Aerospace Safety

The Future Is Now

By Gil BevenFlorez Jr.

The aerospace renaissance is here and it brings with it familiar and new environmental and workplace hazards. Safety professionals and industrial hygienists must be well-versed in contemporary safety regulations and practices, as well as the risks associated with this industry.

Aerospace production operations have multilayered dangers that may manifest during space flight. As the commercial aerospace industry grows, safety practices must evolve to ensure that safe operations remain at a competitive price. Modern-day safety personnel must integrate historical lessons learned with anticipated new hazards when planning for and executing current and future aerospace programs.

Safety in the Aerospace Industry

The aerospace industry has contributed significantly to the development of the safety profession. A few years before President Richard Nixon signed the OSH Act of 1970, three astronauts boarded *Apollo 1* for a launch rehearsal test and died horrifically when the cabin caught fire. NASA's investigation found that the organizations responsible for the test failed to recognize the environmental hazards present during the test, and failed to provide adequate safety precautions for those hazards.

The *Apollo 1* launch rehearsal test was known as a plugs-out test. All pyrotechnics were disabled and no fuel was in the spacecraft during the test. This may explain the complacency in not having adequate safety measures in place, despite a clear need for them. Three examples of the complacency present during the plugs-out test include 1) no emergency fire and medical teams on site; 2) the astronauts in the capsule had no egress for emergency situations; and 3) although the pyrotechnics were disabled, the combustible materials in the cabin were not controlled.

In the aftermath, no ignition source could be identified. As a result of this tragic incident, NASA initiated safety programs. The passage of the OSH Act would further push the integration of human safety needs into the space program.

The need for safety was as important in the late 1960s and early 1970s as it is today. Despite the hard lessons learned from the *Apollo 1* incident, safety-related preventable incidents continue to occur.

On July 26, 2007, Scaled Composites was investigated for a fatal incident resulting from the test of a hybrid nitrous-oxide-fueled rocket engine (Chang, 2007). Another publicized event occurred on July 16, 2013, during a space station extravehicular activity. A European Space Agency astronaut almost drowned due to a leak in a space suit. This prompted NASA to make a public commitment to space suit safety (Harwood, 2014). In 2015, OSHA fined Space Exploration Technologies for safety violations and initiated an investigation at a United Launch Alliance facility (Perez-Trevino, 2015).

While some of these incidents may have been preventable, they highlight the challenges that face aerospace safety professionals. As new and experienced aerospace companies move forward in this new space age, it is not enough to develop a safety environment based on familiar threats—safety professionals must anticipate concerns based on evolving technological advances and the landscape of an increasingly cost-competitive aerospace culture.

While safety professionals need to be specialists in practices and regulations, they must also be familiar with the challenges in the aerospace culture. The aerospace culture is influenced by various technical disciplines, regulations and practices that can affect the ability to foster a safe work environment. Personnel manage multiple priorities when conducting their duties. In the most recent incidents, safety precautions were either not properly implemented or nonexistent. Safety professionals should be proactive in understanding the various departmental duties to determine where synchronizing safety efforts with their objectives could be possible.

Interestingly, aerospace culture significantly overlaps with the security and project management fields. For instance, safety professionals should be familiar with the International Traffic Arms Regulation and Export Administration Regulations. These regulations may affect safety investigations and the creation of job hazard analysis paperwork. However, in some cases, analyses conducted to ensure a safe production and postdelivery operational environment may not be disclosed for reasons of both national security and intellectual property protection. In these secure environments, incidents will happen.

However, the risks can be managed through project management, which has risk management as a core competency. This competency requires the development of a risk register. The safety professional can use the risk register to determine the countermeasures to chemical and environmental hazards that may endanger workers. These risk factors extrapolated from the register may extend risk registers, job hazard analysis and other important paperwork. A strategic alliance with the security and project management fields will be critical for the development of a safe, productive environment for the commercial aerospace era.

As the aerospace renaissance blossoms, the OSH community will face familiar threats and new hazards. The multilayered dangers from the production line to the flight line have historically affected the safety profession and will continue to do so. The industry must place a greater emphasis on aerospace safety education.

References

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