

Drive & Control profile

Rexroth VarioFlow conveyors offer total package of modular advantages for Oak State products in case packing, cartoning



VarioFlow's modular capabilities help Oak State achieve smooth and efficient operation from conveyors totaling hundreds of feet, integrated within a relatively small plant area.

Easy-to-assemble modular approach adds both packaging capacity and flexibility for the needs of this contract packager

When food product consumers' tastes change, food product manufacturers' processes need to change with them, to stay ahead in a competitive marketplace. That's where Oak State Products (www.oakstate.com), a Wenona, Illinois-based contract packager and manufacturer of baked goods, comes in. Oak State performs a wide range of packaging

and production services for major food product manufacturers, from conceptual development to distribution. But as the 21st century began, Oak State found it increasingly challenging to stay ahead of food product marketers' demand for changes and adjustments to packaging styles in response to shifting consumer demands.

Challenge:

- Develop a flexible conveyor system to respond quickly to changes in preferences
- Increase overall conveying capacity while maintaining smooth merges
- Modify or adapt existing conveyors wherever possible
- Complete installation within four weeks with minimal disruption

Rexroth Solution:

- VarioFlow VF90 and VarioFlow S 160 modular conveyors
- Batch processing system in which cartons were merged in groups to provide smooth merging
- VarioFlow-based conveyor lines installed parallel to existing ones, then switched over to help meet the tight timeframe

Benefits:

- Flexibility in responding to changing customer preferences and increased demand
- Reduced maintenance costs and downtime
- Estimated throughput increase of 20 percent
- Longer conveyor chain life
- Reduced energy use and product damage
- Re-use of existing conveyor systems after modifications

Oak State certainly had the physical capabilities to meet any demand. Their plant featured advanced packaging equipment including robotics, wrapping machines and other automation for cartoning and case packing. One packaging area was devoted to meeting needs for a specific style, such as grocery versus convenience-style packaging.

The Challenge of Change

The challenge came when Oak State's customers switched from one style to another -- for example, in response to increasing demand for convenience-style packaging, or a shift from 2- or 3-pack cartons to open-pack trays. It was difficult to add or convert production lines because the space for product conveying was quite limited. The area devoted to grocery or convenience packaging had three legs for grocery and one for convenience packaging—making it difficult for Oak State to keep up when demand for the convenience style increased. Production line changeovers were also challenging because of space limitations (caused mainly by the fact that during busy times, the available space fills quickly with packing equipment), tight clearances and small areas in which to work. Oak State needed to increase flexibility to maintain profitable production levels—but they didn't want to walk away from their investment in existing conveyor technology. And while Oak State also wanted to keep their conveyor line footprint small to allow possible future expansion, they didn't want to expand the physical plant area just to accommodate more packing equipment.

Oak State worked with an experienced Bosch Rexroth VarioFlow PRO system builder that provided

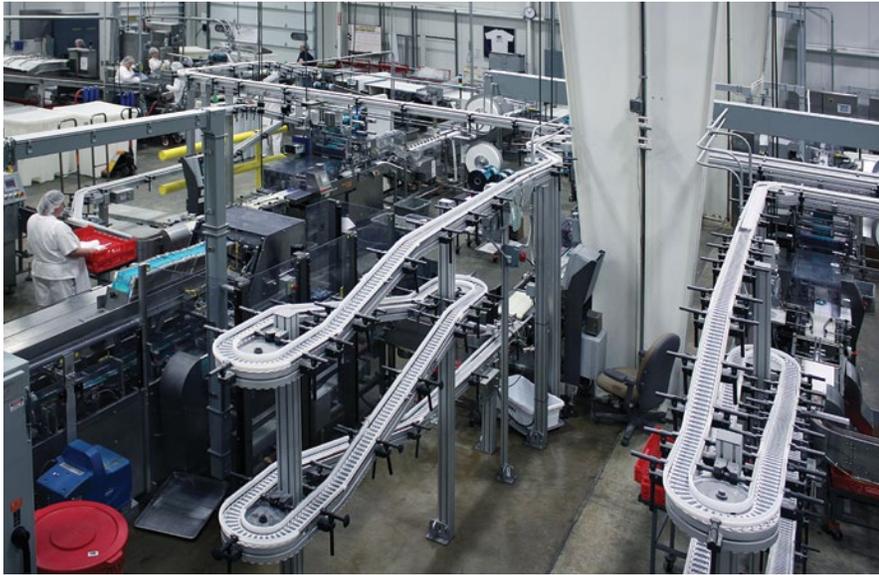


Rexroth VarioFlow conveyors enable productivity by allowing higher throughput and faster changeovers when product specifications are altered.

modular conveyor solutions featuring [VarioFlow](http://www.boschrexroth-us.com) single-strand flexible chain conveyors from Bosch Rexroth's Assembly Technology product group (www.boschrexroth-us.com). The builder had previously installed a line at Oak State's facility devoted to cartoning and packing. This line featured VarioFlow S conveyor systems, some crafted into drop-down conveyors to merge multiple lines of cookie trays leading into wrapping machines. Oak State was pleased with every aspect of the new system, including traffic control concepts that prevented collisions between product (which cause marring and damage) and details like brush cleaners to keep icing off conveyor chains. With this success in mind, Oak State more recently turned to a more ambitious goal: modular improvements to the area running grocery or convenience orders. Oak State's goal was to feature several production legs that could be switched quickly from one style to another, and easily expanded if necessary.

Oak State's objectives involved more than just increasing the number of production lines. They were in need of an innovative way to configure Rexroth conveyor products to match space limitations and production requirements. There were also deadline considerations. Oak State needed a fabricator that offered rapid delivery and the capability to perform prefabrication prior to the installation. Customer demands required the new production area to be up and running within about 12 weeks. Finally, from an integration point of view, Oak State needed a simple and easy-to-run system that minimized potential logistical headaches like elevators, 90-degree turns, interfaces between short conveyors and intermingling of cartons—in an all-overhead line.

The all-overhead line was necessary in order to avoid employee crossovers during packing and assembly, which invite collisions and cause safety hazards, and to maximize access to the work area for maintenance and for



Rexroth VarioFlow 90 alpine conveyors give Oak State the ability to move product packages in three axes.

materials delivery. The all-overhead layout allows Oak State to eliminate all crossovers and create full-floor access for everyone.

The VarioFlow Solution

The Bosch Rexroth VarioFlow modular conveyor concept lends itself to rapid system design, quick installation, and quick start-up. VarioFlow blends a modular design with numerous product options to create a reliable, reconfigurable system. With high chain tensile strength (up to 1250 N) and low chain friction, VarioFlow promised reduced energy use, lower maintenance and longer service life. These product features blended perfectly with the creative problem-solving approach used to create a unique conveyor solution.

Modular VarioFlow 90 and S 160 conveyors were blended artfully to create a full-featured system for efficient transport of food products in wrapped sleeves, plastic trays and cartons—all within existing space

limits. To ensure a well-coordinated system in a relatively small space, designers included both inclining and declining conveyors, alpine conveyors and overhead transport, thus ensuring that packing and other machines would work efficiently alongside or

underneath the conveyors. Oak State's configured guide rails, pinchers, counters and their proprietary electronic control system integrated seamlessly with the modular VarioFlow system.

One of the most critical needs for Oak State was to smoothly merge the flow of cartons, from up to four lines, onto a single descending VarioFlow alpine conveyor—while avoiding time-consuming and costly “traffic jams” that could also damage packages. The fact that all this had to be done overhead, along a catwalk, added to the challenge. VarioFlow modularity made it easy to create a physical merge point, but timing, as they say, is everything. To overcome the challenge, a “batch” or “slug” system was developed in which cartons were released to the main conveyor in groups of ten at a time. Batching the cartons together in small groups made it easy to mesh conveyor speeds and time the process so that one “slug”



Rapid turns and quick mergers in confined spaces, while products are protected from damage, are possible with Rexroth VarioFlow conveyors.

of cartons at a time could be fed onto the descending conveyor and sent to the case packing and palletizing area.

Another key to success was the VarioFlow assisted curve concept. Fitting a large amount of conveyor footage into a small space necessitated sharp curves, which can mean excessive wear, friction and heat on conveyor chains, shortening their life. VarioFlow curves employ small wheels that interact with the chain, keeping it moving and safely away from contacting the inner sides of the extrusion in which the chain runs. The resulting decrease in friction both protects the chain and reduces energy usage by making it easier to drive packages through curves.

But while VarioFlow was the star of the show, a veteran supporting cast—including multiple generations of conveyors dating back to 2005—also helped Oak State reach their objectives. By modifying and re-using



Although it looks a little like a thrill ride, Rexroth VarioFlow conveyors are known for protecting packages from damage.

existing equipment, Oak State saved an estimated \$100,000 versus purchasing all new components. The re-use of existing conveyors wherever possible also helped keep the installation moving quickly and on schedule. Overall, the line upgrade enabled Oak State to increase

capacity by 20 percent, partly through the addition of a fifth wrapper leg to the line.

That schedule was very tight. Counting lead time for pre-fabrication and delivery, Oak State needed the switchover to be completed in just seven weeks, including only four weeks for actual installation within the plant. More importantly, production interruptions had to be kept to a minimum while the operation proceeded.

An innovative parallel approach was used in which new conveyors were built right next to existing, running ones. Individual lengths of conveyor were then switched over one at a time, minimizing interruptions and allowing the tight deadline to be met. Within four weeks, Oak State was more ready than ever before to take on future challenges and increased orders.

Oak State: Ready for the Future

The benefits of the new VarioFlow-based conveyor system go beyond expanded capacity and higher throughput for cartons. Damage to packages, for example, is reduced by streamlined flow and the batch-based merging approach. Smoother conveyor operation means reduced energy use. Maintenance needs are lower, too, due to longer chain life and the fact that modular construction makes it easier to reach key components. Cleaning belts and wiping down conveyor frames, for example, is much more convenient because maintenance staff can easily remove belts and uncouple segments of conveyor. Reduced downtime and ease of maintenance are two of the biggest differences Oak State has noticed since the new conveyors were installed. This



The modularity of VarioFlow applies not only to the ease of installation and reconfiguration, but also to the ease of maintenance and cleaning.

is especially important because space limitations were a challenge in the past, often making it difficult to get to the proper components for cleaning and maintenance. Oak State also estimates an improvement in throughput of about 20 percent.

There's more. Re-using the existing conveyor systems not only saved costs but also materials, time and space, enabling productive use of equipment that might otherwise go to the scrap heap.

Best of all, the flexibility of the new conveyor lines means that Oak State is poised to respond almost immediately to changes in customer ordering patterns and preferences. That includes potential expansion to meet increased demand, and increases in production line speed to meet tighter deadlines. Reconfiguring a line now takes only one or two hours, as opposed to days. Oak State is generally provided with production forecasts, but changes on short notice happen all the time, so the ability to perform rapid adjustments is essential.



Flexibility and rapid response to customer needs are built into Oak State's Rexroth VarioFlow conveyor systems.

It's clear that Oak State represents an excellent showcase for the VarioFlow modular conveyor concepts. Best of all, the new system is likely to bring continued benefits to Oak State, in terms of flexibility and expandability, for as long as consumers continue to enjoy snack foods and desserts.

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