CONTINUING CABIN SAFETY PROBLEMS

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INTRODUCTION

For a number of years, the Association of Flight Attendants has had the honor of coming before you to let you know another side of aviation safety -- that of the interior cabin of the aircraft. In-cabin safety is an important facet in this era of aviation because it has been recognized that, when an emergency develops, occupant survivability depends on cabin interior conditions. Without your continued interest, and the attention of the federal government, we will never see the improvements that should exist inside the cabins of our aircraft. The Association of Flight Attendants is sincerely impressed with the concern expressed by all the members of the Flight Safety Foundation, and particularly the foreign carriers. Through the exchange of information, we have gained better ideas and procedures from you and I firmly believe you have benefitted from our experiences and analysis of cabin safety.

I intend to elaborate on in-cabin experiences as they relate to some of the US Air Carrier accidents in 1975 and 1976. This evaluation of aircraft accidents is merely a continuation of the examination of those problems I have spoken to before in the many presentations made throughout the world and involves "survivable"* accidents. US Air Carrier accidents are no different than foreign carrier accidents. The problems of evacuation are not new to any of us. The important factor is to share this information

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* "In crash injury investigation and analysis, an aircraft accident is considered a survivable type if (1) the crash force imposed on any portion of the inhabitable area of the aircraft remains reasonably intact; i.e., is not collapsed sufficiently to impringe upon, or crush in, that area which normally would be occupied by vital body areas of a person seated in a normal position."

"A non-survivable accident is one in which all inhabitable areas are collapsed or disintegrated by impact to a degree wherein all occupants would sustain crushing injuries of vital body areas..." [1]

and to evaluate the problems, then initiate ACTION to rectify the deficiencies. Talking about the problems, re-studying the problems, re-evaluating known problems, and studying the studies that studied the studies can only be termed, as Winston Churchill put it, "Paralysis by analysis".

In most cases, during the evaluation of past aircraft accidents, we find the same problems and deficiencies over and over again and we simply cannot understand why corrective action has not been taken. Before evaluation of the current accidents, it is important to synopsize some of the previous US Air Carrier accidents relative to the evacuation difficulties. In order not to be misunderstood, it is necessary for me to preface my remarks by saying that aviation is the safest mode of transportation and that statistics will verify this fact. Why then should it be necessary to conduct safety seminars, conferences, and meetings to discuss Aviation Safety? The answer is simple. The airplane is unique in its method of movement and it requires every effort each and all of us can contribute to ensure the safety of those who entrust their lives with us. No matter how small the in-cabin problems are, they can become a matter of life or death in an emergency, and therefore, they require full attention in an effort to change that condition. No truer words were ever printed than "Every industry is obliged to improve its safety record where it can. Those who insist on ignoring the smaller safety problems about which nothing can be done yet, are mostly evading the issue. Most safety measures adopted by an industry deal with small portions of the total hazard. Over the years, the steady improvement that exists is significant. If each step is discouraged because it doesn't solve the whole problem, then nothing is accomplished." [2]

Recurrent Problems Common To Aircraft Accidents Between 1960-1974:

Some of those so-called "smaller safety problems" in past aircraft accidents from 1960 to 1974 were as follows:

- Inadequate restraint systems utilized on interior components (i.e., galley equipment, coffee makers, fire extinguishers, coat closets, luggage racks, etc.) causing blockage of exits and injury to occupants.

- Inability of the flight attendants to view interior/exterior of the aircraft when problems began to develop, making proper evaluation of the situation difficult.

- Inadequate restraint systems provided for use by flight attendants at their assigned seats allowing failure of said seats and causing unnecessary injury to the occupants of the seats.

- Inadequate or non-existent interior lighting hampering escape from the aircraft.

- Inability of flight attendants to retrieve their stored flashlights to guide occupants from the aircraft during emergency situations.

- Inadequate or inoperable communication systems once an emergency developed lessening the ability of the flight attendant to provide evacuation commands.

- Inability of the flight attendant to utilize stored megaphones due to location and weight of this equipment detracting from audible commands to occupants.

- Inability of the flight attendant to operate exits due to improper or inadequate training.

- Deficient slide mechanisms, including inadequate maintenance and inspection of slides/mechanisms causing this equipment to be non-functional during the evacuation sequence.

- The non-existence of restraint bars on aisle seats causing underseat luggage/items to slide into aisle areas upon impact, thus impeding evacuation.

- Unrealistic inflight service required by the air carrier thus creating insufficient storage areas for trash prior to landings.

- Deficient seat belts (cloth to metal) permitted on aircraft due to lack of regulations, causing slippage/wear of the belt and improper restraint for the occupant.

- Non-existent Federal Regulations concerning seat pitch, thereby restricting proper access to aisle areas to exits and lessening the area available to assume the proper brace position.

- Lack of existing Federal Regulations to require research of the crash injury protection as it relates to the present flight attendant seats (the structure, components and parts permitted for use on those seats).

- Lack of adequate latching mechanisms and/or back-up restraints on overhead compartments (including life raft stowage components,

movie screens, overhead panels, cove lights, and passenger stowage units) causing spillage of their contents during emergency situations.

- Improper crew coordination in emergency situations contributing to evacuation confusion.

- Outmoded, inadequate, or unrealistic training of flight attendants and flight crewmembers in evacuation procedures, thus not preparing them for actual emergency situations.

- Uneven distribution of cabin crewmembers throughout interior of aircraft, thus preventing more expeditious evacuation flow and assistance in emergency situations.

- Resistence by the Federal Government to view the cabin safety issue as a serious subject.

TEXT

The period 1960 to 1974 cannot be considered unique as far as the in-cabin safety problems that developed as a result of one accident after another. Those deficient areas mentioned above are "repeat offenders" and as the in-cabin analysis of survivable aircraft accidents continues, we find many similarities. Frankly, no one should be shocked with the findings of some of the current accidents; instead certain airlines and government agencies should be embarrassed by these findings. Today's discussions regarding cabin safety seem to center around the "state of the regulation" and not the "state of the art". Frequently, a certain in-cabin component, part, or structure, has been cited as being deficient for a specific reason (generally that of shear logic, or, in many cases, because it was cited as a result of a previous emergency situation), however, "it met the requirements under which the aircraft was type certificated". If it could possibly endanger lives aboard the aircraft or future evacuation of aircraft, why then would there not be a requirement, in the form of an airworthiness directive or a notice of proposed rulemaking, to rectify the situation? Theoretically, that is how deficiencies of this magnitude should be handled; but in reality, they are not. For the sake of argument, it would be appropriate to analyze some of the more current accidents in order to relate to the similarities as they compare with those between 1960 and 1974.

Synopsis Of Survivable Aircraft Accidents Between 1975 and 1976

(1) Western Airlines, 1975, Casper, Wyoming. This accident occurred on March 31, 1975 during the landing phase when the Boeing 737 overran the departure end of a snow-covered runway. No fire occurred in this accident. The passenger seating configuration for this aircraft is 99 and of the ninety-nine persons aboard the aircraft, all survived. Three of the four passenger injuries occurred during the evacuation phase. The aircraft operated with three pilots and three flight attendants. Two of the three flight attendants were assigned to the aft double jumpseat (aircraft left) and one flight attendant was seated in the forward double flight attendant seat (aircraft left). A deadheading flight attendant located in seat 16B assisted during the evacuation of the aircraft.

(A) IMPACT SEQUENCE: During the impact sequence, debris flew around the cabin; the garbage can dislodged from its compartment in the aft galley spilling garbage on the floor; cove light coverings fell into the passenger seating area; carry-on baggage slid into the aisle areas; and a briefcase in the forward section slid from beneath a passenger seat blocking the cockpit door until the flight attendant kicked it out of the way.

(B) AFTER IMPACT: It should be noted, that following the impact stage, the captain intended to notify the flight attendants to initiate an evacuation, but the cabin P.A. microphone had come loose from its brackets and could not be dislodged from under the captain's seat. However, the second officer left his seat for the cabin area immediately and saw that passengers were leaving the aircraft by the six emergency exits available (two windows and four door exits). The second officer opened the forward galley door (aircraft right) and the slide inflated, (this door contains a slide which automatically inflates the moment the aircraft door is opened) while the forward flight attendant was attempting to open the forward main cabin door (aircraft left). Following the opening of the galley door (right), the second officer proceeded to assist the flight attendant in opening the main cabin door (left) at which time the slide was inflated with the inflate cord. The second officer proceeded out of the aircraft to assist at the left rear exit area.

Meanwhile, in the aft section of the aircraft, one flight attendant proceeded to the right service door, opening it with the assistance of a passenger, while the other flight attendant attempted to open the aft main cabin door. The aft main cabin door opened only a crack; but with the assistance of a deadheading flight attendant, this door was opened and both of these aft exits were utilized during the evacuation of the aircraft.

(C) EVACUATION OF AIRCRAFT: During the evacuation sequence, the obstructions mentioned in the IMPACT SEQUENCE (above) blocked passengers' attempts to exit the aircraft. Additionally, the coat closet in the forward section of the aircraft, just aft of the forward entry door, became an obstruction during egress. The closet door itself, when opened, latches toward the back of the aircraft and passengers were opening the door to retrieve their belongings, thereby blocking the entire aisle area to the exit. The flight attendant finally succeeded in latching the door in its open position to allow egress of passengers.

The evacuation time is said to have lasted over one minute and possible two or three minutes.

(D) AFTER EVACUATION: Flight attendants and pilots assembled the passengers a safe distance from the aircraft and two flight attendants reboarded the aircraft to secure first aid kits, blankets, oxygen, etc. The National Transportation Safety Board, in its report, stated that the dangers of the flight attendants returning to the aircraft, due to a potential fire situation, outweighed any benefit.

(E) NTSB RECOMMENDATIONS CONCERNING IN-CABIN DEFICIENCIES RELATED TO THE WESTERN AIRLINES ACCIDENT: Numerous in-cabin deficiencies, occurring during the impact sequence, were documented in the NTSB "findings", but were not included as recommendations in the NTSB "blue cover" accident report. Although some of these deficiencies may have been recorded in the form of recommendations in previous accident reports or special studies, they should have been referenced in this specific accident report. The following recommendation, listed as Appendix H is the only recommendation at this time involving the interior cabin. "Require air carriers to comply with the provisions of 14 CFR 121.417 (e) (4) by the use of accurate and realistic equipment and procedures which accurately simulate emergency conditions, including the forces involved in opening exits in the emergency mode; and require that during each flight attendant's initial and recurrent training he operate emergency exits which duplicate the forces encountered and actions necessary when such exits are opened in the emergency mode. (Class II) [3]

(2) Continental Airlines, 1975, Denver, Colorado. This accident occurred on August 7, 1975 during the take-off phase near the departure end of the runway. Of the 134 persons aboard, all survived, but fifteen persons were seriously injured. The aircraft operated with three pilots, and four flight attendants. Two flight attendants were seated on the aft flight attendant seat attached to the aft pressure bulkhead door and two flight attendants were seated on the forward flight attendant seat attached to the forward bulkhead just aft of the cockpit (on the aircraft left). Four flight attendants were injured and only one was able to assist in the evacuation of the aircraft.

(A) IMPACT SEQUENCE: During the impact sequence the components and compartments from both the forward and aft galleys dislodged and were strewn about the cabin and/or aisle areas; the overhead enclosed compartments opened dumping their contents; numerous ceiling panels dislodged, partially blocking the aisle and other escape routes; and the cabin floor ruptured in several places. The forward coat/storage compartment fell forward onto the two flight attendants (who were facing it) whose double seat simultaneously collapsed, thus pinning them into their assigned seat. The aft flight attendants submarined in their assigned jumpseat and were trapped between the seat and the belt/harness restraint system. The forward galley (forward of the galley door exit) tipped inward towards the aisle, but did not obstruct that exit area during evacuation; however, contents from the closet/storage compartment spilled into the aisle/exit area hampering evacuation from this exit.

(B) AFTER IMPACT: Following the impact stage, only five of the nine exits could be used for evacuation -- the four window exits over the wing and the forward galley exit (on the aircraft right). Fire was absent during this evacuation which attributed to less injuries and higher survivability in this accident; however, the deficiencies occurring in the impact sequence contributed to the slowness of the evacuation which might have proven fatal had there been a fire.

(C) EVACUATION OF AIRCRAFT: The evacuation time from this aircraft was estimated to be from three to four minutes and all four flight attendants were injured. However, one flight attendant from the aft section was able to extract herself from her submarined position, climb over seats to the window exit area to assist passengers out of the aircraft, while the other flight attendant in the aft section of the aircraft eventually assisted by shouting for passengers to go forward to exit the aircraft. This evacuation was passenger-initiated and the two forward flight attendants were totally incapable of assisting in any way during the evacuation sequence due to their total incapacitation. One flight attendant (forward) eventually extracted herself, while the other was removed from her seat by the captain of the aircraft. The debris from the coat/storage compartment and the galley inserts in the forward cabin made exiting through the forward galley door extremely critical and the ceiling panels as well as the debris from the overhead bins in the cabin became serious obstructions during the evacuation sequence. The left main cabin door was totally blocked by the storage/coat compartment and could not have been used. The aft right galley exit was totally unusable due to distortion from a crack in the fuselage; the ventral stairs were unusable because of the damage to this area of the aircraft; and the left aft door exit was unusable due to the engines which continued to run at a high power setting, causing noise and confusion.

(D) AFTER EVACUATION: Flight attendants and pilots assembled the passengers a safe distance from the aircraft and the rescue crew appeared in a timely fashion to assist all concerned parties.

(E) NTSB RECOMMENDATIONS CONCERNING IN-CABIN DEFICIENCIES , RELATED TO THE CONTINENTAL AIRLINES ACCIDENT: Because the three recommendations made by NTSB concerning flight attendant/pilot training are quite lengthy, I shall not quote them. However, in essence, NTSB recommended that emergency evacuation training for both groups should include crew coordination with emphasis on team effort and awareness of individual's responsibilities. NTSB further recommended that crewmember manuals include evacuation duty assignments of the entire crew. Additionally, NTSB issued the following two recommendations concerning flight attendant jumpseats:

"Issue an Airworthiness Directive to require that the seatbelt tiedown rings on all Boeing 727 forward jumpseats be relocated so that the seatbelt will be positioned across the occupant's pelvic girdle at the recommended angle with the seatpan of 45° to 55°. (Class II - Priority followup) (A-76-80)

"Inspect the flight attendant jumpseats on all other air carrier aircraft to insure that the seatbelt tiedowns are positioned properly; where improper installations are found, take immediate action to require that the tiedowns be relocated. (Class II - Priority followup.) (A-76-81)" [4]

In NTSB's "blue cover" report, they state that FAA issued a notice of proposed rule making on July 11, 1975 which would require that flight attendant seats be provided with protective padding behind their seats which would extend above the level of their shoulders , thus providing protection to their heads. Once again, as was the case in the recommendations resulting from the Western 1975 accident, this accident also had numerous deficiencies within the cabin that were included in the NTSB report "findings". Recommendations concerning these deficiencies may or may not have been submitted to FAA; however, once again, they are not contained in the "blue cover" report documenting this accident. A serious deficiency, documented in the NTSB report which should have been included as a recommendation--and was not--, concerns the lack of a restraint device which should secure the closet/baggage compartment to the fuselage of the aircraft. This was and still is a matter of controversy. Any appreciably large or heavy unit installed in the interior of an aircraft should be properly attached to the aircraft cabin structure. This can be accomplished by means of a flexible cable or upper tiedown pins in the fuselage of the aircraft in addition to the "required" floor tiedowns. This method would avoid injury to persons and prevent blockage of exits in the aircraft. It was found that during the impact sequence in the forward section of the aircraft, the flight attendant double jumpseat and the coat closet/baggage compartments simultaneously failed due to the floor structure shifting in that area. While this is an adequate explanation of these failures, it in no way justifies why a recommendation was not made to prevent further occurances of this type. As a matter of contrast, the same distortion in the forward section of the aircraft and a similar breakage of the fuselage in the aft section occurred in direct vicinity of four separate major galley units; however, none of these galley units shifted in the forward direction (although the forward #1 galley tilted inward

It should be noted that during the evacuation of the National Airlines DC-10 accident at Albuquerque, New Mexico in November 1973, the difficulties involving the red manual inflate handle were much the same as those occurring on the United DC-10 accident in Seattle, October 16, 1975, wherein the flight attendant could not locate the manual inflate handle which was hanging over the doorsill outside the aircraft. The flight attendant (National Airlines - November 1973) at 1L could not see the red manual inflation handle. What she saw was the wording which stated, "Lift flap, pull handle". She lifted the flap and pulled the handle and as she did so, the slide disconnected from the aircraft. This was the ditching disconnection handle. The words "for ditching" are there, but they are so far over the doorsill that, if the slide deploys, BUT DOES NOT INFLATE, the wording cannot be seen.

Although, in the United Airlines Seattle accident, the slide was not disconnected from the aircraft, the fact that the inflate handles could not be immediately located at either 1L or 1R poses a dangerous problem. Additionally, because the inflate handle could not be located on the National DC-10 accident at Albuquerque in which the slide was inadvertently disconnected from the aircraft, improvements on the system should have been initiated sometime ago to rectify a known deficiency.

(B) EVACUATION OF AIRCRAFT: During the evacuation sequence, neither the door at 4L (fourth door aft on the aircraft left) nor the door at 4R (fourth door aft on the aircraft right) was opened to evacuate passengers. During the subsequent investigation, it was determined that one of the difficulties evolved from the fact that the leverage necessary for operation of the mockup door and the leverage necessary for operation of the actual aircraft door, with the slide engaged, are indeed different. This problem would be rectified by the NTSB recommendation A-75-84. However, it was also determined during the investigation that anyone under 5'7" had difficulty maneuvering this door for several reasons: (a) the flight attendant must lean across the back of the jumpseat to reach the handle and to obtain leverage on the handle to initiate operation of the door. This unstable position does not allow proper balance of the flight attendant's anatomy to successfully open this door. And, (b) the flight attendant cannot position her/himself close enough to the door to exert proper leverage of the handle without the flight attendant being injured by the force of the door which actuates inward before the door proceeds in an upward motion to the opened position. Due to the positioning of the flight attendant jumpseat and its proximity to the door, use of caution is prescribed in training classes for flight attendants who must operate these doors. This is done to avoid the dangers involved if a flight attendant stands close to the door while attempting to open this inward operating door which can, and has, hit and injured flight attendants." [5]

On November 23, 1975 NTSB released Safety Recommendation No. A-75-84 as a result of this evacuation and the Western Airlines B-737 accident in Casper, Wyoming as follows: "Require air carriers to comply with the provisions of 14CFR 121.417 (c) (4) by the use of accurate and realistic equipment and procedures which accurately simulate

emergency conditions, including the forces involved in opening exits in the emergency mode; and require that during each flight attendant's initial and recurrent training he operate emergency exits which duplicate the forces encountered and actions necessary when such exits are opened in the emergency mode. (Class II)." [3]

While we agree in full with NTSB's recommendation, we feel that the issuance of a recommendation concerning the inflate handle on the slides is still a critical factor. Additionally, the ability of the flight attendant to reach the handle and gain enough leverage to open the door should be analyzed and corrective action should be initiated accordingly.

(4) Wien Air Alaska, 1975, Gambell, St. Lawrence Island, Alaska. This aircraft crashed on August 30, 1975 while attempting to land at Gambell Airport. The airplane was an F-27B, normally carrying 28 passengers, one flight attendant, and cargo. Of the 28 passengers and four crewmembers on board, seven passengers and three crewmembers died. The aircraft was destroyed by the combination of impact and fire. The only surviving crewmember was the flight attendant who was pinned in the wreckage following impact and who was rescued later by a state trooper who had been a passenger aboard the aircraft.

(A) IMPACT SEQUENCE: Many of the passengers aboard realized that they were going to hit the mountain. One man shouted to that effect and several passengers reportedly took the brace position prior to impact. Subsequently there were two impacts, the seats went forward, debris flew about, and passengers eventually found themselves upside down with their seat belts fastened. "The aircraft crashed into the northwest slope of Sevoukuk Mountain at an altitude of 424 feet. The first impact mark was found 134 feet below a 558 foot ridge. The aircraft overturned during the crash and came to rest inverted and heading opposite the direction of flight..." [6] The seven passenger deaths were attributed to impact injuries, although three of the seven were burned extensively. Investigation of the accident revealed numerous failures of the leg supports and seat-to-floor attachments of the passenger seat structures. Some seat legs were bent in a forward direction and there were a few horizontal seat supports which were bent downward. However, the accident was considered as partially survivable according to the NTSB report.

Just prior to the impact, the flight attendant returned to her seat, fastened her metal to cloth seat belt and subsequently the aircraft crashed. The flight attendant seat and seat belt did not properly restrain the flight attendant and she was slammed against the solid structure and compartments behind her. The restroom door fell on her legs, and debris and galley equipment came loose and surrounded her. This specific flight attendant seat does not provide even "the minimum protection to the occupant due to (a) the structure itself, (b) lack of back padding, (c) the lack of shoulder harness, (d) the dangerous surrounding environment including the galley equipment, contents of the coat closet containing

the 25-man life raft, (e) necessity of the aircraft to provide surveillance where necessary." [7] The flight attendant was unable to provide any evacuation assistance and was removed by the state trooper who was a passenger aboard the aircraft.

(B) AFTER IMPACT: Following impact which was of a severe and confusing nature, the aircraft caught fire immediately; the fire travelled slowly to the cabin area but allowed passengers time to evacuate the plane.

(C) EVACUATION OF AIRCRAFT: Some passengers escaped the aircraft unaided; however, the majority were removed or assisted from the aircraft by a passenger, Gilbert Pelewook. This Alaskan State Trooper used a piece of metal from the aircraft to shield himself from the fire and began pulling passengers from the wreckage. He entered the aircraft, checked passengers' pulses, removed only those still living due to the critical time factor, and moved on to the next person. He apparently found that the passengers could not get their legs free and that they could not unfasten their seat belts. He later heard the trapped flight attendant moan and removed her too before the fire consumed the wreckage. This gentleman performed a heroic feat during and after the evacuation of this aircraft. Many lives were saved that we know positively would have been lost had this trooper not provided continued assistance.

(D) AFTER EVACUATION: Immediately the residents of the island came to the aid of the injured, carried them to shelter, and cared for them until rescue units could transport them to hospitals. Enough cannot be said for a community whose people are so self-sufficient and willing to provide immediate assistance without prior warning or planned leadership. Each person assumed a responsibility and carried it out. The survivors aboard Wien Flight 99 have the people of Gambell and Gilbert Pelewook to thank for saving their lives.

(E) NTSB RECOMMENDATIONS CONCERNING IN-CABIN DEFICIENCIES RELATED TO THE WIEN ACCIDENT: It is difficult to illustrate the sequence of events involving this accident, due to the nature of the crash; however, there have been specific interior cabin deficiencies which have been pointed out to both NTSB and to FAA in the past (the flight attendant seating problem on the F-27 dates back to 1967). Whether or not FAA has published a proposed change in the Federal Register or whether NTSB has previously recommended a change is immaterial; this information should be included in the NTSB "Blue Cover" accident reports to strengthen their previous recommendations. This accident is a classic example of such ommission. First of all, there were no in-cabin recommendations as a result of this accident...to date. On March 2, 1976, the Association of Flight Attendants took issue with NTSB for not having included recommendations relating to the seating and surrounding environment of the wall-mounted flight attendant folding seat on the F-27. AFA pointed out also that NTSB failed to note the dangers involving the use of cloth-to-metal seat belts even though the FAA introduced

a proposal to change the rules (in 1974) to disallow this type of belt. This type of belt was on both the flight attendant seat and on the passenger seats and this matter has been discussed in detail in previous years because of the specific dangers involved with the use of this type of belt. However, NTSB answered AFA by stating that, "it was determined that no safety recommendations on those specific areas were supported by the circumstances of the accident nor are they justified at the present time in view of rulemaking actions by the FAA on these areas already in existence".... "...the Federal Aviation Administration already has rulemaking in progress on this subject. The proposed changes contained in Notice of Proposed Rulemaking 75-31 and the Proposed Airworthiness Directive on flight attendant seats, Docket No. 14912, will institute overall improvements for flight attendant seating, including the F-27 aircraft..." "...Regarding the subject of metal-to-fabric seatbelts, you may recall that Proposal No. 205 in the FAA's First Biennial Operation Review proposed to amend 14 CFR 91.33 to prohibit such seatbelts in all aircraft. The Safety Board supported that proposal and because the FAA was the proponent, we expect expeditious rulemaking on that subject..." [8] In order not to mislead anyone, during the course of investigation of this accident, there appeared to be no reports of the metal-to-fabric seatbelts slipping during the impact sequence; however, the dangers of this type of belt are well known. Additionally, the Proposed Airworthiness Directive concerning flight attendant seats referred to by NTSB did not become a reality (it eventually only involved side-facing seats) and the outcome of the Notice of Proposed Rulemaking 75-31 is also questionable; therefore, reference in the NTSB "Blue Cover" report should have included the flight attendant jumpseat, rather than an omission which presumes the matter will be taken care of because FAA issued an NPRM.

(5) Overseas National Airways, 1975, John F. Kennedy International Airport, New York. This accident occurred on November 12, 1975 during an aborted takeoff of a 380 passenger DC-10 that caught fire. Of the 128 passengers and 11 crewmembers, all evacuated the aircraft safely. Two crewmembers received minor injuries. This accident is unique in that all but one passenger aboard had received varying degrees of emergency training or familiarization on the aircraft. The aircraft was evacuated in less than one minute and consumed by fire and smoke shortly thereafter.

(A) DURING THE ABORTED TAKE-OFF SEQUENCE BEFORE THE AIRCRAFT CAME TO A STOP: One flight attendant was thrown from her jumpseat; two flight attendants left their jumpseats because of the close proximity of the fire to their locations; and some passengers moved from the right side of the aircraft to the left due to the fire (right overwing and aft cabin area windows began melting and cracking before the aircraft stopped). Passengers attempted to take the brace position, but could not due to the close proximity of the seats in front of them. Smoke was entering the cabin, a ceiling access panel dislodged and partially blocked the aisle on the left side of the cabin and also partially blocked access to the aft left exit; some passengers saw the emergency

lights come on; carry-on baggage and debris flew into the aisles; several oxygen mask access doors came open; and the movie projector (row 17) came down on its platform above the heads of the passengers.

(B) EVACUATION OF THE AIRCRAFT: The evacuation was extremely orderly and immediate. This factor is due largely to the efforts of good training on the part of the airline for all its personnel and quick action on the part of the flight attendants assigned to this flight. It was not necessary to provide commands to the evacuees because they knew instantly what to do. They took no carry-on items out of the aircraft. They assisted each other and they assisted at the exit areas and moved quickly. However, all passengers and flight attendants expressed deep concern to the effect that they felt it would have been virtually impossible to have evacuated 380 passengers under similar circumstance. Of the eight door exits on this aircraft, the two exits on the right at the wing area were not opened (due to the fire), and although the two exits at the left wing area were opened, they were not used. One forward (right) exit and the two aft (left and right) exits were used during this evacuation; however, the forward (left) exit, even though the door was opened, was used by only one person since the slide did not inflate in spite of attempts by crewmembers and passengers to inflate it. In other words, only three exits were used during this evacuation. The carry-on baggage, which had come loose during the roll out sequence and the ceiling panel which fell in the aft section of the aircraft were obstructions during the evacuation. Another matter which became critical during this accident and which could become even more serious in other aircraft accidents is the ability and training of the flight attendants to close exits, should it become necessary, once the exit has been opened. To better explain this operation, I will quote from the NTSB Human Factors Report as follows: "10. DC-10 Evacuation Systems.

a. DC-10 Passenger Entry Door Emergency Operation

DC-10 passenger entry doors are electrically operated in the normal mode and pneumatically operated in the emergency mode. When operated in the emergency mode, nitrogen under 1500 psi drives an air motor which drives the door open in approximately 9 seconds. Once a door is opened with the pneumatic system there are two methods available for closing it again. They are:

(1) There is a lever in the recess for the outside door handle called the "free fall handle" or "door auxialiary release handle". If this handle is pulled from outside the aircraft the door will slowly free fall to the closed position.

(2) From inside the aircraft normal electrical power must be available; the "backlock release control" must be actuated, and then the door can be operated electrically. If normal electrical power is not available, the exit doors cannot be closed from inside the aircraft, once they have been operated in the emergency mode." [9]

(C) AFTER EVACUATION: Flight attendants and passengers assembled a safe distance from the aircraft while the fire fighting crews attempted to suppress the fire.

(D) NTSB RECOMMENDATIONS CONCERNING IN-CABIN DEFICIENCIES RELATED TO THE ONA ACCIDENT: March 8, 1976 NTSB released its Safety Recommendations A-76-15 and 16 pertaining to the restraint systems installed on the flight attendant assigned seats which we fully support. Their explanation of the existing problem is explained as follows:

In this accident, a flight attendant who was seated in a rearward-facing jump-seat and restrained by a dual retractor seatbelt was thrown from her seat. In another recent ONA accident at Istanbul, Turkey, three flight attendants, who were using the same type of restraint system, also were thrown from their seats.

The dual-retractor, seatbelt restraint system is manufactured by American Safety, Inc., and consists of two seat-mounted belt retractors, each of which contains a spring-loaded belt. The belts must be pulled from the retractors and fastened together with a metal-to-metal buckle. When each belt has been extended seven to 10 inches, a locking mechanism in the retractors engages to prevent further extension after belt motion stops. Even though the belts are fastened, when either belt retracts to within the first seven to 10 inches the locking mechanism releases. That belt section can then be extended to its maximum length of about 19 inches.

The Safety Board's investigation disclosed that each belt section must be extended past the first seven to 10 inches in order for the system to provide restraint. In addition, the Board found that one belt section could be extended around the user and fastened without extending the other section and that no restraint would be provided. A physically small person restrained by a properly fastened seatbelt could move back in the seat and allow the seatbelt sections to retract to within the seven to 10-inch extension zone and thereby cause the mechanical locks to release.

The Board recommended to FAA that the Technical Standard Order approving the duel retractor restraint system be rescinded until modified so that the seatbelt cannot release inadvertently and that an Airworthiness Directive be issued to prohibit use of the rearward facing seats until the deficiencies of the restraint systems are corrected or a suitable alternate system installed.

To date, this was the extent of the in-cabin recommendations; but we were in hopes that NTSB would reference their previous recommendations or issue new recommendations concerning items such as restraint systems; what should be stowed in overhead bins; the necessity to utilize better ceiling panel overhead restraints to prevent failure of these panels; and the need for the proper training for flight attendants and pilots to close exits (both from the exterior or interior) which have been opened. Once again, these problems were a direct result of this accident, and they have been pointed out in other accidents and should have been included as recommendations or referenced in the NTSB report.

(6) An American air carrier accident on foreign soil, 1976. Because this aircraft accident occurred on foreign soil, it will not contain the identifying information normally produced in the aircraft accident reports. The aircraft was a DC-10, with a 380-passenger capacity. There were 364 passengers aboard and a crew of 13 (three pilots and 10 flight attendants). The crash occurred during the landing phase. All flight attendants spoke English and various languages other than the language spoken by the entire passenger load aboard the aircraft.

(A) IMPACT SEQUENCE: During the impact sequence, the overhead ceiling panels fell into the cabin along with the projector panel; the electrical power was lost rendering the p.a. system inoperative; five of the ten flight attendants were thrown out of their seats; carry-on luggage was strewn about the cabin; and of the 364 passengers aboard, only the tour guide and a deadheading flight attendant from another airline spoke English and the predominate language of the passengers aboard. The evacuation time was estimated between three to five minutes; the average passenger age was 60 years old. Fire errupted on the left side of the aircraft.

(B) AFTER IMPACT: Confusion existed immediately since the flight attendants could not communicate the seriousness of the incident. Passengers insisted on taking their time and they could not unfasten their seat belts. They retrieved their carry-on items and proceeded to reenter the aircraft once they had evacuated. The items which had fallen during the impact sequence became obstructions during their evacuation, and only four of the eight exits could be used.

(C) EVACUATION OF THE AIRCRAFT: Because the entire left side of the aircraft appeared to be on fire, flight attendants attempted to open only the exits on the right. The first three exits operated normally in the emergency mode, but the fourth exit opened less than a foot due to the debris from the #3 engine. However, the fourth exit was finally opened. Lights on the evacuation chutes were adequate as were the ships' emergency lights. The assist space at the forward exit was so limited that two flight attendants were inadvertantly pushed out onto the ground twenty feet below; however, they were uninjured because of the soft mud below. The local fire department was on the scene in less than a minute attempting to extinguish the fire with foam; but once again, the flight attendants' lack of ability to communicate with the passengers in their language most definitely slowed the evacuation from the aircraft.

(D) CONCLUSIONS AND RECOMMENDATIONS AS A RESULT OF THIS ACCIDENT: The AFA representative who assisted in this accident provided invaluable information as a result of the investigation and provided AFA and the NTSB with some well-throught-out conclusions and recommendations as follows:

> "After personally interviewing all of the Flight Attendants who were on board and reading both the individual statements and the summary, I am listing the following items again to emphasize the fact that some corrective measures must be taken.

1. Five (5) Flight Attendants were thrown out of their seats which could have been very serious both in terms of their own personal injury and the subsequent loss of their assistance in the evacuation of passengers because their seat belt buckles did not hold.

2. On impact, numerous ceiling panels and projector panels fell in all cabins. In the aft cabin, panels fell into the seats.

3. Due to loss of electrical power after impact, the P.A. system was inoperative. The Engineer had to come into the cabin and give the command to evacuate---the evacuation was already in progress as a major fire was evident after the initial impact. I would recommend that the P.A. system have a separate battery or power source just as the emergency lights do, so the system may be used when the aircraft electrical power is lost. Flight Attendants can use the megaphones, however, no commands from the cockpit could have been received.

4. As the crash took place prior to dawn, the hand held flashlights carried by the Flight Attendants were EXTREMELY important. Had the Flight Attendants not been holding their flashlights, as required by our airline's regulations, they would not have had time to retrieve them from their inflight bags. Since there was a total lack of communication due to the language barrier between the Flight Attendants and the passengers, the waving flashlight beam was one of the controlling factors that directed the passengers to the emergency exits. The waving flashlight beams were an indication to the Flight Attendants who could not man their stations due to jammed doors and/or fire that someone was covering a working exit so that they, in turn, could devote their attention and skills where needed most. I would like to see the regulation that all Flight Attendants must be holding a flashlight on takeoff and landing added to all airlines.

5. Due to the total lack of assist space, (especially 1L and 1R) two Flight Attendants were physically pushed out the exit during the evacuation because of lack of brace space. One Flight Attendant was pushed severely enough that she totally missed the evacuation slide and was saved severe injuries from a very high fall only because of the very deep mud on the ground.

6. As a total language barrier existed between the Flight Attendants and the passengers, many of the passengers did not know how to fasten or unfasten their seat belts, even though they were shown

how during boarding. The confusion that took place immediately after the crash led to their inability to unfasten the seat belts, or for some of them even to understand that they were to evacuate the aircraft. There was no interpreter assigned to the flight; however, there was a Flight Attendant deadheading home on medical leave who spoke the language and was of incalculable assistance in making passengers aware of the situation and getting them off the aircraft. All the Flight Attendants and entire crew owe her a debt of gratitude for her truely professional behavior and assistance. I recommend that on any flight where the majority of the passengers speak a language other than English and when one or more of the Flight Attendants do not speak this language, an interpreter be carried to insure the safety of both the working crew and passengers. This Flight Attendant and/or interpreter must not only be able to communicate in both languages the normal announcements, but must speak both languages sufficiently well to communicate in both languages during an emergency.

7. I would like to recommend that stricter rules governing carry-on luggage be put into effect. In times of accidents and especially one such as this, where due to the language barrier and the lack of the passengers understanding the seriousness, their primary concern was to get their hand-carried luggage (not checked luggage) was sufficient to motivate many of them into trying to return to the aircraft once they had been evacuated. This attempt to return to the aircraft by the passengers caused one of the Flight Attendants, in her struggle to both evacuate and prevent passengers from getting back on the aircraft, to physically throw one of the firemen from the aircraft, who in the performance of his job was trying to board.

If carry-on luggage could be eliminated or severely cut down, this additional work load and safety hazard during an emergency could be eliminated." [11]

Hopefully the recommendations suggested by the AFA representative will become a reality. They are well-thought-out and contribute to the safe transportation of aircraft occupants aboard all aircraft.

(7) Alaska Airlines, 1976, Ketchikan, Alaska. This 99 passenger B 727-81 aircraft crashed on April 5, 1976 during the landing phase and subsequently overran the departure end of the runway. Of the 43 passengers and seven crewmembers aboard, one passenger died and 34 were injured (11 seriously). Following the accident, all the flight attendants were able to function (2 received serious injuries), but the pilots were trapped

in the cockpit for approximately 20 minutes. The aircraft fuselage broke in three places during the overrun sequence and a fire occurred immediately. The airplane was evacuated in approximately two minutes. The initial impact did not appear to be of much significance; however, the objects with which the aircraft came in contact in the final slide sequence caused substantial distortion to the exterior and interior of the aircraft.

(A) IMPACT SEQUENCE: Due to the time factor before touchdown, three of the four flight attendants had been unable to assume their assigned flight attendant seating positions prior to impact and took available passenger seats; therefore, they were able to observe the interior and exterior conditions during the touchdown and impact sequence. There appeared to be two impacts, one in a longitudinal direction and the second vertical. Passengers and flight attendants alike struck the seatbacks in front of them. The disruption to the exterior fuselage of the aircraft caused some passengers' seats to fail and be thrown within the cabin, while other seats failed but did not break loose from the seat tracks. Some passengers and a flight attendant came to rest upside down strapped into their seats. Debris in the cabin included seats, carry-on baggage, blankets and other items. Additionally, the contents of overhead panels failed and cove light fixtures dislodged, and became obstructions during the evacuation.

(B) EVACUATION OF THE AIRCRAFT: There appeared to be no panic, shoving or shouting. Passengers evacuated in a hasty but orderly manner, primarily through the overwing exits. A few passengers were able to escape through the forward main door (left) which could only be partially opened due to damage to the exterior of the aircraft; and passengers exited through the three cracks in the fuselage. However, a passenger aboard the aircraft who required boarding assistance due to her physical condition was not able to evacuate the aircraft. Considering the extensive interior disarray, this aircraft was evacuated in an amazingly short period of time. Passengers had difficulties unfastening their belts, however, the gentlemen from the Coast Guard who were seated at and near the wing exits were of invaluable assistance in initiating and helping in the evacuation at this area; passengers did assist each other within and outside the aircraft. One passenger evacuated thru a 2-foot hole in the fuselage and eventually assisted in evacuating passengers at the left wing exit area.

It was found during the accident investigations that "The Passenger Emergency Information card for the Alaska Airlines B-727 contained pictorial and written instructions for opening a cabin door. The illustration showed a red arrow with its head toward the handle, i.e., toward the right, while the written instructions directed the handle to be moved aft, i.e., to the left.

The illustration implies that the handles for both the main cabin and galley service doors are moved to the right to unlock the doors. When in practice only the galley door handle is moved to the right and the main door handle is moved to the left." [12]

(C) NTSB RECOMMENDATIONS CONCERNING THE ALASKA AIRLINES ACCIDENT: The "blue cover" report has not been released to date; however some of the areas that logically should be covered appear to be (1) correction of the safety information cards concerning operation of the exit doors; (2) necessity to require able-bodied assistants to accompany disabled passengers aboard aircraft; (3) notation concerning NTSB's prior recommendations involving secure restraint devices to be utilized on galley inserts on board aircraft; (4) recommendation for better securement of ceiling and access panels in the aircraft to prevent blockage and obstructions during evacuation; (5) guidelines as to better procedures for signaling to cabin crewmembers of final approach for landing; (6) recommendation regarding the flight attendant portable flashlight; (7) recommendation to require training for flight attendants regarding the opening of emergency exits from outside the aircraft.

Synopsis of Common Hazards in Aircraft Accidents

Specific in-cabin deficiencies have been documented in the aircraft accidents from 1960 to 1974 which again appear in the seven accidents I have just synopsized. In most cases, there is a need to promulgate better recommendations and to initiate action to improve areas such as crewmember training, better education to the travelling public, continued studies in certain areas, better enforcement of present regulations, and improved design requirements. There is a need for strengthened Federal Requirements which will prevent reoccurance of these published deficiencies. To better illustrate and provide a comparison of some of the deficiencies, I have devised a chart for easy reference. Each of the difficulties identified in the seven accidents in 1975 and 1976 are accompanied with the recommendations that should have been published or action that should be initiated. It is interesting to note that in three of the seven accidents, passengers had difficulties with their seat belts. To me, this is an indication that either the preflight announcements or the passenger information cards are not getting the point across to the passenger, illustrating theneed a better passenger education system. The failure of the flight attendant seats and/or restraint systems appeared in five of the seven accidents. It is well known that the deficiencies associated with the flight attendant seats have been published for years, and yet no concrete action has been initiated, other than FAA issuing an Airworthiness Directive to remove side-facing seats. It is true that a Notice of Proposed Rule Making has been issued by FAA, but that too is a questionable matter, and by the time it gets watered down, chances are we will have a few more accidents with a few more injuries or deaths which at this point in the history of in-cabin safety, we cannot afford. Ceiling panels or wall panels failed in five of the seven accidents and obstructed or blocked exiting of the aircraft. This indicates a need for design of better restraints to secure these devices. In three of the seven accidents, there were difficulties in inflating the slides and in a fourth accident, there was difficulty in positioning of the slide. In the three cases involving the inflating difficulties, the FAA and manufacturers' studies should be stepped up because better design could correct the problems. More specific regulations, particularly for the jumbo-type aircraft, need to be promulgated. Carry-on items dislodged or fell from the overhead enclosed compartments in just about every accident (except the taxi evacuation) which indicates again that the public needs to be provided with educational information. There should be better enforcement of the present carry-on regulations and studies should be initiated to provide better design of carry-on compartment restraint systems including underseat restraint bars. Stronger regulations need to be initiated and enforced. The following chart illustrates the vital need to focus proper attention on the needs of cabin safety as it affects all occupants of the aircraft.

INTERIOR CABIN DEFICIENCY CHART - SPECIFIC ACCIDENTS 1975 - 1976

CODE:
- = Difficulty identified
+ = Not indicated as a difficulty
0 = Not applicable

A = Need better training
B = Need public information education
C = Need stepped up studies
D = Need better enforcement of present regulations
E = Needs better design
F = Needs new regulations

IN-CABIN DIFFICULTIES	WAL	CAL	UAL	ONA	Unname	WEN	ALA	TOTAL
1) Fire/smoke difficulty	+	+	+	-	-	-	-	4(-)3(+)
SEATS								
2) Passenger seat support failures	+	+	+	- C	+	- C	- C,E	3(-)4(+)
3) Passenger difficulty in releasing seatbelt	+	+	+	+	- B,C	- B	- B,C	3(-)4(+)
4) Flight attendant seat or restraint system failure	- C,E,F	- C,E,F	+	-C,E,F	-C,E,F	-C,E,F	0	5(-)1(+)
5) Flight attendant evenly distributed in cabin	- F	- F	+	+	+	- F	0	3(-)3(+)
6) Flight attendant unable to view interior/ exterior of aircraft	- F	- F	+	+	+	- F	0	3(-)3(+)
INTERIOR COMPARTMENT/COMPONENT/FIXTURES								
7) Compartment failures (storage, overhead, restroom)	+	-E,F	+	+	+	-	+	2(-)5(+)
8) Compartment inserts dislodging	-E,F	-E,F	+	-E,F	-E,F	-E,F	-E,F	6(-)1(+)
9) Ceiling panels, wall and light fixture failure	-E,F	-E,F	+	-E,F	-E,F	0	-E,F	5(-)1(+)
EXITS/SLIDES/LIGHTING								
10) Interior/exterior lighting difficulties	+	-C,E,F	+	+	+	0	+	1(-)5(+)
11) Operation of exit difficulties (available exits)	-A,C	+	-A,C	-A,C,E,F	-	0	-	4(-)1(+)
12) Slide problems	-	0	-A,C,E,F	-A,C,E,F	-A,C,E,F	0	0	4(-)
CARRY-ON								
13) Carry-on items dislodging	-B,C,D,F	-B,C,D,F	+	-F	-B,C,D,F	-B	-B,C,D,F	6(-)1(+)
MISCELLANEOUS								
14) Flashlights inaccessible to flight attendants	-D,E,F	-D,E,F	-D,E,F	+	+	-D,E,F	-D,E,F	5(-)1(+)
15) Language barrier	+	+	+	+	-B,C,F	+	+	1(-)6(+)
16) P.A. system unavailable	-E,F	-E,F	+	0	-E,F	0	-E,F	4(-)1(+)
17) Flight Attendant unable to get to or use megaphones	-C,E,F	-C,E,F	-C,E,F	-C,E,F	-C,E,F	0	-C,E,F	6(-)

Summation of NTSB Accident Reports

As is the case with most NTSB reports, the Alaska Airlines Human Factors Report is an example of the thoroughness and dedication of the investigators assigned to these accidents. However, many of the problems and deficiencies noted in these investigations remain on file in the NTSB Library -- occasionally Special Studies are conducted; but there should be more emphasis on the promulgation of a recommendation, obtained from a specific example of a cabin hazard or failure. These deficiencies deserve better attention and follow-up than to merely be mentioned in a report than filed away in the archives to collect dust.

Occupant safety would be advanced considerably if better procedures, safer methods, and suggested changes were recommended as a direct result of the deficiencies documented during investigations. Additionally, emphasis and weight would be added to NTSB's reports if they were to (1) cite previous accident reports and/or special studies which outlined specific recommendations applicable to the problems found during the investigation of each accident and (2) not assume that because a request for change in the rules have been submitted to FAA, that the problem is taken care of.

NTSB should meet with FAA on a continual basis to discuss and document all previous recommendations to include the current status and make these findings public. Too often recommendations are lost in the mill due to the FAA's "we're initiating a study on this matter" syndrome. Results are hard to find and generally lost over a period of years.

Summation of FAA's Response to Recommendations on Cabin Safety

I cannot help but be brief on this subject because the U.S. flight attendants find an obvious lack of response/interest on the part of the FAA when the subject of cabin safety is brought up. This attitude is demonstrated by (1) FAA's having disbanded the Cabin Safety Specialist position in July 1976; (2) the fact that FAA employs only one former flight attendant as an in-cabin air carrier inspector (FAA has 342 ACI's) throughout their system to check aircraft operations; (3) that FAA continually initiates studies to study previous studies involving in-cabin safety; (4) that although FAA assumed the responsibility for the health and safety of the flight attendants, they have not initiated concrete action because FAA contends now that the matter has not been solved by the Labor Department; and (5) that FAA has not promulgated rules and regulations to afford flight attendants the ability to assist their passengers in aircraft emergencies.

It should be noted that of 55,000 FAA employees only two are flight attendants (former flight attendants); one is the in-cabin inspector mentioned previously and the other works for the CAMI in Oklahoma City in the Survival and Protection Laboratory. With 40,000 flight attendants on the U.S. Air Carriers, it seems only logical FAA would employ flight attendants or former flight attendants to observe and provide solutions to the mounting and dangerous in-cabin problems affecting each and every one of us as passengers and flight attendants aboard todays near 3,000 jet aircraft.

The U.S. flight attendants want FAA to eliminate their continued "investigative studies" and initiate concrete action to provide the necessary protection to the occupants aboard our aircraft.

SUMMARY

The AFA does not feel it necessary to justify the position we have taken in our criticism of Government Agencies responsible for our safety as well as the safety of passengers aboard our aircraft, because the lives of aircraft occupants were entrusted to these agencies by Congress years ago. However, we do feel that flight attendants and passengers can no longer accept this bureaucratic shuffling of responsibility for safety from agency to agency. We would emphatically state that we recognize the many individuals in both the FAA and NTSB who are truly interested to enhance cabin safety. They are to be commended; but there appears to be a flaw in the overall system itself which prevents timely action and appropriate emphasis on making improvements to in-cabin deficiencies. Valuable lessons can be learned from human factors problems evident in aircraft emergencies, and certainly should be heeded by the agencies responsible for remedying cabin hazards.

We as a group feel a moral responsibility to carry out our duties to prevent injuries and improve safety for all occupants of our airplanes. And in doing so, we have come to organizations such as the Flight Safety Foundation, Society of Air Safety Investigations, Survival and Flight Equipment Association and others to express our concern and request your assistance in promoting in-cabin safety.

Through the public recognition and through the recognition of those of you gathered here today, of the difficulties we encounter in trying to promote our side of air safety, we're beginning to move ahead. Our analysis, which is critical in parts, should not be misconstrued as a negative approach. What we are attempting to provide are suggestions for a different approach to the problems cited and a basis for improvements.

However, the U.S. flight attendants cannot and will not accept apathy toward in-cabin safety. With your continued interest and concern, no occupant will have to suffer unnecessarily from the often tragic consequence of this attitude.

Thank you for your interest and attention to cabin safety.