



Air Safety Office  
Parker Hannifin Corporation  
Parker Aerospace  
14300 Alton Parkway  
Irvine, California 92618

**Date:** 2/5/2020

**Examination Location:** Parker Stratoflex, 220 Roberts Cutoff Rd, Ft. Worth, TX

**Subject:** Bell 206B Hose Exam – For NTSB under FAA Witness

**Attendees:** Darryl Shaw – FAA Aviation Safety Inspector, Parker: Shadrach Nanney – Product Engineering Manager, Jeremy Katt – Air Safety Officer

#### **EXAM DETAILS**

Millicent Hill, NTSB requested testing and examination of the following hoses and provided this description:

##### Oil Supply System

Examination of the oil supply system revealed the engine oil tank remained secured to the airframe by the forward and aft tank supports and was not damaged. The oil filler cap was in-place and was able to be properly secured to the tank. The cap seal appeared satisfactory with no visible cracks noted. The oil level in the tank did not register on the dipstick portion of the cap. All hoses were intact and remained tightly secured to the oil tank, oil cooler, oil filter, and aft firewall fittings. No excessive oil leakage/stains were noted in the area of these components. The hoses were disconnected from the tank which was removed from the helicopter. About 9.5 ounces of oil were drained from the oil supply tank, lines connected to the tank and oil cooler, and also to the oil filter. The oil filter was not in bypass. The oil filter element contained a small amount of contaminant. No oil leaks were noted at the oil cooler. The oil carrying flexible hoses from the engine to the aft firewall fittings were examined and while they contained minimal residual oil, no oil was noted between the hose exterior and fire sleeve interior. One hose identified as "oil out at gearbox" exhibited a sharp bend near the gearbox fitting. The hoses were retained and documented:

Marked "Oil In at Gearbox", TSOC75, PT 1-4-05, A 4Q04

Marked "Oil Out at Gearbox", 98441 ASSY, 156722-10-0376, PT A4Q04, A 3Q04

Marked "Tank Vent at Gearbox", 70-009J00A424A, Size 8, 11/26/2001, A4Q01

Marked "Gearbox Vent Tube", 97499, MFR 98441-1560537, Size 12, 8/10/2001, A3Q01

The package containing the four hoses was sent to Parker Stratoflex and quarantined unopened in a locked lab area. The package was opened and contained four hoses, 3 which had red NTSB tags attached.



The general condition of the hoses were good and in a normal in service condition and the fire sleeves weren't damaged. The Oil Out hose, Tank Vent @ Gearbox Hose, and Gearbox Vent Hose were assembled at Parker Stratoflex, and the Oil In hose is a Stratoflex hose assembled by Aviall. Aviall is the distributor who is trained and authorized to assemble for Stratoflex. The Oil Out hose was assembled in October 18, 2004, the Oil In hose assembled on January 4, 2005, the Tank Vent @ Gearbox hose on August 10, 2001, and the Gearbox Vent Tube hose on November 26, 2001.

#### Oil Out Hose:



The Oil Out Hose is missing both fire sleeve clamps on each end.



The Oil Out hose is missing the nipple and nut bulkhead fitting. A new stock fitting was procured from stock and installed so the hose could be tested.



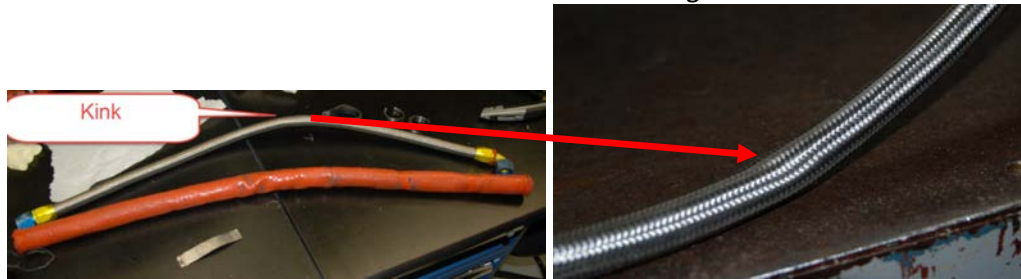
The hose was tested by capping one end and pressurizing with air under water to 500 psi. The hose did not leak as no bubbles were observed.



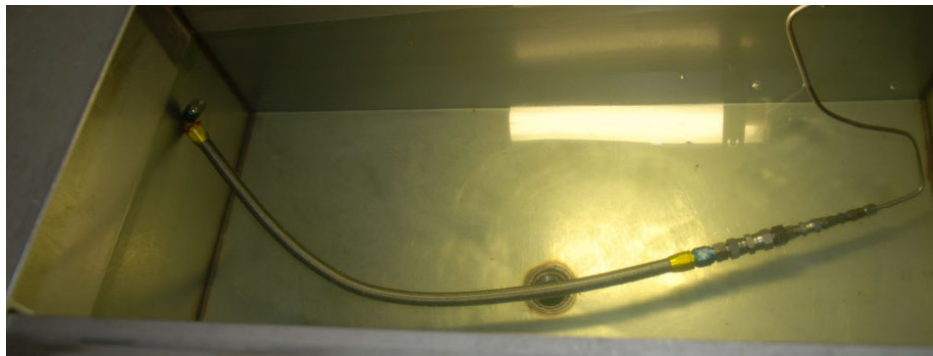
#### Oil In Hose:



The fire sleeve was removed. The hose had a kink and slight bend in the middle.



The hose was tested by pressurizing with air under water to 500 psi and the hose did not leak as no bubbles were observed.



**Tank Vent @ Gearbox Hose:**



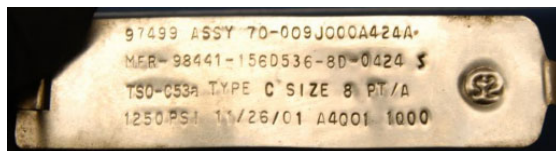
RTV had been applied to ends of hose (indicative of being assembled by Aviall as Stratoflex fire sleeve ends are dipped). The hose had a slight kink on the tag end.



The hose was tested by pressurizing with air under water to 500 psi and the hose did not leak as no bubbles were observed.



#### **Gearbox Vent Tube Hose:**



The hose was capped on one end and an adaptor added to connect to the test fixture. The hose was pressurized to 500 psi and a few bubbles were coming from the hose flare indicating a leaking flare to adaptor connection.



The adaptor was removed and the hose female flare had a slight wear mark on the female flare side.



A different newer adaptor was used to attach hose to the test fixture and was pressurized again with air under water and the hose and flare did not leak.



The hoses were placed in plastic bags and repackaged in a different box. The box was returned to the quarantined lab area.

## **SUMMARY**

The missing clamps on the Oil Out hose would not affect performance of the hose and is only there to retain the fire sleeve to the hose fitting.

All four hoses were pressure tested with 500 psi of air and submerged in water to visually inspect for bubbles. All four hoses held 500 psi with no leaks observed. The gearbox vent tube hose leaked initially, but did not leak when a newer different adaptor was used to hook the hose to the test fixture.