Shuttles co-operate with AGVs

Bulk bag handling in channel racks and production supply

For the first time STILL implemented the interplay of semi-automated shuttles with fully automated FM-X reach trucks in a channel rack.

Summary of the solution

Time and space are money. This is why it is indispensible to make good use of available warehouse space. High density warehouse systems allow to make best use of available space. Beyond this, intralogistics is moving towards installing automated systems aiming to make warehousing as efficient as possible. If both systems are smartly combined, maximum efficiency in warehousing can be achieved.

One type of the mentioned high density warehouse systems are so called channel systems. The basic ideas is as simple as it is efficient: A shuttle running on rails inside the channel picks up a pallet at the entrance of the rack level and automatically moves it down the channel, deposits it at the end and returns to the entrance to pick up the next pallet which has been unloaded from a lorry by a forklift truck meanwhile. If the shuttle is to operate in a different channel, it is relocated by the lift truck. The shuttle is remote controlled. This is a semi-automated solution in which the shuttle carries out the commands issued by a human operator. These solutions base on the "human-machine interface" and are therefore vulnerable to errors. Integrating a shuttle in a fully automated overall system would require an interface with a warehouse management to control the shuttles. This would enable fully automated storage and retrieval in channel racks with shuttles and automated trucks and replace the human-machine interface. Fitting the STILLPalletShuttle with an interface especially designed for communication with a master warehouse system as well as with automated warehouse trucks allows to install fully automated systems. These avoid handling errors and ensure transparency as well as traceability of all movements of materials.

In only nine weeks, STILL installed a raw materials warehouse including all required components for Kuraray Trosifol in Troisdorf close to Cologne. In a sophisticated material flow concept semi- automated shuttles in a channel rack communicate with fully automated reach trucks for the first time.

KURARAY TROSIFOL

Without knowing it, virtually everyone of us has already been in contact with so called PVB film. PVB film is highly tear-proof and is used to make laminated safety glass for car windscreens. Kuraray Trosifol in Troisdorf close to Cologne, Germany is one of the leading producers of these film sheets that are not only used in car glazing but also in other safety glass applications such as banks, jewellery shops, sky scrapers, solar panels and even in the glass dome of the Deutsche Bundestag.

Modern production supply

To maintain its competiveness Kuraray Europe GmbH extended its production capacity and at the same time centralised its storage for raw materials in an automated materials warehouse in order to cope with an acute shortage of space. Intelligently combined software and automation systems ensure a transparent and economically feasible flow of materials throughout the system. The outstanding feature of the system: for the first time semi-automatic shuttles communicate with fully automated reach trucks in order to provide the right raw materials at the right time to the right replenishment station for the production lines.

Smart intralogistics from a single source

The PVB specialist had been looking for a general contractor to build the new raw materials warehouse for a long time. With a size of 4 500m2 the size of the building roughly matches a small football pitch. "We had held talks with many known suppliers and presented our project. We ended up with only three suppliers who felt capable of delivering such a project and in the end STILL was the only one who was able to implement the required overall concept as a general contractor in the given time frame," explains Manfred Kania, Head of Logistics with Kuraray Europe GmbH. The sophisticated overall system provided by the department for intralogistics systems at STILL comprises:

+ High-density channel rack system with 3.300 slots
+ Seven pallet shuttles
+ Three automated FM-X reach trucks
+ Two RX 60 electric counter balanced trucks
+ A working platform approx. 40 meters long with seven work stations
+ Conveyor equipment including chain conveyors, transfer carriages with telescopic forks, buffer storages and an empty-pallet stacker
+ A material flow computer and the master warehouse management computer.

To cope with volatile production volumes the warehousing system was designed for high transparency and flexibility. Besides this, operation round-the-clock was to ensure fast amortisation.

Quick implementation

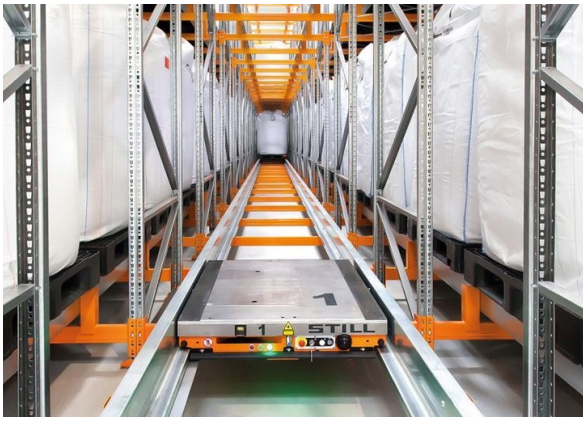
After the concept had been finalised, it was time to face the major challenge of the project: the time frame available to implement the project allowed only nine (!) weeks for completion.

"Assembly of the racking, conveyors and working platform with subsequent cold commissioning of all areas had to be completed in this short time frame at any cost," Dr. Sven Schade, responsible project manager at STILL remembers, and adds "despite initial difficulties to cold commission such a pilot project, the system started service in due time thanks to the great commitment of all suppliers involved and the uncomplicated and partnership cooperation with Kuraray Trosifol."

Material flow in the raw materials warehouse

The raw material needed for production is supplied as fine PVB granulate packed in large bulk bags. These bags are unloaded from arriving lorries by manually operated electric RX 60 forklift trucks which are fitted with scanners and data terminals. On unloading, the load is scanned for registration by the master warehouse computer and directed to the right storage channel which is indicated on the STILL touch screen terminal. In the storage channels the STILLPalletShuttles automatically stack the bulk bags to store them ensuring tightly packed storage and quick accessibility to the goods at the same time.

RX 60 counter balanced trucks move the bulk bags to the rack system.



A shuttle retrieves a pallet to supply production.

At the goods-out end of the channels, the three automated FM-X reach trucks operate 24-hours. The reach trucks automatically relocate the shuttles positioning them precisely to the millimetre into the right channels and move the retrieved bulk bags to the conveyor system. The conveyor system comprises chain conveyors, transfer carriages with telescopic forks, buffer storage zones and an automatic stacker for empty pallets.

To retrieve the bulk bags the FM-X reach truck places the shuttle precisely to the millimetre in the right channel.

The FM-X reach trucks automatically move the bulk bags to the conveyor equipment on the working platform.

All these components move the bulk bags to a total of seven work stations where the raw material is sucked out of the bags to be transported to the five production machines in the neighbouring halls through pipelines. The empty pallets are collected in the empty- pallet stacker and removed from there by one of the FM-X for intermediate storage in dedicated channels by one of the shuttles.

The retrieved bulk bags are placed on the transfer station of the conveyor equipment.

Perfectly harmonised interaction of the conveyor equipment with the transfer carriage and the stacker for empty pallets.

Seamless traceability

The central control hub for this smart material flow concept is the warehouse management computer. It communicates with the truck control computer, the STILLPalletShuttles, the material flow computer and the quality management system. It is responsible for every movement of goods and vehicles and reports received and despatched goods to the higher-level SAP system - seamless and in real time. Every process in the warehouse system is automated and stored in the IT system. This provides transparency and traceability of every movement.

Smart energy concept

Every day some 400 pallets are delivered by lorry and stored in the racking system. Consumption of the materials and retrieval from the rack system averages to about twelve pallets per hour. The system supplies production 24-hours per day with raw materials. This means that the STILL warehouse equipment is constantly in service. For this reason Still implemented an energy concept based on spare batteries. The battery voltage of all trucks is permanently monitored. On reaching a defined trigger level, the trucks or shuttles automatically move to the battery change station.

Summary

All intralogistics components of the new Kuraray Trosifol raw materials warehouse were installed by STILL. It was the first time that a combination of semi-automated pallet shuttles and fully automated reach trucks was implemented - and all that in only nine weeks! "In time to start the production, we were able to take the new warehouse system live," Manfred Kania shows his satisfaction. The various manually operated warehouses were closed down and all warehousing was joined up and simplified. "A failure of our new distribution centre would bring all or our production lines that operate around-the-clock to a halt within hours. Consequently the required minimum warehouse system availability was 98% which STILL was able to provide to our greatest satisfaction. Beyond this the highly modern logistics centre provides us with an economic and transparent warehouse system which drastically simplifies manual materials handling, " Kania happily summarises the project.

Possibly occurring disturbances are covered by an emergency backup concept. The service guarantees frictionless materials handling and makes the whole process dependable in the long run. A 24-hour on-call service and the short reaction times of the STILL service engineers make the flow of materials just as secure and reliable as glazing fitted with PVB film from Kuraray Trosifol.