

• EDITORIAL & COMMENTARY

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'What Can Organizations Learn from the Space Shuttle Columbia Accident?'

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In February 2003 the Space Shuttle Columbia was lost on re-entry. An investigation board was convened to see what had happened and make recommendations to NASA on what needed to be done to move forward with a return to space flight. All organizations can use some of the same advice that the accident review board gave to NASA. Today's article will discuss only a few of the findings and recommendations.

TECHNICAL CAUSE: The physical cause of the loss of *Columbia* and its crew was a breach in the Thermal Protection System on the leading edge of the left wing. The breach was initiated by a piece of insulating foam that separated from the left bipod ramp of the External Tank and struck the wing in the vicinity of the lower half of Reinforced Carbon-Carbon panel 8 at 81.9 seconds after launch. During re-entry, this breach in the Thermal Protection System allowed superheated air to penetrate through the leading-edge insulation and progressively melt the aluminum structure of the left wing, resulting in a weakening of the structure until increasing aerodynamic forces caused loss of control, failure of the wing, and breakup of the Orbiter. That is, **"The foam did it."**

ORGANIZATIONAL CAUSES: The organizational causes of this accident are rooted in the Space Shuttle Program's history and culture. This includes the original compromises that were required to gain approval for the shuttle program, subsequent years of resource constraints, fluctuating priorities, schedule pressures. A mischaracterization of the Shuttle as operational rather than developmental, and lack of an agreed national vision for human spaceflight also contributed. Cultural traits and organizational practices detrimental to safety were allowed to develop, including: reliance on past success as a substitute for sound engineering practices (such as testing to understand why systems were not performing in accordance with requirements); organizational barriers that prevented effective communication of critical safety information and stifled professional differences of opinion; lack of integrated management across program elements; and the evolution of an informal chain of command and decision making processes that operated outside the organization's rules. That is, **"The foam did it, but the organization allowed it."**

What lessons can we all learn from Columbia? We need to communicate, communicate, and then do some more communicating. According to General George S. Patton, Jr. - *"It is the information you do not (or cannot) share that will kill you."* The space shuttle is an example of a system with a large amount of information overload, but what organization in today's environment does not suffer from some form of information overload? We therefore must insist on discussion. Too many organizations do not use all the technology they have to effectively communicate with each other, their customers, and partners as much as they should or could. We need to encourage minority opinions. Too many decision-makers rely on a small set of people for input into their decisions and minority opinions are often overlooked or ignored. Information systems should be utilized to maximize minority opinion input. Conduct effective meetings so that managers can transmit & receive. Information systems can help organize run more efficient meetings, that take less time, get more accomplished, and involve more people.

Another important lesson from Columbia lies in how we promote employees to work together to make important decisions. Our decision support systems use some good information technology, but they are only as good as the people using them. We need to develop and nurture teamwork, project management and leadership in our organizations and their systems. Leaders create and sustain culture. Leadership training and system safety training are wise investments in an organization's current and future health. Leadership training should be provided as a vital part of every high-risk professional's career development. This training should include: decision making, risk assessments, communication skills, interpersonal skills, system safety and security, and developing and utilizing "what if" scenarios.

All of these lessons learned from Columbia tend to be part of Information Systems (IS) degree programs. Organizations need IS educated and trained professionals to help them deal with their own instance of information overload. What foam do you have in your organization? What are you allowing? How can you use information systems to help turn things around?