

NATIONAL TRANSPORTATION SAFETY BOARD

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



December 1, 2016

MATERIALS LABORATORY FACTUAL REPORT

Report No. 16-099

A. ACCIDENT INFORMATION

Place : Zeeland, Michigan
Date : June 27, 2016
Vehicle : Enstrom 280, N518EG
NTSB No. : CEN16IA238
Investigator : Craig Hatch, AS-CEN

B. COMPONENTS EXAMINED

Rajay turbocharger assembly, band clamp, and scavenge pump assembly.

C. DETAILS OF THE EXAMINATION

Figure 1 shows a photograph of the as-received band clamp, Rajay turbocharger assembly, and scavenge pump assembly. The label on the Rajay turbocharger was marked Model No. 36T5EE10J2. The Rajay turbocharger and scavenge pump assembly were intact.

The band clamp assembly contained a strap portion and two U-shaped retainers (see figure 2). The bottom end of each U-shaped retainer is to be joined by several spot welds to the inner side of the strap portion. Examination of the band clamp assembly revealed the two U-shaped retainer portions fractured at all the spot weld locations. Figure 3 shows a photograph of the fracture face of two nearly adjoining spot welds. The separated parts from the band clamp assembly were ultrasonic cleaned with Alconox, a commercial detergent. Bench binocular microscope examination of the clamp assembly revealed the spot weld fracture faces were obliterated from relative movement between mating fractures. The contact faces between the strap portion and U-shaped retainer portions contained evidence of galling damage. Scanning electron microscope examination of the two spot weld fracture faces in figure 3 collaborated the findings of the binocular microscope examination.

Frank Zakar
Senior Metallurgist



Figure 1. As-received Rajay turbocharger assembly (left side of page), fractured band clamp assembly (center of page), and scavenger pump assembly (right side of page).



Figure 2. Close-up view of the as-received band clamp assembly showing the strap portion (left side of page) and two U-shaped retainers (right side of page). The cross section of a U-shaped retainer appears similar to a “U” groove. The fractured spot welds coincided with the bottom of the “U” groove portion. Arrows indicate examples of spot weld fracture locations.

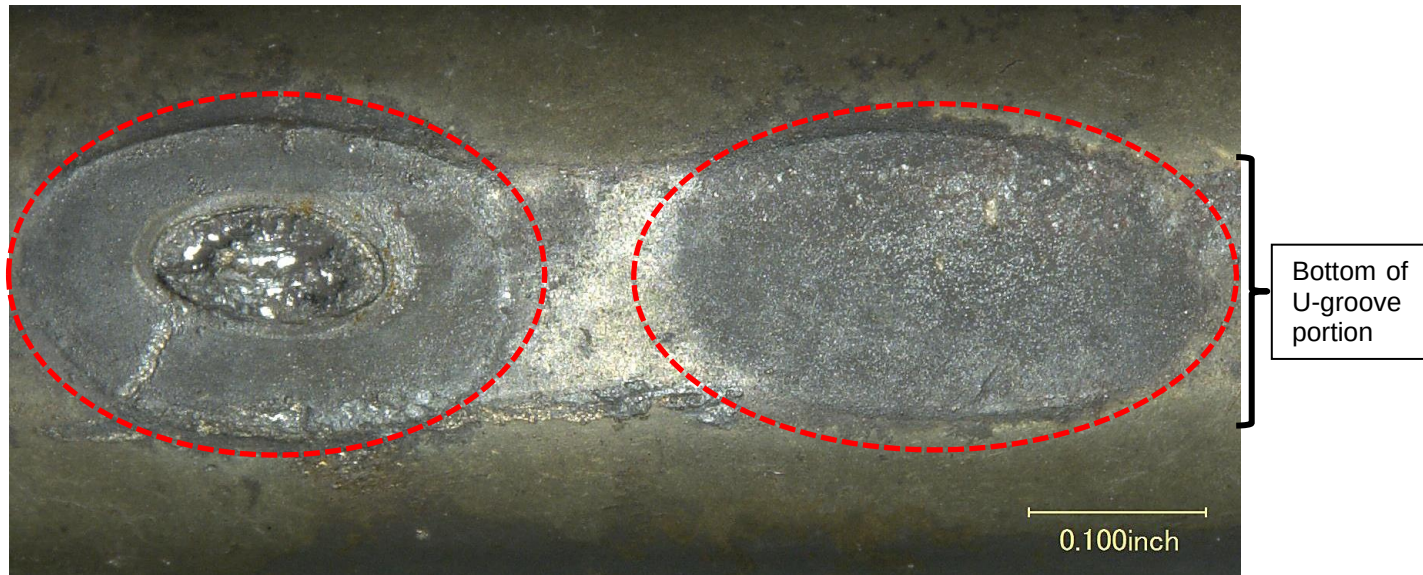


Figure 3. Close-up photograph of an isolated area on the external surface of the U-shaped retainer showing the fracture faces of two nearly adjoining spot welds, areas enclosed by dashed lines. The fracture faces showed evidence of galling damage.