

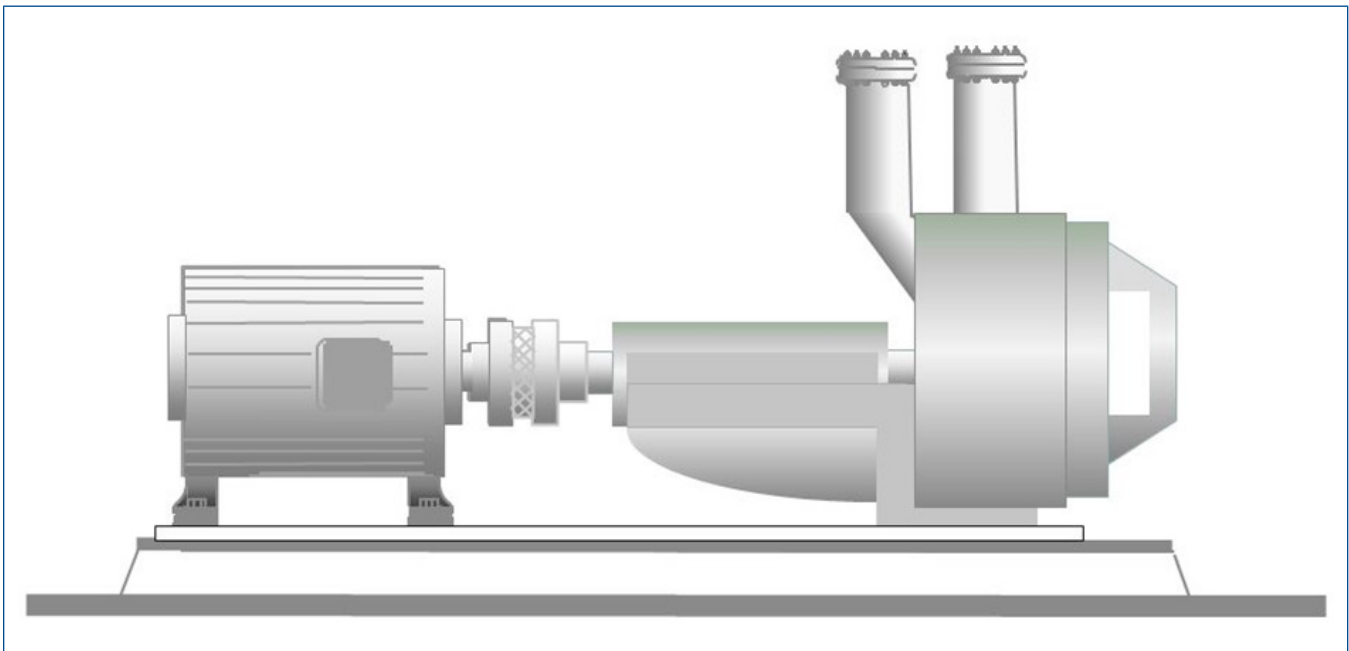
Using Peak Detection Monitoring on a Paper Machine Refiner

This paper describes the application of Emerson's unique approach for early peak detection – PeakVue™ technology - to better assess the machinery health of paper machine refiner equipment.

Introduction

Paper machine refiners are critical to optimum plant performance. But varying loads and pulp contaminants typical of the asset can lead to wear of the refiner plates and bearing components, degrading performance and ultimately leading to equipment failure. Predictive monitoring of the refiner provides the information necessary to identify those developing faults, such as...

- Imbalance
- Misalignment in the drive shaft
- Rolling element bearing failure
- Chipped, broken or worn refiner plates
- Resonance
- Bent shaft
- Damaged couplings
- Insufficient or inadequate lubrication
- Structural or mechanical looseness



Typical Motor and Refiner Assembly

The Challenge

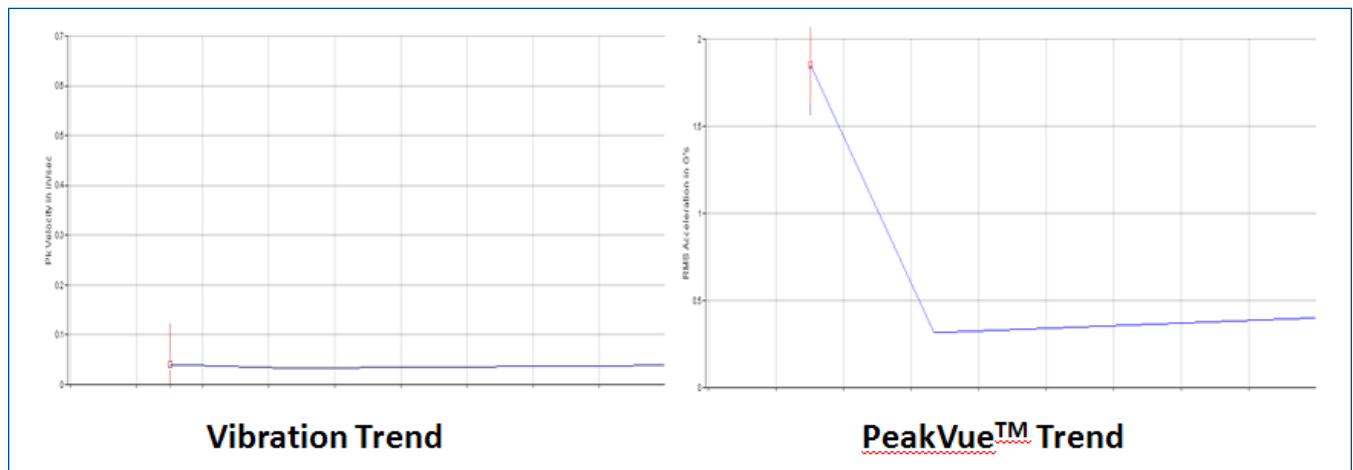
The plate assembly of a refiner is a typical failure point, but the refiner housing structure makes vibration monitoring of the internal plates difficult. Refiner bearings can be monitored in a consistent manner with other machine components, but the various design configurations for refiner plate assemblies makes it difficult to diagnose. Lack of feedback on the plate condition creates an incomplete picture of the machine's health and puts you at risk for unexpected failure.

Applying Peak Detection for Accurate Monitoring

Emerson's vibration monitoring technologies feature a unique approach to monitoring that provides the earliest indication of developing bearing and refiner faults. While standard vibration monitoring looks at measurements in inches/second, PeakVue technology measures impacting in g's. This measurement will often times show indication of a developing fault while the standard vibration measurement remains unchanged. Energy bands enhance trending and alarming, making it easier to interpret the data. More detailed information can be accessed through spectra and waveform data, and trend values can be compared against alert and fault levels.

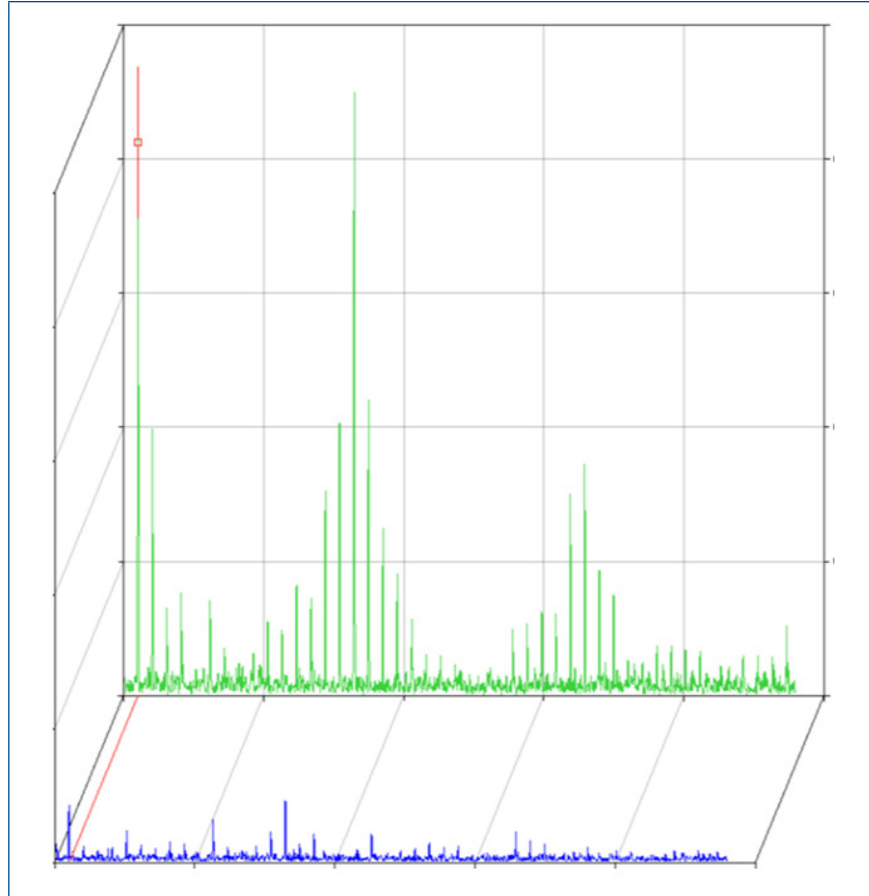
What does PeakVue look like?

In the following trend plots, data was collected using a portable machinery health analyzer. In the vibration trend, no significant amplitude changes are observed, while the PeakVue trend plot indicates elevated amplitudes from the very first reading. The vibration trend did not change, but the PeakVue trend shows marked amplitude decrease after maintenance repairs were completed.



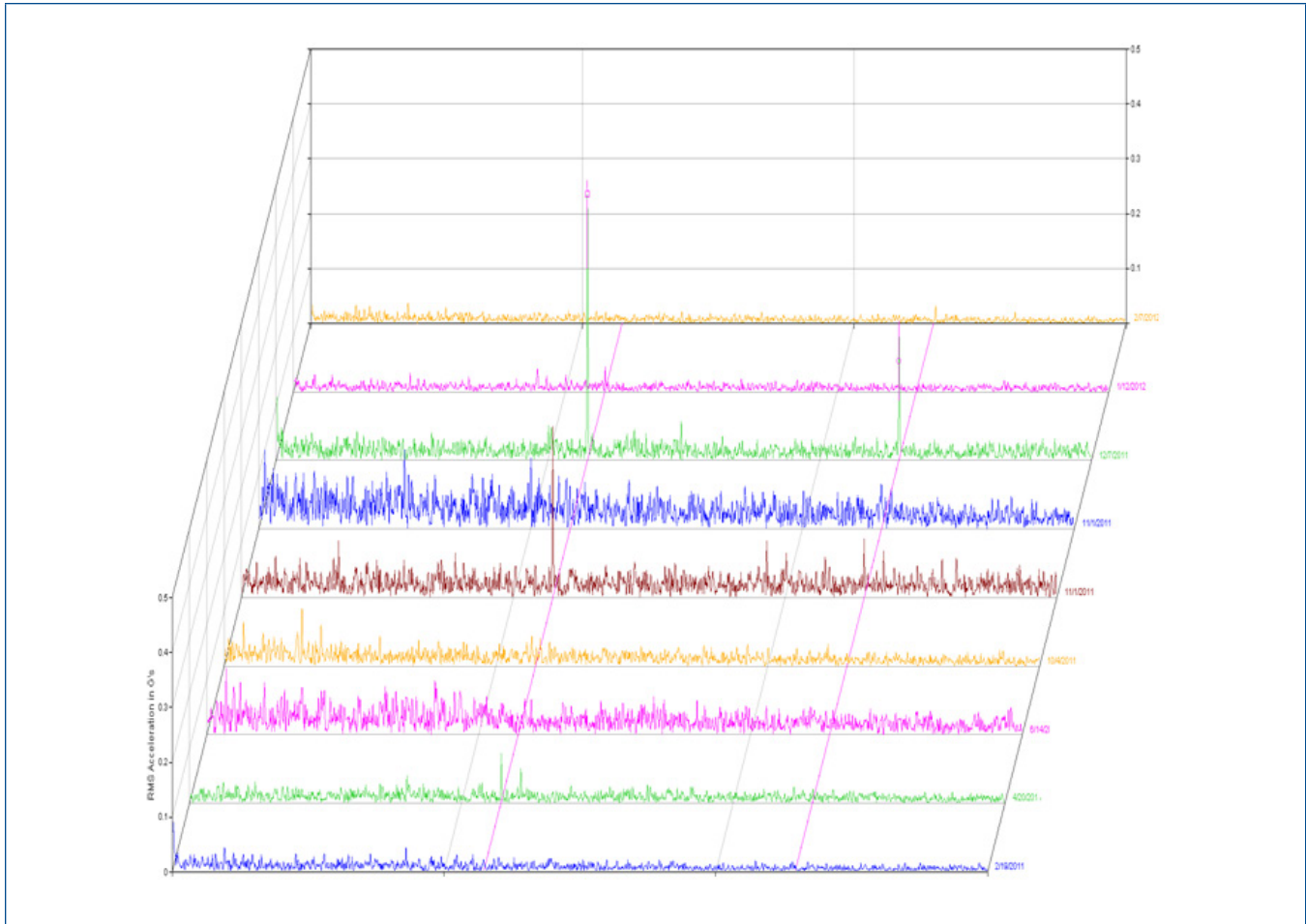
Vibration Trend (left) vs. PeakVue Trend (right)

In the multi-spectrum PeakVue plot below, the 1xRPM multiples and plate defect peaks can be clearly seen before maintenance was initiated (green spectrum) and a decreased amplitude (blue spectrum) is apparent after repairs were made. The vibration spectral data did not indicate the seriousness of this refiner problem.



Multi-spectrum PeakVue Plot

In another example, the multi-spectrum PeakVue plot below indicates two separate problems are present in the data. The first event (brown spectrum) showed elevated refiner plate defect peaks which were addressed by replacing the refiner plates. In the second event, an initial baseline PeakVue spectrum (center blue) indicated slightly elevated broadband noise. When another measurement was taken (top green spectrum) with the refiner plates loaded, the plate defect peaks were again present due to the incorrect installation of two of the refiner plates. The top two spectra were obtained after this problem was resolved and with the refiner returned to normal operation.



Multi-spectrum PeakVue Plot

Conclusion

Refiner plate defects are a primary source of motor and refiner bearing defects. Using vibration and PeakVue diagnostic technologies to monitor refiner plate as well as bearing condition can enhance paper machine refiner operation, resulting in improved productivity and reduced maintenance. Combining PeakVue data with motor current amperage and refiner plate load could allow for modification to operations before significant damage occurs.

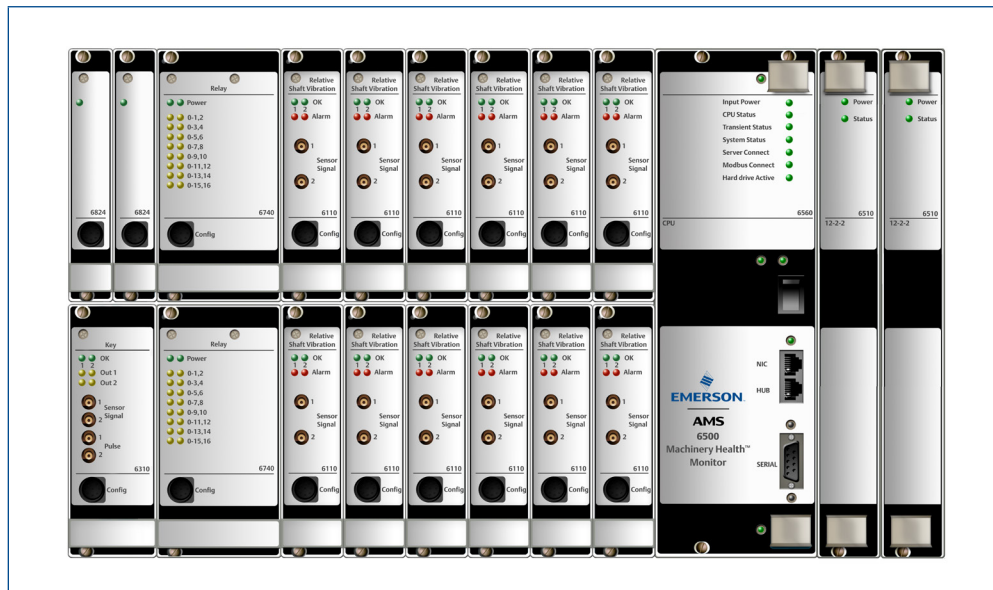
While the examples above were identified using a portable machinery health analyzer, such as Emerson's AMS 2140, PeakVue is also available in Emerson's wireless vibration transmitter (AMS 9420) and continuous online monitoring system (AMS 6500).



AMS 2140 Machinery Health Analyzer



AMS 9420 Wireless Vibration Transmitter



AMS 6500 Machinery Health Monitor

To learn more about Emerson's portfolio of vibration analysis solutions, go to www.assetweb.com/mhm.

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