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Audio-replay capabilities have enhanced this author's vibration-analysis toolkit and could be doing the same for yours.

Over the years, technicians have listened for sounds made by machines in order to identify evolving problems as early as possible. By the time a fault becomes serious enough to be heard in a noisy plant, however, it could be too late to prevent damage. Now, portable vibration collection devices aid in the early detecting of problems and maintaining the health of rotating machinery.

Even so, the use of these devices has not made listening an obsolete art. Sound remains an important element in the early recognition of deteriorating conditions and in validating potential faults in rotating machinery. When used in conjunction with vibration waveform plots, playback of recorded sounds supports the existence of a fault, helping to convince persons who may have difficulty reading graphic plots. Often, analysts must deal with managers who see only meaningless squiggly lines when shown a waveform or spectral plot. Add sound, and the lines suddenly make sense.

Put on your headphones

The sounds coming from machines provide important clues that may be missed by relying on vibration data alone. That’s why I advocate the wearing of headphones by technicians who are

collecting vibration data. I always try to watch the data as it is being acquired to detect abnormalities in amplitude or pattern. In most plants, there's so much noise-making activity (i.e., associated with vehicle traffic, people, machines, etc.) that it can be difficult to watch every reading as it is taken. By listening to the accelerometer signal, it's possible to instantly recognize a change from the normal hum of a smoothly functioning machine.

I've been wearing headphones during route collection of vibration data for many years in order to hear unfiltered sounds covering the entire frequency spectrum. Emerson's portable CSI 2130 Machinery Health Analyzer records the waveform vibrations emanating from a machine. Anytime I hear something abnormal, I make a "note" on the analyzer to take a careful look at the waveform data after uploading it to a computer. When reviewing the data later, I'll see the note calling attention to the waveform collected from that particular machine.

The analyzer generates plots of frequency spectra as well as the waveforms. Analysts look at the waveform to determine the severity or impact of the vibration, and they look at the spectrum to determine the cause—*be it imbalance, a bearing defect, a lubrication-related issue or something else*. The information can later be uploaded to computer-based software for detailed analysis. That's where the latest version of Emerson's AMS Suite: Machinery Health™ Manager comes in. It incorporates the ability to convert the audio portion from waveform data collected periodically or online. Users can actually hear an audible indication of a problem.

The easiest way to do this using the Machinery Health Management software is to plot the waveforms to be played, right-click on the waveform, and select "Play Audio" to launch the Waveform Audio Player (Fig. 1). A loop button allows repetition of short-duration audio replays for close study.

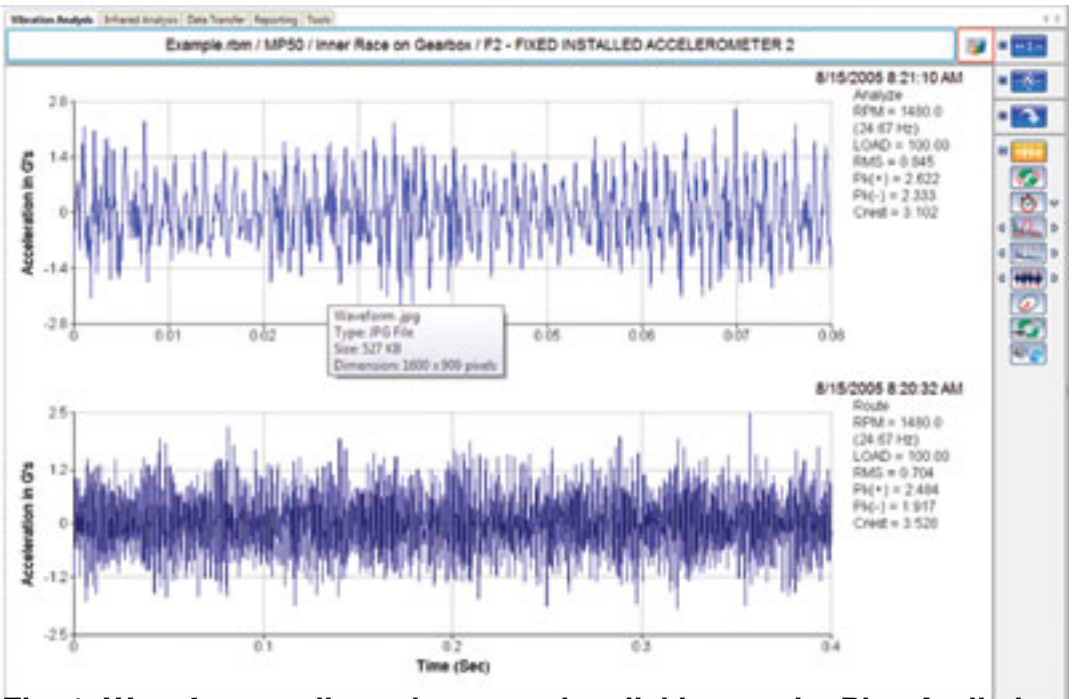

Fig. 1: Waveform audio replay starts by clicking on the Play Audio button. Vibration at different

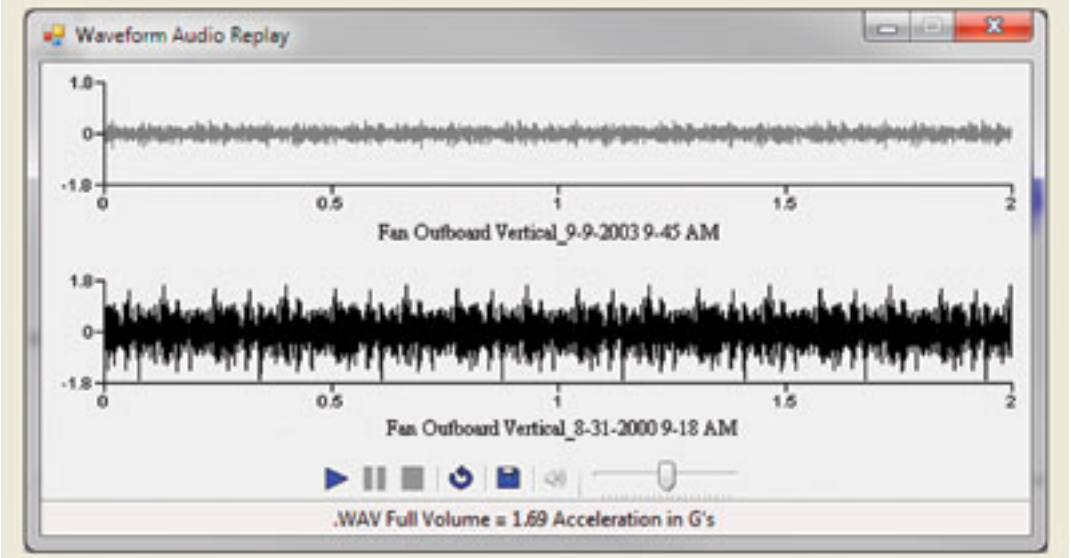

Fig. 2: Our "Fan Outboard Vertical" data, initially written to disk as a .WAV file, is ready for listening.

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