WASHINGTON IN ACTION

New Rules On Wiring; Broken Rules At Emery

FAA sets an aggressive schedule for its new wiring initiatives, and grounds Emery after gathering months of evidence pointing to deficiencies.

By Sean Broderick

The U.S. Federal Aviation Administration's (FAA) new wiring safety initiative puts much emphasis on enhanced maintenance and inspection practices, and includes aggressive deadlines for issuing key advisory materials and rules mandating the changes.

The Enhanced Airworthiness Program for Airplane Systems (EAPAS), unveiled Aug. 16, is built on data gathered as part of the larger Aging Transport System Rulemaking Advisory Committee (ATSRAC) effort. Information was culled from routine heavy maintenance checks of 81 planes, intrusive checks of six recently retired aircraft, and other sources to help paint a picture of how wiring degrades over time.

The inspection teams found nearly 3,400 wiring discrepancies on the in-service planes. When analyzed, they concluded that — contrary to conventional wisdom — wiring degradation isn't primarily a product of age, moisture and other factors that break down material over time. Rather, as often as not, wiring problems come from more controllable factors.

"Wire degradation can occur with age and be accelerated by exposure to moisture, vibration and mechanical stress, and temperature variation," FAA wrote in the 35-page plan that outlines how EAPAS will evolve. "Over time, the possibilities increase that improper installation or repair, contamination, or inadequate maintenance has caused further exposure to these conditions. In addition, wiring assemblies that were certified safe when designed may, over the years, be transformed in their construction by rerouting or other modifications which diverge from the original safe design philosophy."

Examples of problems found include the same equipment installed several different ways in different aircraft because of a lack of clear directions on how the work should be done. In some cases, the installations pose safety hazards because wires run too close together; or because high-voltage wires for non-essential components like in-flight entertainment systems are bundled with low-voltage wires that power flight-critical systems, which increases the threat of arcing. Inspection teams also found wire chafing caused by regular contact with mechanics or nearby structural parts. Often, the damaged bundles were victims of regular inspections of nearby areas as mechanics shifted or bumped the wires during their work.

In other cases, the agency believes patterns of wire-related problems went unnoticed because of the lack of specific requirements to report wire problems. If wire damage causes a component to fail, the mechanic preparing the service difficulty report (SDR) more likely will write it up as a problem with the specific component, rather than its wiring. Thus, a recurring problem caused by a design or installation shortcoming easily can be mistaken for a component reliability issue.

EAPAS proposes to help operators, maintainers, designers and FAA inspectors eliminate these problems through a series of actions divided into two groups. Near-term tasks — some of which already are done — include issuing advisory material for operators and inspectors on developing and maintaining aging systems and maintenance programs, beefing up wiring-related SDR procedures, issuing aircraft-specific airworthiness directives (ADs) that tackle known deficiencies, and tasking ATSRAC to start working on rules changes. Deadline for the near-term items is Dec. 31.

Long-term, FAA plans to issue EAPAS-related rules that add aging systems to maintenance programs, clarify wiring-related requirements for aftermarket installations, update Federal Aviation Regulation (FAR) Part 25 certification standards related to wiring systems, and determine if more comprehensive wire design and performance standards are needed.

The action plan focuses on seven categories: maintenance, training, wire repairing, oversight, research and development, information sharing and design. Under maintenance, tasks include encouraging manufacturers, operators and STC holders to provide information on how to minimize wire contamination in service bulletins, engineering orders and other continued airworthiness instructions. The agency also plans to update the *Standard Wiring Practices Manual* through an advisory circular in 2003.

The centerpiece of the EAPAS program will be a far-reaching rule that the agency hopes to have out sometime in 2004. The regulation will mandate EAPAS training programs for repair stations and operators (FAA will encourage voluntary compliance through operational specifications changes in the interim) and change design, certification and instructions for continued airworthiness requirements in the FARs.

Before any of the major changes can be put in place, however, the agency must determine what the new rules and guidelines will say. FAA will rely heavily on ATSRAC for recommendations on how to craft many of the EAPAS elements. ATSRAC already has been tasked to look at improving maintenance practices, upgrading wire system certification requirements, beefing up existing training programs, and enhancing the *Standard Wiring Practices Manual*. To keep EAPAS on schedule, the agency has asked the committee to issue its report by August 2002. ■

Handout #7