

# NATIONAL TRANSPORTATION SAFETY BOARD

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



August 16, 2016

## MATERIALS LABORATORY FACTUAL REPORT

Report No. 16-074

### A. ACCIDENT INFORMATION

Place : Williams, California  
Date : August 30, 2014  
Vehicle : Travel Air C-4000 (N9952)  
NTSB No. : WPR14LA361  
Investigator : Howard Plagens (AS-WPR)

### B. COMPONENTS EXAMINED

Control tube.

### C. DETAILS OF THE EXAMINATION

The control tube had separated between two collars, approximately 7 inches from one end, as shown in Figure 1.

The control tube fracture surfaces are shown in Figure 2. The fracture surfaces were heavily smeared, and the majority was covered with the same glossy, hard substance that coated the inside of the control tube (yellow arrows, Figure 2). Per an internal NTSB Materials Lab email report dated November 13, 2015, this substance was determined via Fourier Transform Infrared (FTIR) spectroscopy to be an organic compound likely consisting of solidified corrosion inhibiting compound.

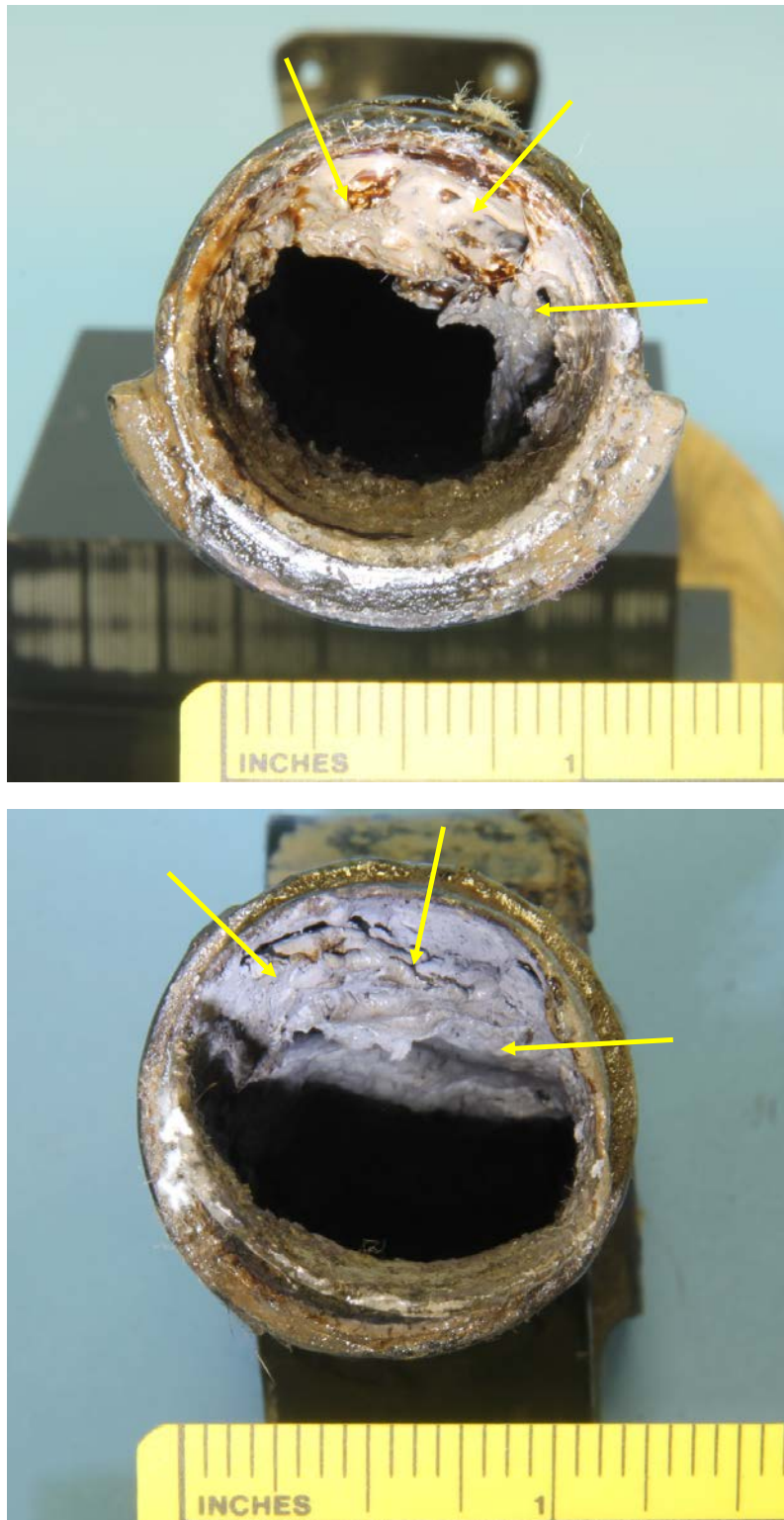
The areas of the fracture surfaces minimally covered in the hardened substance and largely undamaged had features consistent with overstress. The fracture occurred in a spiral along an approximately 45 degree angle, which is consistent with torsional overstress.

A cross-section was prepared through the control tube away from the fracture. Corrosion was observed on the inner surfaces of the control tube. Significant thinning of the control tube wall thickness was visible, with the most corroded sections retaining roughly half to two-thirds of the wall thickness of the least corroded sections. The thinner wall thickness is shown in Figure 3. The thinner wall thickness resulting from the corrosion likely could not support the same loading conditions as the full wall thickness, and could have contributed to the overstress separation of the control tube.

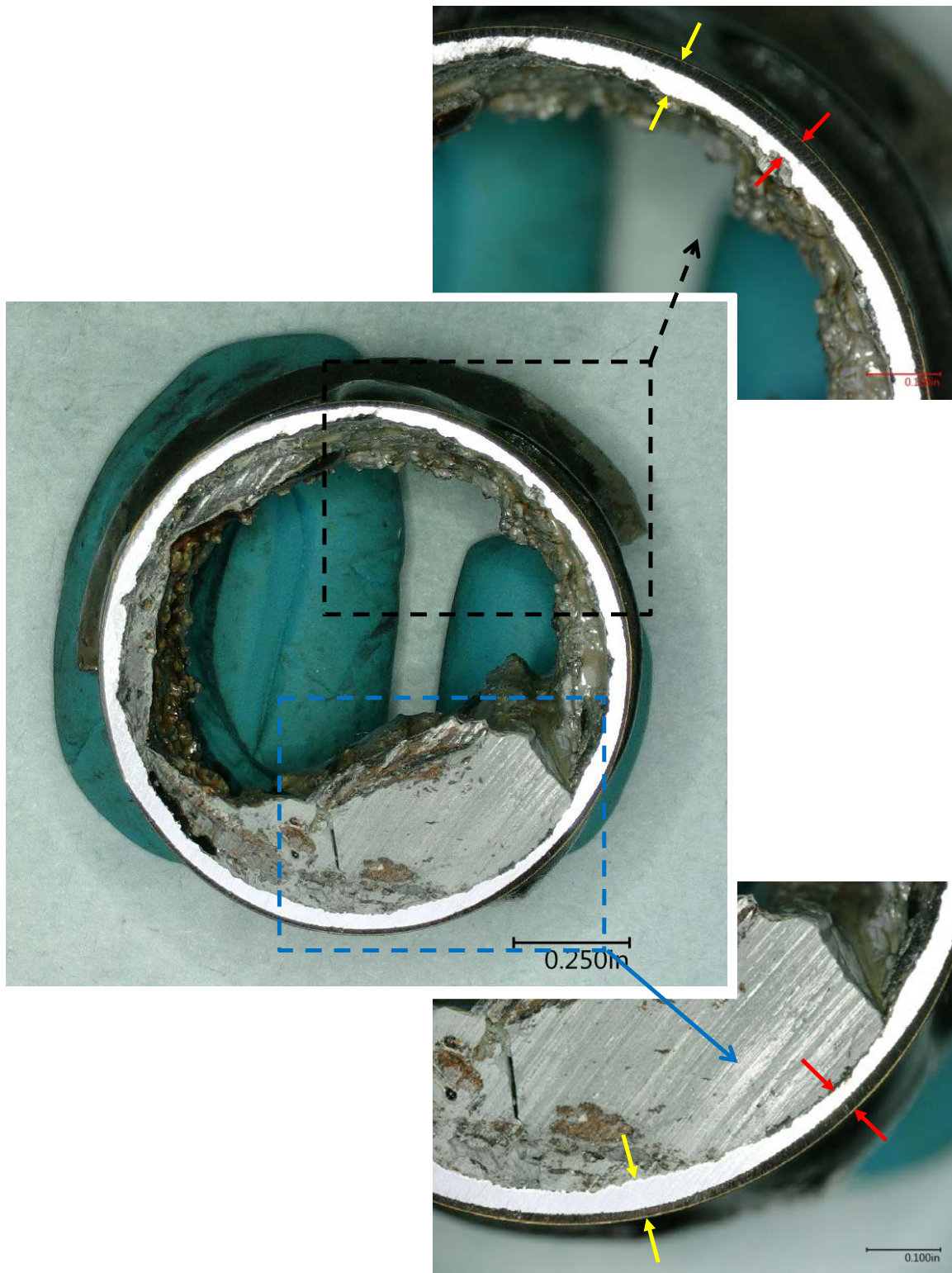
Adrienne V. Lamm  
Materials Engineer



**Figure 1:** An overall photo of the separated control tube is shown in the top photo. The bottom photo shows a close-up photo of the separation in the control tube.



**Figure 2:** Close-up photos of the fracture surfaces on the separated control tube. The yellow arrows point to the hardened substance observed inside the control tube.



**Figure 3:** Digital microscope images of the cross-section prepared through the control tube. The red arrows indicate locations where the wall thickness had thinned due to corrosion, as compared to other less corroded areas indicated by yellow arrows.