CANADIAN TIRE

Canada’s Most Well-known Retailer Gears up for Growth With Country’s Largest DC
Honeywell Intelligrated’s Flexible Sortation System Helps Canada’s Most Well-known Retailer Reduce Footprints and Fingerprints

Please note: “Honeywell Intelligrated” within this case study refers to Intelligrated, which Honeywell acquired in 2016.

As Canada’s most-shopped general merchandise retailer, Canadian Tire Retail is the category leader in sports, leisure and home products, as well as automotive parts, accessories and service.

Founded in 1922, Canadian Tire Corporation, Limited is a growing business comprised of more than 1,100 general merchandise and apparel retail stores and gas stations. Canadian Tire Retail is the company’s subsidiary retail arm and the main growth engine, with 485 stores across the country serving more than three million customers every week. Prior to finalizing design, Canadian Tire Retail had experienced 8.4 percent annual growth in cubic shipment volume. Compounded with a new store footprint that would accommodate bulkier consumer items than previous retail outlets, Canadian Tire was facing a distribution center (DC) capability challenge.
To address its new DC needs, the company turned to Honeywell Intelligrated, an automated material handling systems provider with a long-standing relationship with Canadian Tire. Together, the team would develop a new facility, the largest DC in Canada to date, at 1.5 million square feet. Located about 45 minutes outside of Montreal, the DC features technology and material handling systems designed to sort and ship inventory arriving from more than 1,000 suppliers.

A Bulky Challenge

“Our products can range from a small six-pack of jelly jars to vacuum cleaners to elliptical trainers. There is no precise item profile – there is not even a general profile,” noted Dan Chan, vice president of supply chain major projects at Canadian Tire. “Our facility needed to store and move large, bulky items while at the same time transport small each picks.”

An additional challenge was that, unlike its big box competitors, Canadian Tire operates on a franchise model – selecting and storing merchandise for its franchisee dealers, then delivering the ordered goods. “From a supply chain perspective, we have a pure pull system,” said Chan. “Our customers are our associate dealers, and they order from us.”

Piece picking and bulk handling for customer-specific orders means that Canadian Tire needs to have a DC that can hold bulk storage, but at the same time remain largely automated. The company needed an efficient DC that was big, fast and flexible.
An Existing Partnership

To get started, Canadian Tire turned to Honeywell Intelligrated, its long-term material handling provider.

“Honeywell Intelligrated has been an excellent partner to Canadian Tire for several reasons. One, they understand our business really well, so the learning curve of bringing someone else new into a partnership is non-existent. Two, they’ve got great technology and they continue to enhance their offering to us. And three, it’s the people and the team. I know that I can call my account executive and if we have a request, I know I can get an answer,” said Chan.

The facility also represents a unique partnership between Canadian Tire and GENCO, the third-party logistics provider that operates two distribution centers for the retailer. While Canadian Tire would develop and own the new facility, GENCO would operate it on a daily basis.

Location, Location, Location

With 75 percent of its product shipping from Vancouver on the west coast, and 25 percent shipping from Halifax on the east coast, Canadian Tire assessed its current capacity and needs. Because the company had a Calgary DC to serve the western part of the country, and two Brampton DCs to serve the eastern and central parts, the Montreal region appeared ideally positioned to serve the Ontario, Quebec and Atlantic Canada retail stores. The final site was selected in Coteau du Lac, Quebec, approximately 45 minutes outside of Montreal, for quick and effective delivery of merchandise to Canadian Tire stores.
Anticipating a large facility with associated container storage, dock and associate parking, the 167-acre site would feature a facility of more than 1.5 million square feet as well as an outside container storage area.

**The Challenge: Big, Fast, Efficient and Flexible**

Understanding the future goals, Canadian Tire required that its latest and largest DC remain flexible and efficient. Goals and requirements of the facility included a reduction of footprints and fingerprints, handling flexibility, and energy and wear efficiency.

1. **Reduction of footprints and fingerprints:**
   A large building can mean long walk times and multiple touches before final delivery. Honeywell Intelligrated's design took into account processes and equipment that would minimize the number of times a product is handled and the amount of manual movement required in the material handling processes.

2. **Handling flexibility:**
   The facility needed to handle both conveyable items as well as bulk products that must be moved by lift trucks. Additionally, Canadian Tire warehouses run picking cycles for truck loading, so no matter where conveyable products or bulk products were being sourced, they needed to arrive to a shipping door at roughly the same time to be consolidated.

3. **Energy and wear efficiency:**
   During the year, Canadian Tire has two seasonal peaks: one in the spring and one in late fall. Throughput and demand changes as we move from the peaks to the valleys. Therefore, Canadian Tire’s facility required the ability to ramp up and down when needed.
The facility was split into four buildings (separated by firewalls) with 57 receiving doors and 57 shipping doors on opposite sides of the facility. During the slow season, entire buildings can be shut down, saving on the cost of lighting and heating parts of the building. Alternatively, the facility can utilize all 114 doors to ramp up during busy selling seasons.

In addition to the energy required to run the building itself, the material handling equipment is also designed to run efficiently during peaks and valleys in demand. Canadian Tire has a variable-speed system, capable of 400 to 600 feet per minute; with the option to run at lower speeds, the company can save energy and material handling equipment wear.

**The Response: The Pick Cycle Orchestra**

“Part of the core success of this DC is the reliance on a ton of automation to make sure our trucks are loaded correctly,” said Chan.

“With the WMS and Honeywell Intelligrated’s BOSS control software, we are able to bring together product from opposite ends of the building to the same shipping door, at the exact same time. It’s a massive undertaking with impressive results, and Honeywell Intelligrated was our key partner in achieving this efficiency.”

**Overview: Software and Controls**

Canadian Tire’s warehouse management system is an in-house developed product called DCCS and is used across their DC network. DCCS is responsible for providing all of Canadian Tire’s operational functionality and communicates to Honeywell Intelligrated’s conveyor and sortation control system.

The Honeywell Intelligrated BOSS® conveyor and sortation control system consists of three basic functional elements: a control system, a monitoring system and a diagnostics system—all integrated and supported on a single architecture. These features enable Canadian Tire to successfully monitor their system. Information obtained includes:

- Operational data and statistics
- Error reporting
- Diagnostics
- Maintenance data

The system also has a number of unique features that help conserve energy when products are not present on some conveyor lines.
Receiving to Shipping

The flow of goods in to and out of the new DC is flexible in terms of its ability to handle bulk items alongside conveyable goods. Because incoming products arrive on both pallets as well as being simply bulk loaded, the first process is unloading and palletizing the bulk product. Barcodes are applied to all of the pallets and then pallets are staged for put-away. Upon scanning the barcodes, the lift truck operator will be directed by the WMS to the appropriate put-away location in the pick module or reserve storage areas.

Order Fulfillment Process

When incoming orders enter the WMS, pick cycles are initiated. A cycle can contain orders for up to 25 stores. The picking is staged by the WMS to ensure that both bulk and conveyable items for a store order arrive at the shipping door at roughly the same time, since the system will not start picking for the next cycle until the previous cycle is complete.

Pick cycles are completed manually by workers inside one of 12 pick modules. Each module, standing four stories tall and 150 feet long, is flanked by racking filled with product. Conveyable products can be picked directly to conveyor, while "loose" or smaller product is placed in corrugated cartons or reusable totes. Operators attach labels to product, cartons or totes and pick until their section is complete, at which time they will place totes onto a take-away conveyor for routing to additional pick areas or to shipping.

Complete orders travel via spiral conveyors to feed onto one of eight take-away conveyor lines.

The eight lines of picked product are delivered to a high-speed wedge merge, where all of the conveyor lines in the facility come together. Capable of speeds up to 600 feet per minute, the high-speed wedge merge can also run at a slower rate. Running the sorter at a lower rate provides energy savings, reduces wear and tear, and makes the system highly flexible to meet seasonal demands.
From the high-speed merge, cartons are funneled into a single conveyor line and fed through the induction area that consists of gapping, scanning and dimensioning. The cartons are scanned and measured, and if the dimensions are out of tolerance, the carton is diverted to an exceptions loop where the issue is resolved or the carton is relabeled and sent to the right store. Otherwise, the carton continues onward to shipping.

Carton information from the scanner is fed into Honeywell Intelligrated’s conveyor and sortation control system, ensuring that the downstream sliding shoe sorter retains a 4- to 6-inch gap for maximum throughput and sorting precision. Capable of speeds up to 600 feet per minute, the sliding shoe sorter gently and accurately diverts cartons to four pop-up wheel shipping sorters capable of 250 feet per minute. The labels are scanned again to determine which of the shipping doors has been assigned to that store during that cycle. Once a door has been assigned to the carton, it is diverted by a pop-up wheel sorter to that lane.

Bulk products, such as fireplaces and patio furniture, are picked by lift truck or walkie operators and are loaded first onto the trailer, and the rest of the load is built around them.

“The design of our sorting process is unique because we spread the volume across sorters, maximizing throughput by using speed only where it is needed,” described Arnold Cunje, senior sales manager for Honeywell Intelligrated. “We collect everything from all of the picking modules at high speed, and begin to slow them down as they are sorted first by the distribution sorter and finally the shipping sorter.”

### Montreal Facility at a Glance:

**Facility**
- 13 miles (21 kilometers) of conveyor
- 120 cartons per minute
- 900 motors
- 12 four-level pick modules, including: an overhead trash conveyor, a center take-away conveyor and spiral conveyors

**System Hardware**
- High-speed wedge merge, capable of 400 to 600 feet per minute
- Honeywell Intelligrated high-speed sliding shoe conveyor maintains a 4- to 6-inch gap between cartons
- Four Honeywell Intelligrated pop-up wheel shipping sorters operating at 250 feet per minute software

**System Software**
- Honeywell Intelligrated BOSS conveyor and sortation control
- Five BOSS control stations
- DCCS WMS (Canadian Tire’s proprietary WMS)
“This building will serve us well for the next several years,” said Chan. “Many companies make the mistake of building for now, without accounting for a level of growth. We built this facility for five years from now, at our projected growth rate.”

Looking Ahead: Addressing New Demand With Existing Facility

“We opened this facility in early 2009, and not too long after that we had a need to expand some of our automotive parts distribution capacity,” said Chan. “The first thing we thought was ‘go talk to the Honeywell Intelligrated team, because I think they can offer a solution for us, since they know our business so well.’ Honeywell Intelligrated was quick to respond and delivered a solution to help us move forward that we will implement early in 2011.”

The solution involves the conversion of the first two pick modules in building one into aftermarket auto parts pick modules. With this retrofit, the company will be able to expand its SKUs in automotive parts from 52,000 to 75,000.

Conclusion

“One of the most impressive aspects of this very high-speed automated system is that it is extremely quiet,” said Chan. “Honeywell Intelligrated was able to put 21 kilometers of conveyor into the building to help us be as efficient as possible with our labor productivity, and yet it is amazingly quiet compared to our older DCs.”

The facility is built for growth, and Canadian Tire has only started to capitalize on the full capacity of the system. Canadian Tire typically runs the system at 400 feet per minute; even with the lower speeds, the facility meets current requirements for throughput and has the capacity to process more than 55 million cubic feet per year, or 140,000 cubic feet per day.

“From our experience, we know that Honeywell Intelligrated is an excellent company to work with; they have the design, implementation and support staff to ensure that projects get the appropriate material handling automation,” concluded Chan. “We have worked with Honeywell Intelligrated before, and we are already working with them again on our expansion plans.”