CASE STUDY: INTERNATIONAL PAPER, USA

Abstract

Business growth has compelled International Paper, a worldwide leader in the manufacture of paper and packaging solutions, to look for new ways to increase operational efficiency and to improve customer service. To achieve these goals, the company decided to implement an RFID based tag and reader system as the basis of a new warehouse tracking system. The integration of the new system with existing production processes at a mill in Texarkana, Texas, resulted in noticeable improvements in the efficiency of inventory handling.

Case study fact sheet

Full name of the company:	*International paper*
Location (HQ / main branches):	*Headquartered in New York, USA, International Paper has operations in 40 countries*
Main business activity:	*Production of paper products, mainly packaging*
Year of foundation:	*1898*
Number of employees:	*about 83,000*
Turnover in last financial year:	*US$ 25 billion (€ 20.2 billion)*
Primary customers:	*other businesses from various industries*
Most significant geographic market:	*USA / global*
Main e-business applications studied:	*RFID*
Key words:	*RFID, warehouse and inventory management*

Background and objectives

International Paper is the world's largest paper and forest products company. Their factories produce a wide selection of paper products for printed communication, as well as corrugated shipping products for food and beverage packaging. The company operates 36 pulp, paper and packaging mills, 132 converting and packaging plants, 35 wood products facilities, 13 specialty chemicals plants, and 2 specialty panels and laminated products plants.[1]

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[1] Figures as of 31 December 2003, information from the company website at www.internationalpaper.com (downloaded in Feb. 2006).

The Texarkana, Texas mill and warehouse supports approximately one hundred different customers with a range of paper products of different weights and sizes. Although the mill was already performing well, International Paper executives felt that the number of products and daily transactions in the warehouse offered opportunity for improvement, and they were not satisfied with the results of other solutions, such as bar coding inventory stock.

At the same time, the International Paper Smart Packaging group, based in Memphis, Tennessee, had been developing RFID product solutions since 1999. The mill and the smart packaging group jointly agreed to develop a warehouse inventory tracking system using RFID, with the goal of providing each roll of paper with a unique identifying tag that would provide visibility into processing, location, and shipping. It was hoped that the activity could demonstrate a business benefit, a return on investment, and an ability to adapt to new technology.

e-Business activities

The Texarkana mill processes raw timber into giant rolls of finished paper products. The rolls can weigh up to seven tons, and be up to 1.9 meters in diameter. They are handled by forklift trucks with padded "hands" that manoeuvre the rolls between various locations in the warehouse and mill. Up to eight rolls are stacked vertically on top of each other. On a typical day, 5000 product moves are made, often simply to access other rolls in storage. Between the physical handling, and the size of the rolls, and the extent of the warehouse, inventory tracking is a difficult problem.

From bar-coded to RFID-based inventory handling

Prior to the decision, in late 2001, to implement an RFID system, there was no automated warehouse management system. Inventory was bar-coded and manually linked into a legacy, off-the-shelf, production system that handled order fulfilment. Over the course of a one-year period, International Paper was able to develop an RFID system that integrated into the existing manufacturing process, while solving a number of challenges. The system was in use in production by the end of 2002.

The solution that was ultimately deployed makes use of Matrics passive UHF disposable RFID tags and associated readers, which are mounted on the forklift. They partnered with Apriso (www.apriso.com), of Long Beach, California, to provide middleware, which is used to map out locations and provide directions to drivers via forklift mounted computer screens. Two key challenges that were solved were frequency selection in a noisy environment, and durability of the chosen components, in a relatively harsh environment.

The RFID system is fully integrated into the warehouse management system. When a new customer order is received, the order detail , including customer, delivery date, and product specifications, are entered into the existing information system, and at the same time also linked to a particular RFID tag through the unique ID number on the tag. The tag is placed on the core of a paper roll; data are linked to a unit shipment for that customer. The roll is then sent into the production process.

When the paper roll exits production, it is collected by an RFID reader equipped forklift which scans the tag and provides the driver with detailed information about the next process step, on the forklift's computer screen. This can include options such as shipping, or storage location. If the forklift driver delivers the roll to the wrong storage bay or shipping dock, he immediately gets an alert. The system asks if he wants to override the instructions. The driver presses yes or no. If he presses yes, he gets a list of reasons and he must choose one. A real-time locating system also tracks the trucks movement and position, which not only gives International Paper the ability to track where a roll was dropped, but also makes it possible to optimise the warehouse.

Unexpected benefits

The system has also been expanded to monitor the efficiency of workers who operate forklifts. The mill keeps track of each worker's success rate for inventory delivery to the proper location. It provides alerts to drivers who are mishandling rolls, which allows them to quickly correct mistakes. The system is also used to report driver performance to factory management.

Impact

This warehouse tracking system has resulted in substantial benefits for the mill. International Paper reports that the system is more than 99% accurate, and has resulted in a five percent increase in inventory turns.

One consequence of this has been record monthly shipments. Additionally, inventory is managed more closely to their first-in, first-out (FIFO) goal, and forklift equipment is managed more efficiently, which results in reduced maintenance costs.

Lessons learned

As a result of the deployment of this RFID based warehouse tracking system, International Paper has learned a number of important lessons:

- The introduction of a technology, when there is no precedent, is quite a **significant challenge**. But, through smart and patient application of a new technology, they were able to overcome the conventional wisdom, even within the mill, that technical considerations would make automated warehousing impossible.

- It is important to **partner with experts**, such as the linkage between the smart packaging group and mill, to overcome technical challenges.

- Professional **change management** is critical. Business processes have changed, and employees had to be trained in the new processes. In this context, it was important to convey the message to the staff that the new technology was intended to support workers and not as a labour replacement.

- Successful deployment should look for **auxiliary benefits**, such as the opportunity to monitor and improve worker efficiency.

References

Research for this case study was conducted by Gordon Bitko, RAND Corporation (bitko@rand.org), on behalf of e-Business W@tch. Sources and references:

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