

Case History No.16 REACTOR CIRCULATION PUMP BEARING DEFECT

Condition Monitoring (CM) is carried out on approximately 181 items of rotating equipment over several of the SHOP production units on a continuous 5 week cycle.

This case history is based around one of a team of three identical Dresser Pacific Type SVH reactor circulation pumps used to circulate Butanediol & Catalyst Solution at a rate of 500 tons/hour. Figure 1 below exhibits the trended overall vibration values recorded from the pump drive end bearing location over an 8 month period. The spectrum also in Figure 1 is related to the last trend value and clearly does not indicate any underlying problems.

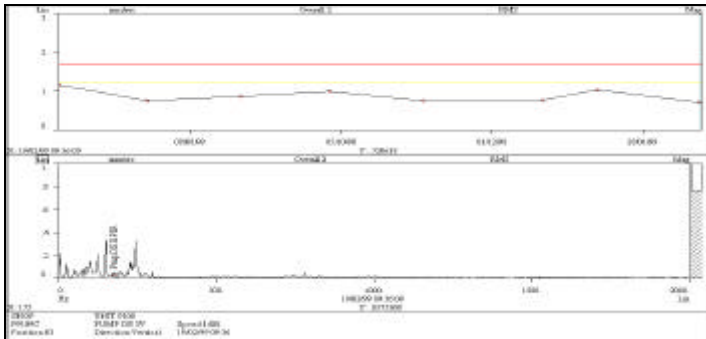


Figure 1 - Trend plot and spectrum indicating healthy bearings

The next trend plot taken 5 weeks later exhibited a slight increase in overall vibration (from 0.7 mm/s rms to 1.2 mm/s rms). The vibration spectrum related to this increase had clear signs of an impending defect on the pump drive end bearing inner race see Figure 2.

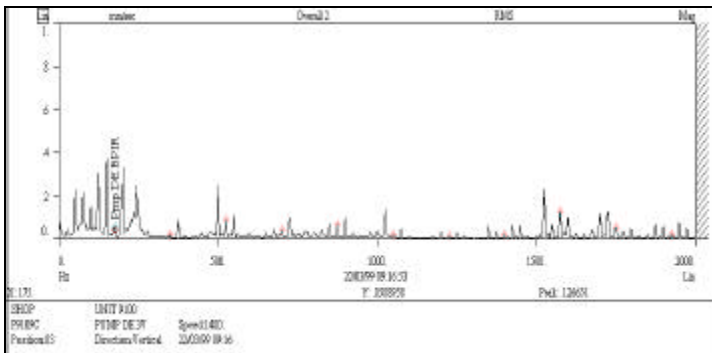


Figure 2 - Vibration spectrum indicating early bearing damage.

These findings were recorded in the CM log and would be reviewed at the next scheduled survey as the overall levels and spectral content was regarded acceptable at this time.

Overall vibration levels recorded at the next survey clearly had breached the pre-defined A2 alarm level and indicated a

significant change in the spectral activity which coincided with calculated defect frequencies for the pump drive end bearing inner race along with running speed side band activity, see Figure 3.

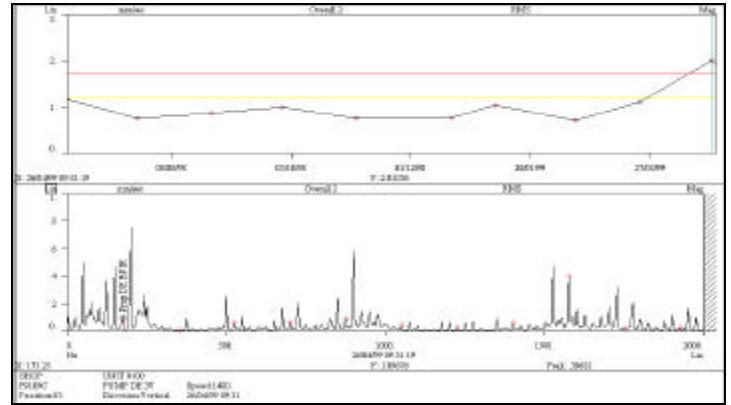


Figure 3 - Increase in trend value and spectral activity.

From this information a recommendation was made to the production unit to replace the pump drive end bearing at the next available opportunity. Due to the production requirement of this pump it was monitored on a regular basis over the next few weeks until it could be removed from service. Examination of the pump drive end bearing proved the initial analysis to be accurate with two spawl areas being evident see Figure 4.

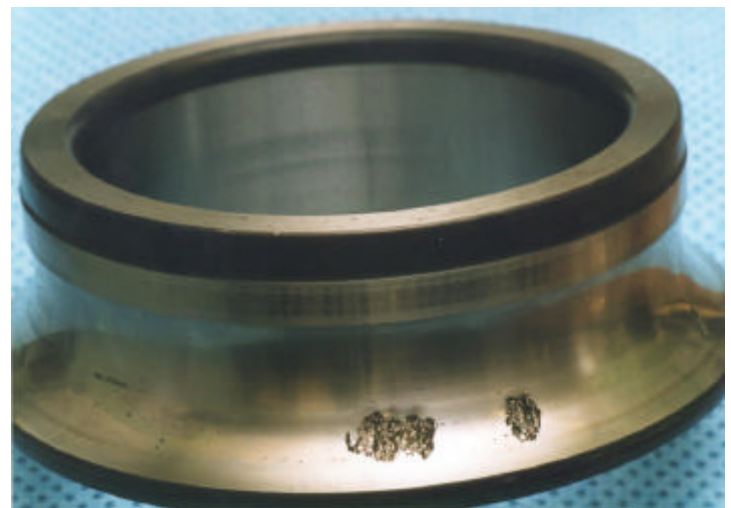


Figure 4 - Photographic evidence of inner race damage.

The estimated mechanical cost saving due to early and accurate analysis was said to be in the region of £2,000. And clearly proves that **“Machines Talk, and it PAYS to LISTEN”**.

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