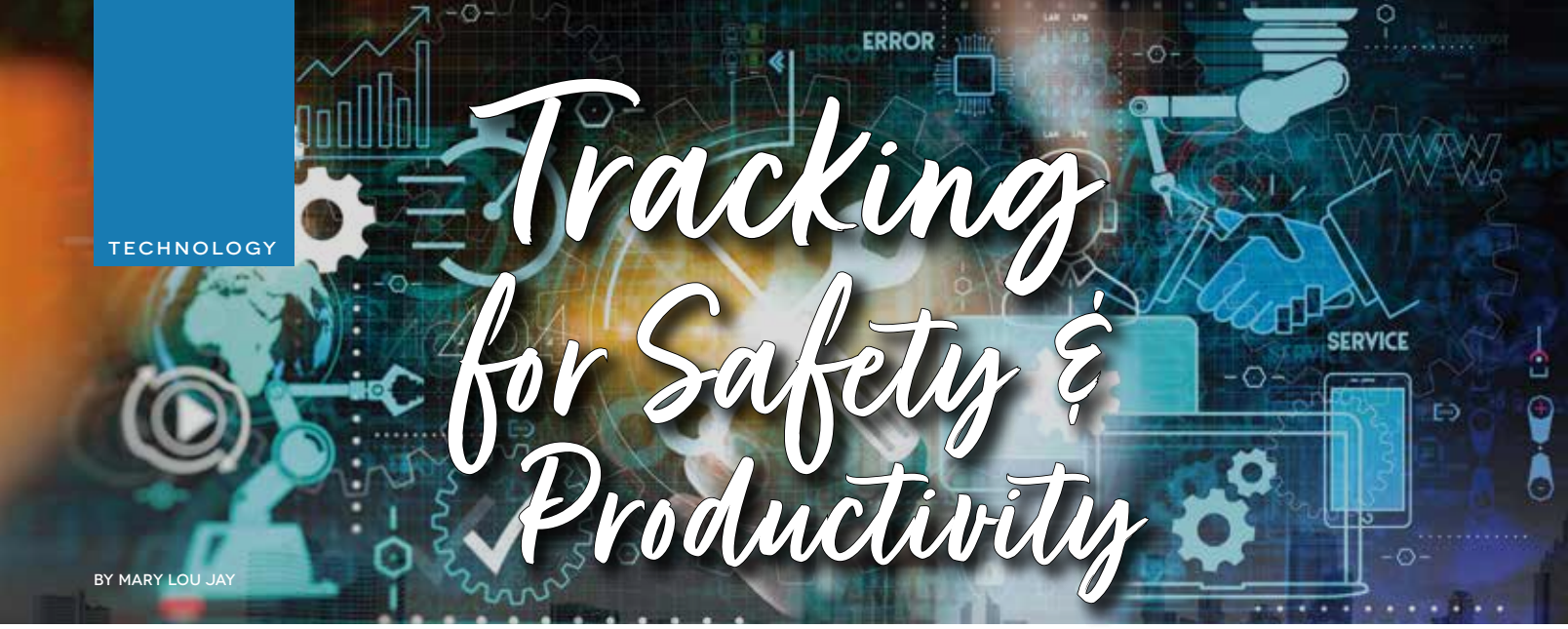

TECHNOLOGY

Tracking for Safety & Productivity

BY MARY LOU JAY

Keeping workers as safe as possible during the coronavirus crisis has been challenging for construction companies. If a worker tests positive for the virus, it can be hard to retrace exactly where they have been on a jobsite for the previous few days and even more difficult to determine who has come in contact with them during that time.

Contractors who have employed identification tracking systems using radio-frequency identification (RFID) or Bluetooth Low Energy (BLE) are finding this task a lot easier. Their on-site workers wear tags with unique identifiers that provide information about where they are currently located and where they have been during the course of a day. By looking at this data from each area of the jobsite, project managers can determine where the infected person was working and who came in contact with them.

Having the ability to track workers during a pandemic has been one of the unexpected benefits of the location tracking system from Sitemetric that E.E. Reed Construction of Herndon, Virginia adopted about seven months ago.

"We first started using it to monitor our daily labor on site and our client's vendors, workers and technicians," said J.C. Roussel, senior project manager, E.E. Reed. The project, a 220,000-square-foot two-story structure, has had anywhere from 500 to 600 people working on location each day. "Giving them an identification badge provided us with an opportunity to know where everyone was working and where the hot zones were – the most highly concentrated areas of workers. We were trying to figure a way to better our efficiency by moving workers around," he explained.

The Sitemetric system provides E.E. Reed's managers with three reports each day. There is one at 9:00 a.m. after most workers have badged in and another at 7:30 p.m. after they've badged out. A report at 5:30 the next morning summarizes the previous day's activity. "We spend 15 to 20 minutes going through the report, itemizing the daily averages and labor, matching subcontractors' tickets to the actual workers," Roussel said.

When the project team first began analyzing the data, they soon realized that tradespeople arriving at the jobsite late or leaving early was costing them the equivalent of 40 hours of work each week. "When we presented this to the subcontractors, it opened their eyes and they realized how much money they were losing by paying these workers for hours that they weren't actually working," he added. "The problem got remediated very fast."

Safety is another factor in contractors' adoption of tracking technologies. "Workers can have a clip on their belt, and if someone falls and has an accident, it will alert everybody," said Matt Abeles, vice president of construction technology and innovation at Associated Builders and Contractors. "Some systems have audio evacuation alarms, so if there is an emergency on a jobsite everyone knows that they have to go."

Identification tags can help ensure that everyone is out of the building during emergency drills. During one drill, the E.E. Reed managers purposely left a few badges behind, and the system accurately reported that those tags had not exited the building.

Tracking systems can cover large or small areas. E. E. Reed has divided the data center worksite into tracking zones ranging from 50 to 300 feet. During the pandemic, managers adjusted the size of the zones to pinpoint locations even more precisely. "If someone were to test positive, we would know exactly where that individual was working at that time and who was at that location," Roussel said.

LOCATING EQUIPMENT

Patrick Thomas, president of Sitemetric, said that checking on workers via electronic tags is a modern-day version of a manual tracking system that was used to build the Empire State Building in the 1930s, a job notable for its fast completion. Thomas successfully introduced a similar manual approach when working with HITT Contracting Inc. on a time-sensitive project in the aftermath of 9/11.

MILWAUKEE TOOL'S BLE-ENABLED TECHNOLOGY HELPS CUSTOMIZE AND LOCATE EQUIPMENT.

Today's RFID tracking systems provide contractors with the data that they need to identify problems – like workers not putting in full days – early in the project, when there's still time to correct them, Thomas added.

"Contractors look at these systems and wonder who is going to pay for it, but with the rate of return realized using this technology, they could actually be saving money," he said.

But workers are not all that RFID and BLE systems are monitoring; contractors also employ them to quickly locate valuable tools and equipment.

"Going back five years, every large job site had a full-time employee who was just managing the tools on a job site. But if you can track all your tools – company wide – that saves real dollars and costs," said Abeles.

Milwaukee Tool began offering tools with built-in BLE back in 2015. Today its One-Key system includes more than 40 different tools, including drills, drivers and crimpers. It also sells the TICK Tool and Equipment Tracker that can be added to all brands of tools and equipment.

The One-Key system relies on a mobile app that can run in the background on workers' smart devices. When someone with the app gets close to a BLE-enabled tool or a tool with a TICK, the information about the tool's location anonymously is sent via the app to the main tracking system. "We have the ability to generate a crowd-source tracking network," said Josh Marchok, assistant project manager for One-Key product development.

The company recently added geofencing capabilities to their system so contractors can now receive notifications if someone removes their tools from the jobsite. In some cases, contractors have been able to use this information to notify the police and get their tools back. Milwaukee Tool is using the BLE technology for more than just tool tracking. For some One-Key-equipped tools, workers can use the connection to customize speeds and clutch settings or turn anti-kickback controls on and off. If tools are stolen, the app can also send a signal making the One-Key tools inoperable as long as they are within range of the network.

Knowing where tools are can save contractors a lot of time, said Marchok. "It is very helpful for contractors to have visibility as to where the tool is located. Making sure that tools are at the right place at the right time is important because downtime kills productivity on site."

CHOOSING A SYSTEM

Contractors that are considering RFID and/or BLE tracking need to understand the systems' limitations; they are designed for tracking people, tools, equipment and materials, but not for managing an entire construction project, said Abeles. But tracking technology is relatively easy to introduce since it does not require the kind of cultural change that has to occur when contractors adopt project management software.

There are many tracking and identification systems available on the market today, but Thomas advises companies to look for a provider with experience in the construction industry. "Otherwise, the application is not going to match their needs and they are not going to

be able to completely use it," he said. The tracking provider should do a thorough analysis of a construction site to determine which type of system — RFID, BLE, or some combination — would work best for their particular situation.

Thomas thinks it is only a matter of time before the use of tracking systems becomes more widespread.

"Right now, the construction industry is slow to adapt to change, and tracking is only being used on a very small percentage of projects," he added. "But that will change. What is going to happen is that insurance companies and banks will say that you do not get the money to build the project unless you are doing this. It will become a requirement.

"I really think it is about making the industry better for future generations, so they do not have to go through all the confusion and ambiguity that exists on many construction sites today," he said.

Roussel is convinced of the value of tracking technologies. "I wouldn't build another data center without it," he said. ■

IDENTIFYING TRACKING TECHNOLOGIES

There are several different types of tracking systems; all involve placing tags with unique identifiers on people, equipment or materials and then transferring location information from those tags to a reader via radio waves.

With **passive RFID systems,** the identifying tags do not have a beacon that actively sends out a signal to a reader; the information on such tags can be accessed only when a reader comes in close proximity to them.

In **active RFID systems,** a battery is added to a tag so it can send out a signal to the reader. This makes the tags bulkier, but the reader can pick up their signal at much greater distances.

Many identification systems today use **Bluetooth Low Energy (BLE),** which is similar to active RFID. The tags have battery-powered beacons, but the BLE technology is much more energy efficient than other RFID systems so that batteries last longer. Another advantage to BLE is that the signals can be read using apps on cell phones and other Bluetooth-enabled devices.