PRÜFTECHNIK AG

TechNote #19 VIBCODE® Installation

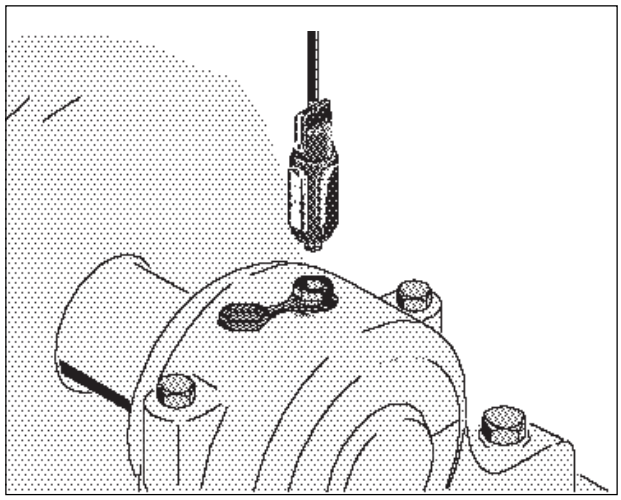
Location and mounting of VIBCODE® measurement studs

Introduction

This leaflet describes how and where to mount VIBCODE measurement studs. This will be of help to both:

- Maintenance engineers installing a VIBCODE system at their site;
- Machine manufacturers who wish to equip their machines with VIBCODE stud mounting points.

Mounting is quite straightforward, but it is worthwhile taking the time to select the optimum locations, especially for bearing condition monitoring where you may be relying upon your readings to determine if a bearing needs replacement.



Note for machine manufacturers

If you are a manufacturer of rotating machinery you may wish to drill and tap your machines for VIBCODE stud mounting. Read through this leaflet and prepare measurement points for RMS vibration and bearing condition (plus cavitation in pumps). This amounts to typically 6 points per machine.

We use a popular threading format compatible with other available types of measurement stud (M8 thread, >12mm deep).

If you already drill and tap for some other type of measurement stud then there are two things to check carefully to see if you are also VIBCODE compatible:

1. Check our drilling and tapping specification on the back page of this leaflet against yours. You may for example simply have to add a countersink.
2. See if your locations match our recommendations. You may just have to add a couple of new ones, or move points nearer bearings etc.

If these requirements are met then we would be delighted if you added 'VIBCODE compatible' to your machine literature and specifications!

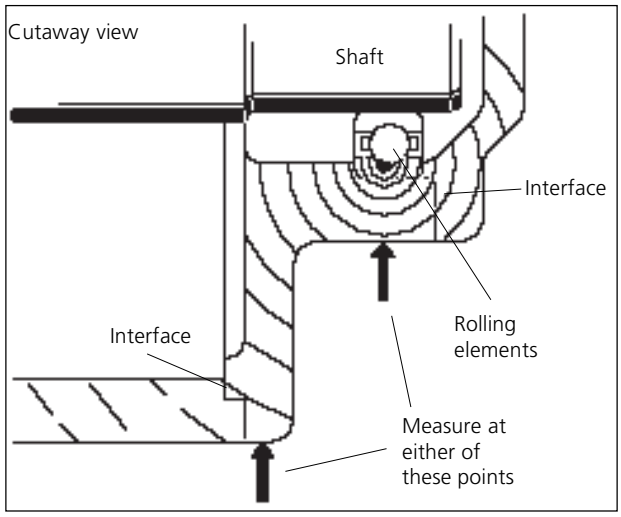
Where to measure bearings (Shock Pulse Method)

For bearing (shock pulse) measurement it is critical that the measurement point be selected as close as possible to the bearing in question and in the correct orientation.

If these recommendations are not followed, the signal from the bearing may be masked by other vibrations or resonances, leading to false indications. Here is a checklist for positioning a VIBCODE stud for bearing measurement:

1. One mechanical interface

Each interruption (or interface) in the material dampens the signal to be measured. Therefore the signal path must contain only one mechanical interface, that between the bearing and the bearing housing. It may be necessary to consult design drawings to see how the machine is constructed.



2. Shortest possible signal path

The signal path between the bearing and the measurement point must be as short and straight as possible.

3. Loaded region

Shock pulses are emitted from the bearing in the 'loaded region' where the highest force is exerted. This is often towards the bottom of the bearing unless there are particular radial forces pulling the shaft to one side e.g. torque effects, or a drive belt or gearing. To find the load point run the machine (which should be aligned - check it with ROTALIGN!) and measure the highest signal radially around the bearing with VIBROTIP internal sensor.

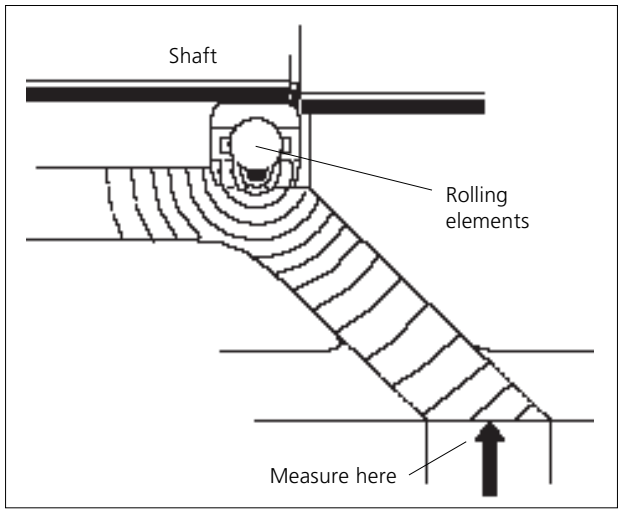
Fit a VIBCODE stud radially as close to this point as is safe and practical.

Where to measure RMS vibration (ISO 2372)

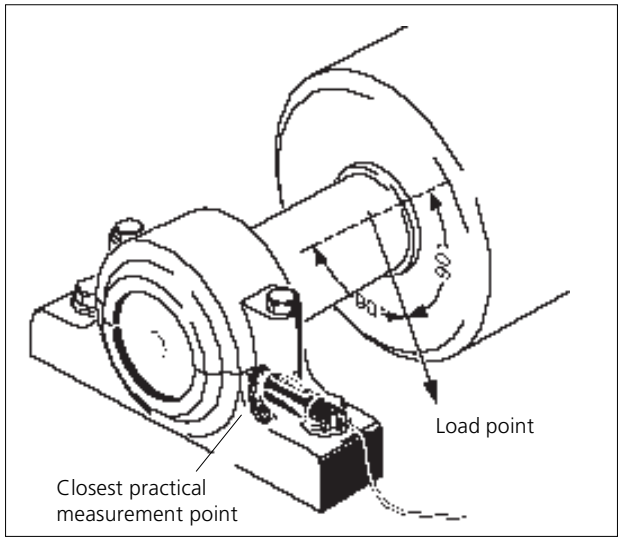
ISO standard 2372 (1974) is a useful guide for general vibration levels for different classes of machines. Whereas bearing condition monitoring described opposite specifically identifies damaged bearings, this ISO standard defines overall vibration which could be due to misalignment, imbalance, component damage or a dozen other reasons. The engineer can measure vibration at different points around the machine to identify a problem.

Here's a checklist for positioning VIBCODE studs for RMS vibration measurement:

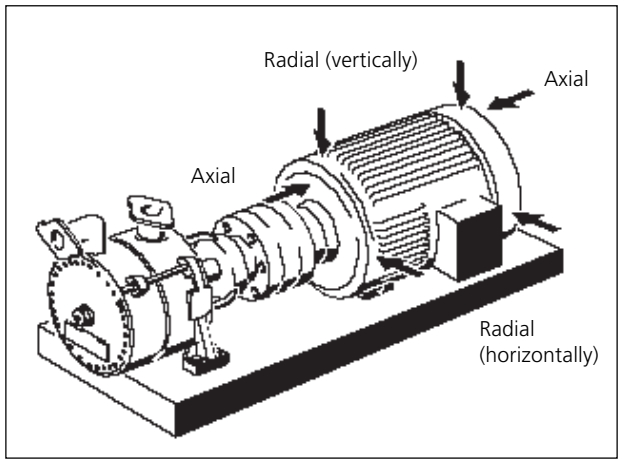
1. The ISO standard recommends measuring three vibration measurements at each bearing: two radial, offset by 90° from each other and one axial (see diagram). That's at least 6 per machine!
2. You might be able to dispense with one axial measurement: Axial vibration is transmitted from the shaft to the machine housing via caged (fixed) bearings and NOT via uncaged (floating) bearings; Many machines have one of each.
3. The locations of these points are not as critical as for bearing condition, but you should still measure as close to the bearings as possible.
4. You may be able to use your existing bearing condition points for radial vibration measurements.
5. Resonance-prone sections are NOT suitable.



The shortest possible signal path should be chosen-



Measure within the loaded region whenever possible.



Ideal locations for vibration measurement

Cavitation

Cavitation occurs in pumped liquids by bubbles continuously being created and imploding, thus damaging e.g. pump impellors. This high frequency vibration is generated at the impellor blade tips and is best measured radially on the pump housing.

Temperature and RPM

If there is an existing VIBCODE measurement point (e.g. for vibration) near to where you want to measure temperature or RPM then use this as your reference rather than mounting a separate stud.

Mounting VIBCODE studs

(metric version)

The following tools are needed for mounting:

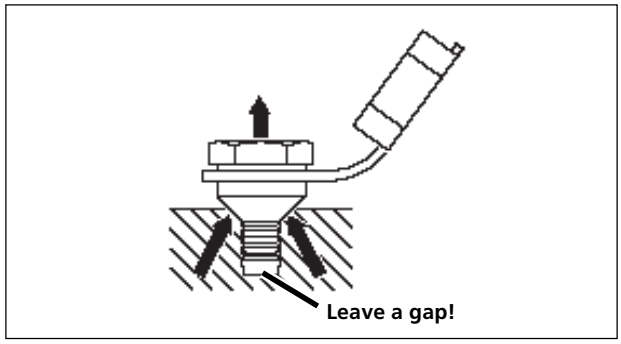
- Hand-held drill
- 6.8mm drill bit
- 90° Countersink bit e.g. VIB 8.610
- Threading kit M8
- Torque wrench with 18mm hex socket
- Compressed air for cleaning out the hole

Note, before fitting the stud smear a very small amount of grease on the countersink.

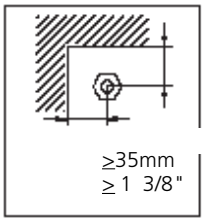
Tighten the stud with a hex socket or a ring spanner (or wrench) without using excessive force! Damaging the stud (e.g. with an adjustable spanner) can cause problems when plugging-in the VIBCODE probe.

Important: Check the stud seating!

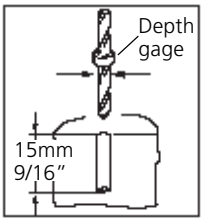
The stud's tapered section must seat perfectly into the countersunk hole so that the signal can be conducted over a large area.



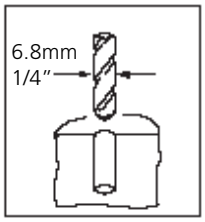
If there is only partial contact then transmission will be poor. The same is true if the hole is too shallow and contact occurs at the bottom of the hole: poor transmission will result.



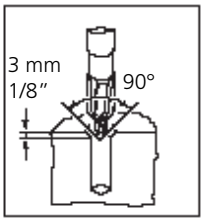
Leave space!



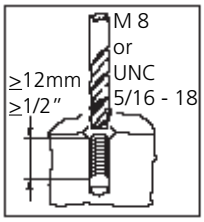
Pilot hole



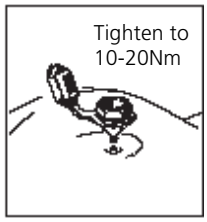
Bore hole



Countersink



Tap thread



Mount

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