



SHIPPING SMALLER ORDERS, MORE OFTEN AND AT FASTER SERVICE LEVELS

WHY HIGH-SPEED SORTATION COULD BE THE ANSWER

WHAT'S THE PROBLEM?

The relentless growth of today's instant turnaround, 24/7 business and consumer marketplace—driven in part by the success of global overnight delivery services and the demands of Internet-driven e-commerce—has brought about a paradigm shift in the world of logistics and material handling. Distribution and fulfillment operations are being asked to handle much smaller orders

at much higher service levels than ever before. This expectation of speed and lean in-store inventory is stressing retail replenishment operations as well, with demands for multiple smaller shipments per week and POS replenishment overnight. The result is a breakdown of historically successful but rudimentary material handling equipment and processes, and a higher labor content or even expedited capital expenditure on additional facilities with duplicated inventory.

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Traditionally, most warehousing and distribution operations had been organized to receive and store SKUs in pallet or multiple-case quantities and then would process outbound orders via full-case or multi-SKU cartons. In the last few years, these same facilities are being asked to receive/store case quantities and process outbound orders consisting of 1 to 4 units per outbound carton. Further exacerbating the problem is the challenge to send out the same if not more total pieces per day: For a 200,000 operation this means at least 50,000 outbound cartons per day instead of 5,000.

Certain operations rely on seasonal labor to accommodate fluctuating demands, but experience trouble staying ahead of the curve. With an unreliable steady supply of labor, especially during peak volume periods, a distribution center risks falling short of expected service levels.

WHAT'S THE SOLUTION?

Companies are scrambling to update their supply chain strategies to accommodate a trend that has become a consistent reality due to 10 percent annual growth in e-commerce over the last five years. Many have separated operations with the addition of greenfield facilities, or turned to 3PL companies at higher per piece costs; in either scenario, these companies have duplicated SKU inventories to fulfill the separate operations.

Alternatively, there are several companies that have leveraged high-speed loop sortation systems to meet this challenge. Some have added smaller unit or shipping sorters into their existing facility to maintain a single inventory, maximize their footprint productivity and extend the life of their current building. Others jumped further and left their old operations for greenfield facilities that

employ high-speed loop sortation to process both retail and e-commerce orders on the same system, with some extending their ROI by adding return processing, shipping, kitting and rainbow pallet building operations to this single piece of material handling equipment.

Not only is this helping these companies solve their distribution problem, but smart companies are leveraging this to defeat competitors, gain market share, cut costs and even open up new business channels. The Internet consumer does not wait for stock to be replenished; they jump to the next website/company and complete their purchase. If given a choice between receiving an item next day vs. a week later, at the same, less or no shipping charges, the faster/cheaper option is chosen.

In the “brick and mortar” world, smaller backrooms create leaner in-store inventory and push the risk of stock-outs to the distribution center’s ability to replenish based on nightly POS data. Some brick and mortar operations have leveraged high-speed loop sortation to guarantee in-store customers’ free overnight home delivery of out of stock items directly from the distribution center—in essence saving an otherwise lost sale. Most retailers will agree that this type of attention and service creates brand loyalty like nothing else can.

Keep reading to learn more about high-speed loop sortation, its applications and the total value of ownership that this technology can provide, and decide whether it is right for your operation.

BENEFITS OF HIGH-SPEED LOOP SORTATION

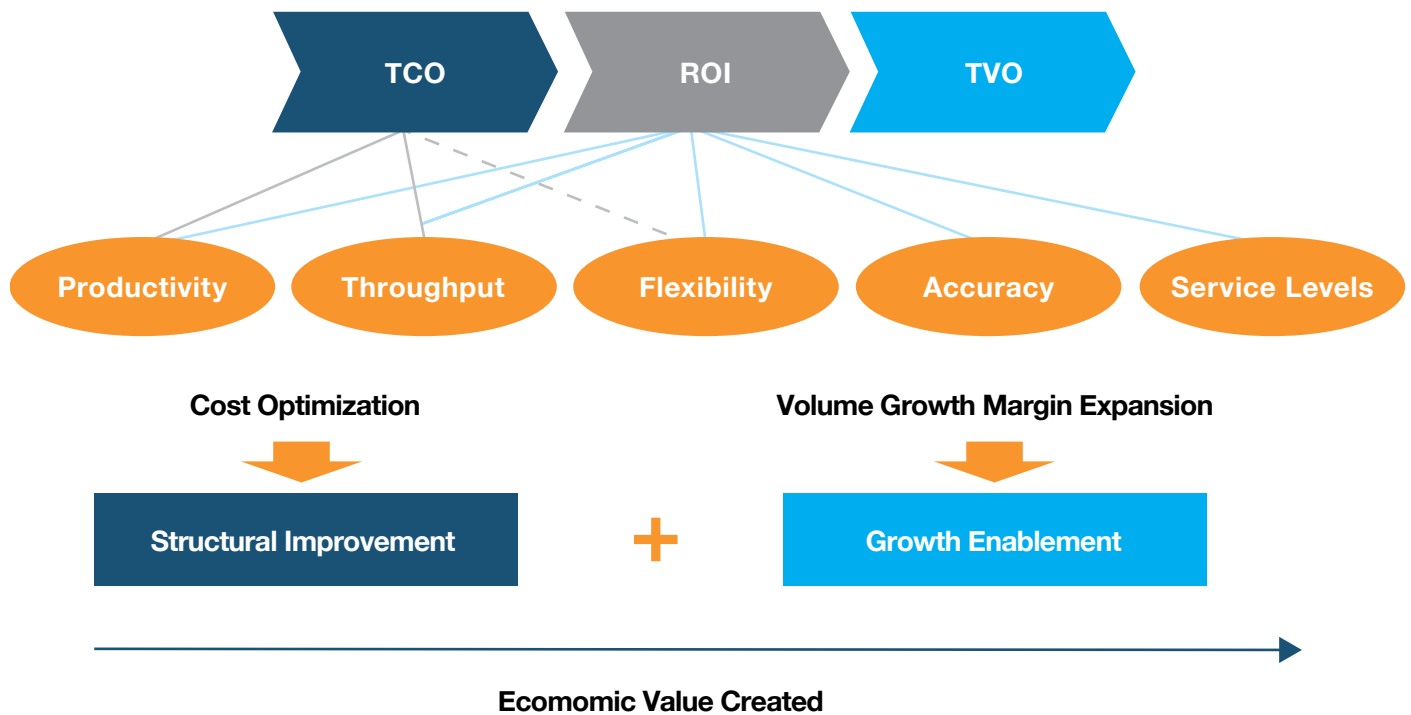
High-speed loop sortation delivers a core set of benefits that can have long-term strategic and competitive value for warehousing operations—those for retail,

wholesale or e-commerce, as well as courier and express delivery operations:

- › Improved productivity—allowing a lower head count and a higher number of units per worker per hour while often eliminating 2nd or 3rd shifts.
- › Increased throughput—moving more volume through a facility each day, increasing the number of goods moved and reducing the number of facilities required to move that volume through the entire network.
- › Greater flexibility—enabling operations to process direct-to-consumer, store, wholesale, returns, receiving and kitting/sequencing on the same piece of capital equipment.
- › Heightened accuracy—providing 100 percent scan and 100 percent track and trace of singulated units, critical for high-security industries such as high value products or pharmaceuticals.
- › Higher service levels—faster response time for order fulfillment, increased ability to respond to unique customer requirements, enabling same day shipping or zone skipping.
- › Reduce dependency on labor—enhances the ability to manage fluctuating labor availability while boosting efficiency.

WHEN AND WHERE IS HIGH-SPEED LOOP SORTATION APPLICABLE?

High-speed loop sortation does more than just divide large batches into smaller discrete orders. It can be used to simplify processes and increase the speed, accuracy and throughput of many “bottleneck” operations—including



receiving/cross-docking and shipping operations. At these stages in the distribution center, a high-speed loop sorter often provides the most efficient and accurate sortation of individual units, case goods and parcels, while moving these items throughout the system with great efficiency, flexibility and throughput, while requiring minimal labor.

The system incorporates advanced data collection and reporting tools, utilizing bar codes, RFID tags and other technologies to provide an integrated, real-time framework for tracking inventory, throughput and productivity. This inherently leads to:

- › 100 percent track & trace movement of individual units
- › 100 percent vendor stock validation
- › 100 percent outbound scanning verification

What kind of distribution operations benefit from today's state-of-the-art high-speed loop sortation? Those that face several persistent challenges that can limit their ability to fully realize their company's potential. Ask yourself some key questions about how your operation is performing:

- › Are there bottlenecks in your distribution center that prevent you from reaching your throughput requirements and service levels? Do your systems lack features that would better align them to your business needs?
- › Is manual sortation leading to increased labor costs? Is adding headcount having minimal effect or even making the problem worse?
- › Are your current systems or processes stifling your growth, preventing you from being as flexible and responsive as today's marketplace demands?
- › Are increased inaccuracies leading to customer dissatisfaction?

- › Are you receiving/sorting/shipping more than 5,000 units per hour in any of these operations? At this volume, considering a high-speed loop sortation system could prove to be a sound financial investment.

Today's most successful retail distribution and e-commerce operations, as well as courier, express and parcel services, are meeting these demands by continually perfecting the accuracy, reliability and speed of delivery, setting broad marketplace expectations. To accomplish these continuous improvements, they are using high-speed sortation systems that support complex material-flow technology with computerized/centralized management, control and reporting. These systems combine the flexibility of dynamic sorting strategies to match ever-changing business requirements, all powered by high-speed sorting functionality capable of handling 4,000 to 40,000 units per hour and beyond.

WHY HIGH-SPEED SORTATION COULD BE THE ANSWER

UNDERSTANDING HIGH-SPEED LOOP SORTATION TECHNOLOGY

The BEUMER Group has an installed base of over 1,400 cross-belt and tilt-tray loop sortation solutions for a wide range of applications that boost efficiency, speed and precision in goods movement and management.

Advanced high-speed loop sortation solutions can be implemented to serve two broad applications:

- › Unit sortation—sorting of individual items for the purpose of order fulfillment, returns, kitting and consolidation.
- › Parcel sortation—sorting of case goods, parcels and shipping bags for the purpose of shipping, receiving and cross-docking.

Although there are a variety of sortation systems that provide solutions for those applications, high-speed loop sortation offers the highest throughputs, accuracy, reliability and flexibility. Industry-leading BEUMER systems are highly customizable to meet specific needs, with a wide range of handled product types and weights.

EVALUATING THE TOTAL VALUE OF HIGH-SPEED LOOP SORTATION

Implementing high-speed loop sortation can be capital-intensive—and this has challenged many material handling and logistics operations: Although they can anticipate the benefits it offers, the costs and time to design, engineer and implement—as well as the core operational and business strategy changes necessary to make it deliver its full value—can create barriers to adoption.

In some cases, by taking a narrow, piecemeal approach to utilizing sortation, businesses will

keep initial costs down; however, their risk will increase in several ways:

- › By just implementing sortation systems on top of existing warehouse processes built around manual sortation, businesses could end up adding headcount and complicating processes, actually increasing inaccuracies and inefficiencies;
- › Businesses may not be strategically positioned to use their sortation investment to respond to growth in demand for individualized unit delivery, new market opportunities or other changes, leaving them at a competitive disadvantage.

Traditionally, measuring automation return on investment—ROI—has been based on a limited economic model: add up system costs (initial cost, operational cost, spare parts and maintenance) and then compare them against anticipated return (reduced headcount and increased throughput/productivity for lower cost-per-unit handled) for example.

However, in an ever-changing marketplace, the businesses that consistently outperform the market do so by ensuring that capital investments cascade down from overall business strategy—including both financial (cost structure and working capital improvements) and market (brand growth, share gain and development/penetration of adjacent markets) strategies.

Successful companies are finding that this approach strengthens their ability to fully integrate automation technology decisions into company strategy and assess the total return/value that those investments deliver—an approach called total value of ownership, or TVO.

Productivity



Throughput



Flexibility



Accuracy



Service Levels



A TVO approach demonstrates that benefits beyond the structural improvements of increased unit/package volume growth and increased profit margins are accounted for in the long-term growth strategy. BEUMER has developed a process for assessing the TVO of high-speed loop sortation for material handling businesses. This process utilizes proven models that accurately predict both near-term returns (by improving productivity with reduced direct labor and increased throughput) and profitable long-term growth.

TVO OF HIGH-SPEED LOOP SORTATION: A REAL-WORLD SUCCESS STORY

BEUMER has successfully applied the TVO model to help a number of companies validate the investment in high-speed loop sortation solutions—companies that had previously built their operations around traditional logistics models.

Oriental Trading Company (OTC) is the nation's largest direct-to-consumer retailer and distributor of value priced party supplies, toys and novelties. OTC underwent a major upgrade of the systems that run their 750,000-square-foot distribution center in La Vista, Nebraska.

An expanding product offering and high volume of product moving out of the distribution center each day fueled the need for OTC to improve their sortation system with productivity and order accuracy as the critical success factors. The solution: a BEUMER tilt tray sorter which feeds their 600 packout stations and was configured to efficiently support up to 50,000 active SKUs and a capacity to sort over 400,000 units during its peak day.

BEUMER's double-density tilt tray sorter offered key advantages to OTC in throughput, productivity and business efficiency:

- › Higher productivity: 45 percent increase with 79 million units picked and packed in 2011
- › Higher throughput: The double density design made it possible to double the sorter system capacity, enabling sorting over 43,000 units per hour.
- › Better footprint: Optimized chute width and floor space of the existing distribution center—more packout stations in the same footprint — no need to expand facility or buy new warehouse space.
- › Higher accuracy: From 99.25 percent to 99.93 percent

The result: OTC achieved higher throughput, productivity and accuracy. It also increased efficiency of its “explode and assemble” process, reduced floor space and improved order processing flexibility by working with

BEUMER to choose a system for its distribution center upgrade.

HIGH-SPEED LOOP SORTATION: FOR FUTURE GROWTH AND TOTAL VALUE

The decision to utilize high-speed loop sortation to maximize the growth potential of your business depends on making the most effective assessment of the total value it offers your business, in the near-term and the long-term. In every major functional area of today's distribution center—receiving, order fulfillment, shipping, returns and consolidation—high-speed loop sortation has had a transformative effect on business performance, flexibility and long-term value.

BEUMER has found that using a TVO approach to analyzing investments in automation technology can provide a much stronger and more strategic tool to drive investment decisions in your business—for our customers serving every segment of today's logistics business.

To be successful, your business needs to:

- › Ensure that capital investments cascade down from overall business strategies—including financial strategies (e.g., cost structure and working capital improvements) and market strategies (e.g., customer retention, share gain and penetration of adjacent markets).
- › Expand investment focus to include cost reduction and process, technology and service innovations that drive growth by creating greater value for you and for your customers.
- › Make certain that your system vendor invests the time and resources to understand your strategic objectives—and then creates a solution aligned with those objectives.

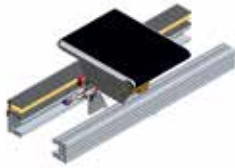
ANOTHER EXAMPLE OF A REAL-WORLD SUCCESS STORY BY A LEADING APPAREL RETAILER

In order to support significant annual sales growth, Chico's FAS, Inc. automated its DC-2, enabling flexibility and the integration of both retail store replenishment and direct to consumer (DTC) order fulfillment from a single facility. At the heart of the operation — an 840 foot BEUMER Belt Tray Sorter. To learn more, view video: BEUMER Cross-Belt Sortation System at Chico's Distribution Center. <https://www.youtube.com/watch?v=vEJECJ37j-U>.

- › Consider how our 24/7 global marketplace makes dramatic demands on today's logistics and material handling operations—and just as importantly, how these demands offer opportunity for new growth by those businesses with the vision to make strategic automation investments now. High-speed loop sortation offers a fundamental strategic resource that can transform the performance of your enterprise and equip it with a technology whose total value can be effectively measured, both now and well into the future of your business

APPENDIX

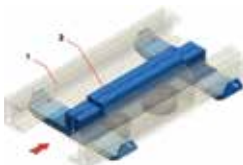
HIGH-SPEED LOOP SORTATION TECHNOLOGY DEEP-DIVE



Cross-Belt Sorter



Tilt Tray Sorter



Linear Motor Drive

BEUMER provides two main types of high-speed loop sortation systems, with several specific subsets. Choosing the right sortation system depends on the product type and handling requirements for customer-specific operations.

› Cross-belt (single and dual belts per tray): These platforms utilize an individually powered belt conveyor, or belt tray, instead of a tilt mechanism, providing the highest level of product control. Compared with a tilt tray, cross-belt sorters provide gentler product handling due to the belt-to-belt transfer, as well as increased accuracy due to the positive item discharge. BEUMER cross-belts are the industry-leading cross-belt sorters using proven adaptive discharge profiles, which result in the highest sort accuracy in the smallest footprint.

› Tilt tray sorters (electrical tilt, mechanical tilt, double-density): Products are inducted onto individual trays (wooden or plastic trays) which tilt at the discharge point, causing the units or parcels to slide off into the destination. Economical and robust mechanical tilt trays use a single discharge tipping rail, while electronic tilt trays can be tilted on command with variable discharge profiles that dynamically adjust the timing and discharge speed based on the product type, shape and location on the tray. The tray itself depends on the customer's application: wood tray, wood tray with ribs, tub tray with collapsible side for round items and butterfly tray for handling cylindrical items. BEUMER also offers a double-

density mechanical tilt tray sorter that features two trays that tilt to opposite sides of the sorter, doubling the system's throughput with the same footprint.

› Choosing between sorter types should be based on the product type and handling requirements for customer-specific operations. Every client's product, order demographics and outbound carton packing requirements are unique, and as such require a customized solution. BEUMER's experience with over 1,400 systems installed worldwide is unparalleled in the sortation industry.

› Unique to the industry, BEUMER's patented contactless energy and data supply increases uptime while significantly decreasing maintenance labor. Each belt tray or electronic tilt tray has its own high-efficiency motor with non-contact power supply. All motors are individually powered, thus eliminating the master-slave configuration. Cross belts and e-trays offer the highest tray availability, with low maintenance requirements, thus maximizing overall sorter utilization.

POWER:

› Non-contact asynchronous linear motor drives propel the sorter without any contact between the motor and the sorter carriage.

› Newly developed OptiDrive sorter drives utilize high-efficiency AC motors to power the sorter with two small wheels, providing significant reduction in energy.

INDUCTIONS:

State-of-the-art BEUMER inductions include camera-based item detection, continuous product position learning on the induction belts and highest sustained rates and accuracy. This is required for clients to have the flexibility to meet the operational peaks and valleys of their operation. There are three types of inductions to place product onto a loop sorter:

- **Manual inductions:** in which an operator physically places units directly onto moving sorter trays. Overhead scanning or item detection assigns item data to the trays. Manual inductions are the least expensive induction method and allow for the induction of non-conveyable items and exceptions handling, with rates averaging approximately 900 units per hour (uph).
- **Semi-automatic inductions:** in which operators place items on a laydown belt which is automatically conveyed onto the sorter trays. Single or multi-feed lines can sustain induction rates of 3600 uph, with 1800 uph sustained per operator.
- **Fully automatic inductions:** have no human interaction and pull gaps between items before conveying directly onto the sorter at sustained rates over 4000 uph.

DESTINATIONS:

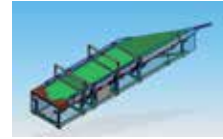
Destination design needs are unique to each client, and determine the long term success of a loop sorter system. From simple slide discharges or direct to tote, to complex multi-level dual chamber destinations and fragile item brake belt chutes, BEUMER engineers all chutes specifically for each operation. Successful

design is a combination of detailed engineering and the art of applying the experience of 1400 sorter installations. From glassware, to apparel, to brake rotors, a destination can be designed to meet specific needs. Post sort operations must also be considered including multi-order post sorting, order packing and fragile/small item packaging.

SOFTWARE:

High-speed sortation systems require highly evolved sortation control software (SCS) to minimize recirculation, maximize throughput and convert bulk picked product into complete orders ready for packing. The faster a sorter destination “turns over,” e.g., all product complete, the more times it can be used in a given period, which maximizes the usage of this capital equipment. BEUMER SCS is proven and tested over 30 years and hundreds of installations, providing a low-risk solution with a feature-rich offering to meet varying business needs. Powerful, user-friendly interfaces and real-time reporting allow for labor adjustments, inventory redirection and exceptions handling based on the realities of the warehouse floor. BEUMER’s extensive experience with all of the world’s leading WMS and WCS providers has resulted in robust systems seamlessly integrated into the full logistics solution.

BEUMER high-speed loop sortation systems satisfy three crucial requirements of high-speed sortation: the highest sorting capacity, the highest accuracy and the highest system availability. Every customer’s needs are different, so it’s important to find a sorter manufacturer that provides a customized solution based on throughput levels or productivity needs and accuracy criteria.



Semi-automatic Induction



Automatic Induction



Example of Destinations



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