

NATIONAL TRANSPORTATION SAFETY BOARD

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



November 1, 2018

MATERIALS LABORATORY FACTUAL REPORT

Report No. 18-087

A. ACCIDENT INFORMATION

Place : Melville, New York
Date : May 30, 2018
Vehicle : North American SNJ-2, N62382
NTSB No. : WPR18FA155
Investigator : Andrew Swick, AS-WPR

B. COMPONENTS EXAMINED

Cabin heater assembly with section of exhaust pipe.

C. DETAILS OF THE EXAMINATION

An overall view of the cabin heater assembly is shown in figure 1. The submitted heater assembly components consisted of an upper and a lower airflow chambers that as assembled surround a section of exhaust pipe. The section of exhaust pipe that was enclosed between the heater assembly halves is shown resting in the lower half of the heater assembly in figure 1.

Data plates were attached to the heater assembly pieces. The data plate on the lower half was stamped with a manufacture date of June 6, 1955. The date field in the data plate on the upper half was not stamped.

The submitted section of exhaust pipe was examined visually. The exhaust pipe was crushed at the outboard end but otherwise appeared intact with no evidence of holes or cracks in the pipe wall.

A closer view of the outboard ends of the heater assembly halves is shown in figure 2. Cracks were detected visually along welds at the outboard ends where the interior and exterior walls of the chamber met as indicated in figure 2. The cracks at each location extended through the wall.

In the upper half of the assembly, the crack was approximately 0.9 inch long and had a crack opening displacement of approximately 0.05 inch as shown in figure 3. Fracture surfaces were viewed through the crack opening using a stereo optical microscope, and fracture features were covered in dark oxide consistent with a preexisting crack.

The crack in the lower half of the assembly is shown in figure 4. The fracture surfaces of the crack were displaced laterally, and impact marks corresponding to contact with the exhaust tube were present on the surface of the interior wall of the chamber adjacent to the crack. Portions of the fracture surface of the crack had flat features perpendicular to the interior surface consistent with a preexisting crack. However, light gray fracture features on slant planes were observed on the fracture surfaces adjacent to the interior surface of the chamber wall, consistent with a recent ductile overstress fracture. As noted above, the exhaust pipe was crushed near this area of damage.

Weld segments overlapping the as-manufactured welds and welded patches consistent with repair welds were noted in multiple locations on the heater assembly, including in the cracked areas. Several areas of repair welds are noted in figures 3 and 4.

Matthew R. Fox, Ph.D.
Senior Materials Engineer



Figure 1. Overall view of the submitted components.

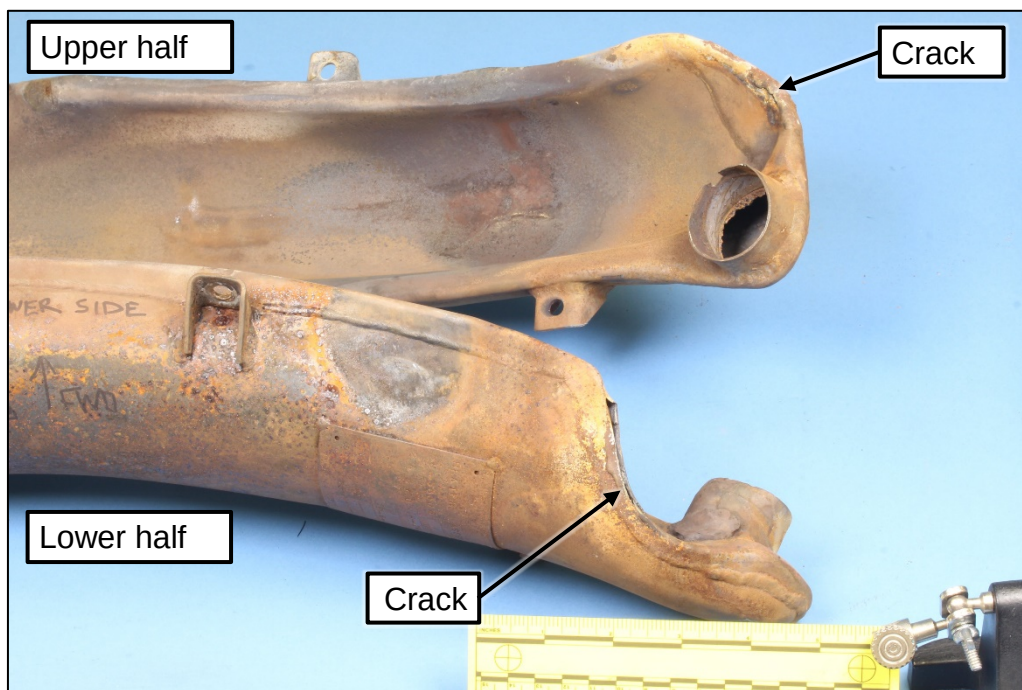


Figure 2. Closer view of the cracked ends of the heater assembly halves.

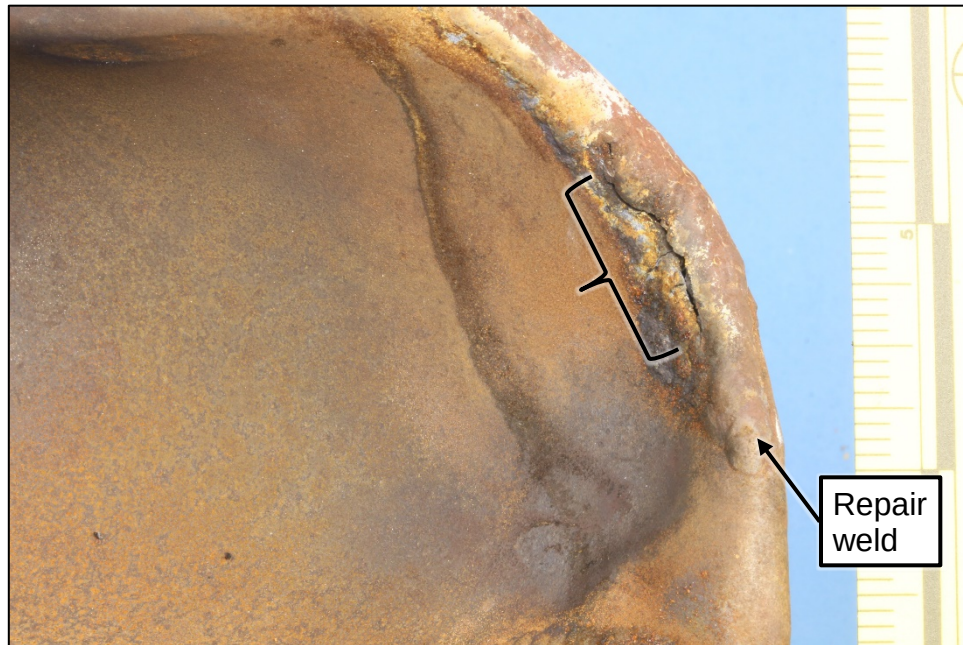


Figure 3. Close view of the crack in the upper half of the heater assembly.

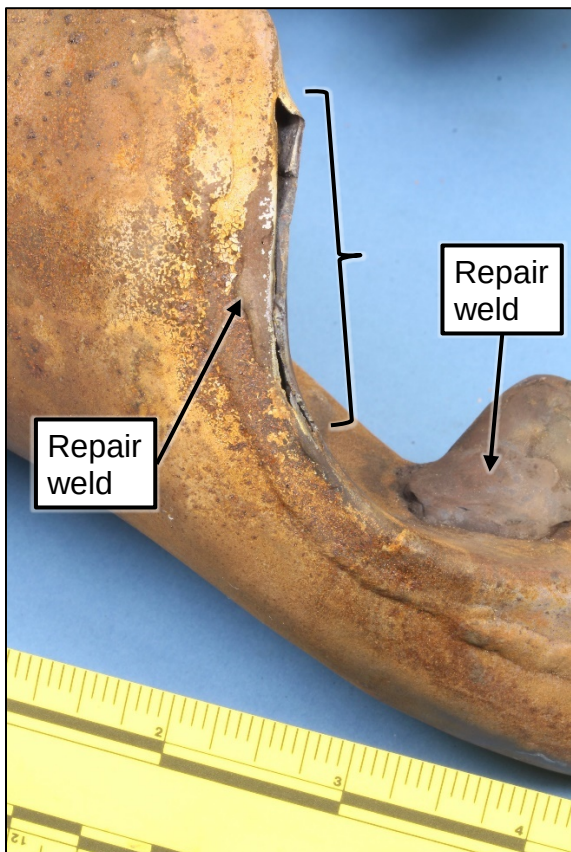


Figure 4. Closer view of the crack in the lower half of the heater assembly.