



# The Sterile Cockpit

by Robert L. Sumwalt

It's no secret. When a flight crew's attention is diverted from the task of flying, the chance of error increases. Over the years there have been dozens of air carrier accidents that occurred when the crew diverted attention from the task at hand and became occupied with items totally unrelated to flying. Consequently, important things were missed. Things like setting the flaps prior to takeoff, or extending the landing gear before landing. Things like monitoring altitude on an instrument approach, or using engine anti-ice for takeoff during a blinding snow storm.

In 1981 the FAA enacted FAR 121.542 and FAR 135.100 to help curb the number of these accidents. Commonly known as the "sterile cockpit rule," these regulations specifically prohibit crew member performance of non-essential duties or activities while the aircraft is involved in taxi, takeoff, landing, and all other flight operations conducted below 10,000 feet MSL, except cruise flight. ([Click here to go to FAR 121.542 and 135.100](#).)

It's unrealistic to expect a crew to fly together for several days and never discuss anything except items related to flying the aircraft. In fact, experts have demonstrated that in order to be most effective, crews need to talk -- even if it is just merely "get to know you" sort of chat. The sterile cockpit rule is a good rule because it clearly defines when it is time to set aside non-essential activities and tend strictly to the task at hand -- that of safely operating the aircraft.

In spite of the existence of the sterile cockpit rule over the past decade, pilots have continued to have accidents and serious incidents that perhaps could have been prevented. For the most part, disobeying the rule is not intentional. It just happens. But as this review shows, the consequences of non-compliance can be very serious. Truly, the sterile cockpit needs to be cleaned up.

This reviewer used the ASRS database to find specific examples of problems related to non-compliance with the sterile cockpit rule. We carefully reviewed 63 reports that had been previously coded by analysts as having some relevance to the sterile cockpit rule. Here is a synopsis of the problems that we found that could be attributed to sterile cockpit violations:

48% were altitude deviations

14% were course deviations

14% were runway transgressions

14% were general distractions with no specific adverse consequences

8% involved takeoffs or landings without clearance

2% involved near mid-air collisions due to inattention and distractions.

## The Culprits

The way in which the sterile cockpit rule was broken in each report was tallied and analyzed. Some reports contained more than one culprit. Many of the reports contained acknowledgments like this:

- "If we [had] adhered to the sterile cockpit, this situation probably would not have occurred." (ACN 118974)

Following are the four most common reasons for non-adherence to the sterile cockpit rule:

### Extraneous Conversation

The most habitually cited offense was extraneous conversation between cockpit crew members. Cited one First Officer:

- "Although VMC on the approach, the new special weather was... [indefinite ceiling, 200 obscured, visibility 1-1/4 mile in ground fog], snow falling and some snow on the runway...I was flying and Captain viewing PIT stadium and various sights out the window, chatting incessantly...Captain then reviewed procedures for short ground roll on snow covered runways and returned to miscellaneous conversation." The crew believed that they then landed without contacting the tower and receiving landing clearance. After some serious soul searching, this reporter continued "...the potential for disaster scenarios should be apparent...The bottom line: lack of professionalism. Captain habitually rambled from push back to block-in through a four day trip. This was the first of two incidents on the same day...Below the line: lack of courage. F/O and F/E were not willing to ask the Captain to please shut up so we could fly the airplane." (ACN 102595)

The Captain of an air carrier aircraft admits to conversation not pertinent to flying duties:

- "...Both the F/O and I became distracted because of a conversation that was started before the level-off. At 4300 feet our altitude alert system went off...Our sterile cockpit procedures should have eliminated this problem if properly followed." (ACN 168474)

Five reports detailed extraneous conversation with jump seat riders. The ability to ride on an air carrier's jump seat is quite a valuable privilege, but it is important that the additional cockpit rider not be allowed to create distractions. A look at two of these reports:

- "While descending into a broken deck of clouds, unannounced traffic appeared at 12 o'clock and less than a mile, climbing up our descent path. In my best estimation we were on a collision course. I immediately, without hesitating, instinctively pushed the aircraft nose down and to the right to avoid impact. The Captain was engaged in a conversation with [somebody] on the jump seat." (ACN 167026)

And in the other ASRS submission:

- "This very senior Captain was about to leave on a Scuba diving trip and talked nonstop to the female jump seat rider upon discovering she was also a diver...This [altitude deviation] could have been prevented entirely if this particular Captain...[had paid] attention to his job and observe[d] some approximation of the sterile cockpit below 10,000 feet." (ACN 119289)

The connotation "extraneous conversation" does not always have to imply just those persons on board the aircraft. Look at how extraneous chatter with air traffic controllers introduced problems for these crews. Air traffic controllers, take notice:

- "We turned base to final. Tower talked about mutual acquaintances and local weather. On final, at about 2500 MSL, we realized we lined up for the wrong field...First mistake: getting involved in conversation with [the] Tower operator..." (ACN 108035)

And in another incident:

- "At the outer marker...with thunderstorms in progress, reported wind shear and heavy rain ...the tower insisted on knowing if our gate was open. We told him we were too busy to find out, he persisted with claims of needing to know where to put us on the ground once we landed. We attempted once to try to contact the company but failed due to frequency congestion... We were distracted by the tower's request for non-pertinent info during the sterile period... This [practice]...(of the controller needing to know if a gate is open at the most intense and critical phase of flight) must not be continued. It is an unsafe practice and deters us from conducting a safe flight." (ACN 114244)

## **Distractions from Flight Attendants**

Distractions caused by flight attendants visiting the cockpit or calling on the interphone were noted in almost one quarter of the reports in our data set. This was our second highest source of deviation from the sterile cockpit rule.

- "As aircraft approached Runway 18, Flight Attendant 'A' entered cockpit with coffee for the crew. Crew attention momentarily diverted...Aircraft penetrated hold line approximately six feet for Runway 18...Small single engine aircraft on final for Runway 18 was instructed to go around by Tower...Probable cause of this was short taxi distance to hold line and crew's interruption by [the] Flight Attendant." (ACN 149054)

In another incident, the crew was surprised when they lined up with the wrong runway -- and doubly surprised when they noticed they were in an unplanned formation with a jet landing on the same runway!

- "...Flight Attendant came into the cockpit and asked what gate we were going into as we had a passenger with a wheelchair going to another flight...I advised approach we had our traffic [in sight]. Approach now cleared us for what I thought was a Runway 26L visual approach, call tower at the outer marker. As we proceeded to Runway 26L, which was the closest runway to our arrival side,...I looked over [at] my First Officer and out his side window and saw the [other jet] at our altitude, approximately 100 feet away...I'm sure that, with the Flight Attendant interruption, I heard what I expected to hear, 'cleared to the left runway.' " (ACN 98883)

## Non-Pertinent Radio Calls and PA Announcements

Several reports we examined indicate that problems arose when non-pertinent company radio calls and PA announcements were made below 10,000 feet. Remember, below 10,000 feet if it's not directly related to flight safety, it's in violation with the sterile cockpit rule.

- "Beautiful day making approach into familiar station, Captain elects to make a PA announcement to passengers while flying the aircraft. Resulting distraction of the passenger announcement [caused us to over-shoot]... altitude 500 feet." (ACN 54741)

While being vectored in a busy terminal area, the Captain in the following report called on the company radio frequency to notify maintenance about a minor cabin discrepancy. As the reporter soon discovered, his absence from the ATC frequency caused an overload with his First Officer. Several ATC radio calls were missed. The controller growled a little, they lost their landing sequence, and the pilot's pride was hurt. But a valuable lesson was also learned.

- "...My thinking, however irresponsible it was, was that I should call maintenance with this item to save us time on the ground...I realize that the incident and this report is the result of very poor cockpit management on my part...It was most unwise and unfair of me to put the work load I did on that Controller and the First Officer...I hope I have learned the importance of giving my undivided attention to Approach Control, as opposed to reporting maintenance items [while flying below 10,000 feet]." (ACN 92145)

## Sight-seeing

Nowhere does Webster's define "sight-seeing" as an activity that is essential to the safe operation of aircraft. When sight-seeing is conducted by flight crew members below 10,000 feet, not only is it potentially dangerous, but it is illegal, as well. Two reports demonstrated that a cockpit full of sight-seeing crew members is an ASRS report looking for a place to happen -- possibly even an accident.

- "Assigned the PORTE SID from SFO. I missed the 4 DME turn point due to preoccupation with a [special purpose aircraft] below and to our right, landing at NAS Alameda. The Captain (flying) missed it too...Bay Departure queried us and advised us to maintain visual separation from [another aircraft] off OAK, paralleling us below and about 2 miles to the right. Preoccupation with the visual environment caused us to neglect the IFR procedure." (ACN 189397)

In another incident report:

- "...Descending through 5000 feet to my assigned altitude of 4000 feet. The Captain discontinued his running commentary of the sights...to state that we were only cleared to 6000 feet." (ACN 83932)

## Recommendations and Considerations

The sterile cockpit rule was designed to help minimize many of the problems that we just annotated. Judging from these reports, a safer operation can be achieved by simply abiding by the rule's guidelines.

### In the Beginning

A good time to establish the desire to maintain a sterile cockpit environment is before beginning a trip. In briefing cockpit and cabin crew members the captain can politely say, "I think the sterile cockpit rule is really important, so we'll adhere to it. Okay?"

### Setting the Standards

During the preflight briefing the captain should also inform the flight attendants how they can determine if the flight is above or below 10,000 feet. Many companies have already established procedures for this, such as a "10,000 foot PA announcement," or a call to the flight attendants on the interphone. However, these procedures require one crew member to be "out of the loop." And as evidenced by literally thousands of ASRS reports, the potential for problems (such as misunderstood clearances and altitude deviations) increases when a crew member is out of the loop. Some airlines have installed a cockpit-controlled "sterile cockpit light" that can be illuminated when descending below 10,000 feet and extinguished when climbing above 10,000 feet. For those who develop company procedures, consideration should be given to developing something that doesn't create its own set of distractions. With the increased use of two-crew member cockpits this consideration is increasingly important.

### Unexpected Entry

Unexpected calls or cockpit entry by flight attendants during the sterile cockpit period can be distracting and potentially dangerous. It is recommended that the Captain, during the pre-departure crew briefing, emphasize the importance of the sterile cockpit rule and request that flight attendant calls or entry during this time be undertaken only for reasons of great urgency. As one reporter resolves:

- "The next time a flight attendant enters a sterile cockpit, I will immediately ask if there is an emergency." (ACN 109249)

### High Altitude Airports

Another reporter offered a good suggestion involving high elevation airports, where 10,000 feet MSL for the sterile cockpit boundary may be too low.

- "The First Officer and myself were involved in a conversation with the company pilot riding jump seat. Although I subscribe to the sterile cockpit rule below 10,000 feet, I failed to realize

that, due to Denver's high field elevation, 17,000 feet MSL would have [been] a more appropriate time to discontinue our conversation and be sure that our affairs were in order...Unfortunately, because of our conversation, I failed to slow to 250 knots until passing Kiowa...The main reason I am filing this report is that I was habitually using 10,000 feet MSL for focusing my attention on the terminal/approach procedure and maintaining a sterile cockpit. A better method would certainly be 10,000 feet AGL or 40 to 50 miles from destination." (ACN 65327)

## Low Altitude Flight

This reporter, a commuter pilot who often has cruise altitudes below 10,000 feet MSL, offers a similar worthwhile suggestion following an altitude deviation.

"I believe this situation occurred because our cruise altitude was 8000 feet, and we were accustomed to conversation and other activities along the route and were not observing the 'sterile cockpit' environment. Would suggest that, in these flight circumstances where cruise altitude is less than 10,000 feet, crews make a specific DME mileage their beginning for 'total concentration-sterile cockpit' procedures." (ACN 173707)

No person about to undergo major surgery would think too kindly of the surgical team who failed to sterilize themselves and their operating instruments before the operation. After a series of air carrier accidents and serious incidents, the traveling public feels the same way about their crew members. **Keep the sterile cockpit "clean."** Your fellow crew members and passengers are hoping that you will.

## Cockpit Chatter Leads to Crash

From Flight Safety Foundation's August 1992 Flight Safety Digest  
(Accident/Incident Briefs)

### DHC Dash 7. Aircraft Destroyed. Thirty-six fatalities.

The four-engine Dash 7 was on an instrument approach to Runway 04 when it crashed into high terrain about five nautical miles from the airport. At the time of the crash, the aircraft was slightly off course and flying at an altitude of 560 feet MSL (mean sea level). The published minimum altitude at the area of impact was 1,200 feet MSL.

A subsequent investigation indicated that the pilot was having a conversation with a passenger who was sitting on the jump seat. The report said the crew was likely distracted by the conversation. The report cited the pilot and co-pilot for poor airmanship in not monitoring altitude and course information.

## Sterile Cockpit Rules

### FAR 121.542 / FAR 135.100--Flight Crew Member Duties

(a) No certificate holder shall require, nor may any flight crew member 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 non-safety 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 crew member may engage in, nor may any pilot in command permit, any activity during a critical phase of flight which could distract any flight crew member 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 non-essential conversations within the cockpit and non-essential 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 phase of flight involves 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."

[...back to the top of the article](#)

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