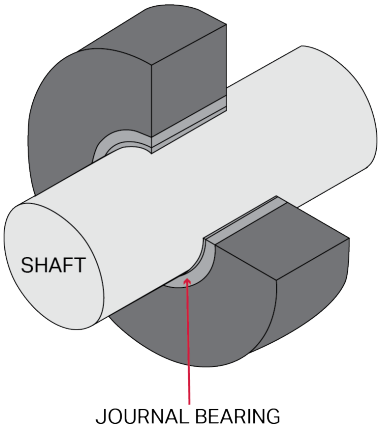
Understanding Oil Whirl and Oil Whip

Understanding the phenomena of oil whirl and oil whip is essential for diagnosing and mitigating sub-synchronous instability in journal bearings.



Oil whirl is a self-excited fluid malfunction commonly encountered in journal bearings, where the oil film drives the shaft ahead of it in a forward circular motion, causing the shaft to follow a whirling path around the bearing clearance. This condition is a prevalent cause of sub-synchronous instability in rotating machinery.

During oil whirl, the system responds to the frequency of the fluid, with the vibration frequency locked to 0.38 to 0.48 times the machine's running speed. This characteristic frequency range makes oil whirl a distinctive and recognizable instability issue.

Oil whip, on the other hand, is an exacerbated condition that occurs in machines already experiencing oil whirl. It manifests when the oil whirl frequency aligns with the system's natural frequency, or when the average circumferential velocity of the oil matches the shaft's resonance frequency. This synchronization leads to severe vibration amplitudes and can significantly impact the operational stability and longevity of the machinery.

Understanding and analyzing oil whirl and oil whip is crucial for maintaining the reliability and efficiency of rotating machinery. Identifying these phenomena early allows for timely intervention, preventing potential damage and ensuring the smooth operation of machinery in various industrial environments.

CTC's PRO Line Proximity Probes are crucial tools used in the diagnosis of oil whip and oil whirl. PRO Proximity Probe sets, also called eddy current probe sets, are the industry's most durable and reliable probes, drivers, and extension cables. PRO Line Proximity Probe sets are fully compatible with all major condition monitoring and machine control systems.

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