The View from Washington

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Aging Aircraft Maintenance Addressed at Summit

On March 22, the Federal Aviation Administration's Small Aircraft Directorate hosted a two-day Aging Aircraft Summit to address concerns over aging general aviation aircraft. It was two days of public comments — or perhaps, I should describe it as two days of denial.

The summit focused on corrosion, fatigue, parts availability, training and wiring. I presented a paper on aging wiring.

As many of you know, especially those who have participated in AEA's wiring inspection training, the FAA established the Aging Transport Systems Rulemaking Advisory Committee (ATSRAC) in 1998 to evaluate heavy transport aircraft aging wiring. As a result of the findings of the half a dozen working groups, they determined the initial premise that "wiring ages" was false.

And, as a result, ATSRAC redefined "age" to mean:

"Age is not the sole cause of the wire degradation referred to as 'aging.' The probability that maintenance interventions, contamination, improper repair or mechanical damage has occurred to a particular wire system will increase over time. Therefore, with respect to transport airplane wire systems, 'aging' includes not only the breakdown of inherent characteristics of wire as a function of time, but also the various degradation effects of maintenance interventions, contamination, improper repair or mechanical damage."

AEA concurs with this new definition. It is not the age of the aircraft or wire that is fundamentally the problem, but rather the "degradation effects of maintenance interventions, contamination, improper repair or mechanical damage" to the wire that causes the wiring reliability to be below acceptable standards.

From 1998 to 2002, the ATSRAC and its reports strictly focused on old heavy transport (air carrier) category aircraft. In January 2002, ATSRAC decided to accept a new tasking: to evaluate "light" transport category aircraft to compare the results of these aircraft to the finding from the "heavy" transport working groups. As a result, Working Group No. 10 was tasked to review FAR 25 aircraft in FAR 91/135 operations to determine applicability of ATSRAC proposed rulemaking.

Working Group No. 10 inspected 39 aircraft encompassing eight different aircraft models. The working group found a total of 2,256 discrepancies, which averages approximately 57 wiring discrepancies per aircraft inspected. Of the 2,256 discrepancies, 73 of the findings were considered "significant," and none of the discrepancies were considered a "safety-of-flight."

AC 43.13-1B states, "The satisfactory performance of an aircraft is dependent upon the continued reliability of the electrical system … Damaged wiring or equipment in an aircraft, regardless of how minor it may appear to be, cannot be tolerated."

So, even though 2,183 discrepancies were not considered "significant," they still should have been corrected.

For the avionics industry, this is especially important. Our customers are buying the latest and most advanced technology available for their aircraft. They want the most reliable systems available, and yet, the wiring powering the avionics is substandard. The circuit breakers are old and unreliable. The wiring is old and brittle. The wiring bundles are unmarked, poorly routed and improperly supported. In general, it is an old "rat's nest" the customer wants you to splice into.

In 2002, the Aging Aircraft Research Laboratory at Wichita State University's National Institute for Aviation Research (NAIR) began a research effort into the airworthiness of aging aircraft. Two airplanes initially were selected for the investigation: a 1969 Cessna 402A and a Cessna 402C, with the later addition of a 1975 Piper Navajo Chieftain.

According to the NAIR, each aircraft underwent a complete disassembly and inspection. This phase included inspection of:

- System components
- Intrusive wiring visual inspections
- Circuit breaker testing
- Structural assessment utilizing alternative non-destructive inspection techniques
- Detailed disassembly of major aircraft sections and microscopic examination of critical and suspect areas

In general, the results of this GA study mirrored the results of ATSRAC Working Group No. 10 for corporate aircraft and Working Group No. 1 for heavy transports.

The general observations from the ATSRAC evaluations indicated the air-

craft were in good condition overall, but problem areas to focus on included:

• Wiring repairs

• Routing of modification wiring

• Clamping and structural contact (chaffing)

• Adopting a "clean-as-you-go" philosophy

The conclusion of ATSRAC's general aviation study was that 2,041 (89.4 percent) of the findings were covered by the inspection criterion of AC 43.13-1B. In addition, seven out of the eight aircraft types had a "standard wiring practices manual" that contained adequate ICA instructions, and 80 to 90 percent of the findings in the seven aircraft with a standard wiring practices manual were covered by inspection criterion contained in the OEM's manual.

AC 43.13-1B states that Chapter 11 is not intended to supersede or replace any government specification or specific manufacturer's instruction regarding electrical system inspection and repair. However, for most light GA aircraft, Chapter 11 functions as the standard wiring practices manual for those aircraft because most light GA aircraft, especially the older aircraft, don't have adequate wiring maintenance or inspection criterion in their maintenance manuals.

The inspecting and care of electrical systems is contained in Chapter 11, Section 1 of the AC. But first, a definition: Paragraph 11-1 defines the term "electrical system," as used in the AC, to mean those parts of the aircraft that generate, distribute and use electrical energy, including their support and attachments — which means anything with electrons flowing though it that is not covered by some other OEM maintenance manual should be inspected, repaired and maintained in accordance with AC 43.13-1B, Chapter 11. (For alterations, use AC 43.13-2A.)

The AC calls to inspect equipment, electrical assemblies and wiring installations for damage, general condition and proper functioning. When a technician finds a defective part or component, the AC stipulates the technician should "replace components of the electrical system that are damaged or defective with identical parts, with aircraft manufacturer's approved equipment, or its equivalent to the original in operating characteristics, mechanical strength and environmental specifications."

A list of suggested problems to look for and checks to be performed include:

1. Damaged, discolored or overheated equipment, connections, wiring and installations.
2. Excessive heat or discoloration at high current carrying connections.
3 Misalignment of electrically driven equipment.
4. Poor electrical bonding (broken, disconnected or corroded bonding strap) and grounding, including evidence of corrosion.
5. Dirty equipment and connections.
6. Improper, broken, inadequately supported wiring and conduit, loose connections of terminals, and loose ferrules.
7. Poor mechanical or cold solder joints.
8. Condition of circuit breaker and fuses.
9. Insufficient clearance between exposed current carrying parts and ground, or poor insulation of exposed terminals.
10. Broken or missing safety wire, broken bundle lacing, cotter pins, etc.
11. Operational check of electrically operated equipment, such as motors, inverters, generators, batteries, lights, protective devices, etc.
12. Ventilation and cooling air passages are clear and unobstructed.
13 Voltage check of electrical system with portable precision voltmeter.
14. Condition of electric lamps.
15. Missing safety shields on exposed high-voltage terminals (i.e., 115/200V ac).

These 15 items are a good start, but an electrical-system inspection cannot stop with just these items. There is more inspection criteria buried throughout Chapter 11.

For those who haven't dusted off a copy of AC 43.13-1B lately, I've listed an outline of the sections contained in Chapter 11 as a refresher:

CHAPTER 11.
Aircraft Electrical Systems

Section 1. Inspection and Care of Electrical Systems
Section 2. Storage Batteries
Section 3. Inspection of Equipment Installation
Section 4. Inspection of Circuit-Protection Device
Section 5. Electrical Wire Rating
Section 6. Aircraft Electrical Wire Selection
Section 7. Table of Acceptable Wires
Section 8. Wiring Installation Inspection Requirements
Section 9. Environmental Protection and Inspection
Section 10. Service Loop Harness (Plastic Tie Strips)
Section 11. Clamping
Section 12. Wire Insulation and Lacing String Tie
Section 13. Splicing
Section 14. Terminal Repairs
Section 15. Grounding and Bonding
Section 16. Wire Making
Section 17. Connectors
Section 18. Conduits
Section 19. Protection of Unused Connectors
Section 20. Electrical and Electronic Symbols

Most sections contain some inspection procedures. I encourage every technician to review the inspection procedures in the AC. It doesn't matter whether the maintenance contract is an annual or periodic inspection, a repair to faulty equipment, or a new installa-

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Frequently Asked Questions

TOPIC:

Repair Station Training Program

QUESTION:

After attending the AEA Repair Station Training Program seminar with my FAA inspector, I asked my inspector his opinion of what he had heard for the past eight hours. He said the seminar was very good but the use of AC 145-10 was too simplistic, and he said he was intending to use the Repair Station Training Program to "raise the bar" in aircraft maintenance technician qualifications and training.

Q: What should I do if my inspector doesn't accept the RSTP template from AEA's Resource One?

ANSWER:

This is an excellent question.

• First, the templates on AEA's Resource One are the FAA's templates contained in AC 145-10. The exact same language is used — although the Resource One version allows both large and small repair stations to select the air carrier customer criterion of Section 7.

• Second, FAA headquarters has said on numerous occasions that the FAA has no intent to micromanage the Repair Station Training Program. The FAA would not approve courses or curriculum. The FAA would not be approving the record-keeping system. And, in general, the FAA would not be approving the minute details of the Repair Station Training Program.

• Third, AC 145-10, as are all ACs by definition, is "an acceptable means of compliance." As long as the AC is applicable to the regulation you are showing compliance to, your inspector does not have the authority to deny you the right to use a particular advisory circular. AC 145-10 states in paragraph 100, "This AC provides an acceptable means, but not the only means, of showing compliance with Part 145, Section 145.163."

In this case, you have chosen to use the templates in AC 145-10 to show compliance to 14 CFR Part 145, Section 145.163.

So, getting back to the question: What should you do if your inspector does not approve your RSTP?

• Review your Repair Station Training Program to ensure you didn't make any errors and that it is a correct representation of the templates from AC 145-10.

• Respectfully inform your inspector you have elected to use the Repair Station Training Program templates from AC 145-10 as your means of showing compliance to 14 CFR 145.163.

• Refuse to acquiesce to their demands to change your program.

• Immediately file a Customer Service Initiative with your Certificate Holding District Office so this issue is resolved at the appropriate management level. Do not argue with your inspector. As always, send a copy of your CSI petition to AEA at ricp@aea.net.

Note: AEA offers these Frequently Asked Questions in order to foster greater understanding of Federal Aviation regulations and the rules that govern our industry. AEA strives to make them as accurate as possible at the time they are written, but rules change so you should verify any information you receive from an AEA FAQ before relying on it at that time.
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tion — the wiring associated with the contracted task should be inspected, maintained and, if necessary, repaired before the aircraft is returned to the customer.

Remember, the satisfactory performance of an aircraft and, especially, today's avionics are dependent on the continued reliability of the electrical system, and damaged wiring or equipment in an aircraft, regardless of how minor it may appear to be, cannot be tolerated and must be repaired. ❑

Regulatory Update

United States

Aircraft Electrical Load and Power Source Capacity Analysis

On March 13, the Federal Aviation Administration published in the Federal Register a Notice of Availability and request for comments on the acceptability of ASTM International's F2490-05 Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis as an acceptable means of compliance to 14 CFR Part 23, 23.1351(a)(2).

This notice announced an FAA-proposed policy on recognizing ASTM International's F2490-05 Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis as an acceptable means of compliance to 14 CFR Part 23, 23.1351(a)(2).

The Standard Guide provides acceptable methods and procedures to determine electrical system capacity needed to provide worst-case combinations of electrical loads during all phases of airplane operations.

Under the provisions of the revised Office of Management and Budget Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities," dated February 10, 1998, industry and the FAA have been working with ASTM International to develop consensus standards for the design, fabrication, modification, inspection and maintenance of electrical systems installed on normal and utility category airplanes.

These consensus standards satisfy the FAA's goal for airworthiness certification and a verifiable minimum safety level for normal, utility, acrobatic and commuter category airplanes. The FAA participates as a member of Committee F39 in developing these standards. The use of the consensus standard process assures government and industry discussion and agreement on appropriate standards for the required level of safety. AEA chairs the ASTM Committee F-39, which produced this consensus standard.

The FAA has found ASTM Designation F 2490-05, titled "Standard Guide for Aircraft Electrical Load and Power Source Capacity Analysis" acceptable for normal and utility, acrobatic, and commuter category airplanes.

ASTM International copyrights these consensus standards. Individual reprints of this standard (single or multiple copies, or special compilations and other related technical information) can be obtained by contacting ASTM by mail at 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, Pa., 19428-2959; by telephone at 610-832-9585; by fax at 610-832-9555; by e-mail at service@astm.org; or via the Internet at www.astm.org.

For more information about standard content or membership, or about ASTM International Offices abroad, contact Daniel Schultz, staff manager for Committee F39 on Aircraft Electrical Load and Power Source Capacity Analysis, at 610-832-9716 or dschultz@astm.org.

Comments must be received on or before May 12, 2006.

Mail comments to: Federal Aviation Administration, Small Airplane Directorate, Continued Operational Safety, ACE-113, Attention: Barry Ballenger, Room 301, 901 Locust, Kansas City, Mo., 64106. Specify the standard being addressed by ASTM designation and title, and mark all comments: Consensus Standards Comments.

Standardization and Clarification of Application of 14 CFR Part 23, Sec. 23.1301 and Sec. 23.1309, Regarding Environmental Qualification

On March 21, the FAA published Policy Statement Number PS-ACE100-2005-10039. This notice announces the issuance of an FAA policy. The policy standardizes and clarifies the FAA application of 14 CFR Part 23, sections 23.1301 and 23.1309, Amendment 23-41 or later for environmental qualification. This notice is necessary to advise the public, especially manufacturers of normal, utility and acrobatic category airplanes, and commuter category airplanes and their suppliers, that the FAA has adopted the policy.

The policy statement also is available at www.faa.gov/regulations_policies/.

Flight Standards Service Organizational Changes

On Feb. 14, the FAA published FS 1100.1, subject: Flight Standards Service Organizational Handbook. FS 1100.1 transmitted changes to the organizational structure of the Regulatory Support Division, AFS-600.

The following information explains the changes that took place in AFS-600:

• The Regulatory Support Division, AFS-600, provides for a headquarters/regional oversight methodology for the flight standards designees.

• The Light Sport Aviation Branch, AFS-610, duties and responsibilities have been refined to include current directives, guidance and implementa-

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tion of the light sport aircraft/sport pilot regulatory changes. AFS-610 continues to be the agency focal point on certification, standardization and training in light sport aircraft/sport pilot initiatives.

• The Designee Standardization Branch, AFS-640, removed the policy responsibility for the National Examiner Board and assigned the policy responsibility to AFS-650.

• The Designee Quality Assurance Branch, AFS-650, is established. AFS-650 is a new organizational element that will develop and implement a headquarters/regional oversight methodology for flight standards designees.

OSHA Issues Final Standard on Hexavalent Chromium

The Occupational Safety and Health Administration published a final standard for occupational exposure to hexavalent chromium in the Feb. 28, 2006, Federal Register. The standard covers occupational exposure to hexavalent chromium, Cr(VI), in general industry, construction and shipyards, which includes aviation.

"OSHA has worked hard to produce a final standard that substantially reduces the significant health risks for employees exposed to hexavalent chromium," said Jonathan L. Snare, acting assistant secretary for occupational safety and health. "Our new standard protects workers to the extent feasible, while providing employers, especially small employers, adequate time to transition to the new requirements."

The new standard lowers OSHA's permissible exposure limit (PEL) for hexavalent chromium, and for all Cr(VI) compounds, from 52 to 5 micrograms of Cr(VI) per cubic meter of air as an eight-hour, time-weighted average. The standard also includes provisions relating to preferred methods for controlling exposure, respiratory protection, protective work clothing and equipment, hygiene areas and practices, medical surveillance, hazard communication and record-keeping.

Hexavalent chromium compounds are widely used in the chemical industry as ingredients and catalysts in pigments, metal plating and chemical synthesis. Cr(VI) also can be produced when welding on stainless steel or Cr(VI)-painted surfaces. The major health effects associated with exposure to Cr(VI) include lung cancer, nasal septum ulcerations and perforations, skin ulcerations, and allergic and irritant contact dermatitis.

Employers are responsible for providing a safe and healthful workplace for their employees. OSHA's role is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health.

Canada

Transport Canada Revises Guidance for FMS Designed for VNAV Approaches

TCCA has published Advisory Circular 500-020 to replace ACPL 57 Issue 1, and provide revised guidance on the criteria for incorporation of temperature compensation in new or updated Flight Management System (FMS) designs for barometric Vertical Navigation (VNAV) approach procedures.

Whereas ACPL 57 called for application of temperature compensation for all temperatures, this AC requires temperature compensation only when below International Standard Atmosphere (ISA) conditions exist at the destination airfield. The requirement for above ISA compensation has been suspended pending resolution of operational considerations, promulgation of an operational requirement, and provision of operational guidance and training material.

Other changes reflected in this AC include a clarification that temperature compensation is to be applied to the minimum descent altitude/decision altitude of an approach procedure. This is consistent with the current cold-temperature compensation procedure in Nav Canada Air Pilot, Canada Air Pilot General Pages (CAP GEN). In addition, the International Civil Aviation Organization "accurate" method has been included as an acceptable means of temperature compensation.

AC 500-020 can be viewed at www.tc.gc.ca/CivilAviation/certification/guidance/500/500-020.htm.

Transport Canada Issues Guidance for Enhanced Inspection of Electrical Wiring

TP 14331 has been issued to provide guidance for developing enhanced electrical wiring interconnection system (EWIS) maintenance for air carriers, air operators, holders of type certificates, holders of supplemental type certificates, maintenance providers, repair stations, and persons performing modifications or repairs.

The guidance in the TP is based on recommendations submitted from the FAA/TC/Industry Aging Transport Systems Rulemaking Advisory Committee (ATSRAC). The information in the TP is derived from the maintenance, inspection and alteration best practices identified through extensive research by ATSRAC working groups and federal government working groups. The TP provides a means for TCCA to officially endorse these best practices and to dispense this information industrywide so the safety benefits of this information can be realized.

The guidance provided in TP 14331 can be applied to all aircraft maintenance or inspection programs. The Enhanced Zonal Analysis Procedure in Appendix A of the TP is specifically directed toward enhancing the maintenance programs for aircraft for which their current program does not include tasks derived from a process that specifically considers wiring in all zones as the potential source of ignition of a fire.

TCCA states this TP is not mandatory and does not constitute a regulation. The TP describes acceptable means, but not the only means, of developing, implementing and evaluating enhanced aircraft EWIS maintenance and inspection methods, practices and techniques.

TP 14331 can be viewed at www.tc.gc.ca/CivilAviation/publications/tp14331/menu.htm.

Transport Canada Publishes Policy on Applicability of Standards Settings Organizations to Approved Organizations

TCCA has published Advisory Circular AMM-002 to establish Transport Canada's position regarding TCCA-approved organizations (AMOs and approved manufacturers) certificated by the registrar of a standards setting organization. TCCA states while an AMO or approved manufacturer may have a certification to ISO 9001 or AS9100, this does not provide relief from having to demonstrate compliance to the applicable CARs.

An approved organization must have a quality system in place that ensures all activities of the organization are in compliance with the CARs. However, the approved manual may contain references to the registrar's requirements, provided these references do not create doubt as to compliance with the CARs. The use of a registrar's oversight audits in conjunction with the required "external audits" also is addressed.

AMM-002 can be viewed at www.tc.gc.ca/civilaviation/maintenance/AARPC/ac/Amm-002.htm.

Europe

EASA

From June 6-8, 2006, a U.S./Europe International Aviation Safety Conference will take place in Portland, Ore. It provides a forum for open discussion with other civil aviation authorities and industry representatives on current initiatives and strategic directions. This conference also provides a forum for interested parties to participate in harmonization and safety enhancement activities, and to present initiatives of their own to the global community.

Who Should Attend?

The conference will be valuable to FAA, EASA, industry, and aviation executives, managers and engineers worldwide who are working on aircraft certification, maintenance, operations, and aviation safety issues, programs and projects. The conference provides an opportunity to contribute to global aviation safety through collaborative effort and improved individual and organizational performance. Ric Peri, AEA's vice president of government and industry affairs, will be attending the conference.

The conference agenda, information about registration, lodging and more is available on the FAA website at www.faa.gov/news/conferences/.

EU/DOT

In February 2006, the Council of the European Union issued a Draft Regulation amending the Council Regulation 3922/91 with a new Annex containing the common rules for operation of aeroplanes. The Joint Aviation Requirements Commercial Air Transportation (Aeroplanes) JAR-OPS 1, including Amendment 8 of Jan. 1, 2005, provides for a minimum level of safety requirements and, therefore, constitutes a good basis for community legislation covering the operation of aeroplanes.

Changes had to be made to JAR-OPS 1 in order to bring it into conformity with community legislation and policies, with account being taken of its numerous implications in the economic and social field. The new EU-OPS text forms Annex III to the council regulation.

EUROCONTROL

Armenia became Eurocontrol's 36th member state on March 1, 2006. Armenia has been a member of the international civil aviation community since 1992, when it joined the International Civil Aviation Organization, and in 1996, was one of the first former Soviet Republics to become a member of the European Civil Aviation Conference. Since then, the country has benefited from external technical assistance.

From April 26-27, 2006, Eurocontrol will conduct a workshop in Toulouse, France, on "Driving ADS-B and CPDLC Forward in Europe." This workshop is part of the CASCADE program, which addresses the next generation of data-link applications and service to improve further air traffic control sector productivity. For more information, visit the Eurocontrol website at www.eurocontrol.be.

JAA

The Joint Aviation Authority recently introduced an automatic notification service about upcoming amendments to JARs. Subscriptions can be made to JAR-OPS 1&3, JAR-26, JAR-STD, JAR-11, JAR-FCL and JAR-MMEL.

JAA has issued the latest version of JAR-OPS 1 Amdendment 10. The

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change includes amendment to JAR-OPS 1.398, "Use of ACAS."

Central JAA responsible for JAA training has issued a new training schedule available on the JAA website. It now includes audit technique training for operation and maintenance. For more information, visit www.jaa.nl.

Australia

Draft ACs Published

Draft AC No. 21-45(0), titled Airworthiness Approval of Airborne Automatic Dependant Surveillance-Broadcast (ADS-B) Equipment, has been published and now is available for comment.

Draft AC No. 21-43(0), titled Experimental Certificate for Large Unmanned Aerial Vehicle (UAV), has been published and now is available for comment.

These ACs can be viewed at http://rrp.casa.gov.au/archive/timelines/06_021.asp.

CASA

CASA is advising the closure of rulechange project MS 05/02, titled Maintenance of Light Sport Aircraft (LSA). It was closed March 17, when amendments to CAO 95.56 took effect.

On March 6, the deputy chief executive and chief operating officer signed an instrument that exempts persons carrying out maintenance on limited category or experimental aircraft from compliance with the requirements of Regulation 42U and Paragraphs 42W (2) (b), (4) (a) and (4) (c) of CAR 1988. The instrument was lodged with the Federal Register of Legislative Instruments on March 6. It was registered March 8 and became effective March 9.

For more information, visit the CASA website at www.casa.gov.au/rules/miscinst/index.htm#2006. ❑