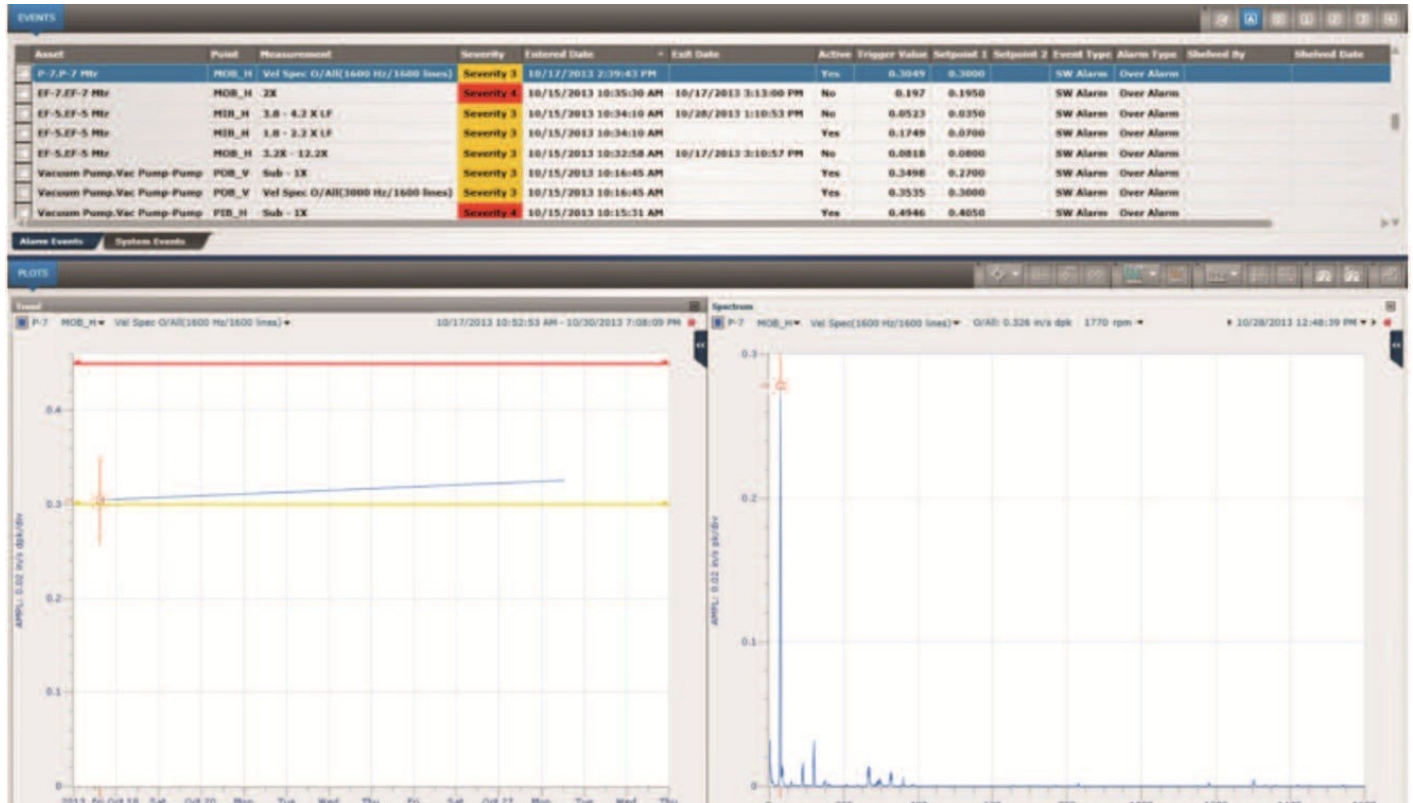


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## System 1\* for Portables

Date : April 11, 2014



## NEW TOOLS TO IMPROVE DIAGNOSTIC ANALYSIS

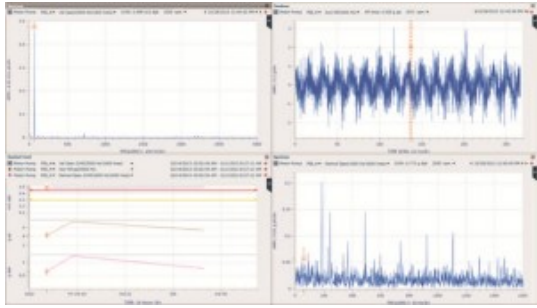
System 1 for Portables offers new tools and incorporates Bently Nevada\* and Commtest\* expertise on machines and machine faults to create a software environment conducive to running an effective condition monitoring program. New features like predefined default Smart Plots, fault frequency overlays, other plot tools and reporting options will help in identifying and diagnosing machine faults more quickly and effectively than ever.

## Smart Plots

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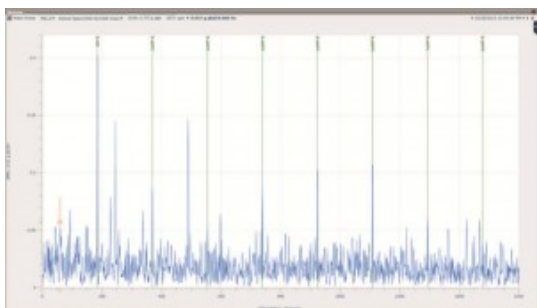
After uploading collected data and identifying machines of interest, the next logical step is to review relevant data that was collected on each machine. By using the Smart Plots feature in System 1 for Portables you can quickly view predefined default plots that display the information that is most important for your current point of interest. These plots are built to display data that is important for diagnostics and will vary depending on which component you currently have selected. The default plot definitions are built and displayed differently depending on the asset/component type that is selected, the data collection method, and common fault types.



For example, if you are focused on a particular bearing and switch to the Smart Plots view, depending on your measurement configuration, you may see four plots that include a velocity spectrum, acceleration waveform, demodulated (“enveloped”) spectrum, and a stacked trend plot with the associated measured variables (Figure 1). In comparison, if you had displayed smart plots from a selected machine train, the smart plots would have displayed stacked trends ordered driver to driven, showing the overall vibration levels for the horizontal, vertical, and axial measurements for that entire train.

## Fault Frequency Overlays

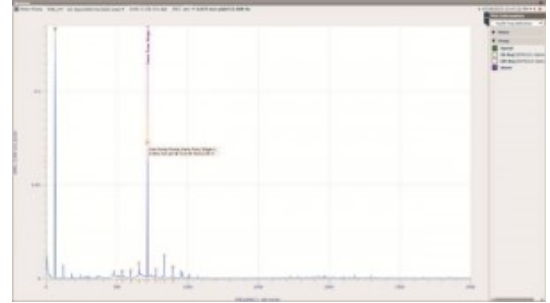
Another feature that has been introduced as part of System 1 for Portables is the ability to overlay fault frequency markers onto a spectrum plot in order to identify specific components of interest. These fault frequencies are machine specific and dependent on properties that are established during the database configuration process. The overlays can include the fundamental frequency as well as a number of harmonics. These overlays can help you to diagnose why there are peaks of high vibration at particular frequencies.



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Example: When you evaluate a demodulated vibration spectrum taken on a rolling element bearing, these overlays will help show if peaks line up with known bearing fault frequencies (Figure 2). In addition to bearing-related frequencies, frequencies associated with machine running speed, power supply line frequency, rotor bar and vane pass events, and other asset specific faults can be overlaid on the plot. By using the fault frequency list provided in the plot, you can display multiple fault frequencies on the same plot at the same time to identify different regions (Figure 3).



## Other Plotting Features

System 1 for Portables also offers a number of additional features that assist analysts who are performing advanced diagnostics on monitored machines.

Based on the existing data collection and signal processing settings, the resulting spectral resolution limits may make the exact frequency of a vibration peak somewhat unclear. By using the peak interpolation tool included in the software, you can calculate a very close approximation of what that frequency actually is. This can provide valuable information such machine running speed in situations where it is not being measured directly by a tachometer instrument.

Two additional software features are Quick Plots and Alarm Plots. Quick Plots allow you to establish plots with parameters that are of particular interest to you and see them instantly. These plots remain open and update automatically with new data as you focus on other points or machines. This offers a huge time savings compared to other condition monitoring software because instead of having to recreate the same plots every time a new machine is selected, the plots you already created are automatically updated with the information applicable to each new selection.

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Alarm Plots allow you to quickly view the data that is associated with any selected alarm event. Typically the plots will include a trend of the measurement that went into alarm, along with its associated spectrum or waveform plot (Figure 4). When you select a different alarm event the predefined default Alarm Plots are automatically updated with the appropriate supporting evidence.

## Reporting Options

System 1 for Portables also includes options for creating reports that will help present your diagnostic analysis. The Percent Change Report can be used to show change in measured variables that occurred between data collection cycles. This report can be created to include all measured variables for a particular selection, or you can use the filtering options to only include those measurements that have a significant change or are above a certain threshold (Figure 5).

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System 1\* Percent Change Report (PDC)

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Machine Name	Asset	Point	Measurement	Units	No. Change (Previous)	Latest Sample Value/Time	Latest Sample	Prev. 1
Pump	Motor Pump	M08_3	33	µV/g	250	28 Oct 2013 12:43:33 PM	0.0007	0.002
Pump	Motor Pump	M08_3	508 - 12	µV/g	129.45	28 Oct 2013 12:46:55 PM	0.0039	0.004
Pump	Motor Pump	M08_3	8392	µ/g	136.67	28 Oct 2013 12:43:33 PM	0.0079	0.008
Pump	Motor Pump	M08_3	33	µV/g	100	28 Oct 2013 12:43:32 PM	0.0002	0.001
Pump	Motor Pump	M08_3	3250 - 4387 Hz	µV/g	100	28 Oct 2013 12:43:26 PM	0.0004	0.002
Pump	Motor Pump	M08_3	33	µV/g	100	28 Oct 2013 12:43:30 PM	0.0002	0.001

Another available report is the Diagnostic Report. This report will export machine and event information, along with the plots that have been created, and put it in a template that is ready for a vibration analyst to enter detailed diagnostic findings and recommendations for the necessary actions that need to be taken.

## Conclusion

The features that are offered in Systems 1 for Portables today, as well as those that will be added over time, will assist vibration analysts in completing their diagnostic analysis and in maintaining an effective condition monitoring program. The tools not only embed decades of knowledge into the software, but are also designed to help analysts focus in on problem areas and make an accurate diagnosis more effectively than ever before.

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