The Cockpit, the Cabin, and Social Psychology

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Abstract

All airline pilots are required to receive crew resource management (CRM) training, which augments technical flight and ground training with human factors subjects. There has also been an increase in this type of training for flight attendants. CRM training has been shown to be efficacious for both groups when viewed separately. Unfortunately, in real flight operations, there are cognitive and physical factors that cause these disparate groups to work less than efficiently between their groups, particularly when a cohesive environment is critical, such as in an emergency. This paper looks at the factors that influence the separation of these two groups and offers recommendations to address this critical issue.

Introduction

Today's flight and cabin crews are much different than they were during the early years of commercial aviation. The captain of the aircraft was once considered "God" and his decisions were always the "right" ones. There was little, if any, input from the other pilots because they assumed the captain knew what he was doing. It was also considered somewhat disrespectful to question the decisions of a superior. Part of this thinking had its genesis from the military. At one time the military was the biggest producer of pilots, and along with military training came a good dose of machismo, ego, and autocratic decision-making processes (many military fighters were single pilot aircraft and therefore lacked the redundancy of, and decision inputs from, another crewmember). This attitude did not transfer well into civilian cockpits. The problems began to manifest in pilot error related airline accidents that claimed hundreds of lives:

- 1978, United 171 ran out of fuel over Portland, Oregon and no one noticed until it was too late.
- 1972, Eastern 401 gradually descended into the Everglades as all three crewmembers became fixated on a landing light indication and the autopilot became disengaged.
- 1982, Air Florida 90 was not properly de-iced and crashed shortly after takeoff from Washington, D.C. In addition, standard operating procedures were violated by an inexperienced flight crew.
- 1985, Delta 191 was caught in an unreported windshear on final approach to the Dallas/Fort Worth airport.
It was obvious that something needed to be done to address the human aspect of flying an aircraft. Airlines were noticing that although pilots were technically competent, their people skills were deficient. In other words, the captain could fly a perfect Instrument Landing System (ILS) approach, but could not work in a synergistic environment to effectively accomplish tasks. This can create a potentially dangerous and antagonistic situation.

Approximately 25 years ago, one major airline took notice and began implementing "people skills" training as part of technical flight training. It became known as Crew Resource Management (CRM). Formerly known as Cockpit Resource Management, CRM has its roots at United Airlines, where in 1980, a formal training program was set up to concentrate on human factors in the cockpit. The reason for the change from "cockpit" to "crew" resource management training was because the training eventually branched out to include not only the pilots but also flight attendants, mechanics, dispatchers, management personnel, or in fact anyone who had a responsibility for the safe completion of a flight.

CRM, amongst other things, teaches pilots how to improve communication, prioritize tasks, delegate authority, and monitor automated equipment. United Airlines established their CRM program when it was not mandated by regulation. Based on United's model, other airlines quickly followed suit. Today, CRM is required training for all airline operations, as per Advisory Circular 120-51D (FAA, 2001). It should be noted that CRM training, as of the publication of this paper, is not mandatory training for charter operations requiring two pilots. Therefore, many operators of business jets for private charter are not currently required to, nor have voluntarily adopted, a CRM training program for their pilots or support personnel. The National Transportation Safety Board (NTSB, 2002), the government agency that investigates accidents, made a recommendation to the FAA (the only agency that can promulgate new aviation rules and regulations) that CRM becomes mandatory training for charter operators. The 2002 recommendation came in the light of the tragic crash of a Gulfstream III in Aspen, Colorado in 2001, where, after a thorough investigation, the NTSB cited the following as causal factors in the accident:

- The captain did not discuss the instrument approach procedure, the missed approach procedure, and other required elements during his approach briefing because he expected to execute a visual approach to the airport.
- The captain and the first officer did not make required instrument approach callouts, and the first officer did not call out required course, fix, and altimeter information.
- The flight crew did not discuss a missed approach after receiving a third report of a missed approach to the airport and a report of deteriorating visibility in the direction of the approach course.

(Source: NTSB, 2002, Accident Report # DCA01MA034)

The Board's 2002 recommendation to the FAA read as follows:

The National Transportation Safety Board recommends that the Federal Aviation Administration: Revise 14 Code of Federal Regulations (CFR) Part 135 to require on-demand charter operators that conduct operations with aircraft requiring two or more pilots to establish a Federal Aviation Administration-approved crew resource management training program for their flight crews in accordance with 14 CFR Part 121, subparts N and O. (A-02-12).

(Source: NTSB, 2002, Safety Recommendation A-02-12)

Unfortunately, as of this writing, the FAA has not adopted the NTSB recommendation and aircraft charter operators are currently not required to provide CRM training. Since the rejection of the recommendation, another high profile accident has taken the life of Senator Paul Wellstone (D-Minnesota). Again, the NTSB cited inadequate CRM training as a causal factor in the 2002 accident (NTSB, 2003, Accident Report # AAR-03/03). Along with the NTSB, this author has been passionate about an adaptation of CRM training for aircraft charter operators. Only time will tell...
Pilots vs. Flight Attendants?

We will now shift away from charter operations and shift back to the discussion of airline operations, which will be the focus of the rest of this paper. When CRM began to expand out of the cockpit and into the rest of the aircraft, the flight attendants were the next logical part of the crew to be included in the CRM training plan.

The role of a flight attendant has changed significantly since the "glory days" of flying. The very first "flight attendants" were three 14-year old cabin boys, who were hired by Great Britain's Daimler Airways in 1922 (Orlady & Orlady, 1999, p.374). Passenger service, rather than safety, was the primary reason these "airborne bellboys" were included on the flight. Food and beverage service was not offered on these first flights. Apparently, the reason for these boys to be in the cabin was more for aesthetics rather than functionality. Things would soon change.

In 1930, United Airlines set a new precedent for cabin crew personnel. United began to hire "stewardesses" for all of their flights. These stewardesses had to be attractive, single, and registered nurses. They also had to be less than 25 years of age (p.374). Many of these stewardesses were glamorous and added to the charm of flying. Keep in mind that flying in this time period was reserved for the well to do. Flights were considered a luxury and there was actually a dress code for passengers in the early to middle years of commercial air transportation. During the rapid expansion of air transportation after 1930, the role of the stewardess slowly began to evolve into safety and comfort for the passengers.

Today, stewardesses are known as flight attendants and their role has changed even further. Safety is now the number one priority for all airlines. Passenger service is second on the list. Flight attendants no longer have an age restriction nor are they required to be registered nurses. Gender issues have also been resolved. In fact, approximately 20% of flight attendants today are males (p.375).

Today's flight attendants are highly trained, highly skilled, and center on safety as the core of their job function. And, just like the pilots, many have been trained in crew resource management principles. However, some recent findings have uncovered some disturbing facts about the division of responsibilities and safety issues between the cockpit (pilots) and the cabin crew (flight attendants). The underlying goal for both the pilots and flight attendants is the safe and efficient completion of a flight. Yet, there has been an unrelenting division of these groups in times of emergencies as well as routine operations. How could this be? As a layperson, you would assume that these groups would be highly cohesive by nature, and yet the opposite has been shown to be true.

On a snowy winter afternoon [in 1989], the crew of Air Ontario Flight 1363 attempted a takeoff from Dryden, Ontario, with an accumulation of snow and ice on the wings and crashed because the aircraft could not gain enough lift to clear tress beyond the end of the runway. In the crash and resulting fire, 24 passengers and crewmembers, including both pilots, were killed (Helmreich & Foushee, 1993).

During CFONF’s [aircraft registration number] stop at Dryden snow was falling and accumulating on the wings. The First Officer (FO) commented on the radio at 1200 [12:00 noon local time], “quite puffy snow looks like it's going to be a heavy one” (Helmreich, 1992). It was during this time and when the aircraft began to taxi that several passengers commented to the Flight Attendants (FA) about the contamination on the wings. An experienced pilot “expressed his concerns about icing to the lead flight attendant but was told (falsely) that the aircraft had automatic de-icing equipment” (Helmreich & Foushee, 1993). The FA’s did not inform the flightcrew of the expressed concerns of the passengers for de-icing (Helmreich,
In another example of a breakdown between these two groups, a 1986 accident report of an Air Canada DC-9 illustrates another problem in the communication process. Just as in the Air Ontario accident, the lack of information dissemination between the flight attendants and the pilots contributed to the loss of 23 of the 46 lives onboard.

A total of four minutes were wasted between the initial report of a fire being made to the captain and the commencement of an emergency descent (FSF, 1990). The flight attendant who first discovered the fire made an attempt to extinguish it, but due to the volume of smoke, she was not able to locate the source. She then requested to another flight attendant that a report be made to the purser. The purser, in turn, was only able to report to the captain that a fire had been discovered in the lavatory but was not able to articulate the details such as the extent of the flames and smoke or the exact origin of the fire (FSF, 1990). The report also indicated that the captain did not appear to be too concerned with the problem.

The four-minute delay between the recognition of the problem and the start of the emergency descent to the nearest airport by the flight crew came at the expense of 23 lives. This example once again shows how important the line of communication is between the pilots and flight attendants, particularly in emergency situations. The information needs to be timely and accurate so the pilots can make an informed assessment and begin remedial processes as soon as possible.

The process may also work in reverse (cockpit to cabin). In this example the outcome is successful but the breakdown in communication and teamwork may demonstrate a less than adequate example of human performance:

Abnormal Situation: Hydraulic System B failure on climb out. Flight Engineer brought problem to captain's attention. I (F/O) continued to fly aircraft while the Capt and F/E worked the checklist. So, all is well and pretty good CRM going on the flight deck. However, we failed to communicate problem with the lead flight attendant, who with 1 or 2 other F/As detected (sounds) that there was a problem. The captain made the decision to return to the departure airport, yet the flight deck still failed to communicate this decision effectively with the lead flight attendant.

Once on the ground we communicated the nature and extent of the problem with the lead flight attendant who said that she had been left "out of the loop", and therefore could not communicate effectively with the other F/As. Flight crew agreed that [we] "dropped the ball" and apologized, but we all agreed that we learned a valuable lesson; always think of CRM extending beyond the flight deck. (Anonymous, personal communication, September 14, 2004).

Outcomes are not always negative, however. As a Japan Airlines flight was beginning its descent toward Narita, a fire broke out in the right rear coatroom (FSF, 1990). Two flight attendants began fighting the fire while the third informed the purser who informed the pilots. The captain immediately declared an emergency and sent an off-duty flight engineer into the cabin to help. The fire was quickly extinguished, passengers were relocated, and a successful landing was made with no injuries (FSF, 1990). The crew's timely and coordinated efforts showed how a synergistic environment could have a positive outcome in an abnormal situation. The crew was later commended by the ministry of transportation (FSF, 1990).

What's the Problem?

The problem with pilot and flight attendant teamwork, particularly in the area of communications, has its roots in the disparate job functions of both groups. When speaking of pilots, it is a mostly male dominated profession. Conversely, when speaking of flight attendants, it is a mostly female dominated profession. It should be noted, however, that there has been an increased percentage of "gender
balancing" over the last few decades for both groups. Theoretically speaking, and this comes from basic innate gender characteristics, male and female thought processes could be somewhat divergent. This is not to say that there is an abundance of testosterone in the cockpit or that females may be influenced by their inherent affective nature, but the gender differences do have to be considered when groups are segregated into mostly male versus mostly female categories.

Besides gender influences, the most salient reason for division in these groups appears to lie in the division of job functions and responsibilities. The cockpit crew is separated from the cabin crew by not only physical barriers (the door), but also communicative barriers (most communication is conducted through an impersonal interphone). Until relatively recently, pilots considered the cockpit "their territory" while the flight attendants considered the cabin "their territory." Typically, the only times that these two groups would interface was when the pilots needed to be fed, or in the event of an emergency.

Research shows that the division in these groups may be attributable to historical, organizational, environmental, psychosocial, and regulatory factors (Chute & Wiener, 1995). The investigation of the Air Ontario crash discussed earlier in this paper gave us more than the cause of the accident; it established the foundation of factors in play that extend far beyond the cockpit and the pilots. Among these findings was a serious separation of the pilots and flight attendants. Chute and Wiener (1995) summed the results very eloquently by saying "the basic problem is that these two crews represent two distinct and separate cultures, and that this separation serves to inhibit satisfactory teamwork."

Supporting this hypothesis was compelling testimony from the surviving flight attendant of the Air Ontario crash:

Well, we have - the pilots and the flight attendants have respect amongst one another as friends but when it comes to working as a crew, we don't work as a crew. We work as two crews. You have a front-end crew and a back-end crew, and we are looked upon as serving coffee and lunch and things like that.
(Sonia Hartwick, surviving flight attendant, Air Ontario accident, Dryden). (Cited in Chute & Wiener, 1995).

The separation of pilots and flight attendants was further widened by two additional factors; the 1981 promulgation of the "sterile cockpit rule" by the FAA (Federal Aviation Regulation 121.542), and the 2001 cockpit door-strengthening requirement brought about by the events of 9/11. While both of these regulations were needed to enhance safety, the unfortunate side effects manifest as a barrier to effective communication between the groups.

The sterile cockpit rule was implemented to eliminate non-essential chatter between the pilots during critical phases of flight. A 1974 accident investigation by the NTSB revealed that distractions and discussions of non-relevant flight issues were causal factors leading to the crash of Eastern Airlines Flight 212 in Charlotte, North Carolina (NTSB, 1974). In that crash, 71 of 82 people lost their lives because the pilots were discussing politics rather than the plans for their approach to Charlotte Douglas Airport in bad weather. The new rule was to prevent this type of non-essential chatter below 10,000 feet and reads as follows:

Sec. 121.542 Flight crewmember duties.

(a) No certificate holder shall require, nor may any flight crewmember perform, any duties during a critical phase of flight except those duties required for the safe operation of the aircraft. Duties such as company required calls made for such nonsafety related purposes as ordering galley supplies and confirming passenger connections,
announcements made to passengers promoting the air carrier or pointing out sights of interest, and filling out company payroll and related records are not required for the safe operation of the aircraft.

(b) No flight crewmember may engage in, nor may any pilot in command permit, any activity during a critical phase of flight which could distract any flight crewmember from the performance of his or her duties or which could interfere in any way with the proper conduct of those duties. Activities such as eating meals, engaging in nonessential conversations within the cockpit and nonessential communications between the cabin and cockpit crews, and reading publications not related to the proper conduct of the flight are not required for the safe operation of the aircraft.

(c) For the purposes of this section, critical phases of flight includes all ground operations involving taxi, takeoff and landing, and all other flight operations conducted below 10,000 feet, except cruise flight.

Note: Taxi is defined as "movement of an airplane under its own power on the surface of an airport."

[Doc. No. 20661, 46 FR 5502, Jan. 19, 1981]

The rule is self-explanatory; the pilots should not be doing anything not related to the flight tasks at hand. This includes the taxi portion as well as operations below 10,000 ft, except cruise flight if the final altitude will be less than 10,000 ft. In this author's opinion, the sterile cockpit rule has had mixed results. Numerous post-crash cockpit voice recordings (CVR's) to date still indicate an abundance of non-essential chatter by the pilots, particularly during the taxi phase. It should also be noted that flight attendants are included in the sterile cockpit rule. Flight attendants must be seated in their jumpseats and remain seated until the captain signals (usually with a chime) that the "sterile" portion of the flight is complete. Just like the pilots, the flight attendants are not allowed to perform any non-essential duties such as distributing blankets, preparing meals, or serving beverages or food.

The problem therefore manifests in the cabin crew not wanting to "bother" the pilots during a critical portion of the flight; even if he or she feels that the matter is critical. The flight attendant must use discretion in deciding what is critical and what is not. The obvious dichotomy is that if the flight attendant calls the cockpit and he or she is wrong, there may be repercussions from the pilots, management, or both. On the other hand, if there is a serious issue and it is not communicated to the pilots the same results may ensue.

To further confound the issue of the sterile cockpit rule, crash statistics indicate that 80 percent of accidents involving commercial aircraft occur within the period of time that the sterile cockpit rule is in effect (FSF, 1990). In other words, during the takeoff and landing phase, where the majority of accidents occur, communication between the cockpit and cabin crew needs to be at its best. However, the opposite is often true.

Because of the ambiguity of "what should be communicated" between the two groups, Japan
Airlines (JAL) in 1987 revised their flight attendant training manual to include items that are considered "essential communication" during takeoff and landing that may necessitate an emergency evacuation of the aircraft (FSF, 1990). These "essentials" included:

- Any outbreak of fire
- The presence of smoke in the cabin
- Any abnormality in the attitude of the aircraft during takeoff or landing
- The existence of any abnormal noise or vibration, and
- The observation of any fuel or other leakages

(Source: FSF, 1990)

The JAL training also included important information regarding when to make the calls to the pilots: "Cabin crews are to make an immediate emergency call upon discovery of any abnormality." What to call: "Even in circumstances where you are not absolutely sure, make the call," and how to call: "Use the pilot call for emergency communication." (FSF, 1990). Other airlines have instituted similar training modifications and they appear to be welcomed by both groups.

The second critical issue involves the door-strengthening requirement that was prompted by the events of 9/11. While the communications problems regarding the sterile cockpit are more or less cognitively based, the fortification of the cockpit door serves as a physical barrier. While there is no doubt that the doors needed to be strengthened against unauthorized entry, it also further separated the cockpit and cabin crews. Other than an emergency in the cabin, the days of the pilots walking down the aisle for a leisurely stroll are long gone. In fact, many airlines require a flight attendant to "keep watch" outside the forward lavatory when a pilot requires a "physiological break." Other than that, all communication is conducted through an interphone, and of course these types of communications are subject to interference from noise, vibration, etc. While it is absolutely necessary to be closed and locked throughout the duration of the flight, the cockpit door still presents itself as a physical barrier to two groups that must have open communication.

**Conclusion**

By now you have seen the magnitude of the problem; two groups, two cultures, and two completely separate job functions. The pilots, who work in the small but highly complex cockpit—and the flight attendants, who come from the service-oriented and spacious cabin—having difficulties bringing their environments closer together and working in harmony.

The recommendations set forth by Chute and Wiener (1996) offer an excellent starting point. They include:

- Clarification of the Sterile Cockpit Rule/Reexamine Teaching of Sterile Cockpit Rule
- Team Formation and Crew Briefings
- Aircraft Technical Training for Flight Attendants
- Jumpseat Familiarization Flights for Cabin Crews
Crew Resource Management (CRM)

- Integrated CRM Courses that Include Pilots and Flight Attendants

(Source: Chute and Wiener, 1996)

It is important that both pilots and flight attendants understand the importance of the sterile cockpit rule. The rule was put in place not to disrupt the flow of critical flight information, but to mitigate the abundance of non-essential chatter in the cockpit. Additional training should be included, such as that of Japan Airlines, that would emphasize what communications are appropriate during the times when the sterile cockpit rule is in effect. Apparently, the sterile cockpit rule is becoming better and better understood as illustrated by this testament from a pilot of a small domestic airline:

We observe the "sterile cockpit" rule. Our flight attendants are great with this!! They will only call after they have received the message "Departure Checks" when climbing through 10,000 feet. On arrival and descending through 10,000 feet the flight attendants will get the message "Arrival Checks." As I have said all of the flight attendants are good at observing this rule. If the flight attendants have a genuine concern during the "sterile cockpit phase" they will call; the majority have no problem calling if they feel there is a problem. I can say that we do not have a problem with flight attendants making unnecessary calls to the flight deck. (Anonymous, personal communication, September 14, 2004).

Pilots and flight attendants need to understand the basic psychology of group dynamics and the positive effect that pre-flight briefings can have between groups. Many pilots and flight attendants may have never worked together before and yet both of these groups tend to remain isolated before, during, and after a flight. Some captains are better with an introduction and a briefing than others. But overall, there tends to be a "chill in the air" during pre-flight routines. The importance of an introduction and briefing cannot be overstated; a simple handshake or congenial gesture may be all that is required to build trust and camaraderie (Burgoon, 1991). Without trust, how can these two groups have effective communication? In terms of briefings, it is understood that there is a shortage of time for "socializing," but a simple briefing by the captain to the cabin crew is a sign of goodwill and teamwork.

Unfortunately, many captains only provide weather-related briefings to the cabin crew as a courtesy for possible delays, but whether this type of brief builds trust or camaraderie is questionable.

The suggestion that flight attendants receive some technical training is a valid point. Learning basic aerodynamic principles as well as being able to identify major parts of the aircraft is well worth the additional training hours. Flight attendants should at least be able to identify the wing components such as the flaps, slats, slots, spoilers, and ailerons, as well as the vertical and horizontal stabilizers. In an emergency situation, when the pilots cannot come to the cabin, a quick and accurate assessment may need to be made by the flight attendant as he or she communicates the problem to the cockpit via the interphone. Ambiguities in wording may also be incorporated into this type of training. An example would be if a flight attendant reports a fuel leak on the "left" wing. Depending on which way the flight attendant is facing (forward or rearward), either wing can be the "left" wing.

Jumpseat familiarization flights are a cost-effective way to allow the cabin crew to "see the cockpit in action." This allows the flight attendants, typically on a day off, the opportunity to sit in the cockpit and observe the pilots work during the course of a flight. The thought is that with a better understanding of what is required of the pilots, particularly in high workload situations, flight attendants will have a better idea of "what is going on behind that locked cockpit door" and therefore have a deeper understanding and appreciation of the other group. Unfortunately, since Chute and Wiener's paper in 1996, the events of 9/11 have put many limitations on the use of this practice. On the other hand, pilots regularly get to observe flight attendants in the cabin (many "commute" to work via an airline flight or travel by air for vacations). This gives the pilots many opportunities to observe the job requirements of the other group.
Crew Resource Management (CRM) 

Chute and Wiener's final recommendation that CRM classes be combined between both groups speaks for itself. There is no doubt that the efficacy of this type of training will be best when both groups are able to interact with each other. Problems that are detected in the CRM class can be more easily resolved in the classroom than in a real life emergency. And rather than both groups receiving their CRM training separately and hoping for a "happy meeting" down the line, they will be able to learn under the same roof and there will hopefully be a higher level of standardization in the transfer to the line.

In addition to the recommendations outlined by Chute and Wiener, the author recommends investigating a few other areas. Further elucidation of the psychosocial problem could be addressed by the use of group training, with an emphasis on assertiveness training. Although the topic of assertiveness is generally included in basic CRM modules, a stand-alone course that includes more in-depth content on role-playing and case studies may have a higher amount of retention and transfer for the cabin crew. The author feels that flight attendants could benefit from assertiveness training because of the inherent hierarchical composition of the aircrew. It is not always easy for a first officer to speak up to a captain, let alone a flight attendant having to speak up to one of the pilots. Assertiveness training is effective in teaching people how to speak up with the right words at the right time, even if their personality is considered timid or quiet.

Finally, the author recommends that a few "flight attendant sterile cockpit scenarios" be added to recurrent simulator training for pilots. These scenarios could be invoked during normal training sessions during taxi out, climbout, approach, or taxi-in. This should not incur any additional training costs since the pilots would be in training anyway. Although the simulator instructor could assume the role of the flight attendant, the best method would be the utilization of real flight attendants. A simulated scenario could consist of a call from the flight attendant during taxi that there is a strong smell of raw fuel in the cabin. The pilots would then have to make decisions amongst themselves and with the flight attendants for seeking resolution to the problem (i.e., Do we go back to the gate? Do we continue? Did we notice those odors on the last leg?). Other scenarios for the airborne segments should also be incorporated. If nothing else, these types of scenarios would further reinforce the importance of communication and synergy between the pilots and flight attendants.

References


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cockpit crew. *Cabin Crew Safety.*


