FLIGHT SAFETY FOUNDATION

ALAR

APPROACH-AND-LANDING ACCIDENT REDUCTION

TOOL KIT

FSF ALAR BRIEFING NOTE 1.5

Normal Checklists

Adherence to standard operating procedures (SOPs) and use of normal checklists are essential in preventing approach-and-landing accidents (ALAs), including those involving controlled flight into terrain (CFIT).

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]

Scope and Use of Normal Checklists

SOPs are performed by recall using a defined flow pattern for each flight deck panel; *safety-critical points* (primarily related to the aircraft configuration) should be cross-checked with *normal checklists*.

Normal checklists enhance flight safety by providing an opportunity to confirm the aircraft configuration or to correct the aircraft configuration.

Normal checklists usually are *not* read-and-do lists and should be conducted after performing the flow of SOPs.

Completion of normal checklists is essential for safe operation, particularly during approach and landing.

Initiating Normal Checklists

Normal checklists should be initiated (called) by the pilot flying (PF) and read by the pilot not flying/pilot monitoring (PNF/PM).

This should not prevent the PNF/PM from applying an important crew resource management (CRM) principle by suggesting the initiation of a normal checklist if the PF fails to do so.

Normal checklists should be conducted during low-workload periods — conditions permitting — to help prevent any rush that could defeat the safety purpose of the normal checklists.

Time management and availability of other crewmember(s) are key factors in the initiation of normal checklists and the effective use of normal checklists.

Conducting Normal Checklists

Normal checklists are conducted usually by challenge and response (exceptions, such as the "After Landing" checklist, are conducted as defined by SOPs).

Most checklist items require responses by the PF; some items may be challenged and responded to by the PNF/PM.

To enhance crew communication, the following procedures and phraseology should be used:

- The responding pilot should respond to the challenge only after having checked or achieved the required configuration;
- If achieving the required configuration is not possible, the responding pilot should call the actual configuration;
- The challenging pilot should wait for a positive response (and should cross-check the validity of the response) before proceeding to the next item; and,
- The PNF/PM should call the completion of the checklist (e.g., "checklist complete").

Some aircraft have electronic normal checklists or mechanical normal checklists that allow positive identification of:

- Items completed;
- Items being completed; and,
- Items to be completed.

Interrupting and Resuming Normal Checklists

If the flow of the normal checklist is interrupted for any reason, the PF should call "hold (stop) checklist at [item]."

"Resume (continue) checklist at [item]" should be called before resuming the normal checklist after an interruption. When the checklist resumes, the last completed item should be repeated.

Information introducing the SOPs in the aircraft operating manual (AOM), the normal checklists or the quick reference handbook (QRH) should be referred to for aircraft-model-specific information.

Training

Adherence to SOPs and disciplined use of normal checklists should begin during transition training, because *habits and routines acquired during transition training have a lasting effect*.

Transition training and recurrent training provide a unique opportunity to discuss the reasons for SOPs, and to discuss the consequences of failing to adhere to them.

Conversely, allowing deviations from SOPs and/or normal checklists during initial training or recurrent training may encourage deviations during line operations.

Line checks and line audits should reinforce adherence to SOPs and use of normal checklists.

Factors That May Affect Normal Checklists

To ensure effective use of normal checklists, it is important to understand why pilots inadvertently may omit some checklist items or omit completely a normal checklist.

Such omissions often are the result of operational circumstances that disrupt the normal flow of flight-deck duties.

The following factors often are cited in discussing the partial omission or complete omission of a normal checklist:

- Out-of-phase timing, whenever a factor (such as a tail wind or a system malfunction) modifies the time scale of the approach or the occurrence of the trigger event for the initiation of the normal checklist;
- Interruptions (e.g., because of pilot-controller communication);
- Distractions (e.g., because of flight deck activities);
- Task saturation;
- Incorrect management of priorities (e.g., lack of a decision-making model for time-critical situations);
- Reduced attention (tunnel vision) in abnormal conditions or high-workload conditions;
- Inadequate CRM (e.g., inadequate coordination, cross-check and backup);
- Overreliance on memory (overconfidence);
- Less-than-optimum checklist content, task sharing and/or format; and,
- Possible inadequate emphasis on use of normal checklists during transition training and recurrent training.

Summary

Timely initiation and completion of normal checklists is the most effective method of preventing omission of actions or preventing inappropriate actions.

Calls should be defined in the SOPs for the interruption (hold) and resumption (continuation) of a normal checklist (in case of interruption or distraction).

Disciplined use of normal checklists should be:

- Emphasized at all stages of initial training, transition training and line training; and,
- Enforced during all checks and audits performed during line operations.

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

- 1.1 — Operating Philosophy;
- 1.3 — Golden Rules;
- 1.4 — Standard Calls; and,
- 2.4 — Interruptions/Distractions.

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.

Related Reading From FSF Publications

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

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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).

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

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

Flight Safety Foundation (FSF) Editorial Staff. "B-737 Crew's Unstabilized Approach Results in Overrun of a Wet Runway." *Accident Prevention* Volume 60 (July 2003).

FSF Editorial Staff. "Sabreliner Strikes Mountain Ridge During Night Visual Approach." *Accident Prevention* Volume 60 (April 2003).

FSF Editorial Staff. "Ice Ingestion Causes Both Engines to Flame Out During Air-taxi Turboprop's Final Approach." *Accident Prevention* Volume 56 (February 1999).

FSF Editorial Staff. "Flight Crew's Failure to Perform Landing Checklist Results in DC-9 Wheels-up Landing." *Accident Prevention* Volume 54 (May 1997).

Adamski, Anthony J.; Stahl, Albert F. "Principles of Design and Display for Aviation Technical Messages." *Flight Safety Digest* Volume 16 (January 1997).

Gross, Richard L.; FSF Editorial Staff. "Studies Suggest Methods for Optimizing Checklist Design and Crew Performance." *Flight Safety Digest* Volume 14 (May 1995).

Pope, John A. "Checklists — Guideposts Often Ignored." *Accident Prevention* Volume 48 (May 1991).

Wilson, Donald. "A Tool for Communication." *Accident Prevention* Volume 46 (July 1989).

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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