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| LOGIMAT SPECIAL | Sensors & identity technology |

Automated material requisition systems

Wireless sensors manage replenishments to the "last metre"

Sensors which communicate by remote control have considerable advantages, especially in the field of intralogistics. They can be used anywhere, for example to track load carriers on their way from the warehouse to wherever the material is to be assembled. Replenishments are then needs-based. This is a good basis for an automated requisition system, which is also able to assume other tasks on the shop floor.

Although production and logistics processes are well planned – for example with ERP, PPS or WMS – irregularities can still occur when replenishing production materials or components which are not inventory-managed.

The quantities which are actually present or required increasingly deviate from those shown in the IT system – even though a Kanban system is being used to manage replenishments. In many companies, these irregularities are becoming more and more visible as the articles being assembled become increasingly complex, made up of more and more parts. At the same time, the number of variants is growing, as are the demands being made on assembly times and cycle times. In order to have enough material always available under such conditions, staff build up a reserve – with the result that the circulating stock (and capital tie-up) are high, as are the space requirements. Action is therefore required.

THE CHALLENGE:
Irregularities in the supply of replenishments

Taking a closer look at the process, the cause becomes clear. In the "classic" Kanban system, staff order replenishments by card, for example screws or other expendables.
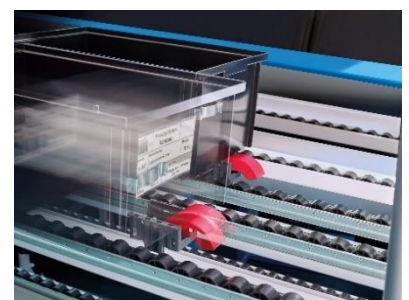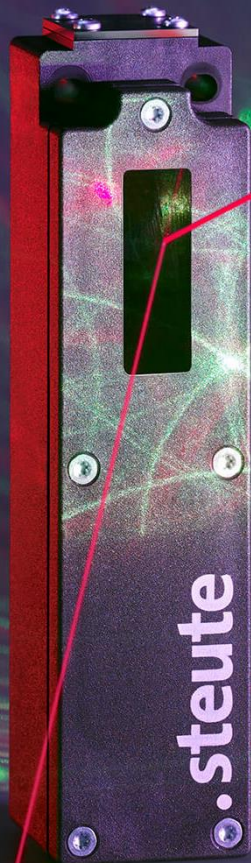

Wireless sensors detect containers, for example in racks, and notify the company IT by transmitting signals via a Sensor Bridge.

The automated requisition system "nexy" manages the replenishment of materials or components which are not inventory-managed.

Integral to the requisition process: laser sensors detect containers or, using the long-distance variant, the quantity of palleted goods or the presence of pallets.

The automated requisition system can also monitor the position of dollies.

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Dashboard: Predictive Maintenance

The card then travels in the opposite direction to the material flow. This takes some time, so that the stock level is never precise because both the card(s) and the material are travelling. The consequence is a delay between the requisition order and the supply of replenishments. This can also lead to problems and errors.

In particularly critical situations, there is even the danger that machines will come to a standstill, leading in turn to downtimes in some production steps or even along the complete production line.

THE SOLUTION:
eKanban with remote control ordering of replenishments

For these reasons, it makes sense to change from traditional Kanban to eKanban, and this is often what is happening in practice. When a worker takes a container from an eKanban rack, a "smart" sensor immediately and automatically sends a corresponding notification to the ERP system, which then triggers the replenishment process. Put simply, everyone in the company who needs to know can see that 500 screws will be required at assembly point XY in approx. 2 hours. The consequence: replenishments are sent in a controlled manner and just in time. Only what will really be needed in the immediate future is actually provided, without any bottlenecks

arising. And savings are also made in a different very important area – space along the assembly line.

Automated systematic material requisition

The system which can guarantee precise and fast provision of replenishments to the "last metre" for non-inventory-managed components as far as the assembly point is an automated material requisition system.

Put simply, an automated requisition system comprises three components: a wireless network, radio-compatible sensors, and an interface to the company IT. The "nexy" system from steute Leantec is an industry-compatible wireless network adapted to the application in question which connects sensors and actors in the field via Access Points to a Sensor Bridge. The Sensor Bridge is then the interface to the company IT. Via a dashboard or also per app, users can adapt the system to their own requirements and also configure individual sensors.

When sensors become mobile

Remote communication between sensors and the Sensor Bridge is a basic requirement for the desired function of this system. Wireless sensors permit the detection of (e.g.) containers, components and fill levels in real time – even in locations where cables would be a hinderance or could not be laid at all. In addition, with a remotely controlled automated requisition system, the "hardware" in the field is very flexible: the sensors can simply be installed wherever they are needed. And if, for example, an assembly point has to be reorganised, this flexible positioning of sensors and actors is also advantageous.

Wide selection of wireless switches and sensors

Concrete tasks assumed by the wireless sensors include the monitoring of SLC and other containers in (mobile or stationary) eKanban racks. A sensor developed especially for this task detects the presence of a container in an individual slot and triggers a requisition note if it is removed. This can also be in cascading form: replenishments can be triggered by the corresponding sensor – wirelessly of course – when the last-but-one container is removed.

Other sensors detect the fill levels of small parts in large containers, while yet other series detect the presence of pallets or monitor the number of packages in e.g. parking areas of consignment zones. Because the sensors send their signals by radio, they are also able to monitor and communicate the locations of moving parts, including the dollies themselves.

Uninterrupted monitoring of real needs

This way of supplying replenishments has many advantages, such as being truly needs-based (as detected by sensors) rather than working with prognoses or previously collected data. Only what is about to run out and is thus required right now is actually supplied.

Put another way: the automated requisition system creates a "digital twin" of the material supply – including a look to the material which will be required in the immediate future. The result: replenishments are perpetual, while both oversupplying and undersupplying are avoided.

A tried and tested concept – further developed in time for the LogiMAT

Users of this wireless network include renowned automotive suppliers, as well as manufacturers of household devices or electrical and electronic components. In some cases, several thousand wireless sensors are installed in a single location and in one or multiple "nexy" systems. This system is simple to configure and scalable in large areas – and is being continually expanded to include new practical functions. steute will be presenting the latest new features "live" at the LogiMAT – using multiple demonstrators.

One of these new features is the Predictive Maintenance Dashboard. It visualises the complete individual wireless network both spatially and functionally, with all its component parts, and also displays the "health" of the overall system, as well as of each individual sensor in the field. This monitor thus helps to pinpoint irregularities and potential sources of interference and, as a consequence, to avoid downtimes. At the software level, "nexy" is being expanded to include, for example, new logic functions which facilitate improved sensor-actor communication at the field level. The corresponding software module docks onto the Sensor Bridge.

One network – multiple tasks

An additional benefit is that the "nexy" system has "multi-client capability". This means: one and the same network, including the Sensor Bridge as the link to the company IT, can be used not only for material requisition, but also in parallel for other applications. The sensors and actors in the field, as well as their interface parameters, are only ever assigned to the appropriate "client" – i.e. the application in question. In this way, parallel operation of different applications and responsibilities is guaranteed within one production area with a single, uniform infrastructure and without any conflicts.

For these (additional) tasks, not only suitable radio-compatible sensors and actors are available, but also preconfigured applications which can be implemented with very little effort. One application, for example, facilitates the coordination and monitoring of the transfer of materials or containers from stationary conveyors to AGV and vice versa, while another controls signal and warning

lamps for displaying the status of different operations. It is obvious that this multiple use gives rise to synergies especially as the principles of simple use and flexible adaptation to individual requirements apply for every application.

steute at the LogiMAT: Hall 5, Booth D61. Further information is also available at: www.steute-leantec.com.

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