



# Time Domain

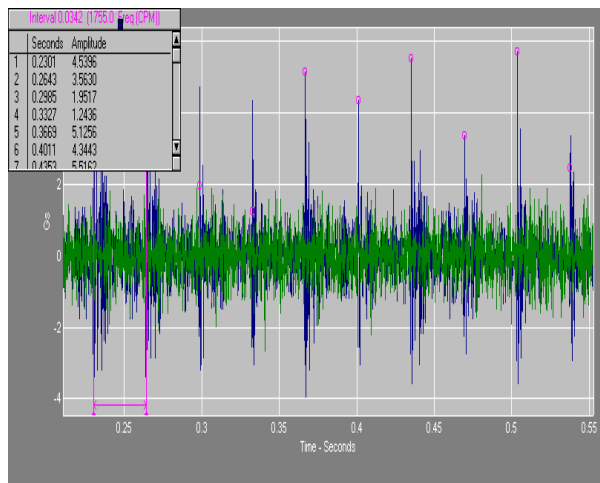


- Early warning signs of broken gear teeth are subtle but can be found with the right tools.
- Replacing parts that are about to fail saves everyone from unnecessary headaches.

## Case History Pinion Tooth

During January 2000, while completing our monthly check on a gear case we saw a large increase in the time domain spectrum. The time domain is a good indicator of gear problems, especially broken teeth. The spectrum shown to the right is an overlay of the prior spectrum and this spectrum. Notice the energy peaks at running speed. This is a perfect example of a broken tooth on the input pinion gear. The normal frequency spectrum did not show excessive increases in amplitudes. The maintenance technician could also hear a slight noise from the unit.

The gear case was removed from service. With this unit the oil analysis did not show excessive contamination. This unit was a tail drive gear case on a longwall mining section. Being in such a critical location the unit would cause extensive downtime and loss of production if it would fail.



This is a good example of positive predictive maintenance helping management to make good decisions that will increase production and decrease downtime. This is also positive proof that time domain spectrums must be taken on all units, which are in a vibration health care program for rotating equipment. Time domain spectrums are also useful in determining bearing defects on slow rpm machines.

This is one of many examples of vibration analysis uncovering a problem before the unit failed. In the next newsletter I will illustrate a different case study of vibration analysis, that detects a problem and verification of the problem when investigated. If you have any questions contact us. Feed back is very important to us.

**Spend a little money  
now to save big  
money later.**

Any questions feel free to contact Larry Massey  
[lmasssey@ma.rr.com](mailto:lmasssey@ma.rr.com)