



RECORD OF EMAIL CORRESPONDANCE

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Date: October 18, 2022
Person Contacted: Brannon Mayer, Cirrus
NTSB Accident Number: WPR21LA145

Narrative:

The squib contains a bridge wire that heats up and ignites a composition of Boron-Barium Chromate (B1). Activation of the B1 then initiates ignition of the BKNO_3 . Testing determined that the most probable root cause failure of the CAPS system was the failure of the B1 to properly ignite resulted in the failure of the BKNO_3 to ignite. Testing did not conclusively determine why the B1 did not properly ignite; however, several possible factors were identified.

- 1) Oxygen/Fuel Ratio: Stiochiometric analysis showed squibs built in 2015 had different ratios of boron and barium chromate. In the B1 composition, boron is used as the fuel and barium chromate is the oxidizer. The oxygen to fuel ratio is important for efficient burn.
- 2) Homogeneity: It was noted the B1 produced in 2015 was less homogenized, i.e. boron pieces were larger. If larger inhomogeneities existed, this could have contributed to the no-fire events.
- 3) Moisture Content: The event squib did record higher moisture levels, although it is possible this could have been skewed since the squib was opened and the BKNO_3 was removed to expose the green lacquer. Moisture absorption could reduce burn rate and ignitability.

Actions Taken by Cirrus

Following the accident, Cirrus issued SB2X-95-27 calling for the removal of 25 squib assemblies produced from the same lot as the accident squib. Testing of the returned parts demonstrated additional “no-ignition” squibs from the same lot. SB2X-95-27R2 was subsequently issued which expanded the number of recalled squibs to 347 that went to SR20 and SR22 airplanes which included squibs that were manufactured with the same batch of B1 as the accident squib.

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The suspect batch of B1 was tracked from the manufacturer and it was determined that 27 SF50 airplanes would receive squibs with potentially the same issue. SF50-0010 was issued for the recall of the 27 squibs, but it was determined that 1 of the squibs had since been removed from service due to a ground fire. Service Bulletin SB5X-90-13 was issued which defined removal of the remaining 26 suspect squibs assemblies from the SF50 airplanes.

As a result of SB2X-95-27 and FRA000017186, the squibs that were removed from airplanes and returned to either Cirrus or Vulcan Systems were tested. In August 2022, testing was conducted on returned squibs which resulted in another no-fire squib (SN 0416-3617). This serial number was outside the previously understood scope of suspect parts. As a result, SB20X-95-27R3 was issued on October 14, 2022, which expanded the scope of the previous service bulletin by an additional 925 igniters.

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