

How RFID technology can enhance your asset management program

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Introduction

Even though the technology has been around in some form since World War II, chances are that you think of Wal-Mart's supply chain initiative when you hear the words "radio frequency identification," or "RFID." Since January 2005, the retail giant has required suppliers to place RFID tags on pallets and cases. Wal-Mart is already seeing a return on their investment, such as gaining the ability to refill out-of-stock products three times faster than before.¹

But does RFID technology make as much sense for asset management as it does for supply chain management? While senior executives may pay close attention to product inventory, they sometimes underestimate how the cost of purchasing, maintaining, and disposing of assets can affect the bottom line. Engineering directors, IT managers, and maintenance personnel understand the impact, but they typically have had ineffective tools – time-consuming, error-prone manual systems and spreadsheets – that prevent easily and quickly tracking, measuring, and reporting on the status and performance of these assets. For manufacturers alone, according to ARC Advisory Group, just improving asset performance by a few percentage points could be worth billions of dollars annually across the industry.²

RFID technology enables the automated gathering and sending of asset information – including location, meter readings, maintenance status, and much more – without a person needing direct line of sight or contact with that asset. Not only does RFID provide a fast, accurate method of obtaining this valuable information, but the types of information it enables asset managers to gather can help companies do such things as reduce costs by implementing a need-based maintenance schedule rather than an arbitrary calendar-based schedule, increase revenue by accurately valuing assets being sold, and increase equipment longevity by identifying usage patterns and the need for additional user training.

This brief paper describes the basic RFID technology components and how they work, and it compares the differences between using RFID and barcoding for asset management. This paper also provides real-life examples of how RFID technology is being used by enterprising organizations today to gain significant time savings and enable better asset management.

1 Marc L. Songini, Wal-Mart Details Its RFID Journey, InfoWorld, March 02, 2006, <http://www.infoworld.com>.

2 Sid Snitkin, Collaborative Asset Lifecycle Management Vision and Strategies, ARC Advisory Group, April 2003, p. 4.

How RFID technology works

RFID technology consists of two basic components: a tag (or “transponder”) that is affixed to the asset being monitored, and a reader (an antenna and transceiver). When the reader transmits a signal in a specific radio frequency, the tag is activated and sends the data back to the reader. The reader passes information to the control system, but also can write information back to the tag.

RFID tags are described as “passive” or “active.” A passive tag is one that does not contain a battery; the power is supplied by the reader. When the reader transmits a signal, the tag’s built-in coiled antenna forms a magnetic field. The tag draws power from the field, energizing its circuits and enabling it to send the information encoded in its memory. An active tag is equipped with a battery that can be used as a partial or complete source of power for the tag’s circuitry and antenna. Some active tags are sealed units, while others contain replaceable batteries, thus extending the tag’s useful life.

Key factors in selecting a tag for a specific application include the likely distance between the tag and reader, and the amount of data to be stored on the tag. Passive tags must be close to the reader – generally within a few feet – and have less memory than active tags. Active tags may be hundreds of feet from the reader and have more storage capacity than passive tags. See Table 1 for a comparison of active and passive RFID tag characteristics.

Table 1. Relative Comparison of Active and Passive RFID Tags

	Passive Tags	Active Tags
Cost	Less expensive – from a few cents to a few dollars	More expensive – often \$20 or more
Size	Smaller – some as small as a grain of rice	Larger
Power	Provided by reader	Provided by battery
Maintenance	None required	Battery or tag replacement required
Useful life	Longer – up to 20 years or more	Shorter – depends on battery life
Distance at which tag can be read	A few feet	Up to hundreds of feet
Memory	Less memory (typically 16K)	More memory (as high as 512K)

Two types of RFID readers also exist: “fixed” and “portable.” A fixed RFID reader is a device that automatically detects RFID tags without any user interface or mobile capability. These readers typically have a direct Ethernet connection and intelligence built into the unit to enable tag capture and basic data transfer. Fixed readers are primarily used to track such information as location and work in process. They are typically implemented as a “pass through” station, such as the doorway to a tool crib. RFID portable (or “mobile”) readers typically are Pocket PC/Windows® CE devices, which look similar to today’s familiar barcode readers. They can be carried by personnel or attached to vehicles, such as forklifts.

Once the RFID reader gathers data, the information is passed through middleware to the organization's enterprise asset management application (see Figure 1). As a result, the system may trigger an alert, release a work order, create an invoice, locate an asset, or do whatever else is required.

Figure 1. Example of RFID Information in Preventive Maintenance



RFID versus barcode

While the first type of barcoding had been developed decades earlier, the first Universal Product Code scanner only began operation in 1974 at an Ohio supermarket. A package of chewing gum was the first product to include a barcode. The technology has been used to speed up grocery checkout lines worldwide since then.

Barcode is referred to as “line of sight” technology. That is, the barcode must be placed very near a scanner to be read. Barcodes can store only limited amounts and types of information. In addition, they cannot be preprogrammed, and they must be scanned one by one.

Like barcode, RFID is all around us: in the “drive through” lane at the toll booth, at the “quick tap” pump at the gas station, on military cargo and containers, and even, perhaps, in Bowser, the family dog. There are plenty of differences, however, between the two technologies. For example, an RFID tag only need be within range of the reader. RFID tags do not need to be within line of sight, nor do they need to be stationary or presented in a certain orientation to be read. In addition, RFID tags can store more – and more types – of information than barcodes. They can be reprogrammed and can be read simultaneously and automatically. Table 2 compares these technologies along with the manual processes often used to manage assets today.

Table 2. Relative Comparison of Asset Management Tools

	Manual Process	Barcode	RFID
Data accuracy	Least accurate	Most accurate	More accurate
Data collection time/labor	Most time/labor	Some time/labor	Least time/labor
Data input time/labor	Most time/labor	Some time/labor	Least time/labor
Equipment cost (tags, readers/scanners)	N/A	Some	More
Ability to track assets out of line of sight	No	No	Yes
Amount of data storage on tag	N/A	Less	More
Ability to exchange information two ways	No	No	Yes
Ability to reprogram tags	N/A	No	Yes

It is important to note that neither barcode nor RFID technology is meant as a theft deterrent. Both technologies rely on the use of tags, and tags can be removed.

RFID technology in real-world applications

To fully understand how RFID can make a difference, it is important to explore some real-life examples. Two that will be discussed here include fleet management and utilities.

Fleet Management

A management services firm currently oversees a large fleet of forklifts, cranes, and trucks for a client. This includes everything from rental or leasing of equipment, to maintenance and disposal. The firm recognized that fleet maintenance alone, if improved, could save significant amounts of money for its customer. The manual collection of equipment usage data was expensive and time consuming. Gauges sometimes were faulty or inoperable, providing inaccurate data. The firm also recognized that, just because a key was in a vehicle's ignition, it didn't necessarily follow that the equipment had been used or required maintenance.

In an effort to help its client manage these assets better, faster, and cheaper, the firm began using RFID technology to capture actual forklift engine-hour readings. Rather than someone manually recording this data for each piece of equipment in the fleet, as used to be done, someone now walks about the facility with a handheld recorder. Data from any forklift within 200 feet of the reader is automatically captured. As soon as the handheld recorder is placed into a docking station, the information is fed into an asset management software program. The program then creates an asset utilization report for the management firm and its customer.

The benefits are immediately obvious. Data collection is fast. It is accurate. And those people who need the information in order to make decisions no longer must wait for someone to key data – hopefully without error – into the system.

The management services firm is now considering other key measures it wants to capture with RFID, including the number of times a vehicle's forks move up or down (a sensor would be placed in the hydraulic system), or the number of times and frequency a forklift – or rather, the operator! – crashes into something (which would be recorded with the help of a G-force sensor).

By easily capturing key pieces of data with RFID technology, the company feels it will be able to determine which make and model of forklift works best in their environment and for certain types of jobs. It will be able to implement a preventive maintenance program based on actual vehicle condition rather than on an arbitrary schedule, much like how people change the oil in their cars based on actual mileage rather than “every six months.” They also will be able to determine whether they need more vehicles, or whether they just need a few rapid battery chargers.

In addition to mobile equipment management, the firm anticipates implementing facilities management and process management applications in the future. It's all about helping their customers find better, faster, and less expensive ways of doing business.

Utilities

A small US municipality has outfitted its residential water meters with RFID tags. To gather meter readings for water usage, a city employee simply drives by the households. The tags send information back to the reader in the city's van, which passes information to the billing system. For the city, data is captured quickly and accurately. For the home owner who need not be present or call in the reading, it's convenient.

This system also helps the city manage assets: it can identify whether a meter is working improperly. By having this information sooner rather than later, the city reduces potential revenue loss from faulty equipment and can track asset lifecycle trends.

Other Industries

Fleets and utilities aren't the only ones interested in better asset management through RFID technology today. The US Army is developing a prototype RFID-based system that will measure not only how many times a weapon is fired – something that must be manually recorded today, even in combat – but also the effects of those firings (heat, force, vibration) on the gun barrel.³ This information will assist the Army in understanding the maintenance requirements of a weapon's barrel.

In another example, nearly half of the healthcare organization respondents to a 2005 survey expected to implement RFID systems by 2006 to track expensive equipment. Because most hospitals currently cannot track the whereabouts of equipment, according to the researchers, they tend to over-purchase equipment to ensure they can find it when needed.⁴ Pharmaceutical groups are also strongly eyeing RFID to track the movement of expensive drugs.

Some companies even are looking at using RFID to track personnel. For example, RFID tags may be placed at different points on a security guard's route throughout a building. Rather than having to stop at given stations to confirm his presence, the guard can instead concentrate on monitoring the building, allowing the reader at his side to automatically perform the confirmations for him.

³ Claire Swedberg, "US Army Developing RFID System to Track Weapons Usage," RFID Journal, November 9, 2006, www.rfidjournal.com.

⁴ M.L. Baker, "Survey: RFID Use in Hospitals to Rise Despite Obstacles," CIO Insight, August 24, 2006, <http://www.cioinsight.com>.

Summary

The costly, time-consuming nature of data gathering in the past meant that organizations limited how much asset-related information they gathered and how frequently they gathered it. With today's RFID technology, more data can be gathered faster and less expensively than ever before – information that can be used proactively to prevent problems, to schedule maintenance based on actual condition rather than on an arbitrary calendar date, and to optimize the value of all the enterprise's assets. Two companies helping to make these benefits possible are partners Infor™ (<http://www.infor.com>) and Blue Dot Solutions (<http://www.bluedotsolutions.com>).

Infor, one of the largest business software providers today, delivers integrated solutions for a wide range of industries, as well as best-in-class, stand-alone products that address the critical challenges its customers face in areas such as asset management, enterprise resource planning, supply chain planning and execution, and others. Its core asset management products include Infor EAM Enterprise Edition, Infor EAM Business Edition, and Infor EAM MP2.

Blue Dot Solutions (<http://www.bluedotsolutions.com>) is a leading provider of intuitive mobile and wireless computing solutions for asset-intensive companies and industries. Their mNOW! Mobile Framework provides customers with capabilities for combined mobile and RFID functionality in a single infrastructure. Blue Dot's mNOW! Middleware facilitates the delivery of information from a handheld device to customers' Infor asset management solutions.

To obtain more information about how RFID technology can help you better manage your assets, contact your local Infor or Blue Dot Solutions representative.

About Infor

Infor delivers business-specific software to enterprising organizations. With experience built in, Infor's solutions enable businesses of all sizes to be more enterprising and adapt to the rapid changes of a global marketplace. With more than 70,000 customers, Infor is changing what businesses expect from an enterprise software provider. For additional information, visit www.infor.com.

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