



Case History No.33 VELOCITY VS ENVELOPE

Routine vibration surveys are carried out on all the bottle and tray conveyors, the main machinery assets of the ready to drink (RTD) line 46 at Diageo (UDV) Leven in Fife. This activity is part of a condition monitoring programme, which is an integral part of the total asset care system.

Regular vibration velocity and envelope readings are collected on the motors, gearboxes and conveyor bearings to identify changes and determine each machines condition.

During the September 2003 survey, a step change was noted in both the velocity and envelope trends on a motor NDE bearing. Figure 1 below illustrates the increases and the effect on the trended velocity readings

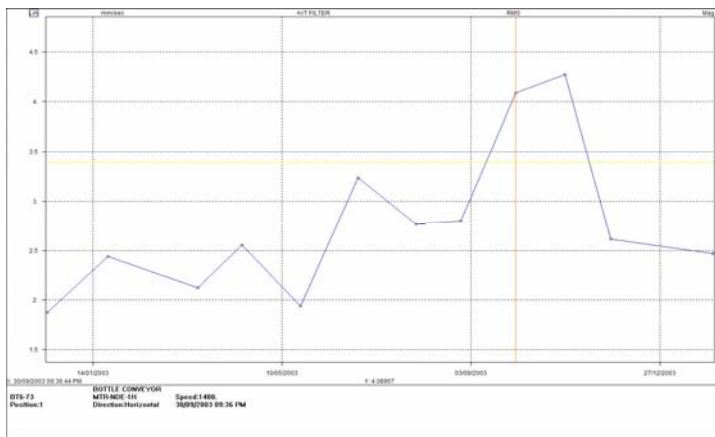
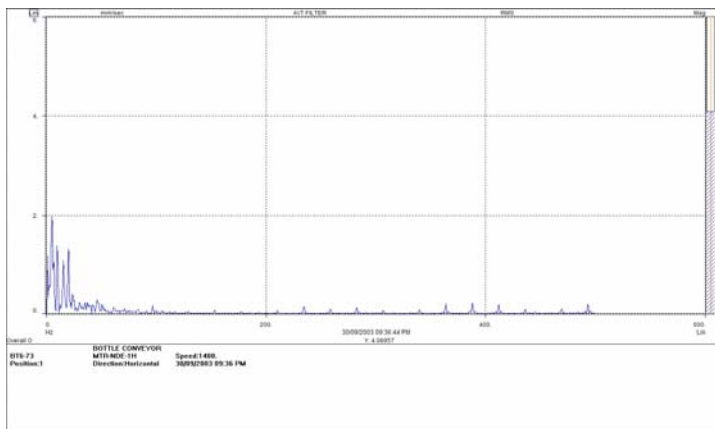
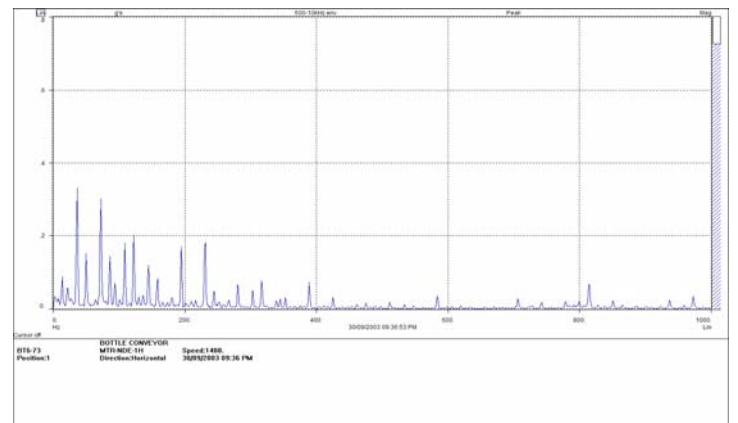


Figure 2 below shows a velocity spectrum with low amplitude, high frequency components, indicative of an early bearing defect.



These high frequency peaks were not sufficient evidence to warrant an Action note (A/N) being issued, within the guidelines of the asset care A/N system. However, detailed analysis of the envelope spectrum confirmed the presence of a developing bearing defect, which left unattended would result in failure with the resulting loss to production.



The envelope spectra, Figure 3 above, clearly shows the bearing damage with multiple harmonics of the developing defect frequencies.

The motor change was planned and carried out during the next available maintenance window. Following this remedial work overall levels and spectrum content returned to previous satisfactory levels.

This case history further stresses the value of collecting multi parameter measurements across a machine. A variety of techniques and vibration measurements are particularly powerful in identifying faults on variable speed/load machines, generally rotating with input speeds below 1000 rpm and gearbox output speeds typically around 100 rpm.

This analysis enabled timely intervention and a planned maintenance activity. Left undetected it would have interrupted production, resulting in a minimum down time, estimated at 1 hour. This equates to a minimum £900 cost saving, plus any replacement parts. In reality this cost saving could have been higher dependant upon the time of failure!

Even small cost savings prove the effectiveness of an asset care plan!