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Department of the Interior Aviation
Lessons Learned

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Subject: Human Factors in Aviation Mishaps

Area of Concern: All Aviation Activities

Distribution: All Aviation Users

Discussion: The Department of Interior had three aircraft accidents in FY08. In all three accidents, human factors was a present and contributing factor. In all three accidents, there were no mechanical difficulties or problems with the aircraft that would have contributed to an accident. In all three accidents, the pilots were very experienced. In all three accidents, there was someone, either on the ground or in an aircraft, that could have spoken up and perhaps prevented the accident from occurring.

We all know that “to err is human”, so preventing human error makes for a strong safety program. Because humans make mistakes, DOI has developed checks-and-balances to catch human errors before they lead to accidents. Unfortunately, when the control measures don't catch the human error, accidents happen. One approach to the genesis of human error is the one proposed by James Reason. Generally referred to as the “Swiss cheese” model of defenses, Reason attributes some holes in our control measures to active failures and others to latent conditions (see Figure 1 on page 2).

Until the development of the Human Factors Analysis and Classification System (HFACS) by Scott Shappell & Douglas Wiegmann, few tools were available to enable an accident investigator or accident review board to identify the "holes" in the control measures. HFACS was developed in response to a trend that showed some form of human error, at various levels, as a primary causal factor in 70 to 80 percent of all aviation accidents. Drawing upon Reason’s concept of latent and active failures, HFACS describes four levels of failure (see Figure 1 on page 2).

These levels include Unsafe Acts (operator error, or more commonly referred to as aircrew/pilot error), Preconditions for Unsafe Acts (such as fatigue and inadequate communication), Unsafe Supervision (such as pairing inexperienced aviators for a difficult mission), and Organizational Influences (such as lack of flight time because of budget constraints).

HFACS identifies the human causes of an accident and provides a tool to not only assist in the investigation process, but to **target training and prevention efforts**.

Here’s the key – **accidents will continue to occur if training and prevention efforts do not take place**. Discovering the “holes” in the Swiss cheese is of no value if nothing is done to fill those holes.

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Aviation managers, it's your responsibility to implement Aviation Mishap Review Board recommendations that your organization accepts, become familiar with HFACS, and develop training programs to fill the holes in the Swiss cheese.

As an aircrew member, passenger, or controller on the ground, if you see or feel that something is unsafe, it is your duty and responsibility to SPEAK UP !

Everyone plays a part in building a strong safety program.

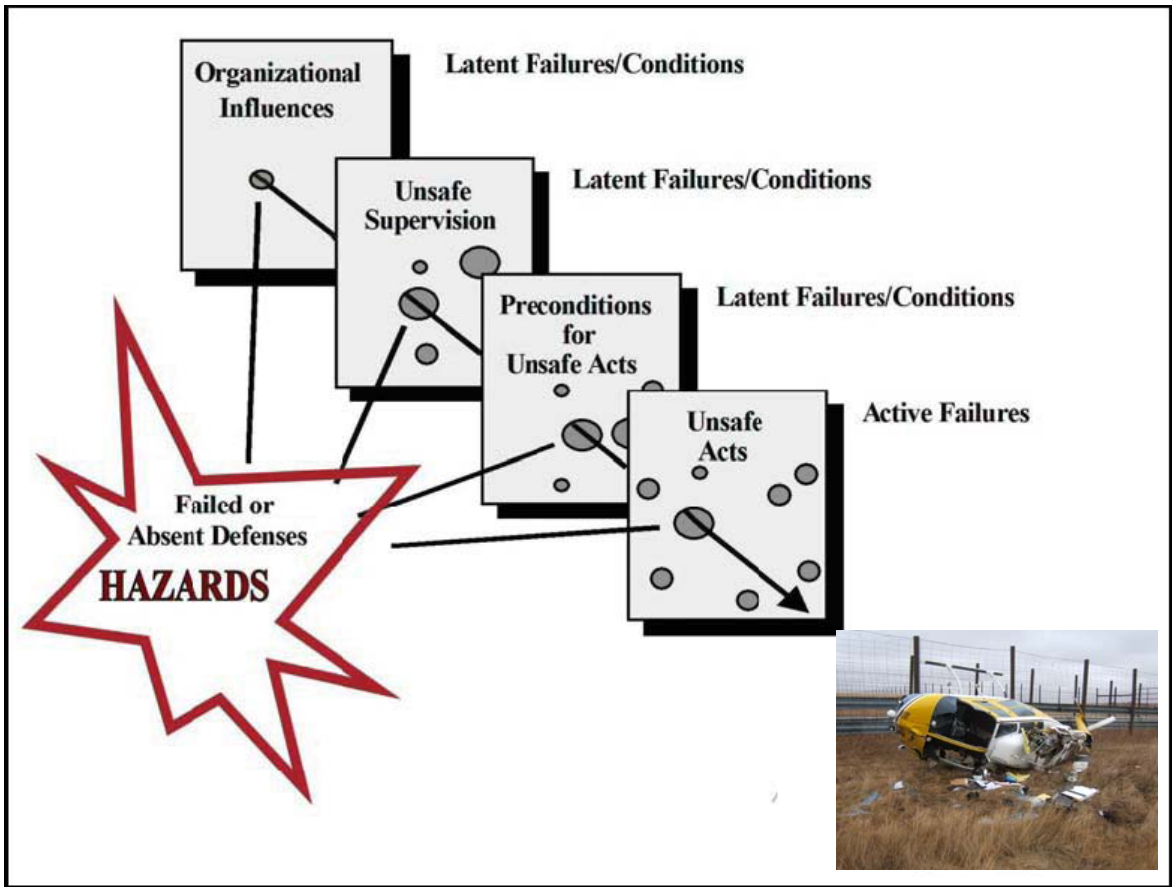

Figure 1. The "Swiss cheese" model of human error causation

References: (1) The Human Factors Analysis and Classification System – HFACS, Shappell & Wiegmann, FAA Civil Aeromedical Institute, 2000. Found online at: http://www.faa.gov/library/reports/medical/oamtechreports/2000s/2000/0007/

(2) Managing the Risks of Organizational Accidents, James Reason, 2001

/s/ Robert Galloway
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