Predictive Maintenance: There's an App for That

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Implementing a predictive maintenance (PM) program can be tough. Despite its proven success, many companies have been operating the same way for over 50 years and don't know where to start. Understanding where to start and where to focus is critical. The intention of this article is to give insight to start and sustain an effective program using today's technology and devices.

It seems only yesterday that we had to pull over to payphones, stop by the fax machines, or even mail a letter to get things done. In the past 10 to 15 years, technology has drastically changed the way business is done.

All of us are now equipped with devices that can receive emails, texts, video calls and run powerful applications. This technology has brought us much closer with each other and allows us to share data far more quickly than ever before.

We are now entering another level of data sharing using the Internet. Unlike the past, we are now able to send data off to a cloud storage environment. Once sent, authorized personnel can view the data in real time. This fundamental change provides many advantages, especially when we apply it to predictive maintenance.

For example, a very normal but hypothetical situation occurs. A maintenance professional is collecting data from assets and finds something drastically wrong that needs attention immediately. With today's technology he has more options at his fingertips than before. If he is collecting data from an Internet-connected device he can send the information to the cloud with an alert attached so that people monitoring will get the alarm. He may also be able to email or text this data to a decision-maker for immediate action.

In the past, no matter how the professional was collecting the data, he would have to wait until he was done with his route and come back to a computer and upload the data or do further analysis. With this scenario, many times an emergency is forgotten or takes precedence over other urgencies. Unless the professional actually leaves his post and stops what he's doing to alert a subordinate or decision maker, this rarely ever gets action.

This example is just a drop in the bucket of what we all are experiencing in our digital lives. Fifteen years ago, if you wanted to send a picture of your kids to your mother out-of-state, you would have had to lick a stamp and send it. Now we take the picture, type a few of the first few letters of an email or text address and hit send. Wow, what a world we live in!

This technology is catching up with industry and predictive maintenance.

Modern-day tablets, including Apple's iPad, are very powerful computers. We all understand the fascination of absorbing content on these wonderful devices, but it gets forgotten that they are also used for collecting data and getting work done. They are very portable and virtually always connected to the Internet. Thousands of companies have adopted these tablets for use in filling out purchase orders, forms and many other daily tasks by workers collecting data.

One of the most insightful things that leading companies have realized is that most people already understand how to use the operating system and do not require a learning curve to work with today's tablets and smart phones.

Infrared thermography data can be quickly and easily captured and put to use by modern tablet or smartphone devices (image courtesy of Flir).

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Taking all of this information to the next level, imagine the ability to add sensors and tools to these tablet devices; many companies are realizing the advantage of these tools.

Vibration analysis. Vibration analysis is one of the leading measurements taken in the predictive maintenance community of professionals. It has proven itself over and over again to be a method to detect imbalance, misalignment, bent shafts, eccentric rotors sheaves, resonance, mechanical looseness, oil whirl, bearing failures, gear mesh problems, motor problems and more. Most modern analyzers also have balancing capability to correct vibration issues on the floor related to imbalance.

More importantly, data collectors are designed to trend data over time to know exactly when failures will occur.

Infrared thermography. Infrared thermography is used to measure temperature to determine a machine's operating condition and detect thermal anomalies and areas that are hotter or colder than they should be. Infrared practices can be used to detect problems in electrical switch gear, gearboxes, electrical substations, transmissions, circuit breaker panels, motors, bearings, steam lines, and other important industrial components. This technology also aids in letting us know when important assets are going to fail.

Motor condition analysis. Circuit analysis and power readings of the motor windings and motor rotor can also tell us important information about the running condition and general health of the motor.

As mobile devices gain popularity, companies are adopting ways to use their simplicity, portability and connectability to everyday business tasks. We have seen them collect credit card information, bar code scans, photos, custom reports for field engineers, and even navigation data for aircraft pilots.

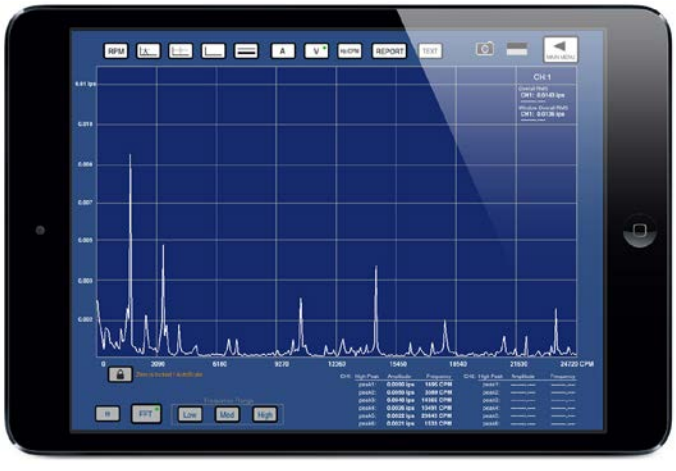
Now imagine the ability to attach complex, precision sensors to the fray. This opens many more possibilities than ever before. Why, you may ask? What is the difference between using a dedicated electronic measuring device vs. using a tablet computer or smartphone for analysis?

1. All of the features for the user that cannot be found on a dedicated measuring device (i.e., e-mails, photos, notes, phone calls, texts, video conferencing, Internet searches for information, storage and viewing of important asset manuals and blueprints, maps and much more).
2. Ease of use and a common operating system.
3. Multiple sensors and applications on one platform/device.
4. Portability and durability with the available cases.
5. Wireless connection to servers, cloud, and Internet with the ability to send out data wirelessly.
6. Continually updated software.
7. Security options, never available on other devices, to remotely wipe data or recover the device.
8. Ability to destroy the device and still recover data from a secure cloud or server.

This list of advantages clearly marks these devices to be the platform of the future; not only for the sound reasons mentioned but also due to the fact all of our youth are using and learning on them in our educational systems.

There are only a few companies breaking into the ability to add external tools and sensors to these devices. With the obvious advantages there will be many to follow. Currently Flir has added the ability to remote to their inferred cameras; GTI Spindle Technology has added vibration analysis, temperature, precision balancing and alignment; Red Fish has added multiple sensors to the multimeter; and Osmium has a full oscilloscope device. There are several others on the web as well.

In closing, I would like to state that the introduction of these new devices into the predictive maintenance and other data collection fields will be welcomed. Many of the devices of yesterday can discourage companies from investing in the technology due to the expense and complexity of the devices. These new tablet devices carry a much lower price point and are learning tools as well as data collectors. Not to mention, they are accepted with open arms by the masses. **PTE**



Vibration analysis and other predictive maintenance data can now be sent quickly and easily to the decision-makers who can act on the data (image courtesy of GTI Spindle Technology Inc.).

Tablet- and smartphone-based vibration analysis tools are speeding up response time to problems with rotating machinery (image courtesy of GTI Spindle Technology Inc.).