Optimizing Production with Automated ID:

Nokian Tyres Case Study

The challenge

Nokian Tyres (www.nokiantyres.com) is a Finnish manufacturer of tires, specializing in winter tires for passenger cars, delivery trucks, buses and other heavy vehicles.

The automated ID implementation covers two manufacturing lines and 27 assembly lines at the production plant in Finland. The manufacturing lines use raw material to create different tire components that are stored on wagons until needed. Forklifts deliver components to assembly lines according to the tire type being produced.

To manage their production, Nokian Tyres uses a just-in-time stock control process based on Kanban principles. The actual stock control, from store to production, consisted of a manual system of markers (cards) associated with the wagons that hold the tire components.

The card was moved to a specific location on the board depending on a number of factors: wagon content, whether it was full and in storage, loaded onto the production line or empty. The status of the wagon had to be manually checked, and the card moved to the appropriate position. The checking itself involved walking, or even bicycling across the factory back to the board!

To optimize their manufacturing process and better control key assets, Nokian Tyres wanted to automate their Kanban process, and so evaluated different automated identification (ID) solutions and technologies. The combined expertise and products of Trackway (www.trackway.eu), EB (www.elektrobit.com) and Confidex (www.confidex.fi) was selected to meet Nokian Tyres' challenge.
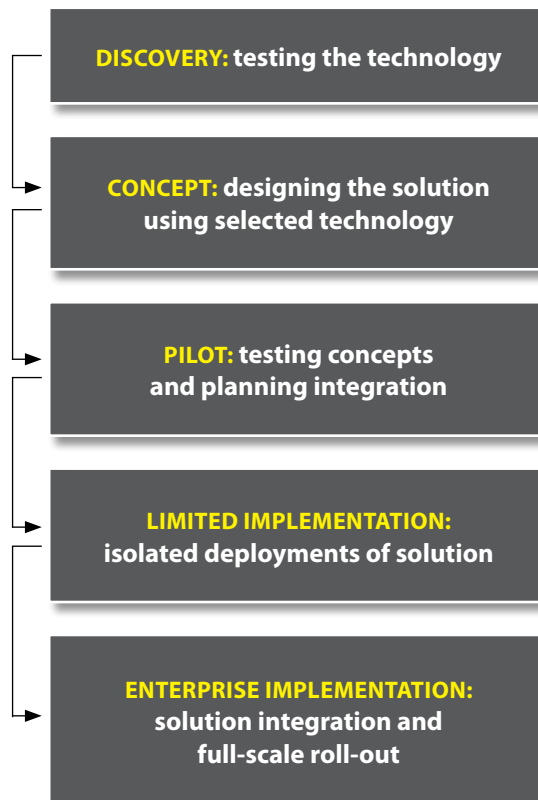

Manual control of production process

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The solution

Approach

Adopting a new technology can be risky, especially in the context of a well-developed manufacturing process. It is important to plan the development carefully and test the solution properly. To ensure successful roll-out of an automated ID solution, a phased development process was followed, as illustrated below.

DISCOVERY: testing the technology

CONCEPT: designing the solution using selected technology

PILOT: testing concepts and planning integration

LIMITED IMPLEMENTATION: isolated deployments of solution

ENTERPRISE IMPLEMENTATION: solution integration and full-scale roll-out

Automated ID development process

To reduce the possibility of disruption to the manufacturing process, it is important to carefully develop, test and integrate the new solution. The pilot phase proves the concept and allows for a more detailed integration plan for introducing the new solution into a commercial environment. The first exposure takes place in an isolated deployment, minimizing the risk to the commercial venture. Successful isolated deployments can then be integrated into a complete system solution.

Implementation

In 2007, Trackway helped Nokian Tyres implement a new solution to replace the manual card system. The automated ID system employed a combination of Trackway Manufacturing and Trackway RFID server software, EB's Identification Network concepts, EB RFID Readers, and Confidex Survivor RFID tags. This system represents the first full RFID implementation in Finland for a manufacturing process at production level. It is also the largest RFID deployment to date in Finland.

The wagons carrying tire components were fitted with RFID tags and barcode labels. When a component is manufactured, it is assigned to a wagon by the Trackway Manufacturing system where it remains until it forms part of a tire. The content and status of each wagon is managed throughout the entire process.

Constantly monitoring the assembly process and managing the stock, the Trackway Manufacturing system sends the request for the components to be delivered to the assembly line. When the request is sent, a forklift truck fitted with a Trackway terminal receives the order to collect and deliver the component. A forklift terminal with a barcode reader is used to scan the barcode on the wagon to register removing it from the store. This allows the Trackway system to update stock figures in real-time.

The wagon is checked into the buffer store of the assembly line using the Trackway forklift terminal and a barcode reader. The wagon is then fed into the assembly line where the EB RFID Reader reads the identity of the wagon and sends the information to Trackway's control system.

When the empty wagon is removed form the assembly line, the EB RFID Reader notifies the Trackway system. Based on this information,

Trackway knows what to request from the manufacturing lines. Trackway Manufacturing system constantly adjusts the priority of material produced by the manufacturing lines in real-time. The empty wagon is returned to the manufacturing lines for replenishment, and the cycle begins again.

The Trackway Manufacturing system processes tens of thousands events daily, ensuring the real-time status of production is available instantly. The system also handles exception circumstances, such as a damaged wagon or faulty component. Damaged or faulty items can be removed and replaced almost instantly. Handheld RFID-barcode hybrid readers are used to manage the maintenance interventions as well as monitor the current status of the wagons.
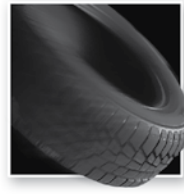
The results

The implementation of the new solution has led to a clear increase in productivity. Through more accurate, real-time reporting and directing of manufacturing and stock control, assembly line efficiency has significantly improved. Losses due to material waste and errors have reduced. A greater flexibility has also been introduced, allowing the rapid response to assembly line problems and the transfer of production from one line to another.

Trackway Manufacturing system handles manufacturing process control and prioritization in accordance to Kanban principles. It provides a real-time control and supports asset management. Trackway RFID server ensures scalability and enables effective management of the whole RFID infrastructure.

The EB RFID Reader features high acquisition performance with a rugged mechanical design for typical industrial installations. The EB Identification Network is a scalable service-oriented solution using distributed intelligence at all levels to ensure a high availability and easy scalability.

The Confidex Survivor RFID tag was chosen from a range of models and makers, for its reliability and performance, especially when attached to metal structures. The Confidex Survivor is an EPC Class1 Generation2 UHF hard tag, offering a high performance-to-cost ratio and a long life span.

EB RFID Reader URP1000-ETSI

Confidex Survivor™ RFID tag

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