RFID: On the Road To Cost Savings for the Automotive Industry

Introduction

In the dynamic manufacturing environment of an automobile factory, there are thousands of intricate processesgoing simultaneously. Not least of which is numerous containers, pallets, boxes, barrels and anything that containsparts large and small that throughout each process eventually make up a working automobile. As with any intricateprocess, having the right parts on hand at the right moment means the difference between maintaining one's buildschedule to missing the schedule entirely and not being able to deliver on time.

Automotive manufacturer have highly developed assembly line processes to reduce waste and inefficiencies. However, rugged RFID enables automotive manufacturers to sophisticate their process automation down to thedistribution and management of materials. Everything from supplies to MRO supplies to tools and containers can bemanaged and monitored with the same level of lean principles that have made the assembly line what it is today.

The profit margins for automotive supplier are getting leaner, and there is a constant need to re-think and improvetheir production processes. Time, cost, and productivity issues are always at the forefront. Automotivemanufacturers have started adopting automatic identification with RFID from asset management with use ofreusable container tracking down to item level tool and equipment tracking. Knowing the whereabouts and conditionof supplies at a moment's notice is in itself an extremely valuable commodity.

Current process and revenue loss

Currently, there is not a reliable method of tracking these metrics. During the process of manufacturing,when a container of parts or other critical items ismissing, additional items need to be procured inorder to keep the manufacturing line going. Industry expert, Bill Hoffman, estimates that almost $750,000,000 per year is lost due to misplaced andlost containers. Bill Hoffman has stated that the missing containers are the "500-pound gorilla sitting in the corner" when it comes to this problem. With the ability to have accurate and real-time visibility in the automotive manufacturing supplychain, this in turn reduces costs of unnecessary repurchase of missing parts that are not missing.Being able to track the container as it moves fromeach station, process or department is key.

In order for a solution to add value, the mechanism must have the ability to store new data such asrevised contents and even location. Although barcodes offer a user-interactive scan-abletraceability, it does not offer the ability to write new data to the barcode, short of printing a new one that introduces the potential for human error. Having said that, a combination of the two will coexist at least for the interim as the process shifts to a totally wireless and hands-free RFID setup.

AIAG
Automotive Industry Action Group

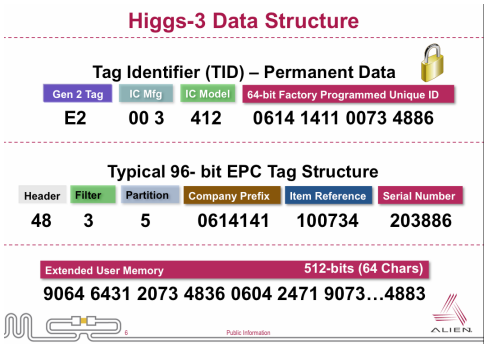
AIAG B-11 Rev 8 RFID Standards

The Automotive Industry Action Group (AIAG) is a nonprofit organization that includes over 500 members. Among the members include GeneralMotors, Ford Motor Company, Honda, Nissan,Chrysler Group LLC, Daimer, Toyota and Navistar International, to name a few.

The AIAG has released revision 8 of their B-11 Item-Level RFID standard. A large part of the standard is outlining a system that is open-looped. As opposed to closed-loop systems where the RFID tag data stay swithin a certain system (i.e. data does not leave a warehouse database or is not shared with other parties), an open-loop system must do the exact opposite.

The automotive industry, for example, routinely exchanges data and parts with numerous parties among several levels within their supply chain and has done so for many years. Being able to identify all of these components is not a small feat. RFID, in addition to barcodes, is being employed to provide additional data for a specific part, which may be changed over a part's lifetime. The data needs to provide more than a simple mechanism for naming a component and needs to be accomplished in realtime

A primary goal of B-11 is to create and use the common syntax to identify unique components,regardless of the party reading them. Part of the requirement is to put the same information in both barcode and RFID form, if possible. This ensures that whichever method used, the same information is conveyed (i.e. the part's name, rank and serial number); although extended memory in RFID can be includes information such as manufacture date,location, shelf life and any critical information relevant to the part and its intended application.



Beyond the Barcode: Leveraging Additional Data At Part Level

Using the proven EPC Gen2 RFID memory structure of 96-bit EPC and 512-bit User Memory, the data for each part may be stored in several different memory banks.

The first bank contains the part "name" in the EPC field, which is created and written to the tag at the point where the tag is placed onto the component.

The "name" is often regarded like a "birth record". The data in the name field is then locked to prevent tampering and general future changes. The second bank contains general data. Information may be read, written and re-written in this area. This leveraged for that and much more.

How Rugged RFID Works

Xerafy Micro X II

A rugged RFID-on-metal tag, such as Xeraf's MicroX, (with a read range of around 20 feet or 6meters) is an ideal tag for large metal containers. TheMicroX tag is ideal for environments that need to not only have sufficient read range and require accurate communication every time the asset goes through aread zone at forklift speed. The XERAFY X-family of high impact resistance tags that have the ability tosurvive the most rugged and harshest environmentare a logical fit for a manufacturing facilityThe technology can even determine the direction of material flow and whether the container is being manually pushed or carried in multiple stacks on a forklift. A common fixed reader architecture utilizes EPC Gen2 interrogators, mounted in portals at dockdoors and strategic points of entry in different parts ofa factory, are able to track containers as they enter and exit.

Uses of RFID in the manufacturing of automobiles need not be limited to track and trace of containers.Components such as tires, chassis and car bodies canalso benefit from embedded RFID as part of a WIP track and trace model. Ford uses RFID to trace large truck engine blocks in a WIP model. RFID embedded bolts insert into each block as it goes through the manufacturing process. The traceability ensures that the block is correctly built and ensures all requiredbuild processes have been completed.

Cribmaster Example

Cribmaster Inventory Management System

Cribmaster™ has proven immediate ROI on the automotive assembly line. RFID makes the assemblyline process more streamlined and efficient by reducing the time it takes to locate missing supplies and tools. If tools are missing, the assembly line needs to halt, which in turn translates to lost revenue every minute. In addition, when reordering tools and supplies, having the ability to locate present quantities on hand can significantly reduce the amount of on-hand stock.

At the end of the day, reducing cost and waste is the key element. The difference in knowing what assets is available and where they're located, could be the distinction between making versus missing the production and financial deadlines.

Automotive Tool Tracking Case Study

Automotive Tool Tracking

An automotive case study from Balluff provided $2 million per year in savings for a North American transmission manufacturing plant. It was clear from the first year that the ROI from installing automated tool management system really made a pay-off.

The Balluff automatic tool management system is controlled at the item level with LF and HF RFID technology inserted into tool holders. The transmission processing

machines were upgraded toelectronically read information from each tool such as cycle count, size, service date, and 15 other parameters.
The automatic tool management system resulted independable, repeatable, and cost-effective solution that reduced broken tools by 75%. Reducing tool costs saved the transmission plant roughly $1Million/year. In addition, the automatic tool tracking increased tool utilization over 25%, which saved about $800k/year. Many savings in automating the tool operations were hard to measure such as increased productivity,improved processing, and reduced stress on employees.

The following statistical summarize the benefits found in this real-life scenario and overall return on investment. Paper and pencil information registration versus the benefits of automation are obvious.

MANUAL TRACKING

Broken Tools
- Quantity: 175/year
- Down Time: 10 min
- Down Time Cost: $700/min
- Broken Tool Impact: $1.225M

Tool Utilization
- Utilization: < 65%
- New Tools: > 2500/year
- Lost Usage: $590,000
- Tool Setters: 8
- Tool Setter Salary: $600,000
- Tool Utility Total: $1.19M

Total Cost: $2.42M

AUTOMATIC RFID TRACKING

Broken Tools
- Quantity: 20/year
- Down Time: 10 min
- Down Time Cost: $700/min
- Broken Tool Impact: $140,000

Tool Utilization
- Utilization: < 92%
- New Tools: < 1700/year
- Lost Usage: $91,800
- Tool Setters: 4
- Tool Setter Salary: $300,00
- Tool Utility Total:$391,000

Total Cost: $0.53M

Conclusion

Today, a container merely contains parts. Its contents are unknown to the passerby unless they stop to read the attached manifest (if still attached) or actually open the container to see what is inside. The worst scenario is the container, full of critical parts, may go unaccounted for all together and not turn up until well after its contents have been repurchased at the expense of the automobile manufacturer, who is already operating on a critical margin.
The proven cost benefits with automatic tool tracking methodologies are seen in eliminating missing or erroneous data to remove the issues of:

- Tool Crashes
- Broken Tools
- Operator Setup Errors
- Excessive Wear
- Lost Tool Tracking
- Operator Interference

The use of RFID technology can provide the traceability of parts to ensure use of the right tools, fix recurring setup problems, provide the quality assurance for proper tools processing, and monitor wear. The comparison of RFID tounreliable manual methods of pencil and paper or barcodes shows clear ROI. After all, when driving on the road forsavings costs, one needs to know precisely where they're headed.

About XERAFY

XERAFY is committed to bringing our customers the world's smallest and most reliable passive UHF RFID-On-Metal(ROM) and iN metal tags that are qualified and tested to meet extreme conditions over the lifetime of the asset.

XERAFY's innovative technology offers the Industrial, Manufacturing, Defense, IT, and Supply Chain markets, an affordable, durable, high temperature smart tag that can be easily attached to or embedded to metal assets.

XERAFY enables packaging solutions for automatic check-in / check-out tools, Work In Progress, IT auditing, product authentication and asset management with a competitive advantage in size, cost, design, quality, and performance oftags.

XERAFY is headquartered in Singapore, and maintains sales & support offices in Dallas, Texas, UK and in Shanghai, China.

About AIAG

Founded in 1982, AIAG is a globally recognized organization where OEMs and suppliers unite to address and resolveissues affecting the worldwide automotive supply chain. AIAG's goals are to reduce cost and complexity through collaboration; improve product quality, health, safety and the environment; and optimize speed to market throughoutthe supply chain. Headquartered in the metro Detroit area, its member companies include North American, Europeanand Asia-Pacific OEMs and suppliers to the automotive industry. For more information, please visit the organization's Web site at www.aiag.org.

About WinWare

WinWare Inc. was established in 1992 in Marietta, GA., just outside Atlanta. Its knowledgeable and experienced staffis dedicated to creating enterprise-wide systems that manage tools and inventory in productive environments.

WinWare has a long-term reputation for providing outstanding customer service and technical support for each of its customers, no matter how large or small. The company is committed to providing expert software and hardware solutions.

Visit WinWare's Web site at www.CribMaster.com.

About Balluff

Balluff Inc., the U.S. subsidiary of Balluff GmbH, Neuhausen, Germany, is a leading manufacturer of a wide range ofinductive, optical, capacitive and magnetic sensors as well as linear position transducers and ID systems. Balluff products for OEM and factory floor solutions are used to control, regulate, automate, assemble, position, and monitor manufacturing, assembly, and packaging sequences for industries including metalworking, automotive, plastics,material handling, wood processing, aerospace, electrical, and electronics.

For more information about Balluff RFIDproducts visit: www.balluff.com.