
NATIONAL TRANSPORTATION SAFETY BOARD

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



October 27, 2020

MATERIALS LABORATORY FACTUAL REPORT

Report No. 20-054

A. ACCIDENT INFORMATION

Place : Tucumcari, NM
Date : 9/14/19
Vehicle : Smyth Sidewinder, N492AC
NTSB No. : WPR19LA273
Investigator : Joshua Cawthra

B. COMPONENTS EXAMINED

Portion of Sensenich propeller (Figure 1).

C. DETAILS OF THE EXAMINATION

The portion of the Sensenich propeller exhibited a fracture chordwise across the propeller a little over 12 inches outboard of the center (Figure 1). A sectional cut was made to liberate the fracture surface from the main portion of the propeller for further examination (Figure 2). When exposed to oblique lighting the fracture surface exhibited two distinct regions, the larger one being relatively flat and terminating in a curved boundary and the other being on a slanted plain. The flat fracture area had a curved boundary with the center of curvature at a point on the face of the propeller blade identified as the origin in Figure 3. When examined with a 5X to 50X stereo-zoom microscope, the fracture origin area exhibited a small pit. Further examination with the scanning electron microscope (SEM) revealed fracture features consistent with progressive crack growth on the flat fracture surface in the area identified as the origin (Figures 4, 5). These fracture features are consistent with a fatigue fracture originating from the pit. Using a scanning electron microscope and orienting the fracture surface at a 45 degree incline an image of the pit at the origin area was taken as shown in Figure 6. Energy dispersive spectroscopy (EDS) of the origin area revealed chlorine containing salts consistent with a corrosion-initiated pit.

Joseph Panagiotou
Fire Protection Engineer



Figure 1: Portion of Sensenich propeller as received.



Figure 2: Section of the propeller containing the fracture surface.



Figure 3: Origin area at the center of curvature of the flat fracture containing a small pit on the face of the propeller blade.

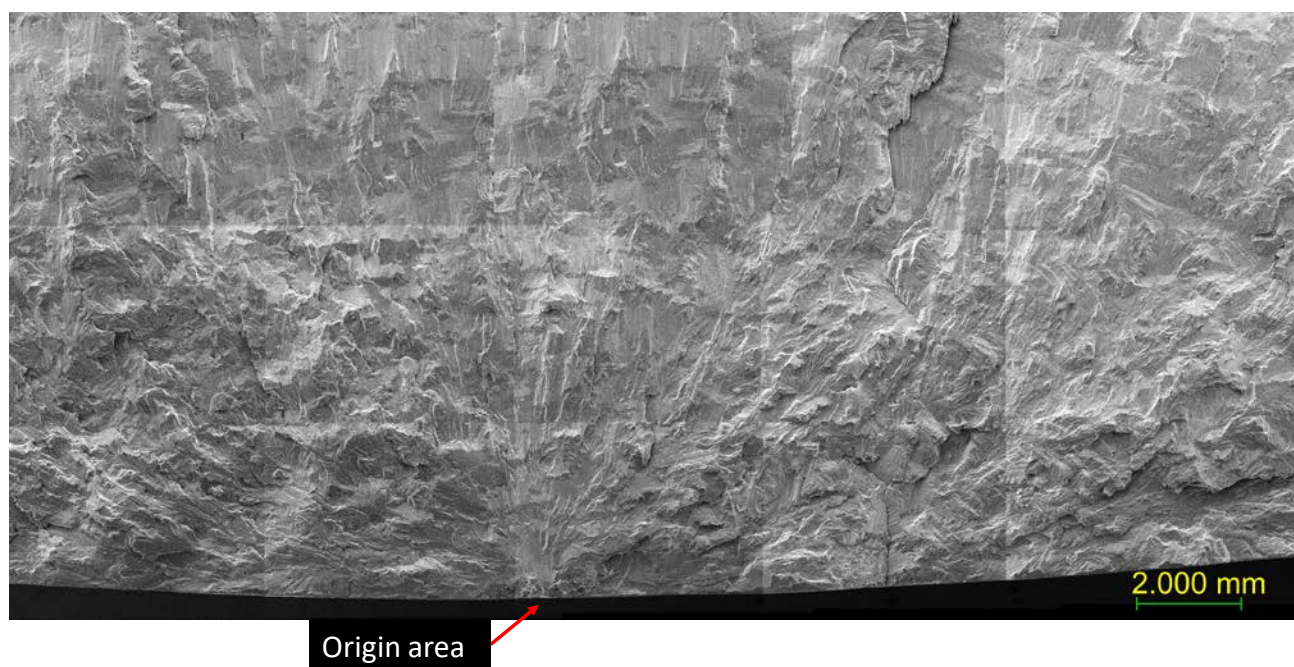


Figure 4: Secondary electron SEM montage image of the fracture surface including the origin area.

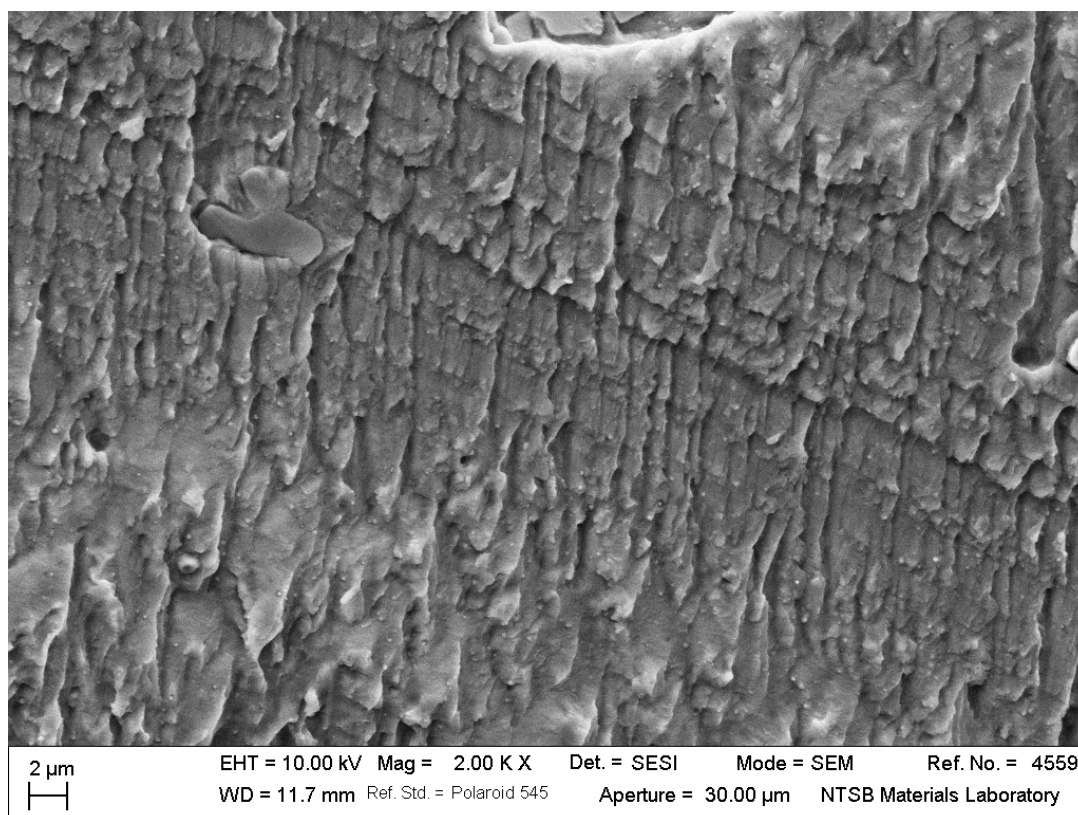


Figure 5: Secondary electron SEM image showing fracture features near the area of origin exhibiting progressive crack growth.

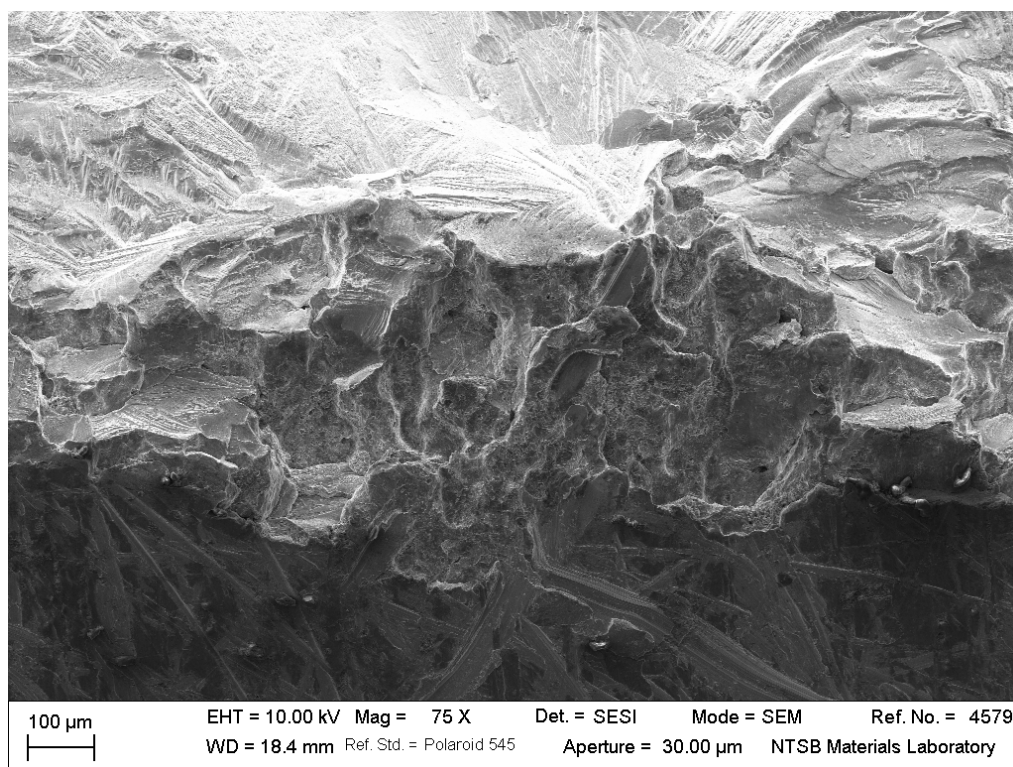


Figure 6: Secondary electron SEM image of the pit at the origin area viewed at a 45-degree angle to the face of the blade.

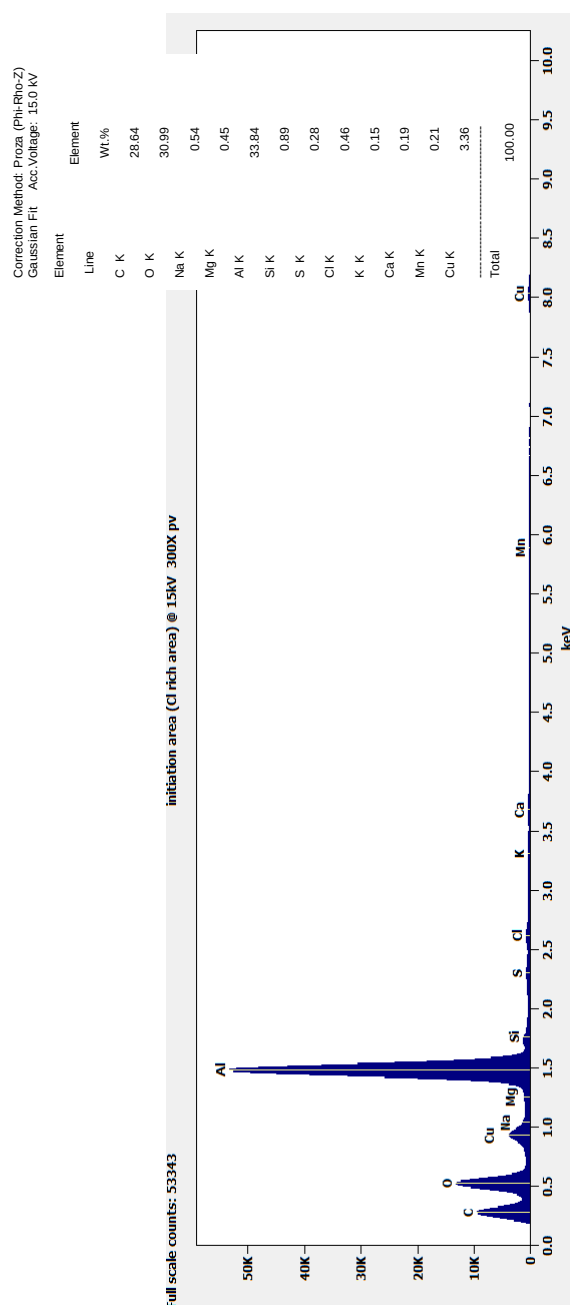


Figure 7: EDS spectra of the origin area.