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How the IoT will change the engineering industry

Advancements in technology and the Internet of Things (IoT) is transforming the engineering industry.

Those of us with experience in mechanical system design are very much aware that most HVAC equipment and systems are available with embedded controls that can be monitored with an internet connection. So, when folks hype the benefits coming from The Internet of Things (IoT), it causes a yawn for most of us. Remote monitoring is an old technology—25 or 30 years old.

However, these capabilities have never been inexpensive. At last, after many years, the internet infrastructure needed to support vast data transfer and storage is becoming ubiquitous. There is now an expectation of connectivity between certain devices even among consumers with lower costs for higher internet speeds.

Still, monitoring mechanical equipment is not as easy as one might imagine. It has always required (and still does) world-class delivery of three basic technologies at prices that folks will embrace.

1. Data has to be gathered. This requires low-cost sensors to be embedded in equipment and a microcomputer that pulls data, maintains a database, and accesses higher-level communication.

2. Communication via wireless or wired connection to an intelligent system has to be reliable. In the old days, system data would stay at the jobsite, exploited by a smart operator. Today, the onsite network hub may be a simple internet bridge. There are many ways to move data from the equipment to

an internet node, with wireless having clear advantages in terms of installed cost. But wireless technology is highly susceptible to communication failures. Wireless is easy to describe but hard to implement reliably.

3. Analysis has to turn data into useful guidance for the equipment or system operator. Every application is different—analysis needs to be customized for each application to get the most from these systems. And, of course, conclusions that come from analysis must be communicated to operators or maintenance companies.

What is new about monitoring is a gradual shift to lower costs and improvements in reliability for gathering data, communicating that data, and analyzing it for the client in a meaningful way. Lower cost means that monitoring of equipment will become as ubiquitous as smartphones are today. There are many benefits—better maintenance, higher reliability, longer equipment life, and the ability to operate more sophisticated systems with less operator experience and know-how.

What does that mean to the engineering profession?

1. Clients will expect more. They will expect to be informed of pending failures long before they occur. They will assume they will be told when to grease bearings, change oil, clean tubes, change filters, etc. They will anticipate that if their system needs a tuneup, monitoring will inform them, along with the reasons why, the savings that will result, and the

cost to proceed. In other words, they will require their professional support team to optimize their system and keep them out of trouble.

2. The idea of “continuous commissioning” will shift from a talking point to an expectation. It means recurring-revenue business models need to be understood, packaged for easy sales, and delivered reliably.

3. Equipment specifications will be updated to require the delivery of key data. To use a commercial HVAC fan as an illustration, clients will expect to know air temperature, airflow, pressure rise, energy used, power quality, vibration, sound levels, motor winding, and bearing temperatures—and that’s just for one fan.

4. Engineers will need to specify what to do with the data. The collected data will need to be sent to different parties or graphical user interfaces.

An old strategy axiom teaches us to be aware of trends—find a parade and get in the front when possible. The IoT is most definitely becoming such a parade. **cse**

Wade W. Smith is a business coach and consultant, helping manufacturing companies implement enlightened business strategies to secure a competitive advantage. His career began in technical marketing at Trane Co. in 1973 and transitioned to general management from 1987 until his retirement in 2015. Smith’s clients include the Twin City Fan Co. and other members of the Air Movement and Control Association International Inc., where he was previously the executive director.