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Department of the Interior Aviation
Lessons Learned

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Subject: Supervisory Factors in Aviation Mishaps

Area of Concern: Aviation Managers / Supervisors

Distribution: All Aviation Users

Discussion: During the period 2000-2009, DOI has sustained 32 accidents and IWPs that list Unsafe Supervision as being a contributing factor in these mishaps.

In DOI Lessons Learned 09-02, Human Factors in Aviation Mishaps, dated January 7, 2009, we looked at the "Swiss cheese" model of defenses, as proposed by Dr. James Reason. Dr. Reason attributes some holes in our control measures to *active failures* and others to *latent conditions*. *Active failures* are the actions or inactions of operators that are believed to cause mishaps. Traditionally referred to as "error", they are the last "acts" committed by individuals, often with immediate and tragic consequences. For example, an aviator forgetting to lower the landing gear before touch down.

In contrast, *latent failures* or *conditions* are errors that exist within the organization or elsewhere in the *supervisory chain of command* that affect the tragic sequence of events characteristic of a mishap. For example, tasking aircrews at the expense of crew rest can lead to fatigue and ultimately errors (active failures) in the cockpit. Viewed from this perspective, the actions of individuals are the end result of a chain of factors originating in other parts (often the upper echelons) of an organization.

The purpose of this Lessons Learned is to show aviation managers that they can also be a link in a mishap chain of events and to provide ideas/suggestions to assist them in breaking that link and preventing a mishap.

The following discussion on unsafe supervision is from the DoD Human Factors Analysis and Classification System:

> **Supervision**
> A mishap event can often be traced back to the supervisory chain of command. As such, there are four major categories of Unsafe Supervision: *Inadequate Supervision, Planned Inappropriate Operations, Failed to Correct a Known Problem*, and *Supervisory Violations* (see Figure 1 on page 2).

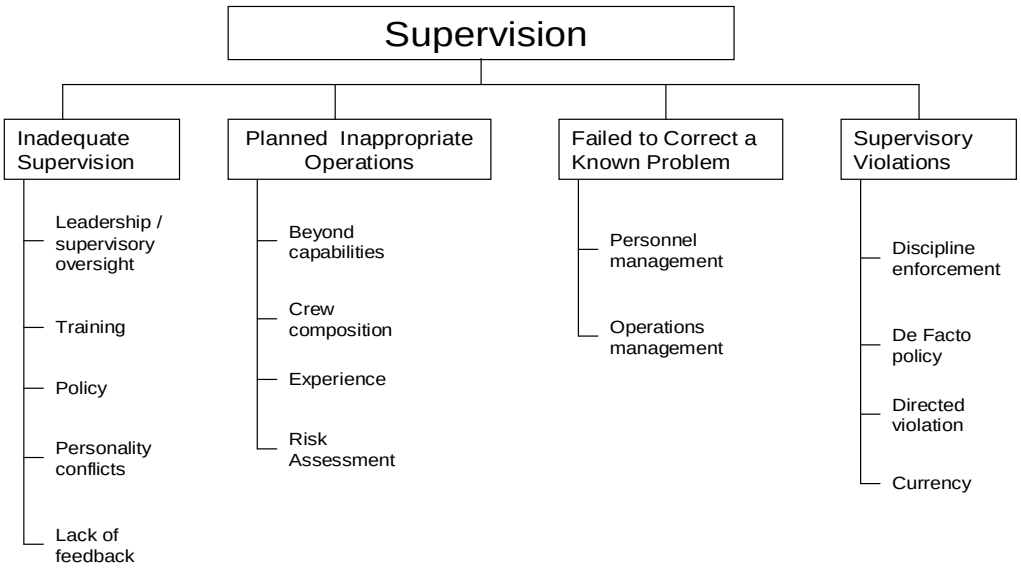


Figure 1 Categories of Unsafe Supervision

Inadequate Supervision: The role of supervisors is to provide their personnel with the opportunity to succeed. To do this, supervisors must provide guidance, training opportunities, leadership, motivation, and the proper role model, regardless of their supervisory level. Unfortunately, this is not always the case. It's easy to imagine a situation where adequate Crew Resource Management (CRM) training was not provided to an operator or team member. Conceivably, the operator's coordination skills could be compromised, and if put into a non-routine situation (e.g., emergency), would be at risk for errors that might lead to a mishap. Inadequate Supervision is a factor in a mishap when supervision proves inappropriate or improper and fails to identify a hazard, recognize and control risk, provide guidance, training and/or oversight and results in human error or an unsafe situation.

Planned Inappropriate Operations: Occasionally, the operational tempo is such that individuals are put at unacceptable risk, crew rest is jeopardized, and ultimately, performance is adversely affected. Such Planned Inappropriate Operations, though arguably unavoidable during emergency situations, are not acceptable during normal operations. Included in this category are issues of crew pairing and improper manning. For example, it's not surprising to anyone that problems can arise when two individuals with marginal skills are paired together. During a period of downsizing and/or increased levels of operational commitment, it is often more difficult to manage crews. However, pairing weak or inexperienced operators together on the most difficult missions may not be prudent. Planned Inappropriate Operations is a factor in a mishap when supervision fails to adequately assess the

hazards associated with an operation and allows for unnecessary risk. It's also a factor when supervision allows non-proficient or inexperienced personnel to attempt missions beyond their capability or when crew or flight makeup is inappropriate for the task or mission.

Failed to Correct a Known Problem: Failed to Correct a Known Problem refers to those instances when deficiencies among individuals, equipment, training or other related safety areas are "known" to the supervisor, yet are allowed to continue uncorrected. For example, the failure to consistently correct or discipline inappropriate behavior certainly fosters an unsafe atmosphere and poor working environment. Failed to Correct a Known Problem is a factor in a mishap when supervision fails to correct known deficiencies in documents, processes or procedures, or fails to correct inappropriate or unsafe actions of individuals, and this lack of supervisory action creates an unsafe situation.

Supervisory Violations: Supervisory Violations, on the other hand, are reserved for those instances when supervisors willfully disregard existing rules and regulations. For instance, permitting an individual to operate an aircraft without current qualifications is a flagrant violation that invariably sets the stage for the tragic sequence of events that predictably follow. Supervisory Violations is a factor in a mishap when supervision, while managing organizational assets, willfully disregards instructions, guidance, rules, or operating instructions and this lack of supervisory responsibility creates an unsafe situation.

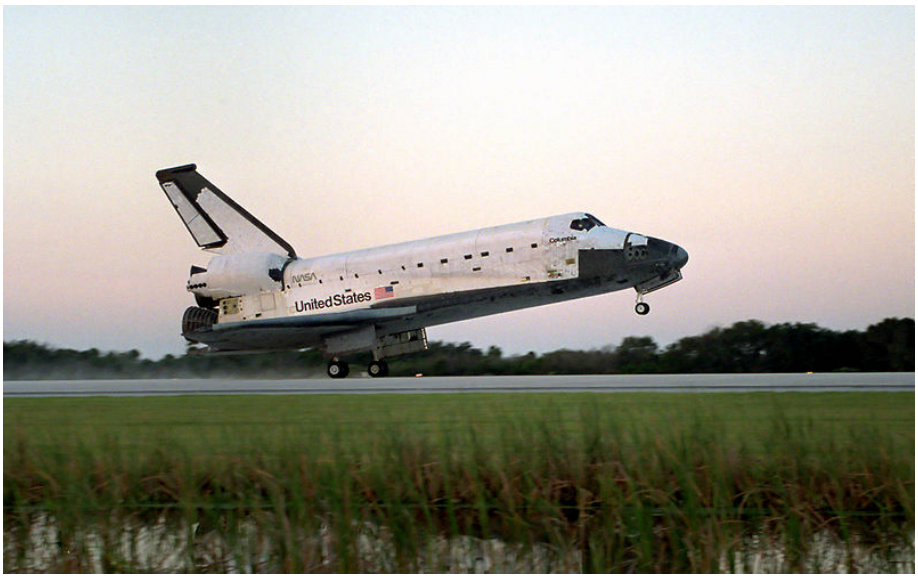
Case Study: Space Shuttle Challenger.

The Space Shuttle *Challenger* (51-L) disaster occurred on January 28, 1986, when an external tank containing liquid hydrogen fuel and liquid oxygen oxidizer, and two solid rocket boosters, broke apart 73 seconds into its flight leading to the deaths of its seven crew members.

The spacecraft disintegrated over the Atlantic Ocean, off the coast of central Florida. The crew compartment and many other vehicle fragments were eventually recovered from the ocean floor after a lengthy search and recovery operation.

The report of the Presidential commission on the Space Shuttle Challenger accident, also known as the Roger's Commission, found that there was a "serious flaw in the decision making process leading up to the launch of flight 51-L." That "failures in communication ... resulted in a decision to launch 51-L based on incomplete and sometimes misleading information, a conflict between engineering data and management judgments, and a NASA management structure that permitted internal flight safety problems to bypass key Shuttle managers." "Instead, … NASA management came to accept the problem as unavoidable and an acceptable flight risk."

Acts of unsafe supervision don't always result in such catastrophic events, but it's important to note that all accidents, especially those involving unsafe supervision, can be prevented. Supervisors play a vital role in aviation safety. It's up to you to provide the supervision necessary to break the mishap chain of events that can lead to accidents.



References: (1) Managing the Risks of Organizational Accidents, James Reason, 1997

(2) Department of Defense Human Factors Analysis and Classification System

(3) The report of The Presidential Commission on the Space Shuttle Challenger Accident (created by Executive Order 12546 of February 3, 1986) is available at: http://history.nasa.gov/rogersrep/genindex.htm

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