

NATIONAL TRANSPORTATION SAFETY BOARD

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



April 28, 2020

MATERIALS LABORATORY STUDY REPORT

Report No. 20-018

A. ACCIDENT INFORMATION

Place : Reno, NV
Date : March 17, 2019
Vehicle : Piper PA 24, N5028P
NTSB No. : WPR19LA098
Investigator : Stephen Stein (AS-WPR)

B. COMPONENTS EXAMINED

Engine mount/nose landing gear (NLG) truss tubes pieces.

C. DETAILS OF THE STUDY

Eight pieces containing nine tubes from the engine mount/nose landing gear (NLG) truss from the accident aircraft were submitted for examination. The truss tube pieces were labeled with roman numerals I-IX, with tubes II and III connected as one piece.

All the pieces had at least one fracture surface on the truss tubes. The fracture surfaces on each truss tube are shown in Figures 1-9. The fracture surfaces were non-planar and rough, which is consistent with overstress. The remaining truss tube surfaces were flat with evidence of cutting, which is consistent with sectioning to facilitate removal from the wreckage.

Corrosion products were observed on the inner surfaces of all the truss tubes. Several of the truss tubes had evidence of wall thinning resulting from the internal corrosion. Close-up images of exemplar truss tubes with wall thinning are shown in Figures 10-12.

A few truss tubes had tearing adjacent to their fracture surfaces. The tearing was likely due to deformation prior to final separation. In general, the truss tubes with tearing had less internal corrosion products.

The condition of each truss tube submitted is summarized in Table 1.

Table 1: Truss Tube Condition Summary

Truss Tube	Internal Corrosion Deposits	Tearing Adjacent to Fracture Surface	Wall Thinning	Figure
I	Heavy	No	Yes	1
II	Moderate	No	Yes	2,10
III	Moderate	No	Yes	2,10
IV	Heavy	No	Yes	3,4,11,12
V	Heavy	No	Yes	5
VI	Heavy	No	No	6
VII	Moderate	Yes	No	7
VIII	Light	Yes	No	8
IX	Light	Yes	No	9

Heavy: Thick deposit build-up covering all the inner surfaces.

Moderate: Deposits coating large areas of the inner surfaces, with some build-up.

Light: Little to no deposits present, with inner surfaces still silver in color.

Adrienne V. Lamm
Materials Engineer



Figure 1: The top photo shows an overall view of truss tube I. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.

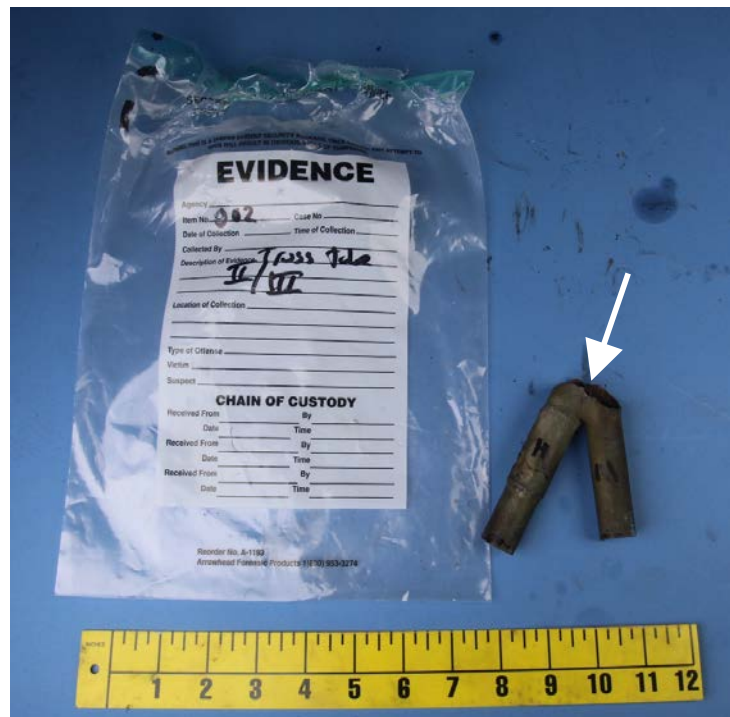


Figure 2: The top photo shows an overall view of truss tubes II and III. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 3: The top photo shows an overall view of truss tube IV. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 4: The top photo shows an overall view of truss tube IV. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 5: The top photo shows an overall view of truss tube V. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 6: The top photo shows an overall view of truss tube VI. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 7: The top photo shows an overall view of truss tube VII. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.

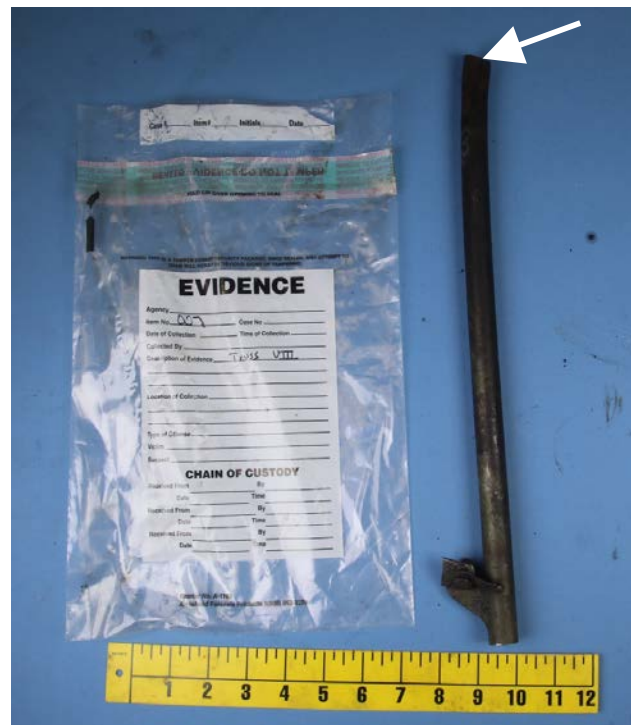


Figure 8: The top photo shows an overall view of truss tube VIII. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 9: The top photo shows an overall view of truss tube IX. The white arrow points to the viewing perspective in the close-up shown in the bottom photo.



Figure 10: Digital microscope image showing corrosion deposits on the internal surfaces of truss tubes II and III. The red arrows indicate wall thinning due to corrosion.

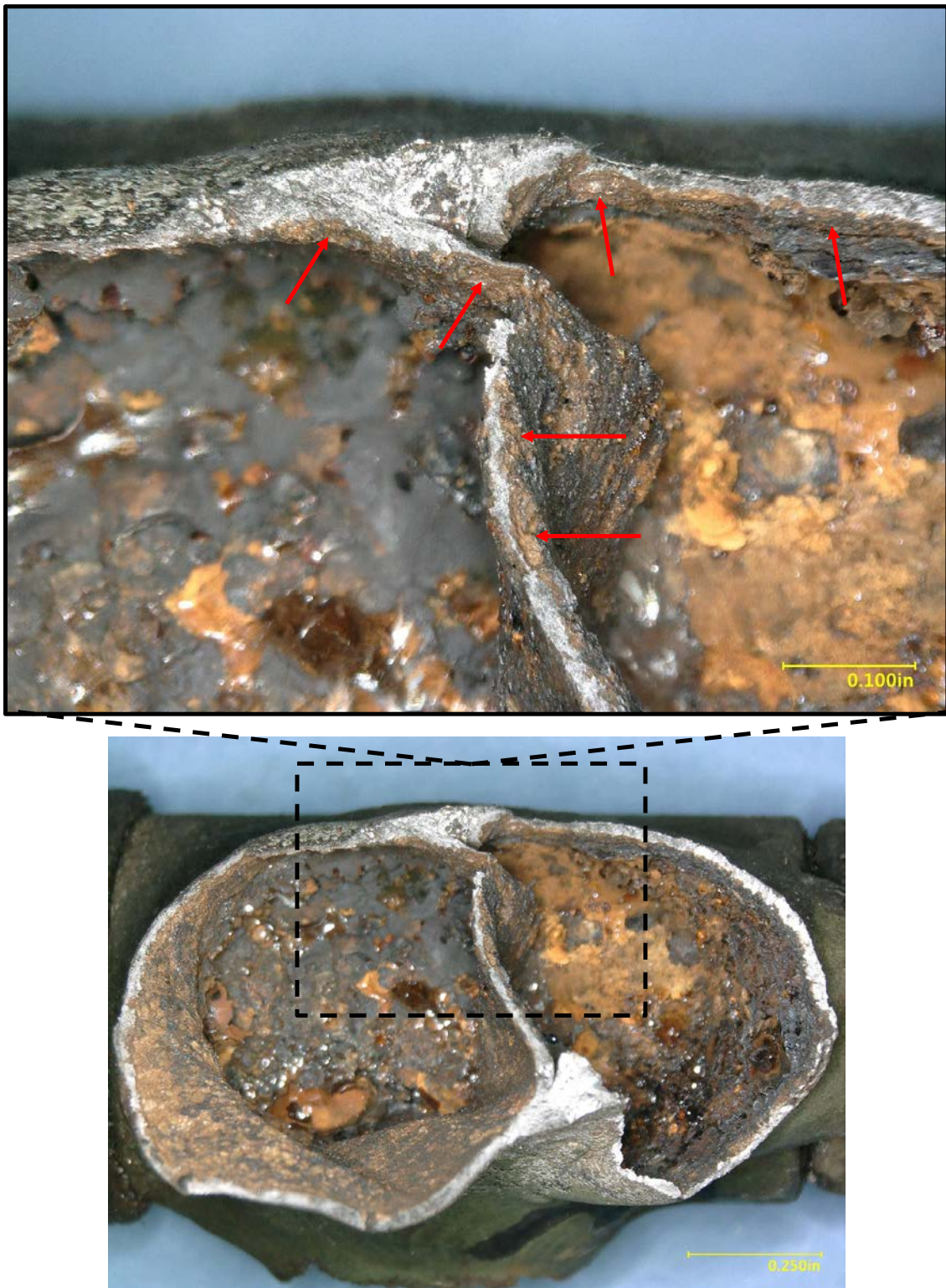


Figure 11: Digital microscope images showing corrosion deposits on the internal surfaces of truss tube IV. The red arrows indicate wall thinning due to corrosion.

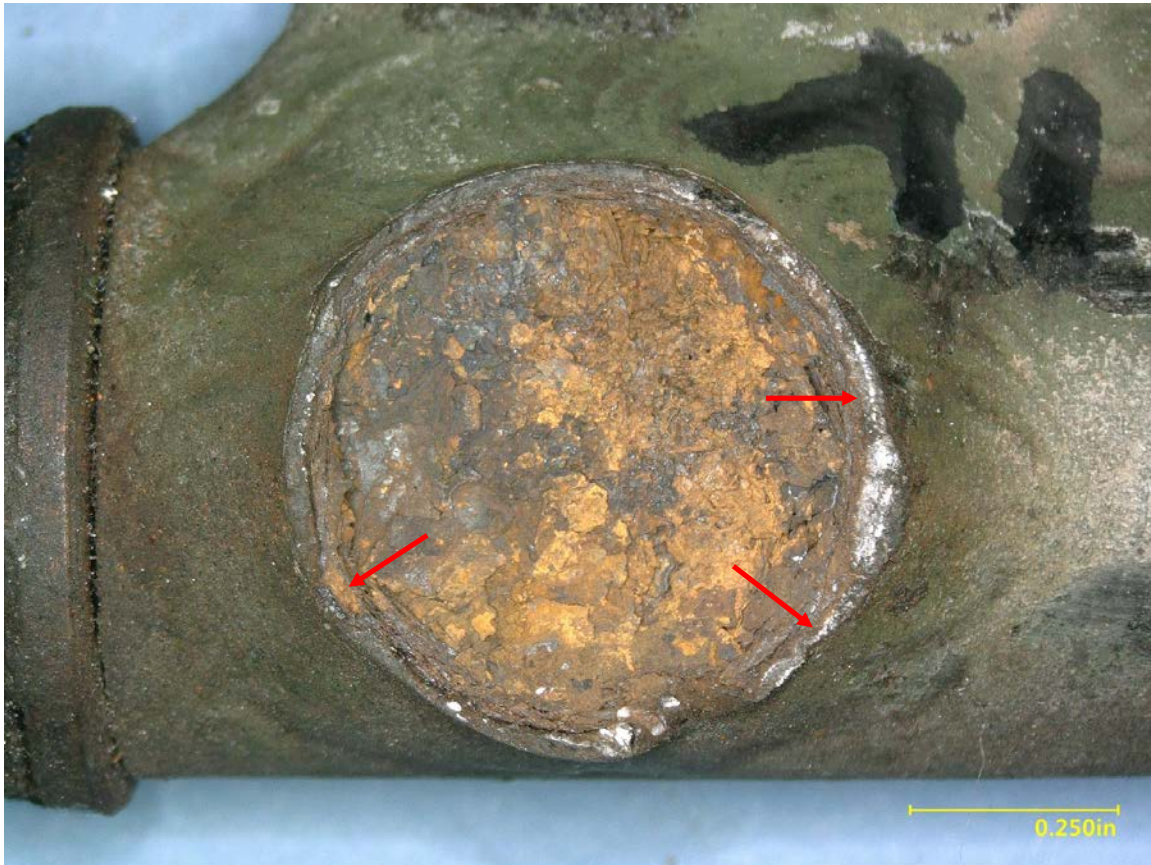


Figure 12: Digital microscope images showing corrosion deposits on the internal surfaces of truss tube IV. The red arrows indicate wall thinning due to corrosion.