

AWB 33-1 Issue 1, 9 May 2001 EMB 120 Cabin Lighting with Bruce Lights

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Applicability

To All Embraer EMB120 aircraft with Bruce Industries cabin lighting installed IAW FAA STC

SA5845NM

Background

Recent SDR report and in-service experience has highlighted the possibility of damage by chaffing to the wiring harness installed as part of the Bruce Industries kit. Specifically the high voltage output of the ballast.

Discussion with Bruce Industries has indicated that they have received no reports of damage by chaffing, the major problem reported to them with the installation has been due to arcing at the fluorescent lamp fitting.

Investigation

Extract from SDR :

"As the result of a report indicating a cabin lighting problem, and during defect rectification, it was observed that the ballast output wiring was found to have chafed against the gasper air duct causing the wiring loom and insulation surrounding the duct to burn. Disturbance of the wiring loom to investigate the damage, again caused the wires to short circuit and burn. "

Comments from Bruce industries are as follows :

1. We have had no reports of arcing attributed to wiring damage associated with this system. However, we do recognize the potential.
2. There have however been reports of arcing at the lamp/lamp holder interface. Should the lamp not be fully seated against the lamp holder contacts, there is sufficient potential for an arc to bridge the gap. Over time a carbon path may develop which will exacerbate the situation. The same sequence is possible anywhere along the output path from the ballast.

3. Over the last few years we have actively been developing solutions to eliminate or mitigate arcing attributed to installation conditions. The SDR mentions over current protection as a possible cure. It is unfortunately not as easy as setting a trigger based on current or even voltage. One of the ballast's central design functions is to regulate current to the lamp. During an arcing event the ballast is unaffected and continues to regulate current as per spec. The rated current for a lamp in bright mode is sufficient in combination with the voltage demands of small diameter lamps to generate an arc of destructive potential. Bruce Industries have successfully designed a few circuits that detect an arcing condition and shutdown the ballast without presenting any appreciable nuisance failures in the field. One such circuit employing a microprocessor running a trigger algorithm that monitors operating conditions.
4. This unit is available as a replacement ballast, identical in form, fit and function, to the unit supplied for the EMB120 retrofit kits. P/N BR9000-21 a non-dimmable ballast incorporating arc detection. Bruce Industries are modifying their STC to reflect the change.
5. Part Number BR9000-22 is a currently in use ballast, the only difference is that it has the capability of dimming. The BR9000-22 is in service on the CRJ200, CRJ700, ERJ135 and ERJ145. With a jumper installed at the connector, the BR9000-22 may be used on the EMB120. Bruce Industries recommendation is that the dimming circuitry be removed or disabled internally and the part number changed to BR9000-11. Please Contact Bruce Industries for further details : Email Steve Jaffe stevej@bruceind.com

Recommendations

1. CASA strongly recommends that operators carry out, as soon as practical, an initial inspection of the wiring looms and harnesses affected by the retro fit of the Bruce Light Kits. Determine that they are free from damage, do not chaff or abrade any structure or fittings and are adequately secured to prevent or reduce damage in the future. Defects found as part of the investigation are required to be submitted to CASA as an SDR pursuant to regulation 51A of CAR 1988.
2. CASA also recommends that operators review their maintenance program to ensure that an adequate inspection of the wiring associated with the cabin lighting system is in place. As this installation was carried out as a result of the application of an STC, neither the manufacturers Maintenance Planning Document nor the Maintenance Review Board Document will address the requirements regarding maintenance of this installation. It would be prudent to review the STC and ensure that any continuing Airworthiness Requirements are also incorporated.
3. Maintenance personnel should be reminded of the requirement to be vigilant during the installation of these fluorescent lamps to ensure that they are correctly installed, it would be prudent to inspect the base for signs of deterioration arcing or tracking each time the tube is replaced.
4. CASA recommends that consideration be given to replacement of the older style ballasts on an attrition

basis with the newer style that provides arc detection.