A V TECHNOLOGY LIMITED

Machines Talk,
And It Pays to
LISTEN.

Case History No.4

LUBRICATION DEFICIENCY

Rolling element bearings are among the most important components in the vast majority of machines and exacting demands are made upon their carrying capacity and reliability. The continued research and development of rolling bearing technology has enabled engineers to calculate the life of a bearing with some considerable accuracy, thus enabling bearing life and machine service life to be accurately matched.

Unfortunately it sometimes happens that a bearing does not attain its calculated rating life. There are many reasons for this - heavier loading than had been anticipated, **Inadequate or unsuitable lubrication,** careless handling, ineffective sealing or fits that are too tight with resultant insufficient internal bearing clearances. Each of these factors produces its own particular type of damage and leaves its own special imprint on the bearing.

This case history serves to demonstrates the possibility to detect in some cases the effect of inadequate lubrication within a rolling element bearing. The machine used for this demonstration is a 2 speed 1475/990 rpm/90 hp cooling tower fan motor. during testing of the motor it was observed that an intermittent high pitched noise was being omitted from what was suspected as the NDE bearing. Overhaul velocity rms. readings throughout the motor exhibited readings below 1 mm/sec rms and were considered low and acceptable.

To determine the cause of this noise, a set of 5000Hz acceleration readings were obtained from both the NDE and DE motor bearings in the vertical, horizontal and axial directions. On examination of the spectra from both DE and NDE bearings in the vertical direction a 'haystack' effect was evident in the region of 2000 to 3500 Hz (see Figure 1).

This type of spectrum, based on experience, is normally generated by a reduction in the lubrication effect resulting in some degree of metal to metal contact within the rolling element bearing. If this condition is not remedied then accelerated bearing wear will occur leading to an increase in operating temperature and consequent bearing failure, see Figure 1.

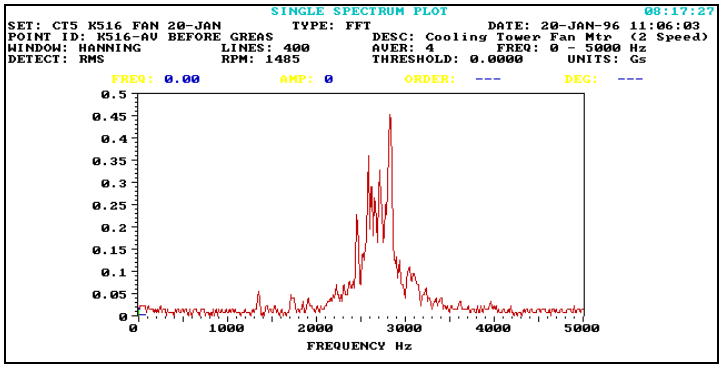

Figure 1 - Before bearing lubrication.

Once the condition had been determined, it was decided to apply a given amount of lubricating grease to this bearing. With the vibration data collector set to analyser we were able to monitor the immediate effect the lubricating grease had on the vibration. After grease was added and distributed within the bearing the live spectra indicated a slight recurrence of the original condition, it was then decided to apply a further few shots of grease. The effect was immediately noticeable with a considerable reduction in vibration activity exhibited by the analyser. The same procedure was carried out at the motor DE bearing, see Figure 2 below.

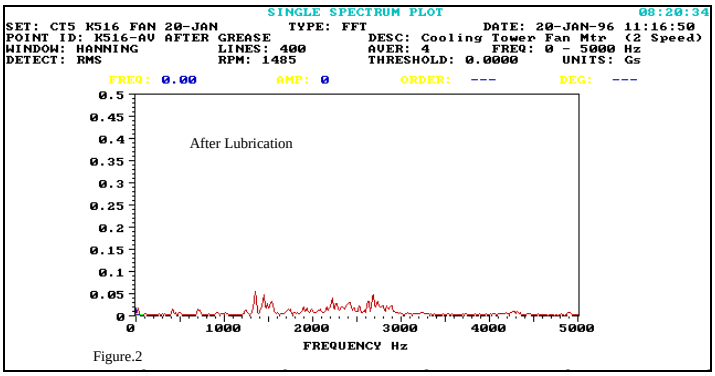

Figure.2

Figure 2 - Reduced high frequency vibration.

Conclusion - By locating and correcting this lubrication deficiency, a possible motor bearing failure due to this condition was prevented.

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