swisslog

IMPLEMENTING WAREHOUSE AUTOMATION IN BROWNFIELD SITES

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A GROWING NEED FOR CAPACITY AND THROUGHPUT

A 2018 study by CBRE, the world's largest real estate company, found that the average age of U.S. warehouses was 34 years. More recently, the company forecasted that thousands of new warehouses will be needed across the U.K. and Europe to accommodate changing consumer spending habits. As a result, many operators are now struggling to meet growing demand and changing requirements in facilities that are not well equipped to support those objectives.

This was confirmed in a Supply Chain 24/7 survey of warehouse and DC operations focused on the challenges operators face. Forty-three percent cited insufficient space; 39% the inability to attract qualified labor; 34% outdated storage, picking and handling equipment; and 32% inadequate information systems.

Today's robotic and data-driven automation systems can address these challenges and extend the life and productivity of older warehouses. While some operators may assume their facilities can't accommodate automation because of their age or other factors, most brownfield warehouses are in fact good candidates for automation.

The technologies available today can be configured to adapt to existing building limitations and deliver increased storage capacity and higher throughput. In addition, experienced integrators such as Swisslog can often implement the current generation of modular technologies through a phased approach that minimizes disruption to operations.

This paper reviews the leading technologies that should be considered for brownfield automation and presents the Swisslog approach to implementing automation in brownfield sites.

Key Definitions

Brownfield warehouse: an existing conventional warehouse/building that can be re-purposed.

Greenfield warehouse: new build warehouses/buildings.

THE CHALLENGES AND BENEFITS OF BROWNFIELD AUTOMATION

In a new facility, building designers and automation system suppliers can work together to ensure the building is designed to optimize the density, and performance of the automation. When adding automation to a brownfield site, the automation system must adapt to the existing structure.

In the past, this was a significant hurdle, but today's automation systems offer the flexibility to adapt to a wide range of building conditions. These systems can be configured to conform to irregular building shapes and around building columns and other obstructions. Some can even work in buildings with low ceiling heights.

Uneven or cracked flooring can also present a challenge in older buildings, but some automation systems can be configured to compensate for irregular flooring. When that isn't possible, it is still much less expensive to repair or replace flooring than construct a new building. Swisslog has developed a site assessment process that can help warehouse operators determine the feasibility of a particular facility to accommodate automation and ensure safety and fire protection standards can be maintained or enhanced.

The other challenge businesses face when considering automation for an existing site is the potential disruption to operations. Building a new warehouse is usually less disruptive to warehouse operations than adding automation to an existing facility. But here again, current automation technologies provide a degree of flexibility that wasn't available in the past. They feature modular designs that experienced integrators can leverage to deploy automation in phases that enable continued service to customers through established manual processes while the automation is being deployed.

> Automation systems can adapt to a range of building sizes and shapes as demonstrated by these configurations of the Swisslog PowerStore shuttle system.
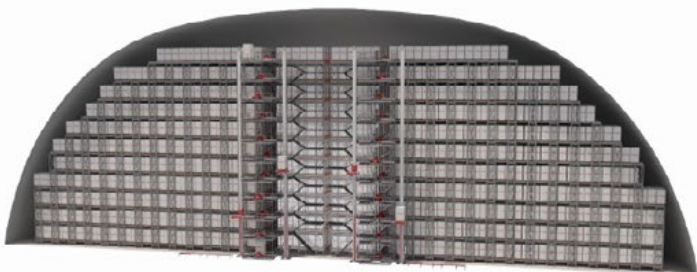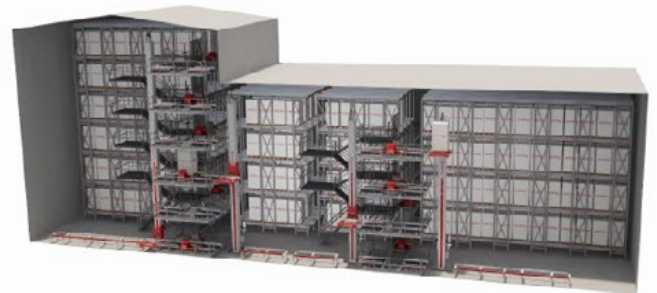
In summary, while there are challenges that may be imposed by the limitations of existing facilities and the need to maintain customer service, these challenges can be overcome with the right technology and the right partner. And adding automation to a brownfield site delivers a number of benefits that allow these projects to deliver a fast return on investment:

- **Reduced capital costs**: In almost all cases, the cost will be much lower to implement automation in an existing facility than to build a new facility, even if some physical upgrades are require to support the automation.

- **Increased storage density**: AS/RS systems can deliver up to 60% more storage capacity than traditional warehouse storage, enabling more products to be stored in a smaller footprint and delaying or eliminating the need for expansion.

- **Increased productivity**: Automation can support productivity improvements, particularly in each picking operations where productivity improvements of 200% to 300% are typical. Automation also eliminates some of the most tedious tasks in the warehouse, so not only are labor requirements reduced but it becomes easier to recruit and retain talent for the remaining positions.

- **Improved picking accuracy**: Using technology such as pick-to-light, automation systems can achieve much higher picking accuracy than is typical with manual processes. In goods-to-person picking systems, picking accuracies of +99% are routinely achieved.

- **Reduced environmental impact**: Automation can reduce a warehouse's carbon footprint by minimizing interplant and intra-plant transportation requirements and eliminating the need for lighting in some sections. Due to reduced transportation requirements, there is often an opportunity to reduce forklift fleet size.

- **Reduced product damage**: Warehouses that rely on forklifts for product movement can experience regular and costly product damage caused by the forks on the trucks. Automation systems help ensure safe transportation of products into and out of storage.

- **Faster response to market changes**: Implementing automation in a brownfield site can often be accomplished in half the time it takes to design and construct a new building, shortening the time required to respond to market or business changes.

- **Increased Intelligence**: The software deployed to support automation can provide better visibility into product inventory, enhanced reporting on warehouse performance and synchronized coordination of manual and automated processes across the warehouse.

## Determining Whether You Can Benefit from Warehouse Automation

If you answer yes to any of the following questions, it's worth exploring whether your facility can accommodate automation:

1. Are supply chain service levels deteriorating or unable to keep pace with changing market requirements?

2. Has SKU proliferation reduced picking efficiency?

3. Has SKU proliferation or inventory growth caused you to outgrow the storage capacity of your warehouse?

4. Are costs per fulfillment increasing because more labor is required to expedite orders and meet customer expectations?

5. Are you having difficulty attracting and retaining labor?

AUTOMATING PALLET HANDLING IN BROWNFIELD SITES

Warehouses that handle pallets can achieve significant improvements in storage capacity and throughput through the deployment of either pallet shuttles or stacker crane systems.

Key factors that will influence what system is right for a particular application include SKU count, desired storage density and throughput requirements.
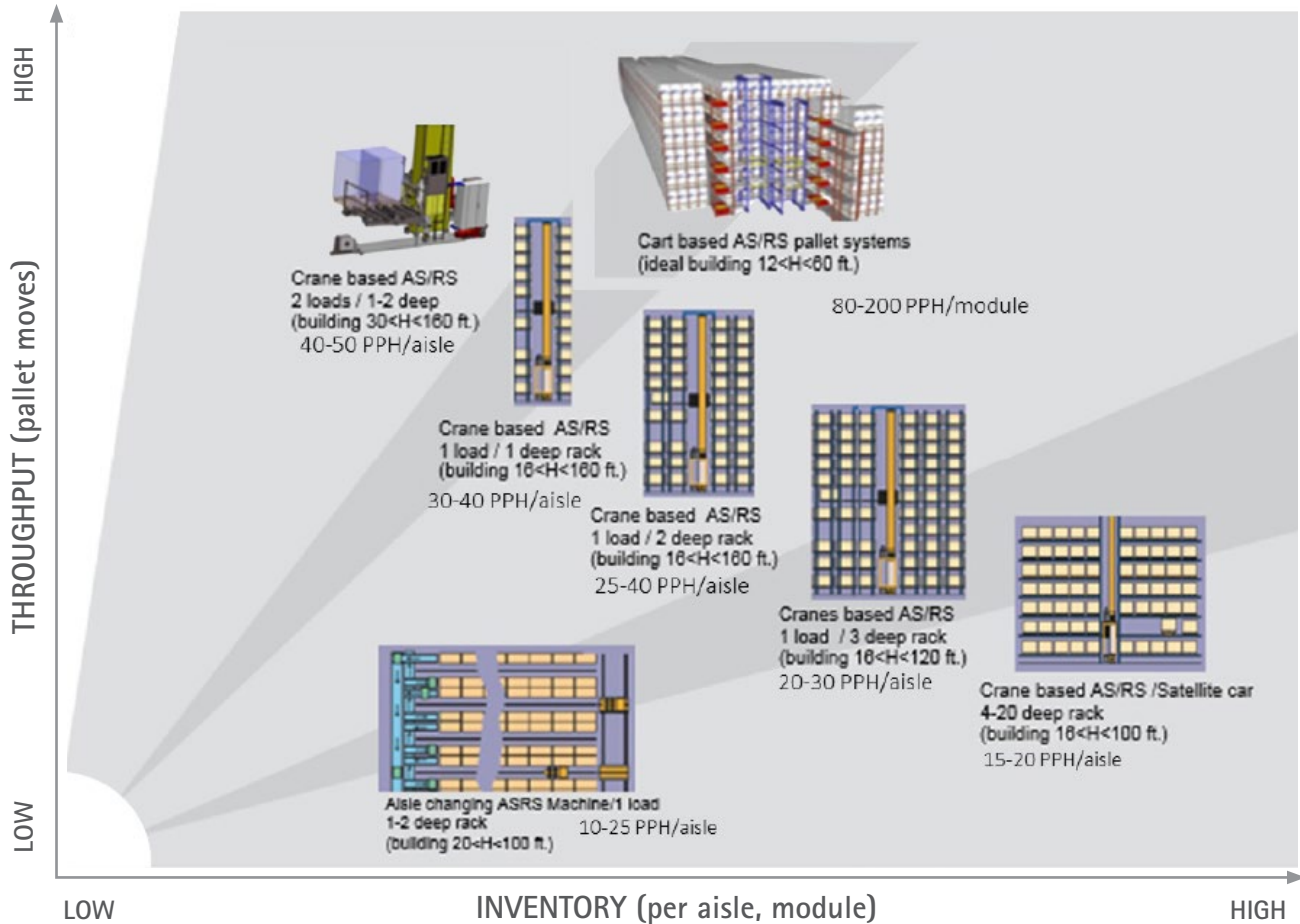
With a full range of automated pallet handling solutions, Swisslog can tailor automation system capabilities to site throughput and density requirements.

Pallet shuttles, such as the Swisslog PowerStore system can be ideal for warehouses seeking high density storage and high throughputs. The flexible design enables cube space to be maximized in irregular building shapes and sloped or stepped ceilings. With PowerStore, storage density can be increased

by 60% compared to traditional pallet storage. Each aisle in the system can provide throughputs of 200 pallets per hour with excellent energy efficiency and a low carbon footprint. The system also has a temperature range that extends from –30°C (-22° F) to 50° C (122°F), making it ideal for cold temperature storage where it can minimize the need for warehouse staff to be exposed to harsh temperatures.

Pallet shuttles deliver the best performance in applications with lower SKU counts and a high quantity of products per SKU, such as food and beverage and other fast-moving consumer products warehouses.

For high bay warehouses that don't require the throughput provided by PowerStore or have high SKU counts, a stacker crane can deliver the right balance of storage density and throughput. Swisslog's Vectura stacker crane is a proven and economical solution that delivers excellent efficiency and reliability. Vectura cranes are pretested and shipped in modules which are easily assembled on–site without the need to remove the warehouse roof as is required in some other crane systems.
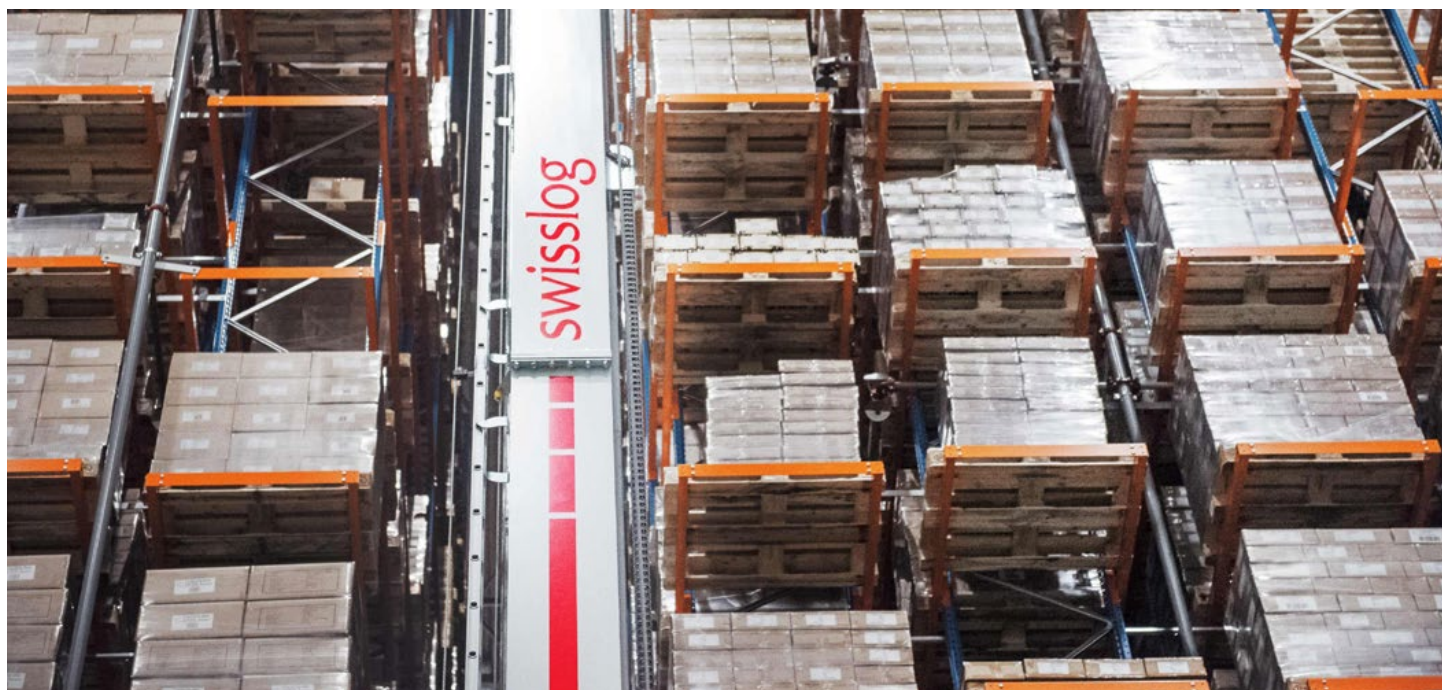
# AUTOMATING BIN, CASE AND TOTE HANDLING IN BROWNFIELD SITES

With the growth in e-commerce and the demand for smaller order sizes from customers in a range of industries, many warehouses that were never designed for carton handling or each picking are being required to support those functions.

There are multiple systems that can help warehouses keep pace with changing customer requirements by automating carton storage and by enabling goods-to-person picking.

The AutoStore system is one of the most popular solutions for supporting goods-to-person picking and Swisslog is the world's leading integrator of AutoStore systems. Through its cube-grid storage system, AutoStore offers the best storage density of any goods-to-person system. Its modular design enables it to adapt to irregular building shapes and be configured around obstructions, making it ideal for brownfield sites. It supports throughputs up to 5,000 order lines per hour.

The key limitations of the AutoStore system are that it only handles standard-sized AutoStore captive bins, so it isn't well suited for handling cartons or irregularly shaped products directly. In addition, it currently does not support operation in temperatures below freezing and is limited in its ability to leverage high ceiling heights through vertical storage. Standard-size AutoStore bins can be stacked up to 16 high in the grid, which limits system height to about 7.6 meters (25 feet).

Carton shuttles, such as Swisslog's CycloneCarrier, offer higher throughputs and increased flexibility in the type of products that can be stored, but at lower storage density than AutoStore.
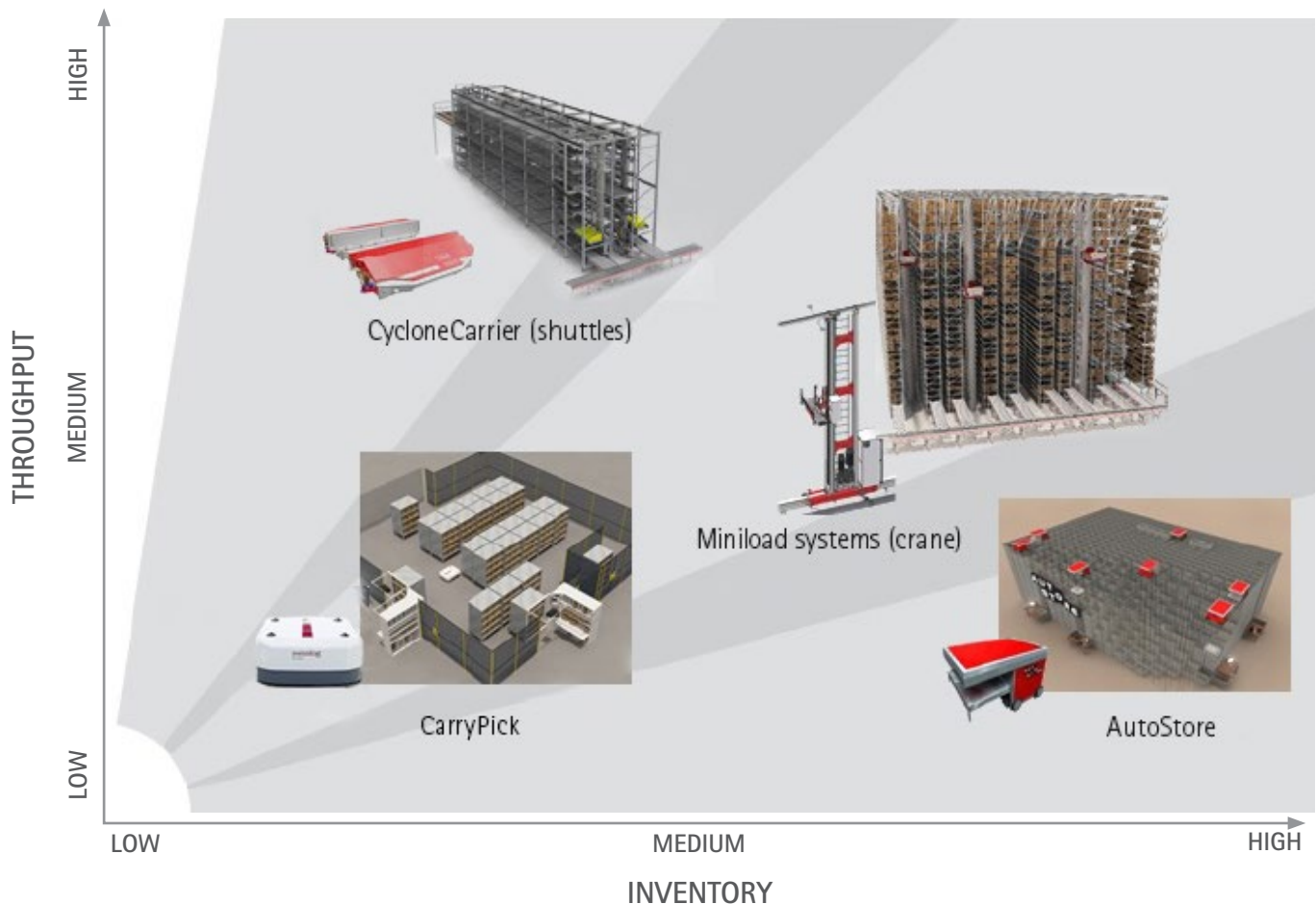
A range of goods-to-person technologies can be deployed in brownfield sites depending on density and throughput requirements.
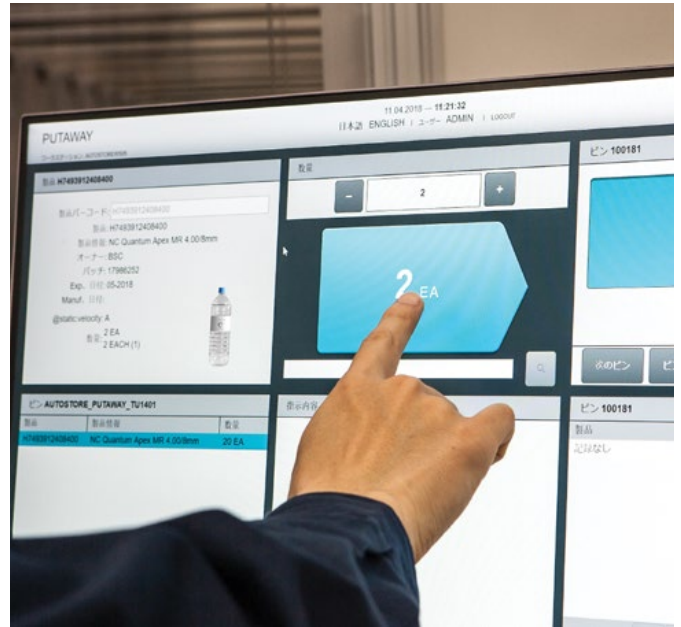
This solution is ideal for warehouses supporting mixed-case palletizing and can be paired with robotic palletizers to fully automate palletizing for store or MFC replenishment. Shuttles are also well-suited for warehouse buffering applications.

Mini-load stacker cranes are also available for carton handling and light loads and can handle larger and heavier payloads than AutoStore or a shuttle system. At moderate flows, mini-load stacker cranes deliver an economical, reliable and modular solution to carton handling and each picking The Swisslog Tornado crane is ideal for reserve storage and replenishment of manual picking zones, as well as feeding goods-to-person pick stations. The cranes can operate in ambient, chilled or frozen environments.

A final solution to consider is the Swisslog CarryPick system. This system can't deliver the storage densities of the other automation solutions but offers an ideal choice for entry-level goods-to-person picking that requires very little infrastructure, deploys quickly and is easy to scale. CarryPick uses mobile robots to move products stored on racks to ergonomic pick stations. In addition to its modular design that makes it easy to scale as demands change, CarryPick offers the flexibility to move the entire system to a new facility if you outgrow your existing warehouse.

The functionality and performance of the software that in the success of a warehouse automation project. Swisslog's SynQ platform provides the flexibility to work as the warehouse management system (WMS) or with an existing WMS to provide automation control with a high degree of functionality and interoperability.

The modular SynQ platform integrates warehouse management (WMS), material flow (MFC/WCS), and automation control systems (ACS) functionality, along with an array of business intelligence tools, in a single modular platform. This allows SynQ to support multiple automation systems as well manual processes. The platform provides a common user interface for processes across the warehouse that is designed to increase the accuracy and productivity of warehouse workers.

AUTOMATION SYSTEM CONTROL SOFTWARE

The functionality and performance of the software that controls the automation system can play an important role in the success of a warehouse automation project. Swisslog's SynQ platform provides the flexibility to work as the warehouse management system (WMS) or with an existing WMS to provide automation control with a high degree of functionality and interoperability.

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IMPLEMENTING AUTOMATION IN BROWNFIELD SITES

Regardless of the automation system selected, implementation must be carefully managed to minimize disruption on current operations. The Swisslog process for implementing automation can often be accomplished while the facility continues to serve customer using established manual processes.

One approach that has been successful is to consolidate storage in one area of the warehouse to free up space for the initial phase of the automation deployment. The first module of the automation system is then deployed and brought on-line as a pilot and the warehouse operates in hybrid manual-automated mode while the next module is deployed.

Alternately, we've worked with some customers who have been able to transfer some inventory to secondary locations to free up space for the first phase of implementation. Once the first module is deployed, the increased storage density provided by the automation system can be leveraged to free up space for additional modules.

In either case, every effort is made to plan and manage the project to minimize the impact on warehouse operations.

TAKING THE NEXT STEP

While new warehouse capacity is certainly required in today's market, there are significant opportunities to extend the life of older warehouses through automation systems that increase storage capacity, increase throughputs, and enable newer, more efficient approaches to palletizing and picking.

Swisslog brings a unique set of capabilities to the challenge of revitalizing older warehouses, offering both a full range of automation technologies that can meet the need of almost any application as well as the integration and project management expertise required to deploy these technologies with minimum disruption to warehouse operations. For more information contact info@swisslog.com