RFID: Coming to a Tool Crib Near You

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Keeping the line moving at the tool crib has always been a problem. Without an efficient method for handling the congestion of workers waiting for the tools they need, it’s easy for employees to spend more time in that line than the company might like. During plant shutdown, getting tools can be more difficult, with full crews of subcontractors all clamoring for tools, causing more congestion and confusion at the tool-crib window.

Tool-management software is one way to ease these problems. By reducing congestion and ensuring that tools are available when needed, tool-tracking software gets technicians on the job quickly in the morning and off the clock with ease each night. For years, this software has worked using bar-code tracking systems. Now, Radio Frequency Identification (RFID) adds versatility to this powerful solution.

Tool-management systems use unique identifiers in the form of bar codes, which can be affixed to any item in inventory. When an item is needed from the tool crib, the bar code is scanned, which pulls up a record of the item and allows it to be assigned to a specific employee or job in the database. This database not only tracks movement of items, it also can manage maintenance and purchasing of tools. Capabilities like this allow a company to reduce money spent maintaining a tool inventory through fewer tool replacements. More importantly, this system allows a company to drastically improve the way it uses its tool inventory. Tools are where they need to be when they need to be there, making maintenance jobs run smoothly and efficiently with less time spent searching for missing tools. Now that RFID chips have started replacing bar-code labels, the scene is set for impressive tool-tracking improvements.

Immediate returns for using RFID in tool tracking includes the ability to scan items without removing them from plastic or cloth bags or carrying cases. This reduces the time it takes to update the main tool database and the time employees must spend in line at the tool crib. Having an RFID chip already embedded inside a tool decreases time spent on the implementation process of a tool-tracking system. It also makes it more difficult to remove. Unlike a bar code, the implanted RFID chip cannot be removed without first dismantling the tool. Companies can rest assured that the chip proving their ownership will remain within the tool, providing a significant theft deterrent to those both inside and outside of an organization. Some RFID-embedded tools are already available for purchase, as are RFID tags for installation by a qualified technician into older tools.

The main part of an RFID system is the RFID tag, which houses a chip and antenna. Similar to bar-code labels, these chips store unique identifying information, such as product or serial numbers. These numbers are used by the main software database

to pull up detailed information about the tool. Such information may include past tool users, job location, maintenance history, warranty information and more. As with a bar-code label system, a scanner is used to access information stored within the chip. But rather than a laser eye simply reading a Universal Product Code (UPC), RFID scanners actually send a radio frequency to the chip, and information is then broadcast back to the scanner. The scanner then communicates with the database to unlock stored information about the item.

A future goal will be to incorporate Electronic Product Code (EPC) chips in all goods during manufacturing. These are tiny RFID chips that can be embedded within a small sticker and placed on the item or in its packaging, and are basically an electronic version of the current UPC standard. The use of EPC chips in product packaging or on the product itself, has raised some privacy concerns that have yet to be resolved. But it seems clear that their use will increase convenience and security in ways that overshadow concerns. Eventually, all bar codes will be replaced with EPC chips, ushering in the total phaseout of bar codes and taking RFID mainstream.

Currently the size and cost of active RFID chips those with their own power source prohibits their use in many situations. Chips that are currently available for installation in tools are passive, meaning they are activated by the signal sent from the scanner. As the size and price of active RFID chips drop, these chips will be used for tool tracking, which will allow the chips to transmit data over considerable distances and expand possibilities for their use. This does not mean that the passive tags available today cannot be cost-effective tracking solutions. It means that some items still may be more effectively tracked using bar codes until the cost and size of active RFID chips with longer read distances decreases.

Once EPC chips with their own power source gain extensive use, which may still be five years away, the possibilities for RFID will expand. RFID chips may one day automatically track the progress of a repair job, generating a computer graphic that shows steps completed. RFID will be able to notify workers where specific items should be installed within a plant. RFID-tagged items will check themselves into inventory automatically upon delivery. Alarms even will sound when an item is taken into an unapproved area of the plant. These automated environments not only will increase company security by ensuring items stay where they belong, but also will improve efficiency by allowing items to be located in an instant.

The first major step in RFID adoption already has been taken. Until recently, RFID had no standard for use, meaning readers and tags used various frequencies, lacked compatibility and the ability to interface. In April 2005, the acceptance of Generation 2 RFID protocol (GEN 2) positioned the technology to take a stronger hold on supply-chain management. This standardization means manufacturers worldwide can begin to include EPC chips with products with the assurance that these chips can be read, putting all companies on the same page for RFID use. Additionally, this newest specification resolves many of the problems experienced during use of older RFID technologies, including some security issues and the ability to function in challenging environments. GEN 2 RFID standards will make global compliance far easier to achieve.

As RFID continues to develop, it will provide even more applications to improve the efficiency of plant operations. Meanwhile, tool tracking through RFID gives tool cribs a chance to increase their return on a valuable investment the tools they use all while improving use of employees' time.

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