



WATER, WATER EVERYWHERE

How **Niagara Bottling** automated storage to keep inventory in check



Supply chain executives in the food and beverage industry face challenges when balancing production runs, inventory volumes and delivery schedules. Warehouse managers are increasingly required to store more products in existing warehouses, to retrieve them faster for growing volumes of just-in-time orders to retail stores, make more efficient productive use of labour, reduce energy consumption and improve cost efficiencies.

Space within production warehouses is at a premium, and these facilities are consistently running out of space. Finished products are frequently stacked on floors and aisles, which contributes to increased fork truck accidents and equipment damage, spillage and damaged products, and lost and expired inventory. The continuous increase in the cost of land, construction, labour and facilities has put a heightened value on space conservation within these production warehouses.

These factors have forced food and beverage manufacturers into using 3PLs or renting outside space to store manufactured prod-

ucts. But this presents a new set of issues. Although most contemporary 3PLs run highly efficient operations, transporting pallets of product to off-site storage incurs rental costs, increased transportation costs, and loss of last-touch product control, which can increase product damage and returns.

Consequently, manufacturers are more closely looking at their distribution and storage models, and how they can more optimally balance their inventory against production and delivery.

A growing number of manufacturers are moving away from fork trucks, and instead employing fleets of laser-guided vehicles (LGVs). Similarly, they are shifting their high-volume, palletized SKUs away from stationary rack storage locations, away from floor staging, and away from remote warehousing sites. Instead, they are embracing highly automated, robotic shuttle-based pallet

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deep-storage systems, which provide excellent density and flexibility to fit within existing variable-ceiling-height facilities.

Automated distribution

One such manufacturer is Niagara Bottling. Family owned since 1963, Niagara owns and operates 35 combined production/distribution facilities throughout the U.S., Canada and Mexico, bottling water and other beverages.

In 2010, Niagara selected E80 Group (E80) to fully automate each of its distribution operations. E80 develops automated logistics solutions for consumer goods manufacturing and distribution, with a focus on integrated robotic systems, such as laser-guided vehicles (LGVs), robotic palletizing, layer picking and repacking, and automated storage and retrieval (AS/RS) high-density warehouses. The company has considerable experience in food and beverage.

“For our warehouse automation we were using forklifts, double front end forklifts, to move our product around,” said Bill Hall, executive VP, manufacturing and engineering, at Niagara. “In 2009 I was touring a plant that had E80 LGVs in operation, and I thought we could apply LGVs in our distribution. I was particularly interested in loading pallets onto trucks with LGVs for shipping, which E80 LGVs were capable of doing. We had E80 automate one of our plants and have continued partnering with them to automate our remaining facilities.”

Since 2010, E80 has automated distribution operations at Niagara’s 35 plants with fleets of unmanned LGVs moving pallet loads from end-of-line bottling through all phases of distribution, including pallet rack storage, floor staging for shipping, and loading directly into truck trailers for shipping.

“The LGVs floor stack everything in our facilities,” added Hall. “They handle 2,500-pound pallets of water, while each of our facilities are making 50 to 60 turns of inventory annually.”

These distribution functions are standardized for each of these facilities, and custom-integrated with E80’s Smart Decision Maker (SDM) warehouse control system (WCS), which ties into Niagara’s ERP within each plant. All distribution functions are coordinated and controlled by E80’s SDM, enabling streamlined robotic pallet handling.

Robotic pallet movement and storage

Niagara’s biggest and most complex plant produces 120,000 bottles of water and beverages per hour, 24/7/365, and employs a fleet of 56 E80 LGVs to move the palletized water and beverages through the warehouse into pallet rack storage and shipping.

The facility not only handles water, but also hot-fill beverages and soft drinks. In 2019 the plant planned to add three new process lines, for a total of nine. But the use of space for production would have eliminated too much of the facility’s storage space. More product would have been produced than the warehouse, and its off-site storage locations, could store. Multiple off-site locations were already being used for supplemental finished-product storage.

Niagara wanted to reduce the plant’s dependency on external warehouse space, while maintaining more control over the speed of delivery to its customers. The bottler turned to E80 to design a solution.

“We outgrew the facility very quickly and wanted to maximize the square footage of the building on the site,” continued Hall. “We looked at real estate expansion, but it was cost prohibitive, so we decided to go with vertical storage inside of the building. Once we made that decision, we looked at three or four different suppliers, including E80 who has always been one of our preferred partners.



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– Bill Hall, executive

VP, manufacturing and engineering, at Niagara Bottling

We felt technology-wise, cost-wise and execution-wise E80 was the right choice.”

High-density storage

The E80 team proposed a customized version of its SmartStore solution to be installed inside the plant’s distribution space. It would be a high-density 160,000 square-foot, five-level, mobile robotic shuttle-based storage and retrieval system (AS/RS), with 33,000 pallet positions, designed for deep storage of palletized loads. The system would consist of five modular sections that can be expanded or contracted by adding or deleting pallet positions and shuttles. This would replace the existing pallet racking in the warehouse.

“Although the SmartStore provided an ideal solution for pallet storage at the Rialto facility, it posed a significant challenge to execute the transition,” explained Dallasta. “The challenge was two-fold. First, we had to build SmartStore within an existing building, and determine the module configurations to take full advantage of the space in the most efficient way, factoring in existing ceiling heights and supporting columns. Quite different from a greenfield solution.”

The second challenge was that this distribution facility was a high-volume working plant. Bottling production and distribution could not stop. The project needed to be executed with minimum impact on the plant’s operation, a considerable challenge.

“During installation of SmartStore we expected to have some interruption of our existing throughput because we never could really shut the entire factory down,” explained Hall. “We timed it to where the interruptions were during the off season to minimize the impact. E80 worked with us to keep the interruption down to about 20 percent of throughput at any given time. The modularity

of SmartStore is what allowed us to continue to run during installation.”

Palletized product is stored in five modules of highly dense rows, up to 20 pallets deep, of the same SKUs. Lithium-ion battery-powered shuttles travelling at speeds up to 10 feet per second (fps) transport pallets within the system’s aisles and rows. The shuttles carry a satellite on board that collects and transports the pallets in the channels of the rack, recharging the battery at the same time. Lifts and transfer stations vertically move pallets between aisle levels. The result is a solution of maximized storage density, operating frequencies and system modularity.

“SmartStore has proved to be a very dependable and repeatable ASRS solution,” said Hall. “We are thrilled with the outcome.”

Laser-guided vehicle fleet

The warehouse’s fleet of 56 LGVs incorporates the most recent automation developments in laser-guided vehicles for pallet movement. Using a combination of logic software and wireless navigation, these LGVs can perform tasks that are not possible with other transport systems – such as the uniform movement and positioning of pallet loads to within a fraction of an inch of their designated targets, without noise, and with a high degree of safety for workers and their operational environment.

“Most of the LGVs operating in the warehouse are transporting pallets, two at a time, from the nine stretch wrapper discharge locations in the end-of-line bottling area, to the high-density storage induction platforms, or directly to floor staging in shipping,” said Dallasta. “Similarly, these LGVs transport pallets from high-density storage to floor staging in shipping. All pallets staged in shipping are loaded directly into trucking trailers with LGVs.”

These LGVs are E80 model CB30 Dual Drive, with extendable forks and dual side-by-side pallet carrying capability. They can lift pallets to a height of 31 feet, with a lift capacity of up to 6,000 pounds, and a maximum speed of 4.9 fps.

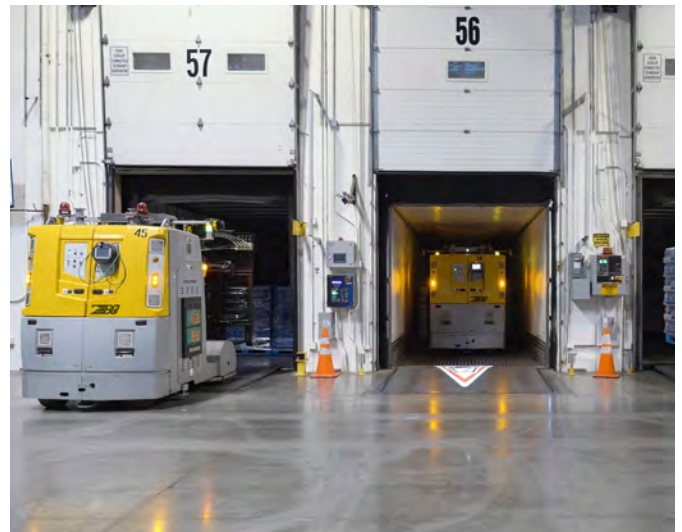
The second type of LGV in the warehouse is the E80 model Reach. It is used to store and supply raw material pallets to the bottling floor with items such as corrugated for packaging machines, stretch wrapper film, and ingredients for carbonated beverages. The pallets in the raw materials warehouse are stored in racks four to five levels high.

The Reach LGV is a single-pallet vehicle with extendable forks for double-deep pallet storage. It is used for selective storage systems where the LGV’s forks allow it to pick and place multiple product codes. It can lift pallets to a height of 39 feet, with a lift capacity of up to 6,000 pounds, and a top speed of 4.9 fps. The vehicle is designed to maneuver in tight spaces, with a turning radius of 10.2 feet.

Integrated warehouse controls

The smooth functioning of the LGV fleet and SmartStore depends on E80’s SDM WCS, which coordinates orders received from the plant’s ERP, then directs the work to the LGVs and SmartStore to execute. SDM controls the traffic of the LGVs in the warehouse, and where pallets will be stored in SmartStore and shipping.

“SDM ensures that the automated systems (LGVs and shuttles) are used in the most efficient way to distribute the workload to available resources, optimize LGV routes and balance throughput and product distribution in SmartStore,” explained Dallasta. “The WCS also plans product movement between different warehouse areas to maximize warehouse saturation. It identifies opportunities for optimization and defragmentation as required.”



LGVs load and unload trailers at the Niagara Bottling facility.

It ensures automated management of systems and flows, communicating with the nine bottling line palletizers and wrappers. The logistics flow of the distribution environment is managed from one integrated logistics platform coordinates and optimizes all operations. The SDM control system guarantees total product traceability and safety.

Niagara has standardized on the SDM WCS not only in its Rialto warehouse, but in all of its plants. This integrated standardization has streamlined and supported the company’s overall efficiency.

“The SDM software is really performing well for our inventory, tracking and visibility, well above 99 percent accuracy in all of our facilities,” explained Hall. “It is fully integrated straight to our ERP, so all the information is automatically handed off between SDM and our ERP. It gives us confidence in our finished goods inventory, and is an easy tool to use at the facility level as well as for senior management at headquarters.”

Fully operational since June 2021, the benefits to Niagara’s Rialto distribution facility include elimination of downtime, mistakes and product damage; reduced distribution costs; shorter delivery times; and improved sustainability of the warehouse’s supply chain.

Niagara builds approximately five new facilities each year. Each operation needs to make the best use of the available space. Turn-around and process time is very important. How fast it can turn a truck through its facilities is critical.

“E80 automation has taken the warehouse from 40 square feet per pallet position down to 20 square feet per pallet position,” added Hall. “It has taken mission time from 12 minutes down to six or seven minutes. LGVs require less traffic to do the same job.”

“It is all very seamless,” continued Hall. “This is one of the beautiful things about choosing E80 for our LGVs and SmartStore. The LGVs are upstream and downstream of SmartStore, and E80 is handling all of the transactions. The integration is really very easy for our leadership team.”

Over the last 20 years Niagara has become the biggest water company in the U.S.,” said Hall. “Maybe, by volume, the biggest in the world. Now, for the first time in our history we are transitioning from a strictly water company to beverage company. Automation will continue to play a central role in our facilities as we expand into new markets.” ■