

A V TECHNOLOGY LIMITED



Case History No.2 BALL BEARING INNER RACE DEFECT

Vibration data collected from P272 motor and pump had over the last 32 months exhibited low and acceptable values, typically around 1.5 mm/s rms throughout. Vibration data collected in January 1997 indicated an upward trend at the pump drive end indicating a probable fault within the pump, see Figure 1 below.

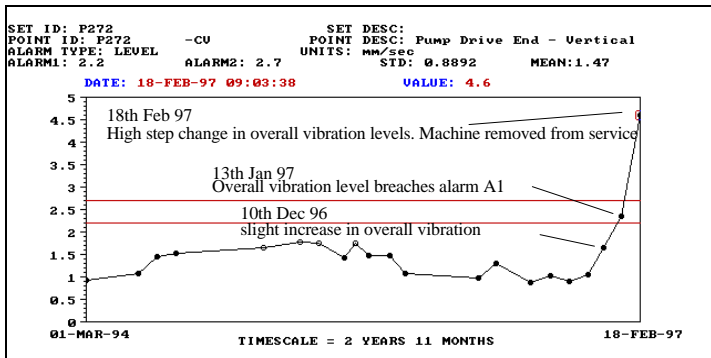


Figure 1 - Continued increase of overall vibration levels at pump.

Vibration spectra collected from the pump drive end bearing on the 13th January 1997 did not exhibit any of the calculated fundamental defect frequencies for an SKF 6311C3 bearing, although the vibration spectrum did indicate baseline lifting between 24000 cpm and 72000 cpm indicating a 'noisy' bearing, see Figure 2 below.

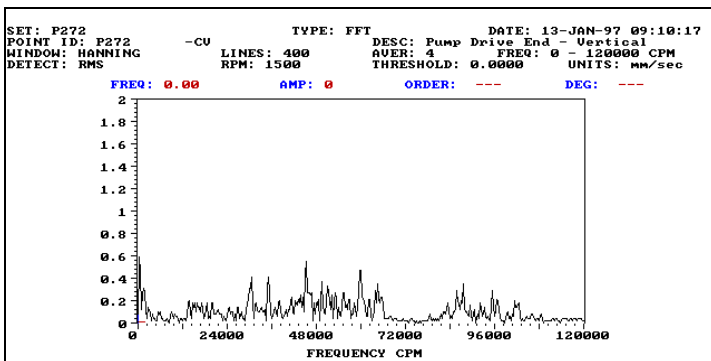


Figure 2 - Early signs of bearing wear/damage.

Based on the overall vibration levels and the early signs of bearing defect in the spectrum it was decided to continue running the machine and review the next set of data. 35 days later the machine was re-tested and exhibited a further increase in overall vibration levels along with an increase in broad band activity in the vibration spectrum, see Figure 3. Based on this information it was planned to replace the pump bearings as soon as the production process allowed.

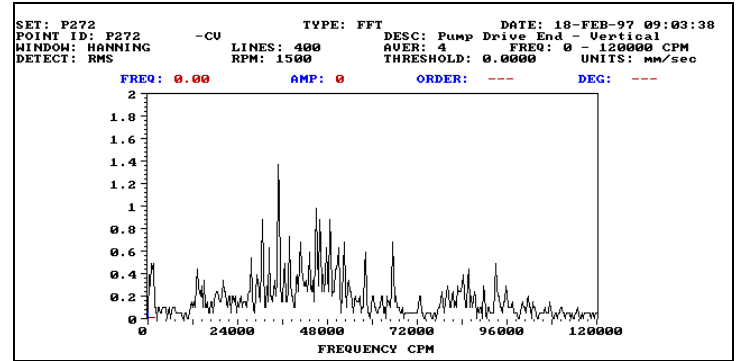


Figure 3 - Increased bearing wear/damage

Examination of the pump bearings highlighted an area of flaking on the inner race of the ball bearing and subsequent damage of the outer race and several balls. Figure 4 below shows the damaged area on the ball bearing inner race.

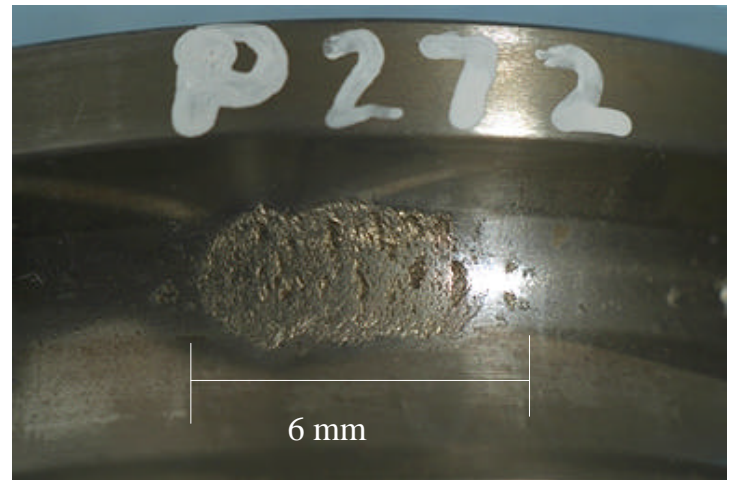


Figure 4 - Spawling on the bearing inner race.

Failure of this machine would not have resulted in serious production losses as a spare unit was readily available. However, if a mechanical seal had failed as a result of high vibration or bearing failure this would have had serious environmental implications due to the nature of the product.

The bearings were replaced and the machine was brought back into service with minimum disturbance to the process. The parts and labour cost saving due to early fault detection was estimated to be **£4,000**.

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