



**SAIB:** CE-13-22

**Date:** March 13, 2013

**SUBJ:** Electrical Power System – Circuit Breaker Switch

*This is information only. Recommendations aren't mandatory.*

## **Introduction**

This Special Airworthiness Information Bulletin (SAIB) advises owners and operators of various airplanes equipped with **W31 series switch style circuit breakers (SSCB) manufactured by Tyco or Potter Brumfield** of an airworthiness concern.

Specifically, there have been known continued failures of these SSCBs on Cessna Aircraft Company airplanes and Beechcraft Corporation (formerly known as Hawker Beechcraft Corporation) airplanes. These circuit breaker switches may also be installed on other type certificated airplanes as well as homebuilt airplanes.

At this time, the airworthiness concern is not considered an unsafe condition for the current production Tyco SSCBs that would warrant airworthiness directive (AD) action under Title 14 of the Code of Federal Aviation Regulations (14 CFR) part 39.

## **Background**

The FAA is aware of continued failures of W31 series SSCB manufactured by Tyco or Potter Brumfield. The concern is for all airplanes that have Tyco or Potter Brumfield SSCBs installed, including those airplanes that have complied with AD 2005-20-25 for certain Cessna Aircraft Company (Cessna) models and AD 2008-13-17 for certain Beechcraft Corporation (Beechcraft) models. These SSCBs could be installed under a type certificate (TC), a supplemental type certificate (STC), or other means.

Known Cessna airplanes include Models **401, 401A, 401B, 402, 402A, 402B, 402C, 404, 411, 411A, 414, 414A, 421, 421A, 421B, 421C, 425, and 441** airplanes equipped with circuit breaker switch, part number (P/N) CM3589-50, 593-250-101, 593-250-102, W31-X2M5A-50, or W31-X1000-50.

Known Beechcraft airplanes include **F33 Series and Models G33, V35B, A36, A36TC, B36TC, 95-B55, D55, E55, A56TC, 58, 58P, 58TC, G58, and 77** airplanes equipped with circuit breaker switch part number (P/N) 35-380132-1 through 35-380132-53, which were required to be removed by the AD and are no longer allowed to be installed, and P/N 35-380132-61 through 35-380132-113.

The prevalent failure mode is in an open condition, thus preventing power to its system. The more rare failure mode is the condition where these devices fail with an internal short that can bypass the internal circuit protection mechanism and leave the system energized. This results in overheating of the SSCB where they get hot to the touch and may eventually produce smoke. This failure can also leave the associated circuit and wiring unprotected in the event of a subsequent short circuit. Review of the Service Difficulty Reporting System data indicates that SSCBs, which are frequently cycled, are more prone to failure. Analysis of available service difficulty report (SDR) data indicates 2 percent of those analyzed failed by 2,000 cycles; 50 percent of those analyzed failed by 6,500 cycles, and 90 percent of those analyzed failed by 10,000 cycles. The FAA's analysis shows that on average

there is one cycle per flight hour for normal operations and four cycles per flight hour for high usage (e.g. flight training). .

As previously referenced, the FAA issued ADs for certain Cessna and Beechcraft airplane models that utilize these SSCBs. The cause for the issuance of the ADs were cases where the defective SSCB posed a significant overheat/fire hazard due to internal issues of the circuit breaker switch. The mandated replacement SSCBs incorporated design changes that provide better protection regarding this condition, which mitigated the hazard to an acceptable level.

The FAA has continued to monitor this issue and has identified additional mitigations that will further reduce the risk of this issue. We have been working with Cessna Aircraft Company and Beechcraft Corporation to have these aircraft manufacturers work with their suppliers. The manufacturer of these circuit breakers reviewed the issues and provided an additional internal modification since the ADs mandated configuration in an attempt to further reduce the heating affect. The FAA has evaluated the additional data associated with the switches and finds no further mandatory action is warranted at this time.

This SAIB provides recommended replacement guidance for the SSCB, but does not alleviate the original requirements for the previously issued ADs for the Cessna airplanes (AD 2005-20-25) and Beechcraft airplanes (AD 2008-13-17). This SAIB supplements those applicable ADs and also provides guidance to those who have SSCBs on their airplanes that are not specifically covered by the applicable ADs.

### **Recommendations**

The FAA recommends that all owners and operators of the subject airplanes comply with the guidelines outlined in the applicable original equipment manufacturer (OEM) recommended replacement period as described within the respective aircraft maintenance manuals.

For airplanes not having any OEM guidelines and using these SSCBs as a switch, the FAA recommends removal, discard, and replacement of these circuit breaker switches every 2,000 flight hours for normal use airplanes or 600 flight hours for high use airplanes (airplanes used for training or airplanes where these circuit breaker switches would be cycled multiple times during a flight).

To help mitigate any adverse affects caused by a failing SSCB, we also recommend that all owners and operators of the subject airplanes incorporate an operational procedure to verify the systems controlled by their circuit breaker switches are indeed off when the circuit breaker switch is turned off. If the SSCB is not functioning properly, replace before the next flight.

### **For Further Information Contact**

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### **For Related Service Information Contact**

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