HOLROYD INSTRUMENTS

FAQ

How does Acoustic Emission (AE) compare with Vibration?

All engineers know that machinery vibrates when it is running and that some serious fault conditions can give a significant increase in vibration. Its a good way of detecting the presence of out of balance for example.

Unfortunately this overall level of vibration is typically insensitive to more subtle effects such as the early signs of bearing and gear teeth wear. To overcome this Vibration Analysis has to be carried out where the vibration signal is pre-processed using subjectively set filters and then analysed in the frequency domain (uses an FFT to provide a frequency spectrum). To interpret this vibration frequency spectrum it is necessary to calculate all the possible defect frequencies which could be present (this is not a trivial task and requires precise information on machine speed and bearing and gear geometries). Once you have done this you can observe the signal levels at each of the possible defect frequencies and see if they have increased since the last time you made a measurement. You need to do all this at several positions on each machine - even the majority which are in good condition ! If this all sounds complicated and time consuming that's because it is.

By contrast our unique implementation of the AE technique homes directly in on the high frequency (~ 100 kHz) component of the elastic waves being generated by operating machinery. The resulting AE signal is very strongly influenced by fault processes and has a much reduced sensitivity to the effects of normal running (ie good machines are much quieter at 100 kHz yet machine faults which result in deteriorating contacting surface give rise to very loud signals). Because of this it is possible to analyse the overall AE signal (without homing in on defect repetition frequencies) in order to provide a clear indication of the presence of faults.

Experience in the field has shown over and over again that our MHC products are much simpler and quicker to use than vibration instruments yet every bit as sensitive to the earliest signs of mechanical degradation. In fact there are numerous instances where it is far more sensitive than FFT based vibration techniques.