ADVANTAGES OF RFID IN TRANSPORTATION AND LOGISTICS

TODAY'S HIGHLY EFFICIENT CLOSED LOOP SYSTEMS ARE ONLY THE BEGINNING OF THE COMING RFID-DRIVEN TRANSFORMATION OF TRANSPORTATION AND LOGISTICS VISIBILITY AND MANAGEMENT.

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VISIBILITY ON THE BOTTOM LINE

In the transportation and logistics industry, the costs of inefficiencies caused by lack of visibility are considerable. Shrinkage, inaccuracies and inefficient order fulfillment affect product costs and profitability. But the metrics from many of today's RFID installations in place are also considerable. RFID can better automate the counting and tracking processes that are required for faster and more accurate supply chain logistics. Many transportation and logistics companies are using RFID today to achieve near 100% shipping, receiving, and order accuracy; 99.5% inventory accuracy; 30% faster order processing and 30% reduction in labor costs.

With enhanced visibility across the supply chain, the bottom-line benefits of today's RFID systems are proving to be substantial for these and many more of the industry's savviest organizations.

As the economy gradually recovers from the global recession, businesses are focusing on maximizing their supply chain efficiency to sustain their profitability and viability during both good economic times and bad. Companies with part or all of their businesses focused on transportation and logistics understand the necessity of reducing cost, improving service and efficiency and increasing ROI from one end of the supply chain to the other. A growing number of organizations—including manufacturers, third-party transportation and logistics providers and retailers—understand that RFID is becoming a major force in the transformation of global supply chain visibility and operations.

SUPPLY CHAIN PAIN

The reality of the global supply chain is here. For the global economy, and for virtually every business that operates in it, that's good news. More markets. More suppliers. More customers. More business. More ROI. Of course, it also means more competition, tighter margins and increased urgency to streamline operations and reduce costs. Global supply chain operations are costly and vulnerable to expense-raising inefficiencies, inaccuracies, uncertainties, shrinkage, human error, lost assets and many other problems. On a global scale, expenses associated with these problems can be enormous. It's clear that one of the most important keys to reducing cost is enhancing nimbleness and increasing profits in this complex environment.

THE NEED FOR VISIBILITY

Optimized supply chain management is based on getting more done in less time and with fewer resources. Many of today's transportation and logistics businesses struggle to tame both their asset management and supply chain operations. Virtually every business or institution with an extensive supply chain finds that optimizing it is a process finds that supply chain optimization is a process that's time-intensive, largely based on manual procedures, prone to human error and increasingly costly. In focusing on these issues, businesses are working to increase asset, inventory and shipment visibility in every link of the chain. That's not surprising. It's hard to track and manage what you can't see. End-to-end visibility facilitates more effective, timelier decisions; reduces delays through prompt detection, reporting and resolution of operational anomalies; allows swift rerouting of goods in transit to meet changing business requirements; and provides real-time tracking status and traceability.

AN RFID REFRESHER

For many organizations, the solution is the automation of visibility and management processes. Most transportation and logistics companies have been using barcoding successfully for years now. A growing number are also adding Radio Frequency Identification (RFID) solutions. RFID is essentially a more automated way of knowing what you have and where it is. There are substantial differences between barcoding and RFID. One of the most significant is the fact that barcodes need a clear line-of-sight to bar code scanners, making them difficult and slow to work with in

many locations and situations. Another is the high number of manhours it takes to count shipments, inventory and assets with barcodes. In addition, barcodes are able to identify only the type or class of goods, rather than individual items.

RFID, on the other hand, identifies and locates every single item you want to track, from trucks to forklifts to returnable transit items (RTIs) to containers to whatever is being shipped in them. With RFID there are no line-of-sight requirements, so you can read a great many tags simultaneously. RFID lets you read, write and re-write to flexible, low-cost tags that offer greater data capacity, durability in harsh environments and the security of being difficult to replicate. And you can read them at distances of up to 30 feet.

An RFID system includes tags, or transponders, that include a small antenna and a chip that can hold a significant amount of data such as product number, manufacturer, location and much more. It also includes three basic types of RFID readers.

- Fixed readers have an external antenna and are often located at entry points to facilities and yards.

- Handheld readers provide on-demand scanning and are used by personnel moving through the space.

- Mobile readers can be located on moving equipment, such as trucks and forklifts, for faster, more accurate inventory and process tracking.

> "WITH A BARCODE SCAN, YOU HAVE A ONE-TO-ONE RELATIONSHIP, BUT WITH RFID YOU CAN HAVE A ONE-TO-MANY RELATIONSHIP, AND THAT'S WHERE YOU SEE A SIGNIFICANT INCREASE IN EFFICIENCIES. INSTEAD OF HAVING TO TOUCH EACH ITEM ONE AT A TIME, RFID BASICALLY THROWS AN UMBRELLA OF ENERGY AROUND AN AREA OR A BOX AND DETECTS EVERYTHING IN IT."
>
> — L. ALLEN BENNETT, CEO AND PRESIDENT
> ENTIGRAL SYSTEMS, GREENSBORO, NORTH CAROLINA

Readers work by sending an RF signal at a selected frequency, energizing tags to send their stored information to the reader and system server. Depending on your project, you can choose from UHF "passive" tags that use the RFID reader for power, or "active" tags that cost more but have their own batteries and can be used for projects that require longer read ranges. UHF passive tags are increasingly being deployed because the lower tag costs allow increased visibility into broader categories of goods and assets. No matter which tags are right for your solution, the benefits of RFID can be significant. In general, the industry is seeing about a 10 percent improvement in counting efficiency with RFID.

RFID VISIBILITY BENEFITS

Essentially, RFID gives transportation and logistics operations increased visibility into equipment, inventory and business processes. It increases your efficiency by shortening processes and and streamlining your data capture procedures, and increases accuracy by minimizing or eliminating error-prone, time-wasting manual processes. It reduces labor costs with automated processes that utilize always-on fixed RFID readers and it increases productivity with mobile and on-demand handheld readers. RFID provides real-time data that gives you up-to-date information across your entire supply chain. RFID solutions will help you lower your operating costs, increase throughput in your distribution centers, maximize on-time deliveries and improve customer service and satisfaction.

In addition, for most transportation and logistics businesses, the visibility provided by RFID provides benefits well beyond the supply chain. Forward-looking companies are using RFID technology to increase efficiency in numerous other applications such as receiving and put away, delivery confirmation, returns processing, inventory and security.

RFID HARD AT WORK

Even as RFID is poised to transform transparency and efficiency throughout the entire global supply chain, it is already a hard working transportation and logistics solution. Over the last few years, RFID systems have been helping a growing number of operations optimize both asset and inventory management, using both internal, or closed loop implementations, and external, or open loop systems. In today's logistics industry, companies are using RFID for shipment and asset tracking and management, warehouse and distribution management and yard management.

Tracking Management

One of the biggest business issues in our industry is lack of visibility of shipments and goods and the implications that this lack of visibility can have on in customer service. When you don't know where a trailer, container, or pallet is at any given time, you don't know where your products are, and neither do your customers. Efficiency suffers, asset utilization shrinks, labor costs increase, asset productivity and value lessen and payments are delayed. RFID solutions are currently solving these internal asset management and tracking problems for a growing number of logistics companies and departments all over the world.

One of Asia's largest logistics organizations, Toll Global Logistics needed to more efficiently track goods and shipments at its Singapore facility. With goals including reducing manhours by decreasing reliance on manual procedures and increasing visibility for the company and its customers, the organization deployed a system that tagged

"INCREASED SUPPLY CHAIN VISIBILITY BASED ON RFID READS COULD GIVE COMPANIES A BETTER VIEW OF WHEN INVENTORY PROBLEMS MIGHT BE ARISING, ALLOWING THEM TO TAKE EARLIER ACTION THAT MIGHT RELIEVE THE NEED FOR (AND COST OF) EXPEDITING FREIGHT."

— SUPPLY CHAIN DIGEST ARTICLE, APRIL 2009

each of the location's 150,000 pallets with UHF passive RFID tags. When shipments arrive, staff members scan the barcodes on the boxes, then use a portal to read RFID tags on the pallets these boxes are loaded into (or taken out of). The pallet identification data are then linked and sent via WiFi to software that stores the data and makes it available to both internal users and customers. Toll Global Logistics estimates that the system will save about six minutes of staff time per pallet, resulting in more than 600 man-days per year.

Warehouse Management

In warehouses and distribution centers, RFID solutions are helping to deliver process improvements that positively impact customer satisfaction and your bottom line. RFID automation helps increase efficiency in receiving, sortation, routing, locationing and shipping, Use of RFID-enabled equipment, such as forklifts and handheld RFID readers, automates information capture, allowing thousands of items to be scanned simultaneously and eliminating costly, error-prone pen and pencil recording or time-consuming handheld barcode scanning. RFID automation increases picking and putaway efficiency, maximizes order accuracy and minimizes re-deliveries. Your labor productivity is enhanced throughout the facility. Most important, with RFID streamlining end-to-end workflow, you assure that the right goods reach the right customer at the right time.

Southeastern Container manufactures plastic bottle pre-forms in three injection-molding facilities in the eastern United States. Pre-forms are then shipped to bottle manufacturing plants in cardboard containers and plastic bins, with empty containers being returned to the molding facility to repeat the cycle. But problems in the return process were costing thousands of dollars a year due to loss and damage. The company replaced existing containers with RTIs, returnable folding plastic bins designed to increase efficiency and reduce cost. Since these new containers cost nearly ten times the cost of a cardboard container, Southeast Container introduced an RFID-driven end-to-end cycle counting system to track container lifetimes against the number of cycles guaranteed by the manufacturer. Each container is permanently identified with a passive RFID tag for locating and tracking each unit in real time, enhancing visibility and extracting maximum business value from each container. The company expects to achieve payback on this project in less than two years.

Yard Management

In many transportation and logistics organizations, yard management is the last bastion of manual processes. The process is virtually the same—and just as inefficient— the world over. You have an employee moving through the yard on foot or in a vehicle, counting how many pieces of equipment, containers and vehicles are in the yard and noting their location on paper with pen or pencil. It's a time-intensive and error-prone process that causes a number of visibility-related problems, including redundant trailer moves, shipping delays and costly penalties, yard and gate congestion, product shrinkage, excessive use of refrigeration, wasted fuel and lost time. To address these problems, numerous organizations across the supply chain are turning to RFID systems that automate asset tracking and locationing and reduce or eliminate manual processes in these yard-based environments. RFID is able to significantly reduce human intervention by, enabling machine-to-machine information sharing to greatly enhance accuracy.

In a large Kimberley-Clark production facility, eight different departments are requesting trailer moves every day. Trying to manage the yard, the company performs daily four-hour manual yard checks. Even so, significant time and dollars are being wasted trying to locate trailers; trailer re-handling and multiple trailer moves are often required to manage status and location. Efficiency also suffered from a lack of tools for management of trailer pools and third-party services. Kimberley-Clark solved its yard management problems with a complete RFID system that included fixed readers at gates with handheld readers as backup. RFID tags were attached or detached to trailers entering or leaving the gate. Readers were also installed on yard trucks, along with GPS and Wi-Fi for faster, more accurate, more automated yard management that eliminated manual checks. Results were outstanding, including trailer location in 10 minutes as opposed to up to three hours, a 19 percent reduction in trailer detention, 31 percent reduction in third-party service costs, a 23 percent reduction in trailer rental, and an overall 6 percent reduction in total costs.

The Future of RFID

These and many other successful uses of RFID are opening a lot of eyes to the value of its applications in transportation and logistics. Around the world, a great many organizations are using RFID to increase visibility not just internally but

from one end of the supply chain to the other. This trend will only increase as RFID technology continues to evolve, improving performance and lowering price points. In addition, RFID technology is increasingly being used in a variety of other transportation and logistics applications.

Sensing Food Safety

One good example of RFID evolution is the increasing interest in using RFID tags as sensors, for example, to monitor food safety on refrigerated trailers. "Let's say a fruit supplier is sending pallets of pineapples and bananas on the same refrigerated trailer, with each requiring a different temperature to ensure safety," says Mike Maris Senior Director of Transportation & Logistics Solutions at, Motorola Solutions. "RFID tags on each pallet can contain sensors that monitor temperatures in various vehicle areas." When one area starts to warm up beyond spec, the RFID tags automatically notify master control and the driver through an on-board vehicle nerve center. In some cases, the tags can automatically cue the compressor to restore the correct temperatures. In other cases, the driver can pull over and check the trailer to make certain the entire shipment maintains safe temperatures and the load won't be lost. In the event of a food recall, RFID sensors also help ensure all-important traceability.

Quality Control and More

"Another trend we're seeing is the use of RFID to ensure supply chain quality control," continues Maris. "Similar to the 'mystery shopper' concept, organizations are using RFID to track certain shipments and monitor quality control across the supply chain. You might call them 'mystery shippers.'" One organization using RFID for quality control is Correos, the Spanish National Postal Service, which places RFID tags in sample letters sent to various areas of the country. They then follow the RFID with readers throughout the whole process from pickup to delivery, then document where they've been successful and where they haven't.

"There are many other ways, besides tracking assets, that RFID helps instill quality control in transportation and logistics processes and procedures," Maris adds. "For example, for transportation companies, RFID can help trucking companies reduce fuel costs with tags placed inside gas tanks automatically recording the amount of fuel and charging the transaction to the system. This eliminates the need for drivers to carry credit cards or cash, and reduces opportunity for robbery and theft." Other examples include using RFID to provide "dead reckoning" location of assets or people within one meter inside a warehouse or distribution center, and RFID is helping to drive green initiatives such as reusable containers and other returnable transport items (RTIs) and recycling programs.

Third-party carrier Deutsche Post DHL is currently using a Smart Truck pilot project in Berlin to test innovative route planning to deliver better customer service and lower CO_2 emissions. RFID tags and readers first ensure that the right packages are on the right truck, then dispatch sends an optimum route based on real-time traffic conditions. Built-in GPS guides the driver to the first delivery, and RFID checks to ensure the right package has been delivered. Turn-by-turn

"OVERALL, (RFID) SENSOR DATA HAS MANY USES FOR THE FOOD INDUSTRY. CHEMICAL-BIOLOGICAL AND TEMPERATURE SENSORS ARE USED TO MONITOR FOOD SUPPLY AND FOOD RECALLS —FROM TRACKING WHETHER A BUILDING THAT HOUSES FOOD HAS VIBRATED TO KNOWING EXACTLY WHEN A CONTAINER OF LETTUCES WILL GO BAD."

— RICHARD MACMANUS,
EDITOR-IN-CHIEF, READWRITEWEB
"SENSOR & RFID APPS FOR THE FUTURE" MAY, 2010

"AS RFID TECHNOLOGY HAS IMPROVED, AND PRICE POINTS FOR TAGS AND EQUIPMENT DECLINE, THE OPPORTUNITY TO USE RFID PROFITABLY IN MANUFACTURING, ASSET TRACKING OR OTHER APPLICATIONS VERSUS OTHER AUTO ID TECHNOLOGIES INCREASES."

— SUPPLY CHAIN DIGEST ARTICLE, APRIL 2010

directions are then sent to guide the truck to its second delivery and so on. The enhanced visibility provided by the RFID system confirms the status of each package at any given time, and ensures that packages are all delivered correctly, lowering fuel costs and emissions through optimized routing and reduction in the number of re-deliveries.

Standards-Driven Growth
Key to global RFID growth is the establishment of international standards. The industry is already working towards refining a number of standards across the supply chain. Standards that have been established including Electronic Data Interchange (EDI) standards, the Global Data Synchronization Network (GDSM), the Produce Traceability Initiative, Generation 2 Electronic Product Code (EPC) systems, and GRAI standards for identifying containers. Says Maris, "There are many standards focused towards being able to share information across the global supply chain and to enable product traceability every moment of the day."

RFID on a Fast Track
Today, RFID is proven technology providing far-reaching benefits for transportation and logistics organizations. While many of these businesses are successfully using systems for asset management, warehouse and yard management, the future of RFID goes far beyond internal closed loop solutions. Transportation and logistics companies are moving inexorably toward deploying open loop solutions in which every link in the supply chain is able to utilize the same RFID tags. The industry is already working to fast track the solutions that will get us there, including developing innovative new RFID tagging and reading technologies such as active and semi-active tags, initiatives to enable environmentally friendly green solutions and solutions to lower supply chain management costs. Equally important, RFID technology costs are steadily decreasing as adoption continues to grow, thereby allowing faster return on investment for projects while at the same time allowing profitable RFID deployments across a wider set of materials and goods..

In the not-so-distant future, open loop RFID systems will play an ever-increasing role in lifting the curtain of invisibility from the global supply chain, delivering a broad range of system management benefits, reducing costs and spurring the global economy to new heights of efficiency, control and ROI.

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