

Product tech note - helicopter

Helicopter bearing monitoring



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A major helicopter manufacturer needed an accelerometer designed to monitor critical grease-lubricated power-train bearings dependably while surviving the extreme environment. Accelerometers can be mounted on the rotor swashplate assembly and the bearing housings of the tail rotor drive train. The swashplate sensors are exposed to airstream as the helicopter is in flight while the drive train accelerometers are exposed to elevated temperatures, grease and hydraulic fluid.

Monitoring solution

Initially, the customer was installing and removing the sensor each time they wanted to capture readings to avoid subjecting the sensor to wear and tear, and to make sure the signal was of good quality. The helicopter manufacturer's Test Engineer said, "The original vibration signal must be strong, so that the signal can be extracted from the naturally noisy helicopter environment. We tested a couple of the specified Wilcoxon® sensors by putting them onto a shaker table and subjecting them to extreme heat, then extreme cold and buzzing them. After all this the sensors still worked great." The findings led the customer to realize they could leave the Wilcoxon sensors installed for increased efficiency.

Testing procedures sensors

A bearing is not a clean place and is usually exposed to grease as well as other forms of liquid and moisture. The engineer tested the Wilcoxon before he suggested leaving them on the bearings. He put bearing grease, hydraulic fluid, and a sensor into a bucket which was placed in an environmental chamber. A week later, the only change in the sensor was to the exterior color. It held its calibration and operated flawlessly.

Helicopter sensors

The Wilcoxon 908TS-1 and 908TS-2 vibration sensors, which feature integral cables, were designed and built specifically for this helicopter manufacturer to meet their specifications. Wilcoxon builds many sensors for harsh industrial applications and was readily able to meet the rugged design and performance requirements. Sensors from another vendor were originally used, but the sensors were not protected against Electromagnetic Interference (EMI) causing radio frequency signals to produce false vibration readings. Because the Wilcoxon 908TS-1 and 908TS-2 are EMI protected, this problem was eliminated. Using Wilcoxon's helicopter sensors includes the following benefits:

Benefits

- No false readings due to EMI pick-up in the accelerometers
- Rugged design resists attack by chemicals and fluids
- Critical measurements can be made at anytime because of permanent sensor mounting
- Long-lasting reliability in extreme environments