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

month/day/year

MATERIALS LABORATORY FACTUAL REPORT Report No. 14-011

A. ACCIDENT INFORMATION

Place	:	Amarillo, Texas
Date	:	December 14, 2012
Vehicle	:	Beechcraft E-90
NTSB No.	:	CEN13FA105
Investigator	:	Craig Hatch AS-CEN

B. COMPONENTS EXAMINED

Attitude reference gyro

C. DETAILS OF THE EXAMINATION

The attitude reference gyro from the accident aircraft was submitted to the Materials Laboratory for examination. The instrument was a Sperry Tarsyn 333, 3-axis gyro. The instrument consisted of two chambers, one forward and one aft as shown in Figure 1. Each chamber contained a gyro bearing.

The forward chamber had some minor impact damage to the exterior cover and one leg of the support structure for the gyro. The gyro bearing was found to be free-moving and undamaged by impact. After the bearing was removed from the support structure, several faint, full circumferential rotational marks were found on the surface of the bearing as shown in Figure 2. This was indicative that the bearing was rotational at some point when the surface of the bearing rubbed against another surface, resulting in the rotational marks seen. There was no impact related scoring found on the bearing. However, there was little damage to the interior of the gyro that could have resulted in impact related scoring on the bearing.

The aft chamber had a significant impact depression in the exterior case as shown in Figure 3. There was evidence of scoring on the interior of the cover as shown in Figure 4. The support structure for the gyro bearing was damaged. One of the support legs for the gyro bearing was fractured. The bearing was intact and partially free-moving. Partial circumferential scoring was found on the surface of the bearing as shown in Figure 5. This observation was indicative that the bearing was rotating, and then subjected to an impact. This condition is consistent with the bearing rotating at the time of the accident.

Nancy B. McAtee
Chemist

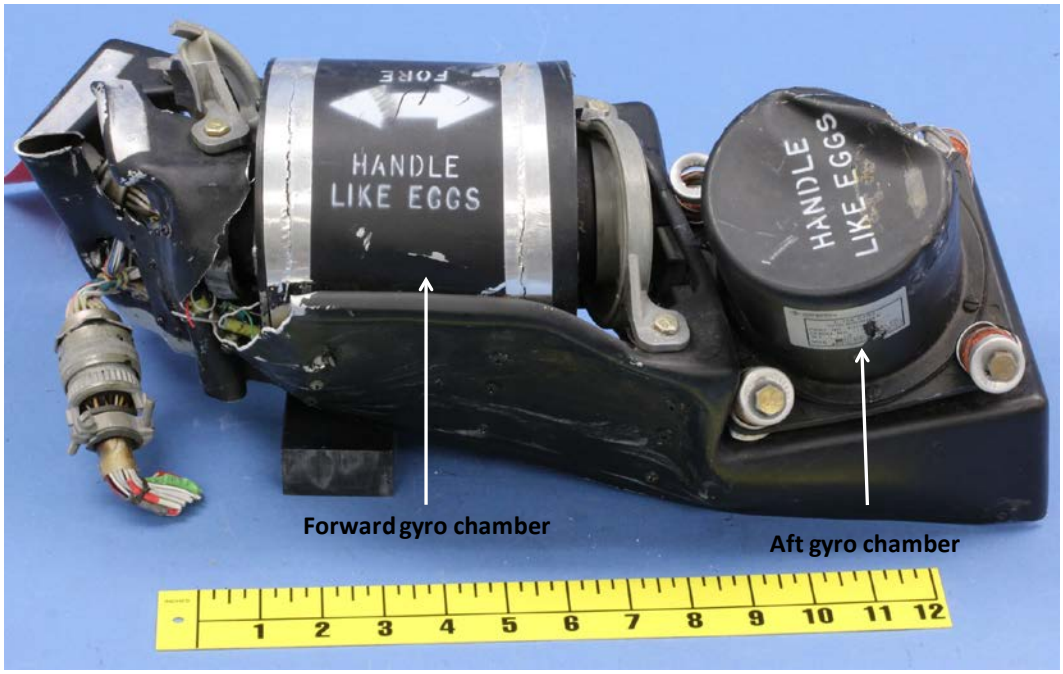

Figure 1. Overall photograph of attitude reference gyro.

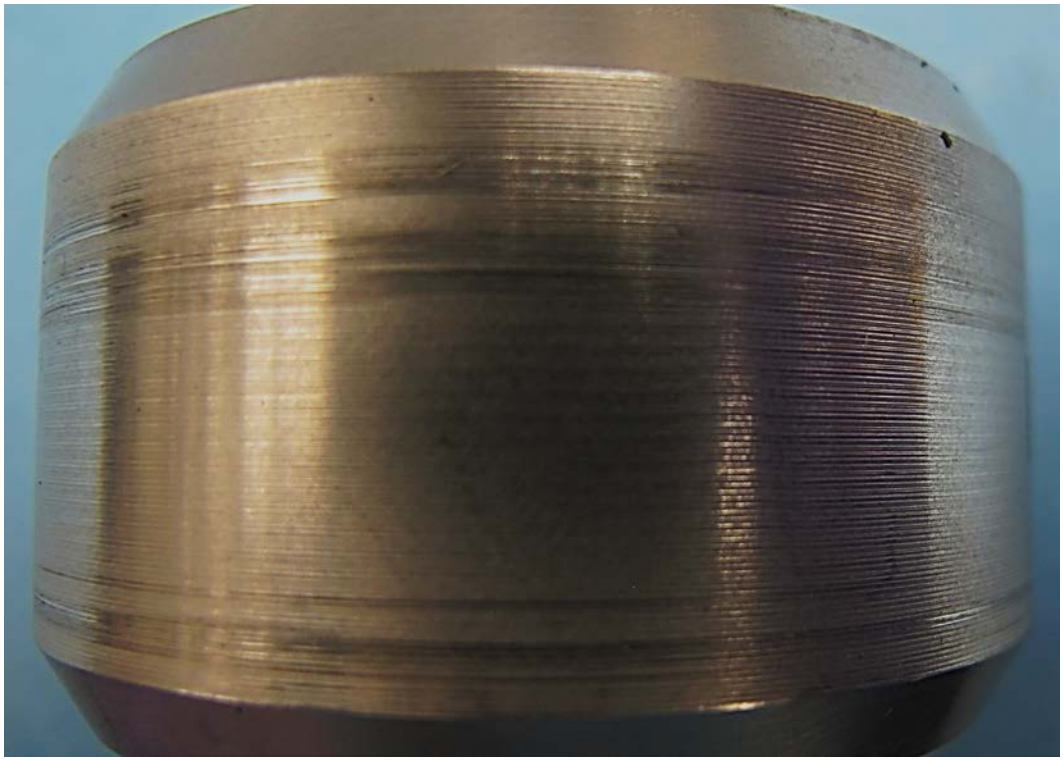

Figure 2. Photograph of circumferential rub marks on forward gyro bearing.

Figure 3. Overall Photograph of damage to the aft gyro chamber cover.

Figure 4. Close up of scoring on interior of aft gyro chamber cover.

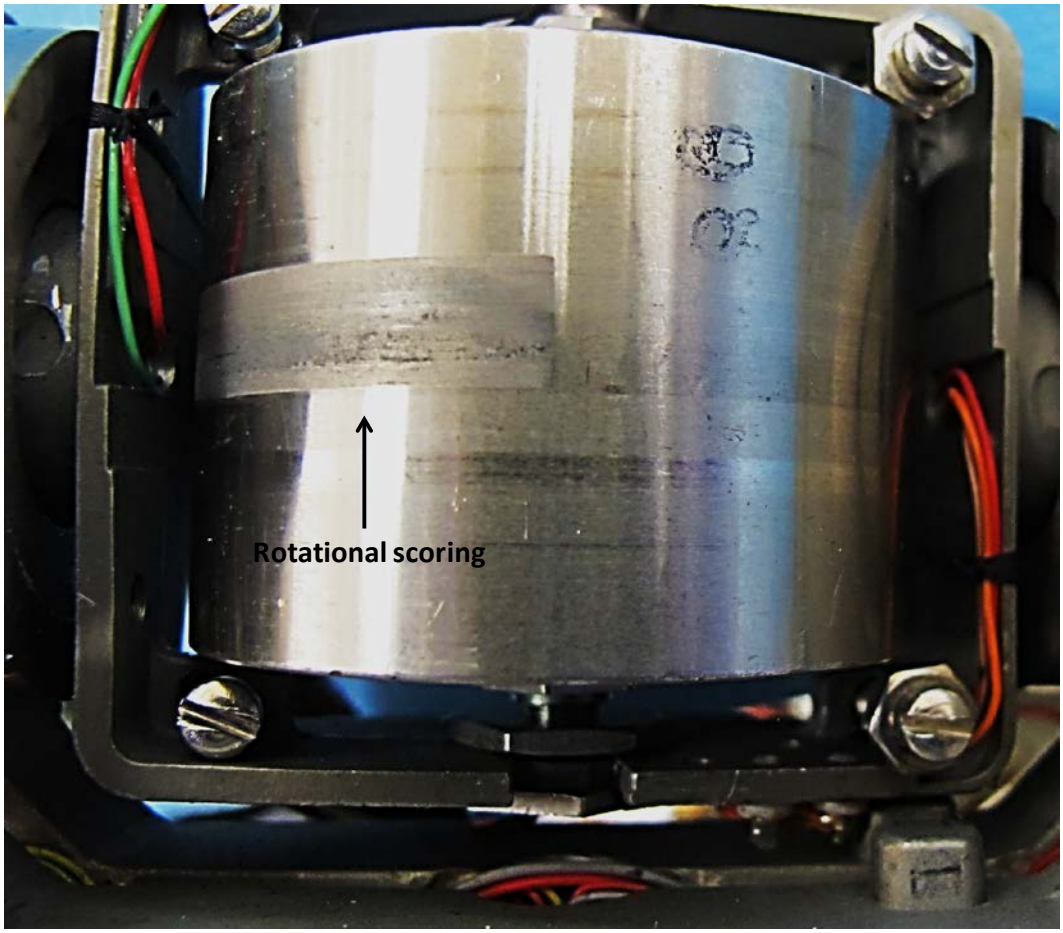

Figure 5. Photograph of partial circumferential scoring on aft bearing.