NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594

September 13, 2013

MATERIALS LABORATORY FACTUAL REPORT Report No. 13-085

A. ACCIDENT

Place	:	Hallandale, FL
Date	:	May 23, 2012
Vehicle	:	Bombardier Challenger 601-3R, N207JB
NTSB No.	:	ERA12LA356
Investigator	:	Ralph Hicks, AS-ERA

B. COMPONENTS EXAMINED

Passenger door pushrod

C. DETAILS OF THE EXAMINATION

A passenger door from a Challenger 601 departed the aircraft at approximately 3000 feet on May 23, 2012. The materials laboratory received the pushrod, as illustrated in Figure 1. The rod was bent approximately 45° at the center and had fractured at one of the threaded ends. The pushrod also showed two dents approximately 3 inches from the opposite and intact end of the rod assembly.

The threaded end that had fractured is depicted in Figure 2. The threaded bolt showed compressed thread crests on one side and outstretched thread valleys on the other side (see Figure 3). The majority of the original threaded surfaces bore a layer of rust-colored oxidation. This surface oxidation was not present on any of the fracture surfaces. Examination of the fracture surface revealed dimple rupture, which is indicative of overstress (see Figure 4). The cracked areas in the stretched thread valleys also displayed dimple rupture. No other indications of other failure modes, including corrosion leading to fracture, were found. The observed features are consistent with bending overstress of the pushrod.

Erik Mueller
Materials Research Engineer

Figure 1 – The fractured pushrod, as received.

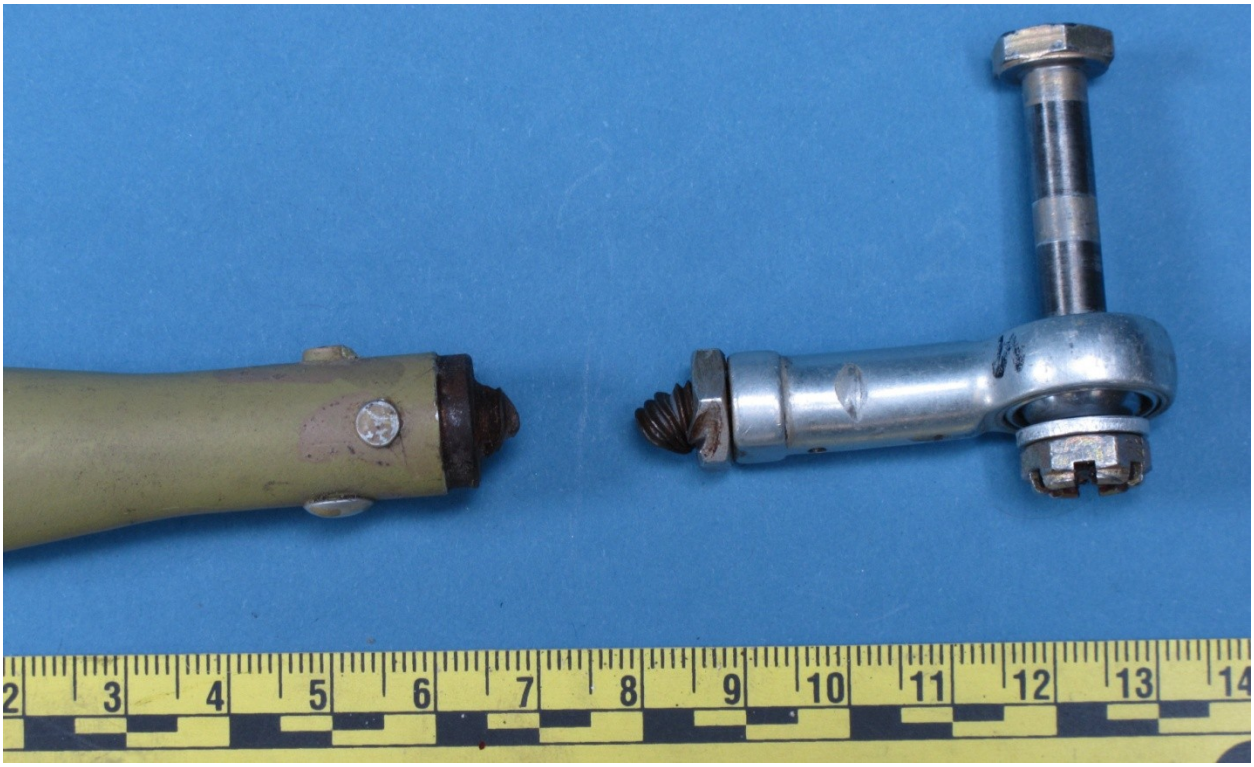
Figure 2 – The fractured end of the pushrod, as received. The threaded end shows indications of bending in the threads.

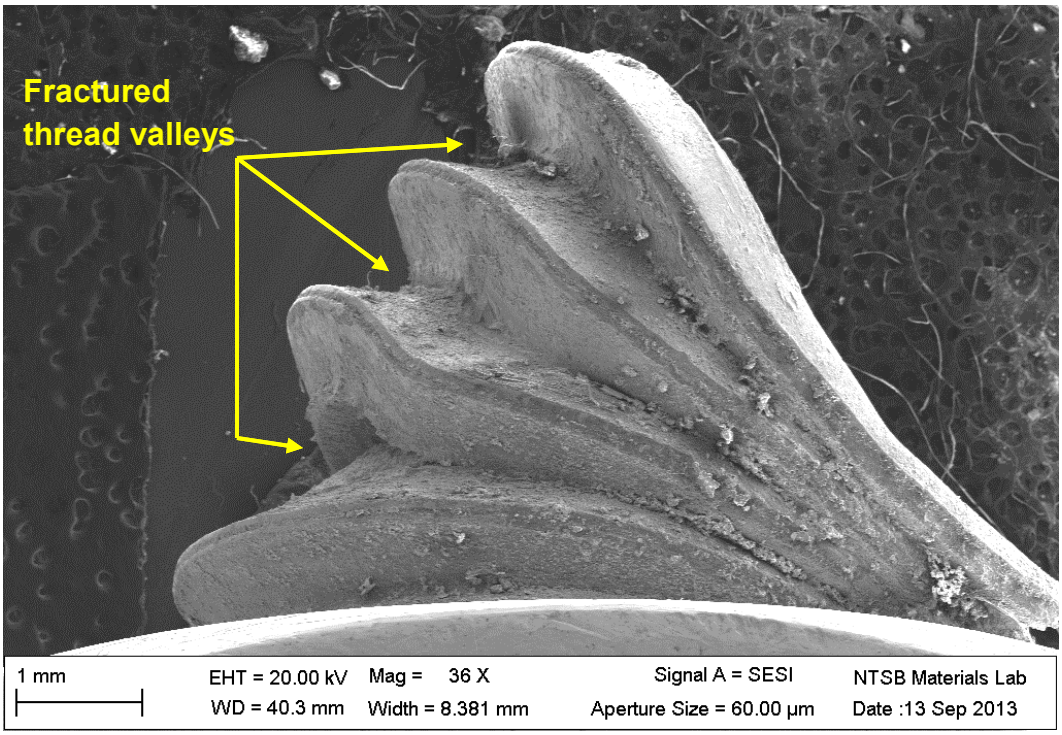

Figure 3 – Secondary electron (SE) micrograph of the fractured threaded end, showing cracking in the thread valleys on one side and compression of the thread crests on the other.

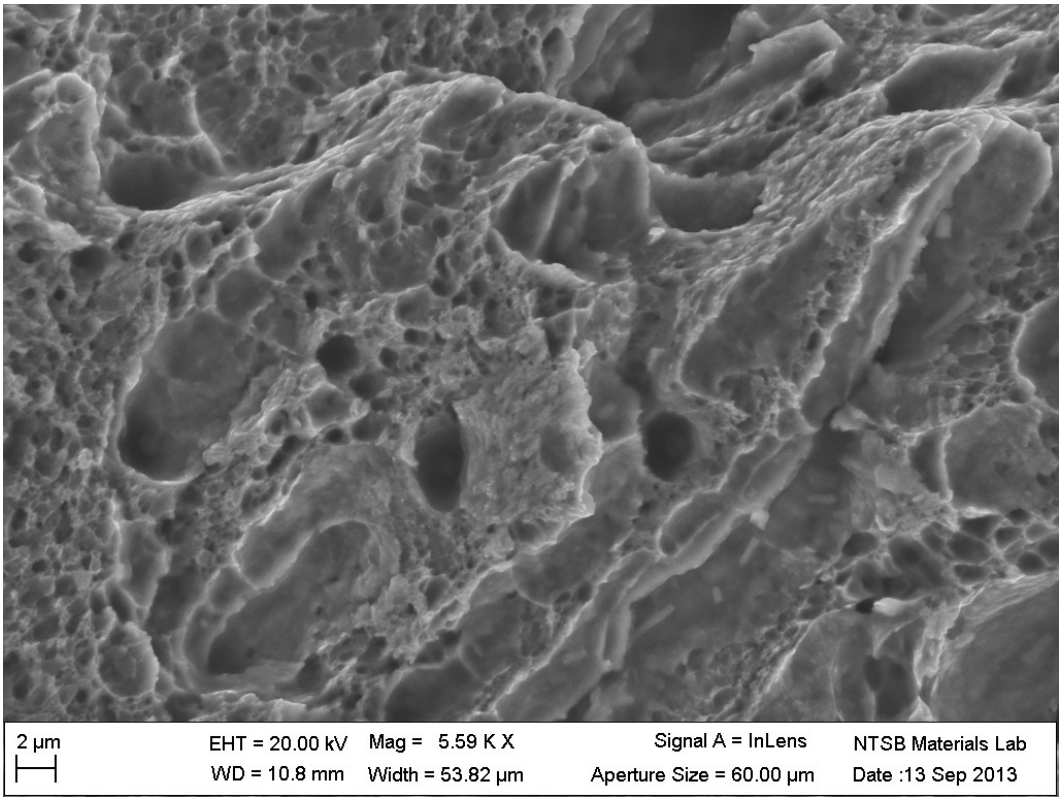

Figure 4 – SE micrograph of dimple rupture on the main fracture surface.