



NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety

STRUCTURES GROUP CHAIRMAN'S FACTUAL REPORT

December 17, 2020

A. ACCIDENT

DCA20LA107

Operator: Swift Air, Flight 3518
Location: Victorville, California
Date: May 19, 2020
Time: 1500 Pacific Daylight Time (PDT)
Aircraft: Boeing 737-8Q8
Registration: N820TJ

B. STRUCTURES GROUP

Chairman: Clinton R. Crookshanks
National Transportation Safety Board
Denver, Colorado

Member: Patrick Lusch
Federal Aviation Administration
Washington, District of Columbia

Member: Jim Talay
The Boeing Company
Long Beach, California

Member: Gilmer (Tripp) Carter
Swift Air, LLC
Greensboro, North Carolina

C. SUMMARY

On May 19, 2020, about 1500 Pacific Daylight Time (PDT), Swift Air flight 3518, a Boeing B737-800, N820TJ, was climbing through about 8,000 feet when the flight crew heard a loud bang but the systems and engine indications remained normal. The flight crew elected to continue to San Diego International Airport (SAN), San Diego, California. Post-flight examination of the airplane found that the vertical stabilizer dorsal fin and several other panels

were missing. The left horizontal stabilizer was substantially damaged from impact with the missing components. The flight was operated as a 14 Code of Federal Regulations Part 121 scheduled passenger flight from Victorville Airport (VCV), Victorville, California, to SAN.

D. DETAILS OF THE INVESTIGATION

1.0 Aircraft Examination and Damage

The NTSB did not travel to the scene or examine the aircraft in person. All work was done by the operator and a repair team from Boeing under the direction of the NTSB.

Post-flight inspection of the aircraft found that the dorsal fin and three panels on the lower left side of the vertical stabilizer were missing (Figure 1). The missing panels and dorsal fin were not recovered. The fuselage crown skin, left horizontal stabilizer, and vertical stabilizer sustained damage. The upper fuselage crown skin was dented, punctured, and gouged at four locations between fuselage station (FS) 666 and FS 1005 and between stringer (S) S-2L and S-5L. The left horizontal stabilizer leading edge had multiple dents, gouges, and punctures along its length. The left horizontal stabilizer lower skin had multiple dents, gouges, and punctures from stabilizer station (SS) 267 outboard to the tip. The left horizontal stabilizer upper skin had multiple dents, gouges, and punctures from SS 75 to the tip. The left horizontal stabilizer front spar upper chord was fractured between SS 263 and SS 278, the lower chord was deformed between SS 298 and SS 301, and the web was gouged at SS 226 and SS 264.5. The panel attach structure on the lower left side of the vertical stabilizer was fractured and deformed in several places.



Figure 1-N820TJ missing dorsal fin and vertical stabilizer panels.

The dorsal fin is normally attached to the upper fuselage at 14 locations. Figure 2 is a photo of the attach points on the accident airplane after the accident with the holes numbered for identification and the required fastener (bolt) part numbers.

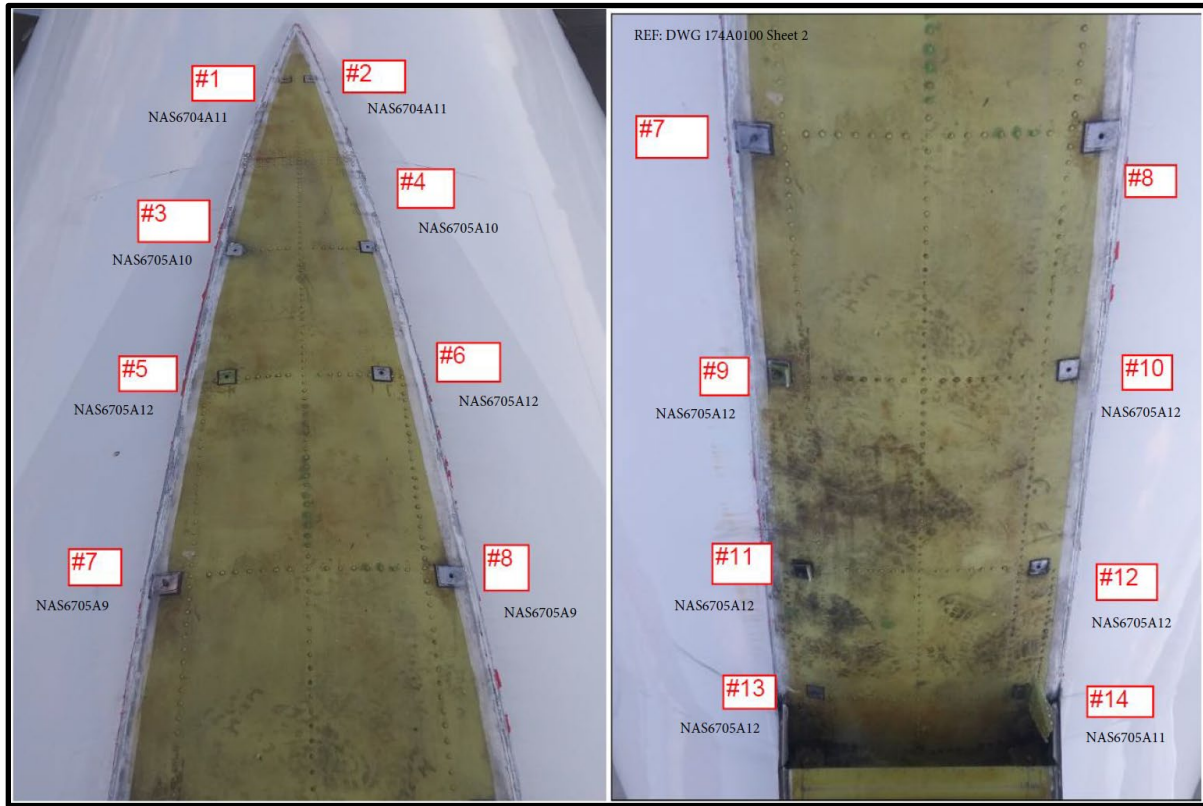


Figure 2-N820TJ Dorsal Fin attach points and required fasteners.

There were no bolts found in holes 1-6, 8, 10, 12, and 13. Bolts remained in holes 7, 9, 11, and 14. Pieces of the dorsal fin rib structures remained attached to the bolts in holes 9, 11, and 14. Three loose bolts were recovered on the interior ceiling panels beneath the dorsal fin location. Photographs of the 4 installed bolts prior to removal were supplied to the investigation by the operator as shown in Figure 3. The bolt installed in hole 7 was marked NAS6705-9, the bolt in hole 9 was marked NAS6705-12, the bolt in hole 11 was marked NAS6705-12, and the bolt in hole 14 was marked NAS6705-12. One of the three loose bolts was marked NAS6705-9, one was marked NAS6705-12, and the marking on the third was partially unreadable but contained an 8, 3, 0 1M, and S (Figure 4).

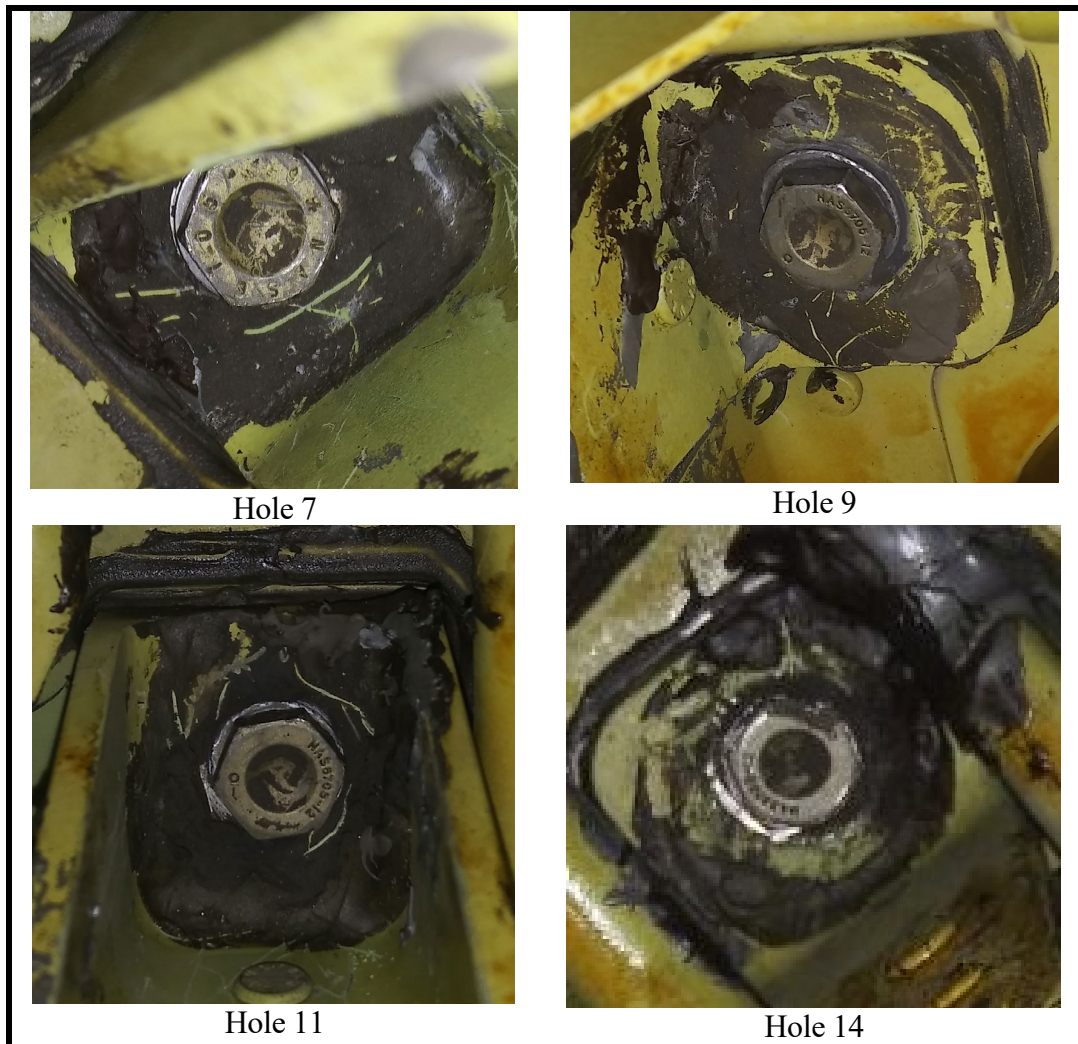


Figure 3-Bolts remaining at locations 7, 9, 11, and 14.

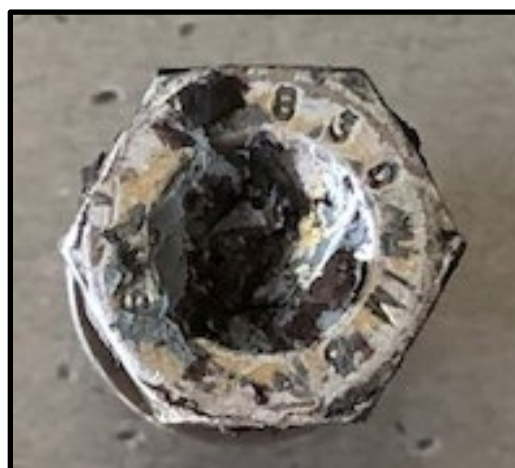


Figure 4-Loose bolt with partially unreadable markings.

The photos showed that there was evidence of old sealant material around the installed bolt locations and remnants on the heads of the bolts but no sealant covering the bolt heads. The hole

locations where there were no bolts exhibited a similar lack of sealant. The dorsal fin rib sections that were attached at locations 9, 11, and 14 all had an intact nut plate installed on the upper side that the bolts were threaded into.

The operator shipped the recovered bolts, fractured dorsal fin components, and portions of the horizontal stabilizer to the NTSB Materials Laboratory for examination. Only 6 of the 7 recovered bolts were received from the operator. Photographic evidence indicated the loose bolt found on the ceiling panel with the partially unreadable head marking was the bolt not included in the shipment. The details of the hardware examination can be found in the NTSB Materials Laboratory Factual Report 20-040 in the public docket.