NBAA SAFETY RESOURCE

Procedural Non-Compliance: Learning the Markers and Mitigating the Risks

Much has been written about the effects of procedural non-compliance (PNC) in aircraft accidents. Unprofessional behavior by flight crewmembers, including non-adherence to sterile cockpit procedures by engaging in non-pertinent conversation, has been shown to distract crews from their primary flight-related duties. Intentional crew non-compliance was a factor in 40 percent of the worldwide accidents reviewed by human factors experts.[1] If the crews had maintained standard operating procedures (SOPs) at all times, such accidents would not have occurred.

During an NTSB survey of accidents from 1978 to 1990 where procedural non-compliance was determined to be a factor, errors such as not making required callouts or failing to use appropriate checklists were found to be a causal factor in 29 of 37 accidents (78 percent). During a 10-year study in the late 1990s, Boeing found that in more than 138 accidents totaling over 5,600 fatalities, failures of the pilot flying and pilot monitoring to adhere to standard operating procedure were the primary cause of 80 percent of those accidents, as well.[2]

Line operational safety audit (LOSA) data compared crews that followed SOPs to those that intentionally deviated from SOPs. This data revealed that crewmembers:

• Made three times more errors, on average.

• Mismanaged more errors.

• Found themselves in more undesired aircraft situations.

PROCEDURAL NON-COMPLIANCE MARKERS

It is essential to train flight crews to recognize the red flags that mark the conditions leading to PNC. The following are just a few of the hazardous situations in which PNC becomes accepted by the flight crew:

• **Permission to Deviate** – This occurs when a senior crewmember cuts a corner, recognizes the deviation and approves of it by making a mitigating statement. This sets the tone for follow-on occurrences by one or more crewmembers to do the same. This is called selective compliance.

• **Flight Without Passengers** – A flight crew may adopt an attitude of "anything goes" on ferry or repositioning flights conducted without passengers. Intersection takeoffs, abbreviated checklists, non-standard aircraft opera-

---

1   R. Khatwa and R. Helmreich, *Flight Safety Digest*, 1999.
2   National Transportation Safety Board, 2004.

SAFETY & AIRCRAFT OPERATIONS   LEGISLATIVE & REGULATORY ADVOCACY   NETWORKING & COMMERCE   EDUCATION & CAREER DEVELOPMENT   BUSINESS MANAGEMENT RESOURCES

National Business Aviation Association   1200 G Street NW, Suite 1100   Washington, DC 20006   (202) 783-9000   www.nbaa.org

tion, etc. may be confidentially allowed by complacent flight crews. This item has been recognized by the FAA in a safety alert for operators (SAFO 07006) that discusses repositioning flights and procedural non-compliance.[3]

- **Environmental Pop-up Flights** – Short release times or flights caused by ATC traffic and/or weather can cause the flight crew to cut corners to stay within the normal crew rest and/or duty time and to remain within FAA/company policies.

- **Dispatched Pop-up Flights** – These flights, which are too tight for due process, can cause the flight crew to nearly or actually exceed their crew rest or duty time, scheduling requirements or operational policies. These pressures, which are caused by the operator's dispatching, can cause the flight crew to cut corners to stay within the normal crew rest and/or duty time and to remain within FAA and/or company policies. Additionally, the crew may take on an attitude of reciprocal disregard toward authority and procedures when asked to operate outside of stated parameters.

- **Crew Physiology and Fatigue** – When fatigued or impared by physiological stress, PNC can develop rapidly. Poor crew communication, getting lost in checklists and failure to conduct thorough flight briefings are common indicators of fatigue.
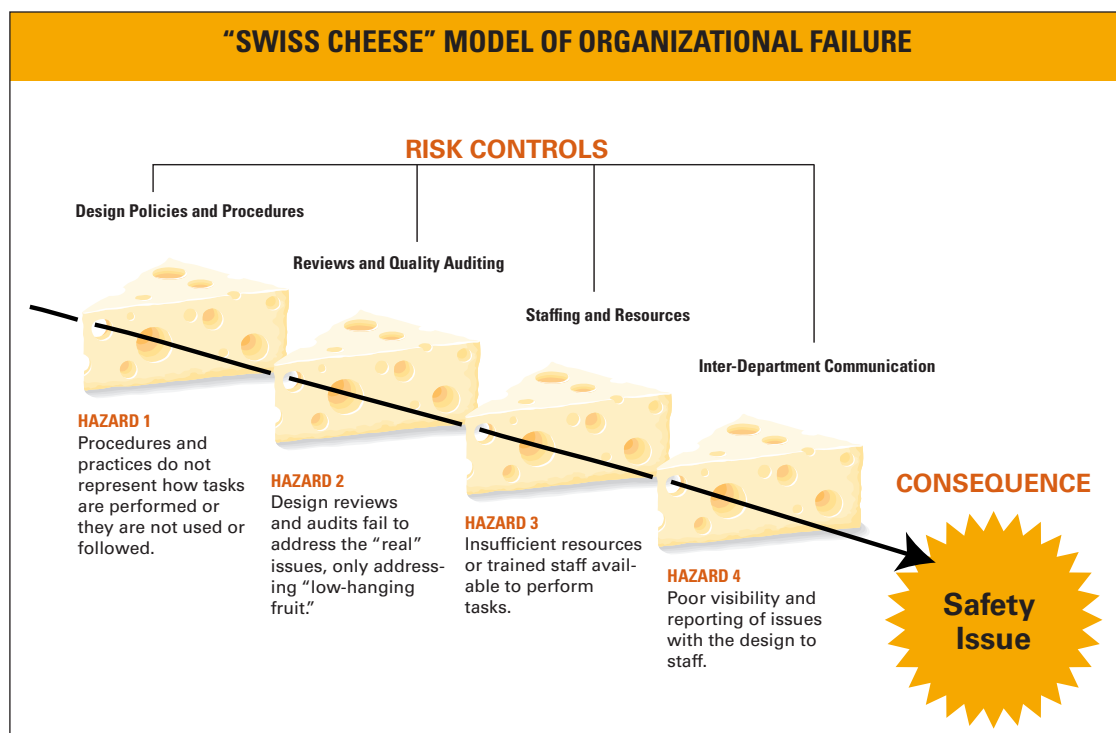
REDUCING PROCEDURAL NON-COMPLIANCE

Two distinct actions can be taken to reduce procedural non-compliance:

1. Organizational Commitment to Support, Develop, Maintain and Review SOPs

Inconsistent and illogical procedures can lead to procedural non-compliance. Reason's Swiss cheese model of organizational failure[4] highlights the "layers" of protections the organization can implement. Importantly, the entire process must have *continuous feedback and improvement* to ensure procedures and policies are effective.

"Safety assurance" uses metrics and audits to monitor the performance of risk controls.

As shown at right, risk equals severity times probability of the consequence.

"SWISS CHEESE" MODEL OF ORGANIZATIONAL FAILURE

RISK CONTROLS

Design Policies and Procedures

Reviews and Quality Auditing

Staffing and Resources

Inter-Department Communication

HAZARD 1
Procedures and practices do not represent how tasks are performed or they are not used or followed.

HAZARD 2
Design reviews and audits fail to address the "real" issues, only addressing "low-hanging fruit."

HAZARD 3
Insufficient resources or trained staff available to perform tasks.

HAZARD 4
Poor visibility and reporting of issues with the design to staff.

CONSEQUENCE

Safety Issue

---

3   FAA SAFO 07006, "Safety During Positioning Flights," July 3, 2007.
4   James Reason, "Human Error: Models and Management," *British Medical Journal*, 2000.

Departments should solicit feedback from their pilots as to what works and what doesn't work and why. Checklist modification can be very easy, and FAA certificate management offices/aircraft evaluation groups (CMO/AEG) are more than willing to modify checklists based on meeting and exceeding an equivalent level of safety (ELOS).

2.   Flight Crew Recognition of Procedural Deviations and Mitigation Strategies

Learning to recognize what these PNC markers are can lead to immediate and direct corrective action by the crew. Just as a stable approach critera can trigger a go-around, or a checklist procedural item can prevent a gear-up landing, learning and responding to the PNC markers can trigger intense diligence on the part of the crew to embrace procedural compliance.

When encountering one of these markers, the crew should immediately address this proximity to PNC by stating: "The situation we are in now has triggered a PNC alert for me. What do you think?" For example, at a major global airline, they use "CUS" words that are immediate triggers to stop an unsafe action.

- C – I'm **concerned** about this.

- U – I'm **uncomfortable** about this.

- S – I think this is un-**safe**.

In the business aviation context, flight crew actions should include the following:

- Slow down. It has often been said in aviation that the fastest thing that occurs in the cockpit is putting an oxygen mask on, the rest of the issues can all be priorities. Numerous line check airmen at a global Part 121 airline have stated that once an EICAS/ECAM message occurs, they press the stopwatch, and wait five to seven seconds in order to evaluate the situation accordingly.

- Review the situation in question.

- Reassess the situation by using proper threat and error management (TEM) and aeronautical decision making (ADM). If threats are addressed, they can be prepared for and safe operations can resume. If errors are detected, they are immediately repaired, and safe operations can resume.

- Come to an action consensus as a crew.

- Implement the solution and change the variables to enhance ADM and crew coordination in the future. Review what procedures do and don't work. Perhaps a verbiage change is required.

In summary, flight crews that learn the markers for PNC can immediately put a solution into effect.

Learn More

This white paper was created by the Professionalism Working Group of the NBAA Safety Committee in October 2015. Review the Top Safety Focus Areas identified by the committee at www.nbaa.org/safety-focus. Learn more about the NBAA Safety Committee at www.nbaa.org/committees.

About NBAA

Founded in 1947 and based in Washington, DC, the National Business Aviation Association (NBAA) is the leading organization for companies that rely on general aviation aircraft to help make their businesses more efficient, productive and successful. Contact NBAA at (800) FYI-NBAA or info@nbaa.org. Not a Member? Join today by visiting www.nbaa.org/join.