NATIONAL TRANSPORTATION SAFETY BOARD

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

October 27, 2006

MATERIALS LABORATORY FACTUAL REPORT Report No. 06-095

A. ACCIDENT

Place	:	New York, New York
Date	:	October 11, 2006
Vehicle	:	Cirrus SR-20
NTSB No.	:	DCA07MA003
Investigator	:	Carol Horgan, AS-40

B. COMPONENTS EXAMINED

Crankshaft propeller flange.

C. DETAILS OF THE EXAMINATION

An overall view of the crankshaft propeller flange fracture is shown in figure 1. The crankshaft was fractured in the radius immediately aft of the flange. Fracture features were generally in a jagged slant plane with a matte gray appearance consistent with overstress fracture. Slant plane features were located around approximately 330 degrees. The remaining 30-degree portion of the fracture had shiny smeared appearance consistent with compression side of an overstress bending fracture. Spiral cracks were observed in the outer diameter hardened layer adjacent to the fracture as shown in figure 2 around approximately 180 degrees around the circumference approximately opposite from the smeared area. The cracks intersected jagged features of the fracture. The direction of the spiral was consistent with fracture under torsion loading, where the aft side of the fracture rotated clockwise relative to the forward side of the fracture.[1] On the inner diameter of the crankshaft adjacent to the fracture and slightly clockwise from the smeared area, parallel circumferential cracks were observed also consistent with bending. Further to the clockwise direction on the inner diameter, angled cracks were observed in the hardened layer that intersected jagged features on the fracture surface and turned circumferential near the crack tips. On the outer diameter near where the radius intersected the flange, nearly parallel circumferential cracks turning toward the radial direction near the crack tips were observed as identified in figure 2. These cracks were centered slightly clockwise from the position opposite the smeared area on the fracture surface.

Matthew R. Fox
Senior Materials Engineer

[1] Clockwise as viewed looking forward.

Image No.:0610A00953, Project No.: 2006100021

Figure 1. Overall view of the aft side of the propeller flange.

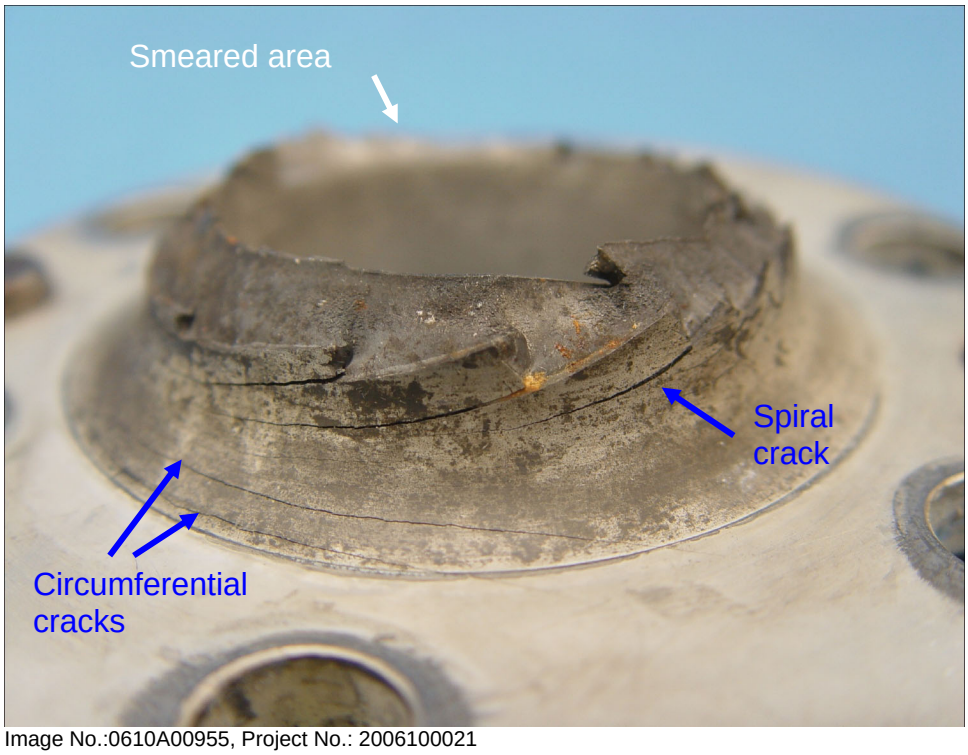

Image No.:0610A00955, Project No.: 2006100021

Figure 2. Close view of spiral cracks at the surface of the propeller flange.