



Commercial
Aviation
Services

SERVICE LETTER

SERVICE ENGINEERING • BOEING COMMERCIAL AIRPLANES • P.O. BOX 3707 • SEATTLE • WASHINGTON 98124-2207

707-SL-20-026 **747-SL-20-070**

727-SL-20-038 **757-SL-20-042**

737-SL-20-047 **767-SL-20-044**

777-SL-20-020

ATA: 2040-00

7 January 2005

SUBJECT: CIRCUIT BREAKER RELIABILITY

MODEL: 707/727/737/747/757/767/777

APPLICABILITY: All Model 707/727/737/747/757/767/777 Airplanes

REFERENCE: Federal Aviation Administration Report DOT/FAA/AR-01/118, Aircraft Age-Related Degradation Study on Single and Three-phase Circuit Breakers, dated November 2002

SUMMARY:

This service letter advises operators of the reference FAA report regarding a study on age-related degradation of airplane circuit breakers. The report includes recommendations for incorporation of periodic cycling of the thermal circuit breakers into an operator's maintenance plan.

BACKGROUND:

In 2000, the Federal Aviation Administration (FAA) sponsored a test program to evaluate the performance of circuit breakers removed from older airplanes. The intent of this program was to ascertain the condition of the aged circuit breakers through laboratory testing and to determine the extent of performance degradation from the original specification requirements. Testing of the circuit breakers included detailed visual and x-ray examination, voltage drop tests, current overload tests, insulation resistance tests and failure analyses.

In November 2002, the FAA released the results, which are provided in the reference report and may be accessed at the following web address:

<http://www.tc.faa.gov/its/worldpac/techrpt/ar01-118.pdf>

707-SL-20-026 747-SL-20-070
727-SL-20-038 757-SL-20-042
737-SL-20-047 767-SL-20-044
777-SL-20-020

7 January 2005

Page 2 of 3

DISCUSSION:

The FAA-sponsored evaluation indicated that circuit breakers installed in aircraft over an extended service life would continue to protect the electrical wire, provided a more controlled evaluation of circuit breaker aging is implemented. The report makes several recommendations aimed at improving the reliability of circuit breakers and reducing maintenance related problems, including:

1. Cycling circuit breakers periodically with no electrical power to the airplane,
2. Protecting circuit breaker panels during routine maintenance,
3. Cleaning the back of circuit breaker panels,
4. Inspecting circuit breaker panels for loose, broken or misapplied wire termination hardware,
5. Inspecting circuit breakers for signs of overheating and arcing, and
6. Dissemination of instructions to use the correct wire termination hardware.

BOEING ACTION:

Boeing already has or plans to address recommendations “2” through “6” above through the standard wiring practices manual or through maintenance inspection changes.

However, Boeing is unable to quantify the benefit, or an effective or common interval, for cycling of circuit breakers on a periodic basis, as indicated in recommendation “1” above.

SUGGESTED OPERATOR ACTION:

Boeing suggests that operators review the reference FAA report, and based on the operators’ maintenance program and experience, determine whether a circuit breaker cycling program would be beneficial to their fleet. Boeing recommends operators consider the frequency of circuit breaker usage during normal maintenance activities in determining an appropriate cycling program interval.

ESTIMATED LABOR HOURS:

The estimated labor hours are undetermined, as the process is dependent on the specific airplane and configuration.

707-SL-20-026 747-SL-20-070
727-SL-20-038 757-SL-20-042
737-SL-20-047 767-SL-20-044
777-SL-20-020

7 January 2005

Page 3 of 3

WARRANTY INFORMATION:

Warranty remedies do not apply for the advisory information provided in this service letter.



R. David Reed
For Respective Fleet Support Chiefs

MF:cmm