



Every technological sea change seems to beckon a unique moniker. Taking a page from the various computer operating systems, most of which are followed by a number and a decimal (think Apple's latest OS X 10.11), industry insiders are championing the latest tech trend as "Industry 4.0."

If the third industrial revolution involved the switch to computers and automated production, the fourth then is taking that digital focus a step further into constant connectivity. Of course, this too has its own catchphrase and acronym: the Internet of Things (IoT). IoT pushes the concept of the Internet from connectivity based on web browsers to utilizing the Internet for networking machinery, allowing data to flow from sensors on

the machinery to a datacenter where it is archived and finally to an interface where it can be analyzed.

IoT is almost synonymous with "cyber-physical systems," or CPS. IoT and CPS share a basic architecture, the foundation of which involves big data that is gathered to gain insights. Among the more promising perks of Industry 4.0, therefore, is that the more data gathered about how production machines operate, the "smarter" the system becomes.

For example, with IoT systems placed on bandsaws, sensors monitor just about every aspect of the saw's operation, from the down force to RPMs to harmonics and motor temperature. As the saw operator cuts a particular material with a specific blade, the data shows how many cuts can be made before the blade fails. As more and more manufacturers upload their data to the cloud, operators can simply punch in the information about the material they're cutting and blade they're using and get an estimate of how many cuts they can expect before the blade fails. →

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Michael Finklea, director of sales and marketing at Cosen Saws



CPS has been covered loosely in science fiction. The more paranoid among us might first think of the Terminator movies where the artificial intelligence system, Skynet, becomes self-aware and triggers a war of machines against humans. CPS involves cybernetics and mechatronic design for what is often referred to as embedded systems, and there is an aspect of the system becoming “smarter” the more it is used. However, as Michael Finklea, director of sales and marketing with Cosen Saws, puts it, Industry 4.0 is really about data and math and has nothing to do with science fiction-based doomsday scenarios.

“It’s about information that allows you to be proactive,” Finklea says.

MECHALOGIX COMES ABOUT

In October 2015, Cosen introduced its first Industry 4.0 offering – Mechalogix, a system that relays data about how a machine is operating. Finklea explains that the driving force behind Mechalogix is that many industries are focusing on lean manufacturing, just-in-time manufacturing and shrinking

inventories. It has, therefore, become critical to maximize the percentage of up time and limit downtime. Mechalogix allows operators to create alerts in real time that can be sent to any device connected to the Internet.

“What’s going on with the machine? What’s it doing?” Finklea says operators ask themselves these types of questions on a regular basis. Today, however, they have answers. They can tap into their Mechalogix account to see how the machinery is operating .

“The data reveals how productive your machine actually is,” he says. “If your machine only operated for 10 hours out of the last 24 hours – why is that? And the reasons for that can be garnered from Mechalogix. It helps you get the maximum productivity out of each machine.”

Mechalogix is a cooperative venture with the University of Cincinnati, Cosen and the Taiwanese government. Jay Lee, Ph.D., an expert in predictive analysis, spearheads the research at the University of Cincinnati’s Center for Intelligent Maintenance Systems →

Mechalogix – Cosen Saws’ new system that relays data about how a machine is operating – is available on the company’s mid-level bandsaw, the G320. It also comes standard on the company’s higher end bandsaws, such as the CNC430 shown here.





The G320 bandsaw is a good fit for small- to mid-sized companies that want to be connected to “big data” and the latest technology that provides the insights they need for better productivity.



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(IMS). The IMS center, according to its website, is internationally known as the front-runner in predictive analytics and big data modeling for industrial systems and life cycle performance.

Since they began researching and developing Mechalogix, Finklea says they’ve brought to life components that weren’t yet invented – miniaturized and refined sensors – and introduced new options to the solution, including the ability to incorporate the data into enterprise resource planning (ERP) systems. →



“Basically,” Finklea says, “this is a long-term study performed over two years. We cut material on our machines at the IMS center in Taiwan and here in Charlotte, N.C., and they developed a model that allows us to give blade life predictions. The machine is running and you’re making cuts – how long is that blade going to last? In the past, it was a guess. Mechalogix allows you to see physical data and know what is actually going on.”

Knowing when a blade is going to fail is important, especially for operators making cuts on large pieces of material. If the blade fails mid-cut, it could damage the material, which has to be scrapped, and it could damage the machine.

“Bandsawing tends to be the least thought of part of the manufacturing process,” Finklea says. “Yet it’s the very start of the process, so it really affects the downstream productivity of your facility. All the other machines are sitting there waiting because your guy broke a blade and can’t make parts quick enough. If you know what’s

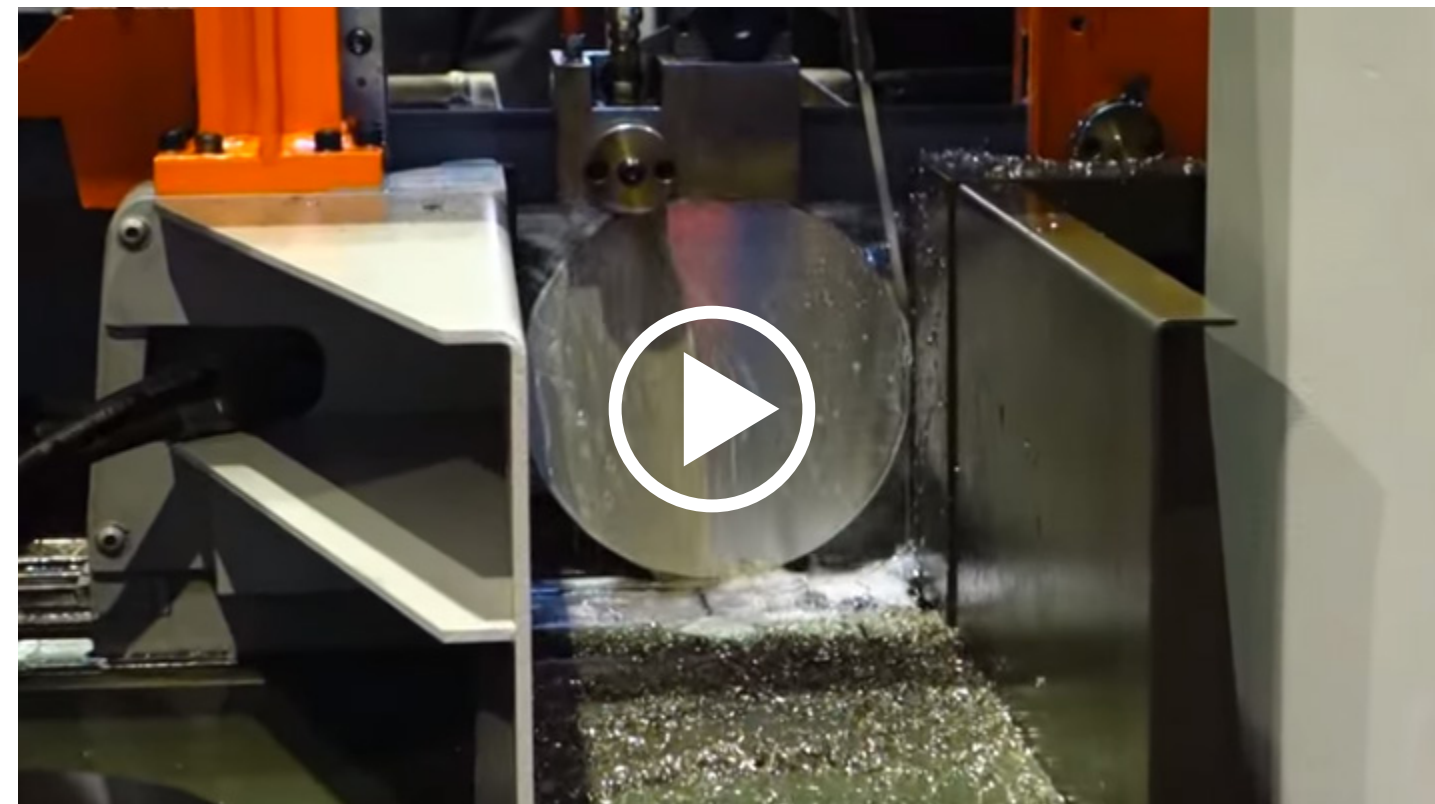
going to happen with your blade, you can be proactive and change a blade and have minimal downtime.”

CYBER SECURITY

Mechalogix uses the cloud to archive all the data coming from Cosen’s bandsaws equipped with the solution. That’s one of many benefits to users – they can rely on the data gathered by others to discover how long their blades will last. Fortunately, however, users don’t have to worry about prying eyes for a couple of reasons. First, the data captured, which is used to allow the system to become more “knowledgeable,” is not identifiable by source. The second security aspect to consider is that the data is only numbers – not trade secrets.

“The data that is coming from the machines is going to your account,” Finklea advises. “Once it goes to your account, the only people that can see it are you and those you give access to. It’s just raw numbers, not sensitive information about what you’re building and how you’re building it.”

Watch Cosen Saws’ CNC430 Intelligent CNC Performance bandsaw as it cuts through 7.87-in. round 304 stainless steel stock at 20 sq. in. per min.



Regardless of these assurances, Finklea says, “technology scares people,” which means there will be pushback from companies that are unaware of security protocols in cloud-based solutions. Bigger companies, Finklea notes, are very much pro-big data. For smaller companies, however, “you have to really prove to them the importance of this data and how it can help them.”

Finklea says they’re using servers with the most advanced security available. However, some companies, like those working on military contracts, are prohibited from connecting to the outside at all and have to rely on internal systems. Cosen hasn’t yet completed a closed-loop, on-site system, but they have clients that require it, so it’s in the works. →



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INTRODUCING SMART SAWS

Mechalogix comes standard on Cosen's higher end bandsaws, such as the CNC430 and the CNC530. However, in an effort to reach out to smaller production facilities and introduce a little piece of Industry 4.0 to them, Cosen is now offering Mechalogix on its mid-level machine, the G320, which when equipped with Mechalogix becomes the G320 Smart Saw.

"The concept is to try to bring it down to mid- and small-sized manufacturing," Finklea explains. "They may not be thinking about big data right now, but we want to familiarize them with the concept. The G320 is still a very affordable machine."

Finklea says they've made hundreds of thousands, if not a million, inches of cuts to develop the predictive model. One facility in Taiwan that works with expensive, exotic alloys was chosen to test Mechalogix. They were able to increase blade usage by 122 percent, which Finklea admits is a "ridiculous" number, due mostly to the facility's decision to change blades so frequently before using Mechalogix.

However, putting trust in the predictive tools in Mechalogix, they went from cutting 5,000 in. of material per blade to 12,000 in.

Mechalogix can be monitored through a smartphone application that works on Android devices and on iPhones. Finklea says if a manager of a production facility notices a bottleneck in the operation, they simply pull out their phone, open the app and see exactly what the machines are doing (or not doing), and address the issue immediately.

"This is really starting to be a big deal," Finklea says. "Industry 4.0 is really going to start coming in pretty hard. There are more and more European companies getting a footprint here. And again, there are more organizations now that require big data to help justify their existence, help them determine how they're doing something right and how they're doing it wrong." ■



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