

NATIONAL TRANSPORTATION SAFETY BOARD

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



February 13, 2015

MATERIALS LABORATORY FACTUAL REPORT

Report No. 15-017

A. ACCIDENT INFORMATION

Place : Sebring, Florida
Date : January 16, 2015
Vehicle : Aventura II, N511DS
NTSB No. : ERA15FA102
Investigator : Shawn Etcher, AS-ERA

B. COMPONENTS EXAMINED

Elevator Horn Assembly
Trim Tab Cable Section

C. DETAILS OF THE EXAMINATION

The received elevator horn assembly (top) and section of elevator trim cable (below) are displayed in the two views of figure 1.

The elevator horn was intact and appeared undamaged except for distortion of the left elevator attachment channel shown in figure 2. The forward portion of the upper flange of the channel was deformed upward and the aft portion of the lower flange was deformed downward as shown in figure 2. The respective deformations were forward and aft of the left elevator attachment bolt as indicated and were consistent with the elevator pivoting rear downward about the attaching bolt.

The elevator trim cable section is displayed in figure 3 with the solid inner cable wire in both retracted and extended positions. In the extended position a longitudinal wear area was visible on the inside of the forward bend, as denoted by the red bracket. The wear area extended into the bend as shown in the upper view of figure 4. Further, the inner diameter of the sheath of the trim cable was worn into the shape of the inner wire as shown in the lower view of figure 4. The wear had penetrated the plastic inner sheath liner and was into the metal outer layer of the sheath. The wear on the inner wire and sheath were consistent with side loading of the cable.

The extreme end on the inner wire (denoted by the yellow bracket in figure 4) was partially covered in a thin layer of translucent yellow brown material consistent with cable lubricant compound. The surface also showed diametrically opposed marks consistent with a screw type pinch clamp that were not covered by the lubricant compound. Other marks on the wire were covered.

On one side, a single crescent shaped mark (yellow arrow) was visible consistent with the edge of the clamp hole. A continuous sliding scrub mark (long red arrow) extended to the end of the wire.

Diametrically opposite the crescent mark, the surface of the wire contained a series of very light marks (red arrows) suggestive of the edge of the clamping screw in multiple positions with a continuous scrub (long red arrow) to the end of the wire.

Joe Epperson
Senior Metallurgist



Figure 1. Overall views of the as-received elevator horn, looking aft (top) and elevator trim cable section looking outboard (below).



Figure 2. View of the left side of the elevator horn showing the deformation of the left elevator attachment channel.



Figure 3. view of the trim cable with the inner wire retracted (top) and extended (below). The wear area is denoted by the red bracket. The yellow bracket highlights the area of the inner wire shown in figure 5.

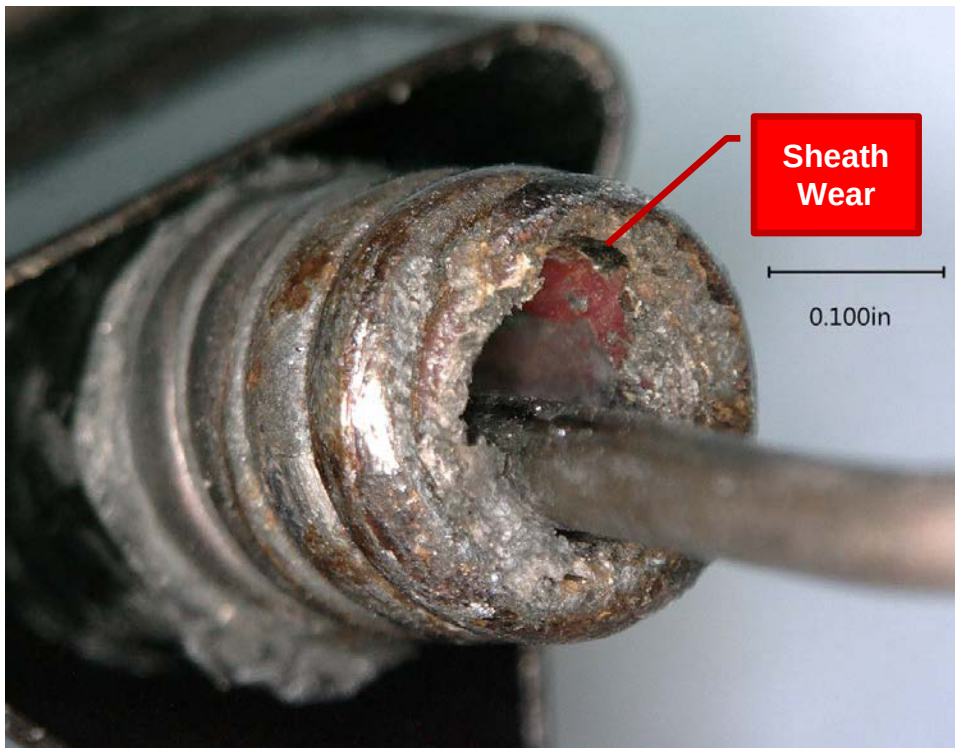
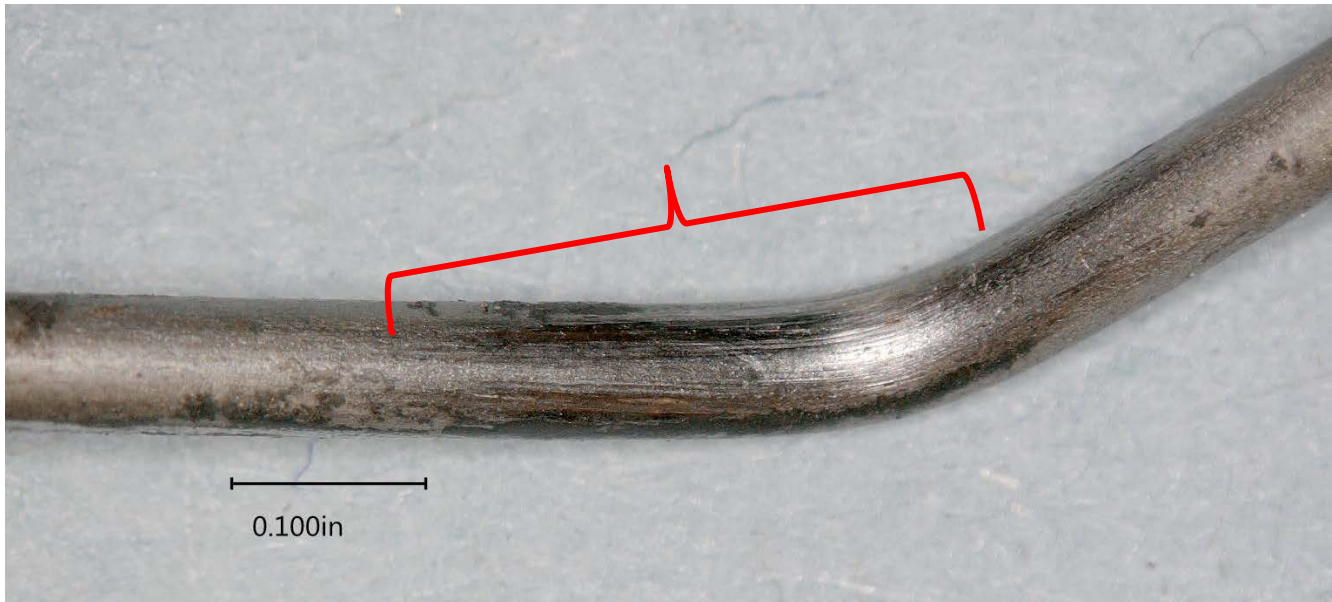


Figure 4. Upper view shows a closer view of the wear (red bracket) on the inner wire. Lower view shows the wear to the inner diameter of the cable sheath in the shape of the inner wire.

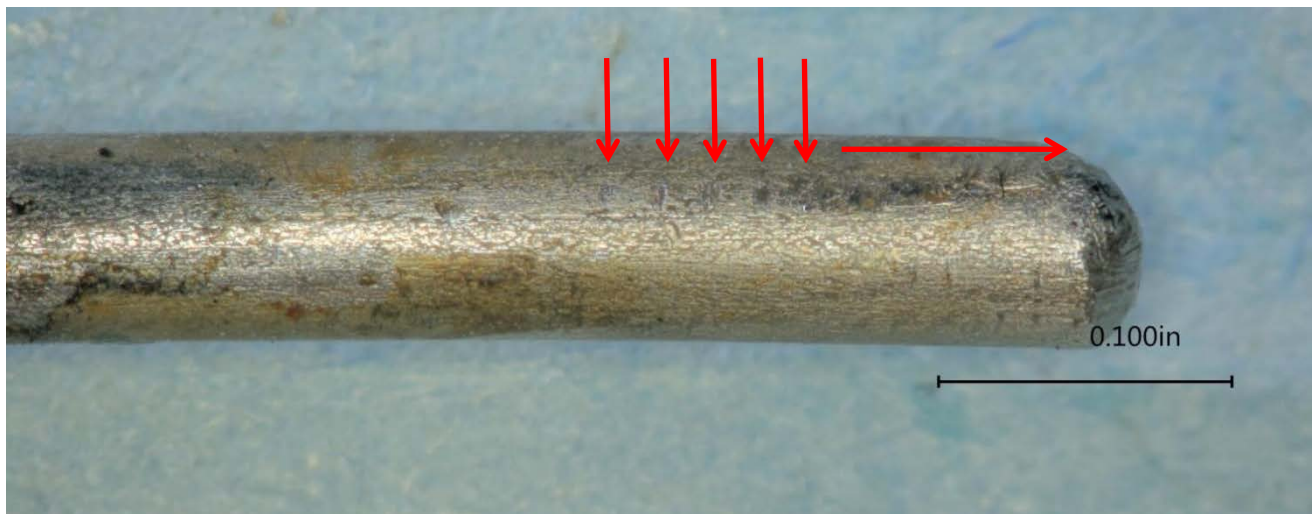
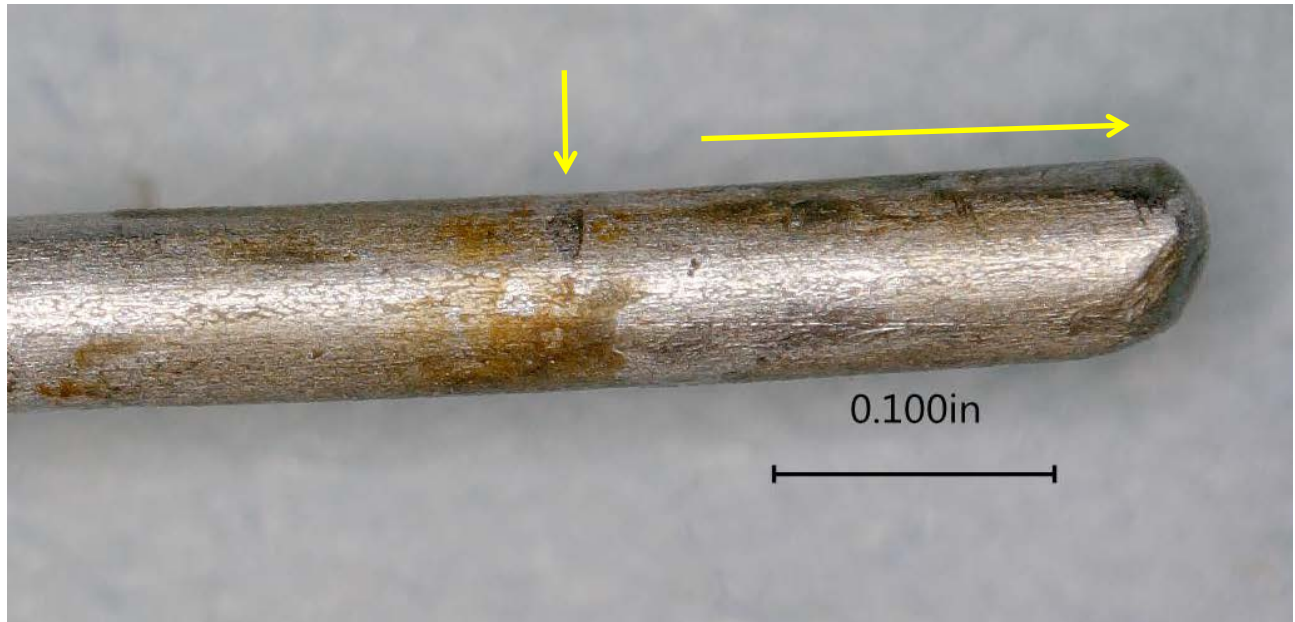


Figure 5. Views of the inner wire surface showing contact marks consistent with a screw type cable clamp. Upper view shows a crescent mark (yellow arrow) followed by a sliding scrub mark (long arrow). The lower view show a series of light marks (red arrows) diametrically opposed to the crescent mark followed by a continuous scrub mark (long arrow).