# FALCON SERVICE ADVISORY

*FSA2000-20-00-03*

| Aging of Electrical Wiring Systems: EAPAS / ATSRAC Recommendations Regarding Maintenance | | | |
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| May 18, 05 | Origin: Regulation | Status: Open | Classification: Maintenance |

## ? REASON

### BACKGROUND

Safety concerns about aging wiring systems in airplanes were brought to the forefront of the US government's attention in connection with the accident involving TWA-800 in July 1996.

The Aging Transport System Rulemaking Advisory Committee (ATSRAC) was formed in January 1999 and tasked with providing public recommendations to the Federal Aviation Administration (FAA).

The committee was chartered by FAA Order 1110.127, which stated that the "committee's primary task is to propose such revisions to the Federal Aviation regulations and associated guidance material as may be appropriate to ensure that non-structural systems in transport airplanes are **designed, maintained, and modified in a manner that ensures their continuing operational safety throughout the service life of the airplanes**."

Committee members include the FAA, EASA, Transport Canada, operators, professional associations, repair stations and manufacturers.

ATSRAC activities are detailed on the public website: **www.mitrecaasd.org/atsrac**.

Initial tasks focused on the wiring of large transport aircraft (i.e. aircraft with at least 30 PAX / 7500 lbs. payload). In 2001, the program was extended to "small transport aircraft", with the formation of a specific ATSRAC Harmonization Working Group (HWG # 10).

As a result of a first phase, the committee made recommendations to the Authorities for improving design, documentation, training and maintenance related to electrical wiring and components (to be considered as a system, called "EWIS", Electrical Wiring Interconnect Systems).

These recommendations were incorporated into a more general FAA plan called EAPAS (Enhanced Airworthiness Program for Airplane Systems).

The FAA is currently in the process of rulemaking based on these recommendations. A NPRM (Notice of Proposed Rulemaking) is scheduled to be released during the first half of 2005, with the publication of final rules expected in mid 2006. The EASA and Transport Canada are working closely with the FAA to achieve consistent requirements.

The EAPAS program also includes an extensive Aging Electrical System Research Program (AESRP). This program is intended to conduct research into aging wiring systems to determine mechanisms that drive the aging process, develop tools to better inspect and maintain wiring, and develop technologies that mitigate the hazards associated with wiring failure.

## IMPACT ON FALCON MAINTENANCE

### *EASPAS/ATSRAC RECOMMENDATIONS*

The EAPAS/ATSRAC program will lead:

- To adding new inspections in the maintenance programs (basic or supplemental programs), as a consequence of the implementation of an enhanced methodology to identify scheduled maintenance tasks (Enhanced Zonal Analysis Procedure - EZAP);
- To clarifying in the documentation how general visual inspections and detailed inspections should be performed and what the expectations of such inspections are (electrical system inspection criteria);
- To further detailing in the documentation the appropriate maintenance practices (including repair practices) and defining more specific guidelines to guard against inadvertent degradation of wiring;
- To enhancing initial and refresher maintenance training regarding practices to be used during operations on electrical wiring.

### *SPECIFIC IMPLICATION: MAINTENANCE OF CIRCUIT BREAKERS*

As part of the Aging Electrical System Research Program (AESRP), the FAA sponsored a test program to evaluate the performance of circuit breakers removed from older large transport airplanes.

Results indicated that circuit breakers installed on aircraft with extended service life would continue to protect the electrical wire, provided adequate maintenance precautions were complied with. Specifically, the report recommends that:
Maintenance programs include:

Periodic cycling of all circuit breakers with no electrical power;
Inspection of the circuit breaker panels for loose, broken or misapplied wire termination hardware;
Inspection of the circuit breakers for signs of overheating and arcing.

Maintenance manuals include specific instructions detailing:

How to protect the back of the circuit breaker panels during routine maintenance;
How to clean the back of the panels;
Authorized wire termination hardware to be used in case of replacement.

As far as cycling of the circuit breakers is concerned, the study shows that cycling the breakers on and off (with no electrical power applied to the airplane) will improve the voltage drop rated current and circuit breaker's current overload characteristics.

### *DASSAULT IMPLEMENTATION PLAN FOR EASPAS/ATSRAC RECOMMENDATIONS*

Without waiting for the publication of the final rules, Dassault has initiated studies to reflect EAPAS/ATSRAC recommendations into Falcon maintenance programs (Chapter 5) and related documentation.

The general instructions relating to zonal inspections and maintenance practices will be detailed in the new "Standard Practices" Chapter 20 manual (Please refer to FSA 2000-00-00-35). The specific instructions relating to the electrical wiring systems will be reflected in a new Wiring Practices Manual (WPM). The technical specifications applicable to these documentation changes will be defined in 2005, with the objective of releasing the new instructions starting in year 2006.

Concerning cycling of the circuit breakers, the Falcon fleet experience does not provide a basis to quantify the benefit of such a practice. Nevertheless, considering the low impact on aircraft maintenance cost, Dassault's recommendation will be to perform a manual cycling of all circuit breakers during the C check.

This change (as well as all Chapter 5 changes resulting from the EASPAS/ATSRAC) will be reviewed with the MRB members, prior to its implementation.

This FSA will be updated when additional information is available.