



Reduce Unplanned Downtime: Learn the Warning Signs of Bearing Failure

Bearing failure is almost entirely avoidable if you have a proactive mindset and put effort toward learning your equipment. In fact, bearings should last a minimum of 8-12 years, so if you're changing them quite frequently, this is for you. By learning to pick up on warning signs of bearing failure, you can stop replacing bearings and start focusing on the bigger reliability picture.

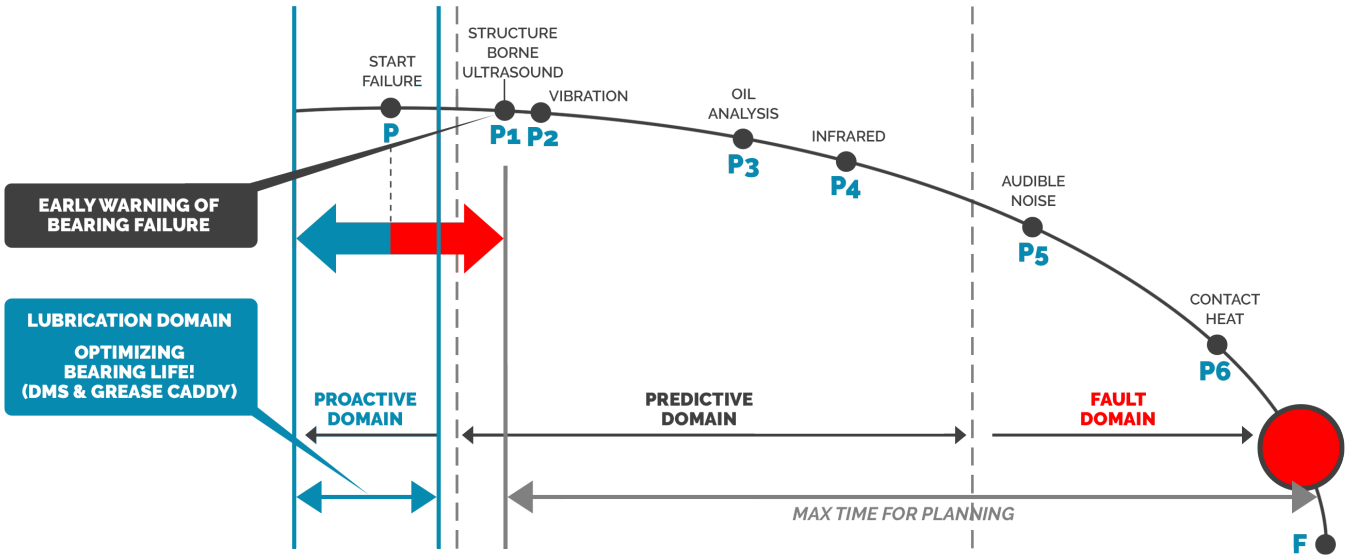
The 4 Stages of Failure

Bearing failure occurs in 4 distinct stages—the higher the stage, the less likely you will be able to revive it. However, by using the proper tools, you can easily identify the early stages of failure and remedy the situation.

Stage 1: Friction causes the bearing to emit a 250 to 350 kilohertz (KHz) frequency. This is the earliest detectable point using vibration analysis.

Stage 2: A 500 to 2000 hertz signal rings.

Stage 3: At the onset of the third stage, the harmonics of the fundamental frequency are very apparent. Defects in the races are now obvious and visible on vibration analysis of the noise signal. At this point, there is also a significant temperature increase.



Stage 4: During the fourth stage, there is very high vibration. The fundamental frequency and harmonics begin to decrease as the random ultrasonic noise is boosted. Temperatures will skyrocket as the bearing self-destructs.

Regreasing should occur no later than stage 2 to effectively save it, but you must know how to identify these failure stages.

Detecting Failure

Vibration analysis and oil analysis can accurately predict a failure but are not always the most cost-effective.

Thermography is a less expensive way to detect failure. Bearing manufacturers have long known of the relationship between bearing life and temperature and have developed formulas that accurately calculate safe operating temperatures. These formulas and calculators show that once a bearing starts operating outside its ideal temperature range, its life will begin to degrade at an accelerated rate. In theory, for every 15 degrees C above 70 degrees C that the base oil operates, its life is more than halved.

Knowing this, why is thermography not a more popular method for bearing life prediction? Monitoring temperatures is not always considered reliable because of the sheer amount of variables that contribute to the heat generation. Ambient temperature, friction, speed variability, load and runtime all influence the temperature that will be measured.

Ultrasound technology, on the other hand, provides an advanced approach to detecting failure while producing a high return on investment. Systems like the OnTrak SmartLube monitor the dB levels emitted by an under-lubricated bearing and automatically dispense the appropriate amount of grease.

As soon as early-stage failure occurs, the operator simply receives an alert on the cloud-based system and gives the device permission to lubricate. No searching for the grease gun, no lubricant mix-ups, no scheduling—the bearing gets lubricated with the push of a button, essentially “resetting” it to a healthy state.



Proactivity is Key

Now that you know how to identify the warning signs of bearing failure, it’s important to keep your team accountable and look for these signs regularly, whether that’s scheduled thermography inspection, oil analysis sampling or investing in ultrasound equipment.

In respect to industry 4.0, automation is becoming increasingly useful in plants around the world. If you can use a device to put your lubrication on autopilot, allowing early failure detection and remedy, you’re on the track to significant time and money savings.

