



Safety in the Air — What More Can Be Done?

The key to improvements in aircraft accident survival rates is in improved understanding by passengers of the equipment and procedures needed in an emergency.

by

Mary Edwards, Ph.D
Human Technologies Consultant

Manchester — Lockerbie — Kegworth. Grouped together, these United Kingdom locations ring a familiar resonance to those involved with aviation safety. They are all sites of passenger aircraft accidents that have taken place in recent years. The first, at Manchester Airport, happened during an attempted takeoff; the Lockerbie accident occurred as the aircraft was at altitude; the third, at Kegworth, happened while the aircraft was attempting to land.

There were no survivors in the Lockerbie disaster. Nor, by its nature, could an event of this kind be survivable. An explosion resulted in the disintegration of the airframe in flight with no survivors. However, some people survived the fire after an engine failure at Manchester and some survived the impact with the ground at Kegworth. This small sample of accidents reflects the more general picture; people involved in aircraft accidents are more likely than not to survive.

Given that the majority of passengers survive aircraft accidents, why do some fail to survive?

Accident investigators have shown that certain structural features of aircraft have contributed to the toll of death. Lives have been lost when seats failed to resist impact forces and broke away; insufficient space was provided in the vicinity of an exit to permit people to use it effectively; overhead lockers failed and heavy baggage was thrown violently on to those sitting beneath them. Recommendations concerning such design features often are incorporated into accident reports, and they are consid-

ered by the regulatory authorities in conjunction with manufacturers and the airlines.

Through the years, lessons from the accident record have been incorporated into the regulations governing aircraft design with the aim of increasing survivability. Recent changes include new seat strength standards, increased fire resistance of escape slides, and greater clearance around some exits.

However, progress in this area is considered too slow in some quarters and too slight in relation to the dimensions of the problem. There is, for example, a perennial demand for rearward-facing seats in passenger aircraft. Such seats are advocated on the grounds that passengers seated in them can tolerate higher deceleration forces.

However, simply to change the orientation of the seats is only the beginning of the exercise to provide a significant increase in survivability. Passengers would require, in addition to lap belts, full shoulder harnesses and energy-absorbing headrests. The strength of the seats and their tie-down structure would have to be increased considerably. In the event of an emergency landing, passengers would be facing in the direction of travel of unsecured objects launched by impact forces, and thus they would be vulnerable to injury from the objects.

In the wake of the Manchester accident, where numerous passengers were unable to evacuate the aircraft after it stopped and burned on the runway, there have been renewed calls, hitherto resisted, for the provision of smoke

hoods to safeguard passengers against the effects of toxic fumes. Again, the simple introduction of a piece of equipment is only a small part of the process. If the equipment is to be of any value, it must be used correctly and promptly. When and how should passengers be briefed about the use of these devices? What instructions should be provided? At what point during the flight should the briefing take place?

The evidence of passenger utilization of other emergency equipment, such as the oxygen mask, at the time when it is needed, is not reassuring. Many passengers pay scant attention to the safety briefings given by flight attendants at the beginning of each flight, and typically they do not read the briefing cards. It is not surprising, therefore, that passenger behavior in emergencies is less than effective.

The design of cabin features — such as the size of exits and the location of interior partitions — to accommodate a speedy flow of passengers evacuating an aircraft, as well as the design of instructions and briefing cards to maximize comprehension, are some of the essential elements in cabin safety. However, unless passengers utilize this information, their survival may be in jeopardy — the appropriate exit will not be used if passengers are frozen to their seats and the best designed briefing cards will not be read if passengers do not recognize their importance. Passenger behavior is central to the issue of safety.

The study of passenger behavior in emergencies must inevitably consist of the reports of those present who are able to respond to investigators' questions, and upon other methods of reconstructing an accident scenario. Simulation studies offer only limited help, because some critical features of real emergencies cannot ethically be reproduced, and any acceptable approximation is likely to lead to spurious results. Analyses of accidents and emergency situations have led to two conclusions.

First, contrary to popular myth, panic (i.e. disorganized, anti-social, violent behavior) is not a common response; freezing, where passengers are overwhelmed by fear and incapable of action, is a more likely outcome. This type of response may be expected to occur when people, in conditions of great stress, do not know what to do.

The second conclusion is that, in spite of crew briefings and briefing cards, passengers in general demonstrate an unpreparedness that leads to inappropriate action.

It is necessary to recognize that behavior exhibited at the

time of an emergency has its origin in attitudes, beliefs and habits that have developed during a long period of time. Attitudes toward safety, in society as a whole, do not give it a high priority. How many hotel guests check the escape routes from their rooms in case of fire? How many drivers accept that even small amounts of alcohol impair their skills? The aircraft cabin is regarded as a sitting room or a dining room where dangerous events are unlikely to occur.

Passengers' beliefs are often at variance with the reality of the situation. For example, some passengers believe that the time available for escaping from a burning aircraft is far greater than actually is the case, while others believe that to read the safety briefing card before an emergency takes place is a waste of time. Yet, emergency conditions are not likely to be conducive to reading. Other passengers believe that a flight attendant will always be available to help them if an emergency arises, overlooking the ratio of attendants to passengers and the possibility of attendants being too injured to assist anyone.

Those who have survived aircraft accidents when others have perished are often those who exhibit certain habits. For reasons associated with events in their past life, or from occupational expertise, they routinely take account of exit locations in case of fire, whether they are in hotels, theaters or aircraft; they read safety briefing information; and they mentally prepare themselves for an emergency. Evidence that prior preparation is a critical factor in survival can be seen in the report of an accident involving a DC-10. This aircraft sustained damage after seagulls were ingested into an engine during takeoff. Following an emergency stop, at which time the aircraft began to disintegrate and caught fire, an emergency evacuation was ordered. All 128 passengers, who were airline employees, evacuated the aircraft in less than one minute. There were no fatalities and only two serious injuries were sustained. The aircraft was completely destroyed, most of it consumed by fire. All the passengers except one had received training for emergencies.

Thus, the conclusion is that lack of preparedness on the part of passengers forms the greatest hazard to safety. Substantial increments in survival rates can only be obtained by improved understanding by passengers of the equipment and procedures necessary in the event of an emergency.

No single airline can be expected to pioneer such a change. Without concerted international effort, followed by statutory requirements, it seems inevitable that the present situation will continue. ♦

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About the Author

Mary Edwards, Ph.D., graduated with honors in psychology and philosophy from the University of Bristol, U.K. She taught courses in business psychology and held an appointment as a psychologist within a government program for occupational rehabilitation. Following research into organizational structure and function, she was awarded a Ph.D. from Loughborough University of Technology.

Subsequent research projects conducted by Edwards in the area of human factors have included studies of robot ergonomics, accidents in the home, industrial safety systems and the design of public transport road vehicles.

In 1985, Edwards was joined by her husband, Professor Elwyn Edwards, in establishing their consulting company, Human Technologies. They co-authored the book, "The Aircraft Cabin — Managing the Human Factors," published in 1990 by the Gower Publishing Co.

Effective Cabin Crew Training

***The precepts of cockpit resource management (CRM)
might well be extended to the cabin crew.***

—

*by
Jeanne M. Elliott
Northwest Airlines Inc.*

Cockpit resource management (CRM) training is designed to improve the ability of a cockpit crew to work together as a team and, to some degree, involves behavior modification.

Can the concept of CRM be applied to the cabin crew, and can it have a beneficial impact on creating improved teamwork and acceptance of responsibilities?

A full-fledged CRM-type program may not be appropriate for the cabin crew. However, there are definitely compatible applications with respect to the goals and objectives of CRM that can be effectively used in flight attendant training programs.

Significant issues for consideration include leadership, decision-making, work organization, delegation of responsibility, acceptance of responsibility, assertiveness, and crew interaction and communication.

In past years, as a training instructor, I taught flight attendants that, if one crew member was unable to handle a problem, complete a task or effectively interact with a passenger, another crew member should be called to resolve the situation. Today, a more progressive approach to such scenarios is taught; confrontation training equips the crew member to defuse people-related problems on their own, using skills fine-tuned in the classroom. Timing, interaction with the individuals involved and the specifics of a situation all can alter the ability to perform competently. No one is looking for heroes or heroines but only for methods of getting a job done — effectively and in the best way possible.

An opportunity to discuss actual difficult and challenging situations would be invaluable to the crew member involved, as well as to the other members of the crew. How was the situation perceived? Where was the breakdown? What could have been done differently? The ability to recognize

where performance failed, or was impeded, could provide the guidance needed to create a greater awareness of one's own behavior, performance level, stress tolerance and decision-making abilities.

The CRM concept might also lend itself to enhancement so the performance and effectiveness of those cabin crew members who function in a "lead" flight attendant capacity. The senior flight attendant can be invaluable in assuring routine in-cabin service and most importantly, in providing leadership in an emergency situation. During such a time, the ability to communicate, provide leadership and direction, make decisions, delegate responsibilities and maintain self-control are necessary to cope with an emergency no matter what its magnitude.

Cockpit crew members tend to be task oriented, but they also must be fully cognizant of the total environment, not just the problem or task at hand. The same is true in the cabin, and flight attendants must be adaptable and responsive to varied circumstances.

In CRM training, the ideas are borrowed directly from business management. Crews are taught to recognize how their individual styles can create communication blocks that can cause confusion, interference, non-performance, dysfunctional behavior and accidents. Individual resources are invaluable and must be protected, encouraged and allowed to develop to the fullest extent possible. Human resources are the greatest assets of any company and need to be recognized and nurtured.

The CRM concept is priceless in its recognition of human behavior, performance and crew interaction and, ultimately, in job performance. One can not assume another individual's level of knowledge, training or experience. This is the value of "focus" training, such as

CRM, in identifying specific problem areas and providing workable solutions, or at least realistic guidance.

Ultimately, the most effective use of the CRM concept would be "coordinated crew training" where both cockpit and cabin crew members are provided a commonality in training to instill confidence and respect in each other's responsibilities on the aircraft. In this way, crew coordination can assure the highest standards of safe and efficient operations. ♦

(From a paper presented before the International Society of Air Safety Investigators, 21st Annual International Seminar in San Francisco, California, U.S., October 1990)

About The Author

Jeanne M. Elliott has been involved with the aviation industry for more than 25 years in varying capacities relative to cabin safety, crew member training, inflight supervision, in-cabin inspection/surveillance, and program development and management.

Her career includes early work with the U.S. Federal Aviation Administration (FAA) as an air carrier cabin safety specialist. This position was created to give the FAA a closer liaison with the airline industry in developing and enhancing the safety role of the flight attendant in the areas of crashworthiness and survivability.

Elliott has written on occupant/crew member safety and protection in publications distributed worldwide. She participates with industry organizations dedicated to cabin safety and occupant survival, and is affiliated with a major international air carrier.

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CABIN CREW SAFETY

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