



Cockpit and Cabin Crews: Do Conflicting Mandates Put Them On a Collision Course?

Friction between cockpit and cabin crews is not uncommon, and some incidents have led to situations that jeopardized safety. New research suggests effective methods to improve communication and coordination between the crews.

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During a hectic night approach to a busy U.S. airport, a flight attendant opened the door to the flight deck to remove dinner trays, flooding the cockpit with light and distracting the flight crew.

The flight attendant had refused an earlier request by the captain to bring meals forward early in the flight, and the food arrived in the cockpit after the descent had begun, according to an incident report filed by the captain with the U.S. National Aeronautics and Space Administration's (NASA's) Aviation Safety Reporting System (ASRS).¹

In the report, the captain wrote that "the approach was unsafe" and described a serious breakdown in communication between the cockpit crew and the cabin crew. "ATC [air traffic control] became very ... busy. Constant airspeed changes, vector headings and altitude changes. Suddenly approach control said, 'Stop descent immediately. Unidentified traffic at [12 o'clock].' Did not see any traffic at [12 o'clock], looked out left side of aircraft and saw light plane pass directly under in the dark. May have been near miss.

During all the hectic action in the cockpit, well below 10,000 feet (3,050 meters), the flight attendant opened door. ...

"The captain is helpless to plan the approach anymore. The flight attendants ignore requests and directions from the captain. They work for marketing department and don't hesitate to tell pilots they don't have to listen to them. On this flight, the flight attendant's blatant disregard of captain's request resulted in an unsafe approach. If the flight attendant had listened to captain's request to bring meals up, she would not have been in cockpit at low altitude causing a distraction."

The flight attendant's point of view was not contained in the report.

Although cabin and flight deck crews share the same goals (the safety, efficiency and productivity of the flight), the two crews have evolved into two distinct cultures, resulting in communication and coordination problems between them.

Numerous communication and coordination problems were involved in the events described in the above captain's

report. Moreover, it appears that there is a level of animosity between the two crews that may be based on a lack of awareness and understanding of the duties of the other crew members during flight.

In the captain's view, the flight attendant did not comply with his request for a meal to be served immediately and exhibited a lack of concern for his well-being and, therefore, that of the flight. In addition, he believed that the flight attendant violated the "sterile cockpit" regulation [U.S. Federal Aviation Regulation (FAR) 121.542)] by entering the cockpit below 10,000 feet to remove the meal trays. The captain's view is also intensified by the perception that the flight attendant is only answerable to the marketing department, making the chain of command on board the aircraft ineffectual.

Several changes in aviation compel a re-examination of the safety implications of cockpit/cabin communication: crew resource management (CRM), previously confined to the cockpit¹⁷; the emergence of the two-pilot crew, even on wide-body jets and trans-oceanic routes; and the recognition by the U.S. National Transportation Safety Board (NTSB) of the critical role of cockpit/cabin communications in accidents and incidents.⁵

Deficient crew communication has been cited in a number of accidents and incidents as a contributing factor. In 1989 an Air Ontario Fokker F-28 crashed on takeoff at Dryden, Ontario, resulting in 24 fatalities. An investigation found that flight attendants withheld critical information (wet snow on the wing) for a number of complex reasons. Among those reasons cited were professional respect, an assumption that the pilots were aware of all pertinent information and a reluctance to second-guess the pilots.⁹

This reluctance was also evident in the January 1989 British Midlands Boeing 737-400 accident when the captain reported (over the public address system) a problem with the right engine, but the passengers and cabin crew could see fire on the left engine. The error went uncorrected and the captain proceeded to shut down the only good engine.

An examination of accident and incident reports, including federal agency reports and reports in aviation history books, and visits by the authors to joint training classes of cockpit crews and cabin crews, suggest that five basic factors have influenced the differences between the two cultures and perpetuate the division and the problem. The factors are:

- Historical background — origins of the jobs and their influence on personal attributes and attitudes today;
- Physical separation — lack of awareness of other's duties, responsibilities and problems, each influenced by lack of physical proximity;

- Psychological isolation — personality differences, misunderstanding of motivations, pilot skepticism and flight attendant ambivalence about chain of command;
- Regulatory factors — sterile cockpit confusion and licensing issues; and,
- Organizational factors — administrative segregation, training differences and schedules.

Some of the differences can be traced to the origins of the professions themselves. The first flight attendants were known as "skygirls." They were required to be under 25 years of age, weigh less than 115 pounds, be under 5 feet 4 inches (162.6 centimeters) tall, single and female. The height and weight restrictions originally were based on aircraft weight and balance limitations. (Today, this is not a consideration, but their weight is still monitored for marketing reasons.) In addition to serving box lunches to passengers, duties included swatting flies before takeoff and cleaning passengers' shoes during the flight. Subservience and compliance were important attributes in the skygirls.

A 1930 manual admonished them to "maintain the respectful reserve of the well-trained servant when on duty." Interactions between the pilots and skygirls were guided by another rule to "treat captains and pilots with strict formality while in uniform. A rigid military salute will be rendered as they go aboard and deplane."³ Passengers liked the attentive service that the skygirls offered, and airlines grew to view the skygirls as a marketing asset. In the decades since the inception of inflight service, the image of the flight

attendant has been glamorized and popularized in the media and by the air carriers themselves.

The role of the commercial aviator evolved from daredevil barnstorming and the bravado of the coast-to-coast air mail flights of the 1920s.¹⁴

While the populations of both cultures are now large and diverse, members of the two groups still exhibit some characteristics that have been imbued by tradition and valued by their peers and management. An independent spirit, for example, is still prized among pilots, and a gracious demeanor is well regarded in flight attendants.

The commercial airliner has long been divided into two geographical environments: the cockpit and the cabin. Each environment has distinct boundaries, space constraints and technological differences. These physical differences have ramifications when a member of one crew enters the other crew's domain.

The physical barrier of the cockpit door exacerbates communication difficulties. The lack of contact results in

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little awareness on the part of either crew of the other's duties both during normal flight and in an emergency.¹⁵

Lack of awareness can result in unrealistic expectations in the performance of duties by the other crew. A flight attendant, for example, may believe that the pilots are just sitting idly during cruise, when they are in fact scanning the instruments, monitoring the radio or preparing for the approach. Pilots may expect crew meals to be delivered on request and be unaware of the passenger service demands in the cabin, or how turbulence can affect the workload and physical well-being of the cabin crew. Moreover, the separation can result in a territorial attitude, i.e., "You take care of your part of the airplane, I'll take care of mine."

Several subfactors contribute to psychological isolation on the part of the cultures. They include personality differences and pilot skepticism about flight attendant motivations and operational knowledge, and flight attendant ambivalence about chain of command issues and hesitancy to communicate with the flight deck.

America West Airlines used the Myers-Briggs Type Indicator (MBTI) test to explore differences in personality dimensions of pilots and flight attendants.¹⁵ Pilots were found to be task-oriented, preferring a cognitive style of problem solving based on logic and systems-oriented reasoning. Flight attendants, however, preferred an affective cognitive style to decision making.

A study of crew member attitudes toward appropriate crew behavior found large differences between U.S. pilots and flight attendants.⁸ Using multidimensional scaling, pilots' attitudes loaded heavily (.86) on a dimension that indicated self-reliance and personal responsibility for success or failure. While good crew coordination was seen as important, pilots exhibited less perceived need for pre-flight briefings, verbalization of plans or coordination of cockpit and cabin crews. Three groups of U.S. flight attendants all scored very low on this dimension (.21, .11, .08). The opposite was true on a dimension that emphasized good communication and the captain's encouragement of questions from other crew members. U.S. flight attendants scored .68, .75 and .85, while U.S. pilots scored .19, illustrating the difference in approaches to authority and teamwork, and perhaps the nature of their jobs.

While there is limited research on flight attendants, there is an abundance of research on pilot attributes. Several studies found that pilots differed on many personality dimensions from the general population.^{11,12} The studies concluded that piloting, regardless of the pilot's sex, either required, attracted/or selected out the personality type that has been popularized for so long in song, movie and verse: a person who is courageous and adventurous;

one who is oriented toward demonstrating competency, skill and achievement; one who finds pleasure in mastering complex tasks; and one whose manifest sexual orientation is decidedly heterosexual.¹²

As a result of controlled-flight-into-terrain (CFIT) accidents, the U.S. Federal Aviation Administration (FAA) initiated the "sterile cockpit" rule (FAR 121.542).^{13,16} This regulation states that no flight crew member shall perform "any duties during a critical phase of flight except those duties required for the safe operation of the aircraft." Critical phases of flight include "all ground operations involving taxi, takeoff and landing, and all other flight operations conducted below 10,000 feet, except cruise flight."

In addition, the regulation states that no flight crew member may engage in any activity during a critical phase of flight that could distract a crew member or interfere in any way with the proper conduct of the flight. "Nonessential communications between the cabin and cockpit crews" were prohibited. It is this clause that has caused the greatest confusion in interpretation by airlines and crew members.

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Flight attendants, many already intimidated by the authority and mystique of the flight deck, are expected to determine which situations are essential to the safe conduct of the flight. Rather than take the chance of being wrong and thereby breaking the law or embarrassing themselves, and perhaps subjecting themselves to a reprimand from the captain, they opt not to communicate valuable, safety-related information to the pilots.

A 1988 study identified 10 signals or procedures to indicate the sterile cockpit.² The study said that some carriers have more than one signal within the same airline. The signals included a bell chime, "no smoking" sign off (no longer applicable on domestic flights because of smoking ban), number of minutes after takeoff and before landing, engine noises or flashing the seat belt sign. The FAA did not specify what constituted a safety threat, and there has been widespread confusion among flight attendants about what hazards are critical enough to warrant disturbing the pilots.

Many air carriers and flight crew unions perpetuate division by assigning the crews to different departments and unions. This reinforces the concept that there are two crews rather than one. Pilots are usually under flight operations (where safety is stressed), but the cabin crews are typically part of the marketing or sales departments (where service is emphasized). This segregation dates back to 1930 and the inception of cabin service. A 1930 Boeing Air Transport stewardess training manual states: "The pilots are from the Operating Department while the stewardesses are from the Traffic Department so there is no real need for conversation or contact."⁷

The stewardesses were also forbidden to conduct conversations with pilots on duty or to enter the field office except when necessary. Remnants of this historical philosophy still characterize some crew member interactions.

David Adams, Australian accident investigator, observed: "If you look at almost any company, you will usually find that the cabin attendants and the flight crews are very very clearly separated. They work for different branches of the company in most cases. The culture is one of almost complete separation. Yet the fact of the matter is, in a safety situation, these two sections of the company have to work together. And the consequences of not efficiently working together quite often means a bunch of people get killed."⁹

Compounding the departmental obstacles, crews often work together for only one or two flights of a sequence. They can work with as many as four or five different crews in one day.

Additional research supported the concept that familiarity played an important role in the quality of flight operations.⁴ It was found that post-duty flight crews performed at a higher operational level than pre-duty crews. In fact, there were no cases where pre-duty crews were rated better than post-duty crews. This finding was attributed to the fact that post-duty crews had increased familiarity, more accurate expectations and comfort with each other's style of communication. It should follow that the entire flight crew would function at a higher level if given an opportunity to develop a rapport and a smooth operating system.

Although cabin crews typically board a flight 45 minutes before departure, pilots often join the flight minutes before or during boarding. Briefings and introductions are therefore often precluded by this lack of availability. Formal briefings and introductions can alleviate some of the detrimental impact of short crew pairings. A briefing can establish expectations, set the tone for crew interactions, address particular problems or requirements for a flight and serve as a refresher for emergency and security procedures. At the very least, an introduction can set the tone and open communication for ongoing requests and clarifications. The omission of briefings and introductions can carry serious implications in emergency situations when crew members must work as a team but may not have met each other prior to the flight.

Training exaggerates the problem by creating gaps in the instruction that crews receive. Flight attendants from one airline, for example, were trained for nine years that in an emergency they could expect to receive four critical pieces of information from the cockpit crew: type of emergency, signal to brace, signal to evacuate and time available to prepare. To a person, the airline's pilots had never heard of this procedure and even had difficulty guessing what the four pieces of information were.

It has become increasingly vital that cabin crews be knowledgeable concerning aircraft systems and architecture. Valuable time can be wasted in the inaccurate transfer of information, especially when pilots cannot leave the flight deck to validate the accuracy of the information. In the 1989 United Airlines Sioux City accident, a flight attendant told the cockpit crew there was damage to the "back wing."¹⁰ The second officer proceeded to the cabin and looked at the wing, but the damage was to the horizontal stabilizer rather than the wing. [The DC-10 was flown by manipulating the power controls of the two engines that remained functioning after a third engine's fan rotor failed and caused the loss of all the aircraft's hydraulic controls. The aircraft crashed at the airport 45 minutes after the engine failure. Of the 285 passengers and 11 crew members aboard, 174 passengers and 10 crew survived.] The implications of an inadequate command of aircraft terminology and mechanical knowledge are potentially serious. Fortunately, in the Sioux City situation there was sufficient time available and enough personnel in the cockpit to check the flight attendant's information. In a more time-critical situation, valuable time could be wasted re diagnosing the problem or taking the wrong solution path.

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Despite the fact that there is much anecdotal evidence of coordination difficulties between the cockpit and the cabin crews, no empirical data existed on the depth and breadth of these issues. Therefore, a survey was conducted of crew members at two U.S. airlines to investigate communication issues between the two cultures based on the five identified factors. Only the data on organizational factors will

be reported here.

The subjects in this study were 177 current line pilots and 125 flight attendants who voluntarily returned surveys (302 total).

The general survey comprised 30 objective questions designed to probe the five identified factors with multiple choice, yes/no and five-point scale responses. For example, the following item phrased for flight attendants investigated sterile cockpit confusion: "How often are you unclear under which specific circumstances it is appropriate to interrupt the sterile cockpit?" The following question was designed to measure flight attendant reluctance to communicate with the flight deck: "If turbulence occurs and the flight deck does not turn on the seat belt sign, how often do you call them and ask for it to be turned on?" Equivalent questions were asked of the pilots in appropriate language. Both of these questions offered a five point range of response options from "never" to "frequently."

Of the 800 surveys distributed, 302 were completed and returned for a response rate of 38 percent.

Analysis of the personal data for 177 pilots revealed that the majority of the surveyed pilots were male (99 percent) and the mean number of years as a pilot with the airline was 7.31. The sample consisted of 91 captains, 81 first officers and five second officers/flight engineers. The mean number of total flight hours was 10,658. Fifty-three percent of the pilots received their training in the military, while 47 percent received their training as civilians. Twenty-eight percent were on reserve scheduling while 72 percent were not.

An analysis of the flight attendant data revealed that about two-thirds of the surveyed 125 flight attendants were female (84). The mean number of years as a flight attendant with the current airline was seven with a range of 20 years. A similar percentage of flight attendants as pilots were on reserve (24 percent). In response to the question of whether they viewed working as a flight attendant as a short-term job or long-term career, the majority (81 percent) said they viewed it as a career and 66 percent said their feelings about how long they would work as a flight attendant had changed since they were hired. These findings contradicted the prevailing view that most flight attendants view their job as temporary and consequently do not take it seriously. Most flight attendants were qualified on three to five aircraft types.

While this study examined all of the above factors, it was confined to organizational factors. Crew members were asked whether they felt it would be beneficial to have both pilots and flight attendants under one department. More than 60 percent of both pilots and flight attendants agreed that it would be in their best interests if there was only one department for flight crews. Typical responses were:

Pilots: “Yes! Our jobs are to work together. Being in two different departments hinders communication and often times results in misinformation.” And, “Commonality of manuals, procedures, training and communication.”

Flight attendants: “I believe this would enable us to have more of a family effect; e.g., same goals and would make communication better. Our company builds walls between employees ... by making everyone work in different groups.” And, “Even though our jobs are different, our goals are the same — safety and comfort of passengers.”

Those who objected to combining the departments argued that the jobs were dissimilar, with different needs and responsibilities. But many of those against unification also advocated a more coordinated training effort. In addition, the lack of standardization of training, manuals and procedures was perceived as a problem by many pilots and flight attendants. There were numerous complaints by pilots that new flight attendants were being trained to fear and to avoid pilots.

Study subjects were queried whether they noticed any work-related differences when they were paired with the same crew for several legs as opposed to one or two legs of a trip. In support of the research of Foushee

et al., the majority of crew members (77 percent of flight attendants, 71 percent of pilots) said that they did notice differences in the quality of interactions when paired for greater lengths of time. Representative comments identifying the differences included:

Flight attendants: “Increased level of confidence and support.” And, “You know who is who. You know how the flight deck crew flies — what is normal and what is not. You can depend on them for the things they do, e.g., Capt. Jones always tells us if it’s turbulent, he taxis fast so be aware, his landings are hard, etc.”

Pilots: “Cockpit and cabin crews learn what to expect from one another. Set routines, likes and dislikes, etc.” “Carryover procedures and problems are understood; e.g., weather problems, passenger problems, delays, mechanicals etc.” And, “Better communication and working relationship. More openness between crew.”

Overall, the results of this analysis indicated that crew members preferred to have enough time to establish a smooth working relationship with one another. Their responses suggested that safety was enhanced through increased contact.

Pre-flight briefings, while mandated in some crew manuals, seemed to be the exception in practice rather than the rule. When asked how often the cabin crew received a formal briefing from the flight deck, there was substantial disagreement between the pilots and flight attendants (Figure 1). On a five-point scale, more than one-third of the pilots responded that they briefed the cabin crew frequently. However, almost 50 percent of the flight attendants rated the frequency of briefings from the flight deck as infrequent. To clarify this result, it is important to make a further distinction. Sixty-five percent of the pilots said that they usually briefed only the lead flight attendant rather than the whole cabin crew, when they

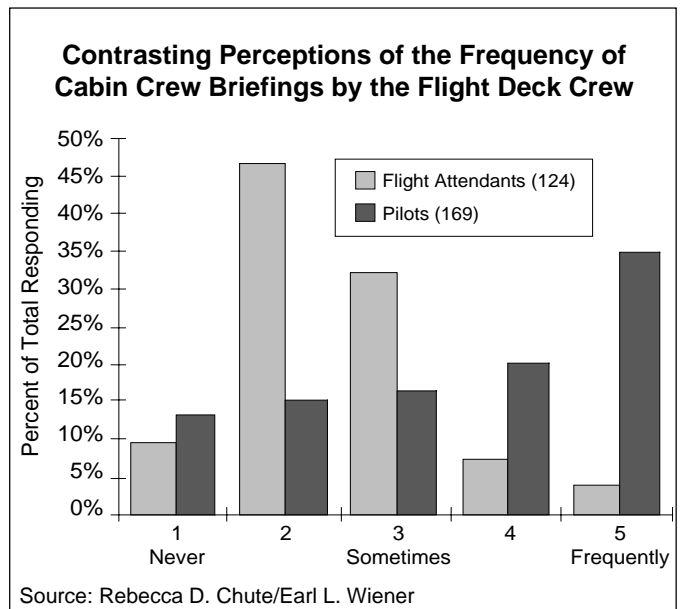


Figure 1

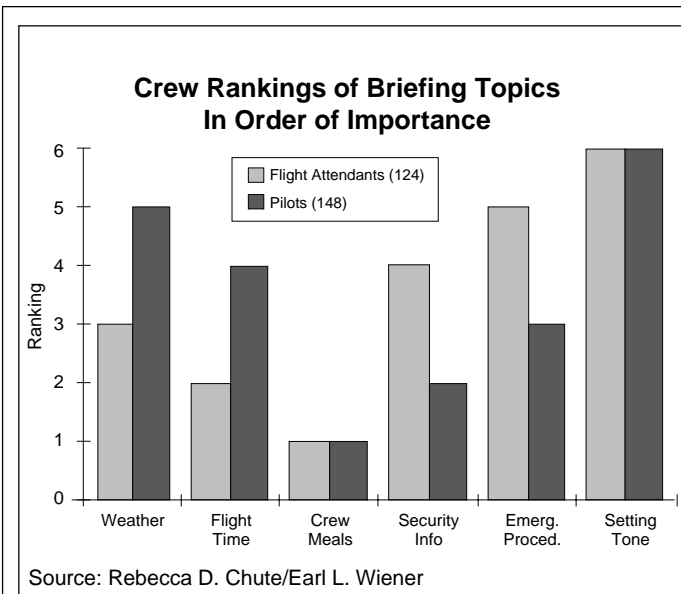


Figure 2

briefed at all. This would result in the majority of the cabin crew not receiving a briefing from the flight deck as well as the impression that those briefings were infrequent. Another factor could be that the lead flight attendant was not passing the information to the rest of the cabin crew, leaving the impression that there had been no cockpit briefing.

Having established that crew briefings are desirable, what kind of information should be conveyed? Crews were very clear about which elements of a briefing were important to them. They were asked to rank each element in terms of importance or to indicate that a topic was not important by leaving it blank (Figure 2). Both flight attendants and pilots ranked setting the tone for crew communication as the most important element of a briefing. Flight attendants ranked emergency procedures as a close second; however, pilots ranked weather as the second most important topic. Both regarded information about crew meals as least important. Flight attendants rated discussion of security information higher than the pilots.

Two items probed the frequency of flight attendant-initiated introductions and pilot-initiated introductions. Once again there was considerable disagreement between pilots and flight attendants regarding their perception of the frequency of introductions (Figure 3 and Figure 4, page seven).

Flight attendants repeatedly requested pilot briefings and introductions. The study asked respondents to complete the sentence “I like it when pilots”

Responses included: “Hold briefings — or at least introduce themselves and establish communication”; “Introduce themselves and give a short briefing regarding communication, etc. It shows respect”; and, “Introduce themselves, give us a briefing on what they like to do in emergencies. Let us know about any problems that may arise including weather and delays.”

Pilots also requested anecdotally that flight attendants go out of their way to introduce themselves, although to a

lesser extent. This is consistent with findings that U.S. pilots scored low relative to flight attendants on a dimension where importance was placed on the coordination of cockpit and cabin crew.⁸ Consequently, it appears that each crew often waits for the other to introduce themselves.

These findings provided the first empirical evidence that problems existed in cockpit/cabin coordination and communication. The crews perceived that they operated as two distinct crews with many barriers between them. These findings indicated that each group believed that it was doing a good job of trying to communicate with the other, but the other group’s efforts were inadequate. They appeared to recognize that a gulf existed between them, and wanted to reduce the distance by administrative unification and longer crew pairings. In addition, cockpit crews may have been underestimating the gravity with which flight attendants viewed briefing topics such as security and emergency procedures.

Issues about crew communication and coordination have been successfully addressed by CRM. CRM has been defined as “using all available resources — information, equipment and people to achieve safe and efficient flight operations.”⁶

CRM has been widely recognized and used by airlines throughout the world because of its value to the improvement of communication and coordination of flight crew members. Thus, a model exists that could extend CRM beyond the flight deck to the cabin crew. Data suggest that CRM training could bring these two disparate cultures into greater cohesion.

Another resource that yields valuable data is NASA’s ASRS program. ASRS is a confidential, anonymous reporting mechanism for all types of safety-related aviation incidents.

To date, the reports have primarily come from pilots and controllers, although it is intended to be used by mechanics, flight attendants and even passengers. However, flight

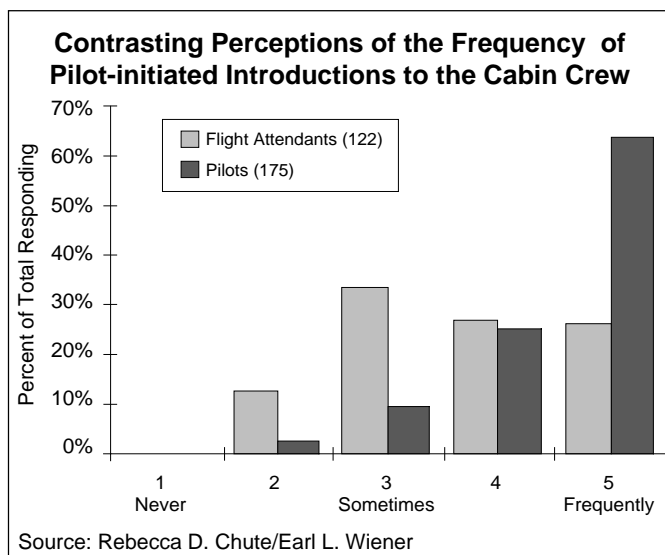
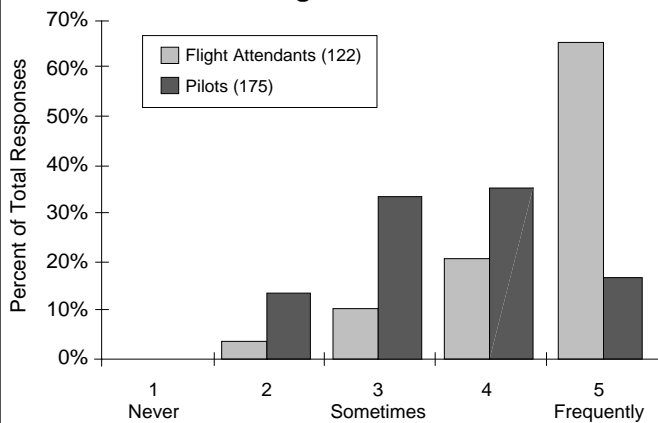


Figure 3

Contrasting Perceptions of the Frequency of Flight Attendant-initiated Introductions To the Flight Deck Crew



Source: Rebecca D. Chute/Earl L. Wiener

Figure 4

attendant reports have been conspicuously absent from the ASRS data base.

The following recommendations are based on the authors' findings:

- CRM training, whether done jointly or separately, should address cockpit/cabin communication. If training is conducted separately, cockpit/cabin communication should be addressed in CRM classes;
- If joint training is conducted, facilitators should have a constructive approach with exercises;
- The reorganization of pilots and flight attendants under the same administrative structure should be thoroughly investigated;
- Cockpit crews and cabin crews should be scheduled for flight sequences as a team. To work most effectively, crews should have the opportunity to develop a rapport and efficient operating routines. This cannot be achieved in transitory pairings;
- Recurrent training should emphasize the importance of crew briefings and that the briefings should include specific elements identified in this paper. Crew briefings should be an important part of captain training;
- Crew check-in procedures should provide for briefing of the two crews prior to passenger boarding. Ideally, a joint check-in facility should be provided;
- Crews should observe the courtesy of an introduction. This complaint was raised repeatedly, and it has a no-cost remedy;
- Jumpseat familiarization programs should be instituted for flight attendants. The emphasis should be on an opportunity for flight attendants to observe the great variation in cockpit workload. Pilots, because they are likely to be in the cabin as passengers,

should be encouraged to observe carefully the cabin operations; and,

- A concerted effort should be made by government agencies, air carriers and unions to encourage flight attendant participation in the ASRS. Cabin crews are an untapped source of safety data about issues such as cockpit/cabin interactions, turbulence injuries, evacuations, emergency equipment functionality and passenger disruptions.

A conscientious effort on the part of air carriers, government agencies and crew members can remove barriers and ensure effective coordination between the two cultures. ♦

Editorial Note: The preceding article was based on information presented at the 11th Annual International Aircraft Cabin Safety Symposium and Technical Conference, Jan. 31-Feb. 5, 1994, in Long Beach, California, U.S.

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Clarification

In the November/December 1993-January/February 1994 special double issue of *Cabin Crew Safety*, specifications of several smoke hoods were provided in a table. The following clarifications are made to that information:

Essex PB&R Corp., has reported that its Plus 10® Filter Breathing Unit filters carbon monoxide at "2,500 ppm [parts per million] for 8 minutes; plus 10,000 ppm for an additional 2 minutes." An Essex representative said that the product will function for a "minimum of 10 minutes under extremely toxic atmosphere" and will function for "several hours against less severe environments."

Fuji Safety Inc. (USA), has reported that its FujiAce Mark II Emergency Escape Smoke Mask has passed tests that "clearly establish the ability of the filter to reduce carbon monoxide concentrations of 2,500 parts per million to safe levels for up to twenty minutes (the maximum duration of the tests)."

Readers who want more information about smoke-hood products should contact the manufacturers for the most accurate and up-to-date facts.

CABIN CREW SAFETY

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