

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594



August 11, 2022

MATERIALS LABORATORY FACTUAL REPORT

Report No. 22-056

1. ACCIDENT INFORMATION

Place : Monroe, Georgia
Date : March 15, 2021
Vehicle : Socata MS894A, N42BF
NTSB No. : ERA21LA155
Investigator : Todd Gunther, AS-WPR

2. COMPONENTS EXAMINED

Exemplar and broken cowling latches

3. DETAILS OF THE EXAMINATION

On March 15, 2021, about 1514 eastern daylight time, a Socata MS894A airplane was substantially damaged when it was involved in an accident in Monroe, GA. The pilot sustained minor injuries. According to the pilot, during flight the cowling suddenly separated and struck the right side of the windscreen, which punctured a large hole in the canopy, allowing wind inside the cabin. The pilot subsequently performed a landing in a field, where the airplane struck trees during the landing. The cowling was found near where the airplane wreckage was located. The left and right front cowling latches were retained for examination.

Figure 1 and Figure 2 show the cowling latches, as received, from opposite sides. The latches consisted of an outer housing that could be actuated over the latch assembly, affixed by two separate rivets. On the intact latch, used as an exemplar in this examination, there was a hook affixed to the latch through a riveted U-shaped clasp, inserted into a T-shaped shaft and held in place via a cotter pin. This shaft was joined to the latch body by a pin. This hook and shaft subassembly was missing in the broken latch, as exemplified in the open positions in Figure 3.

Figures 4 and 5 show views of the hook and shaft subassembly of the intact latch. The flattened hook face narrowed to a small cylindrical shape, which fastened into the T-shaped shaft. The hook was held stationary by the cotter pin, shown in Figure 4. Just outside of the hook and clasp were randomly-oriented scratch marks located on the inside face (see Figures 4 and 5). These scratches were also on the inside surface of the latch

body on the broken latch, as illustrated in Figure 6. The number of scratches, their depth and location were comparable on both latch interiors.

While the clasp was still riveted to the latch (Figure 6), the hook subassembly was missing. Figure 7 and Figure 8 contrast the riveted side walls of the housing and latch body interiors of the intact and broken latches, respectively. As shown in Figure 8, the pin was missing from the pinhole on the right side, though the riveted connection was still intact.

Figure 9 shows a closer view of this area, illustrating the damage on the latch body interior. Figure 10 shows the annotated image of the damage around the pin hole shown in Figure 9. Overall, the damage was consistent with smearing of material, consistent with an adjacent component sliding along the surfaces shown. The smearing direction was generally outward, parallel to the sliding and impact damage on the adjacent rivet head. In addition, there was material deformed outward from the pin hole, including outward smearing on the hole edge. This deformation was parallel to and consistent with the other smearing features on the latch body interior.

Figures 11 and 12 show the opposite interior sides of the intact and broken latch, respectively. Like with the right side, this left side of the latch body interior exhibited a riveted connection with the outer housing adjacent to the pinhole.

Figure 13 shows a closer view of the pinhole adjacent to the rivet on the left side. Unlike the previous interior face, the amount of damage was confined to circular wear marks around the pin hole. These wear marks were approximately 0.03 inches in width and were located around opposite sides of the pin. These marks were consistent with interaction of the latch body surface with the side wall of the T-shaped shaft.

There were no other indications of damage on the broken cowling latch (not also present on the intact latch). The witness marks and the absence of the hook and shaft subassembly were consistent with the loss of the pin. However, as there were no additional subcomponents submitted to the Materials Laboratory, no further information on the nature of the pin failure could be determined.

Erik M Mueller
Materials Research Engineer



Figure 1 – View of the cowling latches, as received, in the closed position.



Figure 2 – View of the opposite side of the cowling latches in Figure 1.



Figure 3 – View of the cowling latches, as received. The latches are in the open position, showing the missing hook and shaft subassembly in the upper latch.

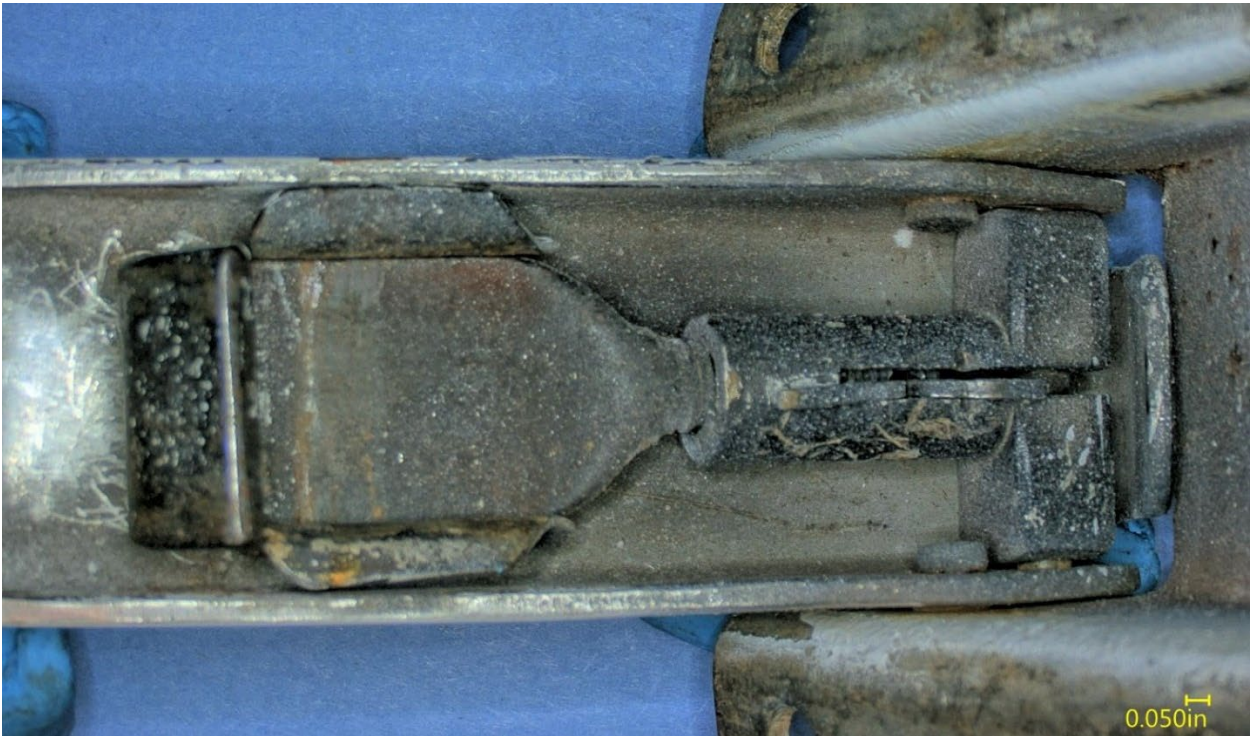


Figure 4 – View of the inside of the intact latch, showing the hook, shaft, and cotter pin subassembly attached to the latch by a pin.

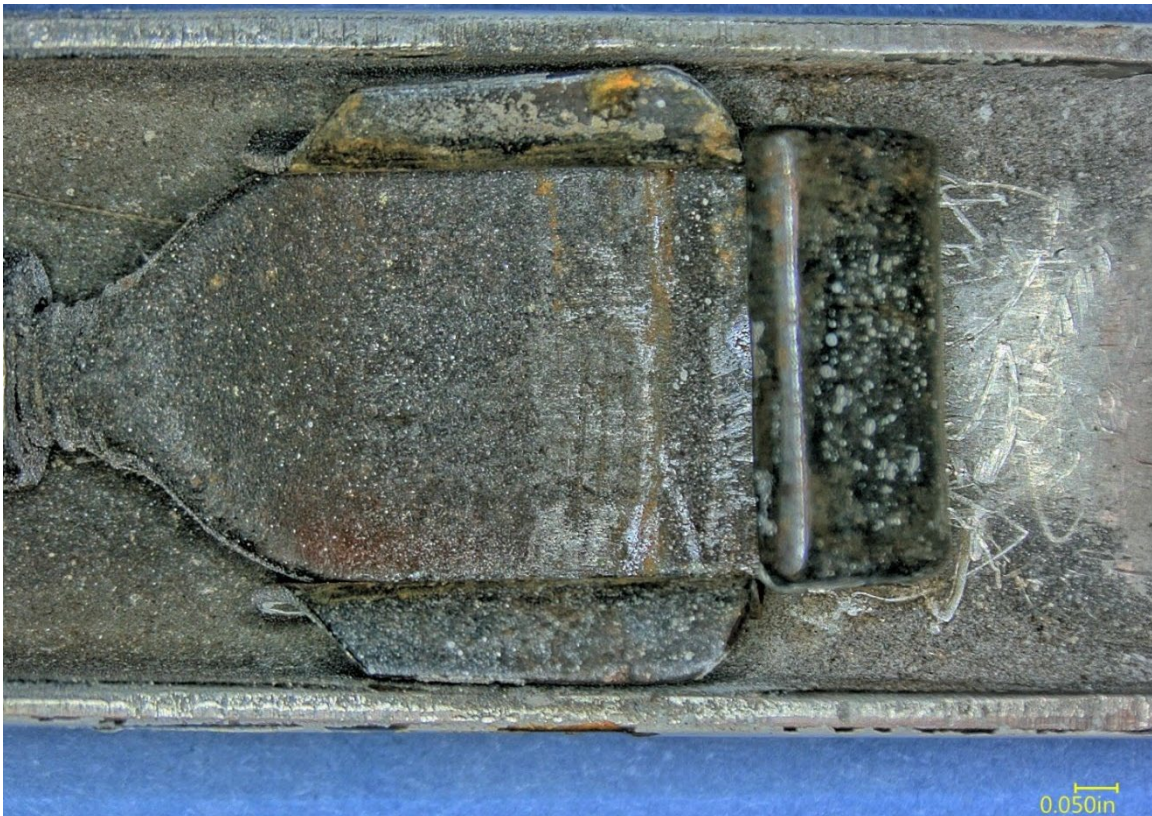


Figure 5 – View of the hook end of the intact latch.



Figure 6 – View of the riveted clasp of the fractured latch.



Figure 7 – Angled view of the right side pin and rivet attachments of the intact latch.



Figure 8 – Angled view of the right side pinhole and rivet of the broken latch.



Figure 9 – Closer view of the right side rivet and pin hole from the latch interior in Figure 8.

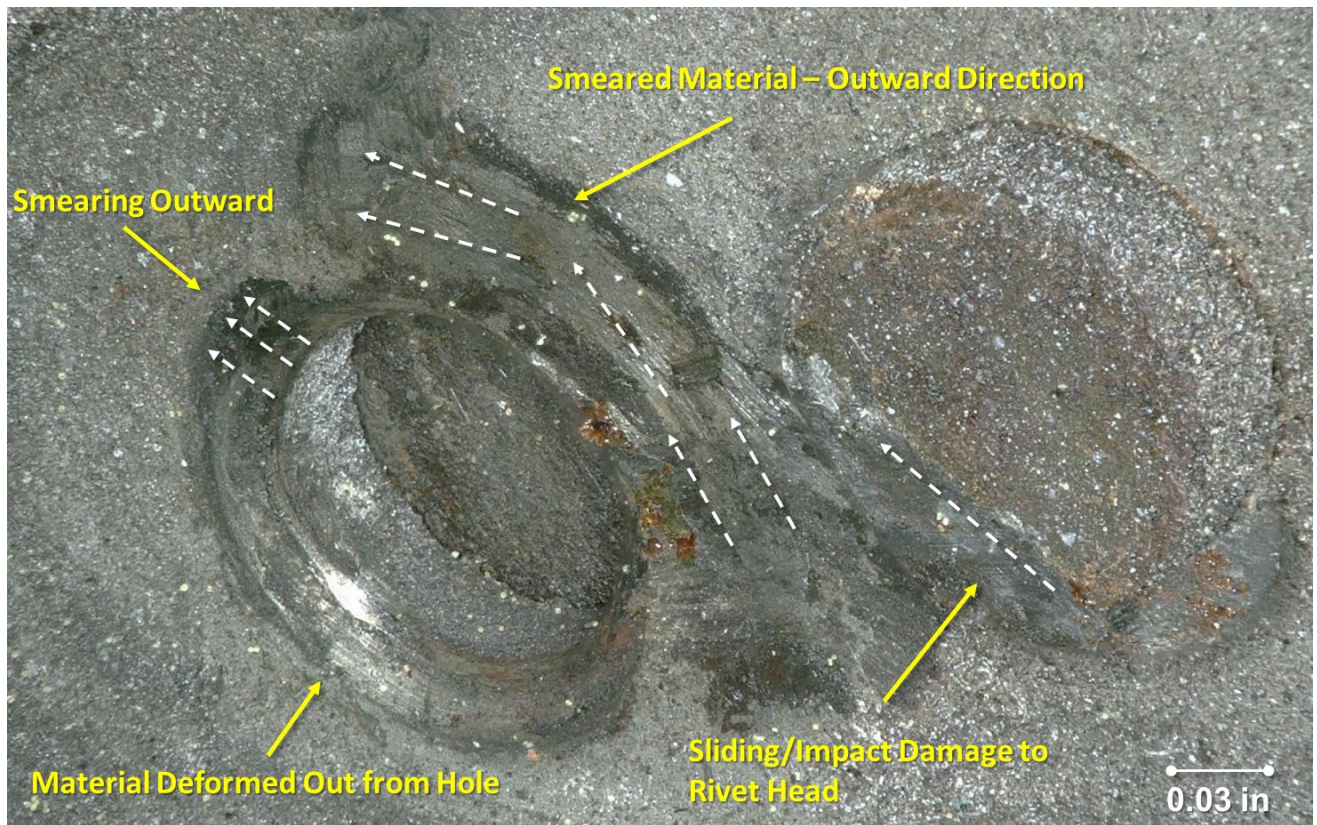


Figure 10 – Annotated view of Figure 9, showing the damage and witness marks present.



Figure 11 – Angled view of the left side pin and rivet attachments of the intact latch.



Figure 12 – Angled view of the left side pinhole and rivet of the broken latch.

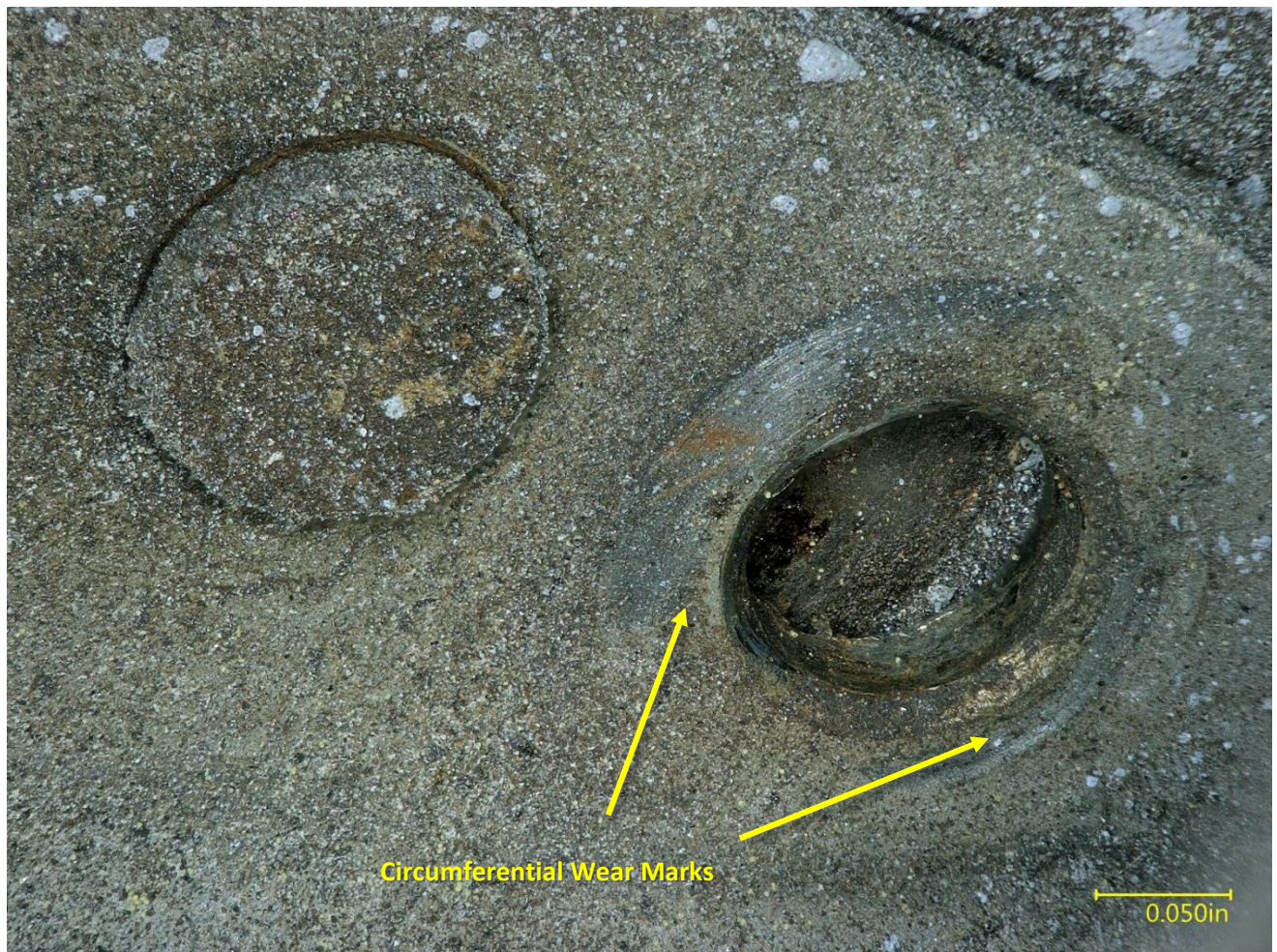


Figure 13 – Closer view of the left side rivet and pin hole from the latch interior in Figure 12.