption and could create obstacles in the aisles which would be a detriment in an emergency evacuation. Principal Operations Inspectors were requested to ensure that briefing cards showed bracing positions that were appropriate to the certificate holder's seating configuration. (See appendix I.)

As a result of Safety Board investigations and a special study on problems encountered by flight attendants and passengers following decompressions onboard DC-10 and L-1011 airplanes and the subsequent use of chemically generated supplemental oxygen systems, the FAA issued Air Carrier Operations Bulletin No. 1-76-24 on November 18, 1982. The ACOB suggested that during the briefing and demonstration, emphasis be given to the location of oxygen masks, the placement of the mask on the face, the use of adjustment straps, and the indication of oxygen flow. It also suggested that briefing cards include instructions for mask donning and any other action which may be necessary to initiate the oxygen flow. (See appendix I.)

FAA Surveillance Requirements

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Federal Aviation Regulations require that safety cards be available to each passenger to supplement the flight attendant oral briefing and demonstrations, that cards contain information for the operation of emergency equipment, and that cards are pertinent only to the type and model of airplane on which they are located. (See appendix J.) Three Air Carrier Operations Bulletins and the Advisory Circular entitled "Passenger Safety Information Briefing and Briefing Cards" (AC No. 121-24), issued on June 28, 1977, provided information to FAA inspectors for the acceptable content of safety cards.

Advisory Circular 121-24 in some instances contains more specific information than do the ACOB's. The AC recommends that although the primary method of instruction should be pictorial, any method or combination of photographs, symbology, diagrams, and written instructions can be used on safety cards as long as the information is clear and concise. The AC states that symbology may be used to convey information when passengers may speak one or more non-English languages, and should provide special instructions when new or unique emergency equipment is on the airplane. (See appendix G.)

Advisory Circular No. 135-12, entitled "Passenger Safety Information Briefing and Briefings Cards," was issued on October 9, 1984 for commuter/air taxi operators who have airplanes with a maximum of 30 passenger seats (appendix K). The AC stated that the problem of motivating people to protect themselves is "not easy," and it "encourages operators to be innovative in their approach" when presenting safety information. Advisory Circular No. 135-12 contained the following guidance which was not included in Advisory Circular 121-24.

For Oral Briefings:

- Entry door and any other exits available to the passengers should be "pointed out." (NOTE: this does not necessarily mean that a crewmember must physically point to exits.)

- Passengers should be told that the briefing cards contain additional safety information which they should read.

- Passengers should also be informed that they should don their oxygen masks before assisting children with their masks.

- Crewmembers should neither be assigned nor perform service-related duties during the briefings.

- The minimum post-landing briefing should advise passengers to remain seated with seat belts fastened until the airplane has come to a complete stop. This announcement should be accompanied by an explanation that this is for their own safety and the safety of those seated around them.

For Safety Cards:

- A multi-colored card which has pictures and drawings will be picked up and read more often than a black and white printed card.

- Information on the cards should encourage passengers to familiarize themselves with the locations of exits other than the one they entered.

- Any manual operations which are necessary to successfully complete the evacuation, such as the recommended placement of the hatch on the seat or outside the aircraft, should be shown.

- The card should tell passengers to jump outward onto the evacuation slide in the seated position, with legs extended, and not sit (e.g., at the door sill).

- The card should inform passengers not to bring carry-on baggage to the exit during an evacuation.

- The card should instruct passengers to help children use their oxygen masks only after the passengers have donned their own masks.

- Include the removal of the flotation device from its stowed location and/or package.

FAA Research on Passenger Education

The FAA commissioned a group of retired airline captains to make an independent evaluation of air carrier operations; a report entitled "Special Air Safety Advisory Group Report to the Federal Aviation Administration" was published on July 30, 1975. The section of the report on cabin safety did not address passenger education. 29/

Between July and September 1976, the Federal Aviation Administration's Office of Aviation Safety conducted a field survey and records review survey of air carrier cabin safety issues and also examined FAA programs on occupant injury protection and survivability. The report entitled "A survey of Air Carrier Cabin Safety" was published in December 1976 and discussed "recurring, persistent cabin safety problems" identified from information provided by associations representing crewmembers, aircraft manufacturers, airlines, and FAA regional offices. 30/ A section of the report which contained a discussion of communication problems acknowledged that passengers do not pay attention to the flight attendant oral briefings and demonstrations. The report stated that the FAA was "evaluating an audio visual presentation of passenger briefings to determine its acceptance and the passengers' responsiveness." The report found that the "public address systems are not consistently of a quality to insure that the message is understandable by the passengers."

One of the several conclusions reached in this report was that "Passenger attitudes for their personal safety is (sic) a matter of concern to flight attendants and one deserving of more attention by FAA and industry if the optimum in injury minimization

29/ "Special Air Safety Advisory Group Report to the Federal Aviation Administration" prepared for the U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Service, Report No. FAA-AFS-1-76-1, July 30, 1975.
30/ "A Survey of Air Carrier Cabin Safety" conducted by the Office of Aviation Safety, Federal Aviation Administration, July-September 1976, December 1976.

and maximization of passenger survival is to be realized." The report made 17 recommendations to improve the FAA's Cabin Safety Program; the following recommendations addressed passenger education:

> Flight Standards Service identify pending regulatory projects pertaining to the Recurring, Persistent Cabin Safety Problems. . .(i.e., passenger safety briefings, quality of PA system) and proceed on a priority basis with rule-making action relative to those problems. Furthermore, concentrate inspection and surveillance on such of those problems not subject to regulatory action to prevent their recurrence.
>
> Elevate agency priority to expedite the completion of FAA cabin safety and crashworthiness R & D projects identified in this report. . .(passenger safety briefings). Systems Research and Development Service and Flight Standards Service should continue to jointly determine the priority and requirements of cabin safety/crashworthiness research projects to be carried out by Systems Research and Development Service.
>
> Office of Aviation Medicine, in coordination with Flight Standards Service, undertake a project to determine a more effective means for enhancing passenger awareness to required before-takeoff briefings.
>
> Flight Standards Service conduct an air carrier-wide campaign to assure that aircraft public address systems adequately serve all areas of the cabin occupiable by passengers taking into account ambient noise conditions.

In 1978, the FAA contracted with the Interaction Research Corporation to study the reasons for the apparent inattention of passengers to safety briefings and to safety cards. 31/ The study, which surveyed 231 persons who had flown as passengers at least twice in the previous 2 years, was designed: "to determine what differences there are between passengers who normally attend to safety presentations (attenders) and those who seldom or never attend (non-attenders)."

Both attenders and non-attenders agreed that safety presentations are useful because crewmembers may not be available to assist them following an accident. There was only slight agreement that crewmembers are trained and capable of assisting all passengers in any kind of emergency. Both groups estimated that the amount of time available for most people to get out of a burning aircraft was 5.5 minutes. (NOTE: Safety Board investigations have shown that during a post-crash fire, all persons must be able to evacuate in 2 minutes or less.) Most responders thought there would not be enough time to get instruction from the crew or the briefing card following an emergency.

Both groups, but especially the attenders, agreed that the information in the oral briefing was not adequate, and that the information contained on the safety cards was needed. Attenders reported that the briefing cards were hard to locate and non-attenders

31/ "An Investigation of Factors Affecting Aircraft Passenger Attention to Safety Information Presentations", D.A. Johnson, Interaction Research Corporation, Report IRC-79-1, for the Federal Aviation Administration, August 1979, Transportation Research Center Contract No. DOT-FA78WA-4095.

said they had greater difficulty locating the cards, probably as a sort of justification for not reading the cards. Both groups viewed the studying of the briefing card as less important than using seatbelts and they indicated that they would study the card if they thought it was as important as the seatbelt. Both groups thought there was not much new information contained in the presentations and what was presented on one aircraft was similar to what was presented on the next. Both groups felt they already knew the information on the briefing card, even before they boarded the plane, which may explain why the non-attenders, while agreeing to the need for the card and recognizing that passengers can take precautions for their own safety in an accident, nonetheless fail to pay attention. Both attenders and non-attenders agreed that fearful passengers are more likely to pay attention to safety information and that it was preferable to be thought of as an experienced air traveller by other passengers.

The study found that non-attenders were more likely to be men, younger, and more educated than attenders, and were more likely to have had more flight experience. Non-attenders were more likely to fly alone and on business trips, while attenders were more likely to fly with someone they knew and were on pleasure trips. About half of the non-attenders, and the majority of the attenders, said that they would pay more attention to the safety presentation in the future if they noticed fellow passengers paying attention. Non-attenders were more likely to report that attention to safety information is wasted because of the perceived low probability of an accident. Attenders also thought the accident probability was low, but that the time spent paying attention was not wasted.

Though overall very low, the level of nervousness associated with the presentation of the safety information was higher for attenders than non-attenders. Both attenders and non-attenders reported that the safety cards and the oral briefings seldom, if ever, made them nervous; however, attenders did report slightly greater (but statistically significant) amounts of nervousness toward the safety presentations than non-attenders. Both groups agreed that an accident need not be hopeless, and that passengers can take steps to protect themselves.

The report concluded by stating that additional research was needed to determine any causal relationships associated with the behavioral factors found in the survey which may influence whether or not passengers pay attention to flight attendant oral briefings or read safety cards. Follow-up laboratory and field tests were proposed to answer such questions as the following: Are attenders those who notice the differences in oral briefings from one flight to the next, or do they notice the difference between briefings because they pay attention more? Do nervous people pay more attention to the safety card, or does the safety card make people nervous? Can methods be devised to increase attention to safety presentations without increasing nervousness or producing other adverse effects?

In spite of the findings of this study and the proposed additional research which is needed to more fully explore passenger behavior, no follow-up action has been taken by the FAA to systematically examine the issues identified in this study.

EXAMINATION OF THE BRIEFING METHODS

At the request of the Safety Board, air carriers provided the following passenger safety briefings materials: 80 safety cards from 13 airlines, flight attendant pre-takeoff oral briefings from 8 airlines, and 11 videotaped pre-takeoff briefings from 5 airlines.

although flight attendant pre-takeoff demonstrations are a distinct and separate means of conveying safety information to passengers, the demonstrations are conducted simultaneously with oral briefings and hence for the purpose of this study the demonstrations were considered to be an integral part of the oral briefings.

Notwithstanding the published guidelines and recommendations of the FAA, the Society of Automotive Engineers, and the International Air Transport Association, and in spite of the applied research of the Douglas Aircraft Company, there are no criteria for the design and the testing of any of the methods used to convey safety information to passengers. It was, therefore, not possible for the purposes of this study to qualitatively assess the briefing methods against any industry standards. Thus, an alternative approach was necessary to determine the compliance of the briefing methods with the aforementioned guidelines and to permit an objective comparison of the briefing methods. The suggested FAA guidelines were used as a benchmark to determine if the briefing methods complied with even these most basic and general recommendations. Appendix H contains the published guidelines for safety cards, oral briefings, and video briefings.

In addition, each briefing method was subjectively compared within each type of method (cards-to-card, videotape-to-videotape, etc.) to identify variations in the presentation of the topics. For example, on briefing cards subjective observations considered color photographs versus black-and-white line drawings. Another consideration was how flight attendant oral briefings and demonstrations vary among airlines with regard to the manner of presenting safety information, and what information was provided beyond that addressed in the guidelines or regulations.

Printed Safety Cards

The 80 safety cards from 13 airlines were grouped by wide-bodied airplanes (B-747, B-767, DC-10, L-1011, and A-300) and narrow-bodied airplanes (DC-8, DC-9, B-707, B-727, B-737, and B-757), and extended overwater and overwater provisions. These groups readily permitted comparisons of the cards for the same make and model of airplane with similar overwater provisions. Further, 34 cards which were identical or nearly identical for the same make and model airplane were considered to be duplicates and were not used in the comparison of the cards. For these reasons, the features of 46 cards were recorded for the following airplanes:

Wide bodied	Overwater provisions	Extended overwater provisions	Total
DC-10	0	5	5
B-747	0	6	6
B-767	2	1	3
L-1011	0	4	4
A-300	0	1	1
Total	2	17	19

Narrow bodied	Overwater provisions	Extended Overwater provisions	Total
DC-8	0	2	2
DC-9	5	0	5
B-707	0	1	1
B-727	4	8	12
B-737	6	0	6
B-757	0	1	1
Total	15	12	27

All 46 cards presented the topics required by the FARs, although in some cases the information depicted was erroneous, ambiguous, or unclear. Not all of the cards conformed to the criteria outlined in the FAA's Advisory Circulars or to the ACOB's. Five topics which were common to all the safety cards, namely, seatbelts, supplemental oxygen, brace position, life preservers, and exit routes, were examined and the findings are summarized below.

Seatbelts.--The cards used between one and three photographs or illustrations to depict the steps to fasten, unfasten, and adjust seatbelts; some illustrations were supplemented by written instructions. All of the cards utilized various colored arrows in the illustrations. [It should be noted that IATA does not address the need to instruct passengers on how to adjust seatbelts.] The following two examples do not show how to adjust a seatbelt and one does not show how to fasten a belt. (See figures 1 and 2.) Eighteen of the 46 cards did not comply with the provisions of Advisory Circular 121-24 by depicting the steps to fasten, tighten, and unfasten seatbelts. (See figures 3 and 4.) Two examples of cards that did comply are shown below.

Supplemental Oxygen.-- Although AC 121-24 stated that cards should clearly indicate that the "bag on the oxygen mask (where applicable) is to be used as an indication of the flow of oxygen," none of the 46 cards indicated this information. AC-121-24 also stated that the "relationship of accident altitude to the amount of oxygen bag inflation" should be indicated but none of the 46 cards clearly conveyed this information either. However, the Safety Board did note that the guidance given in AC 121-24 that the "bag on the oxygen mask (where applicable) is to be used as an indication of the flow of oxygen" is incorrect. Forty-three cards indicated "no smoking," either using one of five symbols or written instructions. Use of the emergency oxygen system was shown by using 2 to 5 illustrations. Thirty-four of the cards used arrows in some of the instructions to highlight donning and tightening masks and pulling activating pins. Eighteen cards did not use sequentially numbered illustrations or photographs.

AC 121-24 and ACOB No. 1-76-24 state that the card should illustrate that passengers must pull the oxygen mask to release the activating pin, to adjust the elastic strap over the head, and to tighten the strap ends to hold the mask on the face. Seventeen cards representing DC-10, DC-9, B-727, B-737, B-747, and A-300 airplanes did show the activation pin being pulled. Six of the 46 cards showed tightening only one mask strap; 23 did not show tightening both straps after the mask was donned; 17 cards did not show tightening of either strap.

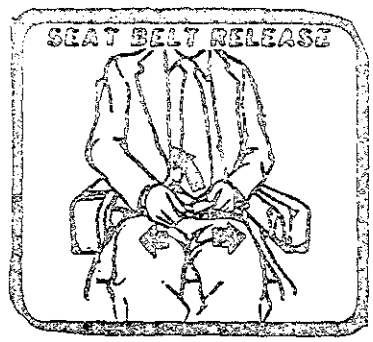


Figure 1.—Seatbelt instructions that do not include instructions for fastening and tightening seatbelt.

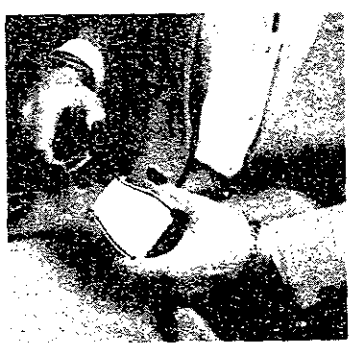


Figure 2.--Seatbelt instructions that do not include instructions for tightening seatbelt.

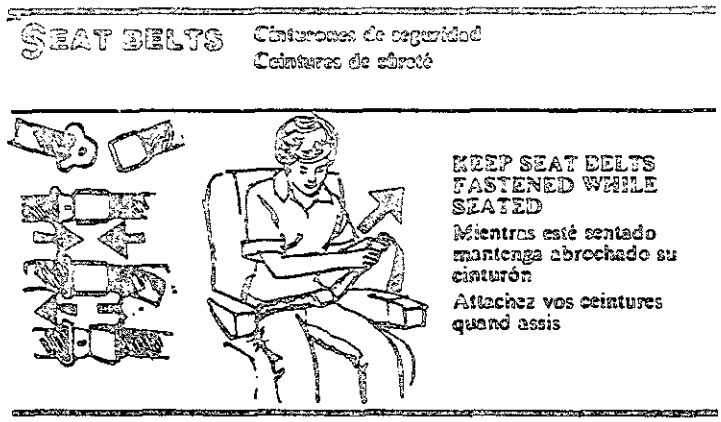
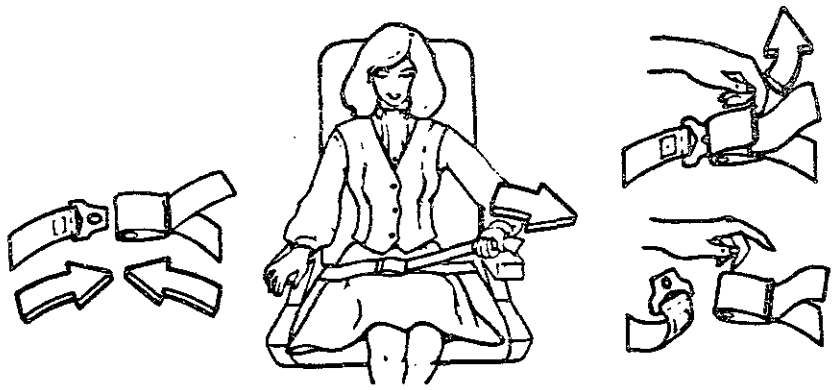


Figure 3.— Seatbelt instructions that comply with Advisory Circular 121-24.



("This artwork is copyrighted and can only be used after obtaining written permission from Interaction Research Corporation, Olympia, Washington.")

Figure 4.—Seatbelt instructions that comply with Advisory Circular 121-24

SAE guidelines and the AC for Part 135 operations contain the only guidance stating that adults should don their own oxygen masks before placing a mask on a child. Twenty cards did not illustrate this procedure. (See figures 5, 6, and 7.)

Brace Positions.-- The recommended brace positions were developed by the following FAA tests which showed that these positions afford the maximum protection from serious injury during crashes. The presentation of these positions is described in ACOB 1-76-23. Also, AC 121-24 states that briefing cards should show brace-for-impact positions and that these positions should be attainable, considering physical limitations and seating configurations. Seventeen cards from four airlines depicted brace positions not in accordance with ACOB 1-76-23. (See figures 8 and 9.) Not all cards showed both high and low seating density brace positions. Four cards used photographs which looked down on a person in a low-density brace position; however, it was not clear from the photographs that the passenger was grasping ankles as is recommended. (See figure 10.)

Life Preservers.-- Life preservers are required only on those airplanes that fly further than 50 nautical miles or 30 minutes from shore. Thus, only 29 of the 46 cards showed instructions for using a life preserver. The presentation of instructions for the retrieval and donning of the preservers varied from 5 to 10 illustrations per card. The 29 cards used, singularly or in combination, a series of several instructions contained in photographs, drawings, and illustrations; some cards used written instructions to supplement the illustrations. Only six cards used sequentially numbered pictorial instructions. Only two of the 29 cards used directional arrows to indicate tightening of straps or pulling the inflation handles. Three examples of instructions for donning life preservers are shown in figures 11, 12, and 13.

Nineteen cards provided 2 to 5-step instructions for placing life preservers on children. Instructions for the use of a "child's" life preserver were shown on four cards using four sequentially numbered photographs and written instructions to "Obtain (the preserver) from a flight attendant." Three cards used either two or three photographs of an adult assisting a child into a preserver, although it appeared to be the same type of preserver and used the same instructions as those for donning adult preservers. The remaining 12 cards gave sequentiallly numbered instructions for placing a life preserver on a child, which were different from those shown for an adult donning a preserver.

SAE and IATA guidelines and the Advisory Circular for Part 135 operations suggest that instructions be given for the removal of a life preserver from its package. Although 13 of the cards carried these instructions, they were difficult to understand on four of the cards. Four other cards provided written instructions in addition to illustrations.

Only seven cards showed an adult donning a life preserver while seated and with a seatbelt fastened; these instructions were depicted in either three, four, or five steps.

Seventeen cards described how to use flotation seat cushions. The instructions were contained in two, three, or four photographs, drawings, or illustrations. Directional arrows which indicated removal of the cushion from the seat were used on only eight cards. Although there are no requirements to provide both flotation seat cushions and life preservers on airplanes, 13 cards had instructions for the use of both kinds of flotation devices.

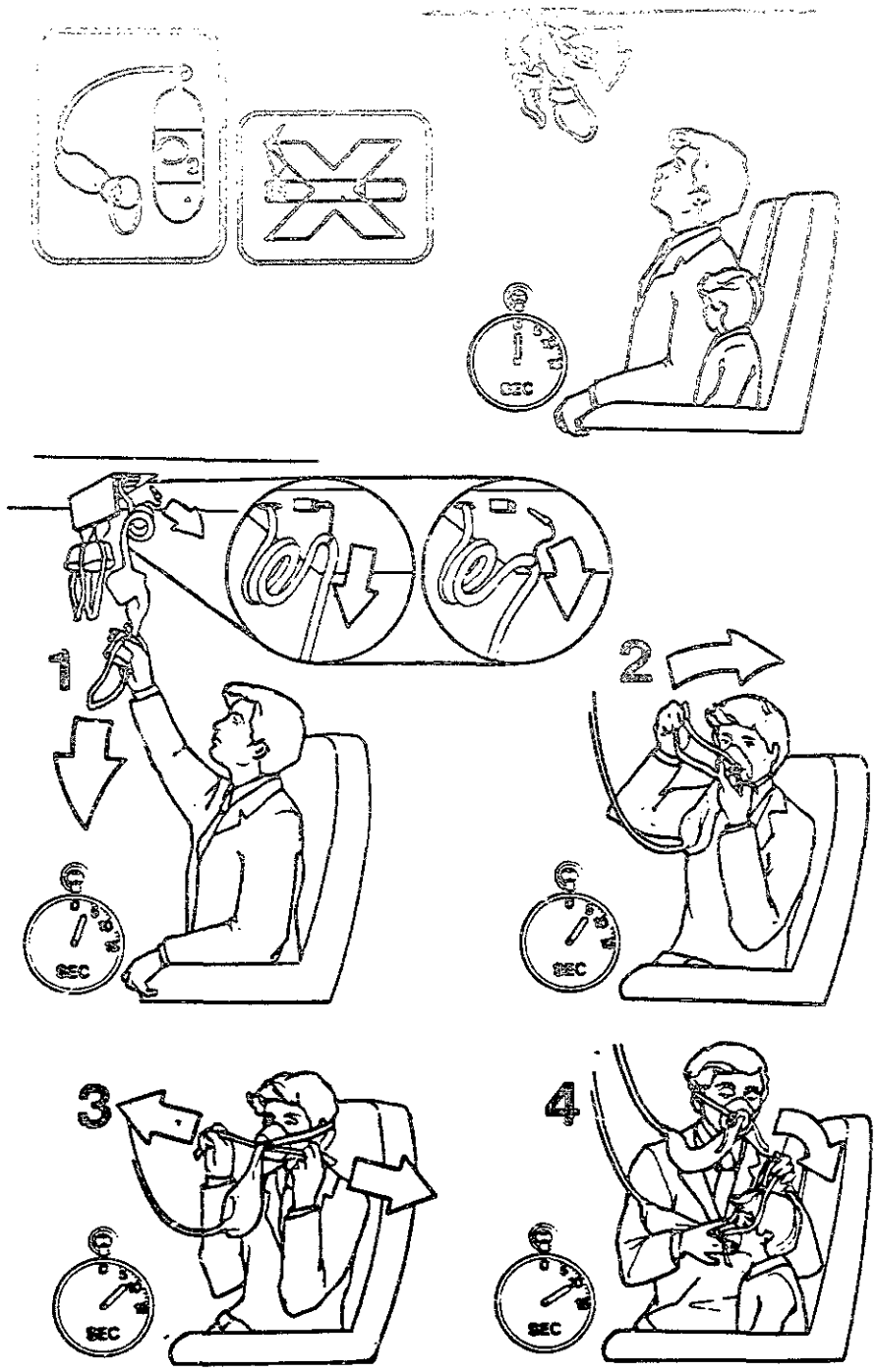


Figure 5.— Oxygen use showing release of activating pin, adjustment of straps, and adult donning mask prior to child.

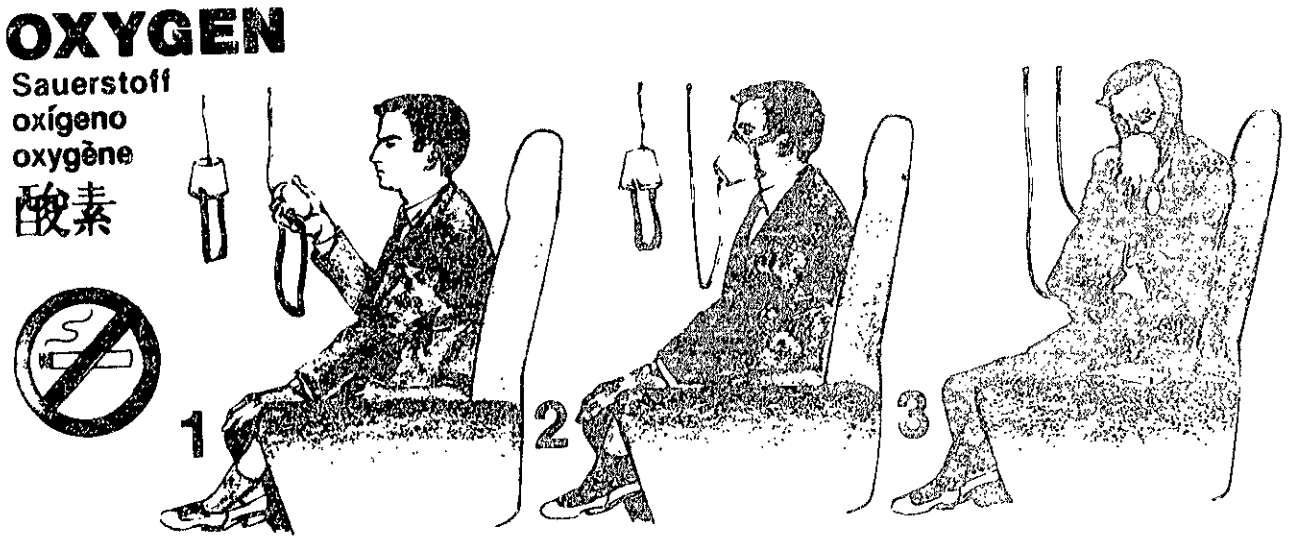


Figure 6.—Oxygen use does not show pulling activating pin, reservoir bag, placing strap overhead, and adjusting straps.

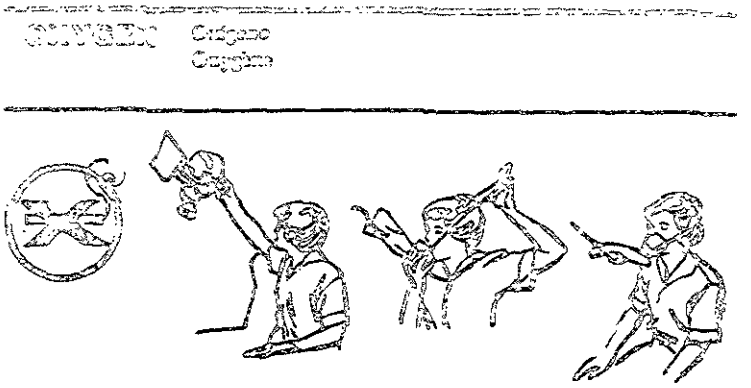


Figure 7.— Oxygen use does not show pulling activating pin, tightening of mask straps, or adult donning mask prior to children.

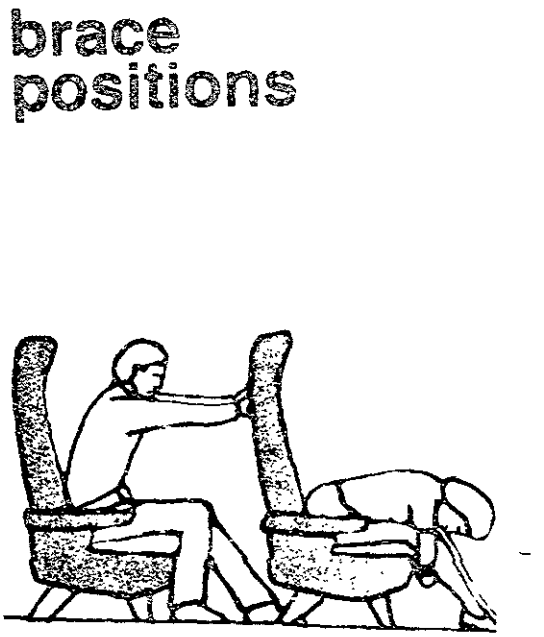


Figure 8.--Brace position not in accordance with Air Carrier Operations Bulletin, 1-76-23.

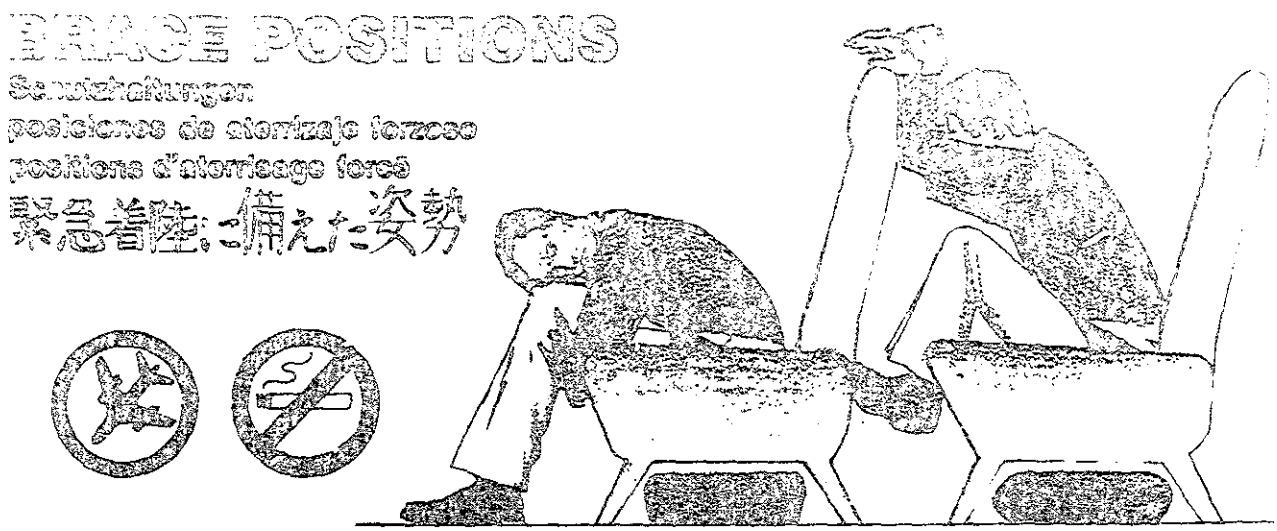


Figure 9.--Brace position not in accordance with Air Carrier Operations Bulletin, 1-76-23.

Figure 10.--Photograph does not clearly show person grasping ankles for brace postion.

Use of life vests
Uso de los chalecos salvavidas
Utilisation des gilets de sauvetage
救命胴衣の使用法

Crew members wear red vests
Los miembros de la tripulacion llevan chalecos rojos
Les membres de l equipage portent des gilets rouges
乗務員は赤色を着用しております

1 2 3 4 5 6

Childs life vest
Chaleco salvavidas de niño
Gilet de sauvetage pour enfant
子供用救命胴衣

Obtain from flight attendant
Se obtiene del asistente de vuelo
Demander au responsable du vol
乗務員から受けります

1 2 3 4

Cushion floatable
Cojin flotante
Coussin flotte
浮き袋

Use
Uso
Mode d'emploi
使用方法

Figure 11.—Card provides instructions for donning life preservers for both adults and children and for using flotation cushions.

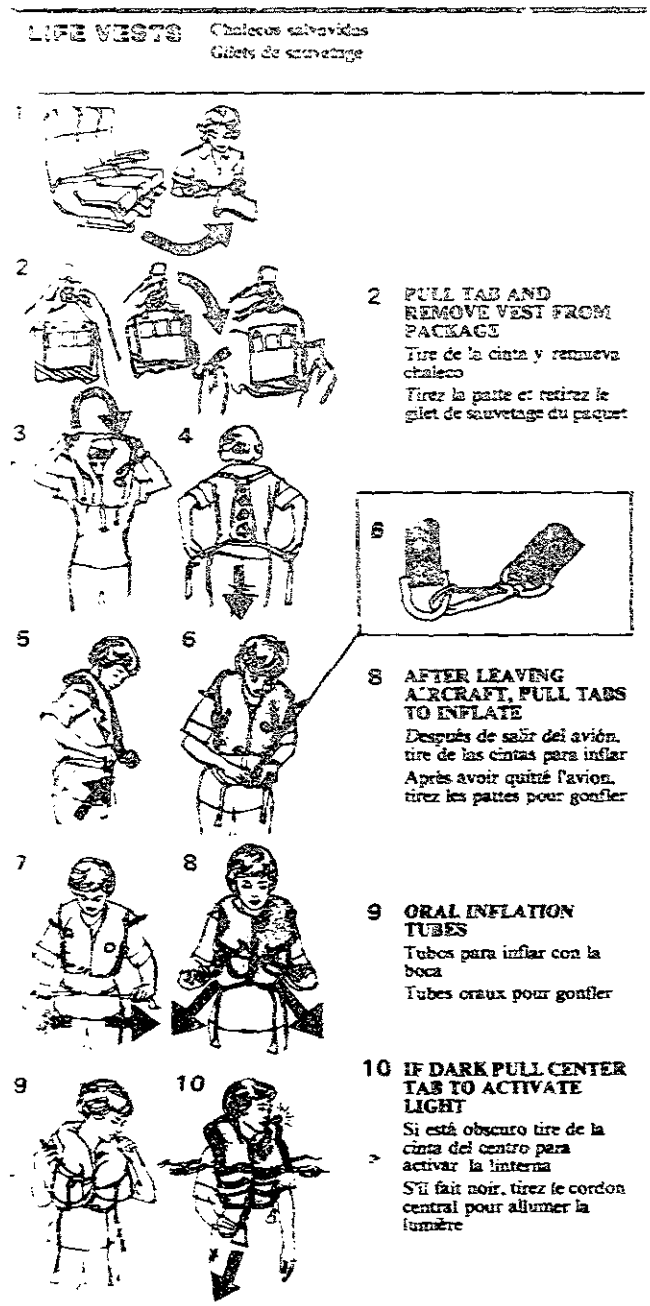


Figure 12.—Card provides instructions for removal of life preserver from package.

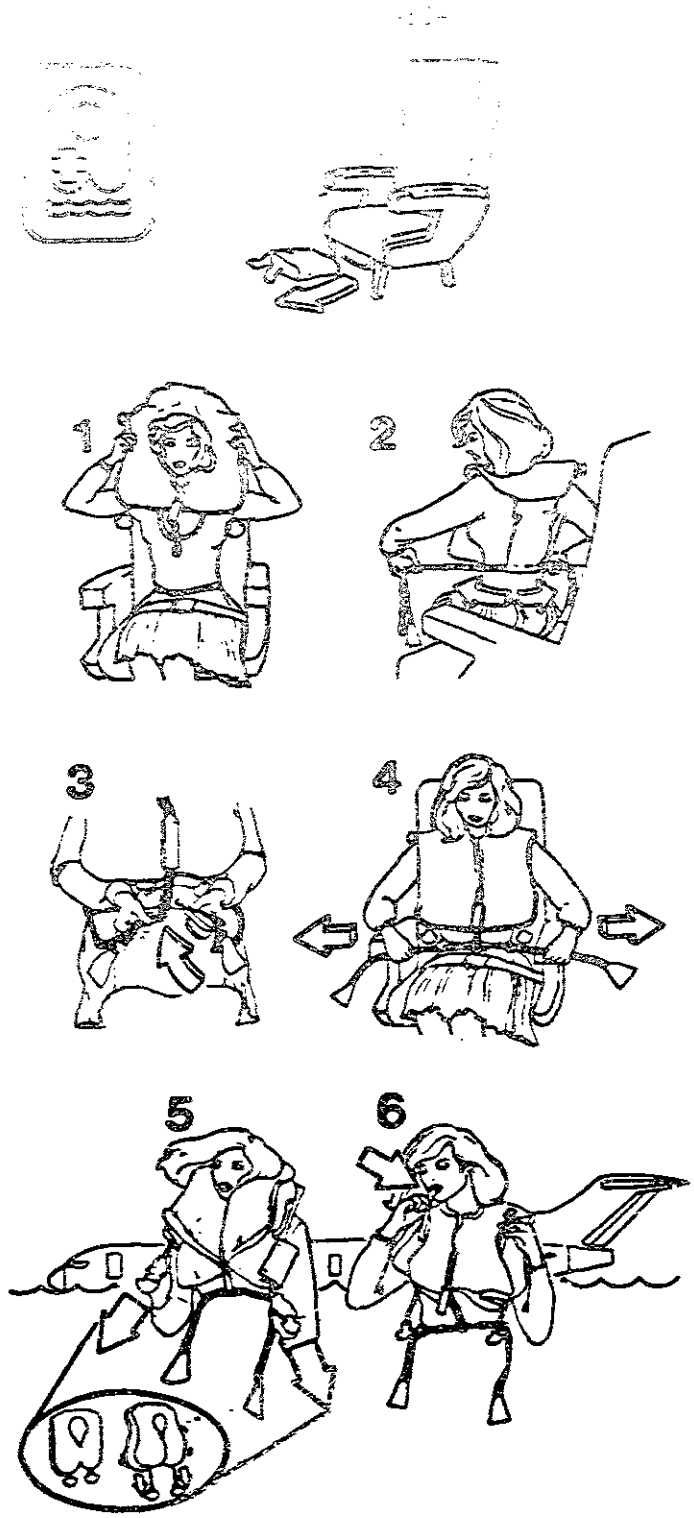


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Figure 13.—Card provides instructions for donning life preserver while seated with seatbelt fastened.

Exit Routes.-- All 46 cards used combinations of arrows, solid lines, and broken lines to show exit routes; however, the intent [meaning] of the broken lines was not always clear, although presumably they showed alternate escape routes. Some cards used different colors to show that a particular exit corresponded to an escape route, i.e., color-coded cabin sections with corresponding colors for exits and slides in that section. IATA guidelines also recommend that passengers be able to use the safety card to locate their seats relative to the nearest emergency exits. (See figures 14, 15, and 16.)

Card-to-Card Comparisons

The IATA proposed guidelines suggest that safety cards be large enough so that they can be seen and identified at all times, that an "eye catching" title with symbology be used to encourage use of the cards, and that the use of pictorial information should make written information unnecessary. The SAE recommends that safety cards be large enough so that they remain in sight of passengers at all times and that the primary means of providing information should be pictorial. With these guidelines as a basis, the cards were compared to each other for their visual attractiveness.

The cards were examined for their overall visual attractiveness because they must compete for the attention of passengers with other reading materials in seatback pockets. Visual attractiveness or "eye appeal" can arouse the curiosity of passengers so that the card will be noticed and picked up. Thereafter, a visually attractive card can cause passengers to become interested in the contents and, hopefully, examine the entire card. The attractiveness of a safety card can be affected both positively and negatively by several variables, which were found with the 46 cards examined. Fifty-two percent of the cards were of the same size or smaller than other reading materials which are typically found in seatback pockets, which meant that unless they were in front of other materials they could not be readily seen. Ten percent of the cards were printed on unlaminated and lightweight paper stock which was susceptible to stains, dirt, and moisture.

Seventy-eight percent of the cards used line drawings and illustrations exclusively with no supplemental written instructions, and 97 percent of the cards used multi-color illustrations as a visual aid to highlight certain information. No cards used photographs exclusively, but 10 percent of the cards used photographs with supplemental written instructions. Pictorial symbology was used on 96 percent of the cards. The most frequently used symbol was the "no smoking" instruction, and the second most used was the instruction for the removal of shoes - women's high heels specifically - when using evacuation slides.

Sixty-five percent of the cards contained bi- and multi-lingual written captions or instructions in Spanish, French, German, and Oriental and Asian languages, which further added to their appeal to non-English speaking passengers.

Observations and Comments on Safety Cards

There was a wide variation in the manner in which information was presented on safety cards as well as in the degree of compliance of some cards to FAA guidelines. Further, although the majority of the cards were found to be visually attractive, they differed in the degree of understandability of the written and pictorial information presented. Except for the safety cards which were produced by a firm which specializes in the development of the safety cards by application of human behavioral principles and learning techniques, it was clear that the cards examined were not developed by testing

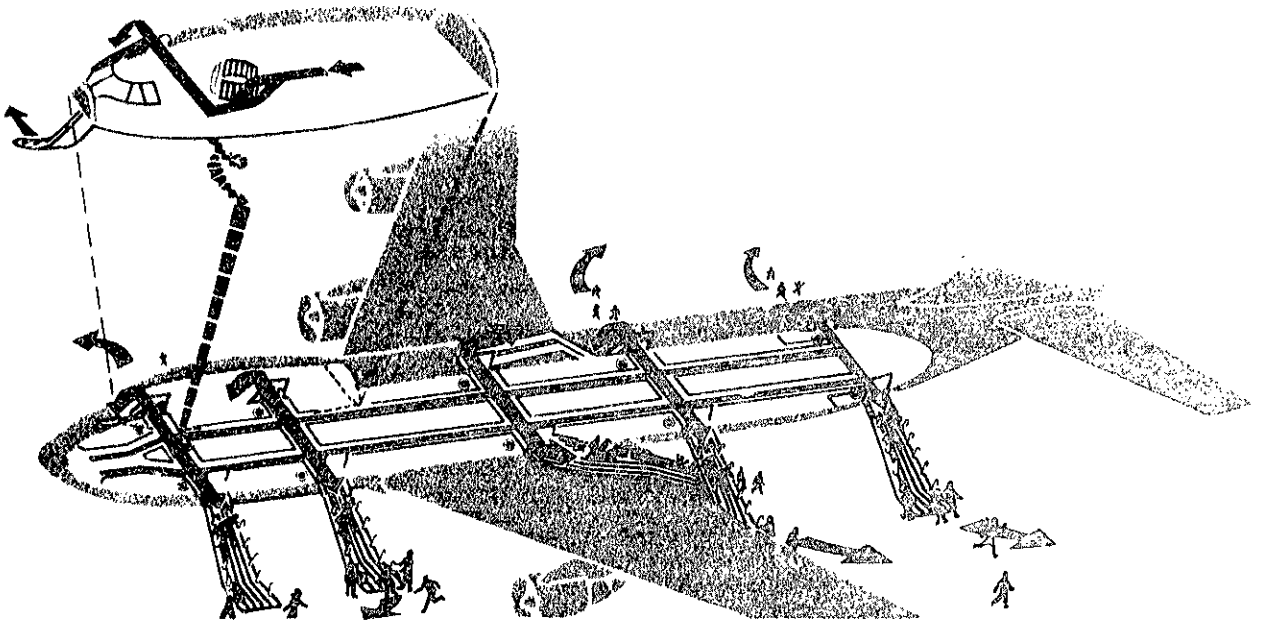

Figure 14.—B-747 exit routes, including upper deck lounge primary and secondary exit routes.

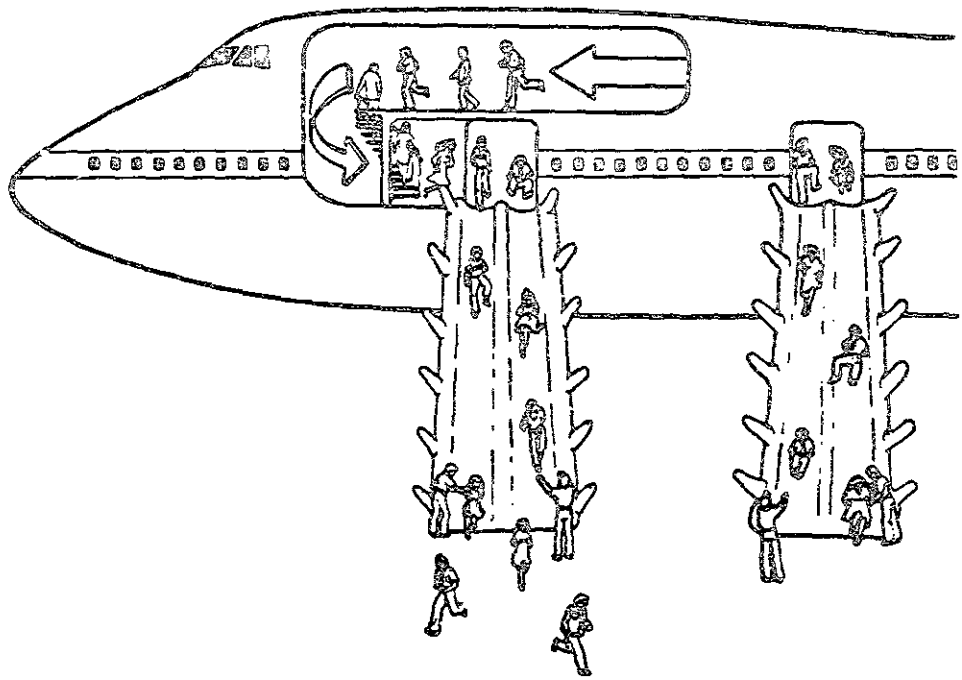

Figure 15.—B-747 Upper Deck: Lounge primary exit routes (secondary exit route not shown).

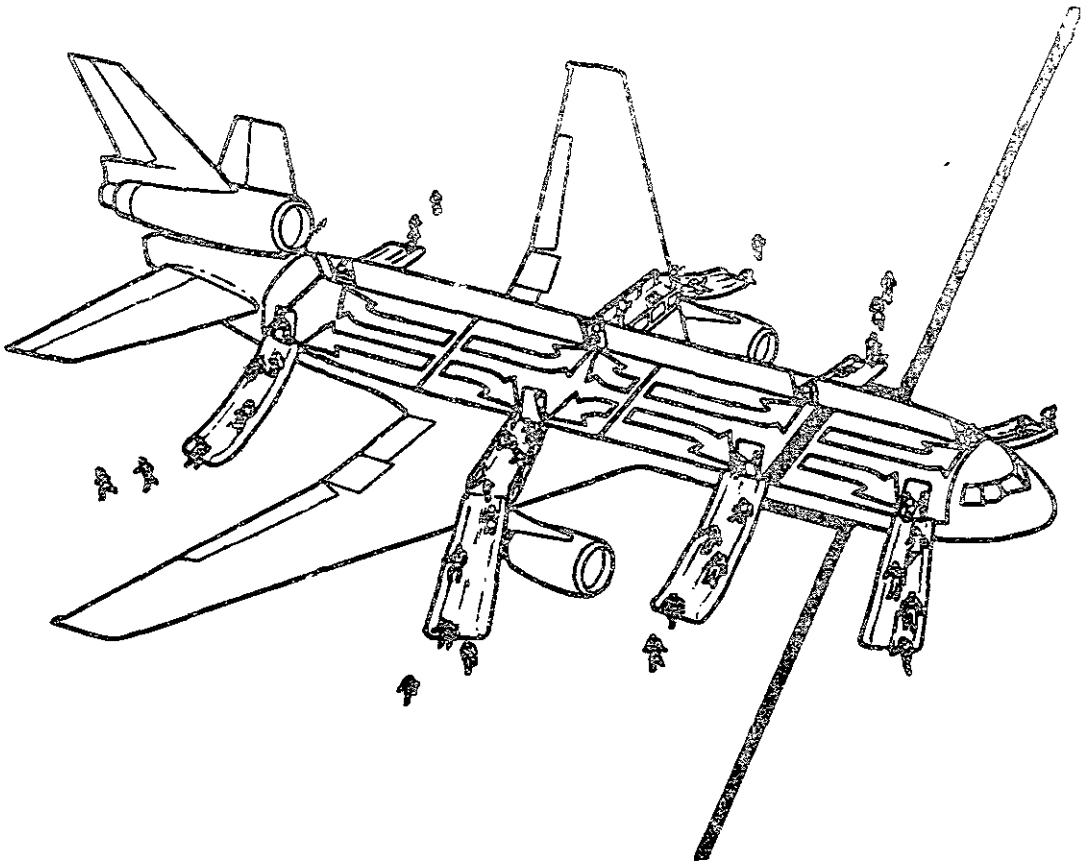

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Figure 16.--DC-10 Exit Routes.

the understandability of the information presented. For example, some cards showed confusing instructions to fasten, tighten, and release seatbelts. As a result of Safety Board accident investigations which showed that passengers have experienced difficulty operating their seatbelts, the FAA required that pre-takeoff briefings include demonstrations on seatbelt usage. However, there are no guidelines available to assist FAA inspectors in determining the understandability of these demonstrations or of the instructions shown on safety cards. Another example of the variation in presentation of information was the number and size of instructions for the use of life preservers. Some cards showed five or more relatively small illustrations which, had they been larger, would have been much more understandable. There was also an absence of understandable instructions on most cards for donning of flotation equipment on children.

This study disclosed a wide variation in the understandability, content, and method of presenting pictorial and printed information on safety cards. Additionally, some cards depicted inaccurate brace positions which were contrary to that recommended by the FAA. Not all cards instructed adult passengers to don their oxygen masks before they placed a mask on a child or showed how to place an adult-sized life preserver on a child. No cards showed how a child or an infant was to be protected during a crash. These variations indicate that FAA inspectors who review and approve safety cards have no definitive guidance, and further, that the guidance contained in Air Carrier Operations Bulletins, Air Carrier Inspector Handbooks, and Advisory Circulars is not being applied in a standard manner.

Advisory Circular 121-24, issued in 1977, had as its goal the "standardization and improvement of the safety information presented to passengers by the airline industry." Although the purpose of this AC was to upgrade the quality of briefing cards, the findings of this study strongly indicate that this goal was not accomplished because many of the cards examined contained erroneous, confusing, and ambiguous instructions.

FAA's Principal Operations Inspectors are responsible for assisting air carriers with the development of briefing cards, approving the cards and any changes thereto, as well as inspecting the cards during enroute cabin inspections. Many of the cards did not meet the goals established by the FAA's Advisory Circular and Air Carrier Operations Bulletins. The Board is disturbed that FAA inspectors have approved these safety cards, which contained information contrary to the FAA's own guidance. The Safety Board is aware that the AC and ACOB's have major shortcomings; nonetheless, they are the only sources of guidance to FAA inspectors, and as such, the Board is concerned that this guidance has not been applied in a standardized manner. The Safety Board is further concerned that neither the training given to FAA inspectors nor their on-the-job experience has apparently adequately prepared them to assist air carriers with development and preparation for approval of safety cards and other safety briefings.

The clarity, size, and number of illustrations varied considerably. Some cards used sequentially numbered illustrations for more complex instructions such as donning life preservers, opening ventral exits, and activating oxygen systems, whereas other cards did not number the illustrations; these cards subsequently were judged as being less informative and more difficult to follow. The Safety Board believes that topics contained on all safety cards can properly lend themselves to standardized presentations to ensure that passengers will receive the same detailed information from all safety cards on similar airplanes regardless of which airline the passenger may choose.

The Society of Automotive Engineers' Aerospace Recommended Practice is far more detailed in listing specific topics than the Federal Aviation Regulations, and for this reason, the FAA used the ARP as the basis for the 1977 Advisory Circular which provides guidance for developing oral briefings and safety cards. Although the ARP provided, for the first time, specific requirements for what minimum pictorial information should appear on safety cards, the ARP allows great latitude on how the information is to be presented. For example, the ARP requires that instructions be given for fastening, unfastening, and adjusting seatbelts. However, designers of safety cards are free to determine the number and the size of pictorial illustrations, the use of color or monochromatic photographs or artist illustrations, whether or not to include a person in the illustrations, and so forth. The Safety Board, while agreeing with the basic premise of the ARP to provide guidance by objective, nonetheless believes that the designers of safety cards need more definitive criteria for pictorial illustrations to make the instructions more understandable. The Safety Board has identified several variations in the manner in which pictorial instructions are portrayed on safety cards, yet each of these cards complies with the ARP requirements. Thus, absent any additional guidance, the designers of cards can conform to the ARP and yet the information presented may not be understood by passengers.

The Safety Board notes that testing the understandability of safety card instructions and the behavior of persons in carrying out these instructions has not been pursued by the SAE, the FAA, or the airlines. The Safety Board finds this unfortunate in light of the wide variations shown in the information contained on the safety cards which were examined in this study. For example, with regard to the operation of seatbelts, the number of illustrations on safety cards ranged from one to three, their size ranged from 1 x 2 3/8 inch to 7 1/2 x 3 inches, and the intent of the pictorial instructions was not clear on some cards. Thus, while the ARP and the FAA's Advisory Circulars provide some guidance on what information should be contained on safety cards, the ARP has not become the catalyst for the FAA and the industry to develop the next logical step of determining how the information should be presented for maximum understandability. The Safety Board believes that research is long overdue into the possible standardization of pictorial information which can lead to the information being better understood.

Safety cards which are visually attractive have a greater probability of being noticed, picked up, and read. It was found that only 52 percent of the 46 cards examined were of the same size or smaller than the other materials typically found in seatback pockets, thus making the cards not readily noticed. Most cards used artist illustrations and the majority of these cards used multi-colored illustrations which added to their visual appeal. Sixty-five percent of all the cards contained bilingual or multi-lingual instructions which added further to their appeal to non-English speaking passengers.

Comparison of Oral Briefing Methods

Oral briefings from eight major U.S. Air Carriers were reviewed. These briefings were used on 13 makes and models of narrow- and wide-bodied airplanes which were equipped for operations over land, over water, and extended overwater. The briefings were compared to the Federal Aviation Regulations and to other guidelines. (See appendix H for a listing of published guidelines.) The briefings were also compared to each other.

Although all of the oral briefings contained the topics required by 14 CFR 121 there was a lack of uniformity among the oral briefings examined. The term uniformity as used here denotes the order in which the safety topics were presented as well as the degree of

detail in instructions given. For example, some briefings explained orally and also demonstrated how a seat cushion should be held in the water for flotation, whereas other briefings explained but did not demonstrate how to hold a seat cushion. Another example was a briefing on how to use the seatback-mounted supplemental oxygen system; the passengers were instructed to pull the lanyard and listen for a "loud snap" which would indicate that the oxygen system had been activated. Other briefings for the same oxygen system did not mention the "loud snap." Neither the regulations nor other FAA guidelines recommend that the pre-landing safety briefing address the location of exits or that passengers should be reminded to refer to the safety cards before landing.

No correlation was found between the format of the briefings for wide-bodied and narrow-bodied airplanes. Similarly, no correlation was found between the briefing format and whether or not the airplane flight was extended overwater, over water, or over land. Two briefings instructed passengers to refer to the safety card instead of the more common industry practice of having flight attendants point to each emergency exit. Only four briefings, or 50 percent of the briefings reviewed, instructed passengers to note the location of alternate exits, or to locate the exit nearest to them, or to locate exits other than the one they had used when boarding.

Observations and Comments on Oral Briefings and Demonstrations

There appear to be three determinants which are interdependent yet controllable in making flight attendant oral briefings and demonstrations effective and understandable, and which may encourage passengers to become more attentive to the briefings. These are the flight attendant's professionalism, the content of the briefing, and the delivery of the briefing.

The flight attendant's professionalism and confident behavior can influence positively the passenger's perception of the attendant's credibility and knowledge of the airplane's safety features while also establishing the flight attendant's role of leadership. In other words, passengers may more readily accept the role of the flight attendant in matters of safety when the flight attendant is viewed as a safety professional.

The content of the oral safety briefings and demonstrations obviously can affect how well the briefing is received and understood by passengers. It has been shown that when naive persons are presented with a large number of complex instructions for novel tasks which must be remembered in a stressful situation, they will tend to disregard the instructions as being "too technical" to be remembered. To counteract this behavior, oral instructions must be simple, clear, concise, and unambigious. Further, the instructions must be understandable to the listener both from the standpoint of why a particular action is necessary (such as wearing a seatbelt in the event that turbulence is encountered) and how the action is to be performed (such as making sure the seatbelt is tightly fastened and worn low on the hips for maximum effectiveness). Other examples could include why it is necessary to tighten life preserver straps, why the preservers should not be inflated inside the cabin, and why it is necessary for adults to don their oxygen masks before placing masks on accompanying children. The Safety Board is aware of concerns that standardizing briefings may not be desirable since passengers could become bored and inattentive when hearing the same information presented in the same order each time they fly. We believe that the issue of standardized oral briefings should be examined to determine if they would have a negative effect upon the passengers. Notwithstanding the issue of standardizing the order of the topics presented during an oral briefing, the Safety Board believes that the briefings could use standardized terminology to increase the

understandability of the information. For instance, studies could demonstrate whether it is better to use "life vest" or "life preserver," "emergency doors" or "emergency exits," or when describing the operation of seatbelts, it is better to say, "to release your seatbelt. . . " or "to open your seatbelt. . . "

The oral delivery of instructional information can be affected by the public address (PA) systems, the degree of interest and enthusiasm projected by the speaker's voice, and how well the speaker projects the information. The poor quality of PA systems has been a concern to the Safety Board for several years and in response to Safety Board recommendations manufacturers have improved both the fidelity of the systems and increased the numbers of speakers in newer and refurbished airplanes. However, ineffective systems are still present in some airplanes and the passengers' ability to hear and to understand safety instructions on the ground and inflight continues to be a problem. Although flight attendant initial training programs include instruction on recommended techniques for making PA announcements, the Safety Board believes that these techniques should be reviewed during recurrent training to reinforce the need for proper use of the PA system to gain maximum effectiveness of safety announcements. While it can be readily appreciated that an unintelligible PA system will prevent passengers from hearing or understanding the information, these announcements can also irritate the passengers because they do not know what is being said and, thus, can adversely affect their perceptions as to how that airline views safety information. Thus, no matter how well the safety briefing is presented and how understandable the instructions may be, the overall effectiveness and passenger attentiveness to and acceptance of the information will be lost because of a poor quality PA system.

The voice of the person who presents the oral briefing should be enthusiastic and pleasant to gain and hold the passengers' attention. Flight attendants should be reminded during recurrent training that the manner in which they present safety briefings and other safety information can influence how well the passengers pay attention to the briefing. The training should also point out that slow, well articulated messages will be better understood by passengers who may have difficulty in understanding English or any other language which may be used, for passengers who are hearing impaired, and for other passengers who may have difficulty understanding announcements over the PA system. Finally, flightcrews should be sensitive to the time required for the flight attendants to perform the pre-takeoff safety briefing and demonstrations. A hurried briefing along with hurried demonstrations because of expedited taxi and takeoff clearance detract from the importance of the safety information.

Videotaped Safety Briefings

Three U.S. air carriers and two non-U.S. air carriers provided 11 videotaped briefings for review. These briefings were used on domestic and extended overwater flights of DC-10, B-747, and B-767 airplanes.

Only general guidelines for video briefings are found in FAA Advisory Circular AC-121-24 and in two Douglas Aircraft Division reports published in 1973 and 1975 and are shown in appendix H.

Comparison of Videotaped Briefings

The videotaped briefings all addressed the topics required by 14 CFR 121. However, they differed significantly in (1) the time spent showing each required topic; (2) the way in

which the topics were presented; (3) the use of close-up/zoom camera techniques to show detailed instructions; and, (4) the use of "live" presentations of persons using oxygen equipment, fastening seatbelts, and opening exit doors.

The overall impression of the video briefings was that they all used technically high quality camera, lighting, and audio techniques, and true-to-life colors with pleasant sounding, good fidelity audio voice-overs which supplemented the video scenes shown. The voice-overs generally were similar to those heard during the pre-takeoff flight attendant safety briefings-demonstrations.

Because there were no specific guidelines to which the video briefings could be compared, the briefings were compared to each other. The following list compares the amount of time spent to present certain topics:

Table 1.

Topics	Number of briefings	Longest duration	Shortest duration	Average time	Median time
		(observed elapsed times are in minutes and seconds)			
Overall presentation	11	6:05	1:50	3:38	3:13
General features	10	1:55	:30.5	:43	:46
Oxygen system use	10	:42	:15.5	:29.5	:35
Overwater provisions	6	2:09	:22	:57	:47.5
Emergency evacuation	10	:51	:05	:22	:17
Seatbelt usage	10	:30	:8.5	:16	:16.5
Exit locations	7	:15	:04	:9.2	:06
Smoking rules	10	:15.5	:2.5	:7.8	:0 5
Reference to safety card for additional information	9	:20	:06	:11	:10

Marked differences were found in the presentation of the operation of emergency exits, overwater and extended overwater provision, supplemental oxygen systems, and preparations for an emergency landing.

The content, accuracy of information, and manner of presenting the information varied among all the briefings. Some briefings contained effective medium and close-up/zoom techniques to illustrate novel information (donning life preservers, operation of supplemental oxygen, etc.), accompanied by informative voice-overs. On the other hand, some briefings were merely televised flight attendant oral briefings and demonstrations which provided the passengers with no more information than would have been possible from viewing a flight attendant briefing. One briefing was developed in this country for a foreign air carrier. During production of the video, naive subjects were tested to determine how well they understood the information. The Safety Board believes that this practice should be routinely adopted to ensure that all the information presented on video briefings is understood by the passengers.

One observation of these briefings was the absence of any standardization for the visual presentations and the accompanying voice-overs both from the standpoints of the amount of information shown and the amount of information orally given. Another observation was the manner in which visual and oral information was given. For example, the more informative and understandable video briefings showed persons performing the

steps necessary to activate emergency equipment and showed the equipment actually operating., i.e., an exit door opening and an evacuation slide inflating. In another example, a briefing which showed a passenger (and not a flight attendant) grasping a door handle and then opening the door was far more informative than a briefing that showed a close-up of a safety card with a voice-over instructing passengers to refer to the safety card to learn how to open the exit doors.

The Safety Board believes that some topics could be standardized among all video briefings. Further, tests should be used to determine the most understandable methods of presenting both visual and oral information. Finally, we believe that showing "passengers" performing the tasks presented below would greatly improve the effectiveness of these briefings.

Supplemental Oxygen.--Show that when masks drop in an entire area of the cabin, the passenger extinguishes a cigarette, pulls the lanyard to initiate the flow of oxygen, and dons and adjusts the oxygen mask. Show the action of an oxygen flow indicator (if one is installed), and explain why the mask's reservoir bag will not inflate. Show how to don an adult's mask before a child's, and give instructions not to remove masks until told to do so by a crewmember.

Flotation Device.--Remove a life preserver from its stowage compartment and open its protective pouch; don the preserver while seated with the seatbelt fastened and give close-up views showing how to attach any straps on the preserver; tell why it is important to tighten the straps, pull on handles to inflate the vest, and blow into the inflation tube. Where applicable, demonstrate how to hold a seat cushion.

Smoking Rules.--Show a close-up view of the "No Smoking Sign," explain that smoking is not permitted in lavatories or while standing in the aisle, that cigar and pipe smoking is not permitted, and that smoking is not permitted after landing until passengers are inside the terminal.

Pre-takeoff and Pre-landing.--Show a view of the cabin with only the emergency lighting on to illustrate how dark the cabin may be during an evacuation. Show how to stow carry-on articles under seats; how to fasten, tighten, and release the seatbelt; how to raise seatback and locking tray tables; how to assume brace positions.

SUMMARY

For over 22 years, accident investigations have identified problems with the content, accuracy, and manner of presenting safety information to passengers onboard commercial air carrier airplanes which operate under 14 CFR 121 and 135. Yet there have been few changes in the manner of presentation or in the effectiveness of passenger safety information. Furthermore, the Safety Board is concerned with the continuing problem of the passengers' lack of motivation to pay attention to flight attendant oral briefings and demonstrations, to printed safety cards, and more recently, to videotaped safety briefings.

The Safety Board finds it disquieting that, in spite of the FAA's testimony before the U.S. House of Representatives, it has not systematically researched passenger safety information, and that neither the FAA nor the airline industry has taken steps to develop criteria to quantitatively and qualitatively assess the content and manner of conveying safety information to passengers.

A 4-day Cabin Safety Conference was convened in late 1984 to examine all facets of cabin safety and to recommend to the FAA topics which warrant further study. Passenger safety information was one of several topics discussed during an 8-hour working group session. The limited time allotted to the issue of passenger safety information and to reecmmendations for further study demonstrates to the Safety Board the validity of its earlier recommendation that the FAA should convene a separate task force dedicated solely to an indepth assessment of passenger safety information.

Airlines have developed, with FAA concurrence, videotaped safety briefings for use in lieu of pre-takeoff flight attendant oral briefings and demonstrations. The Safety Board is pleased that some airlines on their own initiative have developed these videotaped safety briefings without benefit of definitive guidance from the FAA, although some advice is contained in an FAA Advisory Circular. This study has found that, although these video briefings are technically of a high quality, the briefings varied in four significant ways: (1) the time spent on each topic, (2) how the topics were visually presented, (3) the use of zoom/close-up views to show novel actions, (4) and the use of persons actually performing actions, such as using supplemental oxygen, donning life preservers, opening exit doors, and operating seatbelts. It is obvious to the Safety Board that these video briefings were developed without first determining that the information was understood by naive persons and then testing to demonstrate that after understanding the information they could perform the actions described. One briefing for a foreign airline was developed by testing the understandability of the video information on naive subjects and thereafter was tested again to show that the subjects could actually perform the actions shown in the briefing. The Safety Board believes that this methodology, which has been successfully used to develop safety cards, also can be applied to developing videotaped briefings. Furthermore, videotaped briefings should present information in a standardized format to ensure that passengers will receive the same amount and detail of instructions for each make and model of airplane regardless of the airline they choose. The FAA has no guidance material available on standardizing the content and manner of presenting videotaped safety information. The Safety Board believes that the FAA should provide the leadership in conducting long overdue research in developing video briefings which will better prepare passengers to act correctly in an emergency and to publish criteria for the development and production of videotaped safety briefings.

The Safety Board surveyed airlines, their employees, aviation safety firms, and passenger associations for their views on the adequacy of current safety briefings, how the briefings could be improved, and the efficacy of providing specialized safety training to frequent air travellers. A common response was that passengers do not pay attention to flight attendant briefings and demonstrations, and that passengers do not read safety cards. Only the Air Transport Association disagreed that improvements are needed with oral briefings and safety cards. Both positive and negative comments were made to the suggestion of safety training for frequent passengers; however, almost all responders believed that passengers who receive such training must not interfere with or otherwise disrupt the duties of the highly trained crewmembers during emergencies. The Safety Board agrees that the crew must maintain discipline and leadership during nonroutine and emergency situations and that passengers cannot be permitted to assume authority except in the absence of trained crewmembers during life threatening situations. The Safety Board further acknowledges that providing such training to passengers would entail some expense to both the provider of the training and to the persons who are trained. Nonetheless, we believe that there are ways to provide more than rudimentary knowledge of the safety equipment onboard air carrier airplanes to frequent flyers as well as first-time air travellers. For instance, airlines could provide video messages and "hands

and displays of life preservers, oxygen masks, and seatbelts in terminal waiting areas and encourage passengers to operate these devices through marketing techniques. Airlines could host meetings of civic, professional, and service organizations at their training facilities and provide the opportunity for attendees to don life preservers and operate exit doors. A third method would be for airlines and corporations to jointly sponsor "safety seminars" as an opportunity to present the safety features of their airplanes. Lastly, the Department of Transportation, airlines, and the National Advertising Council could provide media public service announcements aimed at informing the public of airplane safety features.

The Safety Board believes that airlines could encourage their employees when they travel as passengers to be attentive to flight attendant oral briefings and demonstrations, to read the safety cards, and when applicable, to be attentive to video briefings. These actions could provide an example and create a form of peer pressure for other passengers to avail themselves of the safety information provided. Further, air carriers could provide familarization of safety equipment to their non-flying employees and to the families of all employees. Airline employee associations could publish safety information in their periodicals and discuss passenger safety information during membership meetings. The Safety Board believes that several approaches can be taken by the airlines, employee associations, and the business and professional communities to disseminate airplane safety information to frequent and first-time air travellers.

Federal Aviation Regulations for Parts 121 and 135 operations provide minimum requirements for conveying safety information to passengers. FAA Advisory Circulars and Air Carrier Operations Bulletins provide general guidance to air carriers and to FAA inspectors for developing flight attendant oral safety briefings and safety cards. However, the Safety Board found that this guidance does not always adequately address methods to convey safety information in a factual, concise, unambiguous, and readily understood manner.

AC 135-12 for Part 135 Commuter/Air Taxi operators provides much better guidance and more specific information than does AC 121-24 for Part 121 operators. For example, guidance for an oral briefing includes pointing out exits, instructing adults to don oxygen masks prior to placing them on their children, and instructing crewmembers not to be assigned service-related duties during the briefing. Some of the safety card guidance that is contained in AC 135-12 but is not contained in AC 121-24 includes the use multi-colored cards, encouraging passengers to be familiar with exits other than the one they entered, instructions for placement of the exit hatch after it is removed, prohibiting removal of carry-on baggage during an evacuation, instructions for use of evacuation slides, adult donning of oxygen mask before children, and the removal of a flotation device from its pouch.

The Safety Board believes that AC 135-12 provides more guidance for flight attendant's oral briefings and for safety cards than does AC 121-24; however, neither Advisory Circular provides guidance in how to don a child's life preserver, nor do they address protective or brace positions for infants and children. The Safety Board believes it is necessary to depict this important information on safety cards and that the FAA should provide appropriate guidance in both Advisory Circulars.

The International Air Transport Association, the Airline Pilots Association, and others agree that pre-landing safety briefings should be given to airline passengers. The Safety Board concurs and believes further that these briefings should be given despite the

length of the flight. Presently flight attendant pre-landing announcements request that passengers bring their seatbacks up, lock tray tables, stow loose articles, and fasten their seatbelts. The Safety Board believes that passengers need to be reminded of other safety features before landing, especially on flights that may last for several hours and extend through several time changes, resulting in passengers becoming lethargic or otherwise less alert than when they first boarded the airplane. The Safety Board believes that an unreasonable burden would not be placed upon flight attendants to make a pre-landing announcement early in the descent for landing with the following information and guidance: (1) passengers to note the exit nearest to them and alternate exits, (2) the location and operation of flotation devices if the approach is to be over water, and (3) a request that passengers refer to their safety cards for instructions on the exit routes and the operation of exits.

Examination of flight attendant oral safety briefings showed a general lack of uniformity in the order the topics were presented, as well as the detail of the instructions which were given to the passengers. Instead of having flight attendants point to each exit, two airlines merely request that passengers refer to the safety card which shows where the exits are located. Only four briefings instructed passengers to note the location of exits near them or alternate exits or an exit other than the one they boarded through. Some briefings exceeded guidelines found in the FAA Advisory Circular by instructing adult passengers to don their oxygen masks before placing masks on children they might be travelling with. Other briefings went beyond the Air Carrier Operations Bulletins by demonstrating how to hold flotation seat cushions. The Safety Board believes that the FAA should develop standardized guidance to air carriers to ensure that oral briefings industry-wide contain all the necessary safety information.

Multilingual briefings pose problems with holding the attention of passengers. The Safety Board believes that studies could identify the most effective ways to present these briefings. For example, is it better to present the entire briefing in one language before continuing with another language, or is it better to present each topic in each language before going on to the next topic? (This last technique is used by a non-U.S. airline with tape recorded briefings in English and in Arabic, alternating the languages periodically for each topic.) Tape recorded briefings also permit an additional flight attendant to perform demonstrations of the safety features as well as ensuring that the content of the briefing is standardized and that the verbal delivery of the briefing is presented slowly and clearly.

Public address system improvements should be continued to ensure that passengers can hear and understand safety messages. This can be critical in airplanes with rear mounted engines which have relatively high ambient noise levels in rear cabins on the ground and inflight.

Human behavioral research has shown that verbal instructions for novel actions must be clear, concise, unambiguous, and readily understood. These principles are especially critical when applied to pre-takeoff and inflight safety announcements because these announcements are typically given in a relatively short time when passengers are preoccupied or otherwise distracted. Research has further demonstrated that the two significant variables with the pictorial presentation of information on safety cards are color versus no color and photographs versus artist illustrations. No statistical differences were found between color photographs and color illustrations and in fact, both were more effective than if they had been black and white. However, black and white photographs were more effective than black and white artist illustrations. Color also was found to make certain novel instructions more easily understood, such as the direction to turn door handles, the donning of life preservers, and the operation of oxygen systems.

An FAA sponsored study in 1973 found six variables which determined whether passengers would pay attention to presentations of safety information: (1) the way the information was presented; (2) apparent response of other passengers to the presentation; (3) the passenger's perception of the probability of an accident; (4) the relative adequacy of the oral briefing; (5) situational and environmental determinants; and (6) the passenger demographics. The study recommended to the FAA that additional research would be necessary to fully explore and define several unanswered questions of human behavior as it pertained to passengers' motivation to accept safety information. The Safety Board is greatly disappointed in the seven years since this study that the FAA has not pursued the recommendations to better define passenger behavior to first, better understand why passengers do not pay attention to safety information, and second, explore methods to modify the behavior of passengers so that they will accept the importance of safety information.

A human behavioral researcher proposed that, to increase passenger attention to oral safety announcements and to the reading of safety cards, it may be necessary to show that it would be socially acceptable to pay attention while making it socially unacceptable not to do so. Another psychologist, commenting upon the often cited assumption that mentioning explicit emergency evacuation instructions produces anxiety among passengers, found that passengers would like to be told about safety equipment and the procedures they could follow to ensure their safety and survival. This researcher found also that the practice of not making passengers anxious may actually inhibit or deter their motivation to pay attention to safety information. Another study showed that even when safety information had been read, understood, and remembered, passengers did not always follow the instructions during emergencies. Laboratory tests found that this kind of inaction was a result of persons not having adequate knowledge of what behavior they should have performed rather than the physical threats which were present. Additional studies were recommended to fully explore the reasons why some passengers demonstrate this maladaptive inaction and to develop methods to control this behavior. Another author concluded that more studies were needed to determine what safety information passengers really need in order to develop the most effective ways to convey the information to enhance acceptance and retention of the information. The Safety Board believes that the literature amply demonstrates some reasons why passengers may or may not pay attention to safety information, is replete with examples of the more frequently seen types of passenger maladaptive behaviors, and provides a persuasive need for indepth research into passenger safety information. The Safety Board is disturbed that neither the FAA nor the airline industry have initiated any research and believes that the FAA should provide the leadership to oversee that research in passenger attention and motivation is properly directed and is completed in a timely manner.

During the 1970's, Douglas Aircraft Company examined adaptive and maladaptive behaviors which had been exhibited by passengers during emergency situations with a view toward modifying the maladaptive behaviors so that passengers would be better prepared to act correctly in an emergency. Douglas' applied research demonstrated that improved safety instructions could correct maladaptive behaviors. Research also has shown that during emergency situations there was a positive correlation between behavioral inaction by passengers to the lack of leadership provided during the emergency and to the passengers not knowing what to do. These findings could be applied to most emergency situations and the leadership demonstrated by crewmembers as well as the safety information which is given to passengers could mitigate behavioral inaction when quick and novel actions have to be performed by passengers. In other words, crew leadership when combined with safety information is more effective than leadership or

information alone. However, since accident investigations have shown that crew leadership is not always available or possible, it is obvious to the Safety Board that passengers must be provided with safety information which is easily understood and readily remembered when it is needed.

Applied research also demonstrated that after a loss of cabin pressure passengers could be given instructions for the use of supplemental oxygen by tape recorded messages broadcast over an airplane's public address system. These messages would be given following a loss of cabin pressure when flight attendants would be required to remain seated and to wear oxygen masks and thus be unable to provide any assistance to passengers. Although this kind of automatically broadcast safety message has been available on wide-bodied airplanes as a customer option for over 15 years, its use is not widespread.

The behavior of the flight attendants can influence both positively and negatively passengers' perception of the flight attendants' role as safety professionals and can thus affect the passengers' motivation to pay attention to safety information. The Safety Board believes that initial and recurrent training should ensure that flight attendants remain aware of their vital role on how they can influence passenger acceptance of safety information. It is clear that improper use of the public address system cannot only greatly detract from the understandability of an announcement, but can also be perceived by passengers as an announcement which contains no worthwhile information. Airlines should encourage flight attendants to speak slowly with good diction and with an interesting and pleasing voice. Although airlines in general do not encourage or permit flight attendants to deviate from published safety announcements, the Safety Board believes that some degree of latitude could be encouraged so that some announcements can be made with nonoffending humor as a way to gain and hold the passengers' attention. The Safety Board believes that airlines could develop and periodically change innovative opening sentences to their briefings to gain the attention of passengers. One such message which is used by a major U.S. carrier is: "The most important safety feature onboard this airplane are your flight attendants. For your safety and comfort, I would ask you to pay attention to your flight attendant who will now explain the safety features onboard this (make/model) airplane."

The Safety Board is convinced that tape recorded safety briefings have several advantages. They ensure that there is no variance in speed of delivery, all information uses standardized words and phraseology, and an additional flight attendant is available to conduct the demonstrations. On this last point, it would appear that a tape recorded briefing would be well suited for those airplanes which have only one flight attendant and especially for those airplanes in which the flight attendant must make the announcement out of sight of the passengers, thus making a demonstration of the safety features impossible. The Safety Board believes that automatically broadcast safety instructions are adaptable to most air carrier airplanes and their installation should be mandatory on newly manufactured airplanes and retrofitted on airplanes which are already in service.

Flightcrews also should be aware that although they do not have the same inflight contact with the passengers as do flight attendants, they also can nonetheless positively or negatively affect the passengers' acceptance of safety information. For instance, the Safety Board agrees that it is an excellent practice for the captain to make an announcement to introduce himself/herself to the passengers and to encourage the passengers to become familiar with the airplane's safety features. Furthermore,

Flightcrews should be aware that expedited clearances for taxi and takeoff can result in hurried or incomplete safety briefings with little or no time remaining for the flight attendants' pre-flight cabin inspection. The Safety Board believes recurrent training should reinforce the need for flightcrews to be continuously aware of the need to provide adequate time for the flight attendants' pre-takeoff briefing and cabin inspections.

FINDINGS

Since 1962, Civil Aeronautics Board and Safety Board accident investigations and special studies have shown that the survival of passengers had been jeopardized because of deficiencies and inaccuracies with safety information briefings.

Safety recommendations to the Federal Aviation Administration have resulted in some improvements in safety information provided to airline passengers. However, a 1983 safety recommendation that the FAA convene a government-industry task force to fully examine safety briefings with the view to improving passenger attention to the briefings and the content of the briefings themselves has not been acted upon to the satisfaction of the Safety Board.

Federal Aviation Regulations, Advisory Circulars, and Air Carrier Operations Bulletins provide only general guidance for flight attendant oral briefings and demonstrations and for safety cards. The guidance generally is in the form of what information should be presented, but not how it should be presented.

Federal Aviation Administration operations inspectors review and approve oral briefings, safety cards, and video briefings. The wide variance in the presentations and the occasional inaccuracies found in these briefings in the course of the study demonstrate that the inspectors are not following FAA guidance materials when reviewing and approving the briefings and cards.

The Advisory Circular for Part 135 commuter/air taxi operations contains better guidance for oral briefings and safety cards than does a companion Advisory Circular for Part 121 air carrier operations.

A 1978 study contracted for by the Federal Aviation Administration examined reasons why passengers do or do not pay attention to pre-takeoff oral briefings and demonstrations and safety cards. In spite of recommendations for further study to more fully explore passenger motivation, no follow-on research was conducted by the FAA.

The Douglas Aircraft Company conducted research in the 1970s into methods to correct maladaptive behavior exhibited by passengers following accidents. The research led to improved placards to explain the operation of emergency equipment, improved pictorial safety cards with few or no written instructions, and clearer oral instructions on the use of emergency equipment. Douglas also developed methods to test how well naive subjects understood various forms of safety information and to test how the subjects performed the emergency actions described.

Neither the Federal Aviation Administration nor the airline industry have quantitative criteria to test the comprehensibility of safety instructions or whether the instructions can be followed in an emergency.

This special study on Airline Passenger Safety Education found a wide variance in the manner that safety cards present pictorial and written information. Information was found to be confusing, difficult to follow and in some instances not in accord with Federal Aviation Administration guidance materials.

Airlines have developed video safety briefings without benefit of guidance information from the Federal Aviation Administration or the airline industry. The study found wide variances in how airlines choose to present taped audio-video safety information.

Few of the flight attendant oral briefings and demonstrations that were examined request passengers to note the locations of emergency exits near their seats. Not all briefings demonstrate how to hold flotation seat cushions. Two airlines do not require the flight attendants to point out the location of exits during the briefing; instead, the passengers are requested to refer to their safety cards for the locations of the exits.

The International Air Transport Association has proposed institution of pre-landing briefings with information on the location of exits, a request that passengers review their safety cards before landing, and if the approach is overwater, that the briefing review the location and operation of water flotation equipment. The Federal Aviation Regulations do not require that this information be presented before landing.

RECOMMENDATIONS

In view of the findings of this Special Study, the Safety Board reiterates its earlier recommendation that the FAA:

> Sponsor a government/industry task force open to foreign participants made up of representatives from the airplane manufacturers, air carrier and commuter operators, researchers, flight attendants, and consumers (1) to identify the type of safety information that is most useful and needed by passengers, (2) to identify and develop improved instructional concepts for conveying the safety information, and (3) to recommend appropriate changes to the operating requirements regarding passenger oral briefings and information briefing cards. (Class II, Priority Action) (A-83-45)

The Federal Aviation Regulations require merely that passengers be "orally briefed" on the location of emergency exits before each flight. However, for many years airlines have directed flight attendants to physically point to each emergency exit during the pre-takeoff safety briefings. The Safety Board believes that this practice is an effective way of informing passengers where each exit is located relative to each passengers' seat. Nevertheless, the Safety Board is disturbed that its investigators have observed that at least two U.S. airlines have discontinued this practice and instead ask that passengers refer to their safety cards for the location of the emergency exits. The Safety Board is concerned that this practice may establish an undesirable precedent that other airlines may follow. In 1972 the Safety Board issued a safety recommendation to the FAA to amend 14 CFR 121 to require that emergency exits be physically pointed out before each flight so that passengers would better know the location of exits. The FAA disagreed by stating that the regulations were adequate without the requirement to physically point to each exit; the status of this recommendation is "Closed--Unacceptable Action." In view of the findings of this study, which show that passengers should be given clear and

unambiguous instructions of the location and operation of safety equipment including the location of exits, and in view of the practice of at least two airlines to no longer require flight attendants physically point to exits, the Safety Board urges the FAA to reconsider this earlier safety recommendation:

> Federal Aviation Regulation 121.571 be revised to state that the appropriate crewmember must physically point out the location of all emergency exits on each aircraft prior to each takeoff. As a general rule passengers do not listen to the oral announcements, this was testified to during the public hearing relative to this accident. However, passengers will tend to watch a flight attendant who physically points out the area of exits and will retain therefore a general idea of the location of such exits particularly those nearest to them. (A-72-128)

The quality of public address systems can affect greatly the understandability of safety announcements made by the flightcrew and the flight attendants. The Safety Board reiterates its earlier recommendation on the importance of passengers being able to hear safety messages in all parts of the cabin when an airplane is on the ground with engines running and during flight:

> Issue a maintenance bulletin calling attention to the need for properly functioning public address systems to assure that safety messages by the crew are understandable in all parts of the cabin both on the ground and in flight (A-82-71).

The findings of this study reinforce further and strengthen the Safety Board's belief that the FAA should take the initiative and provide leadership in studying all aspects of passenger behavior as regards passengers' acceptance of safety information. Further, the FAA in consultation with industry should develop more effective methods of conveying safety information to passengers to ensure that passengers understand the information and also that passengers are able to actually perform the emergency actions which are described during the flight attendant oral briefings-demonstrations, in briefing cards, and during videotaped safety briefings.

Accordingly, the National Transportation Safety Board recommends that:

— the FAA:

> Develop methods to improve passenger motivation to listen to safety information. (Class III, Longer Term Action) (A-85-93)
>
> Develop tests and standards which describe the minimum level of acceptable comprehension and performance to measure whether persons who represent typical passengers understand the safety information presented during oral briefings and demonstrations, on safety cards, and in videotaped briefings, and whether these persons actually are able to perform the actions described, such as using supplemental oxygen system, using life preservers, and opening of exits. (Class III, Longer Term Action) (A-85-94)

Revise, based on the results of testing of passenger comprehension of safety information and performance of emergency procedures, the Advisory Circular entitled "Passenger Safety Information Briefings and Briefing Cards" (AC-121-24, dated June 23, 1977, and AC-135-12, dated October 9, 1984) to include improved guidelines on the content and presentation methods used in oral and videotaped safety briefings, and for pictorial and printed information on safety cards. (Class III, Longer Term Action) (A-85-95)

Revise, based on the results of testing of passenger comprehension of safety information and performance of emergency procedures, Air Carrier Operations Handbooks and Bulletins and air carrier inspector training programs to include instruction to prepare FAA inspectors to provide better guidance to airlines when assisting them in improving the content and presentation of passenger safety information to their passengers. (Class III, Longer Term Action) (A-85-96)

Revise Advisory Circulars 121-24, dated June 23, 1977, and 135-12, dated October 9, 1984, to provide guidelines covering the following items in briefings and demonstrations: adults donning oxygen masks before placing masks on accompanying children; fastening an adult size life preserver or personal flotation device on a child; and brace positions for children. As an interim measure, issue an Air Carrier Operations Bulletin to assist FAA inspectors in providing better guidance to airlines. (Class II, Priority Action) (A-85-97)

Amend 14 CFR 121 to require pre-landing safety announcements to reinforce the pre-takeoff briefings on release of seatbelts, the location of exits, the location and operation of life preservers (in the case of overwater landings), and to urge passengers to refer to safety cards prior to landing. (Class II, Priority Action) (A-85-98)

Amend 14 CFR 121 to require, on airplanes which are equipped with life preservers, that the safety briefings include demonstrations of how to open the life preserver's sealed protective pouch. (Class II, Priority Action) (A-85-99)

Require that automatically activated safety messages be used for explaining the operation of the supplemental oxygen systems following loss of cabin pressurization in all newly manufactured air carrier airplanes and after a specified date, in all other air carrier airplanes which operate under 14 CFR 121. (Class II, Priority Action) (A-85-100)

Require that recurrent flight attendant training programs contain instructions on the use of the public address system and techniques for maintaining effective safety briefings, and demonstrations which will improve the motivation of passengers to pay attention to the oral briefings and to the demonstrations. (Class II, Priority Action) (A-85-101)

Require airlines to include, during initial and recurrent flight attendant training programs, information on how personality and behavior of passengers can be manifested in non-routine and emergency situations; and to provide instruction on how flight attendants can compensate for these interpersonal dynamics when they must assign duties to passengers in emergencies. (Class II, Priority Action) (A-85-102)

Develop a program to test the feasibility, effectiveness, and passenger acceptance of providing safety briefing information in airport terminal gate areas, and of providing printed safety information on or inside ticket envelopes. (Class III, Longer Term Action) (A-85-103)

Explore the feasibility of providing public service messages in the media which acquaint air travelers with safety features aboard air carrier airplanes. (Class III, Longer Term Action) (A-85-104)

-- the Air Transport Association and the Regional Airline Associations and airlines which are not members of the association:

Encourage all employees and their families, when flying as passengers for personal or business reasons, to set an example of attentiveness to oral briefings and demonstrations, and videotaped safety briefings and of reading the safety cards. (Class II, Priority Action) (A-85-105)

Include articles in inflight magazines which provide additional and more detailed safety information for passengers. (Class II, Priority Action) (A-85-106)

-- the Air Transport Association and the Regional Airline Associations:

Establish a standing committee within your organization to review passenger safety briefing methods and to work closely with the FAA in improving the content and presentation of passenger safety information. (Class II, Priority Action) (A-85-107)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JIM BURNETT
Chairman

/s/ PATRICIA A. GOLDMAN
Vice Chairman

/s/ G. H. PATRICK BURSLEY
Member

October 25, 1985

APPENDIXES

APPENDIX A

ACCIDENT CASE HISTORIES

The following accidents illustrate the more common and often recurring problems the Safety Board has found with passenger safety information. The Case Histories are divided into five categories: Loss of Cabin Pressurization; Inflight Turbulence; Emergency Evacuations Following a Crash; Preparations for a Planned Water Ditching; and Unplanned Water Landing. A table listing various accidents with passenger education problems is also included.

LOSS OF CABIN PRESSURIZATION

Although inflight decompressions are an infrequent occurrence, when they do happen several maladaptive passenger behaviors generally will take place in this sudden and stressful situation. Sudden decompressions can be accompanied by a dramatic rise in cabin noise, the formation of a fog-like cloud of condensed moisture along with dust and light debris at the same time the oxygen masks are presented to the passengers either from ceiling or seatback compartments. As a result of a Safety Board study of DC-10 and L-1011 chemically generated oxygen systems, several problems were identified with the use of the systems, and as a result the FAA, airlines, and the airplane and oxygen system suppliers made several improvements in the equipment, in the training of flight attendants, and in the oral briefings and safety cards. Notwithstanding these improvements, the Safety Board believes that the following case histories illustrate problems which may occur again.

Case 1: On April 1, 1973, an L-1011 with 212 passengers and a crew of 13 experienced a loss of pressurization while descending from 29,000 feet. During the decompressions the cabin altitude rose to 20,000 feet. Most oxygen masks automatically deployed in the cabin but 20 oxygen compartment doors failed to open. Passengers donned their masks immediately, but in doing so some placed the mask over only their mouths instead of over their noses and mouths. During the emergency descent, flight attendants assisted passengers who were hyperventilating and those who experienced ear blockage. One attendant sat on a folded over seatback and instructed passengers in the use of their masks. The flight attendants reported that it was difficult to instruct passengers while also breathing oxygen.

Case 2: A DC-10 on May 1, 1975, with 182 passengers and a crew of 12, failed to maintain cabin pressure and at 33,000 feet the crew noticed that the cabin altitude was 15,000 feet and increasing. The oxygen masks deployed and the cabin altitude eventually reached 18,000 feet during the emergency descent. Only two of the 182 passengers properly activated their oxygen systems and donned their oxygen masks. The flight attendants had to assist the other passengers with initiating their oxygen systems and donning their masks.

Case 3: On November 3, 1973, a DC-10 cruising at 39,000 feet with 115 passengers and a crew of 12, experienced an engine disintegration and parts from the engine penetrated the fuselage and the No. 1 engine. The cabin decompressed immediately and a passenger was ejected through a broken cabin window. Damage to the

airplane's electrical system caused some oxygen compartment doors not to open automatically. The cabin altitude reached 34,000 feet; the occupants were exposed to cabin altitudes above 30,000 feet for one minute and to altitudes above 25,000 feet for over two minutes. After the oxygen masks deployed, some passengers did not know how to use them. Other passengers correctly removed their masks from compartment doors but then leaned forward into the masks and did not pull the attached lanyard to start the flow of oxygen. Other passengers discontinued using their masks because the reservoir bags did not inflate as they breathed and they erroneously concluded that the equipment was defective.

Case 4: An almost identical situation of passenger behavior arose on October 3, 1974, when a DC-10 with 53 passengers and a crew of 12 depressurized during a descent from 35,000 and the cabin altitude rose to 25,000 feet. When the oxygen masks deployed, the senior flight attendant told the passengers to don their masks. Only two of the 53 passengers removed their masks from the compartments, pulled the lanyard to initiate the flow of oxygen, and donned their masks correctly. The remaining passengers either did not react at all or they leaned forward and attempted to breathe through their masks without first removing the masks fully from the compartment. Flight attendants circulated among the passengers and activated the oxygen generators and re-instructed passengers on the use of their masks. Both flight attendants' and passengers' reservoir bags did not inflate, oxygen was not flowing to the masks, and the attendants and passengers switched to other masks.

INFLIGHT TURBULENCE

The failure of passengers to heed repeated flightcrew and flight attendants' oral announcements to remain seated with their seatbelts fastened continues to be responsible for unneccessasry injuries when airplanes encounter turbulence. Three cases illustrate this form of inappropriate passenger behavior:

Case 5: On April 3, 1981, a United Airlines DC-10 with 154 passengers and 12 crewmembers encountered turbulence near Hannibal, Missouri. The captain made an announcement and the seatbelt sign was turned on when cirrus clouds were entered. Moments later a large cloud was entered and severe turbulence was encountered. A flight attendant and seven passengers sustained serious injuries and several others sustained minor injuries. None of the flight attendants was seated at the time. Passengers who had not heeded the seatbelt sign and the announcement were thrown from their seats. Several seats were damaged as were overhead panels and storage bins.

Case 6: A B-747 with 148 passengers and 15 crewmembers onboard encountered moderate to severe turbulence on November 4, 1970 for about 4 minutes over Nantucket, Massachusetts. The seatbelt sign had been on since the takeoff from New York because of light turbulence. Six passengers and two flight attendants were hospitalized because of their injuries and several other passengers and flight attendants were treated and released from hospitals. Most of the injured persons were out of their seats or if they were seated, were not wearing seatbelts when the turbulence was encountered. Passengers had not been informed by the cockpit or cabin crews why the seatbelt sign had remained on since the takeoff and further had not been reminded by flight attendants to remain seated while the sign was on.

Case 7: On January 4, 1972, a B-747 encountered one jolt of light to moderate turbulence after encountering convective turbulence near Lake Charles, Louisiana. There were 317 passengers and 13 crewmembers onboard. Thirty-eight passengers and four

flight attendants were injured; four passengers and one flight attendant were hospitalized. The seatbelt sign had been on for about 30 minutes before the accident. The captain had made an announcement and the flight attendants also made an announcement because passengers had not heeded the captain's request to remain seated with seatbelts fastened.

EMERGENCY EVACUATIONS FOLLOWING A CRASH

Case 8: In September 1982, following a reject eoff at Malaga, Spain, a DC-10 ran off the end of the runway. The airplane left the airport boundaries, and the right wing and engine separated from the fuselage after striking several buildings. The tail section of the airplane was immediately engulfed in flames, and an emergency evacuation ensued. Of the 393 persons aboard the airplane, 50 were killed and 42 were seriously injured. All of the fatalities were found in the aft cabin, which seated 167 passengers, near the only exit which was opened and used during the evacuation in that section, the left overwing exit. For reasons unknown, these passengers, all of whom survived the crash but died from the effects of the fire, failed to use the right side aisle, which was clear, and to move forward to other available exits. Some of the passengers in the last few rows of the airplane managed to get out by moving forward in the right aisle, but they too elected to evacuate through the left overwing exit rather than exits located farther forward.

Many of the survivors indicated that their evacuation was not influenced by the passenger safety information which had been presented. Numerous passengers admitted that they had not read the emergency briefing card, but most did recall the oral briefing, which was given in Spanish and English. They said that the briefing was hard to hear and was difficult to understand. The consensus of the passengers questioned was that the written and oral information was of little or no use to them during the emergency. For example, one passenger, when asked if the emergency instructions were of any value, said that "the information was not retained in a moment of crisis."

Case 9: During a night-time approach to Pago Pago, American Samoa on January 30, 1974, a B-707 with 10 crewmembers and 91 passengers crashed almost 4,000 feet short of Runway 5. Ten crewmembers and 87 passengers died as a result of the accident. The aircraft was progressively destroyed as it struck rocks, trees, jungle vegetation, and a 3-foot-high lava wall before stopping. During the last 300 feet of its ground slide, fire broke out and eventually the entire fuselage was gutted by fire. Except for the third officer, who died of traumatic injuries, the rest of the persons died from the effects of the fire. Investigation showed that the crash impact forces were survivable and that the cabin interior was not damaged. Large fires erupted outside the right side of the cabin after the airplane came to rest. A passenger opened a right overwing exit but closed it when flames came into the cabin. Other passengers opened the left overwing exits and all of the surviving passengers escaped from these exits. Survivors reported that before the airplane stopped, passengers rushed to exit in the front and rear of the cabin and the survivors heard no evacuation instructions after the accident.

Investigation showed that the rear entry doors had not been opened and that the forward entry door was opened only 2 or 3 inches. The rear galley door also was not opened. The Safety Board found that three factors affected adversely the survival of the passengers and flight attendants: (1) the flight attendants did not open the primary emergency exits; (2) the passengers' reaction to the crash; and (3) the attentiveness of the passengers to the pre-takeoff briefing and to the safety cards.

Further, since the flight attendants had not sustained traumatic injuries in the crash, they may have been overcome by smoke or toxic fumes before they could redirect passengers to the left overwing exits which were opened but used by only the five passengers. A possibility also existed that passengers had crowded against the forward and rear exits and prevented the doors from opening. The Safety Board concluded that more persons would have survived had they followed pre-flight instructions to proceed to the nearest exit instead of moving toward the doors through which they had boarded the airplane.

All of the survivors had listened to the pre-flight briefing and had read their safety cards which prepared them to evacuate the airplane from the exits nearest to them. The passengers who were also seated in the mid-cabin near the overwing exits and who moved to other exits and did not escape showed that they either did not retain the information from the briefing and the safety cards or that they reacted to the emergency without first considering the location of alternative exits. One of the surviving passengers stated that he stayed close to the floor and away from the smoke and that he also had preplanned his escape routes before the accident.

PREPARATIONS FOR A PLANNED WATER DITCHING

Generally speaking, before an airplane is ditched, sufficient time is available for flight attendants to repeat their pre-takeoff instructions for the used life preservers and thereafter assist passengers with donning their preservers. However, this assistance can take valuable time and compete with other duties the flight attendants must complete before the ditching. The assistance is most often required of passengers who cannot understand either the demonstrations or instructions contained on safety cards. The situation is much worse following an unplanned water landing or when an airplane runs off a runway and comes to stop in water. Passengers must first find and then remove their life preservers from underseat containers and either don the preservers before exiting the airplane or try to don the preservers in the water. In either event, this situation points up the need for passengers to avail themselves of information on the use of life preservers before the situation arises and not rely upon receiving instructions or assistance from crewmembers.

Case 10: On May 5, 1983, at 0856, an L-1011 with 162 passengers and 10 crewmembers departed Miami, Florida, for Nassau, Bahamas. While descending through 15,000 feet, the No. 2 was shut down because of a low oil pressure warning. The airplane climbed to 20,000 feet to return to Miami and while en route the low oil pressure warning lights illuminated for the No. 1 and No. 2 engines and the engines shortly thereafter flamed-out while the crew was attempting to start the No. 2 engine. The airplane descended from 13,000 feet to 4,000 feet before the No. 2 engine was started. A one-engine landing was made at Miami at 0946. The loss of oil from the engines was caused by missing O-ring seals on the master chip detector assemblies on each engine. A predeparture safety briefing with accompanying demonstrations included the donning of life preservers; flight attendants reported that as usual, many passengers did not watch the demonstration and that the cabin was particularly noisy during the safety briefing and demonstrations. In preparation for a planned ditching, the flight attendants briefed passengers and instructed them on the donning of life preservers and selected and briefed able-bodied passengers to assist in the evacuation. The flight attendants were told by the flightcrew only that a ditching was imminent and the passengers were ordered to assume the brace position where they remained for about 10 minutes until a flight attendant looked out and saw Miami. She went to the cockpit and was told by the flight engineer that a normal landing would be made and simultaneously, the captain made a PA announcement to that effect.

Investigation showed that the flightcrew failed to tell the flight attendant how much time was available from the onset of the emergency to the order to prepare the passengers for a ditching. Consequently, the flight attendants rushed or cut short the preparations before the signal to ditch was made because they thought that they were almost out of time. Some passengers panicked and screamed throughout the preparations but only a few were unable to respond to the flight attendant's instructions. Some non-swimmers panicked and had problems donning life preservers. All passengers were assisted by fellow passengers or flight attendants. At least two flight attendants stood on seats to demonstrate how to don the life preservers.

Passengers had problems finding the preservers under their seats. Some could not open the plastic protective pouches and many passengers found it difficult to don their preservers while they were seated with their seatbelts fastened and had to stand to don their vests. Parents had problems putting life preservers on their children. Some flight attendants said that during their cabin preparations for the ditching many male passengers had refused to assist and other passengers, because they had drunk too much, were not asked to assist.

UNPLANNED WATER LANDING

Case 11: At 1936 on January 23, 1982, a DC-10 with 200 passengers and 12 crewmembers overran 15R at Boston-Logan International Airport and the cockpit and forward fuselage broke open and the airplane came to rest in the shallow waters of Boston Harbor. Two passengers who occupied seats in the forward cabin were missing and presumed drowned. The captain, a flight attendant, and two passengers sustained serious injuries and five flight attendants and 19 passengers sustained minor injuries. Most occupants experienced varying degrees of hypothermia and exposure to 38°F air temperature and 30°F water temperature. When the airplane came to rest the cockpit crew, two flight attendants, and three passengers in the forward cabin were thrown into the water. The flight attendants and passengers in the mid and rear cabins remained unaware of the extent of the damage since the only illumination was from the cabin emergency lights, and the noise of the still running No. 2 engine drowned out verbal commands. Eventually, the command was given to evacuate and all emergency exits, except the two in the separated forward cabin, were opened and the slide/rafts inflated. The slide/raft at exit 4-L was not usable because it was twisted by the airflow from the No. 2 engine. Most occupants evacuated the airplane from over the right wing, at the 3-R exit, walked along the wing for about 10 feet, waded in 2 to 3-foot deep water to the shore, and then crawled up the snow covered embankment. About 30 passengers exited from 4-R, went into the slide/raft, and then waded 15 to 20 feet to shore in chest-deep water. Some persons who exited from the left exits swam to shore. The No. 2 engine continued to operate throughout the evacuation and in addition to the engine's reverse thrust which blew the slide/rafts, the noise from the engine greatly hampered the flight attendants' verbal commands.

Passengers encountered difficulties retrieving life preservers from under their seats and opening the sealed protective pouches; one flight attendant had to use her teeth to open the pouch. Some passengers, mistakenly believing that the seat cushions were flotation devices, threw cushions to persons in the water.

Case 12: On May 8, 1978, a B-727 with 6 crewmembers and 52 passengers struck the water of Escambia Bay without warning as it was approaching the Pensacola, Florida Regional Airport. The airplane settled in relatively shallow water and the cabin was not entirely submerged and passengers were able to evacuate the airplane. Three uninjured

passengers drowned after evacuating the airplane. Most of the surviving passengers had problems finding, donning, and inflating the lifevests, which were located under their seats. Only 27 passengers indicated that they used the lifevests, and most of the lifevests used were distributed by the crewmembers. Twenty-two percent of the passengers said they had never seen a lifevest demonstration. Passenger survival was threatened further when some passengers incorrectly assumed that the seat cushions in the airplane were flotation devices. Furthermore, no attempt was made to deploy the emergency evacuation slides and use them as flotation devices. A Safety Board survey revealed that only 41 percent of the passengers on this flight had read the safety card.

ACCIDENTS WITH PASSENGER EDUCATION PROBLEMS

DATE	LOCATION	AIRCRAFT	FINDINGS
9/23/62	North Atlantic	L-1049	Following the ditching passengers had problems using life vests. Instructions in ditching folders were different than instructions given by flight attendants.
5/20/70	St. Croix, Virgin Island	DC-9	Ditching. Pre-takeoff briefing was "inordinately short", life vest briefing was inadequate, pre-ditching briefing was incomplete, and the cockpit PA was inoperable.
11/4/70	Nantuckett, Massachusetts	B-747	Turbulence. Seatbelt sign was on but some passengers did not remain seated with seatbelts fastened.
6/7/71	New Haven, Connecticut	Convair 340/440	Aircraft crashed while on final approach. Although the accident was classified as survivable, only 2 out of 28 passengers survived. One of these passengers had familiarized himself with exit locations and the other passenger followed him.
7/30/71	San Francisco, California	B-747	During takeoff the aircraft struck approach light structures. While fuel was being jetisoned, the cabin was prepared for either a ditching or a land evacuation. The life vests used for the safety demonstration were not the same as used by passengers
1/4/72	Lake Charles, Louisiana	B-747	Turbulence. Passengers did not heed the seat belt sign or PA announcements to fasten seat belts.

ACCIDENTS WITH PASSENGER EDUCATION PROBLEMS

DATE	LOCATION	AIRCRAFT	FINDINGS
6/12/72	Detroit, Michigan	DC-10	Explosive decompression. Passengers were not familiar with emergency use of the supplemental oxygen system and did not use masks properly. Cabin was prepared for emergency landing and several passengers reported that the emergency instruction card was very useful in locating the exit nearest them.
4/1/73	New York, New York	L-1011	Decompression. Passengers incorrectly donned oxygen masks and required further instructions from flight attendants for use of the oxygen system after the decompression.
[illegible]	Albuquerque, New Mexico	DC-10	Decompression. Some passengers did not pull lanyard to start flow of oxygen. When the oxygen mask reservoir bags did not inflate, passengers and flight attendants thought oxygen was not being supplied.
1/30/74	Pago Pago, American Samoa	B-707	Aircraft crashed short of runway. "Passenger inattentiveness to the pre-takeoff briefing and passenger information pamphlet" was listed as one of the three major post crash survival problems. All survivors reported having listened to the pre-takeoff briefing and having read the passenger information pamphlet."
10/3/74	Brownsville, Texas	DC-10	Decompression. Only two out of 53 passengers used the oxygen system and donned their masks correctly.
5/1/75	La Guardia, New York	DC-10	Decompression. Only two passengers properly activated oxygen system and donned masks. The other 180 passengers needed the assistance of flight attendants.

ACCIDENTS WITH PASSENGER EDUCATION PROBLEMS

DATE	LOCATION	AIRCRAFT	FINDINGS
11/16/76	Denver, Colorado	DC-9	After a rejected takeoff, the aircraft overran the runway and caught fire. The passenger information card did not depict the method of operating the tail cone exit.
5/18/78	Pensacola, Florida	B-727	Unplanned water landing. Since the flight was not an extended overwater flight, there was no requirement to brief passengers on location and use of water survival equipment. Passengers had trouble finding, donning, and inflating lifevests. Twenty-two percent of the passengers said that they had never seen a life vest demonstration. Passengers and crew incorrectly assumed that the seat cushions were flotation devices. A Safety Board survey revealed that only 41% of the passengers on the flight had read the safety information card.
4/18/79	Newark, New Jersey	S61-L	Emergency landing after separation of tail rotor and tail rotor gear box. The investigation indicated "The emergency procedures and the passenger briefing cards should specifically require the flight attendant to instruct passengers to assume the standard brace position, which would have reduced the possibility of serious injuries during the emergency landing."
4/3/81	Hannibal, Missouri	DC-10	Turbulence. Passengers did not heed the seat belt sign.
1/23/82	Boston, Massachusetts	DC-10	Aircraft ran off the end of the runway into Boston Harbor. Passengers described problems retrieving, opening package, and donning life vest. Seat cushions were incorrectly assumed to be flotation cushions and were thrown to people in the water. No. 2 engine continued to operate in reverse thrust throughout evacuation, making verbal commands difficult.

ACCIDENTS WITH PASSENGER EDUCATION PROBLEMS

DATE	LOCATION	AIRCRAFT	FINDINGS
2/16/82	King Salmon, Alaska	YS-11	Emergency gear-up landing on frozen river. Neither the amount of nor the presentation of safety information was "sufficient to allow passengers, especially whose knowledge of the language is limited, to operate the exits with minimum delay in an emergency situation."
9/13/82	Malaga, Spain	DC-10	Aircraft ran off the end of the runway after a rejected takeoff and tail burst into flames. Surviving passengers stated that the pre-takeoff oral safety briefing was hard to hear and was difficult to understand. Numerous passengers admitted they had not read the emergency briefing card.
5/5/83	Miami, Florida	L-1011	After the inflight failure of all three engines, passengers were prepared for a ditching. Passengers described difficulties locating and donning life vests. Most passengers found the instructions and procedures for donning the life vests were difficult to follow. Parents had problems putting vests on children.
1/21/85	Reno, Nevada	L-188	The aircraft crashed while attempting to return to the airport immediately after takeoff. A 17-year old male was the only survivor. He stated that although he did not read the safety card or attend to the pre-takeoff briefing, that he did remember enough information from the earlier flight to open the exits if he had to. Prior to impact he braced by curling up in his seat as he had seen in movies. He was ejected from the airplane in his seat.

APPENDIX B

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

TOPIC: EVACUATION/BRIEFING

RECOMMENDATION: 5-RE-45, FEBRUARY 18, 1965
REFORM GOVERNMENT-INDUSTRY TASK GROUP TO REASSESS SAFETY PROVISIONS AS A RESULT OF LESSONS LEARNED FROM ROME CRASH FIRE AND EVACUATION, NAMELY:

- REDUCED EVACUATION TIME
- MARGINAL EVACUATION CHUTE MATERIAL AND DEPLOYMENT METHOD
- NO EMERGENCY ALARM SYSTEM
- INADEQUATE PASSENGER EMERGENCY EVACUATION BRIEFING

SOURCE OF RECOMMENDATION: TRANS WORLD AIRLINES,
B-707-331,
ROME, ITALY,
November 23, 1964

STATUS: CLOSED

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: September 23, 1962
ACCIDENT CITY: NORTH ATLANTIC
ACCIDENT STATE:
REPORT NUMBER:

ACCIDENT SYNOPSIS:

IN REFERENCE TO OUR INVESTIGATION OF THE FLYING TIGER LINE L-1049H, N6923C, DITCHING IN THE NORTH ATLANTIC WHICH OCCURRED, ON SEPTEMBER 23, 1962, WE WOULD LIKE TO BRING TO YOUR ATTENTION CERTAIN RECOMMENDATIONS REGARDING THE CRASH INJURY, EVACUATION, AND RESCUE ASPECTS OF THIS ACCIDENT. OF THE EIGHT CREW MEMBERS AND SIXTY-EIGHT PASSENGERS ABOARD THE AIRPLANE, THREE CREW MEMBERS AND FORTY-FIVE PASSENGERS SURVIVED. AFTER CONSIDERING ALL OF THE FACTS DEVELOPED BY OUR INVESTIGATORS THROUGH INTERVIEWS OF THE SURVIVORS, WE BELIEVE THAT CERTAIN IMPROVEMENTS SHOULD BE MADE TO AIR CARRIER AIRCRAFT TO INCREASE THE SURVIVABILITY OF DITCHINGS SUCH AS THOSE.

LOG NUMBER: 63-0033
RECOMMENDATION NUMBER: A-63-033
DATE OF ISSUE: November 8, 1962
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS TO THE FEDERAL AVIATION AGENCY: (1) LIFE RAFT STOWAGE: PASSENGERS WERE UNABLE TO USE THE LIFE RAFTS STOWED IN THE WINGS. THE ONLY RAFT USED BY THE SURVIVORS WAS THE ONE STOWED IN THE FUSELAGE. THE BOARD RECOMMENDS THAT THE FAA RECONSIDER THE METHOD OF LIFE RAFT STOWAGE WITH A VIEW TO REQUIRE THE STORING OF ALL LIFE RAFTS INSIDE THE FUSELAGE. (2) LIGHTS ON LIFE RAFTS AND JACKETS: THE ONLY LIGHT AVAILABLE OUTSIDE THE AIRCRAFT WAS A FLASHLIGHT CARRIED BY THE CAPTAIN. PASSENGERS HAD DIFFICULTY LOCATING THE RAFT OR ONE ANOTHER IN THE WATER. HAD THE RAFT BEEN LIT AND HAD THERE BEEN A LIGHT INSTALLED ON EACH LIFE JACKET, MORE PASSENGERS WOULD HAVE SURVIVED. THE BOARD THEREFORE, RECOMMENDS THAT AN APPROVED LIGHTING SYSTEM BE REQUIRED FOR LIFE RAFTS AND THAT ALL LIFE JACKETS BE EQUIPPED WITH A SELF-ACTUATING LIGHT. (3) ADEQUACY OF LIFE JACKETS TSO C13: PASSENGERS COMPLAINED THAT THE JACKETS RODE UP AND AROUND THEIR HEADS AND INTERFERED WITH SWIMMING. ALSO, THE SHORT LENGTH OF THE CO2 CARTRIDGE LANYARD PRECLUDED THE AUTOMATIC INFLATION OF THE JACKET. IN VIEW OF THESE COMPLAINTS, THE BOARD RECOMMENDS THAT

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

THE APPLICABLE TSO (TSO C13) BE REVIEWED TO INSURE THAT AN ADEQUATE LEVEL OF SAFETY IS BEING PROVIDED BY THE DETAIL REQUIREMENTS. (4) ADEQUACY OF SEAT TIE-DOWNS: ALTHOUGH THE DECELERATION WAS NOT EXTREME, MANY PASSENGERS FAILED TO EXTRICATE THEMSELVES BECAUSE OF SEAT FAILURES IN THIS SURVIVABLE ACCIDENT. THE BOARD WAS CONVINCED FROM THIS AND OTHER ACCIDENTS THAT AN INCREASE IN THE MINIMUM LEVEL OF SAFETY WAS LONG OVERDUE AND IT IS RECOMMENDED THAT THE STUDIES RELATIVE TO CRASH LOAD FACTORS AND DYNAMIC SEAT TESTING CRITERIA WHICH WE UNDERSTAND ARE NOW UNDER WAY IN YOUR AGENCY BE EXPEDITED TOWARD THE END OF ACHIEVING IMPROVED SAFETY IN THIS AREA AT THE EARLIEST DATE. (5) EMERGENCY INFORMATION: MANY PASSENGERS WHO SURVIVED THIS ACCIDENT AND OTHERS SUCH AS THE UAL DC-8 ON 7/11/61, THE AMERICAN B-720 AT BOSTON ON 9/24/61, AND THE AMERICAN L-188 AT KNOXVILLE ON 8/6/63 DID NOT KNOW THE LOCATION OF THE NEAREST EXIT. THE BOARD FOUND THAT THE PRINTED INSTRUCTIONS IN THE SEAT BACK POCKETS WERE NOT ENOUGH AND RECOMMENDS THAT PASSENGERS BE BRIEFED PRIOR TO THE TAKEOFF ROLL ON THE LOCATION AND ACTUATION OF EMERGENCY EXITS AND THE PROCEDURE TO BE FOLLOWED IN THE EVENT OF AN ACCIDENT.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: December 10, 1962

FAA LTR: RECOMMENDATIONS 1, 2, AND 3 ARE UNDER ACTIVE CONSIDERATION BY A SPECIAL WORKING GROUP. REVISIONS TO THE APPLICABLE TECHNICAL STANDING ORDERS AND THE RELATED CIVIL AIR REGULATIONS ARE ANTICIPATED. A NOTICE OF PROPOSED RULE MAKING WILL BE PROCESSED AS SOON AS POSSIBLE. FAA CONCURS WITH RECOMMENDATION 4, CLEARLY RECOGNIZING THE NEED FOR NECESSARY STUDIES RELATIVE TO CRASH LOAD FACTORS AND DYNAMIC SEAT TESTING CRITERIA. STUDIES ARE BEING CONDUCTED BY FAA AIRCRAFT DEVELOPMENT SERVICE CONSISTENT WITH AVAILABLE MANPOWER AND FUNDS. REGARDING RECOMMENDATION 5, THE FAA IS COMMUNICATING WITH ALL AIRLINES AND COMMERCIAL OPERATORS TO ESTABLISH PROCEDURES FOR ORAL BRIEFING OF PASSENGERS PRIOR TO EACH DEPARTURE CONCERNING THE LOCATION AND OPERATION OF ALL EMERGENCY EXITS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: April 17, 1967
ACCIDENT CITY:
ACCIDENT STATE:
REPORT NUMBER:

ACCIDENT SYNOPSIS:

RECENTLY WE HAVE RECEIVED SEVERAL LETTERS FROM AIRLINE PASSENGERS PERTAINING TO AIRCRAFT EVACUATION HAZARDS THEY HAVE OBSERVED ON DIFFERENT FLIGHTS. THE LETTER FROM MR. T. D. COLLINS IS AN EXAMPLE AND IS ENCLOSED FOR YOUR INFORMATION. ONE PROBLEM MENTIONED IS THAT QUITE OFTEN A SEAT IS LOCATED DIRECTLY IN FRONT OF THE OVER-WING WINDOW EXITS. THE EMERGENCY INFORMATION CARDS DO NOT INDICATE AND FLIGHT ATTENDANTS DO NOT EXPLAIN WHAT SHOULD BE DONE WITH THE SEAT IN ORDER TO OPEN THE WINDOW IN THE EVENT OF EMERGENCIES REQUIRING AIRCRAFT EVACUATION. EVEN IF ADEQUATE INFORMATION WERE PRINTED ON ORADJACENT TO THE WINDOW ITSELF, VALUABLE TIME WOULD BE LOST TRYING TOREAD IT IN EVENT OF AN EMERGENCY. FURTHERMORE, THE INDIVIDUALS CONCERNED MAY BE IN A DAZED CONDITION FROM THE FORCE OF IMPACT AND/ OR LIGHTING CONDITIONS MAY PRECLUDE READING. ANOTHER PROBLEM MENTIONED BY MR. COLLINS IS THAT THE OVERHEAD EXIT SIGNS ARE SOMETIMES PLACED IN THE WRONG POSITION AND/OR SOMETIMES THE PARTITIONS BETWEEN THE FIRST-CLASS COMPARTMENT AND THE TOURIST COMPARTMENT HIDE THE WINDOW EXITS FROM VIEW OF THE TOURIST COMPARTMENT.

LOG NUMBER: 7-RE-0034
RECOMMENDATION NUMBER: A-67-016
DATE OF ISSUE: April 17, 1967
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

IT IS RECOMMENDED THAT ALL PASSENGERS BE MADE AWARE OF THE PROCEDURES REQUIRED TO MOVE THE SEATS OUT OF THE WAY OF THE WINDOW EXITS. FURTHER, IT IS RECOMMENDED THAT AIRLINES UTILIZING MOVABLE PARTITIONS BETWEEN PASSENGER COMPARTMENTS ASSURE THAT THE OVERHEAD SIGNS ARE PROPERLY PLACED TO DEPICT THE EXACT LOCATION OF THE WINDOWEXITS AND THAT THE FLIGHT ATTENDANTS BE REQUIRED TO INDICATE WHERE EACH EMERGENCY EXIT IS LOCATED DURING THE PRE-TAKEOFF BRIEFING.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: May 8, 1967

THE AGENCY HAS BELIEVED FOR SOME TIME THAT ADDITIONAL REGULATIONS ARE NEEDED TO IMPROVE THE CRASHWORTHINESS AND EMERGENCY EVACUATION STANDARDS. EARLY IN 1966 AN AGENCY TASK FORCE WAS ESTABLISHED TO STUDY FACTORS AFFECTING CRASHWORTHINESS AND EVACUATION THAT HAD BEENBROUGHT TO LIGHT BY ACCIDENT INVESTIGATIONS TO REVIEW THE ADEQUACY OF EXISTING REGULATIONS AND TO RECOMMEND REGULATORY CHANGES AS NECESSARY. BASED ON THESE STUDIES AND INDUSTRY DISCUSSIONS, NOTICES OF PROPOSED RULE MAKING NUMBERS 66-26 DATED JULY 29, 1966, AND 66-26A DATED SEPTEMBER 7, 1966, WERE ISSUED. NOTICE 66-26 CONTAINS (AMONG OTHER THINGS) REGULATORY PROPOSALS AIMED AT ENSURING ADEQUATE ACCESS TO TYPE III AND TYPE IV EMERGENCY EXITS. THE SEAT BACK PROBLEM IS SPECIFICALLY SPOKEN TO. WE ARE PRESENTLY STUDYING THE COMMENTS SUBMITTED BY INTERESTED PERSONS BEFORE TAKING FINAL ACTION. CONCERNING THE POINTS MENTIONED IN THE THIRD PARAGRAPH OF YOUR LETTER, OUR CURRENTLY EFFECTIVE REGULATION SECTION 121.310(B) CONTAINS PROVISIONS DEALING WITH EMERGENCY EXIT LOCATING SIGNS, INCLUDING A PROVISION CATERING TO SITUATIONS IN WHICH EMERGENCY EXITS ARE OBSCURED BY PARTITIONS. WE WILL LOOK INTO THE POSSIBILITY THAT THESE PROVISIONS HAVE NOT BEEN COMPLIED WITH BY SOME AIR CARRIERS. WE WILL ALSO AGAIN CALL TO THE ATTENTION OF AIR CARRIERS THE NECESSITY FOR HAVING CABIN ATTENDANTS POINT OUT THE LOCATION OF EMERGENCY EXITS DURING THEIR PRE-TAKEOFF BRIEFING.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: September 23, 1968
ACCIDENT CITY: SPRINGFIELD
ACCIDENT STATE: IL
REPORT NUMBER:

ACCIDENT SYNOPSIS:

DURING THE COURSE OF THE BOARD'S INVESTIGATION OF AN ACCIDENT INVOLVING AMERICAN AIRLINES FLIGHT 290, A BOEING 727-100 SERIES AIRCRAFT, AT SPRINGFIELD, ILLINOIS, SEPTEMBER 23, 1968, CERTAIN ASPECTS RELATING TO THE EMERGENCY EVACUATION OF THE AIRCRAFT HAVE SHOWN A NEED FOR SAFETY ATTENTION. THE FLIGHT HAD MADE AN UNSCHEDULED LANDING BECAUSE OF A REPORT THAT EIGHT STICKS OF DYNAMITE WERE ABOARD. SUBSEQUENT TO LANDING, AN EMERGENCY EVACUATIONWAS MADE; HOWEVER, THE STEWARDESSES WERE UNABLE TO HOOK THE RETAINERBAR OF THE INFLATABLE SLIDE TO THE FLOOR AT THE EMERGENCY GALLEY SERVICE EXIT. FOR THIS REASON, THIS EXIT WAS NOT USED DURING THE EVACUATION. IT WOULD APPEAR THAT THE INSERTION OF THE RETAINER BAR UNDER LESS TRYING CONDITIONS WOULD INSURE THE CORRECT POSITIONING OFTHIS BAR AND ACCELERATE AVAILABILITY OF THE SLIDE, AS WELL AS ELIMINATE THE POSSIBILITY OF A MALFUNCTION UNDER ACTUAL EMERGENCY CONDITIONS. A REQUIREMENT FOR INSERTION OF THE BAR PRIOR TO THE AIRCRAFT'S DEPARTURE FROM THE RAMP AREA WOULD INCREASE THE CHANCES FOR USABILITY OF THE SLIDE WHEN NEEDED.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

LOG NUMBER: 69-0050
RECOMMENDATION NUMBER: A-68-031
DATE OF ISSUE: November 4, 1968
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE BOARD RECOMMENDED: (1) AIR CARRIERS BE REQUIRED TO HAVE THE RETAINER BAR FOR ALL DOOR-MOUNTED SLIDES PLACED IN POSITION FOR SLIDE DEPLOYMENT AT THE FLOOR-LEVEL EMERGENCY EXITS PRIOR TO THE AIRCRAFT'S DEPARTURE FROM THE RAMP FOR FLIGHT. (2) FAA INSPECTORS REVIEW ALL PRINTED CARDS USED BY THE AIR CARRIERS TO SUPPLEMENT THE ORAL BRIEFING TO ENSURE THAT THEY INCLUDE CLEAR INSTRUCTIONS SHOWINGTHE DIRECTION PASSENGERS SHOULD TAKE UPON LEAVING THE WING WHENEVER OVER-THE-WING EXITS ARE USED FOR EVACUATING THE AIRCRAFT. (3) ALL AIR CARRIERS RE-EMPHASIZE, THROUGH THEIR CREW TRAINING PROGRAMS, THE BASIC PHILOSOPHY OF EMERGENCY EVACUATION THAT ALL CABIN EXITS THAT ARE NOT JUMPED, BLOCKED BY FIRE, OR OTHERWISE RENDERED UNUSABLE(INCLUDING VENTRAL STAIRS) SHOULD BE USED TO THE EXTENT REASONABLY POSSIBLE.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: November 13, 1968

11-13-68 RESPONSE FROM THE FAA STATING THAT THEY AGREE WITH THE BOARD'S RECOMMENDATIONS AND THAT THEY HAVE INITIATED ACTIONS TO: (1) AMEND THE APPROPRIATE SECTIONS OF THE CARRIERS' OPERATIONS MANUALS TO REQUIRE THE GIRT BAR FOR ALL DOOR MOUNTED SLIDES TO BE ENGAGED DURING TAXIING, TAKEOFF, AND LANDING. TO THE EXTENT PRACTICABLE, THIS PROCEDURE SHOULD ALSO APPLY TO NONDOOR MOUNTED SLIDES. (2) REVISE THE PRINTED CARDS REQUIRED BY PART 121 OF THE FEDERAL AVIATION REGULATIONS SO THAT THEY CLEARLY DEPICT THE OVERWING ESCAPE ROUTE. (3) EMPHASIZE TO ALL CREWMEMBERS DURING INITIAL AND RECURRENT EMERGENCY PROCEDURES TRAINING THE IMPORTANCE OF USING ALL AVAILABLE EXITS TO THE MAXIMUM PRACTICABLE EXTENT DURING EMERGENCY EVACUATIONS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: July 26, 1969
ACCIDENT CITY: JANESVILLE
ACCIDENT STATE: WI
REPORT NUMBER:

ACCIDENT SYNOPSIS:

UNITED AIR LINES FLIGHT 236 WAS A SCHEDULED, REVENUE, PASSENGER FLIGHT THAT DEPARTED DENVER, COLORADO, JULY 26, 1969, AT 1245 CDT, FOR ITS NEXT SCHEDULED STOP AT CHICAGO, ILLINOIS. THE FLIGHT ENCOUNTERED TURBULENCE NEAR JANESVILLE, WISCONSIN, AT APPROXIMATELY 24,000 FEET. SIX PERSONS RECEIVED MINOR INJURIES AND ONE RECEIVED SERIOUS INJURY. MRS. WILLIAM DOYLE, THE PASSENGER RECEIVING SERIOUS INJURY, WAS IN THE LAVATORY WITH HER TWO-YEAR-OLD DAUGHTER WHEN THE TURBULENCE WAS ENCOUNTERED.

LOG NUMBER: 70-0032
RECOMMENDATION NUMBER: A-70-015
DATE OF ISSUE: April 3, 1970
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE BOARD RECOMMENDED: 1. THAT THE FAA AMEND PART 121 OF THE FAR'S TO REQUIRE THAT ANY TIME "FASTEN SEAT BELTS" SIGNS ARE TURNED ON IN FLIGHT, THE CREW MAKE A VERBAL ANNOUNCEMENT OVER THE PUBLIC ADDRESS SYSTEM TO ADVISE THE PASSENGERS OF THE FACT, AND 2. THAT THE FAA CANVASS ALL CARRIERS, SUBJECT TO THE PROVISIONS OF SECTION 121.317 (A) WITH A VIEW TOWARD ASSURING READILY VISIBLE WARNING SIGNS AT ALLSEATING POSITIONS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: April 21, 1970

4/21/70 THE FAA RESPONDED STATING: NPRM 69-33 ISSUED 8/8/69, PROPOSES TO MAKE CLEAR THAT SEAT BELT SIGNS MUST BE LEGIBLE UNDER ALL CONDITIONS OF CABIN ILLUMINATION TO ALL PERSONS SEATED IN THE PASSENGER CABIN. SINCE THIS PART OF THE NOTICE IS EXPECTED TO BE ADOPTED THERE APPEARED NO USEFUL PURPOSE TO CANVASS ALL CARRIERS AS PROPOSED. REGARDING REQUIRING AN ORAL ANNOUNCEMENT WHEN THE SEAT BELT SIGN IS TURNED ON, WHEN UNEXPECTED TURBULENCE IS ENCOUNTERED, IT IS INADVISABLE TO REQUIRE A PILOT OR OTHER CREWMEMBER TO IMMEDIATELY MAKE AN ANNOUNCEMENT SINCE THEIR FULL ATTENTION MAY BE REQUIRED BY MORE IMPORTANT DUTIES.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

AIR CARRIERS ARE BEING ASKED TO ESTABLISH PROCEDURES REQUIRING A CREWMEMBER TO MAKE AN ORAL ANNOUNCEMENT AS SOON AS PRACTICABLE EACH TIME THE SEAT BELT SIGN IS TURNED ON. SOME OF THE CARRIERS ALREADY MAKE SUCH AN ANNOUNCEMENT WHEN THE SIGN IS TURNED ON PRIOR TO ENCOUNTERING TURBULENCE. OTHERS USE A CHIME TO ALERT THE PASSENGERS. THE FAA FURTHER STATED THAT IN RESPONSE TO NPRM 69-33 DATED 10/7/69, THE BOARD HAD AGREED THAT AN ORAL ANNOUNCEMENT BE MADE WHEN THE SEAT BELT SIGN IS FIRST TURNED OFF AFTER TAKEOFF. ALSO, THE PASSENGERS WOULD BE ADVISED THAT THEY SHOULD KEEP THEIR BELTS FASTENED AT ALL TIMES WHEN SEATED.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: May 2, 1970
ACCIDENT CITY: ST. CROIX
ACCIDENT STATE: VI
REPORT NUMBER: AAR-71-08

ACCIDENT SYNOPSIS:

OVERSEAS NATIONAL AIRWAYS OPERATING AS ANTILLIAANSE LUCHTVAART MAATSCHAPPIJ, FLIGHT 980 (ALM), WAS DITCHED NEAR ST. CROIX. FORTY PERSONS, INCLUDING 35 PASSENGERS AND FIVE CREWMEMBERS SURVIVED. TWENTY-THREE PERSONS, INCLUDING TWO INFANTS AND THE STEWARDESS, DID NOT SURVIVE. THE AIRCRAFT SANK IN 5,000 FEET OF WATER AND WAS NOT RECOVERED. THE FLIGHT DEPARTED KENNEDY INTERNATIONAL AIRPORT, N.Y., NONSTOP FOR ST. MAARTEN, NETHERLANDS ANTILLES. AFTER AND ADF AND THREE CIRCLING APPROACHES IN POOR WEATHER, DURING WHICH A LANDING COULD NOT BE MADE, THE FLIGHT DEPARTED FOR ST. CROIX. ENROUTE TO ST. CROIX IN A LOW-FUEL STATE, THE AIRCRAFT WAS DESCENDED TO THE WATER IN ANTICIPATION OF A DITCHING. WHEN FUEL EXHAUSTION WAS REACHED, THE ENGINES FLAMED OUT AND THE AIRCRAFT WAS DITCHED.

LOG NUMBER: 70-0172
RECOMMENDATION NUMBER: A-70-045
DATE OF ISSUE: September 10, 1970
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

REQUIRE THAT THE ITEM "WARN PASSENGERS" BE INSERTED AS ONE OF THE LAST ITEMS ON THE EMERGENCY LANDING OR DITCHING CHECKLISTS OF ALL CARRIERS, YET SUFFICIENTLY ADVANCED ON THE LIST TO INSURE ADEQUATE TIME FOR PASSENGERS TO BRACE FOR A CRASH.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: September 28, 1970

THE FAA STATED THEY WILL INITIATE A BULLETIN TO THEIR PRINCIPAL OPERATIONS INSPECTORS REQUIRING THEM TO SEE THAT EACH OF THEIR ASSIGNED AIR CARRIERS INCLUDE THE ITEM "WARN PASSENGERS," ON THEIR PREDITCHING CHECKLISTS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

SPECIAL STUDY NUMBER: AAS-72-02
DATE OF SPECIAL STUDY: May 2, 1970

SPECIAL STUDY SYNOPSIS:

THIS STUDY EXAMINES THE CONDITION AND CIRCUMSTANCES WHICH DETERMINEDTHE OUTCOME OF THE DITCHING OF A DC-9 AIRCRAFT IN REGARD TO THE SURVIVAL AND NONSURVIVAL OF THE OCCUPANTS. IT WAS FOUND THAT THE PASSENGERS WERE PREPARED INADEQUATELY FOR THE DITCHING DUE TO A COMBINATION OF FACTORS INCLUDING INSUFFICIENT PREPARATION TIME, INADEQUATE BRIEFINGS, INSUFFICIENT TRAINING AND THE LACK OF PROPER CREW COORDINATION. IT WAS ESTIMATED THAT DECELERATIVE FORCES WERE INTHE ORDER OF 8 TO 12 G'S, CAUSING UNRESTRAINED OCCUPANTS TO BE THROWN FORWARD, INDUCING SEAT FAILURES AND SPINAL INJURIES. THE CAUSE OF SEATS, SEATBELT, AND GALLEY EQUIPMENT FAILURES WERE ANALYZED. IT WAS ESTIMATED THAT THE AIRCRAFT REMAINED AFLOAT FOR 5 TO 6 MINUTES. THE FACT THAT A LIFERAFT INFLATED INSIDE THE AIRCRAFT WAS ATTRIBUTED TO IMPINGEMENT OF THE RAFT PACKAGE BY THE GALLEY STRUCTURE, FORCING THE CREWMEMBERS OUT OF THE AIRCRAFT. LEADERSHIP OF THE CREW WHILE AWAITING RESCUE AND AN INFLATED EMERGENCY ESCAPE SLIDE MINIMIZED FURTHER LOSS OF LIFE. RECOMMENDATIONS WERE ADVANCED DEALING WITH INCREASED TRAINING FOR CREWMEMBERS, BETTER PASSENGER COMMUNICATION TECHNIQUES, INCREASED STRENGTH REQUIREMENTS FOR SEATS,SEATBELTS, AND GALLEY EQUIPMENT AND THE DEVELOPMENT OF SLIDE RAFT COMBINATIONS AND LIFEVEST DESIGN. TWENTY REFERENCES ARE INCLUDED.

LOG NUMBER: 0359
RECOMMENDATION NUMBER: A-72-067
DATE OF ISSUE: June 28, 1972
NTSB STATUS: CLOSED - UNACCEPTABLE ACTION

RECOMMENDATION:

AMEND FAR PART 129, "OPERATIONS OF FOREIGN AIR CARRIERS," TO INCLUDE THE SAFETY PROVISIONS OF SUBPART T OF PART 121 GOVERNING THE BRIEFING OF PASSEN- GERS, OR INCLUDE THESE PROVISIONS IN THE OPERATIONS SPECIFICATIONS ISSUED TO FOREIGN AIR CARRIERS BY THE ADMINISTRA- TOR; AND REQUIRE THAT APPROVED WORDING FOR SUCH BRIEFINGS BE INCLUDED IN THE APPROPRIATE FLIGHT/OPERATIONS MANUALS OF THE APPLICABLE CREWMEMBERS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: July 20, 1972

IN RESPONSE FAA SAID PASSENGER BRIEFINGS APPLICABLE IN THIS CASE SHOULD HAVE BEEN THE BRIEFINGS OUTLINED IN THE ONA DC-9 OPERATIONS MANUAL SINCE ONA HAD OPERATIONAL CONTROL OF THE FLIGHT. SECTION 121.418(C) REQUIRES, AMONG OTHER THINGS, THAT THE CABIN CREW SHOULD HAVE BEEN TRAINED ON ONA CABIN PROCEDURES AND DELIVERED THE ONA PASSENGER BRIEFINGS REQUIRED BY SECTION 121.571 AND 121.573.

LOG NUMBER:	0359
RECOMMENDATION NUMBER:	A-72-068
DATE OF ISSUE:	June 28, 1972
NTSB STATUS:	CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

COLLABORATE WITH THE AIR TRANSPORT ASSOCIATION IN THE DEVELOPMENT OF MORE EFFECTIVE METHODS FOR CONVEYING SAFETY INFORMATION TO PASSENGERS. RESEARCH SHOULD BE CONDUCTED IN THE APPLICATION OF COMMUNICATION TECHNIQUES, BEHAVIORAL SCIENCES, AND OPTIMUM LEARNING SITUATIONS. THE RECENT ADVANCES IN AUDIO-VISUAL TECHNIQUES SHOULD ALSO BE EXPLORED.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: July 20, 1972

IN RESPONSE FAA IS CONTACTING ATA TO DISCUSS MORE EFFECTIVE METHODS FOR CONVEYING SAFETY INFORMATION TO PASSENGERS. THE FAA CONTACTED THE ATA IN DECEMBER 1972. THE FAA IS CONDUCTING RESEARCH AND HAVE INSTALLED A VIDEO PRESENTATION OF PASSENGER BRIEFING FOR THEIR AIRCRAFT IN HANGAR 6 AT WNA. IF SUCCESSFUL, IT MAY BE PUT IN THE PASSENGER AREAS OF WNA AND DULLES AIRPORTS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

LOG NUMBER: 0358
RECOMMENDATION NUMBER: A-72-072
DATE OF ISSUE: June 28, 1972
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE AIR TRANSPORT ASSOCIATION COLLABORATE WITH FOREIGN CARRIERS, THROUGH THE INTERNATIONAL AIR TRANSPORT ASSOCIATION, IN THE STANDARDIZATION OF METHODS FOR CONVEYING SAFETY INFORMATION TO PASSENGERS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: July 20, 1972

ATA IS WILLING TO WORK WITH FAA AND IS CONTACTING IATA TO START WORKING IN THIS AREA. THEY ARE ALSO REVIEWING THE SPECIAL STUDY IN VIEW OF ITS INDUSTRY-WIDE IMPLICATIONS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: January 4, 1972
ACCIDENT CITY: LAKE CHARLES
ACCIDENT STATE: LA
REPORT NUMBER: AAR-72-21

ACCIDENT SYNOPSIS:

ON JANUARY 4, 1972, A NATIONAL AIRLINES, INC., BOEING 747-135, ON A SCHEDULED FLIGHT FROM MIAMI INTERNATIONAL AIRPORT, MIAMI, FLORIDA, TO LOS ANGELES INTERNATIONAL AIRPORT, LOS ANGELES, CALIFORNIA, ENCOUNTERED ONE JOLT OF SHARP-GUST CONVECTIVE TURBULENCE NEAR LAKE CHARLES, LOUISIANA, AT FL 310. DURING THE ABRUPT ENCOUNTER, 38 PASSENGERS AND FOUR STEWARDESSES RECEIVED INJURIES WHICH RANGED FROMMINOR TO SERIOUS. THE SEATBELT SIGN WAS ON AT THE TIME AND HAD BEEN ON FOR SOME TIME PRIOR TO THE TURBULENCE ENCOUNTER. ANNOUNCEMENTS TOTHIS EFFECT HAD BEEN MADE BY VARIOUS CREWMEMBERS. THE FLIGHT CONTINUED ON TO LOS ANGELES INTERNATIONAL AIRPORT WITHOUT FURTHER INCIDENT.

LOG NUMBER: 0391
RECOMMENDATION NUMBER: A-72-127
DATE OF ISSUE: August 25, 1972
NTSB STATUS: CLOSED - ACCEPTABLE ALTERNATE ACTION

RECOMMENDATION:

REQUIRE THAT WHENEVER THE PASSENGER SEATBELT LIGHT IS TURNED ON, IRRESPECTIVE OF WHETHER OR NOT THE FLIGHT ATTENDANTS ARE PERFORMING PASSENGER SERVICE DUTIES, THEY SHALL IMMEDIATELY VISUALLY CHECK SEATBELTS AND REMIND THE PASSENGERS TO KEEP BELTS SNUGLY FASTENED.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: September 12, 1972

09/12/72 - RESPONSE FROM THE FAA TO SAY THAT THEY DO NOT AGREE THAT THE ATTENDANT SHOULD VISUALLY CHECK EACH SEAT IN EVERY INSTANCE, PARTICULARLY IF THE TURBULENCE IS PRONOUNCED. SUCH ACTIONSAS DIRECTING PASSENGERS TO RETURN TO THEIR SEATS, CLEARING THE LAVATORIES AND LOUNGES, AND AN ANNOUNCEMENT THAT THE SEATBELT SIGN HAS BEEN TURNED ON MAY PRECLUDE THE NECESSITY FOR A VISUAL INSPECTION OF EACH SEATBELT. ANY FURTHER REQUIREMENT FOR THE FLIGHT ATTENDANTS TO MOVE ABOUT THE CABIN IN TURBULENCE IS DETRIMENTAL TO THEIR PERSONAL SAFETY AND COULD, IF THEY WERE INJURED, PRECLUDE THEIR BEING AVAILABLE FOR DUTY SHOULD AN EMERGENCY

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ARISE. AIR CARRIERS WILL BE REQUESTED TO PUBLISH REGULATIONS AS PASSENGER INFLIGHT INFORMATION. FAA INTEND CONSOL DATING REGULATIONS PERTINENTTO PASSENGERS THUS EDUCATING PASSENGERS TO THE FACT THAT THE ATTENDANTS ANNOUNCEMENTS CONSTITUTE FEDERAL REQUIREMENTS. FAR 121.571 WAS AMENDED TO REQUIRE THAT AFTER EACH TAKEOFF IMMEDIATELY BEFORE OR IMMEDIATELY AFTER TURNING THE SEATBELT SIGN OFF, AN ANNOUNCEMENT SHALL BE MADE THAT PASSENGERS SHOULD KEEP THEIR SEATBELTS FASTENED, WHILE SEATED, EVEN WHEN THE SEATBELT SIGN IS OFF.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: June 7, 1971
ACCIDENT CITY: NEW HAVEN
ACCIDENT STATE: CT
REPORT NUMBER: AAR-72-20

ACCIDENT SYNOPSIS:

ALLEGHENY AIRLINES, INC., ALLISON PROP JET CONVAIR 340/440, N5832, OPERATING AS ALLEGHENY FLIGHT 485, CRASHED DURING AN APPROACH TO THETWEED-NEW HAVEN AIRPORT, AT 0949 E.D.T., ON JUNE 7, 1971. TWENTY- EIGHT PASSENGERS AND TWO CREWMEMBERS WERE FATALLY INJURED. TWO PASSENGERS AND THE FIRST OFFICER SURVIVED. THE AIRPLANE WAS DESTROYED. THE FLIGHT, OPERATING BETWEEN WASHINGTON, D.C., AND NEWPORT NEWS, VIRGINIA, WITH STOPS AT GROTON AND NEW HAVEN, CONNECTICUT, AND PHILADELPHIA, PENNSYLVANIA, WAS MAKING A NONPRECISION INSTRUMENT APPROACH AND STRUCK COTTAGES AT AN ALTITUDE OF 29 FEET M.S.L., 4,890 FEET FROM THE THRESHOLD AND 510 FEET TO THERIGHT OF THE EXTENDED CENTER-LINE OF RUNWAY 2.

LOG NUMBER: 0392
RECOMMENDATION NUMBER: A-72-128
DATE OF ISSUE: August 28, 1972
NTSB STATUS: CLOSED - UNACCEPTABLE ACTION

RECOMMENDATION:

FEDERAL AVIATION REGULATION 121.571 BE REVISED TO STATE THAT THE APPROPRIATE CREWMEMBER MUST PHYSICALLY POINT OUT THE LOCATION OF ALLEMERGENCY EXITS ON EACH AIRCRAFT PRIOR TO EACH TAKEOFF. AS A GENERALRULE PASSENGERS DO NOT LISTEN TO THE ORAL ANNOUNCEMENTS. THIS WAS TESTIFIED TO DURING THE PUBLIC HEARING RELATIVE TO THIS ACCIDENT. HOWEVER, PASSENGERS WILL TEND TO WATCH A FLIGHT ATTENDANT WHO PHYSICALLY POINTS OUT THE AREA OF EXITS AND WILL RETAIN THEREFORE A GENERAL IDEA OF THE LOCATION OF SUCH EXITS PARTICULARLY THOSE NEAREST TO THEM.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: September 14, 1972

FAR 121.571 IS SATISFACTORY IF PROPERLY COMPILED WITH.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

LOG NUMBER: 0392
RECOMMENDATION NUMBER: A-72-136
DATE OF ISSUE: August 28, 1972
NTSB STATUS: CLOSED - RECONSIDERED

RECOMMENDATION:

THE EMERGENCY INSTRUCTIONS FOR THE INDIVIDUAL AIRPLANE BE DISPLAYED ON THE BACK OF THE SEATS IN EYE LEVEL SIGHT OF THE PASSENGER, TO PROVIDE ADDED ASSURANCE THAT THE PASSENGER IS FULLY AWARE OF VITAL SAFETY AND SURVIVAL INFORMATION. EFFORTS SHOULD ALSO BE EXERTED BY THE INDUSTRY IN COOPERATION WITH REGULATORY AND CONSUMER PROTECTION AGENCIES TO ASCERTAIN THAT ALL VITAL SAFETY INFORMATION BE DISSEMINATED TO THE TRAVELING PUBLIC IN A STRAIGHTFORWARD, CLEAR, AND EXPLICIT MANNER.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: September 14, 1972

THE FAA FELT THAT FAR 121.571(B)(1)(2) DELINEATES CLEARLY THE RESPONSIBILITY FOR BRIEFING PASSENGERS ON EMERGENCY INSTRUCTIONS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: July 30, 1971
ACCIDENT CITY: SAN FRANCISCO
ACCIDENT STATE: CA
REPORT NUMBER: AAR-72-17

ACCIDENT SYNOPSIS:

A PAN AMERICAN BOEING 747 STRUCK THE APPROACH LIGHT STRUCTURE (ALS) FOR RUNWAY 19L WHILE TAKING OFF FROM RUNWAY 01R AT THE SAN FRANCISCO INTERNATIONAL AIRPORT. THE CREW CONTINUED THE TAKEOFF, AND AFTER AN INFLIGHT INSPECTION FOR DAMAGE, DUMPED FUEL AND RETURNED FOR A LANDING AT SAN FRANCISCO. TWO PASSENGERS WERE INJURED DURING THE IMPACT WITH THE ALS AND EIGHT OTHERS SUSTAINED SERIOUS BACK INJURIES DURING THE EVACUATION AFTER THE LANDING.

LOG NUMBER: 0393
RECOMMENDATION NUMBER: A-72-143
DATE OF ISSUE: August 31, 1972
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE FAA TAKE ADDITIONAL STEPS TO ENSURE THAT ALL CABIN CREWMEMBERS ARE PROPERLY INFORMED REGARDING THE SAFETY EQUIPMENT INSTALLED IN THE CABIN AND THAT THE EMERGENCY EQUIPMENT USED FOR PASSENGER DEMONSTRATION IS THE SAME AS THAT PROVIDED FOR THE PASSENGERS' USE.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: October 6, 1972

THEY ARE TAKING ACTION TO REVIEW AND EVALUATE EACH CARRIER'S OPERATIONS MANUAL AND PROCEDURES TO ENSURE THAT THE REQUIREMENTS OF FAR SECTIONS 121.571 AND 121.573 ARE BEING MET IN AN ACCEPTABLE MANNER.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

SPECIAL STUDY NUMBER: AAS-73-01
DATE OF SPECIAL STUDY: May 23, 1973

SPECIAL STUDY SYNOPSIS:

SPECIAL STUDY -- IN-FLIGHT SAFETY OF PASSENGERS AND FLIGHT ATTENDANTS ABOARD AIR CARRIER AIRCRAFT. THIS STUDY EXAMINES NONFATAL IN-FLIGHT INJURIES OF PASSENGERS AND FLIGHT ATTENDANTS IN AIR CARRIER OPERATIONS DURING THE YEARS 1968 THROUGH 1971. INJURIES CAUSED BY TURBULENCE, EVASIVE MANEUVERS TO AVOID A COLLISION, AND SELF-INITIATED INJURIES ARE SUMMARIZED. CONDITIONS, CIRCUMSTANCES, AND PRE-EXISTING FACTORS INSTRUMENTAL IN CREATING A HAZARDOUS ENVIRONMENT FOR PERSONS ABOARD AIRCRAFT ARE EXAMINED, AS WELL AS TYPES OF INJURIES SUSTAINED AND THE TREATMENT OF SUCH INJURIES. ALSO EXAMINED IS THE RELATIONSHIP OF INJURIES TO PASSENGER SEATBELT DISCIPLINE, STRUCTURE AND DESIGN OF CABIN FURNISHINGS, FLIGHT ATTENDANT'S DUTIES, CONSUMPTION OF ALCOHOLIC BEVERAGES, AND THE LOCATION IN THE AIRPLANE OF PASSENGERS AND FLIGHT ATTENDANTS.

LOG NUMBER: 0451
RECOMMENDATION NUMBER: A-73-006
DATE OF ISSUE: May 23, 1973
NTSB STATUS: CLOSED - ACCEPTABLE ALTERNATE ACTION

RECOMMENDATION:

THE NATIONAL TRANSPORTATION BOARD RECOMMENDS THAT THE AIR TRANSPORT ASSOCIATION OF AMERICA AND MEMBER AIR CARRIERS: INITIATE A STUDY TO DEVELOP INNOVATIVE METHODS FOR INFORMING PASSENGERS OF SAFETY EQUIPMENT AND SEATBELT USAGE. THE WORK OF DOUGLAS AIRPLANE DIVISION,MCDONNELL DOUGLAS CORPORATION, MAY SERVE AS A GUIDE TO THE MORE EFFECTIVE TECHNIQUES FOR PRESENTING PASSENGER SAFETY INFORMATION.

ADDRESSEE: AIR TRANSPORT ASSOCIATION

RESPONSE DATE: June 1, 1973

RESPONSE FROM THE ATA THAT, WITH THEIR MEMBER AIRLINES, THEY ARE REVIEWING THE BOARD'S STUDY TO DETERMINE THE BEST COURSE OF ACTION TO PURSUE. ATA STATED THAT ANY NEW METHODS FOR BRIEFING PASSENGERS AND INFORMING THEM OF SAFETY INFORMATION SHOULD NOT BE STANDARDIZED INDUSTRY-WIDE BUT SHOULD BE DONE ON AN INDIVIDUAL AIRLINE BASIS AS APPROPRIATE TO OFFSET PASSENGER COMPLACENCY. THE AIRLINES

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REACTED FAVORABLY. THE ATA MET WITH THE FLIGHT OPERATIONS COMMITTEE TO DISCUSS THE METHODS OF INFORMING PASSENGERS OF SAFETY BRIEFINGS. THE ATA STATED THAT ANY NEW METHODS FOR BRIEFING PASSENGERS AND INFORMING THEM OFSAFETY INFORMATION SHOULD NOT BE STANDARDIZED INDUSTRY-WIDE BUT SHOULD BE DONE ON AN INDIVIDUAL AIRLINE BASIS AS APPROPRIATE TO OFFSET PASSENGER COMPLACENCY. THE AIRLINES REACTED FAVORABLY.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

SPECIAL STUDY NUMBER: AAS-74-03
DATE OF SPECIAL STUDY: January 5, 1975

SPECIAL STUDY SYNOPSIS:

THE NATIONAL TRANSPORTATION SAFETY BOARD IS CONCERNED ABOUT THE NUMBER OF PASSENGERS WHO ARE INJURED OR KILLED DURING EMERGENCY EVACUATIONS FROM AIR CARRIER AIRCRAFT. AS A RESULT, THE SAFETY BOARD HAS CONDUCTED A STUDY, "SAFETY ASPECTS OF EVACUATIONS FROM AIR CARRIER AIRCRAFT," WHICH IDENTIFIES AND ASSESSES FACTORS THAT MOST OFTEN AFFECT EMERGENCY EVACUATIONS. THE STUDY REVEALED SEVERAL AREAS IN WHICH ACTIONS ARE NEEDED TO MAKE EMERGENCY EVACUATIONS SAFER FOR PASSENGERS.

LOG NUMBER: 0600
RECOMMENDATION NUMBER: A-74-112
DATE OF ISSUE: January 5, 1975
NTSB STATUS: CLOSED - ACCEPTABLE ALTERNATE ACTION

RECOMMENDATION:

REQUIRE THAT AIR CARRIER PASSENGERS BE ALERTED, DURING PRETAKEOFF BRIEFINGS, OF THE NEED TO FAMILIARIZE THEMSELVES WITH THE PROCEDURES INVOLVED IN THE OPERATION OF EMERGENCY EXITS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: May 9, 1975

FAA LTR: WE CONCUR AND WILL ISSUE AN AIR CARRIER OPERATIONS BULLETIN. BIENNIAL OPERATIONS REVIEW, PROPOSAL 586; AN ADVISORY CIRCULAR IS BEING PREPARED WHICH WILL PUBLICIZE THE FARS PERTAINING TO CABIN AND PASSENGER SAFETY IN AIR CARRIER OPERATIONS.

DATE OF NTSB FOLLOWUP LTR: July 28, 1977

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 18, 1977

FAA LTR: THIS RECOMMENDATION WAS TRANSFERRED TO THE BIENNIAL OPERATIONS REVIEW AS PROPOSAL 586. THE COMMITTEE RECOMMENDED A NOTICE OF PROPOSED RULE MAKING (NPRM). NPRM 77-12 WAS PUBLISHED IN THE FEDERAL REGISTER ON JULY 21, 1975.

DATE OF NTSB FOLLOWUP LTR: March 18, 1980

NTSB FOLLOW-UP LETTER DATED 7/30/80 SENT TO FAA TO INQUIRE AS TO ACTION TAKEN.

NTSB FOLLOW-UP LETTER DATED 3/18/81 SENT TO FAA TO INQUIRE AS TO ACTION TAKEN.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: June 10, 1981

FEDERAL AVIATION ADMINISTRATION LTR: A PROPOSAL TO AMEND 121.571 IN ACCORDANCE WITH THIS RECOMMENDATION HAS BEEN WITHDRAWN FROM OPERATIONS REVIEW PROGRAM NOTICE NO. 11. THIS PROPOSAL WILL RECEIVE NO FURTHER CONSIDERATION BECAUSE THE CURRENT PASSENGER BRIEFINGS AND INFORMATION REGARDING THE OPERATION OF EMERGENCY EXISTS. DISSEMINATION OF THIS INFORMATION IS BEING EMPHASIZED DURING CREWMEMBER TRAINING PROGRAMS AND DURING PASSENGER BRIEFING THAT IS REQUIRED BY 121.571. ADDITIONALLY, THIS INFORMATION IS CLEARLY POSTED AT EACH EMERGENCY EXIT. THE PUBLIC WAS ADVISED OF THE WITHDRAWAL OF THIS PROPOSAL IN THE FEDERAL REGISTER, VOL. 46, NO. 12 DATED JANUARY 19, 1981.

DATE OF NTSB FOLLOWUP LTR: August 26, 1981

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

LOG NUMBER: 0600
RECOMMENDATION NUMBER: A-74-113
DATE OF ISSUE: January 5, 1975
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

ISSUE AN ADVISORY CIRCULAR WHICH WOULD PROVIDE STANDARDIZED GUIDANCE TO THE AIR TRANSPORT INDUSTRY ON EFFECTIVE METHODS AND TECHNIQUES FOR CONVEYING SAFETY INFORMATION TO PASSENGERS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: May 9, 1975

FAA LTR: AN ADVISORY CIRCULAR IS BEING PREPARED WHICH WILL PUBLICIZE THE FAR'S PERTAINING TO CABIN AND PASSENGER SAFETY IN AIR CARRIER OPERATIONS.

DATE OF NTSB FOLLOWUP LTR: July 28, 1977

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 18, 1977

FAA LTR: ADVISORY CIRCULAR, AC-121-24, PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS, WAS SIGNED AND FORWARDED TO THE PRINTER FOR PUBLICATION AND DISTRIBUTION ON JUNE 23, 1977.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

SPECIAL STUDY NUMBER: AAS-76-01
DATE OF SPECIAL STUDY: April 29, 1976

SPECIAL STUDY SYNOPSIS:

SEVERAL RAPID DECOMPRESSION MISHAPS INVOLVING DC-10 AND L-1011 AIRCRAFT HAVE DISCLOSED PROBLEMS WITH CHEMICALLY GENERATED PASSENGERSUPPLEMENTAL OXYGEN SYSTEMS. THE NATIONAL TRANSPORTATION SAFETY BOARD'S SPECIAL STUDY, "CHEMICALLY GENERATED SUPPLEMENTAL OXYGEN SYSTEMS IN DC-10 AND L-1011 AIRCRAFT"1/INDICATES THAT THESE PROBLEMSARE PRIMARILY THE RESULT OF A LACK OF UNDERSTANDING OF THE SYSTEM BY BOTH PASSENGERS AND FLIGHT ATTENDANTS.

LOG NUMBER: 0713
RECOMMENDATION NUMBER: A-76-025
DATE OF ISSUE: April 29, 1976
NTSB STATUS: CLOSED - ACCEPTABLE ALTERNATE ACTION

RECOMMENDATION:

ISSUE AN ADVISORY CIRCULAR (AC) TO ALL PART 121, 123, AND 135.2 CERTIFICATE HOLDERS TO PROVIDE GUIDELINES FOR IMPROVED PASSENGER BRIEFINGS AND PRINTED INSTRUCTIONS FOR THE USE OF CHEMICAL SUPPLEMENTAL OXYGEN SYSTEMS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 2, 1976

AN AIR CARRIER OPERATIONS BULLETIN WILL BE ISSUED TO INCORPORATE GUIDANCE MATERIAL RELATIVE TO THE FOLLOWING: B. IMPROVED PASSENGER BRIEFINGS AND PRINTED INSTRUCTIONS ON THE USE OF THE SUBJECT SYSTEM.

DATE OF NTSB FOLLOWUP LTR: December 29, 1976

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

LOG NUMBER: 0713
RECOMMENDATION NUMBER: A-76-026
DATE OF ISSUE: April 29, 1976
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

ISSUE AN OPERATIONS BULLETIN FOR A REVIEW OF ORAL BRIEFINGS AND PASSENGER SAFETY CARDS FOR EACH PART 121, 123, AND 135.2 CERTIFICATEHOLDER TO ASSURE THAT BRIEFINGS AND PRINTED INSTRUCTIONS FOR THE USEOF THE PASSENGER CHEMICAL SUPPLEMENTAL OXYGEN SYSTEM ARE FACTUAL ANDUNAMBIGUOUS AND CONFORM TO THE GUIDELINES OF THE ABOVE AC.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 2, 1976

AN AIR CARRIER OPERATIONS BULLETIN WILL BE ISSUED TO INCORPORATE GUIDANCE MATERIAL RELATIVE TO THE FOLLOWING: C. REVIEW AND EVALUATION OF ORAL BRIEFINGS AND PASSENGER SAFETY INFORMATION CARDS TO ASSURE THE INCORPORATION OF CLEAR, FACTUAL DATA ON THE USE OF THESUBJECT SYSTEM.

DATE OF NTSB FOLLOWUP LTR: December 29, 1976

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: November 16, 1976
ACCIDENT CITY: DENVER
ACCIDENT STATE: CO
REPORT NUMBER:

ACCIDENT SYNOPSIS:

THE NATIONAL TRANSPORTATION SAFETY BOARD'S CONTINUING INVESTIGATION OF THE TEXAS INTERNATIONAL AIRLINES, INC., DC-9 ACCIDENT AT DENVER, COLORADO, ON NOVEMBER 16, 1976, HAS DISCLOSED SEVERAL UNSAFE CONDITIONS THAT SHOULD BE CORRECTED -- CREWMEMBER EMERGENCY EVACUATION TRAINING, TAIL CONE EXIT DESIGNATION, PASSENGER INFORMATION CARDS, AND TAIL CONE EMERGENCY LIGHTING.

LOG NUMBER: 0842
RECOMMENDATION NUMBER: A-77-028
DATE OF ISSUE: May 23, 1977
NTSB STATUS: CLOSED - ACCEPTABLE ALTERNATE ACTION

RECOMMENDATION:

ISSUE AN AIR CARRIER OPERATIONS BULLETIN CLARIFYING THE DESIGNATION OF THE DC-9 TAIL CONE EXIT AS A REQUIRED EXIT AND REQUIRING THAT PRINCIPAL OPERATIONS INSPECTORS ASSIGNED TO DC-9 OPERATORS INSURE THAT THEIR ASSIGNED AIR CARRIERS PROVIDE INSTRUCTIONS IN THEIR PASSENGER BRIEFINGS AND ON THEIR PASSENGER INFORMATION CARDS ON THE AVAILABILITY AND OPERATION OF THE TAIL CONE EXIT AS AN EMERGENCY EXIT.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 10, 1977

FAA LTR: FAA REGIONAL OFFICES WERE NOTIFIED BY LETTER OF MARCH 7, 1977, THAT THE TAIL CONE EXIT ON ALL MODELS OF THE DOUGLAS DC-9 IS A REQUIRED EXIT. THEY WERE REQUESTED TO ENSURE ASSIGNED CARRIERS INCLUDE REFERENCE TO THE EXIT IN THE ORAL BRIEFING AND ON THE PASSENGER INFORMATION CARDS AS REQUIRED BY 14 CFR 121.571.

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DATE OF ACCIDENT: May 8, 1978
ACCIDENT CITY: ESCAMBIA BAY, PENSACOLA
ACCIDENT STATE: FL
REPORT NUMBER: AAR-78-13

ACCIDENT SYNOPSIS:

ON MAY 8, 1978, A NATIONAL AIRLINES BOEING 727 CRASHED DURING AN APPROACH TO THE PENSACOLA REGIONAL AIRPORT AT PENSACOLA, FLORIDA. THE AIRCRAFT CAME TO REST IN 12 FEET OF WATER IN THE ESCAMBIA BAY ABOUT 3 MILES OFF SHORE. THE 52 PASSENGERS AND 6 CREWMEMBERS SUCCESSFULLY EVACUATED FROM THE AIRCRAFT, AND 3 PASSENGERS DROWNED. TWO FLIGHT ATTENDANTS AND TWO PASSENGERS WERE INJURED SERIOUSLY, AND SEVEN PASSENGERS WERE INJURED SLIGHTLY.

LOG NUMBER: 0961
RECOMMENDATION NUMBER: A-79-037
DATE OF ISSUE: June 1, 1979
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

AMEND 14 CFR 121.571 TO REQUIRE THAT PASSSENGERS BE BRIEFED ON THE LOCATION OF APPROVED FLOTATION DEVICES BEFORE EACH FLIGHT THAT REQUIRES THE AIRCRAFT TO PASS OVER A LARGE BODY OF WATER DURING TAKEOFF, DEPARTURE, APPROACH, OR LANDING.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 29, 1979

FAA LTR: OPERATIONS REVIEW PROGRAM PROPOSAL 5-14 TO AMEND FRA SECTION 121.571(A)(1)(IV) WAS ADOPTED MAY 23, 1978, WITH AN EFFECTIVE DATE OF JUNE 26, 1978. THIS SECTION REQUIRES THAT ALL PASSENGERS BE ORALLY BRIEFED BEFORE EACH TAKEOFF ON THE LOCATION AND USE OF ANY EMERGENCY FLOTATION MEANS.

DATE OF NTSB FOLLOWUP LTR: February 27, 1981

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: June 15, 1981

FAA LTR: AS STATED IN OUR LETTER OF AUGUST 29, 1979, OPERATIONS REVIEW PROGRAM PROPOSAL 5-14 TO AMEND FAR SECTION 121.571(A)(1)(IV) WAS ADOPTED MAY 23, 1978. THIS SECTION REQUIRES THAT ALL PASSENGERS BE ORALLY BRIEFED BEFORE EACH TAKEOFF ON THE LOCATION AND USE OF ANY REQUIRED EMERGENCY FLOTATION MEANS. IN THAT LETTER WE QUOTED AN EFFECTIVE DATE OF JUNE 26, 1978. THE ACTUAL REVISED EFFECTIVE DATE OF THE AMENDMENT WAS SEPTEMBER 29, 1978.

DATE OF NTSB FOLLOWUP LTR: September 14, 1981

LOG NUMBER:	0961
RECOMMENDATION NUMBER:	A-79-039
DATE OF ISSUE:	June 1, 1979
NTSB STATUS:	CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

EXPEDITE THE ISSUANCE OF THE NOTICE OF PROPOSED RULE MAKING WHICH ADDRESSES REVISIONS TO TSO - C13C (14 CFR 37.123) FOR LIFEVESTS. THE REVISIONS TO THIS TSO SHOULD ELIMINATE THE DIFFICULTIES IDENTIFIED IN THIS ACCIDENT WITH RESPECT TO THE PACKAGING, DONNING, AND OPERATION OF LIFEVESTS BY UNINSTRUCTED SUBJECTS UNDER STRESS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 29, 1979

FAA LTR: WE ARE PREPARING A REVISION TO THE LIFE PRESERVER PERFORMANCE STANDARDS UNDER TECHNICAL STANDARD ORDER TSO-C13C WHICH WILL INCLUDE UPDATED PROVISIONS FOR STOWAGE AND DONNING. WE ARE PROCESSING A NOTICE OF PROPOSED RULE MAKING AND INTEND TO ISSUE THE NOTICE AS EXPEDITIOUSLY AS POSSIBLE.

DATE OF NTSB FOLLOWUP LTR: February 27, 1981

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: June 15, 1981

FAA LTR: THE DEVELOPMENT OF THE DRAFT TSO REVISION DISCUSSED IN THE AUGUST 29, 1979, FAA LETTER TO THE NTSB HAS BEEN COMPLETED. UNDER PROCEDURES ADOPTED IN JUNE 1980, AN NPRM FOR A TSO REVISION IS NOT REQUIRED. INSTEAD, THE GENERAL PUBLIC IS INFORMED OF THE PENDING TSO REVISION BY A NOTICE IN THE FEDERAL REGISTER, AND IS GIVEN THE OPPORTUNITY TO COMMENT AND EXPRESS VIEWS. WE PLAN TO ANNOUNCE THE AVAILABILITY OF THE DRAFT REVISION TO TSO-C13C IN THE FEDERAL REGISTER IN A MATTER OF WEEKS.

DATE OF NTSB FOLLOWUP LTR: September 14, 1981

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: August 20, 1982

FAA LTR: A DRAFT NOTICE OF TECHNICAL STANDARD ORDER (TSO) C-13D WAS PUBLISHED IN THE FEDERAL REGISTER ON NOVEMBER 16, 1982 FOR COMMENTS. THE COMMENTS HAVE BEEN RECEIVED AND ARE BEING REVIEWED. THE FINAL TSO C-13D SHOULD BE ISSUED BY DECEMBER 1982.

DATE OF NTSB FOLLOWUP LTR: September 30, 1982

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: October 28, 1983

FAA LETTER: THE FEDERAL AVIATION ADMINISTRATION (FAA) HAS COMPLETED ITS REVIEW OF THE COMMENTS RECEIVED ON TECHNICAL STANDARD ORDER C13D. THE FAA AGREES WITH THE NTSB'S COMMENT ON PACKAGING OF LIFE PRESERVERS AND INCORPORATED IT INTO TECHNICAL STANDARD ORDER C13D. IT WAS ISSUED JANUARY 3, 1983. THE FAA CONSIDERS ACTION COMPLETED ON SAFETY RECOMMENDATION A-79-39.

DATE OF NTSB FOLLOWUP LTR: October 31, 1983

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DATE OF ACCIDENT: April 18, 1979
ACCIDENT CITY: NEWARK
ACCIDENT STATE: NJ
REPORT NUMBER: AAR-79-14

ACCIDENT SYNOPSIS:

NEW YORK AIRWAYS, INC., FLIGHT 972, A SIKORSKY S61L HELICOPTER WITH 15 PASSENGERS AND A CREW OF 3 CRASHED ON NEWARK INTERNATIONAL AIRPORT AT 1825 ON APRIL 18, 1979, SHORTLY AFTER TAKEOFF. THREE PASSENGERS WERE KILLED, 9 OTHERS AND THE CREWMEMBERS WERE INJURED.

LOG NUMBER: 1100
RECOMMENDATION NUMBER: A-79-076
DATE OF ISSUE: October 4, 1979
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: ESTABLISH A RESEARCH PROJECT TO DETERMINE THE OPTIMAL BRACE POSITION FOR VARIOUS SEAT DESIGNS AND SEATING CONFIGURATIONS ON AIRCRAFT USED IN PASSENGER-CARRYING OPERATIONS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: December 6, 1979

FAA LTR: THE FAA CONCURS WITH THIS RECOMMENDATION AND HAS REQUESTED THE CIVIL AEROMEDICAL INSTITUTE (CAMI) TO CONDUCT A STUDY TO DETERMINE THE PROPER OR OPTIMAL PASSENGER BRACE POSITION FOR VARIOUS SEAT DESIGNS AND CONFIGURATIONS. THE STUDY IS EXPECTED TO BE COMPLETED BY JULY 1980.

DATE OF NTSB FOLLOWUP LTR: December 19, 1979

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: February 2, 1983

FAA LETTER: THE FEDERAL AVIATION ADMINISTRATION'S AEROMEDICAL RESEARCH BRANCH OF THE CIVIL AEROMEDICAL INSTITUTE, PROTECTION AND SURVIVAL LABORATORY, HAS RECENTLY COMPLETED

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ITS RESEARCH AND TESTS WITH RESPECT TO ESTABLISHING "BRACE FOR IMPACT" POSITIONS FOR PASSENGERS AND FLIGHT ATTENDANTS. AS A RESULT OF THIS RESEARCH, ON NOVEMBER 18, 1982, THE FAA ISSUED CHANGE 34 TO FAA ORDER 8430.17, AIR CARRIER OPERATIONS BULLETINS (ACOB), WHICH TRANSMITS ACOB NO. 1-76-23, BRACE FOR IMPACT POSITIONS.

DATE OF NTSB FOLLOWUP LTR: March 31, 1983

LOG NUMBER:	1100
RECOMMENDATION NUMBER:	A-79-077
DATE OF ISSUE:	October 4, 1979
NTSB STATUS:	CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: ISSUE AN AIR CARRIER OPERATIONS BULLETIN REQUESTING PRINCIPAL OPERATIONS INSPECTORS TO INSURE THAT THE TRAINING OF CREWMEMBERS INCLUDES INFORMATION ON THE APPROPRIATE PASSENGER BRACE POSITION FOR SPECIFIC AIRCRAFT CONFIGURATIONS DURING POTENTIAL CRASH LANDINGS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: December 6, 1979

FAA LTR: DEPENDING ON THE OUTCOME OF THE STUDY BY CAMI, THE FAA MAY REQUEST A REVISION OF THE AIR CARRIER TRAINING PROGRAM.

DATE OF NTSB FOLLOWUP LTR: December 19, 1979

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: February 2, 1983

FAA LETTER: THE FEDERAL AVIATION ADMINISTRATION'S AEROMEDICAL RESEARCH BRANCH OF THE CIVIL AEROMEDICAL INSTITUTE, PROTECTION AND SURVIVAL LABORATORY, HAS RECENTLY COMPLETED ITS RESEARCH AND TESTS WITH RESPECT TO ESTABLISHING "BRACE FOR IMPACT" POSITIONS FOR PASSENGERS AND FLIGHT ATTENDANTS. AS A RESULT OF THIS RESEARCH, ON NOVEMBER 18, 1982, THE FAA ISSUED CHANGE 34 TO FAA ORDER 8430.17, AIR CARRIER OPERATIONS BULLETINS (ACOB), WHICH TRANSMITS ACOB NO. 1-76-23, BRACE FOR IMPACT POSITIONS.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF NTSB FOLLOWUP LTR: March 31, 1983

LOG NUMBER: 1100
RECOMMENDATION NUMBER: A-79-078
DATE OF ISSUE: October 4, 1979
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: ISSUE AN AIR CARRIER OPERATIONS BULLETIN REQUIRING PRINCIPAL OPERATIONS INSPECTORS TO INSTRUCT THEIR ASSIGNED AIR CARRIERS TO DESCRIBE THE APPROPRIATE EMERGENCY BRACE POSITION ON THE PASSENGER BRIEFING CARD AND TO REQUIRE THAT PREFLIGHT BRIEFINGS INCLUDE A REFERENCE TO THE PROPER BRACE POSITION.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: December 6, 1979

FAA LTR: DEPENDING ON THE OUTCOME OF THE STUDY BY CAMI, THE FAA MAY REQUEST A REVISION OF THE PASSENGER BRACE POSITIONS ON THE PASSENGER BRIEFING CARDS.

DATE OF NTSB FOLLOWUP LTR: December 19, 1979

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: February 2, 1983

FAA LETTER: THE FEDERAL AVIATION ADMINISTRATION'S AEROMEDICAL RESEARCH BRANCH OF THE CIVIL AEROMEDICAL INSTITUTE, PROTECTION AND SURVIVAL LABORATORY, HAS RECENTLY COMPLETED ITS RESEARCH AND TESTS WITH RESPECT TO ESTABLISHING "BRACE FOR IMPACT" POSITIONS FOR PASSENGERS AND FLIGHT ATTENDANTS. AS A RESULT OF THIS RESEARCH, ON NOVEMBER 18, 1982, THE FAA ISSUED CHANGE 34 TO FAA ORDER 8430.17, AIR CARRIER OPERATIONS BULLETINS (ACOB), WHICH TRANSMITS ACOB NO. 1-76-23, BRACE FOR IMPACT POSITIONS.

DATE OF NTSB FOLLOWUP LTR: March 31, 1983

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: June 14, 1979
ACCIDENT CITY: DULLES AIRPORT
ACCIDENT STATE: VA
REPORT NUMBER:

ACCIDENT SYNOPSIS:

DURING THE 20-MONTH PERIOD FROM JULY 1979 THROUGH FEBRUARY 1981, THERE HAVE BEEN FOUR OCCASIONS IN WHICH AN AIR FRANCE CONCORDE OPERATING FROM DULLES INTERNATIONAL AIRPORT OR KENNEDY INTERNATIONAL AIRPORT WAS INVOLVED IN A POTENTIALLY CATASTROPHIC INCIDENT RESULTING FROM BLOWN TIRES DURING TAKEOFF. THE REPETITIVE NATURE OF THESE INCIDENTS AND, IN PARTICULAR, CREW RESPONSE IN THE MORE RECENT INCIDENTS IS OF SERIOUS CONCERN TO THE NATIONAL TRANSPORTATION SAFETY BOARD. ON JUNE 14, 1979, AN AIR FRANCE CONCORDE EXPERIENCED BLOWOUTS OF THE NOS. 5 AND 6 TIRES ON THE LEFT MAIN LANDING GEAR ON TAKEOFF FROM DULLES INTERNATIONAL AIRPORT, WASHINGTON, D.C. AS A RESULT OF THE SAFETY BOARD'S FINDINGS IN THE ENSUING INVESTIGATION OF THAT INCIDENT, SEVERAL MECHANICAL AND OPERATIONAL RECOMMENDATIONS WERE BEING CONSIDERED; HOWEVER, PRIOR TO A FINAL DECISION ON THEIR ISSUANCE, A SECOND BLOWN TIRE INCIDENT OCCURRED ON JULY 21, 1979, INVOLVING A TAKEOFF FROM DULLES.

LOG NUMBER: 1349
RECOMMENDATION NUMBER: A-81-150
DATE OF ISSUE: November 9, 1981
NTSB STATUS: CLOSED - ACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB URGES THE BUREAU ENQUETES ACCIDENTS TO TAKE ACTION TO ACHIEVE THE FOLLOWING: REQUIRE THE INCORPORATION INTO THE EMERGENCY SECTION OF THE AIRPLANE FLIGHT MANUAL FOR AIR FRANCE CONCORDE OPERATIONS, A PROCEDURE FOR SUSPECTED/KNOWN TIRE FAILURE ON TAKEOFF WHICH INCLUDES MANDATORY REQUIREMENT TO LEAVE THE LANDING GEAR EXTENDED, TO RETURN TO THE TAKEOFF AIRFIELD, TO ADVISE THE CABIN ATTENDANTS OF INTENDED ACTION, AND TO BRIEF PASSENGERS FOR A PRECAUTIONARY LANDING.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: BUREAU ENQUETES ACCIDENTS, INSPECTION GENERALE DE L'AVIATION, FRANCE
RESPONSE DATE: January 7, 1982

BUREAU ENQUETES ACCIDENTS, INSPECTION GENERALE DE L'AVIATION CIVILE LETTER: THE OBJECTIVES RECOMMENDED HAVE FOR THE MOST PART ALREADY BEEN ATTAINED THROUGH MEASURES THAT HAVE BEEN IMPLEMENTED OR THAT ARE CURRENTLY BEING IMPLEMENTED: (1) CURRENT AIR FRANCE OPERATING PROCEDURES REQUIRE, WHEN DOUBT EXISTS WITH RESPECT TO THE CONDITION OF THE TIRES AT THE TIME OF TAKEOFF, THAT THE LANDING GEAR REMAIN EXTENDED. THIS REQUIREMENT MAY, HOWEVER, BE MODIFIED BY THE POSSIBLE EXISTENCE OF PERFORMANCE IMPERATIVES. (2) IF THE LANDING GEAR MUST REMAIN EXTENDED, THE LANDING MUST INDEED OCCUR ON THE TAKEOFF RUNWAY OR THE NEAREST EMERGENCY RUNWAY. (3) REGARDING THE TWO FINAL POINTS OF YOUR RECOMMENDATION, I.E., INFORMING THE CABIN ATTENDANTS AND PREPARING THE CABIN FOR AN EMERGENCY LANDING, PLEASE NOTE THAT AIR FRANCE HAS ALREADY INSTITUTED THESE PROCEDURES. ALL THAT REMAINS FOR US TO DO, THEN, IN ACTING ON YOUR RECOMMENDATION, IS TO REQUEST THAT AIR FRANCE AGAIN DRAW THE ATTENTION OF ITS FLIGHT PERSONNEL TO THE IMPORTANCE OF ADHERING STRICTLY TO THE PROCEDURES ESTABLISHED FOR INFORMING THE CABIN ATTENDANTS AND PREPARING THE CABIN FOR A FORESEEABLE DIFFICULT LANDING.

DATE OF NTSB FOLLOWUP LTR: March 5, 1982

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: September 13, 1982
ACCIDENT CITY: MALAGA
ACCIDENT STATE: SPAIN
REPORT NUMBER:

ACCIDENT SYNOPSIS:

A PRIMARY FACTOR IN ASSURING THE RAPID AND SAFE EVACUATION OF PASSENGERS FROM AN AIRPLANE IN AN EMERGENCY IS THE ADEQUATE TRANSFER OF PASSENGER SAFETY INFORMATION. PASSENGER BRIEFING CARDS ARE REQUIRED TO BE AVAILABLE TO PASSENGERS AND ORAL BRIEFINGS OF PASSENGERS ARE REQUIRED BEFORE ALL U.S. AIR CARRIER AND AIR TAXI FLIGHTS BY FEDERAL AVIATION REGULATIONS AND BEFORE INTERNATIONAL FLIGHTS BY INTERNATIONAL CIVIL AVIATION ORGANIZATION ANNEX 6 STANDARDS. HOWEVER, INFORMATION GATHERED IN MANY ACCIDENT INVESTIGATIONS HAS LED THE SAFETY BOARD TO CONCLUDE THAT THE PRESENT SYSTEM FOR EDUCATING PASSENGERS ABOUT AIRPLANE SAFETY FEATURES IS INADEQUATE AND HAS FAILED TO ACHIEVE ITS PURPOSE OF INCREASING SURVIVABILITY. THE MOST RECENT EXAMPLE IS THE SEPTEMBER 13, 1982, CRASH OF A SPANTEX DC-10 AT MALAGA, SPAIN.

LOG NUMBER: 1551
RECOMMENDATION NUMBER: A-83-045
DATE OF ISSUE: July 12, 1983
NTSB STATUS: OPEN - UNACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS THAT THE FEDERAL AVIATION ADMINISTRATION: SPONSOR A GOVERNMENT/INDUSTRY TASK FORCE OPEN TO FOREIGN PARTICIPANTS MADE UP OF REPRESENTATIVES FROM THE AIRPLANE MANUFACTURERS, AIR CARRIER AND COMMUTER OPERATORS, RESEARCHERS, FLIGHT ATTENDANTS, AND CONSUMERS (1) TO IDENTIFY THE TYPE OF SAFETY INFORMATION THAT IS MOST USEFUL AND NEEDED BY PASSENGERS, (2) TO IDENTIFY AND DEVELOP IMPROVED INSTRUCTIONAL CONCEPTS FOR CONVEYING THE SAFETY INFORMATION, AND (3) TO RECOMMEND APPROPRIATE CHANGES TO THE OPERATING REQUIREMENTS REGARDING PASSENGER ORAL BRIEFINGS AND INFORMATION BRIEFING CARDS.

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: September 22, 1983

FAA LETTER: RESPONSE FROM THE FAA STATING THAT THE SUBJECT IS ADEQUATELY COVERED IN FAR SECTIONS 121.571, 121.573 AND

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

121.333. ALSO, AC 121-24 PROVIDES INFORMATION AND GUIDANCE FOR USE BY AIR CARRIERS IN THE PREPARATION OF PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS. VARIOUS INVESTIGATIONS AND PUBLICATIONS HAVE BEEN SPONSORED BY THE FAA, E.G., FAA REPORT NO. IRC-79-1, AN INVESTIGATION OF FACTORS AFFECTING AIRCRAFT PASSENGERS ATTENTION TO SAFETY INFORMATION PRESENTATIONS, AND SOCIETY OF AUTOMOTIVE ENGINEERS S-9 (CABIN SAFETY COMMITTEE) HAS DRAFTED AEROSPACE RECOMMENDED PRACTICE 1384.

DATE OF NTSB FOLLOWUP LTR: December 7, 1983

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: March 22, 1984

FAA COMMENT: THE FEDERAL AVIATION ADMINISTRATION (FAA) DOES NOT BELIEVE THAT THERE IS SUFFICIENT JUSTIFICATION THAT WOULD WARRANT OUR SPONSORSHIP OF A GOVERNMENT/INDUSTRY TASK FORCE AS RECOMMENDED BY THE BOARD, HOWEVER, THE FAA HAS UNDERTAKEN THE FOLLOWING PROGRAMS RELATED TO THE ENHANCEMENT AND TRANSFER OF CABIN SAFETY INFORMATION:

(1) BY MID-1984 THE FAA PROPOSES TO SPONSOR AN AIRCRAFT CABIN SAFETY SEMINAR. THE PURPOSE OF THIS SEMINAR IS TO PROVIDE THE AVIATION COMMUNITY WITH THE LATEST KNOWLEDGE AND THINKING ABOUT CABIN OCCUPANT SAFETY WITH RESPECT TO DESIGN, PRACTICE, AND PROCEDURES. THE OBJECTIVES ARE TO CONDUCT A COMPREHENSIVE REVIEW OF ALL ASPECTS OF AIRCRAFT CABIN SAFETY WITH REGARD TO DESIGN, CREW PROCEDURES AND TRAINING, EQUIPMENT, AND PASSENGER EDUCATION THAT HAVE A BEARING ON THE IMPROVEMENT OF OCCUPANT SURVIVAL DURING EMERGENICES, BOTH IN FLIGHT AND ON THE GROUND. TENTATIVE SESSION NO. 5 OF THE SEMINAR IS DIRECTED TO PASSENGER EDUCATION, SUCH AS:

A. PASSENGER BRIEFINGS: COMPARISON OF LIVE BRIEFINGS WITH TELEVISED BRIEFINGS, USE OF EMERGENCY BRIEFING CARDS, EFFECT OF VOICE QUALITY ON PASSENGER ATTENTIVENESS, DEPARTURE LOUNGE SELF-BRIEFING MATERIAL, BRIEFING MESSAGE CONTENT, ETC.

B. FREQUENT TRAVELER TRAINING: DISCUSSION OF PARA-SAFETY SPECIALISTS WHO COULD ASSUME RESPONSIBILITY UNDER CABIN STAFF.

(2) WE ARE UPDATING ADVISORY CIRCULAR NO. 121-24, PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS.

DATE OF NTSB FOLLOWUP LTR: January 10, 1985

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

ADDRESSEE: FEDERAL AVIATION ADMINISTRATION

RESPONSE DATE: May 2, 1985

FAA LTR: WE BELIEVE THAT THE BOARD'S ASSESSMENT THAT THE PASSENGER EDUCATION TOPIC WAS INADEQUATELY COVERED AT THE WORKSHOP IS PREMATURE. THE FINAL REPORT RESULTING FROM THE CONFERENCE IS EXPECTED TO BE FINALIZED BY MID-JULY 1985 AND SHOULD PROVIDE PERTINENT INFORMATION TO AID IN THE ASSESSMENT OF THE QUESTION AS TO THE DIRECTION THE FAA SHOULD PROCEED TO RESPOND TO THE BOARD'S CONTENTION THAT THE PRESENT BRIEFING/CARD PROGRAM HAS FAILED TO ACHIEVE INCREASING SURVIVABILITY. A DECISION REGARDING WHETHER THE FAA SHOULD SPONSOR ANOTHER SEMINAR, WHICH EXPLORES SOLELY THE ISSUES OF PASSENGER EDUCATION WILL BE MADE AFTER OUR REVIEW OF THE FINAL REPORT OF THE CONFERENCE AND WORKSHOP ON CABIN SAFETY BEING PREPARED BY THE FSP.

DATE OF NTSB FOLLOWUP LTR: June 13, 1985

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF ACCIDENT: May 5, 1983
ACCIDENT CITY: MIAMI
ACCIDENT STATE: FL
REPORT NUMBER: AAR-84-04

ACCIDENT SYNOPSIS:

ON MAY 5, 1983, EASTERN AIR LINES FLIGHT 855, A LOCKHEED L-1011 AIRPLANE, N334EA, WAS EN ROUTE FROM MIAMI, FLORIDA, TO NASSAU, GRAND BAHAMA ISLAND, WHEN THE FLIGHTCREW NOTED A LOSS OF OIL PRESSURE ON THE NO. 2 ENGINE AND SHUT IT DOWN. RATHER THAN CONTINUE THE DESCENT TO NASSAU, WHICH WAS ABOUT 50 NAUTICAL MILES AWAY, THE CAPTAIN DECIDED TO RETURN TO MIAMI BECAUSE OF BETTER WEATHER AND TERMINAL APPROACH AIDS THERE. HOWEVER, AFTER THE AIRPLANE'S COURSE WAS REVERSED AND LEVELED AT 16,000 FEET, THE NO. 3 ENGINE FLAMED OUT. ABOUT 5 MINUTES LATER, THE NO. 1 ENGINE FLAMED OUT. WITH NONE OF THE AIRPLANE'S ENGINES OPERATING, THE FLIGHTCREW BEGAN A DESCENT TO MAXIMIZE THE GLIDE DISTANCE, AND BEGAN EFFORTS TO RESTART THE NO. 2 ENGINE. AT THE SAME TIME, THE FLIGHTCREW CONSIDERED IT PROBABLE THAT THEY WOULD BE FORCED TO DITCH THE AIRPLANE. THE FLIGHT ENGINEER TOLD THE SENIOR FLIGHT ATTENDANT TO PREPARE THE CABIN FOR DITCHING. AFTER DESCENDING ABOUT 11,000 FEET, THE FLIGHTCREW SUCCEEDED IN RESTARTING THE NO. 2 ENGINE AND SUBSEQUENTLY LANDED THE AIRPLANE SAFELY IN MIAMI. THERE WERE NO INJURIES TO THE 162 PASSENGERS AND 10 CREWMEMBERS.

LOG NUMBER: 1682
RECOMMENDATION NUMBER: A-84-044
DATE OF ISSUE: May 7, 1984
NTSB STATUS: OPEN - UNACCEPTABLE ACTION

RECOMMENDATION:

THE NTSB RECOMMENDS THAT EASTERN AIR LINES: REVISE, AS REQUIRED, ITS PREDEPARTURE ORAL BRIEFING AND SUPPLEMENTARY SAFETY BRIEFING CARDS TO ENSURE THAT EACH ACCURATELY DEMONSTRATES OR DESCRIBES ALL STEPS NECESSARY FOR PASSENGERS TO LOCATE AND RECOVER LIFE VESTS FROM THE STOWED POSITION, REMOVE THEM FROM THEIR PLASTIC CONTAINERS, AND DON THEM.

ADDRESSEE: EASTERN AIR LINES, INC.

RESPONSE DATE: August 22, 1984

THE EASTERN LETTER PROVIDED NO INFORMATION WITH REGARDS TO THIS RECOMMENDATION.

SUMMARIES OF SAFETY RECOMMENDATIONS ISSUED TO THE FEDERAL AVIATION ADMINISTRATION AND TO THE AIRLINE INDUSTRY

DATE OF NTSB FOLLOWUP LTR: January 11, 1985

ADDRESSEE: EASTERN AIR LINES, INC.

RESPONSE DATE: February 11, 1985

EASTERN LTR: OUR PREDEPARTURE OVERWATER BRIEFINGS INCLUDE THE INFORMATION TO LOCATE THE LIFE VESTS IN THEIR PLASTIC BAGS, AND ALL STEPS NECESSARY TO DON AND INFLATE THE VESTS. ADDITIONALLY, OUR BRIEFING FOR A PLANNED WATER LANDING INCLUDES MORE DETAILED INFORMATION ON LOCATING THE VEST IN ITS PLASTIC CONTAINER, OPENING THE CONTAINER, DONNING AND INFLATING THE VEST. THE PLASTIC CONTAINERS ALSO HAVE THE WORDS "PULL HERE - PULL HERE" PRINTED AT THEIR OPENING POINT. COPIES OF OUR PREPARED BRIEFINGS ARE ATTACHED. EASTERN AIRLINES FEELS THAT THE COMBINATION OF OUR BRIEFINGS, DEMONSTRATIONS, AND INFORMATION PRINTED ON THE VEST CONTAINER SHOULD BE ADEQUATE INFORMATION FOR PASSENGERS TO LOCATE AND PROPERLY DON THE LIFE VESTS.

APPENDIX C

SPECIAL STUDIES AND INVESTIGATIONS ON OCCUPANT SURVIVAL

"A Study of United States Air Carrier Accidents Involving Fire, 1955 - 1964."--On March 30, 1966, the CAB issued a study based on its review of 13 air carrier accidents in which death or injury were directly attributable to fire and to the ability of the airplane's occupants to escape. 1/ The study found that deaths and serious injuries following survivable accidents could be reduced by "a more detailed briefing of passengers on emergency procedures and equipment prior to each flight."

"Passenger Survival in Turbojet Ditchings: A Critical Review."--The Safety Board's special study reported on the factors which influenced the survival or nonsurvival of the 57 passengers and 6 crewmembers who were onboard a DC-9 that ditched in the Caribbean Sea on May 2, 1970. 2/ Twenty-two passengers and a flight attendant were killed in the accident. Although the ditching was in daylight and the airplane remained afloat from 5 to 6 minutes, passengers experienced problems when they attempted to evacuate from the airplane and to use their life preservers. The study found that the pre-takeoff briefing was inordinately short--merely a statement of facts rather than a briefing. The pre-ditching briefing did not inform passengers about the emergency equipment on the airplane. The briefing about lifevests was inadequate; despite two demonstrations, the passengers were unfamiliar with the location, the storage, and the packaging of the lifevests, and experienced considerable difficulty in donning the lifevests. This reduced the available time for passenger preparation.

As a result of its study, the Safety Board issued three recommendations to the FAA which addressed safety briefings [illegible] passengers: amend FAR Part 129, "Operations of Foreign Air Carriers," to include the safety provisions of Part 121 "governing the briefing of passengers, or include these provisions in the operations specifications issued to foreign air carriers by the Administrator (A-72-61); require that approved wording for the briefings be included in the appropriate flight/operations manuals of the applicable crewmembers (A-72-67);" and "collaborate with the Air Transport Association (ATA) in the development of more effective methods for conveying safety information to passengers (A-72-68)." The Board recommended also that research in the application of communication techniques, and behavioral sciences, and optimizing learning situations such as recent advances in audio-visual techniques, be undertaken.

In response to the recommendations, the FAA stated that the air carrier's Operations Manual already required that 14 CFR 121 be followed for passenger briefings (A-72-67); that ATA had been contacted to examine more effective methods for conveying safety information to passengers (A-72-68); and that it was conducting research and had installed a videotaped safety briefing at its hangar at Washington National Airport for use with its airplanes, and that if this proved successful, videotaped briefings could be installed at passenger areas at Washington National and Dulles Airports (A-72-68).

1/ "A Study of United States Air Carrier Accidents Involving Fire, 1955-1964", Civil Aeronautics Board Report BOSP-7-6-3, March 30, 1966.
2/ "Passenger Survival in Turbojet Ditchings (A Critical Case Review)", NTSB Special Study AAS-72-2, April 5, 1972.

The Safety Board also recommended that the ATA collaborate with foreign carriers, through the International Air Transport Association (IATA), in the standardization of methods for conveying safety information to passengers. The ATA responded that it was willing to work with the FAA to improve safety briefings and that IATA had been contacted. ATA further said that the special study was being reviewed for industry-wide implications.

"Inflight Safety of Passengers and Flight Attendants."--The Safety Board's 1973 special study examined non-fatal injuries which occurred as a result of inflight turbulence, evasive maneuvers to avoid a collision, or carelessness as well as from the actions of the airplane's occupants. 3/ The study, which covered a 4-year period, found that deficiencies in flight attendant briefings, printed safety cards, flight attendant announcements, and printed signs in the cabin contributed in varying degrees to passenger injuries.

The study noted a continuing and serious problem of passenger indifference to repeated instructions to remain seated with seatbelts fastened when turbulence was anticipated. This indifference to personal safety may have been caused by passengers not understanding fully the reasons for having seatbelts fastened at times other than during takeoff and landing or to their experience as "seasoned travelers" who had flown for years without experiencing either an evasive maneuver or turbulence severe enough to cause discomfort or injury. The study concluded that the inability of cabin attendants to maintain seatbelt discipline effectively and the capriciousness exhibited by passengers who refuse to heed warnings of anticipated turbulence were contributory factors to inflight passenger injury. It also concluded that pre-takeoff briefings sometimes failed to explain the real reason for passengers to wear their seatbelts continuously and that passenger briefings, with proper content and presentation, could be instrumental in reducing the frequency as well as the severity of inflight injuries.

The study recommended that the Air Transport Association (ATA): " initiate a study to develop innovative methods for informing passengers of safety equipment and seatbelt usage. The work of Douglas Aircraft Company, McDonnell Douglas Corporation, may serve as a guide to the more effective techniques for presenting passenger safety information." (A-73-6)

"Safety Aspects of Emergency Evacuations From Air Carrier Aircraft."--"A 1974 Safety Board special study examined in great detail all of the factors which can affect the ability of crew and passengers to escape following an accident or an incident. 4/ The study examined the interrelationships of machine, operator, and environmental factors as they influenced the success of emergency evacuations. The findings which pertained to passenger briefings deal directly with the degree of passenger preparedness for emergency situations and for evacuations in articular. The study, while recognizing that pre-takeoff briefings are supplemented by printed safety cards, noted that Safety Board investigators had observed that passengers were not attentive to the briefings. The study referenced work by Becker 5/ that attributed this lack of attention to a feeling of powerlessness on the part of passengers.

3/ "In-Flight Safety of Passengers and Flight Attendants Aboard Air Carrier Aircraft," NTSB Special Study AAS-73-1, March 14, 1973.

4/ "Safety Aspects of Emergency Evacuations From Air Carrier Aircraft", NTSB Special Study AAS-74-3, November 13, 1974.

5/ Becker, M. A. "Behavioral Stress Response Related to Passengers Briefing and Emergency Warning Systems," Safe Journal, Vol. 3, No. 2, pages 6-9, 1973.

The Safety Board also recommended that the ATA collaborate with foreign carriers, through the International Air Transport Association (IATA), in the standardization of methods for conveying safety information to passengers. The ATA responded that it was willing to work with the FAA to improve safety briefings and that IATA had been contacted. ATA further said that the special study was being reviewed for industry-wide implications.

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5/ Becker, M. A. "Behavioral Stress Response Related to Passengers Briefing and Emergency Warning Systems," Safe Journal, Vol. 3, No. 2, pages 6-9, 1973.

The study concluded that safety cards may not be read because they must compete with other reading material in seatback pockets, and that some pretakeoff briefings may tend to minimize the importance of the information cards. The study cited accidents which demonstrated that when an evacuation was imminent and time was available for a briefing, passengers were attentive to the instructions. Such briefings served several purposes: they were a refresher of the pre-takeoff briefing, they helped to calm and reassure passengers, and they were used as an exchange of information and assigning of evacuation duties to the passengers. It also concluded that, because most evacuations are unplanned, safety information should be presented to passengers so that it is understood easily and is likely to be retained.

The study analyzed the responses to questionnaires by 114 of the 165 passengers who were involved in a B-747 evacuation. Analysis showed that of the 72 passengers who had not read the safety information card, 40 persons were injured by evacuation-related causes. By contrast, of the 42 persons who had read the card, only 7 received evacuation-related injuries. Although the sample was very limited, the data indicated that the percentage of passengers injured who had not read the safety information card was three times as great as that for those passengers who had read the card.

As a result of its study, the Safety Board recommended that the FAA require that air carrier passengers be alerted during pre-takeoff briefings to the need to familiarize themselves with the operation of emergency exits, and that the FAA issue an Advisory Circular for standardized guidance to airlines on effective methods and techniques for conveying safety information to passengers.

"Chemically Generated Supplemental Oxygen Systems in DC-10 and L-1011 Aircraft."--A 1976 Safety Board special study examined several problems with supplemental oxygen systems which were discovered during investigations of decompression accidents and incidents. 6/ The study identified several problems which caused passengers and flight attendants either to not use the oxygen system or to use the systems improperly following a decompression. For example, some passengers did not know how to remove oxygen masks from seatback compartments on DC-10 airplanes, how to initiate the flow of oxygen, or how to don and adjust the masks for a tight fit. These passengers also were generally unaware that the oxygen generator canisters would reach a temperature of 575° F, which in some cases, resulted in burns to persons when they touched the canisters.

The study observed that although recent improvements had been made in the illustration of safety information on passenger information cards, the flight attendant's briefing was the only time that a passenger received oral instructions on the use of the oxygen system. Although the study found that there were no standards, specifications, or universally accepted criteria by which to measure the adequacy of such briefings, there was a diversity of opinion among FAA regional offices which approved the briefing formats about what constituted an adequate briefing.

Two of the nine recommendations resulting from this study which were made to the FAA addressed passenger safety briefings. Safety Recommendation A-76-25 called for an Advisory Circular with guidelines for improved passenger briefings and printed instructions for the use of chemical supplemental oxygen systems, and Safety

6/ "Chemically Generated Supplemental Oxygen Systems on DC-10 and L-1011 Aircraft", NTSB Special Study AAS-76-1, March 3, 1976.

Recommendation A-76-26 called for a review of oral briefings and passenger safety cards to assure that briefings and printed instructions for the use of the passenger chemical supplemental oxygen system are factual, unambiguous, and conform to the guidelines. In response to the recommendations, the FAA issued an Air Carrier Operations Bulletin which contained guidance material for evaluation of oral briefings and for safety card instructions for the use of chemically generated oxygen systems.

APPENDIX D

SAFETY BOARD SURVEY LETTER FOR COMMENTS FOR IMPROVEMENTS TO PASSENGER BRIEFINGS

National Transportation Safety Board

Washington, D.C. 20594

June 7, 1984

The National Transportation Safety Board recently has initiated a Safety Study on safety briefings for airline passengers. The Safety Study will review accidents in which lack of passenger knowledge about safety and emergency procedures affected passenger survival or was revealed to have been otherwise deficient. The study will (1) document current briefing methods and determine their known or likely weaknesses and strengths; (2) suggest possible improvements in these methods, or identify new methods worthy of trial; (3) outline steps being taken or being considered by the Federal Aviation Administration (FAA) and/or the airline industry in this area; and (4) recommend actions to reduce the potential for passenger death or injury resulting from inadequate knowledge of emergency procedures.

To aid the Safety Board in exploring means to increase passenger knowledge of safety equipment and procedures and to enhance their ability to respond appropriately in emergency situations, we are seeking the help and cooperation of the airline industry. You could be of great assistance in determining the advantages and disadvantages of present passenger briefing methods, suggest improvements in these methods, and provide us with your views on a concept to indoctrinate volunteer groups of frequent passengers in the use and operation of the standard safety equipment found on commercial aircraft. Such persons could form a core group of passengers ready to provide assistance to flight attendants and their fellow passengers in emergency situations.

To this end, the Safety Board solicits your advice on the following areas:

- Are present safety briefings adequate?
- What improvements could be instituted?
- Should passenger involvement in safety briefings be broadened?
- Is there a need for specialized briefing techniques for handicapped passengers or those that do not speak the english language?
- Should passengers be made to become more familiar with lifevests, liferafts, evacuation slides, and other emergency equipment?

(2)

- Should frequent passengers be trained in cabin safety procedures?
- What are the positive and negative aspects of such a concept?
- What kind of training could be beneficial?
- How could such training be accomplished?
- Would your organization encourage support, and/or participate in such training?
- What alternatives are availabl[illegible] [illegible]ferable to educate passengers in cabin sa[illegible]atures?

Please feel free to expand your comments beyond these areas if you wish. The Safety Board would appreciate any comments you care to make regarding this concept. If you have any questions, contact Mr. Matthew McCormick of the Bureau of Technology, National Transportation Safety Board, Washington, D.C. 20594. His telephone number is (202) 382-6629.

Your prompt response will be appreciated.

Sincerely yours,

Original signed by

James W. Danaher
Director
Bureau of Technology

APPENDIX E

PASSENGER EDUCATION PROPOSALS CONSIDERED DURING FAA'S 1975 BIENNIAL OPERATIONS REVIEW

Proposal number & Source	Proposal	ATA Comments	Proposal outcome
582 NTSB	Requirement that passengers familiarize themselves with procedures involved in operation of emergency exits.	Existing regulations adequate, including all briefing and passenger safety cards; proposals could lead to inadvertent opening of exit by a passenger familiarizing himself with the operation of emergency exits.	Removed from consideration by FAA because information about operation of exit was posted at at each exit
583 AFA	Several proposals on expanding passengers briefing.	Experience has shown that to be effective, safety briefing must be simple and direct, accompanied by safety briefing card. Swamping passenger with masses of detail would lead to either ignoring briefing on the card and/or retaining little of substance.	Removed from consideration by FAA due to Executive Order 12291
585 FAA	Expand briefing to include instructions on how to fasten and unfasten seat-belt as well as determining proper tension of seatbelt.	Procedures to require check of passengers prior to takeoff and landing to insure seatbelt discipline is more than adequate. Briefing of such nature could become counter productive.	Adopted 14 CFR 121.571, amended May 25, 1978
586 FAA	Briefing of passengers on flotation equipment.	Matter fully covered under existing regulations for extended overwater operations, and if intended for overland operations, the matter is covered by individual placards in the aircraft.	Adopted 14 CFR 121.571, amended May 25, 1978

Proposal number & Source	Proposal	ATA Comments	Proposal outcome
587 ALPA	Option to delete all briefings in regard to keeping seatbelts fastened if placard placed at passenger seats.	Worthy of discussion.	Removed from consideration because FAA believed oral briefings should be required in the interest of safety
590 ALPA	Briefing of location and operation of emergency flotation means for extended overwater operations.	Existing standards of International Civil Aviation Organization concurred in by United States do not approve the seat as a life preserver for overwater operations.	Adopted 14 CFR 121.573, amended May 25, 1978
591 AFA	Two proposals for expansion of briefing information on extended overwater operations.	Present regulations for overwater operations have proven to be completely satisfactory-number of flight attendant as based on evacuation procedures and passenger seating capacity and unrelated to number needed for conduct of preflight briefings.	Removed from consideration by FAA due to Executive Order 12291

APPENDIX F

SOCIETY OF AUTOMOTIVE ENGINEERS AEROSPACE RECOMMENDED PRACTICE ENTITLED: "PASSENGER SAFETY INFORMATION CARDS"

SAE The Engineering Resource For Advancing Mobility

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE RECOMMENDED PRACTICE

ARP 1384A

Issued August 1975
Revised September 1983

PASSENGER SAFETY INFORMATION CARDS

1. PURPOSE: These recommendations are to aid the air transport industry in providing standard passenger safety information cards for use on commercial passenger carrying aircraft.

2. GENERAL PRESENTATION REQUIREMENTS:

2.1 Design and Location: The safety information card shall be designed and located so that the seated passenger will be able to see, and have access to, the card when placed in its normal location aboard the aircraft. It shall not be possible for the card in this location to slip out of sight of the passenger.

2.2 Content: The safety information card shall provide the information described in paragraphs 3.1 through 3.9. For aircraft which carry equipment for extended overwater flights, the information in paragraphs 4.1 through 4.4 shall also be provided. The primary mode of presentation shall be pictorial. The information on the card shall apply only to the type and model airplane on which it is used.

3. MINIMUM REQUIREMENTS:

3.1 No Smoking: Instructions not to smoke shall be provided on each section of the safety card where appropriate.

3.2 Safety Belts: Instructions for fastening, tightening, and unfastening safety belts shall be provided.

3.3 Oxygen Masks: Locations of oxygen masks shall be indicated. Instructions for quickly donning, adjusting and performing any actions necessary for initiating oxygen flow shall be provided. Instructions to help children don their masks only after the passenger has donned his own mask shall be provided.

SOCIETY OF AUTOMOTIVE ENGINEERS AEROSPACE RECOMMENDED PRACTICE ENTITLED: "PASSENGER SAFETY INFORMATION CARDS"

ARP **1384A**

3.4 Brace Positions: Instructions on brace positions to be assumed by passengers shall be provided for all seat orientations used, i.e., forward, rearward, and sideward facing.

3.5 Individual Flotation Devices: Locations of flotation devices, and instructions on their use when in the water, shall be provided. If flotation vests are used, instructions for their removal from their stowed locations, opening the package, donning, using the manual and oral inflation backup systems, and the operation of survivor locator lights where manual operation of such lights is required, shall be provided. If flotation seat cushions or seat backs are available, instructions for using the straps and holding the cushion when in the water shall be provided.

3.6 Passenger Exit Awareness and Location - Land Evacuation: Locations of each of the emergency exits shall be indicated. Instructions on the most appropriate exit(s) to be used shall be provided. Determination of the most appropriate exit(s) for use by each passenger shall be based on at least the following four factors: a) the assumption of a full passenger load; b) the known evacuation rate for each exit; c) the relation of the passenger to each exit; and, d) the assumption that all emergency exits are usable. Passengers shall be instructed not to bring carry-on baggage to the exit. If passengers are to remove shoes they shall be instructed to remove them before reaching the exit.

3.7 Emergency Exit Operation: Instructions on how to open each type of emergency exit in the emergency mode shall be provided. If manual operations are needed to ensure a successful emergency evacuation (e.g., manual operation of the escape device), instructions on the additional operations shall be provided. The preferred placement of the removable hatch after an exit is opened (e.g., outside, on the seat) shall be depicted.

3.8 Use of Overwing Exit: Instructions to walk or run on any ramp that leads from an exit shall be provided. Direction and route of escape after leaving overwing exits shall be indicated.

3.9 Use of Evacuation Slide: Instructions to jump outward in the seated position, with legs extended, and not to sit (e.g., at the door sill) when entering the evacuation slide shall be provided.

4. ADDITIONAL REQUIREMENTS FOR AIRCRAFT WHICH CARRY EQUIPMENT FOR EXTENDED OVERWATER FLIGHT:

SOCIETY OF AUTOMOTIVE ENGINEERS AEROSPACE RECOMMENDED PRACTICE ENTITLED: "PASSENGER SAFETY INFORMATION CARDS"

ARP 1384A

4.1 Passenger Exit Awareness and Location - Extended Overwater Flights: Instructions on the most appropriate exits to be used shall be provided. Determination of the passenger's most appropriate exits shall consider at least these factors: a) the assumption of a full passenger load; b) the number and capacity of life rafts or slide/rafts to be launched from each exit; c) the relation of the passenger to each ditching exit; d) the assumption that all exits which will be above the water line, based on predicted flotation characteristics of the aircraft, and for which provisions have been made for launching rafts or slide/rafts, are usable. Passengers shall be instructed not to bring carry-on baggage to the exit. If passengers are to remove shoes they shall be instructed to remove them before reaching the exit.

4.2 Life Preservers: The specific locations where life preservers are stowed shall be indicated. Instructions on removal from the stowage locations, opening the package, donning, using manual and oral inflation backup systems, and manual operation of survivor locator lights and accessories, as appropriate, shall be provided. If donning procedures for children and adults are different, both methods shall be depicted.

4.3 Life Rafts and Slide Rafts: Stowage locations of life rafts and slide/rafts shall be indicated. Instructions on life raft retrieval, preparations for use, inflation, and securing to the aircraft shall be provided. Launching locations shall be indicated. Instructions for inflation, boarding and detaching of slide/rafts shall be provided.

4.4 Emergency Locator Transmitters and Survival Equipment: Locations shall be indicated, and instructions on retrieval provided, for any required and available emergency locator transmitter and/or survival equipment which are unattached to life rafts or slide/rafts.

PREPARED BY
SAE SUBCOMMITTEE S-9B
CABIN INTERIORS AND FURNISHINGS
OF SAE COMMITTEE S-9
CABIN SAFETY PROVISIONS

APPENDIX G

FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR 121-24:
"PASSENGER SAFETY INFORMATION BRIEFING
AND BRIEFING CARDS

AC NO: 121-24

DATE: 6/23/77

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

1. PURPOSE. This Advisory Circular contains information and guidance material for use by air carriers in the preparation of passenger safety information briefings. The information listed herein includes those items required by regulations, as well as items considered to be desirable passenger information. The goal is to facilitate standardization and improvement of the safety information presented to passengers by the airline industry.

2. REFERENCE. Federal Aviation Regulations 121.311, 121.317, 121.333, 121.571, 121.573, 121.577, 121.589.

3. BACKGROUND. Past investigations of accidents and incidents have shown that many passengers were unaware of safety information that would have helped them in an emergency. The basic methods of informing passengers about safety information are the pretakeoff oral briefing and the passenger information card. Since experience has indicated that many passengers do not pay attention to the oral briefings and do not always read or understand the briefing cards, they should be as appealing and interesting as possible to obtain passenger interest. Such information should be concise and accurate. Present oral briefings have been generally standardized. However, a review of passenger briefing cards shows a wide variance in the quality of cards and the methods used to portray this supplementary information. This Advisory Circular lists items that should be covered in a briefing or on an information card plus other items that are generally covered to add support to the oral briefings. While some air carriers are using pictorial means to convey the information, any means of pictures or words, or a combination thereof, is acceptable as long as the information is presented in a clear and concise manner.

Initiated by: AFS-220

FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR 121-24: "PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

AC 121-24 6/23/77

4. ORAL BRIEFING.

a. Pretakeoff.

(1) As required by FAR 121.571, 121.577 and 121.589, the minimum information to be presented in the pretakeoff briefing is the smoking rule, the location of emergency exits, tray tables and seatbacks in the full upright position and the requirement that carry-on baggage (located at passenger seats) be properly stowed in the underseat retainers for takeoff and landing. Instructions on the fastening, tightening and unfastening of seatbelts should be given.

(2) When required by FAR 121.333(f), the briefing includes the location and use of the oxygen system. The demonstration of the oxygen mask should include instructions on the need to extinguish smoking materials, how to initiate oxygen flow, the placement of the mask on the face, adjustment of the elastic strap on the head and the tightening of the strap ends to hold mask on the face. Passengers should be given information concerning the need for immediate donning of the dropped mask, the amount of inflation of the oxygen reservoir bag (where applicable) and the necessity to keep the oxygen mask on their faces until they are told to remove it by a crewmember. Additional instructions and warnings (on initial generation time lapse, heating of individual canisters, etc.) should be included for oxygen systems that utilize the individual self-generating units.

(3) The pretakeoff oral briefing has been successfully and satisfactorily transferred to a video presentation by at least one carrier. This method of passenger briefing should be considered when the aircraft has the necessary video and sound equipment. The advantages of a video tape presentation are the assurance that a complete briefing is given, that the diction is good and an overall high quality of briefing is maintained. It also lends itself very well to bilingual presentations when necessary.

b. Post Takeoff. The post takeoff briefing required by FAR 121.571(a)(2) includes announcements to the passengers concerning smoking and seatbelts. After the no smoking sign is turned off, they should be advised where the smoking rows or zones are located and that smoking in the lavatories is prohibited. Although not regulatory, a statement should be made at this time to refrain from smoking while standing or walking in the aisles. Just before or immediately after the seatbelt sign is turned off, an additional announcement should be made to keep seatbelts fastened while seated even though the seatbelt sign is off. (Note: This announcement will have a better impact on passengers if made by the captain.)

c. Prelanding. The minimum prelanding briefing (normally given immediately after the captain turns on the seatbelt/no smoking sign) includes

FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR 121-24: "PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

those items required by FAR's 121.577 and 121.589, namely, the requirements for tray tables and seatbacks to be in the full upright position, seatbelts fastened securely, smoking materials extinguished and carry-on baggage stowed in the underseat retainer for landing.

d. Post Landing. The minimum post landing briefing should advise passengers to remain seated with seatbelts fastened until the aircraft is parked at the gate and the engines have been shut down. This request should be accompanied by an explanation that any sudden unanticipated stop could cause physical harm to passengers standing up to retrieve overhead articles. It is desirable to give a signal to the passengers, such as turning the seatbelt sign off, when it is safe to move about.

e. Crewmember Procedures. Each oral briefing presented by a carrier for its passengers should be fully explained and described in the appropriate company manual.

5. PASSENGER SAFETY INFORMATION CARD.

a. General. The oral briefings listed above should be supplemented by a printed card, as required by FAR 121.571, with instructions and diagrams as necessary, to aid the passenger in the use of emergency equipment. The cards may utilize any method of diagrams, photos, written messages, etc., to impart the message, but the message must be clear and concise. The use of symbology to eliminate the need for printed instructions on the card has worked well for many carriers. It has particularly good application on flag carriers who are faced with the necessity of briefing in one or more foreign languages. Special instructions should be added when an emergency system is new and any detail of its use is uniquely different from past systems used by air carriers. A card should be developed that is pertinent to only one specific type and model of aircraft.

b. Content. The passenger safety information card should display the information described in paragraph 5.c. On extended overwater flights, the information in paragraph 5.d. should also be displayed. The primary method of presentation should be pictorial. When the term "instruction" is used in this Advisory Circular, it refers only to the information presented to passengers by the passenger safety information card. As required by FAR 121.571, the information on the card must refer only to the type and model airplane used for that flight.

c. Minimum Presentation Requirements - Overland Flights.

(1) Emergency Exits. FAR 121.571 requires diagrams and methods of operating emergency exits. Location of these exits should also be included. Past experience has indicated that confusion is sometimes created by a diagram or picture that demonstrates operation of an emergency door

FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR 121-24: "PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

peculiar to only one side of the aircraft. If, for instance, all emergency door handles rotate toward the rear of the aircraft, an explanation on the card should expand on the diagram to explain this item to the passengers. Routes from passenger areas to exits (based on full passenger load, known exit evacuation rates and use of all emergency exits) should be depicted.

(2) Evacuation Slides. Operation and use of slides should be shown. If slides are not automatic, the manual mode inflation procedure should be included. Any special warnings about exit routes once outside the aircraft (e.g., on a wing or at the foot of a slide) should be depicted.

(3) Oxygen.

(a) Diagrams should, when use of oxygen is required by FAR 121.333, supplement the oral briefing and demonstration on the use of oxygen systems. It should be made clear that the bag on the oxygen mask (where applicable) is to be used as an indication of the flow of oxygen. The relationship of aircraft altitude to the amount of oxygen bag inflation should be indicated. Some warning against smoking in the vicinity of oxygen flow should be indicated on the card.

(b) The passenger safety information card should illustrate that passengers must (1) immediately pull the mask firmly toward their faces, so as to assure that the lanyard attached to the mask releases the activating pin (if applicable); (2) place the mask on their face (covering BOTH nose and mouth); and (3) adjust the elastic strap over the head.

(4) Seatbelts. Due to the variation in types of seatbelts and past incidents wherein passengers have not known how to use their seatbelts, it is desirable to supplement the oral briefing with illustrations showing the fastening, tightening and unfastening of the seatbelt.

(5) Brace Positions. Proper brace-for-impact positions should be shown for all seat orientations; i.e., forward and rearward. Diagrams should show positions that are realistic and are physically attainable considering the seating configuration in the aircraft described on the passenger briefing card.

(6) Individual Flotation Devices. As required by FAR 121.573, information on the location and use of individual flotation devices (if used) must be provided. Instructions on how to remove the flotation devices and use them in water should be given. The specific stowed location of flotation vests should be indicated. Instructions should be provided on removal from stowage locations, donning, using the manual and oral inflation systems and operation of survivor lights where manual operation of such lights is required.

FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR 121-24: "PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

d. Additional Presentation Requirements - Extended Overwater Flights.

(1) Passenger Exit Awareness and Location. Passengers should be instructed on the most appropriate exit for their use. Determination of the most appropriate exits should consider a full passenger load, the number and capacity of liferafts or slide/rafts to be launched from each exit, position of passengers to each ditching exit and the use of all exits that have been planned for liferaft/slide launchings.

(2) Life Preservers. As required by FAR 121.573, the specific location(s) where life preservers are stowed must be provided. Instructions on removal from the stowage location(s), donning, using manual and oral inflation systems and manual operation of survivor locator lights and accessories, as appropriate, should be provided.

(3) Liferafts and Slide/Rafts. Instructions on liferaft retrieval, preparation for use, inflation methods, launching locations and how to secure to the aircraft should be given. Stowage locations and methods of inflating slide/rafts, methods of boarding and detaching liferafts or slide/rafts should be depicted.

(4) Emergency Locator Transmitters and Survival Equipment. If portable emergency locator transmitters and/or auxiliary survival equipment is required by FAR 121.353, instructions must be provided on their locations and methods of retrieval.

6. BRIEFING OF HANDICAPPED PASSENGERS. As required by FAR 121.571, a flight attendant will conduct an individual pretakeoff oral briefing of each passenger who, in an emergency, may need the assistance of another person to evacuate. If this person is accompanied by an attendant, the attendant should also be briefed. The briefing should cover:

a. Routes to each appropriate exit; and

b. The most appropriate time to begin moving to an exit.

R. P. SKULLY
Director, Flight Standards Service

APPENDIX H

PUBLISHED GUIDELINES FOR BRIEFING CARDS, ORAL BRIEFINGS, AND VIDEO BRIEFINGS

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
GENERAL	121.571(4)(b) Each certificate holder shall carry on each passenger-carrying airplane, in convenient locations for use of each passenger, printed cards supplementing the oral briefing.	While some air carriers are using pictorial means to convey the information, any means of pictures or words, or a combination thereof, is acceptable as long as the information is presented in a clear and concise manner. *General.* The oral briefings listed above should be supplemented by a printed card, as required by FAR 121.571, with instructions and diagrams as necessary, to aid the passenger in the use of emergency equipment. The cards may utilize any method of diagrams, photos, written messages, etc., to impart the message, but the message must be clear and concise. The use of symbology to eliminate the need for printed instructions on the card has worked well for many carriers. It has particularly good application on flag carriers who are faced with the necessity of briefing in one or more foreign languages. Special instructions should be added when an emergency system is new and any detail of its use is uniquely different from past systems used by air carriers. A card should be developed that is pertinent to only one specific type and model of aircraft.		*Design and Location:* The safety information card shall be designed and located so that the seated passenger will be able to see, and have access to, the card when placed in its normal location aboard the aircraft. It shall not be possible for the card in this location to slip out of sight of the passenger.	Information and detailed instructions on the use of vital emergency equipment should be provided on the Passenger Emergency Briefing Card, using diagrams. The passenger briefing card shall be large enough so that, when placed in its normal location aboard the aircraft, the passenger seated for taxi, take-off and landing will be able to visually locate and identify the card. It should not be possible for card, when it is in its normal location, to slip out of the sight of the passenger. The card should have an eye-catching title or symbol identifying itself as safety or emergency instructions. The mode of presentation should be diagrammatic, making written information unnecessary. The information on the card shall apply only to the type and model of the airplane on which it is used.	

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
CONTENT	121.571(4) (b) Each certificate holder shall carry on each passenger-carrying airplane, in convenient locations for use of each passenger, printed cards supplementing the oral briefing and containing— (1) Diagrams of, and methods of operating, the emergency exits; and (2) Other instructions necessary for use of emergency equipment. Each card required by this paragraph must contain information that is pertinent only to the type and model airplane used for that flight.	The primary method of presentation should be pictorial. When the term "instruction" is used in this Advisory Circular, it refers only to the information presented to passengers by the passenger safety information card. As required by FAR 121.571, the information on the card must refer only to the type and model airplane used for that flight.		*Content:* The safety information card shall provide the information regarding No Smoking, Safety Belts, Oxygen Masks, Brace Positions, Individual Flotation Devices, Passenger Exit Awareness and Location—Land Evacuation, Emergency Exit Operation, Use of Overviewing Exit, and Use of Evacuation Slide. For aircraft which carry equipment for extended overwater flights, the information related to Passenger Exit Awareness and Location—Extended Overwater Flights, Life Preservers, Life Rafts and Slide/Rafts, and Emergency Locator Transmitters and Survival Equipment shall also be provided. The primary mode of presentation shall be pictorial. The information on the card shall apply only to the type and model airplane on which it is used.	The mode of presentation should be diagrammatic, making written information unnecessary. The information on the card shall apply only to the type and model of the airplane on which it is used.	*Experimental evaluation of Aircraft emergency information card content and presentation format. (MOC J0735 4/70)* The characteristics of a card displaying emergency information which would be judged as acceptable by most people include: — a minimum amount of descriptive words — a good quality, realistic picture — when a sequence of actions is required, two or more numbered pictures should be used — use of large size print A card along with a live presentation can produce better retention *The design of effective safety information placards (HFE 022 8/80)* Johnson The type of instruction varies depending on the complexity of the task which is to be performed. Instructions for what not to do in addition to information on what to do can maximize understanding.

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
EXITS		*Emergency Exits.* FAR 121.571 requires diagrams and methods of operating emergency exits. Location of these exits should also be included. Past experience has indicated that confusion is sometimes created in a diagram or picture that demonstrates operation of an emergency door peculiar to only one side of the aircraft. If, for instance, all emergency door handles rotate toward the rear of the aircraft, an explantion on the card should expand on the diagram to explain this item to the passengers. Routes from passenger areas to exits (based on full passenger load, known exit evacuation rates and use of all emergency exits) should be depicted.	ACOB No. 3-76-3 Oct. 20, 1976 The printed cards (required by Section 121.571(b) on DC-9-10 aircraft should indicate that the best escape route is over the trailing edge of the wing and the flaps OUTBOARD of the vortex generators; however, leaving the wing over the leading edge is also acceptable. The card should also draw attention to the location of the vortex generators with a warning of the injury which may result from using that area as a slide.	*Passenger Exit Awareness and Location—Land Evacuation:* Location of each of the emergency exits shall be indicated. Instructions on the most appropriate exit(s) to be used shall be provided. Determination of the most appropriate exit(s) for use by each passenger shall be based on at least the following four factors: a) the assumption of a full passenger load; b) the known evacuation rate for each exit; c) the relation of the passenger to each exit; and d) the assumption that all emergency exits are usable. Passengers shall be instructed not to bring carry-on baggage to the exit. If passengers are to remove shoes they shall be instructed to remove them before reaching the exit. *Emergency Exit Operation:* Instructions on how to open each type of emergency exit in the emergency mode shall be provided. If manual operations are needed to ensure a successful emergency evacuation (e.g., manual operation of the escape device), instructions on the additional operations shall be provided. The preferred placement of the removable hatch after an exit is opened (e.g., outside, on the seat) shall be depicted. *Use of Overwing Exit:* Instructions to walk or run on any ramp that leads from an exit shall be provided. Direction and route of escape after leaving overwing exits shall be indicated.	A sketch should show the location of the emergency exit. The passenger should be able to locate his seating position in relation to the nearest emergency exits. Escape routes should be shown.	

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
OXYGEN		Diagrams should, when use of oxygen is required by FAR 121.333, supplement the oral briefing and demonstration on the use of oxygen systems. It should be made clear that the bag on the oxygen mask (where applicable) is to be used as an indication of the flow of oxygen. The relationship of aircraft attitude to the amount of oxygen bag inflation should be indicated. Some warning against smoking in the vicinity of oxygen flow should be indicated on the card. The passenger safety information card should illustrate that passengers must (1) immediately pull the mask firmly toward their faces, so as to assure that the lanyard attached to the mask releases the activating pin (if applicable); (2) place the mask on their face (covering BOTH nose and mouth); and (3) adjust the elastic strap over the head.	ACOB No. 1-76-24 Nov. 18, 1982 Printed instructions on the passenger briefing cards for use of the passenger chemical supplemental oxygen system should be factual and contain sufficient information for proper use. This should include donning techniques, adjustment requirements and any action necessary to initiate oxygen flow.	*Oxygen Masks:* Locations of oxygen masks shall be indicated. Instructions for quickly donning, adjusting and performing any actions necessary for initiating oxygen flow shall be provided. Instructions to help children don their masks only after the passenger has donned his own mask shall be provided.	Instructions that the mask should be pulled to the face and put over the mouth and nose, and attached with elastic straps, should be given. The picture should show the passenger in a seated position with the head on the head rest.	

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
EMERGENCY LOCATOR TRANSMITTER		*Emergency Locator Transmitters and Survival Equipment* If portable emergency locator transmitters and/or auxiliary survival equipment is required by FAR 121 353, instructions must be provided on their locations and methods of retrieval		*Emergency Locator Transmitters and Survival Equipment:* Locations shall be indicated, and instructions on retrieval provided, for any required and available emergency locator transmitter and/or survival equipment which are unattached to life rafts or slide/rafts		
SEAT BELTS		*Seatbelts.* Due to the variation in types of seatbelts and past incidents wherein passengers have not known how to use their seatbelts, it is desirable to supplement the oral briefing with illustrations showing the fastening, tightening and unfastening of the seatbelt		*Safety Belts:* Instructions for fastening, tightening, and unfastening safety belts shall be provided	Instructions for fastening and unfastening of seat belts shall be provided.	
NO SMOKING				*No Smoking:* Instructions not to smoke shall be provided on each section of the safety card where appropriate.	Symbols shall be shown in any combination of instructions where smoking is prohibited.	
BRACE POSITIONS		*Brace Positions.* Proper brace-for-impact positions should be shown for all seat orientations, i.e., forward and rearward. Diagrams should show positions that are realistic and are physically attainable considering the seating configuration in the aircraft described on the passenger briefing card.	ACOB No 1-76-23 Nov. 18, 1982 (1) In aircraft with low-density seating or seats spaced relatively far apart, passengers should, as depicted in Figures 2 or 3, rest their heads and chests against their legs. Flailing can be reduced by having the passengers grasp their ankles or legs as depicted in Figure 2 or if they are unable to do that, they should wrap their arms under their legs as depicted in Figure 3. Their heads should face down in their laps and not turned to one side.	*Brace Position:* Instructions on brace positions to be assumed by passengers shall be provided for all seat orientations used, i.e. forward, rearward, and sideward facing.	Brace positions: Instructions on the brace position to be assumed by the passenger shall be provided.	

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
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BRACE POSITIONS (continued)			(2) In aircraft with high-density seating or in cases where passengers are physically limited and are unable to place their heads in their laps, they should position their heads and arms against the seat (or bulkhead) in front of them as depicted in Figure 1. (3) Passengers in aft facing seats should rest their heads on the seat back (or bulkhead) behind them as depicted in Figure 5. The passengers should not place their hands in back of their heads, as has been recommended in the past, but, rather, should either place their hands in their laps or grasp the side of their seats. (4) The passengers' feet should be placed flat on the floor and slightly in front of the edge of the seat. (5) Passengers should not use pillows or blankets between their bodies and the object they are bracing against (either a seat back or their own body). Pillows and blankets provide little, if any, energy absorption and increase the possibility of secondary impact injury. Also, pillows and blankets could create additional clutter in the aisles which could be a detriment in an emergency evacuation.			

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
BRACE POSITIONS (continued)			(6) Children which are occupying approved child restraint devices should be braced in accordance with the manufacturer's instructions. Children in passenger seats should utilize the same brace position as adults. Adults holding infants should provide as uniform support as possible to the infant's head, neck, and body and lean over the infant to minimize the possibility of injury due to flailing. i. Principal operations inspectors are requested to evaluate the seat spacing and passenger briefing card brace positions of their assigned certificate holders and advise the certificate holders of the foregoing. Where appropriate, changes in the certificate holder's passenger briefing cards should be made. Also, each certificate holder's crewmember emergency training program should contain bracing information appropriate to the aircraft and seat spacing being utilized by that certificate holder.			

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
FLOTATION DEVICES		*Individual Flotation Devices.* As required by FAR 121.573, information on the location and use of individual flotation devices (if used) must be provided. Instructions on how to remove the flotation devices and use them in water should be given. The specific stowed location of flotation vests should be indicated. Instructions should be provided on removal from stowage locations, donning, using the manual and oral inflation systems and operation of survivor lights where manual operation of such lights is required. *Life Preservers.* As required by FAR 121.573, the specific location(s) where life preservers are stowed must be provided. Instructions on removal from the stowage location(s), donning, using manual and oral inflation systems and manual operation of survivor locator lights and accessories, as appropriate, should be provided.		*Individual Flotation Devices:* Locations of flotation devices, and instructions on their use when in the water, shall be provided. If flotation vests are used, instructions for their removal from their stowed locations, opening the package, donning, using the manual and oral inflation backup systems, and the operation of survivor locator lights where manual operation of such lights is required, shall be provided. If flotation seat cushions or seat backs are available, instructions for using the straps and holding the cushion when in the water shall be provided. *Life Preservers:* The specific locations where life preservers are stowed shall be indicated. Instructions on removal from the stowage locations, opening the package, donning, using manual and oral inflation backup systems, and manual operation of survivor locator lights and accessories, as appropriate, shall be provided. If donning procedures for children and adults are different, both methods shall be depicted.	Life Vests/Flotation Devices (seat cushions, etc): Location of life vests and/or flotation devices shall be indicated. Instructions on how to open the life vest bag, and on how to wear the life vests should be provided.	
LIFE RAFTS AND SLIDE/RAFTS		*Liferafts and Slide/Rafts.* Instructions on liferaft retrieval, preparation for use, inflation methods, launching locations and how to secure to the aircraft should be given. Stowage locations and methods of inflating slide/rafts, methods of boarding and detaching liferafts or slide/rafts should be depicted.		*Life Rafts and Slide/Rafts:* Stowage locations of life rafts and slide/rafts shall be indicated. Instructions on life raft retrieval, preparations for use, inflation, and securing to the aircraft shall be provided. Launching locations shall be indicated. Instructions for inflation, boarding and detaching of slide/rafts shall be provided.	A sketch should show the location of the emergency exits with all rafts in a launched position. Information about the escape routes into the life rafts and/or slide rafts shall be given as well as a warning that all shoes should be taken off.	

Comparison of Requirements and Recommended Practices for Passenger Briefing Card

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
EXTENDED OVERWATER		*Passenger Exit Awareness and Location.* Passengers should be instructed on the most appropriate exit for their use. Determination of the most appropriate exits should consider a full passenger load, the number and capacity of liferafts or slide/rafts to be launched from each exit, position of passengers to each ditching exit and the use of all exits that have been planned for liferaft/slide launchings.				
USE OF EVACUATION SLIDES		*Evacuation Slides.* Operation and use of slides should be shown. If slides are not automatic, the manual mode inflation procedure should be included. Any special warnings about exit routes once outside the aircraft (e.g., on a wing or at the foot of a slide) should be depicted.		*Use of Evacuation Slide:* Instructions to jump outward in the seated position, with legs extended, and not to sit (e.g., at the door sill) when entering the evacuation slide shall be provided.	The sketch should show the slides in an extended position. Diagrammatic instructions on how to jump on the slides and a warning that only high-heeled shoes must be taken off should be given.	"*The effects of briefing card information on passenger behavior during aircraft evacuation demonstrations; (MDC J5726) 10/73* 3 groups were tested on procedures for using the emergency slide. One group was given no instructions to jump. The second group was given instructions that simply told them to jump. The third group was instructed to jump not sit. The third group did better than the second and the second better than the first.

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
GENERAL	§121.571 (c) The certificate holder shall describe in its manual the procedure to be followed in the briefing required by paragraph (a) of this section.	*Crewmember Procedures.* Each oral briefing presented by a carrier for its passengers should be fully explained and described in the appropriate company manual.			Information and instructions to be given to the passenger about the *location and the use of emergency installations and equipment.* It is the opinion of the Safety Advisory Committee that it is a wrong approach to hide the word "emergency" or the emergency equipment from the passenger. Life-saving equipment is provided by law and the passenger has a right to know where it is and how to use it.	A live presentation in conjunction with the card presentation can produce better retention than the card alone.
PRETAKEOFF SMOKING LOCATION OF EXITS TRAY TABLES CHAIR BACKS CARRY-ON LUGGAGE SEAT BELT USE FLOTATION EQUIPMENT	§121.571 Briefing passengers before takeoff. (a) Each certificate holder operating a passenger-carrying airplane shall insure that all passengers are orally briefed by the appropriate crewmember as follows: (1) Before each takeoff, on each of the following: (i) Smoking. (ii) The location of emergency exits. (iii) The use of safety belts including instructions on how to fasten and unfasten the safety belt. (iv) The location and use of any required emergency flotation means.	As required by FAR 121.571, 121.577 and 121.589, the minimum information to be presented in the pretakeoff briefing is the smoking rule, the location of emergency exits, tray tables and seatbacks in the full upright position and the requirement that carry-on baggage (located at passenger seats) be properly stowed in the underseat retainers for takeoff and landing. Instructions on the fastening, tightening and unfastening of seatbelts should be given.			Before take-off and before landing—seat belts should be fastened. Location of emergency exits should be pointed out to the passengers.	

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
OXYGEN	§121.333 (f) *Passenger briefing.* Before flight is conducted above flight level 250, a crewmember shall instruct the passengers on the necessity of using oxygen in the event of cabin depressurization and shall point out to them the location and demonstrate the use of the oxygen-dispensing equipment.	When required by FAR 121.333(f), the briefing includes the location and use of the oxygen system. The demonstration of the oxygen mask should include instructions on the need to extinguish smoking materials, how to initiate oxygen flow, the placement of the mask on the face, adjustment of the elastic strap on the head and the tightening of the strap ends to hold mask on the face. Passengers should be given information concerning the need for immediate donning of the dropped mask, the amount of inflation of the oxygen reservoir bag (where applicable) and the necessity to keep the oxygen mask on their faces until they are told to remove it by a crewmember. Additional instructions and warnings (on initial generation time lapse, heating of individual canisters etc.) should be included for oxygen systems that utilize the individual self generating units	ACOB 1-76-24 November 18, 1982 Passenger briefings and demonstrations are representative of inservice system/mask. Emphasis should be given to the location of passenger oxygen (i.e., overhead units, seat backs, bulkheads), proper placing of mask on the face, use of adjustment straps and indications of oxygen flow (reservoir bag)		Instructions regarding the automatic appearance of the mask and the action necessary to provide oxygen flow should be given. Demonstrations on how to put the mask over the mouth and nose should also be given. Instructions to extinguish cigarettes should be given.	*Effectiveness of spoken instructions on passenger use of oxygen masks (MOC J7098 2/76)* It is recommended that commercial jet aircraft have an automatic verbal message to passengers following a decompression.

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
EXTENDED OVERWATER	§121.573 Briefing passengers: Extended overwater operations. (a) In addition to the oral briefing required by §121.571(a), each certificate holder operating an airplane in extended overwater operations shall ensure that all passengers are orally briefed by the appropriate crewmember on the location and operation of life preservers, liferafts, and other flotation means, including a demonstration of the method of donning and inflating a life preserver. (b) The certificate holder shall describe in its manual the procedure to be followed in the briefing required by paragraph (a) of this section. (c) If the airplane proceeds directly over water after takeoff, the briefing required by paragraph (a) of this section must be done before takeoff. (d) If the airplane does not proceed directly over water after takeoff, no part of the briefing required by paragraph (a) of this section has to be given before takeoff, but the entire briefing must be given before reaching the overwater part of the flight.				Location of life vests should be shown. Demonstrations should be given on how to open the life vest bag and how to wear it.	

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
POST TAKEOFF	(2) After each takeoff, immediately before or immediately after turning the seat belt sign off, an announcement shall be made that passengers should keep their seat belts fastened, while seated, even when the seat belt sign is off.	*Post Takeoff.* The post takeoff briefing required by FAR 121.571(a)(2) includes announcements to the passengers concerning smoking and seatbelts. After the no smoking sign is turned off, they should be advised where the smoking rows or zones are located and that smoking in the lavatories is prohibited. Although not regulatory, a statement should be made at this time to refrain from smoking while standing or walking in the aisles. Just before or immediately after the seatbelt sign is turned off, an additional announcement should be made to keep seatbelts fastened while seated even though the seatbelt sign if off. (Note: This announcement will have a better impact on passengers if made by the captain.)	ACOB 1-76-17 October 20, 1976 The flight attendants' briefing announcements should include a statement that smoking is not permitted in lavatories.		During flight—anytime the seat belt sign comes on, the passenger should go back to his seat and fasten the belt. The seat belt should also be fastened whenever the passenger is in his seat, because of unexpected turbulence.	

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board (continued)

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
PRELANDING		*Prelanding.* The minimum prelanding briefing (normally given immediately after the captain turns on the seatbelt/no smoking sign) includes those items required by FAR's 121.577 and 121.589, namely, the requirements for tray tables and seatbacks to be in the full upright position, seatbelts fastened securely, smoking materials extinguished and carry-on baggage stowed in the underseat retainer for landing.			Passengers should be informed *before landing* about: —Use of seat belts. —No smoking rules. —Back of the seat in upright position and tray tables stowed. —Location of emergency exits. —If the final approach path is over water—location of life vests and floating devices. (This should be a reminder only if information has already been given—see 2.1) —Carry-on baggage stowed in respective retainers. —Vital information about the use of emergency equipment can be found in the "Safety Instructions" (Passenger Emergency Briefing Card).	
POST LANDING		*Post Landing.* The minimum post landing briefing should advise passengers to remain seated with seatbelts fastened until the aircraft is parked at the gate and the engines have been shut down. This request should be accompanied by an explanation that any sudden unanticipated stop could cause physical harm to passengers standing up to retrieve overhead articles. It is desirable to give a signal to the passengers, such as turning the seatbelt sign off, when it is safe to move.			After landing—seat belt sign should be on and seat belts fastened till the aircraft comes to a final stop. Passengers should be informed *after landing* about: —Use of seat belts. —No smoking rules.	

Comparison of Requirements and Recommended Practices for Flight Attendant Oral Briefing and Demonstration

Compiled by the National Transportation Safety Board (continued)

	FEDERAL AVIATION ADMINISTRATION					
TOPIC	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17	SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
HANDICAPPED BRIEFING	121.571(a) (3) Except as provided in paragraph (a)(4) of this section, before each takeoff a flight attendant assigned to the flight shall conduct an individual briefing of each person who may need the assistance of another person to move expeditiously to an exit in the event of an emergency. In the briefing the flight attendant shall— (i) Brief the person and his attendant, if any, on the routes to each appropriate exit and on the most appropriate time to begin moving to an exit in the event of an emergency; and (ii) Inquire of the person and his attendant, if any, as to the most appropriate manner of assisting the person so as to prevent pain and further injury. (iii) The requirements of paragraph (a)(3) of this section do not apply to a person who has been given a briefing before a previous leg of a flight in the same aircraft when the flight attendants on duty have been advised as to the most appropriate manner of assisting the person so as to prevent pain and further injury	*Briefing of Handicapped Passengers.* As required by FAR 121.571, a flight attendant will conduct an individual pretakeoff oral briefing of each passenger who, in an emergency, may need the assistance of another person to evacuate. If this person is accompanied by an attendant, the attendant should also be briefed. The briefing should cover a. Routes to each appropriate exit; and b. The most appropriate time to begin moving to an exit.				

Comparison of Requirements and Recommended Practices for Passenger Video Briefing

Compiled by the National Transportation Safety Board

TOPIC	FEDERAL AVIATION ADMINISTRATION			SOCIETY OF AUTOMOTIVE ENGINEERS	INTERNATIONAL AIR TRANSPORT ASSOCIATION SAFETY ADVISORY COMMITTEE PROPOSALS	DOUGLAS AIRCRAFT COMPANY
	FEDERAL AVIATION REGULATIONS 14 CFR 121	ADVISORY CIRCULAR 121-24 JUNE 23, 1977	AIR CARRIER OPERATIONS BULLETINS FAA ORDER NUMBER 8430.17			
GENERAL		The pretakeoff oral briefing has been successfully and satisfactorily transferred to a video presentation by at least one carrier. This method of passenger briefing should be considered when the aircraft has the necessary video and sound equipment. The advantages of a video tape presentation are the assurance that a complete briefing is given, that the diction is good and an overall high quality of briefing is maintained. It also lends itself very well to bilingual presentations when necessary.				*Video tape presentation of passenger safety information (#6393 10/75)* Reasons are apparently not needed to ensure understanding of what a passenger should or shouldn't do. Therefore, displays can be produced in less time than if reasons needed to be provided.
PRETAKEOFF SMOKING LOCATION OF EXITS TRAY TABLES CHAIR BACKS CARRY-ON LUGGAGE SEAT BELT USE FLOTATION EQUIPMENT						
OXYGEN						
EXTENDED OVERWATER						*Effectiveness of video instructions on life jacket donning (MOC J5936 4/73)* Video instructions can increase the ability to quickly don a life jacket, and this seems to be a result of showing "close-ups" of scenes where detailed information was presented.

APPENDIX I

FEDERAL AVIATION ADMINISTRATION ORDER NO. 8430.17, AIR CARRIER OPERATIONS BULLETIN, AND AIR CARRIER EN ROUTE CABIN INSPECTION FORM 8430.16

224. AIR CARRIER OPERATIONS BULLETIN NO. 1-76-23--BRACE FOR IMPACT POSITIONS (Formerly Air Carrier Operations Bulletin No. 69-16). (NTSB Safety Recommendations A-79-76, A-79-77, and A-79-78).

a. The Aeromedical Research Branch of the Civil Aeromedical Institute (CAMI), Protection and Survival Laboratory, has recently conducted research and tests with respect to establishing "brace for impact" positions for passengers and flight attendants.

b. In order to establish a best brace position for each person, it would be necessary to know the size and physical limitations of the individual, the seating configuration, the type of emergency, and many other factors.

c. There are two primary reasons for bracing for impact. One is to reduce flailing and the other is to reduce secondary impact. Secondary impact can be reduced by prepositioning the body (particularly the head) against the surface it would strike during impact. Flailing can be reduced by having the occupant flex, bend, or lean forward over their legs in some manner.

d. Aircraft being utilized today may have seating arrangements which result in very small seat pitches (the space between the seats) or may have a combination of small and large seat pitch spacing (i.e., an aircraft with a first class/coach seating arrangement). Also, recent amendments to Part 121 have upgraded the airworthiness standards for flight attendant seats including the requirement for shoulder harnesses. In view of this information, this operations bulletin is being amended in order to provide the best possible information for most emergency situations.

e. Passengers should take a brace position in one of several ways and in all cases the seatbelt should be worn as tight as possible and as low on the torso as possible.

(1) In aircraft with low-density seating or seats spaced relatively far apart, passengers should, as depicted in Figures 2 or 3, rest their heads and chests against their legs. Flailing can be reduced by having the passengers grasp their ankles or legs as depicted in Figure 2 or if they are unable to do that, they should wrap their arms under their legs as depicted in Figure 3. Their heads should be face down in their laps and not turned to one side.

(2) In aircraft with high-density seating or in cases where passengers are physically limited and are unable to place their heads in their laps, they should position their heads and arms against the seat (or bulkhead) in front of them as depicted in Figure 1.

(3) Passengers in aft facing seats should rest their heads on the seat back (or bulkhead) behind them as depicted in Figure 5. The passengers should not place their hands in back of their heads, as has been recommended in the past, but, rather, should either place their hands in their laps or grasp the side of their seats.

(4) The passengers' feet should be placed flat on the floor and slightly in front of the edge of the seat.

(5) Passengers should not use pillows or blankets between their bodies and the object they are bracing against (either a seat back or their own body). Pillows and blankets provide little, if any, energy absorption and increase the possibility of secondary impact injury. Also, pillows and blankets could create additional clutter in the aisles which could be a detriment in an emergency evacuation.

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(6) Children which are occupying approved child restraint devices should be braced in accordance with the manufacturer's instructions. Children in passenger seats should utilize the same brace position as adults. Adults holding infants should provide as uniform support as possible to the infant's head, neck, and body and lean over the infant to minimize the possibility of injury due to flailing.

(7) Pregnant or handicapped passengers may or may not need the assistance of another person in taking a brace position but should, in general, attempt to take the same brace position as the other passengers. If aft facing passenger seats are available, these passengers may benefit from being relocated to those seats.

f. The brace positions for flight attendants will depend on the direction their seats face and type of restraint system those seats are equipped with.

(1) In forward-facing seats equipped with an inertial reel shoulder harness, the flight attendants should sit back in the seat as depicted in Figure 5 and rest their chin on their sternum as depicted in Figure 4. If the seats are equipped with noninertial reel-type shoulder harnesses, the flight attendants should fasten their shoulder harnesses as tight as possible, lean against them, and rest their chins on their sternums as depicted in Figure 4. The flight attendants' arms and hands should be positioned in their laps or holding onto the side of their seats, but should not be holding onto their restraint systems.

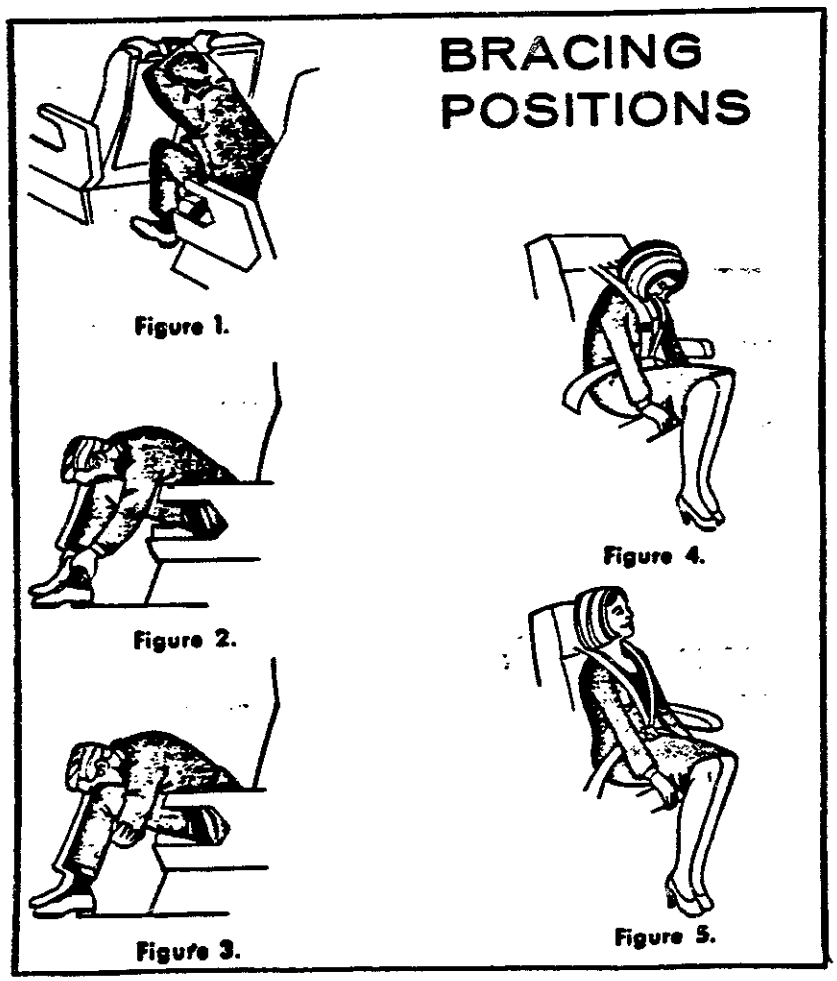
(2) In rear-facing flight attendant seats, the flight attendants should sit back in their seats, rest their heads against their seat backs or headrests, and have the restraint systems, either inertial or noninertial type, as tight as possible as depicted in Figure 5. Their hands should not be clasped behind their heads, but may be positioned as in a forward-facing seat.

g. Helicopter "brace for impact" positions are the same as those for airplanes. Flight attendants, if present, should utilize either the brace position for passengers or for flight attendants depending on their seats and restraint systems.

h. In the case of a planned emergency landing, the passengers should be briefed on the above information. In the case of an unplanned emergency, the flight attendants may only have enough time to give a short command such as "lean over" or "grab your ankles." Experience has shown that in an attempt to take a brace position of some sort, the passengers will end up in a position which could result in less injury than if no attempt had been made at all.

i. Principal operations inspectors are requested to evaluate the seat spacing and passenger briefing card brace positions of their assigned certificate holders and advise the certificate holders of the foregoing. Where appropriate, changes in the certificate holder's passenger briefing cards should be made. Also, each certificate holder's crewmember emergency training program should contain bracing information appropriate to the aircraft and seat spacing being utilized by that certificate holder.

FEDERAL AVIATION ADMINISTRATION ORDER NO. 8430.17, AIR CARRIER OPERATIONS BULLETIN, AND AIR CARRIER EN ROUTE CABIN INSPECTION FORM 8430.16



11/18/82

225. AIR CARRIER OPERATIONS BULLETIN NO. 1-76-24—TRAINING OF COCKPIT AND CABIN CREWMEMBERS ON THE OPERATIONAL CHARACTERISTICS OF CHEMICALLY GENERATED SUPPLEMENTAL OXYGEN SYSTEMS AND UPDATING OF PASSENGER BRIEFING INFORMATION (Formerly Air Carrier Operations Bulletin No. 76-4). Several rapid decompression incidents involving DC-10 and L-1011 aircraft have disclosed problems with chemically generated passenger supplemental oxygen systems. These problems are primarily the result of a lack of understanding of the system by both passengers and flight attendants.

a. Accordingly, it is requested that Principal Operations Inspectors review their assigned operators' training program, passenger briefing procedures and passenger safety cards to ensure that:

FEDERAL AVIATION ADMINISTRATION ORDER NO. 8430.17, AIR CARRIER OPERATIONS BULLETIN, AND AIR CARRIER EN ROUTE CABIN INSPECTION FORM 8430.16

(1) Cockpit and cabin crewmembers training programs include detailed information regarding the operational characteristics of the chemically generated passenger supplemental oxygen system. Training should include canister, lanyard/safety pin, flow initiation mechanism, reservoir bag, oxygen mask, hose, heat shield, oxygen outlets, etc.

(2) Passenger briefings and demonstrations are representative of inservice system/mask. Emphasis should be given to the location of passenger oxygen (i.e., overhead units, seat backs, bulkheads), proper placing of mask on the face, use of adjustment straps and indications of oxygen flow (reservoir bag).

(3) Printed instructions on the passenger briefing cards for use of the passenger chemical supplemental oxygen system should be factual and contain sufficient information for proper use. This should include donning techniques, adjustment requirements and any action necessary to initiate oxygen flow.

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218. AIR CARRIER OPERATIONS BULLETIN NO. 1-76-17 — IN-FLIGHT LAVATORY FIRES (Formerly Air Carrier Operations Bulletin No. 73-13). There have been a number of in-flight fires attributed to persons dropping smoking materials into lavatory waste containers. To help prevent these fires, Principal Operations Inspectors should encourage their assigned air carriers to adopt the following recommendations:

a. Place "No Smoking" placards or decals near the "Occupancy/Vacancy" sign on the cabin side of the door.

b. The flight attendants' briefing announcements should include a statement that smoking is not permitted in lavatories.

c. The flight attendants' procedures should incorporate a visual inspection of all lavatories prior to takeoff and periodically in flight.

In addition, POIs should review their assigned air carriers' emergency training programs to assure that crewmembers receive practical training in firefighting techniques.

10/20/76

404. AIR CARRIER OPERATIONS BULLETIN NO. 3-76-3—EMERGENCY EVACUATION ESCAPE ROUTES FROM OVERWING EXIT ON DC-9-10 AIRCRAFT (Formerly Air Carrier Operations Bulletin No. 69-2). The vortex generators on the wings of DC-9-10 aircraft are located so as to present a hazard to emergency evacuees seeking the most direct escape route from the overwing exits to the ground. There is room for one person to go between the vortex generators and the fuselage, and room for eight or ten abreast to go off the trailing edge of the wing outboard of the vortex generators. Since the leading edge of the wing is less than six feet from the ground, it also offers an acceptable escape route.

a. The printed cards (required by Section 121.571(b)) on DC-9-10 aircraft should indicate that the best escape route is over the trailing edge of the wing and flaps OUTBOARD of the vortex generators; however, leaving the wing over the leading edge is also acceptable. The card should also draw attention to the location of the vortex generators with a warning of the injury which may result from using that area as a slide.

b. Principal Operations Inspectors of air carriers utilizing this type of aircraft should assure themselves that their assigned air carriers are cognizant of this problem and the printed instructions to passengers are in accordance with the above.

RIS: FS 8430-44

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIR CARRIER EN ROUTE CABIN INSPECTION

SYSTEM (1-3)	TR. (4)	1. AIR CARRIER (5-8)	2. TRIP NO. (9-12)	3. MO. (13-14)	4. DAY (15-16)	5. YR (17-18)
C I S						

CARD A (19)

6. TYPE AIRCRAFT (20-29)	7. REGISTRATION NO. (30-34)	8. DEPARTURE A. TIME	8. DEPARTURE B. FROM (35-50)

9. ARRIVAL A. DESTINATION (51-65)	B. TOT BLOCK/BLOCK TIME	10. PILOT IN COMMAND	11. LEAD FLIGHT ATTENDANT	12. CREW BASE (City and State)

INSPECTION CHECKLIST

REQ. ACT.	SAT.	PREFLIGHT	REQ. ACT.	SAT.	DEPARTURE/INFLIGHT/ARRIVAL
		13. FLIGHT ATTENDANT CABIN INSPECTION			18. PASSENGER BRIEFING
		14. EMERGENCY EQUIPMENT			A. REQUIRED INFORMATION
		A. FIRE EXTINGUISHERS			B. EMERGENCY EXIT INSTRUCTIONS
		B. FIRST AID KITS			C. OXYGEN DEMONSTRATION
		C. O_2 WALKAROUND BOTTLE/MASKS			D. PA ANNOUNCEMENT/PAS COMPLIANCE
		D. MEGAPHONES			E. QUALITY OF PUBLIC ADDRESS SYSTEM
		E. EVACUATION SLIDES			F. NO SMOKING/SEAT BELT/EXIT SIGNS
		F. OVER WATER EMERGENCY EQPT.			19. FLIGHT ATTENDANT DUTY STATION
		G.			A. F/A POSITIONS AT TAKEOFF/LANDING
		H.			B. F/A USE OF SEAT BELT [illegible] RNESS
		15. CABIN EQUIPMENT			C.
		A. LAVATORY NO SMOKING DECALS			20. RESTRAINT
		B. PASSENGER BRIEFING CARDS			A. SERVING CARTS/GALLEY EQUIPMENT
		C. PASSENGER AND F/A SEATS AND BELTS			B. USE OF CHILD RESTRAINT DEVICES
		D.			C. CREW/PASSENGER CARRY ON BAGGAGE
		E.			D. TURBULENT AIR SECURITY
		16. GALLEY SERVICE CENTER INSPECTION			E.
		A. STORAGE COMPARTMENTS – RESTRAINT			21. CREW COORDINATION
		B. STATIONARY CART TIEDOWNS			A. MONITOR SEAT BELT/NO SMOKING SIGNS
		C. LOWER LOBE EQUIPMENT – RESTRAINTS			B. CABIN OCCURRENCES/DIFFICULTIES
		D.			C. RESPONSE TO COCKPIT CALLS
		E.			D. HANDLING OF EMERGENCIES
		17. FLIGHT ATTENDANTS			E. ARM/DISARM EVACUATION SLIDES
		A. REQUIRED PERSONAL EQUIPMENT			F.
		B. KNOWLEDGE OF EMERGENCY EQUIPMENT			OTHER
		C. KNOWLEDGE OF EMERGENCY PROCEDURES			22. REPORTING OF EQPT DISCREPANCIES
		D.			23. COMPLIANCE WITH FAA/CO. PROCED./POLICY
		E.			24. F/A GENERAL RESPONSIBILITIES
		F.			25. HANDLING OF HANDICAPPED PERSONS

CARD B (19)

NUMBER ITEM (20-22)	NUMBER SEQ. (23)	26. COMMENTS (Do not leave blank. Include comments to assist evaluating cabin crew. List remarks by item number.) (24-80)

☐ Continued on Attached FAA Form 8430-16

CARD C (19)

27. NAME OF INSPECTOR	29. FORM 110A NO.	30. TOT JOB TIME	31. REGION (20-23)	32. DISTRICT OFFICES (24-31)
28. AIRCRAFT QUALIFICATIONS	33. COPY DISTRIBUITON			

FAA Form 8430-16 (2-77)

1-DISTRICT OFFICE COPY

APPENDIX J

FEDERAL AVIATION REGULATIONS PART 121 AND PART 135 THAT PERTAIN TO PASSENGER SAFETY INFORMATION

§ 121.317 Passenger information.

(a) No person may operate an airplane unless it is equipped with passenger information signs that meet the requirements of § 25.791 of this chapter. The signs must be constructed so that the crewmembers can turn them on and off. They must be turned on for each takeoff and each landing and when otherwise considered to be necessary by the pilot in command.

(b) After August 31, 1981, no person may operate a passenger-carrying airplane under this Part unless there is affixed to each forward bulkhead and each passenger seat back a sign or placard that reads "Fasten Seat Belt While Seated." These signs or placards need not meet the requirements of paragraph (a) of this section.

(c) No passenger or crewmember may smoke while the no smoking sign is lighted and each passenger shall fasten that passenger's seat belt and keep it fastened while the seat belt sign is lighted.

§ 121.311 [Seats, safety belts, and shoulder harnesses.]

(a) No person may operate an airplane unless there are available during the takeoff, en route flight, and landing—

(1) An approved seat or berth for each person on board the airplane who has reached his second birthday; and

(2) An approved safety belt for separate use by each person on board the airplane who has reached his second birthday, except that two person occupying a berth may share one approved safety belt and two persons occupying a multiple lounge or divan seat may share one approved safety belt during en route flight only.

(b) During the takeoff and landing of an airplane, each person on board shall occupy an approved seat or berth with a separate safety belt properly secured about him. However, a person who has not reached his second birthday may be held by an adult who is occupying a seat or berth. A safety belt provided for the occupant of a seat may not be used during takeoff and landing by more than one person who has reached his second birthday.

(c) After September 30, 1969, each sideward facing seat must comply with applicable requirements of § 25.875 (c) of this chapter.

(d) Except as provided in subparagraphs (1) and (2) of this paragraph, no certificate holder may take off or land an airplane unless each passenger seat back is in the upright position. Each passenger shall comply with instructions given by a crewmember in compliance with this paragraph.

(1) This paragraph does not apply to seat backs placed in other than the upright position in compliance with § 121.310(f)(3).

(2) This paragraph does not apply to seats on which cargo or persons who are unable to sit erect for a medical reason are carried in accordance with procedures in the certificate holder's manual if the seat back does not obstruct any passenger's access to the aisle or to any emergency exit.

§ 121.333 Supplemental oxygen for emergency descent and for first aid: turbine engine powered airplanes with pressurized cabins.

(a) *General.* When operating a turbine engine powered airplane with a pressurized cabin, the certificate holder shall furnish oxygen and dispensing equipment to comply with paragraphs (b) through (e) of this section in the event of cabin pressurization failure.

(e) *Passenger cabin occupants.* When the airplane is operating at flight altitudes above 10,000 feet, the following supply of oxygen must be provided for the use of passenger cabin occupants:

(1) When an airplane certificated to operate at flight altitudes up to and including flight level 250, can at any point along the route to be flown, descend safely to a flight altitude of 14,000 feet or less within four minutes, oxygen must be available at the rate prescribed by this Part for a 30-minute period for at least 10 percent of the passenger cabin occupants.

(2) When an airplane is operated at flight altitudes up to and including flight level 250 and cannot descend safely to a flight altitude of 14,000 feet within four minutes, or when an airplane is operated at flight altitudes above flight level 250, oxygen must be available at the rate prescribed by this Part for not less than 10 percent of the passenger cabin occupants for the entire flight after cabin depressurization, at cabin pressure altitudes above 10,000 feet up to and including 14,000 feet and, as applicable, to allow compliance with § 121.329(c) (2) and (3), except that there must be not less than a 10-minute supply for the passenger cabin occupants.

(3) For first-aid treatment of occupants who for physiological reasons might require undiluted oxygen following descent from cabin pressure altitudes above flight level 250, a supply of oxygen in acordance with the requirements of § 25.1443(d) must be provided for two percent of the occupants for the entire flight after cabin depressurization at cabin pressure altitudes above 8,000 feet, but in no case to less than one person. An appropriate number of acceptable dispensing units, but in no case less than two, must be provided, with a means for the cabin attendants to use this supply.

(f) *Passenger briefing.* Before flight is conducted above flight level 250, a crewmember shall instruct the passengers on the necessity of using oxygen in the event of cabin depressurization and shall point out to them the location and demonstrate the use of the oxygen-dispensing equipment.

§ 121.571 Briefing passengers before takeoff.

(a) Each certificate holder operating a passenger-carrying airplane shall ensure that all passengers are orally briefed by the appropriate crewmember as follows:

(1) Before each takeoff, on each of the following:

(i) Smoking.

(ii) The location of emergency exits.

[(iii) The use of safety belts including instructions on how to fasten and unfasten the safety belt.

[(iv) The location and use of any required emergency flotation means.]

(2) After each takeoff, immediately before or immediately after turning the seat belt sign off, an announcement shall be made that passengers should keep their seat belts fastened, while seated, even when the seat belt sign is off.

(3) Except as provided in paragraph (a)(4) of this section, before each takeoff a flight attendant assigned to the flight shall conduct an individual briefing of each person who may need the assistance of another person to move expeditiously to an exit in the event of an emergency. In the briefing the flight attendant shall—

(i) Brief the person and his attendant, if any, on the routes to each appropriate exit and on the most appropriate time to begin moving to an exit in the event of an emergency; and

(ii) Inquire of the person and his attendant, if any, as to the most appropriate manner of assisting the person so as to prevent pain and further injury.

(4) The requirements of paragraph (a)(3) of this section do not apply to a person who has been given a briefing before a previous leg of a flight in the same aircraft when the flight attendants on duty have been advised as to the most appropriate manner of assisting the person so as to prevent pain and further injury.

(b) Each certificate holder shall carry on each passenger-carrying airplane, in convenient locations for use of each passenger, printed cards supplementing the oral briefing and containing—

(1) Diagrams of, and methods of operating, the emergency exits; and

(2) Other instruction necessary for use of emergency equipment.

Each card required by this paragraph must contain information that is pertinent only to the type and model airplane used for that flight.

(c) The certificate holder shall describe in its manual the procedure to be followed in the briefing required by paragraph (a) of this section.

[§ 121.572 Briefing passengers: extended overwater operations.

[(a) In addition to the oral briefing required by § 121.571(a), each certificate holder operating an airplane in extended overwater operations shall ensure that all passengers are orally briefed by the appropriate crewmember on the location and operation of life preserver, liferafts, and other flotation means, including a demonstration of the method of donning and inflating a life preserver.]

(b) The certificate holder shall describe in its manual the procedure to be followed in the briefing required by paragraph (a) of this section.

(c) If the airplane proceeds directly over water after takeoff, the briefing required by paragraph (a) of this section must be done before takeoff.

(d) If the airplane does not proceed directly over water after takeoff, no part of the briefing required by paragraph (a) of this section has to be given before takeoff but the entire briefing must be given before reaching the overwater part of the flight.

§ 121.577 Food and beverage service equipment during takeoff and landing.

(a) No certificate holder may takeoff or land an airplane when any food, beverage, or tableware, furnished by the certificate holder is located at any passenger seat.

(b) No certificate holder may takeoff or land an airplane unless each passenger's food and beverage tray and each serving cart is secured in its stowed position.

(c) Each passenger shall comply with instructions given by a crewmember in compliance with this section.

§ 121.589 Carry-on baggage.

(a) No certificate holder may allow the boarding of carry-on baggage on an aircraft unless the baggage can be stowed in accordance with this section. No certificate holder may allow an aircraft to take off or land unless each article of baggage aboard the aircraft is stowed—

(1) In a suitable closet or baggage or cargo stowage compartment placarded for its maximum weight and providing proper restraint for all baggage or cargo stowed within, and in a manner that does not hinder the possible use of any emergency equipment; or

(2) As provided in § 121.285(c); or

(3) Under a passenger seat.

(b) Baggage, other than articles of loose clothing, may not be placed in an overhead rack unless that rack is equipped with approved restraining devices or doors.

[(c) Each passenger must comply with instructions given by crewmembers regarding compliance with paragraphs (a), (b), and (e) of this section.]

(d) Each passenger seat under which baggage is allowed to be stowed shall be fitted with a means to prevent articles of baggage stowed under it from sliding forward. In addition, after August 31, 1983, each aisle seat shall be fitted with a means to prevent articles or baggage stowed under it from sliding sideward into the aisle under crash impacts severe enough to induce the ultimate inertia forces specified in the emergency landing condition regulations under which the aircraft was type certificated.

[(e) In addition to the methods of stowage in paragraph (a), flexible travel canes carried by blind individuals may be stowed—

[(1) Under any series of connected passenger seats in the same row, if the cane does not protrude into an aisle and if the cane is flat on the floor; or

[(2) Between a nonemergency exit window seat and the fuselage, if the cane is flat on the floor; or

[(3) Beneath any two nonemergency exit window seats, if the cane is flat on the floor; or

[(4) In accordance with any other method approved by the Administrator.]

§ 135.117 Briefing of passengers before flight.

(a) Before each takeoff each pilot in command of an aircraft carrying passengers shall ensure that all passengers have been orally briefed on—

(1) Smoking;

(2) Use of seat belts;

(3) The placement of seat backs in an upright position before takeoff and landing;

(4) Location and means for opening the passenger entry door and emergency exits;

(5) Location of survival equipment;

(6) If the flight involves extended overwater operation, ditching procedures and the use of required flotation equipment;

(7) If the flight involves operations above 12,000 feet MSL, the normal and emergency use of oxygen; and

(8) Location and operation of fire extinguishers.

(b) Before each takeoff the pilot in command shall ensure that each person who may need the assistance of another person to move expeditiously to an exit if an emergency occurs and that person's attendant, if any, has received a briefing as to the procedures to be followed if an evacuation occurs. This paragraph does not apply to a person who has been given a briefing before a previous leg of a flight in the same aircraft.

(c) The oral briefing required by paragraph (a) of this section shall be given by the pilot in command or a member of the crew. It shall be supplemented by printed cards for the use of each passenger containing—

(1) A diagram of, and method of operating the emergency exits; and

(2) Other instructions necessary for the use of emergency equipment on board the aircraft.

Each card used under this paragraph must be carried in the aircraft in locations convenient for the use of each passenger and must contain information that is appropriate to the aircraft on which it is to be used.

APPENDIX K

ADVISORY CIRCULAR 135-12: "PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS"

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: PASSENGER INFORMATION, FAR PART 135: PASSENGER SAFETY INFORMATION BRIEFING AND BRIEFING CARDS

Date: 10/9/84
Initiated by: AFO-250

AC No: 135-12
Change:

1. PURPOSE. The purpose of this advisory circular is to provide information regarding the items that should be covered in oral briefings and on information cards. The advisory circular provides specific information for aircraft having a maximum passenger seating configuration excluding any pilot seat, of 30 seats or less and a maximum payload capacity of 7500 pounds or less. It also provides suggestions about making this information more interesting and meaningful.

2. RELATED FAR SECTIONS. Federal Aviation Regulations (FAR) 91.14, 135.23, 135.117, and SFAR 41.

3. BACKGROUND. An alert, knowledgeable person has a much better chance of surviving any life- or injury-threatening situation. Therefore, the FAA requires a passenger information system which includes oral briefings and information cards. It would be desirable to have every airline passenger highly motivated; however, motivating people, even when their own personal safety is involved, is not easy. One way to increase motivation is to make the presentations as interesting as possible. This advisory circular encourages the operators to be innovative in their approach.

4. ORAL BRIEFINGS. The pre-takeoff oral briefing should be given so that passengers can easily hear it. Crewmembers giving these briefings should speak slowly and distinctly, and, they should point out the exits and whenever possible, physically demonstrate the location and use of the safety equipment.

a. PRE-TAKEOFF. In accordance with FAR 135.117, before takeoff the pilot-in-command should ensure that all passengers have been orally briefed. The briefing should include the following information:

(1) Smoking. The information that smoking is prohibited during takeoff and landing should be given. If the airplane is equipped with "no smoking" signs, passengers should also be advised not to smoke when these are illuminated. If the aircraft has lavatories, passengers should be advised not to smoke in the lavatory.

(2) Seat Belts. The pilot-in-command should ensure that passengers are briefed on the fastening, tightening, and unfastening of seat belts.

(3) Seatbacks. Passengers should be told that the seatbacks should be upright for takeoff and landing.

(4) Exits. The passenger entry door and any other exits available to the passengers should be pointed out.

(5) Fire Extinguishers. Passengers should be briefed on the location and use of the fire extinguishers. This should include information regarding the removal of the fire extinguisher from its holder.

(6) Survival Equipment. Passengers should be briefed on the location of survival equipment.

(7) Passengers Needing Assistance. The pilot-in-command should ensure that passengers who may need assistance in moving expeditiously to an exit are individually briefed. The briefing should at least include information about the most appropriate route to an exit and the most appropriate time to start moving toward that exit.

(8) Supplemental Information. Passengers should be told that the briefing cards contain additional safety information which they should read. They should also be instructed regarding the location of the cards. Since FAR 135.87 requires carry-on bags and cargo to be stowed for takeoff and landing, pertinent information on this could be included in the briefing.

(9) Oxygen Masks. If the flight involves operation above 12,000 feet MSL, passengers should be briefed before takeoff on both normal and emergency use of oxygen. This should include instructions about locating, donning, and adjusting the equipment; prohibition against smoking; and any action which might be necessary to start the flow of oxygen. Passengers should also be informed that they should don their own oxygen mask before assisting children with their masks.

(10) Extended Overwater Operation. If the flight involves extended overwater operation, passengers should be briefed before takeoff both on ditching procedures and also the use of required flotation equipment. This could include:

(i) Exits. Passengers should be instructed on the most appropriate exit for their use. In determining the most appropriate exits, consideration should be given to the passenger load and to those exits designated for use in water landings and raft launchings.

(ii) Flotation Cushions. Passengers should be briefed on the location, removal, and use of flotation cushions. This should include the method of use in the water such as putting the arms through the straps and resting the torso on top of the cushion.

(iii) Life Preservers. The location, removal, donning, and use of life preservers should be demonstrated. This should include using manual and oral inflation systems and manual operations of survivor locator lights and accessories.

(iv) Life Rafts. Instructions on life raft retrieval, preparation for use, inflation methods, launching locations, and how to secure to the aircraft should be given.

b. POST-TAKEOFF.

(1) Smoking. When the "no smoking" sign is turned off, a statement should be made instructing passengers to refrain from smoking while in the lavatory or while standing or walking in the aisles.

(2) Seat Belts. Passengers should be reminded to keep their seat belts fastened while seated. If the aircraft is equipped with a "seat belt" sign, this announcement could be made either immediately before or after the "seat belt" sign is turned off.

c. PRE-LANDING. The minimum pre-landing briefing should include information that seat belts should be fastened securely, smoking materials should be extinguished, seatbacks should be in the full upright position, and carry-on baggage should be stowed in the underseat retainer for landing.

d. POST-LANDING. The minimum post-landing briefing should advise passengers to remain seated with seat belts fastened until the airplane has come to a complete stop and the "seat belt" sign has been turned off (if the airplane is equipped with a "seat belt" sign). This announcement should be accompanied by an explanation that this is for their own safety and the safety of those seated around them.

e. CREWMEMBER PROCEDURES. In accordance with FAR 135.23, the procedures to be followed when giving the briefing required by 135.117 must be explained and described in the appropriate part of the manual. Crewmembers should neither be assigned nor perform service-related duties during the briefings.

5. PASSENGER SAFETY INFORMATION CARDS. FAR 135.117 requires the oral briefing to be supplemented with information cards which are pertinent to only that type and model of aircraft, and contain both diagrams and methods of operating the emergency exits and other instructions necessary for the use of emergency equipment. These should be in a location which is convenient for the use of each passenger.

a. DESIGN AND LOCATION. The safety information card should be designed and located so that the seated passenger will be able to see and have access to the card when it is placed in its normal location aboard the aircraft. The method used to depict equipment and actions can be pictures of people, diagrams, drawings, words, or combinations of these. The use of international symbols is encouraged. All depictions should be easy to understand and not complex. For example, some cards contain too much material in too little space; therefore, the information appears complex. Cards should also be interesting and attractive so passengers will want to read them. One method of doing this is by the use of color. A multi-colored card which has pictures and drawings will be picked up and read more often than a black and white printed card.

b. EXTRANEOUS INFORMATION. The safety information card should not contain information that is not essential for safety. For example, advertising, schedules, or promotional information is not safety-related and should not be on the safety information card.

c. CONTENT. Safety briefing cards that provide information to passengers should include:

(1) Passenger Compliance with Safety Information. The instructions on the cards should advise passengers that they should comply with safety instructions including signs, placards, and instructions of the crewmembers.

(2) Smoking. Information should be given about the prohibition against smoking in the lavatories, during takeoff and landing, any time the "no smoking" sign is illuminated, or when in the immediate vicinity where passenger oxygen is being used.

(3) Seat Belts. Instructions for fastening, tightening, and unfastening seat belts should be given.

(4) Seatbacks. The card should contain information that seatbacks should be upright for takeoff and landing.

(5) Exit Location. The location of every available exit should be indicated. Information on the cards should encourage passengers to familiarize themselves with the locations of exits other than the one they entered.

(6) Exit Operation. The cards should contain diagrams depicting the opening of the required exits, and any manual operations necessary to successfully complete the evacuation such as the recommended placement of the hatch on the seat or outside the aircraft. Past experience has indicated that confusion is sometimes created by a diagram or picture that demonstrates operation of an exit peculiar to only one side of the aircraft. If, for instance, all emergency door handles rotate toward the rear of the aircraft, this should be explained on the card. The card should inform passengers not to bring carry-on baggage to the exit.

(7) Evacuation Slide Use. Instructions to jump outward in the seated position, with legs extended, and not to sit (e.g., at the door sill) when entering the evacuation slide should be provided.

(8) Brace Positions. The card should provide information about protective brace positions to be assumed by passengers in all seat orientations (i.e., forward-, aft-, and side-facing) and all seat spacings for that aircraft.

(9) Oxygen-Masks. If the aircraft is to be operated above 12,000 feet MSL, the card should include instructions about locating, donning, and adjusting oxygen masks; any further information needed to start the flow of oxygen; and instructions to help children use their oxygen masks only after the passenger has donned his own mask.

(10) Fire Extinguishers. The card should depict the location of each available fire extinguisher, show how to remove it from its holder, and give a description of its use.

(11) Survival Equipment. The card should provide information about the location of survival equipment.

(12) Individual Flotation Devices. When the aircraft is used in extended overwater operation and flotation equipment is required, the information card should provide information about the location and use of flotation devices. This information should include the removal of the flotation device from its stowed location and/or package; its use in the water, including manual and oral inflation backup systems; and the manual operation of survivor locator lights and accessories, as appropriate.

(13) Life Rafts. When life rafts are required, the passenger information cards should indicate stowage locations. Instructions on life raft retrieval, preparations for use, inflation, and securing to the aircraft should be provided. Launching locations should be indicated.

(14) Emergency Locator Transmitters and Survival Equipment. When this equipment is required, the passenger information card should provide instructions regarding its location and method of retrieval for equipment which is not part of a life raft.

(15) Supplemental Information. The card could also contain information that for takeoff and landing, tray tables should be upright, carry-on baggage should be stowed, and galley service items will be picked up.

Kenneth S. Hunt
Director of Flight Operations

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