FLIGHT SAFETY FOUNDATION

ALAR

APPROACH-AND-LANDING ACCIDENT REDUCTION

TOOL KIT

FSF ALAR BRIEFING NOTE 2.4

Interruptions/Distractions

Interruptions and distractions often result in omitting an action and/or deviating from standard operating procedures (SOPs).

Interruptions (e.g., because of an air traffic control [ATC] communication) and distractions (e.g., because of a cabin crewmember entering the flight deck) occur frequently; some cannot be avoided, some can be minimized or eliminated.

Statistical Data

The Flight Safety Foundation Approach-and-landing Accident Reduction (ALAR) Task Force found that omission of action or inappropriate action (i.e., *inadvertent* deviation from SOPs) was a causal factor[1] in 72 percent of 76 approach-and-landing accidents and serious incidents worldwide in 1984 through 1997.[2]

Types of Interruptions/Distractions

Interruptions/distractions on the flight deck may be subtle or brief, but they can be disruptive to the flight crew.

Interruptions/distractions can be classified in three categories:

- Communication (e.g., receiving the final weights while taxiing or a flight attendant entering the flight deck);
- Head-down work (e.g., reading the approach chart or programming the flight management system [FMS]); and,
- Responding to an abnormal condition or to an unexpected situation (e.g., system malfunction or traffic-alert and collision avoidance system [TCAS] traffic advisory [TA] or resolution advisory [RA]).

Distractions — even a minor equipment malfunction — can turn a routine flight into a challenging event.

Effect of Interruptions/Distractions

The primary effect of interruptions/distractions is to *break the flow pattern of ongoing flight deck activities* (actions or communications), such as:

- SOPs;
- Normal checklists;
- Communications (listening, processing, responding);
- Monitoring tasks (systems monitoring, pilot flying-pilot not flying/pilot monitoring [PF-PNF/PM] cross-checking); and,
- Problem-solving activities.

An interruption/distraction can cause the flight crew to feel rushed and to be confronted with competing tasks.

When confronted with competing tasks, the crew must select one task to perform before another task, which can result in poor results in one or more of the completed tasks. Thus, the interruption/distraction can result in the crew:

- Not monitoring the flight path (possibly resulting in an altitude deviation, a course deviation or controlled flight into terrain [CFIT]);
- Not hearing or misinterpreting an ATC instruction (possibly resulting in a traffic conflict or runway incursion);
- Omitting an action and failing to detect and correct the resulting abnormal condition or configuration (if interrupted during a normal checklist); and,
- Leaving uncertainties unresolved (e.g., an ATC instruction or an abnormal condition).

Reducing Interruptions/Distractions

Acknowledging that a flight crew may have control over some interruptions/distractions and not over others is the first step in developing personal lines of defense for the crew.

Actions that are under control (e.g., SOPs, initiation of normal checklists) should be scheduled for usual periods of minimum disruption, to help prevent interference with actions that are not under control (e.g., ATC or cabin crew).

Complying with the U.S. Federal Aviation Administration's "sterile cockpit rule"[3] also can reduce interruptions/distractions.

Complying with the sterile cockpit rule during taxi-out and taxi-in requires discipline because the taxi phases often provide relief between phases of high workload and concentration.

The sterile cockpit rule has been adopted by many non-U.S. operators and is included (although in less explicit terms) in Joint Aviation Requirements–Operations 1.085 (which, as of August 2009, was being incorporated into the European Union general operating and flight rules).

The sterile cockpit rule should be implemented with good common sense so that communication remains open among all aircraft crewmembers.

Nevertheless, the application of efficient crew resource management (CRM) by the flight crew or the communication of emergency or safety-related information by cabin crew should not be prevented by a rigid interpretation of this rule.

The U.S. Federal Aviation Administration agrees that *it is better to break the sterile cockpit rule than to fail to communicate*.

Adherence to the sterile cockpit rule by cabin crew creates two challenges:

- How to identify when the rule applies; and,
- How to identify occurrences that warrant breaking the sterile cockpit rule.

Several methods of signaling to the cabin crew that a sterile cockpit is being maintained have been evaluated (e.g., using the all-cabin-crew call or a public-address announcement).

Whatever method is used, it should not create its own distraction to the flight crew.

The following are suggested examples of occurrences that warrant breaking the sterile cockpit rule:

- Fire, burning odor or smoke in the cabin;
- Medical emergency;
- Unusual noise or vibration (e.g., evidence of tail strike);
- Engine fire (torching flame);
- Fuel or fluid leakage;
- Emergency-exit or door-unsafe condition (although this condition is annunciated to the flight crew);
- Localized extreme cabin temperature changes;
- Evidence of a deicing problem;
- Cart-stowage problem;
- Suspicious, unclaimed bag or package; and,
- Any other condition deemed relevant by the senior cabin crewmember (purser).

These examples should be adjusted for local regulations or to suit company policy.

Cabin crewmembers may hesitate (depending on national culture and company policy) to report technical occurrences to the flight crew. To overcome this reluctance, implementation and interpretation of the sterile cockpit rule should be explained during cabin crew CRM training and cited by the captain during the crew preflight briefing.

Analysis of aviation safety reports indicates that the most frequent violations of the sterile cockpit rule are caused by the following:

- Non-flight-related conversations;
- Distractions by cabin crew;
- Non-flight-related radio calls; and/or,
- Nonessential public-address announcements.

Building Lines of Defense

A high level of interaction and communication between flight crewmembers, and between cabin crewmembers and flight crewmembers, constitutes the first line of defense to reduce errors.

Company policies, SOPs, CRM and leadership by the pilot-in-command contribute to effective communication among all aircraft crewmembers, thus enhancing their performance.

The following personal lines of defense can be developed to minimize flight deck interruptions/distractions:

- Communication:
  - Keep flight deck communication clear and concise; and,
  - Interrupt conversations when necessary to correct a flight parameter or to comply with an altitude restriction;
- Head-down work (FMS programming or chart review):
  - Define task sharing for FMS programming or reprogramming depending on the level of automation being used and on the flight phase (SOPs);
  - Plan long periods of head-down tasks for periods of lower workload; and,
  - Announce that you are going "head-down."
- Responding to an abnormal condition or to an unanticipated situation:
  - Keep the autopilot engaged to decrease workload, unless otherwise required;
  - Ensure that one pilot is primarily responsible for flying/monitoring the aircraft;
  - Adhere to PF-PNF/PM task sharing under abnormal conditions (with particular emphasis for the PNF to maintain situational awareness and back up the PF); and,

- Give particular attention to normal checklists, because handling an abnormal condition may disrupt the normal flow of SOP actions (SOP actions or normal checklists are initiated based on events — usually referred to as *triggers*; such events may go unnoticed, and the absence of the trigger may be interpreted incorrectly as action complete or checklist complete).

Managing Interruptions/Distractions

Because some interruptions/distractions may be subtle and insidious, the first priority is to recognize and to identify them.

The second priority is to re-establish situational awareness, as follows:

- Identify:
  - What was I doing?
- Ask:
  - Where was I interrupted or distracted?
- Decide/act:
  - What decision or action shall I take to get "back on track"?

In the ensuing decision-making process, the following strategy should be applied:

- Prioritize:
  - Aviate (fly);
  - Navigate;
  - Communicate; and,
  - Manage.
- Plan:

  Some actions may have to be postponed until time and conditions permit. Requesting a delay (e.g., from ATC or from the other crewmember) will prevent being rushed in the accomplishment of competing actions (*take time to make time*); and,
- Verify:

  Various SOP techniques (e.g., event triggers and normal checklists) ensure that the action(s) that had been postponed have been accomplished.

Finally, if the interruption or distraction disrupts a normal checklist or abnormal checklist, an explicit hold should be announced to mark the disruption of the checklist and an explicit command should be used to resume the checklist at the last item checked before the disruption of the checklist.

Summary

Interruptions/distractions usually result from the following factors:

- Flight crew-ATC, flight deck or flight crew-cabin crew communication;
- Head-down work; and,
- Response to an abnormal condition or unexpected situation.

Company accident-prevention strategies and personal lines of defense should be developed to minimize interruptions/distractions.

The most effective company accident-prevention strategies and personal lines of defense are adherence to the following:

- SOPs;
- Golden rules;
- Sterile cockpit rule (as applicable); and,
- Recovery tips, such as:
  - Identify – ask – decide – act; and,
  - Prioritize – plan – verify.

The following FSF ALAR Briefing Notes provide information to supplement this discussion:

- 1.3 — Golden Rules;
- 1.4 — Standard Calls;
- 1.5 — Normal Checklists;
- 2.1 — Human Factors;
- 2.2 — Crew Resource Management; and,
- 2.3 — Pilot-Controller Communication.

Notes

1. The Flight Safety Foundation Approach-and-landing Accident Reduction (ALAR) Task Force defines *causal factor* as "an event or item judged to be directly instrumental in the causal chain of events leading to the accident [or incident]." Each accident and incident in the study sample involved several causal factors.
2. Flight Safety Foundation. "Killers in Aviation: FSF Task Force Presents Facts About Approach-and-landing and Controlled-flight-into-terrain Accidents." *Flight Safety Digest* Volume 17 (November–December 1998) and Volume 18 (January–February 1999): 1–121. The facts presented by the FSF ALAR Task Force were based on analyses of 287 fatal approach-and-landing accidents (ALAs) that occurred in 1980 through 1996 involving turbine aircraft weighing more than 12,500 pounds/5,700 kilograms, detailed studies of 76 ALAs and serious incidents in 1984 through 1997 and audits of about 3,300 flights.
3. The *sterile cockpit rule* refers to U.S. Federal Aviation Regulations Part 121.542, which states: "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. For the purposes of this section, critical phases of flight include all ground operations involving taxi, takeoff and landing, and all other flight operations below 10,000 feet, except cruise flight." [The FSF ALAR Task Force says that "10,000 feet" should be height above ground level during flight operations over high terrain.]

Related Reading From FSF Publications

Loukopoulos, Loukia D.; Dismukes, R. Key; Barshi, Immanuel. "The Perils of Multitasking." *AeroSafety World* Volume 4 (August 2009).

Rash, Clarence E.; Manning, Sharon D. "Stressed Out." *AeroSafety World* Volume 4 (August 2009).

Rash, Clarence E.; Manning, Sharon D. "Thinking Things Through." *AeroSafety World* Volume 4 (July 2009).

Dean, Alan; Pruchnicki, Shawn. "Deadly Omissions." *AeroSafety World* Volume 3 (December 2008).

Lacagnina, Mark. "Glideslope Unusable." *AeroSafety World* Volume 3 (November 2008).

Lacagnina, Mark. "Bad Call." *AeroSafety World* Volume 3 (July 2008).

Baron, Robert. "Cockpit Discipline." *AeroSafety World* Volume 2 (December 2007).

Lacagnina, Mark. "Mistaken Identity." *AeroSafety World* Volume 2 (November 2007).

Gurney, Dan. "Last Line of Defense." *AeroSafety World* Volume 2 (January 2007).

Berman, Benjamin A.; Dismukes, R. Key. "Pressing the Approach." *AviationSafety World* Volume 1 (December 2006).

Gurney, Dan. "Change of Plan." *AviationSafety World* Volume 1 (December 2006).

Gurney, Dan. "Delayed Pull-Up." *AviationSafety World* Volume 1 (September 2006).

Flight Safety Foundation (FSF) Editorial Staff. "Pilot's Inadequate Altitude Monitoring During Instrument Approach Led to CFIT." *Accident Prevention* Volume 62 (April 2005).

FSF Editorial Staff. "Reduced Visibility, Mountainous Terrain Cited in Gulfstream III CFIT at Aspen." *Accident Prevention* Volume 59 (November 2002).

FSF Editorial Staff. "B-757 Damaged by Ground Strike During Late Go-around from Visual Approach." *Accident Prevention* Volume 56 (May 1999).

Rosenthal, Loren J.; Chamberlin, Roy W.; Matchette, Robert D. "Flight Deck Confusion Cited in Many Aviation Incident Reports." *Human Factors & Aviation Medicine* Volume 41 (July–August 1994).

Sumwalt, Robert L. III. "Accident and Incident Reports Show Importance of 'Sterile Cockpit' Compliance." *Flight Safety Digest* Volume 13 (July 1994).

Notice

The Flight Safety Foundation (FSF) Approach-and-Landing Accident Reduction (ALAR) Task Force produced this briefing note to help prevent approach-and-landing accidents, including those involving controlled flight into terrain. The briefing note is based on the task force's data-driven conclusions and recommendations, as well as data from the U.S. Commercial Aviation Safety Team's Joint Safety Analysis Team and the European Joint Aviation Authorities Safety Strategy Initiative.

This briefing note is one of 33 briefing notes that comprise a fundamental part of the FSF *ALAR Tool Kit*, which includes a variety of other safety products that also have been developed to help prevent approach-and-landing accidents.

The briefing notes have been prepared primarily for operators and pilots of turbine-powered airplanes with underwing-mounted engines, but they can be adapted for those who operate airplanes with fuselage-mounted turbine engines, turboprop power plants or piston engines. The briefing notes also address operations with the following: electronic flight instrument systems; integrated autopilots, flight directors and autothrottle systems; flight management systems; automatic ground spoilers; autobrakes; thrust reversers; manufacturers'/operators' standard operating procedures; and, two-person flight crews.

This information is not intended to supersede operators' or manufacturers' policies, practices or requirements, and is not intended to supersede government regulations.

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