

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C.**

8/9/2022

SYSTEMS SPECIALIST REPORT – DAMAGED WIRES EXAMINATION

DCA20IA014

A. INCIDENT INFORMATION:

Location:	Atlanta, GA
Date:	November 6, 2019
Time:	2115 EST
Aircraft:	Embraer ERJ 170-200LR, N117HQ
Operator:	Republic Airways, Inc.

B. DETAILS OF THE EXAMINATION:

Republic submitted the following wires to the NTSB for examination. The following observations about each wire were taken on 12/9/2019 by Adam Huray (Systems Group Chairman) with assistance from Mike Budinski (Chief, RE-30, NTSB Materials Laboratory).

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B.1 W251-00013-24 (Captain Quick Disconnect Switch)

Wire W251-00013-24 (Captain Quick Disconnect Switch) – Damage was located approximately 6 ³/₄ inch from the base of the gold-colored connector pin. The insulation was broken 360 degrees around the wire. Several wire strands were broken. Mechanical scraping damage was observed on some of the wires. Continuity using a Fluke multimeter was observed from the damaged area to the gold-colored wire connector pin. No definitive signs of arcing were observed. (See Figure 1).

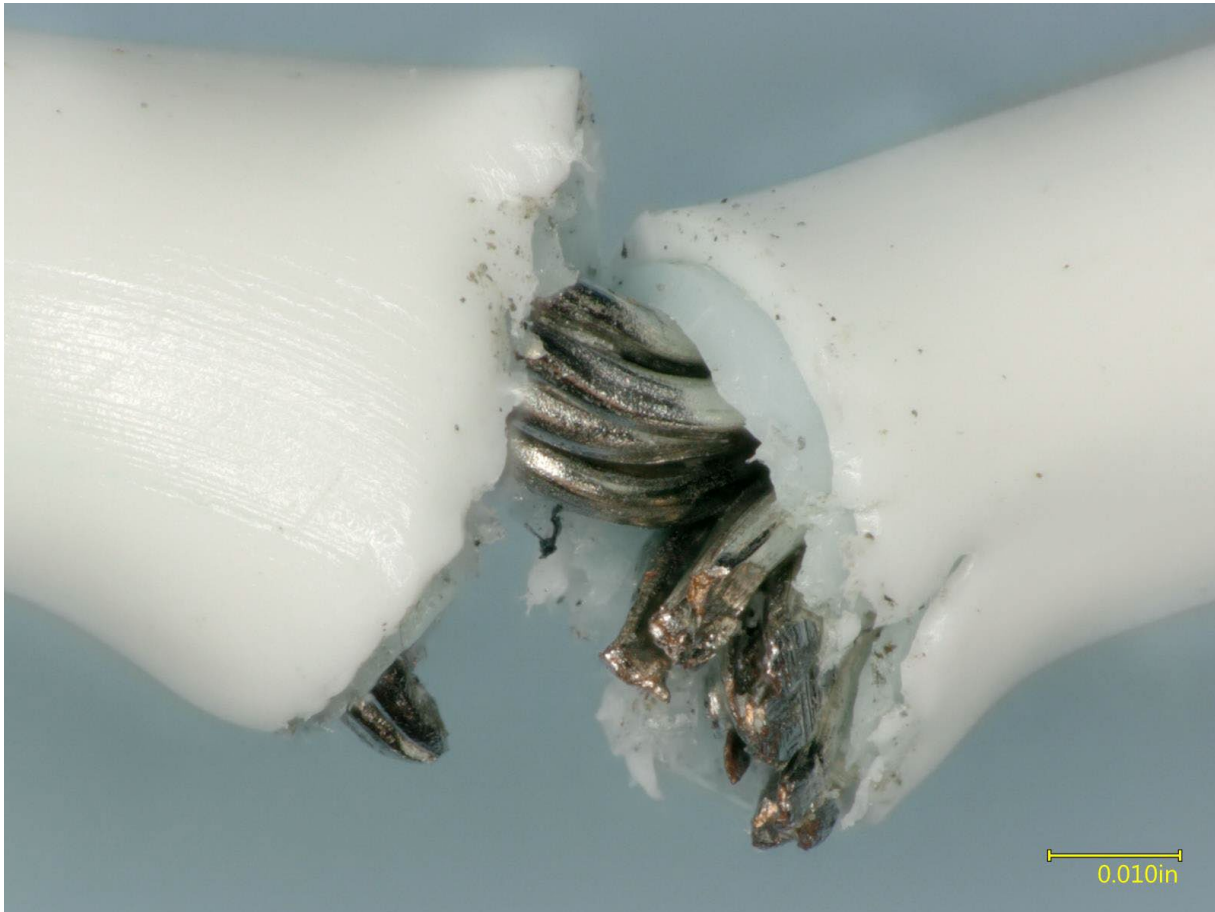


Figure 1: Damage to Wire W251-00013-24 (150x magnification)

B.2 W251-00060-22 (Captain Nose Up Trim A)

Wire W251-00060-22 (Captain Nose Up Trim A) – Damage was located approximately 5 $\frac{3}{4}$ inch from the base of the gold-colored connector pin. The insulation was chaffed and broken exposing the conducting wire. Mechanical scraping damage was observed on the exposed wire. Continuity using a Fluke multimeter was observed from the damaged area to the gold-colored wire connector pin. No definitive signs of arching were observed. (See Figure 2).

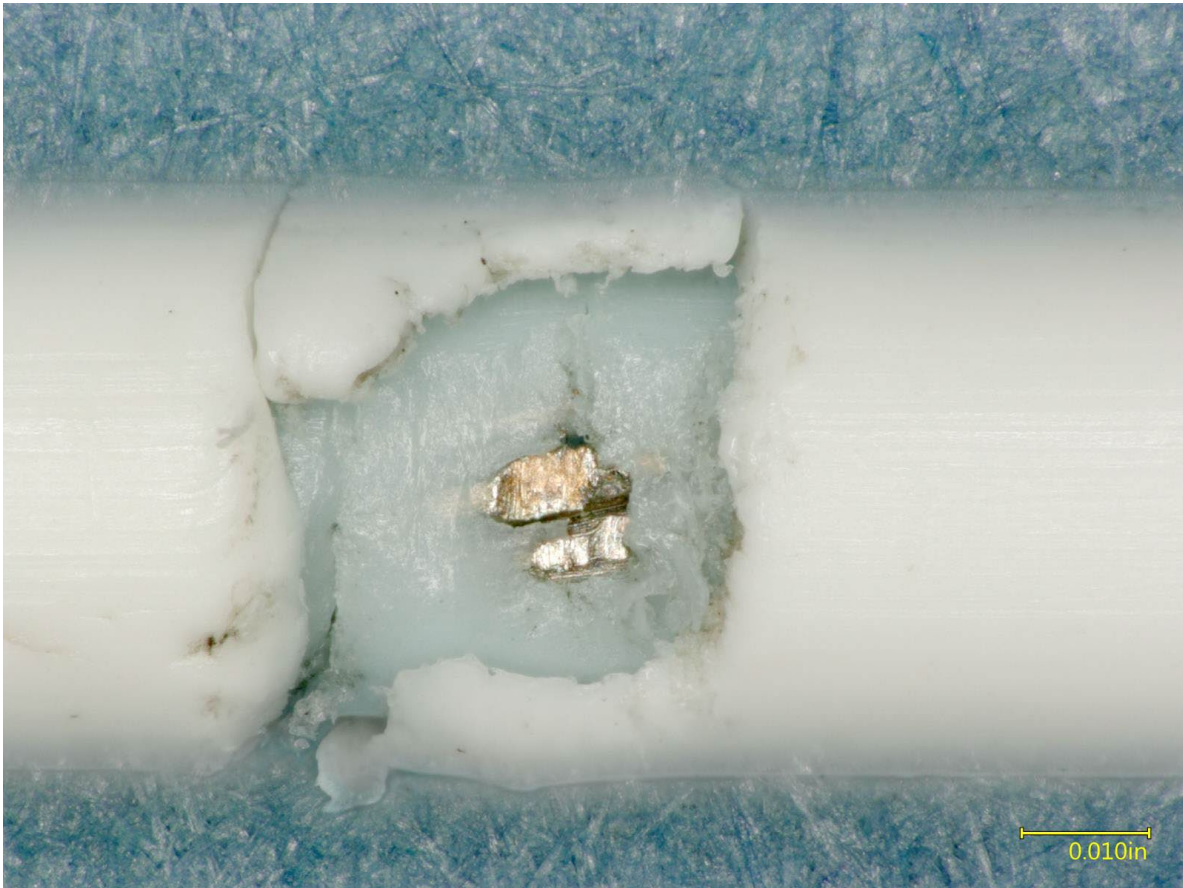


Figure 2: Damage to Wire W251-00060-22 (150x magnification)

B.3 Wire W251-00059-22 (Captain Nose Up Trim B)

Wire W251-00059-22 (Captain Nose Up Trim B) – Damage was located approximately 5 $\frac{3}{4}$ inch from the base of the gold-colored connector pin. The outer layer of insulation was chaffed and broken. Mechanical scraping damage was observed on the insulation. Continuity from the damaged section of wire insulation to the gold-colored wire connector pin was first observed by connecting a small cotton swab soaked with soapy water to the multimeter lead, and then pressing the swab against the damaged area. Following this test, continuity was then checked by using the standard multimeter probe pressed against the damaged insulation, and continuity was not observed in this case. Finally, a small piece of cut safety wire was attached to the multimeter lead and lightly pressed against the damaged insulation, and continuity was again observed. No definitive signs of arching were observed. (See Figure 3).



Figure 3: Damage to Wire W251-00059-22 (150x magnification)

B.4 Wire W251-00061-22 (Captain Nose Down Trim A)

Wire W251-00061-22 (Captain Nose Down Trim A) – Damage was located approximately 5 $\frac{3}{4}$ inch from the base of the gold-colored connector pin. A small nick in the exterior insulation was observed. Continuity was checked from the damaged section of wire insulation to the gold-colored wire connector pin by using a small cotton swab soaked with soapy water attached to the multimeter lead contacting the damaged area; continuity was not observed.

B.5 Wire W251-00058-22 (Captain Nose Down Trim B)

Wire W251-00058-22 (Captain Nose Down Trim B) – Damage was located approximately 5 ¾ inch from the base of the gold-colored connector pin. A small nick in the exterior insulation was observed. Continuity was checked from the damaged section of wire insulation to the gold-colored wire connector pin by using a small cotton swab soaked with soapy water attached to the multimeter lead contacting the damaged area; continuity was not observed.

B.6 Wire W251-00057-22 (Trim Switch Ground)

Wire W251-00057-22 (Trim Switch Ground) – Damage was located approximately 5 ¾ inch from the base of the gold-colored connector pin. A very small nick in the exterior insulation was observed. Continuity was not tested.

Adam Huray
Mechanical Engineer