

# Cold remedy: refrigerated warehouses go high-tech

Operators of public refrigerated warehouses are increasingly using automation technology to provide the efficient, cost-effective services demanded by today's food processors.

J William Hudson, president and CEO, International Association of Refrigerated Warehouses

**A**nticipating and meeting evolving customer needs in the food industry is what motivates operators of public refrigerated warehouses (PRWs). This maxim is now truer than ever, as these companies take advantage of new automation and other technologies to provide a more efficient service to food processors. Some say these latest technological innovations may be the final frontier for increasing efficiency.

PRWs are continually learning about new ways to improve operations through the programmes offered by the International Association of Refrigerated Warehouses (IARW) and the World Food Logistics Organization (WFLO), two organisations that represent leading companies in the industry.

'Technology is one of the last areas left where costs can be reduced,' says Edmund Rucels of Psion Teklogix, a leading provider of technology solutions in the PRW industry and an active member of IARW. 'Many companies have worked to lower their insurance and utility rates, for example. One of the few areas left to achieve savings is re-engineering with technology.'

## The automation challenge

However, achieving a high level of automation in PRWs is challenging. 'For starters,' says John Galiher, president of Preferred Freezer Services based in Jersey City, USA, 'public refrigerated warehouses manage product storage for a variety of food processors with different case sizes and handling requirements. That makes total automation difficult, since uniform case sizes and consistent handling patterns are essential for many aspects of automation.'

However, many automation systems in PRWs are improving the efficiency and effectiveness of product handling for food processor customers. For example, many cold storage operations are using forklifts guided in the aisles (on rails or tracks). Operators do not have to steer the lift, which frees them to

focus on picking the correct product and planning their next move. In addition, pallets are being stacked higher and aisles narrowed to make the most efficient use of space and reduce the distances between forklift stops.

Jack Ampuja, a warehouse and logistics consultant with Logistics Solutions International, sees a future in which several threads of technology will be woven into an integrated system. 'It's information driven,' Ampuja says. 'The more information you have, the better off you are, whether you are a PRW or a food processing company.'

Ampuja expects three technologies to converge for more and more PRWs: scanning, wireless and supply pipeline tracking technologies.

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### Wireless scanning and tracking

Many PRW operators scan products every time they move, at the receiving dock, again at the storage location and once more when items are picked and loaded onto a truck for delivery to the retailer. This type of tracking provides warehouse operators with information on every pallet and every shipment for every customer.

Once products are scanned, the information needs to be downloaded into a central system. Wireless or radio frequency scanners can provide a real-time view of how products are moving into and out of storage. This process is not always easy.

Refrigerated warehouses are challenging for wireless technology. Ampuja says: 'Walls and partitions of freezers, floors and ceilings can block radio signals. However, no one is now building new multi-story warehouses, and there are no wireless problems in the newer one-story buildings.' Rucels agrees: 'Some of the older warehouses as well as underground storage facilities are a challenge for the current 802.11b wireless technology. Narrowband is still much better in these tough environments.'

Moreover, changes in temperature as operators move from freezers at -29°C into warmer loading areas and back can cause water condensation inside handheld scanners, leading to failure. 'Our cold-chain customers are the most demanding on our technology,' Rucels says. 'They have the most severe environmental requirements.' To fight the cold, Psion has developed handheld scanners with built-in heaters. In addition, Rucels notes, his company recently applied for a patent for a frost-free scanner incorporating a scan window that will not fog up.

Pipeline tracking systems are becoming increasingly important in the industry. With these systems, Ampuja claims, food processors, warehouse operators and retailers can use the internet to track a product from the manufacturer's loading dock, over the major highways, through the storage facility and right up to the door of the grocery retailer. Having this kind of information is good for everyone in the supply chain. Ampuja says: 'If PRWs know things are coming in, they can prepare for it.'

Further down the distribution line, stores may not know that something is not available until the truck arrives. A visible pipeline will help retailers plan ahead, especially if a particular product is unexpectedly in short supply.

### The role of standardisation

Many people in the industry believe that the standardisation of packaging materials is the key to the wider adoption of automated systems. 'Unless the grocery industry persuades suppliers to produce only four or five sizes of box, we cannot have much more automation,' Galiher says.

He believes that developing size and shape standards for boxes would reduce the cost of boxes, transportation, storage and other processes in the supply chain, and pave the way for more automation in PRWs. 'If the grocery and food service industry got together and said that, by 2005, we want all manufacturers to standardise, and adjust individual inner packages to fit these

standardised cases, it would absolutely revolutionise the industry, and save everyone money on shipping, packing, unpacking, disposal, crushing and more. When the industry adopts standardisation, automation will really take off,' he says.

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Ampuja does not see standardisation happening any time soon. 'I think [standardisation] is going to be very difficult, if not impossible, to achieve, since there are so many processors involved, and distributors have differing requirements. Nothing like this has been accomplished in dry grocery, which is generally the leading business segment.'

### Significant advances

Bob Koerner, president and chief operating officer of Total Logistic Control in Zeeland, USA, says that some automation and scanning systems are too inflexible for the frequently changing needs of PRWs. Even so, significant advances have been made to improve efficiency. Koerner says: 'In many warehouses, you went from A to B to get something, and then went back to A. One trip might have been wasted. But now, as you move through the warehouse, you are doing something on the way to doing something else. The system knows where you are and gives you a task, and then gives you another task! This kind of system can cut costs on labour and material handling equipment, but it is much easier to implement in a warehouse dedicated to one customer, and each new customer requires customisation.'

In Europe, where labour and real estate are often more expensive than in the USA, PRWs generally make wider use of automation, according to Koerner. Warehouses in Europe tend to have smaller footprints and higher ceilings to get the highest product density possible.

### Product identification trends

Rucels sees more wide-area wireless communication coming into PRWs. 'More systems will be integrated from end to end – from

processor to PRW to retailer.' In addition, Rucels predicts that some PRW customers will start using radio frequency identification (RFID) on their products. This system can replace bar coding for certain products for which bar codes do not work well, such as bulk stored fish and vegetables, by using radio transmitters as receivers to convey information identifying the product.

In 2005, the Uniform Code Council (UCC) will complicate the product code picture by requiring that the 12-digit universal product code (UPC), which has been in use for about 30 years, will be expanded to 13 digits. The UCC is also recommending that manufacturers start planning to expand the code again, to 14 digits.

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The new requirements will bring US and Canadian product codes in line with the international article numbering (EAN-13) system used in Europe and other parts of the world. These changes will require virtually every business that uses UPCs to make changes in their systems to accommodate the longer numbers. Proponents of the requirements say the new coding will reduce costs for US and Canadian distributors by removing the need for them to replace the 13-digit number on imported products with a 12-digit bar code. The transition to the 13-digit system will facilitate the eventual addition of the fourteenth digit as part of the global trade item numbering system (GTIN).

### Moerchen System

One relatively new technological development is the Moerchen System: a package for PRWs that provides total automation from the moment a product arrives at a warehouse until it is loaded on a truck for delivery to the retailer. However, Ampuja, who represents Moerchen in North America, says the system is not a quick fix for existing facilities, as installation requires new warehouse construction at a cost of \$20–25m, including the automated system.

It may be too expensive for many PRW owners, but the way the system works indicates the way the industry might look in future.

When a pallet enters the warehouse from a food processor, employees open it and sort products into separate bins. The bin is coded, every item in it is scanned into the computer, and the bin is released for automatic storage in the high-bay, -29°C warehouse. Warehouse employees never need to enter the storage area, except to maintain or repair the equipment that automates the system.

When an order comes to the warehouse, cranes in the freezer pick the bins for each requested product and put them on conveyors to the packing area. The bins pass through the 4.44°C packing room, where packers select the required number of products, and then return quickly to the storage freezer area. The trip through the warmer area takes less than a minute. The freezer and the warmer areas are separated by air curtains. Items for each order arrive in the packing area in the best order for loading a pallet: heaviest first, lightest last. A few Moerchen Systems have been installed in Europe, but there are none yet in North America.

### Valuable opportunity

In the final analysis, the only purpose of computers and automation is to provide good service to customers and make a profit doing it. This has become increasingly difficult. The price of entry into the industry is getting higher, but the margins are not increasing; some of the services that are now required come without extra margin. But PRW operators do have a valuable opportunity to take advantage of new technology, and move with the new trend towards collecting more information and using automation to improve efficiency. ❖

The IARW came into existence in 1891 when a number of conventional warehousemen took on the demands of storing perishable food and soon realised the increased challenge and complexity of operating temperature-controlled storage facilities.

Today, in addition to collecting information and encouraging the exchange of ideas, the association aggressively promotes more efficient distribution services, aids members in adopting new technology, advises members of legislation and regulations affecting the food industry, assists members in complying with US and international regulations, and participates in alliances with industry and international organisations having a common interest in the safe and efficient flow of food products around the world.