

CTC AppNotes

A series of technical documents written by members of the CTC community

Proximity Probe Mounting - Thrust Measurements

Executive Summary

One of the issues for reliability professionals in the current era is how to effectively and reliably monitor thrust bearing wear in critical applications. This edition of CTC's PRO AppNotes will explore the concept of axial monitoring of plain or journal bearings on assets such as turbines for increased reliability and safety.



The axial or thrust position is one of the most critical measurements in rotating machinery. If a thrust bearing should fail, axial movement of the shaft is no longer constrained and must instead be translated to some other part of the machine. When this is allowed to occur, the uncontrolled axial movement will quickly allow rotating and non-rotating elements to come in contact, resulting in disastrous consequences. Such regrettable occurrences are financially devastating for the asset and can also be a serious safety risk to plant personnel.

Proximity probes are often used to monitor the most critical turbine shafts in power plants. Proximity probes are often used to monitor the most critical turbine shafts in power plants. Proximity probes are often used to monitor the most critical turbine shafts in power plants.

While some degree of reliability can be achieved using a single proximity probe to monitor the thrust position, virtually all the guidelines and standards for reliability (including API Standard 670) agree that dual probes should be used to achieve the greatest reliability. Dual probe systems provide redundancy to ensure continued measurement integrity in the event one of



Probes are important monitoring tools for all types of turbines

the proximity probe units fails.

Preparing for installation

Several important measurement techniques must be decided upon prior to installation and calibration of the system. These techniques should remain in consistent use throughout the plant. The most common thrust position full scale range selected is usually +40 to -40 mils (which falls within the PRO proximity probe systems normal range of

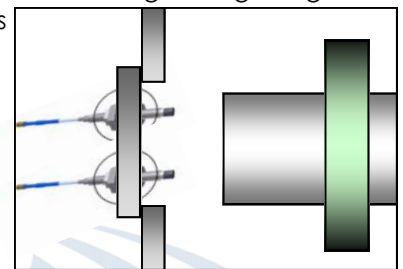
90 mils). Positioning is important as well. The most common recommendation is that proximity probes used to monitor thrust position be placed within two (2) shaft diameters of the thrust bearing (for example 4 on a 4 inch diameter shaft the probes should be mounted no further than 8 inches from the thrust collar). This assures that the proximity probe system is not adversely affected by shaft thermal growth. In some cases this is not possible, and the analysts needs to be aware of the thermal growth expected and plan accordingly.



Installation

Special brackets or housings may be required to achieve correct probe positioning and adjustment. However, frequently probes can be mounted through the bearing casing using PRO's DM901 and DM903 series probe mounting adapters. Where probes cannot be mounted directly monitoring the shaft they can sometimes be mounted to observe the thrust collar or some other integral axial shaft surface. Once the probes are installed correctly they must then be properly gapped. Extreme care must be taken when this step is performed. Improper gapping results in the permissible range of the thrust bearing falling outside of the probe's linear measurement range. In order to properly gap the probe the shaft is mechanically barred against the active thrust shoe or other known position. The proximity probe can then be gapped and the DC voltage documented. In order to insure the proper placement of the probe a worksheet incorporating the allowable shaft wear, float zone and probe parameters should be developed. This will help determine the optimum gap and that all alarms fall within the probes measurement range.

Monitoring a thrust bearing collar with a dual probe installation.



Dual axial probes mounted with DM901-1A bushings

Parts included in this discussion
DM901, DM902, & DM903 Proximity probe mounting options
DP1001 Series proximity probes, cables and drivers
DX3301 Series Bentley compatible proximity probes, cables and drivers.

If you have any questions or for further information please contact CTC directly via Email at dgripe@ctconline.com or sales@ctconline.com or feel free to call 1-800-999-5290 in the US and Canada or +1-585-924-5900 internationally.

If any PRO product should ever fail, we will repair or replace it at no charge, as long as the product was not subjected to misuse, natural disasters, improper installation or modification which caused the defect.