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01 Material flow technology is becoming more flexible, increasingly relying on AGV and mobile eKanban racks rather than stationary conveyors and shelves

## eKanban systems: remote replenishment

Flexible production and intralogistics require an information flow which is also flexible. Cabled communication reaches its limits very quickly. Wireless networks are the ideal solution here, for example with eKanban systems such as those offered by companies like steute.

**W**hen planning the logistics of highly automated production plants, flexibility is a key consideration. This is why planners are now often rejecting stationary, fixed conveyor technology. This is also true in the automotive industry, where for more than one hundred years conveyors dominated – and facilitated efficient mass

production. At pilot sites of premium manufacturers today, for example the Mercedes Factory 56 in Sindelfingen or the Porsche Taycan production in Stuttgart, there are no conveyor belts to be found. Automated guided vehicles (AGV) supply the assembly lines, while smaller AGV





05 Wireless sensors developed specifically for eKanban systems detect the occupancy of rack slots and notify the warehouse management system via the wireless infrastructure

## **eKanban: remotely controlled material supplies**

The benefits of an industry-compatible wireless network become clearer by taking a closer look at eKanban. A typical application: at a manufacturer of medical equipment, the assembly points are furnished with mobile Kanban racks designed with flow shelves. The dynamic shelves inside the racks function according to the "FIFO" principle. As soon as a worker removes the front container, the others slide down the tilted roller conveyor automatically, thanks to gravity.

Wireless sensors are installed in the shelf rows and slots below each storage space. They register whether a slot is occupied, or whether a container has been removed, and then send a corresponding message to the warehouse management system via the wireless network. This means that at every assembly workstation replenishments are requested electronically – as the need occurs, according to the pull principle, and without the need for physical Kanban cards. The wireless signal functions as a virtual or digital Kanban card.

## **Wireless sensors communicate shelf occupancy**

Especially for such applications, steute has developed a wireless sensor (Fig. 5). It detects via a "rocker" whether a container (SLC) or box has been removed from the shelf. A flexible bracket system means that sensors can be attached to the racks of many different manufacturers without any need for tools. Individual settings, such as transmission intervals or the angle of inclination causing the sensor to transmit a signal, can be preconfigured in the software. Since in practice many (several hundred) of these sensors are integrated in a single network, the (low) cost factor was a key target during the development of this sensor.

## **New functions: updates "on air"**

As is usual with software-driven products and solutions, new developments are continual and can be implemented as software updates. One of the latest new features of nexy, for example, is an interface to OPC UA for cross-platform data exchange. Also new is the possibility to operate the Sensor Bridge on an industrial PC and thus to increase the response times and processing speed of data from the field. In its latest version, the Sensor Bridge software can also communicate with the SAP system of the user, enabling connected nexy field devices to receive their new firmware updates remotely. These updates are made available on the Sensor Bridge and then distributed throughout the local network. In this way it is guaranteed with very little effort that all end devices are always operating with the latest software version. Different service levels are optionally available to safeguard the availability of the nexy system, as is only

to be expected of a software solution used to manage production.

## **Multiple applications within a single wireless system**

From the point of view of the operator, it is advantageous if multiple applications can communicate via one and the same nexy infrastructure. For example, AGV fleets can be integrated in the wireless system, and then be specifically deactivated or reactivated, leading in practice to increased flexibility. Another nexy application in intralogistics is wireless Andon systems which can be used to send commands that articles should be moved into or out of stock.

One particularly good idea, already realised in some actual cases, is integration in the wireless network of dolly vehicles, tigger train wagons and other in-house transport. For example, nexy can monitor the position of dolly vehicles within company hubs. In addition, both feeder vehicles and eKanban racks are integrated in the same wireless network.

## **Factors for determining ROI**

Automation specialists, intralogistics experts and industrial engineers appreciate the flexibility and the uninterrupted flow of information facilitated by a wireless network. Meanwhile, purchasers and controllers are interested in the cost factors. The rapid return on investment (ROI) to be expected from an eKanban system with nexy is partly achieved by the time saved otherwise needed for line runners to collect and order material requests manually. In addition, the number of belt standstills can be reduced and calculated into the cost equation because the eKanban system replenishes the materials before they run out.

Another quantifiable cost factor is the material replenishment time. Real case studies show a mean reduction from 6 h to around 3 h. This means: users can reduce their stock and thus also their tied-up capital, as well as the area required for small load carrier (SLC) racks next to conveyors, by around 50 %. Last but not least, warehouse staff are free to take on other tasks because the material replenishment is self-perpetuating.

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