Title: Lessons Learned from Commercial Airplane Accidents

Creation of a Web-based Safety Knowledge System

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International commercial aviation has achieved unprecedented levels of safety. According to ICAO records, 2013 was the safest year in history, with nine fatal accidents, involving 173 total fatalities. 2014 saw fatal accidents and total number of fatalities slightly increase, including two fatalities in the U.S. Even with these increases, accident rates remain at historically low levels. These advances can be attributed to the combined effects of major worldwide initiatives targeting specific safety areas. However, in light of current trends, it is important to remain vigilant, and be on guard against complacency. Analyses of recent accidents have revealed that relatively minor changes in safety programs have the potential to create gaps in safety.

It is also important to recognize that the aviation workforce is changing, and that the pace of this change is faster than in previous periods. Experienced personnel are leaving, and being replaced by personnel with limited, and in some cases, more narrowly focused aviation knowledge. Information technology advances have required the creation of highly specialized positions, resulting in challenges in achieving and maintaining a broad safety understanding. This in turn requires organizations to provide this new workforce with learning tools that are safety relevant, efficient, and focused. As the industry has moved toward expanded globalization, increased international partnerships, and new airline formations, the call for more comprehensive safety learning tools, including knowledge of accident causes, exists.

The FAA has recognized that detailed accident knowledge is widely lacking. The complexity of most current accidents has made it very difficult to collect and distribute key accident information within the aviation community. Investigation and resolution processes can be very lengthy, and involve many steps. During the investigative process, information is generally on a “need-to-know” basis, and is not made available. However, once information becomes available, the FAA recognizes that this higher level of accident knowledge can aid in identifying existing safety gaps within today’s safety systems, and can enhance “day- to-day” safety work.

Recognizing the value of a workforce with an enhanced level of accident knowledge, in 2008, the FAA issued the first release of the “Lessons Learned from Transport Airplane Accidents” (LL) library, involving 10 accident modules. Subsequent releases have expanded the library to include 76 modules, spanning some of the most historically significant, safety shaping accidents, across a period from 1953 to 2008.

In considering an accident for inclusion in the library, four criteria are applied to determine its “readiness.” These are:

1. Official accident investigation is complete, and final report is issued.
2. Corrective actions are complete, or substantially complete.
3. No additional accident/incident that would call 1 or 2 into question.
4. Litigation is complete.

A candidate accident is also judged to be lesson-rich, and able to provide a substantial knowledge value to the LL accident library content. Accident modules are created by a team of specialists, with support from contractors and industry. Team makeup involves both FAA and non-FAA aviation experts with wide-ranging backgrounds, including engineers, pilots, and researchers. Resources used in creation of the accident modules include the official accident reports, manufacturers' publications, regulatory materials, and technical studies. The library also makes extensive use of animations, graphics, photographs, and videos.

The FAA has created a tool to help guard against complacency and loss of costly safety knowledge. In an hour or less, a reader can acquire sufficient information to be able to teach others key information, and lessons, related to each accident. In many cases, this material has required 10 years or more to complete, encompassing the investigative and resolution processes. The library currently has more than 12,000 subscribers, including manufactures, airlines, international authorities, academia, and others, and can be found at http://lessonslearned.faa.gov/.

The library is arranged by three perspectives: Airplane Life Cycles (3), Threat Categories (18), and Common Themes (5). These three perspectives allow the library user to learn details of each accident from various dimensions, allowing more complete understanding of the underlying causes, resolutions, and key lessons. The accident library is now publically available as a tool to help advance the safety of an already very safe international commercial aviation system.