

NATIONAL TRANSPORTATION SAFETY BOARD

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



June 14, 2021

MATERIALS LABORATORY FACTUAL REPORT

Report No. 21-046

A. ACCIDENT INFORMATION

Place : Lubbock, TX
Date : 10/26/2020
Vehicle : Cessna 210, N9622T
NTSB No. : CEN21LA030
Investigator : Josh Lindberg

B. COMPONENTS EXAMINED

Portion of a cabin air heat exchanger (figure 1)

C. DETAILS OF THE EXAMINATION

A portion of a cabin air heat exchanger made by the Hanlon & Wilson company, model 1250200-1, was examined. This heat exchanger used exhaust gasses through an interior volume to heat cabin air on an exterior volume. A section of pipe associated with the exhaust gas exhibited a crack approximately .5 inch long (figure 2). Close examination of the crack revealed deformation of the pipe towards the interior and the fracture faces exhibited shiny corrosion free surfaces (figure 3). This crack was consistent with a puncture due to mechanical force likely incurred during the accident.

After disassembly of the external cover the space where the cabin air would circulate was revealed (figure 4). The sheet metal barrier between the exhaust gas and the cabin air exhibited a region with branching cracks (figure 5). The branching cracks exhibited fracture faces with corrosion and deposits on the surface consistent with the cracks being preexisting to the accident. These cracks had the appearance of having been caused by thermal cycles resulting in thermal fatigue of the sheet metal. The largest continuous crack was approximately 1 inch long with a maximum width of approximately 0.05 inch (figure 6). This crack would have allowed exhaust gasses to mix with the cabin air.

Joseph Panagiotou
Fire Protection Engineer



Figure 1: Portion of heat exchanger as received.



Figure 2: Crack on exhaust gas pipe



Figure 3: External and internal views of the crack on the exhaust gas pipe.



Figure 4: Heat exchanger with cover removed exposing the barrier between the exhaust gas and cabin air.



Figure 5: Branching cracks on the barrier between exhaust gas and cabin air.



Figure 6: Crack fracture face exhibiting corrosion on the surface.