

# NATIONAL TRANSPORTATION SAFETY BOARD

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



May 18, 2022

## MATERIALS LABORATORY FACTUAL REPORT

Report No. 22-019

### A. ACCIDENT INFORMATION

Place : Spring, TX  
Date : 9/29/2020  
Vehicle : Cessna 172N, N75634  
NTSB No. : CEN20LA425  
Investigator : Mitchell Gallo

### B. COMPONENTS EXAMINED

Right and left steering tubes (Figure 1).

### C. DETAILS OF THE EXAMINATION

The right and left-hand steering tubes exhibited bending deformation consistent with impact forces. The piston of the right-hand steering tube (Figure 2) was in an extended position while the piston of the left-hand steering tube was in a collapsed position (Figure 3). The steering tubes were sent for computed tomography (CT) scanning prior to their examination in the Materials Laboratory. The CT scanning revealed that the washer on the piston of the left-hand steering tube had slipped past the annular retaining crimp of the tube body and was now located aft of the crimp (Figure 4). This was in contrast with the washer on the right-hand steering tube where the washer was still on the forward side of the annular retaining crimp of the tube which is its intended position (Figure 5). The left-hand tube was sectioned to expose the piston and washer and facilitate the examination of the inner surface of the tube (Figure 6). The inside surface of the tube was examined using a stereo microscope. No evidence of abrasion was observed to suggest that the washer had been residing on the aft side of the annular retaining crimp for a sustained period of time (Figure 7). The annular crimp had also been deformed and become shallower along half of the steering tube's circumference. This reduction in depth of the annular crimp was situated along the outer radius of the bend in the steering tube as can be seen in Figure 4. The washer (Figure 8) exhibited some deformation and a raised lip along a portion of the inner bore consistent with a radial force being imposed on it by the piston. The bending deformation of the left-hand steering tube, the distortion of the annular retaining crimp, and the deformation to the washer are all consistent with the washer having been pushed past the annular retaining crimp due to impact forces.

Joseph Panagiotou  
Fire Protection Engineer



Figure 1: Steering tubes as received.



Figure 2: Right-hand steering tube.



Figure 3: Left-hand steering tube.

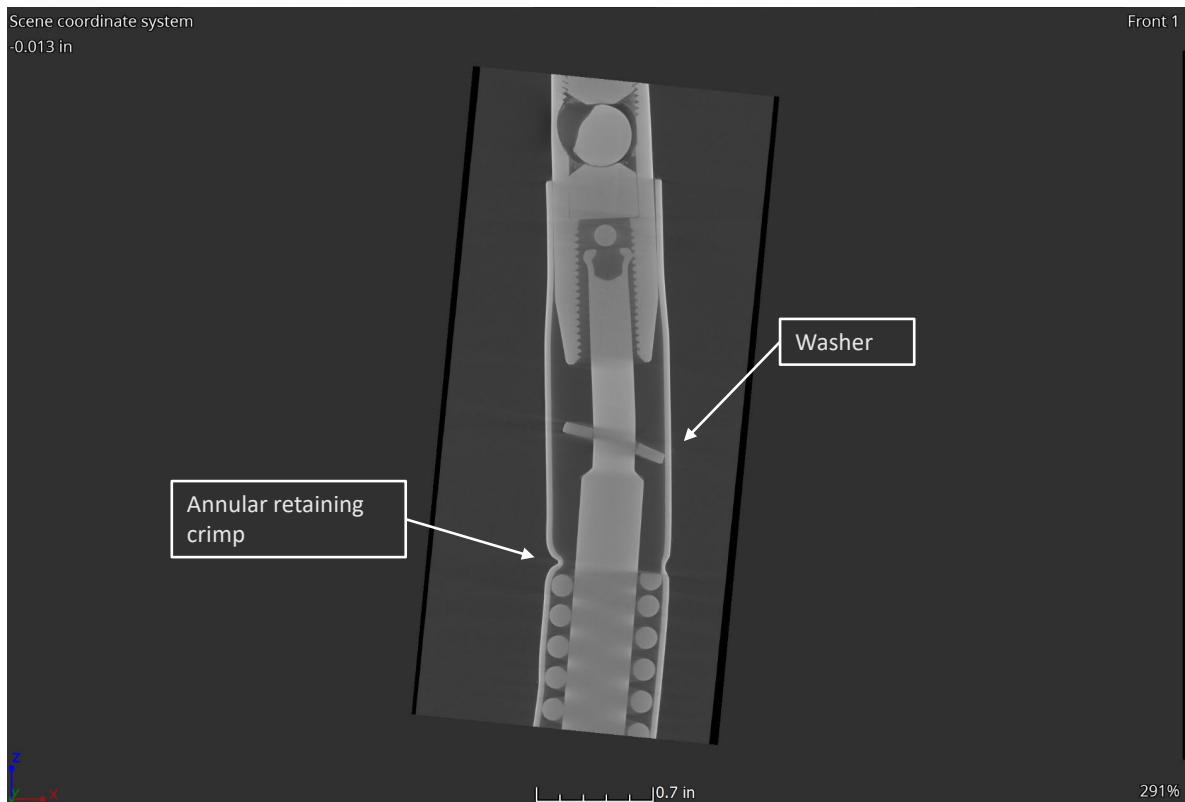


Figure 4: CT image of the left-hand steering tube centered around the annular retaining crimp.

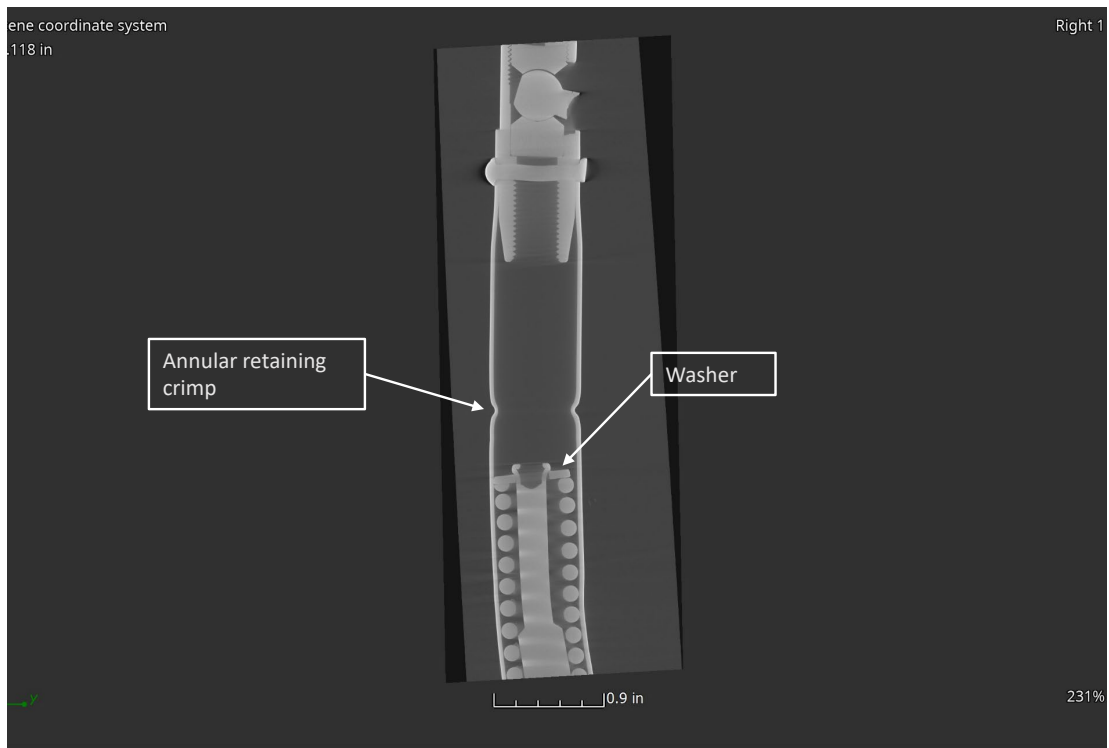


Figure 5: CT image of the right-hand steering tube centered around the annular retaining crimp.



Figure 6: Left-hand steering tube sectioned around the annular crimp.



Figure 7: Inner surface of the left-hand steering tube around the annular crimp.



Figure 8: Washer from left-hand steering tube.