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

November 9, 2012

MATERIALS LABORATORY FACTUAL REPORT Report No. 12-125

A. ACCIDENT INFORMATION

Place	:	Nashua, NH
Date	:	11/9/2011
Vehicle	:	Vans RV-8
NTSB No.	:	ERA12LA069
Investigator	:	Jose Obregon

B. COMPONENTS EXAMINED

The parts submitted for examination were portions of the outboard and inboard landing gear spring brackets and portions of their fasteners (figure 1)

C. DETAILS OF THE EXAMINATION

The inboard landing gear spring bracket was designed with three through holes for its fasteners. The bracket was fractured and plastically deformed in the area of the bolt hole for the middle fastener labeled “C” in figure 2. The fracture surfaces of the bracket exhibited shear lips throughout consistent with an overstress failure. No evidence of preexisting corrosion was observed on the fracture surfaces. The two fasteners at the opposing ends of the bracket (labeled A and B in figure 2) had sustained plastic deformation consistent with cantilever bending. The bolt at position “A” had substantially more plastic deformation than the bolt at position “B”. Additionally, the bolt at position “A” had striped threads consistent with an overload failure. The threads on the bolt at position “B” remained intact. The bolt labeled “C” in figure 2, going through the midsection of the inboard landing gear bracket, did not exhibit as much plastic deformation as the bolts at positions “A” and “B”. Bolt “C” fractured through the middle of the shank portion of the bolt leaving shear lips on the fracture surfaces with respect its axis. The fracture surfaces of bolt “C” are consistent with an overload fracture. The plastic deformation and fracture surfaces associated with the inboard bracket and hardware are consistent with a failure due to overload.

The outboard landing gear spring bracket had two holes at opposing ends for its fasteners (figure 3). The bracket had fractured near the end about ¾ inch inboard of the bolt hole for the bolt labeled “B” in figure 3. The bracket exhibited plastic deformation and shear lips on the fracture surfaces consistent with an overload failure. No evidence

of preexisting corrosion was observed on the bracket's fracture surfaces. The bolt at position labeled "A" in figure 3 had stripped threads consistent with an overload failure. The bolt at position "B" (this bolt is oriented backwards in the photo from how it was installed) had to have its head cut off with an abrasive cutting wheel during recovery. This bolt exhibited substantial plastic deformation but the threads remained intact. The plastic deformation and fracture surfaces of the outboard landing gear spring bracket and hardware are consistent with an overload failure.

X-ray fluorescence spectroscopy[1] revealed that both landing gear spring brackets were consistent with a 4130 steel alloy.

Joseph Panagiotou
Fire & Explosion Investigator

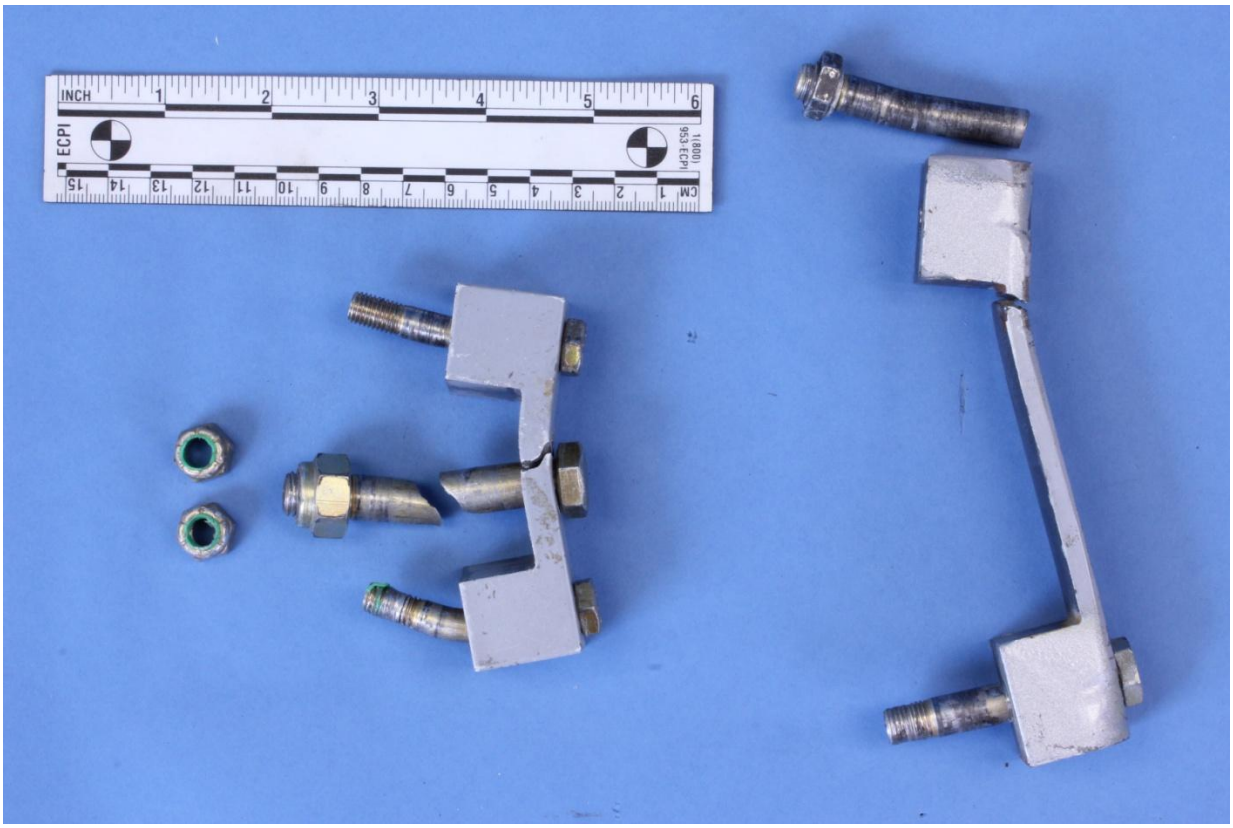

Figure 1: Landing gear spring brackets and hardware as received.

[1] Using a Thermo Scientific Niton XL3t-980 hand held x-ray fluorescence analyzer

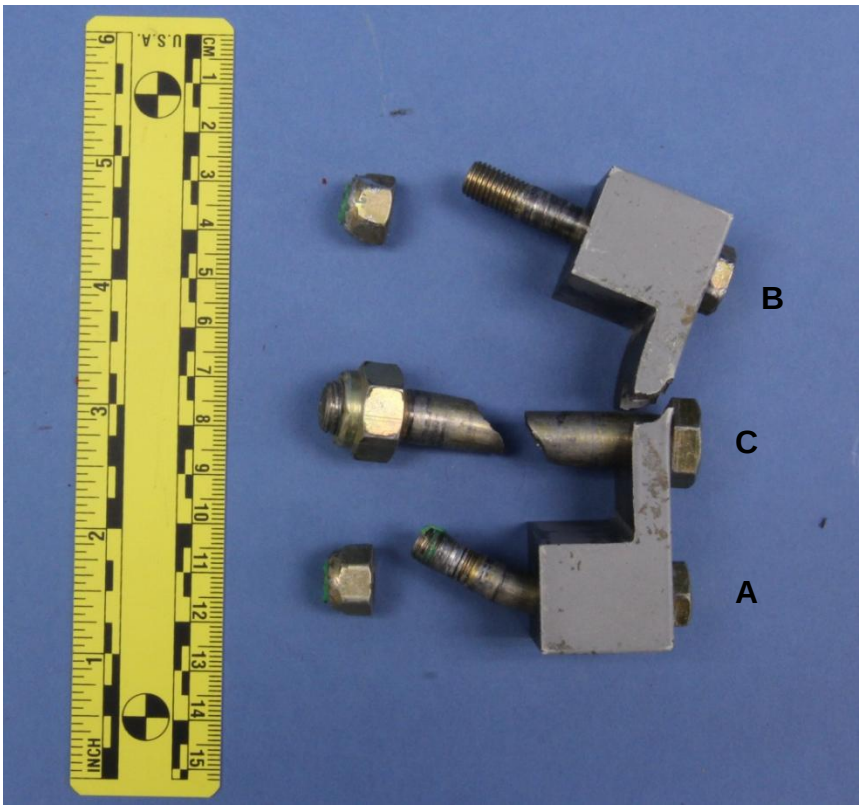

Figure 2: Inboard landing gear spring bracket and hardware.

Figure 3: Outboard landing gear spring bracket and hardware.