

Envelope Analysis with PULSE 6.1

A New Addition to our Machine Diagnostics Solutions

Envelope Analysis Type 7773 is new PULSE software for diagnosis of roller bearing elements and identification of gear box faults.

Introduction

Envelope detection of band-pass filtered vibration signals is a well-established machine diagnostics technique. An excellent troubleshooting tool, the technique is primarily used for rolling-element bearing fault detection and diagnostics. It is used on all rotating machinery where preventive fault diagnosis is essential, for example on engines, drive trains, gearboxes, pumps, turbines, compressors, fans, etc., within the aerospace, automotive, process, shipping and earth-moving equipment industries as well as in power plants and offshore platforms.

What does it do?

Envelope analysis can be used for:

- Amplitude demodulation, i.e., detection of the spectral and temporal representation of the modulating signal
- Spectral (how frequent) and temporal (where in a cycle) identification of the occurrences of impulsive events in rotating machinery

Most often the impulsive events are of low energy compared to the overall energy in the vibration signal. The higher harmonics of the repetitive impulsive events are amplified at the structural resonances of the machinery. Envelope analysis centred at a structural resonance reveals the occurrences of the impulsive events.

Brüel & Kjær Machine Diagnostics Solutions

- FFT Analysis
- Order Analysis
- Vold Kalman Order Tracking Filter
- Signal Enhancement
- Cepstrum Analysis
- **ENVELOPE ANALYSIS**

Applications

Typical envelope analysis applications include:

Roller bearing elements

Identification of cracks in inner race, outer race or roller defects.

Gear boxes

Identification of cracked or broken teeth from impulsive modulation of the tooth meshing frequency.

Turbine blades

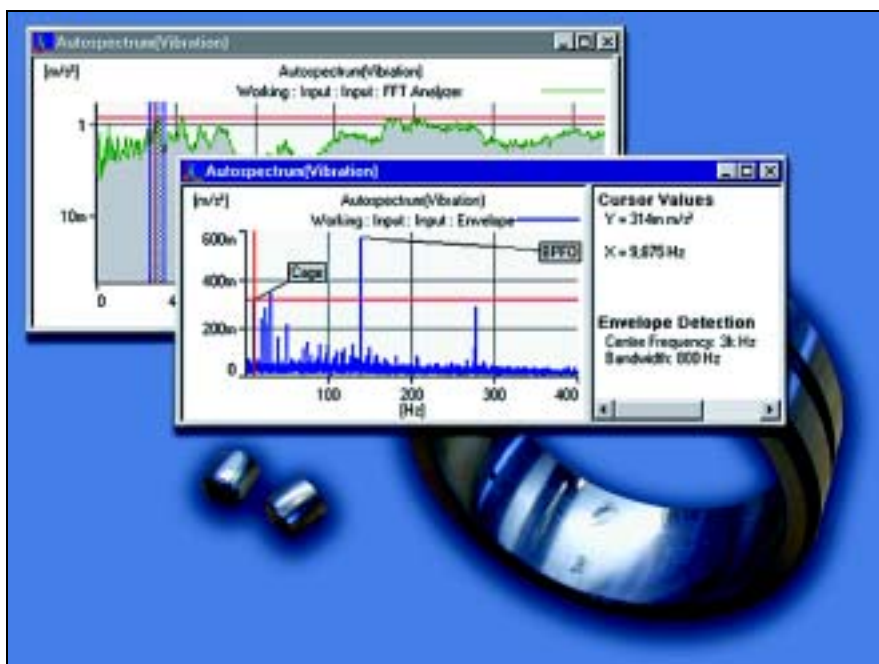
Identification of broken or distorted blades from modulation of the blade passing frequency.

Reciprocating machinery

Determination of precise point (in time) in the cycle of impulsive events like valve openings/closings or combustion.

Induction motors

Identification of broken or cracked rotor bars, or bad soldering from modulation of slot harmonics by twice the slip frequency.



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