The Essential Guide to Choosing a Sortation System for Your DC

Everything You Need to Know before You Decide

Presented by Conveyco
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If you work in the materials handling or order fulfillment industry, chances are good that you are constantly on the lookout for ways to increase the efficiency of your warehouse or distribution center.

And that makes sense: Increased efficiency means a fatter bottom line, and that’s something we can all get behind.

Implementing a sortation system in your facility if you do not yet have one, or upgrading an old system, is a relatively easy way to boost your efficiency.

Because sortation has the potential to touch literally every part of your business, making just one change there can lead to a slew of benefits down the line.

Here, we'll discuss:

- The importance of sortation to your operation
- 4 important questions to ask yourself before choosing a sorter
- How your specific application will impact your sorter choices
- The pros and cons of the most popular types of sorters
- The various factors that impact sorter cost.

Read on to learn more about how sortation can impact your bottom line and how to successfully gauge your options in selecting the right sortation system for your operation’s needs.
If you want your order fulfillment operation to be successful, you must embrace wringing out every possible gain in this area of your business. There are really no two ways about it: If you are inefficient at any step in the fulfillment process, then you are either wasting time or you are wasting materials, and in both cases that means you are either wasting valuable resources or missing out on potential profit.

Chances are, you know exactly how efficient you are at the big stuff—how competitively you procure your goods, how many items you can churn out in a shift, how many orders you can process in a week. But are you paying attention to the efficiency in your sorting?

**Sorting Impacts Everything**

Though the word “sorting” might only conjure images of your order processing operations to mind, the truth of the matter is that sorting has the potential to impact every aspect of your business.
In fact, if you are not appropriately sorting at each of the following steps then you are building inefficiencies right into your workflow. Here are some examples of how you can use sorting each step of the way:

- **Receiving:**
  - **Return Processing:** Items can be sorted out for return to stock or putaway.
  - **Putaway:** Allows trailer-loads of mixed SKUs to be received and easily broken down so that items can be palletized with one touch prior to being put in reserve storage.

- **Picking:** In split-case picking there may be many different areas to be picked from, so a sorter is used to route cartons/totes into the proper zones.

- **Packing:** The right sortation system can be used to consolidate multiple orders within the same pack station so that they can be shipped in the same carton. A sorter can also be used to route split-case orders to specific types of packing tasks based on the type of shipping container required (polybags, cartons, gift wrapping, etc.).

- **Shipping:** Orders can be sorted by LTL, small package, or other carrier or service methods (more on this below).

If you are not sorting in each of these steps, then you are doing all of these tasks manually. And that can only mean one thing: You are wasting time and money by not embracing the benefits of sortation.

## Avoid Wasting Time and Money

If you are not allowing a sortation system to help you more efficiently pick and process your orders, then that means you are relying on human workers to perform those tasks for you without the aid of technology that can make the job easier and more efficient.

That may drive up your costs on two fronts. The staff requirements to do by hand what could be done with the aid of technology not only adds manpower costs and the related overhead, but also introduces more opportunity for human error, which requires increased intervention further down the line.
If your order fulfillment operation doesn’t make use of any kind of sorting, then your workers are picking orders by hand, likely one order at a time. This means that pickers are walking lengthy pick-paths/travel paths and picking orders to carts to then bring back to be processed, packaged, and shipped.

All of this walking, of course, adds up to a lot of wasted time: Walking and manually picking orders accounts for more than 50 percent of the time associated with picking.

If you had a sortation system in place, you could cut down on a lot of this wasted time, boosting your productivity and lowering the number of workers needed to get the job done.

Imagine a worker being able to go down a pick-path and pick items for 30 different orders at once. By then feeding those items into a sorter, the sorter can parcel everything out into the respective order.

This can reduce the time your workers spend walking each day by up to 40 percent, decreasing the picker’s time per order, reducing labor hours, and allowing you to move workers to other areas of higher value work.

Then of course there’s the question of what happens during your peak times of the year. Though you may be able to employ only 30 or 40 full-time workers for 10 or 11 months out of the year, chances are that you regularly find yourself in the throes of a seasonal uptick in demand (such as around the holidays for retail workers).

To keep up with this increased demand during the holidays, many retailers need to hire additional pickers to process orders, sometimes to the tune of several hundred hands. Amazon has been known to build “camps” for its seasonal workers but many fulfillment operations are not as fortunate and struggle attracting sufficient amounts of quality workers each year.

All of those additional workers, even though they are only temporary, easily bite into the profits that your operation can retain. It’s hard to increase your bottom line when such a large chunk of your extra revenue
each year needs to go towards paying your temp or seasonal workers. Seasonal workers are also less likely to be as invested in the success of your operations as a whole, and as such are more likely to make mistakes that can cost you revenue and customers down the line.

With an adequate sorter, though, even a seasonal uptick in demand can be met with fewer additional hands for picking. Because the machine does the bulk of the processing work, the staff you currently have on hand is more likely to be able to pick up the slack.

Even if they can’t handle everything, the number of temp workers that need to be hired is likely to be lower if you have a sorter helping to keep things efficient.

**Sorting and Shipping**

Sorting impacts more than just picking and processing: It can also have a huge impact on shipping as well. Shipping orders is one of the most critical steps that any supply chain needs to master. Unfortunately, it can also be one of the most costly business expenses.

Of course, customers want their orders fast—if you can’t deliver when they want it, they’ll go elsewhere.

Being slow to deliver goods will cost you sales. Reducing your total order cycle time is one way of driving this number down and retaining customers, but your timeline will ultimately always be limited by the geographical space between you and your customers. Not much you can do there, right?

Wrong.

A sorter can help you cut your delivery time in many instances by helping you shave days in transit.

An effective sortation system can allow orders to skip pre-parcel hubs by presorting groups of orders that allow for fewer days in transit (called zone skipping).
This means that your customers get their items faster, which keeps them happy and likely to come back in the future. A happy customer is a customer that’s going to spend money.

**Getting Back on Track**

We all know that efficiency matters. The more efficient you are every step of the way, the more profitable your operation can be.

But what’s the point of running a highly efficient order fulfillment operation if you don’t embrace the power of sorting to make your picking, order processing, and shipping as streamlined as possible?
With technology advancing as rapidly as it has in recent history, a system as little as 5 years old can be substantially out of date—costing you efficiency and, ultimately, money.

Unfortunately, making a decision about changing your sortation system is never as clear-cut as a simple yes or no question.

Getting this decision wrong will cost you a lot of money to correct, so you need to put in the groundwork before pulling any triggers.

Beyond a desire for change, you need to be able to answer a number of questions that will help you determine the pros and cons of switching systems, as well as which sortation technology is the right fit for your business.

1. What are my goals with regard to implementing a new sortation system?

Before landing on any specific type of sortation system, you will need to fully understand why exactly you are looking to make a change.

Do you want to increase your speed and accuracy, reduce the number of human touches within your process, free up floor space, expand your production, or achieve some other objective? Understanding your goals will help you land at the right final decision when selecting your system.
2. How will the characteristics of the products I distribute impact the type of sorter that will be most successful in my operation?

There are many sortation systems on the market today. Unfortunately, they don’t all work with any product.

Product specifications (including geometry, weight, and rigidity to name some) can have a real impact on whether a particular system will work for your operation.

You need to know if a particular system can handle the product that you create or the orders that you ship.

Pro Tip: To assist in this process, keep accurate item master data that includes the geometry and weight of all products along with their velocity over time.

Additionally, those same metrics for outbound shipping cartons (and bags or envelopes, if used) are equally as important to have available to ensure the full range of materials to be handled can be included in the evaluation.

3. What is the peak rate that the system will need to accommodate?

If you are looking at a new sortation system, chances are you want to increase the efficiency of your operations.

The sortation system you select as a replacement needs to at least meet the peak rate that you experience with your current system.

(If it can’t meet that rate, then making a switch is liable to cost you money instead of earning you more of it due to unexpected overtime, downtime due to jams or other mechanical problems that are preventable through proper design and application.)
Know your current peak rate and make sure that any system you select will improve upon it instead of hindering it.

**Pro Tip:** It is important to consider not just the average rates to be shipped or sorted over the course of the day, but also surge rates.

For example, an e-commerce business might ship upwards of 80 percent of their orders in the last 2 hours of the day, depending on how late they decide to accept orders for same-day shipment.

If you offer this or a similar service to clients, the system design must account for that throughput requirement and not simply meet averages.

4. **Do you expect your operation will grow substantially in the years after installing the new system?**

If you expect substantial growth in throughput or destinations, this could potentially impact the type of system you select today. Either you will need a modular system, which can be expanded as needed, or you will need to select a non-modular system that can accommodate the growth that you expect in the future.

**The Bottom Line**

Moving to a new sortation system is not a decision to be made lightly. It can be a substantial investment, and as such it deserves your attention and time.

Before trying to decide which system is right for you, sit down with your team and answer the questions above. Doing so will help you to more easily rule out the systems that don’t work for your business so that you can more quickly land on a system that does.
Deciding that you want to implement a new sortation system in your materials handling or order fulfillment operation is a big decision, and one that can be a bit overwhelming.

In addition to understanding the various pros and cons of different sorters and how your unique operation will impact the sorter that you choose, you also need to think about the particular application that your sorter needs to fulfill.

**Important Metrics to Consider**

Before you start worrying about different applications and how they’ll impact the sorter that you ultimately choose, it’s important to consider the different metrics that will drive the entire sortation design.
These metrics will influence much of the decision-making process:

- What is the material to be handled? The size, shape, fragility, rigidity, and weight of your product will play a large role in determining what sortation system will best fit your needs.

- What is your production rate? How fast (in units per minute) do items need to be processed? Are there peak times of day or customer-driven peaks as a result of same day shipping that increase the actual processing rate required of your system?

- How many destinations are required? Once your items are sorted, where do they need to go? How many different destinations are required? Though some outbound shipping applications only need a handful of destinations, store distributions might have several hundred chutes branching off of a single sorter. This number will impact the layout of your sorter, so it pays to consider all possibilities.

- Do you have any space considerations? How large is your operation/how constrained is the sortation system going to be? Will it be a loop or a linear system? Some sorters need more space than others, so this metric is something that will impact your final decision.

How Application May Impact Sorter Decision

It makes sense to think that application will have an impact on the sorter that you choose. And it will: Depending on your application, certain sorters may be inappropriate for your system concept while others may be more ideal given some of the criteria listed above.

The decision as to which sorter to apply to a concept usually isn't black and white where it can be said that “X sorter is best for Y application.” As with everything else in materials handling and order fulfillment, the truth is a little more nuanced, and dependent on multiple variables that impact one another and the ultimate choice as to which sorter is the RightFit. Here are some things to keep in mind when you are picking a sorter for different applications:
Receiving

If you are selecting a sortation system for your receiving needs, you will need to know the number of inbound trailers that will need to be unloaded simultaneously and the number of destinations that will be required to sort out the inbound work for putaway or other processing.

Packing

When selecting a sorter for your packing needs, you’ll need to be aware of the number of different types of stations required along the route. This will include both standard stations (repackaging, bagging, etc.) and extras like gift wrapping and value adding. You will also need to know the number of stores to be processed per wave or specifics about what type of unique packaging considerations exist.

Shipping

When selecting a sorter for your shipping needs, you should know the number of pallet build locations required for your operation or the number of trailers that will need to be loaded simultaneously.

Planning for Tomorrow

Any successful system implementation requires a serious amount of preparation; selecting a new sortation system is no different. In addition to understanding how certain metrics will drive the sorter that you ultimately choose, it is critical that you consider your needs tomorrow and not forget about scalability for the future.

Leaving expansion in a system for more destinations or to accommodate a growth in the business to the greatest extent practical is key in designing these systems. The goal is to design in a reasonable amount of growth while not overbuilding today and over-investing in idle capacity that goes unused for too long before it is needed. Your systems integrator can help you objectively review which sorters by which manufacturers make sense for your operation today and tomorrow.
Pros and Cons of Popular Sortation Systems

Below are the pros and cons of three of the most common and popular sortation systems used in order fulfillment and materials handling (Pop-up Wheel Sorters, Sliding Shoe Sorters, and Tilt-tray/Cross-belt sorters).

This information, along with knowing the answers to some common questions related to your sorting needs, will help you come to a more confident decision when selecting the sortation system that is right for your operation.

Pop-up Wheel Sorters

This popular sorter consists of wheels or rollers embedded in a belt conveyor which “pop up” to lift or transfer items at an angle to another downstream conveyor.

**Pros:** Pop-up Wheel Sorters require a relatively low investment of capital compared to many other sortation systems. The system is modular, allowing for sections to be added and removed quickly as needed.
**Cons:** This type of sorter has a low to medium sorting rate, which can limit the maximum throughput for an operation. Because the system does not offer a positive divert, the types of items that it can handle are limited.

**Sliding Shoe Sorters**

Sliding Shoe Sorters consist of a “shoe” that is attached to the conveyor surface that positively diverts items onto an aftersort conveyor. This type of sortation system is fed by a single stream of products merged from multiple areas of a building upstream. Sliding Shoe Sorters are a popular choice for shipping needs.

**Pros:** Sliding Shoe Sorters can handle a higher peak rate (anywhere from 20 products per minute to hundreds of products per minute, depending on product size and weight). Because of the mechanics of the system and its positive divert, a wide range of materials can be handled.

**Cons:** This type of sorter is relatively expensive compared to other sortation systems. It also has fixed divert centers, limiting flexibility of the system, and produces a fair amount of noise, which can be a health and safety hazard for your workers.

**Tilt-Tray and Cross-Belt Sorters**

Tilt-tray and Cross-belt sorters are different, but similar, and as such are often lumped together in discussions about sortation systems.

A Tilt-tray sorter consists of trays mounted to carts which run on a continuous-loop conveyor. These trays “tilt” and transfer products into a chute when it has reached its sorting destination. Items are inducted either manually or automatically onto the trays via induction stations at multiple locations throughout the loop.

Cross-belt sorters consist of motorized belt conveyors mounted to carts running on a continuous loop. Like tilt-trays, cross-belt sorters transfer items into a chute when it reaches its sorting destination.
**Pros:** Tilt-tray and Cross-belt sorters offer the highest sorting rate when compared to other sortation systems. They are also capable of handling the most diverse range of product types, making them ideal for operations which handle many types of product. Low noise levels make for a safer and more comfortable working environment for personnel.

**Cons:** The biggest drawback to these sorters is cost: They typically have the highest price when compared to other sortation systems.

**One More Quick Comparison**

Before you make your final decision on which sorter you ultimately implement, it is helpful to see how the different types of sorters compare on one key metrics: Cost per destination.

It is much less expensive to add destinations to certain types of sorters than it is to others. For example, each destination added to a cross belt costs much more than a destination added to a pop-up wheel sorter. This is largely dependent on how complicated the technology behind each type of sorter is.

**Cost per Destination**

![Image courtesy of Intelligrated](image-url)
It’s no secret that implementing a new sortation system in your warehouse or DC can be costly: It’s a big investment, but one that offers tremendous ROI by increasing the efficiency of your order fulfillment or manufacturing operation.

Because cost is such an important consideration, it’s important that you know all of the factors that can impact the final cost of your new system, especially if you have a tight budget or need to request funds for the project.

To help you determine where on the cost spectrum your new sorter is going to fall, here are four factors that can impact the cost of your system.
1. Length/Size of the System

The length or size of your new sortation system will impact final costs in a number of ways. Longer systems obviously require more beds and material to construct than shorter systems, which drives up cost.

They can also take more time and effort to implement, which drives up the labor cost of the project. There is no wonder that sortation equipment has the highest per-foot cost of any other type of conveyance.

In addition to these obvious correlations, longer systems may require multiple drives to keep product moving from Point A to Point B (this will depend on both the length of the system and the divert centers for the specific type of sorters).

Though a sorter’s length will often be driven by your building’s layout/footprint and the number of physical diverts required in the system, a skilled systems integrator will be able to optimize your system’s layout and ensure the application is the best value for your operation.

2. Type of Sorter

Ultimately, the type of sorter that you select for your warehouse or DC is also going to have a direct impact on the cost of your project.

Pop-up Wheel

This type of sorter has a low to medium sorting rate, which offers the lowest level of investment among sortation technology.

Sliding Shoe (and other flat-top sorters)

Because of the robustness and rate this machine can provide it is significantly more costly than pop-up wheel and other lower rate alternatives.
Tilt-tray and Cross-belt (and other loop sorters)

Tilt-tray and Cross-belt sorters offer the highest sorting rate when compared to other sortation systems and are capable of handling the most diverse range of product types. This capability makes these technologies the most expensive type of sortation systems.

3. Number and Type of Diverts/Destinations

Sortation systems can vary pretty significantly based on the number and type of diverts that are required for the operation.

Your DC may require the capability to sort directly onto a truck through the use of extendable conveyors which extend into 53’ trailers and eliminate the need for walking while loading. Other sortation systems may require an assembly chute.

For example, on a tilt-tray system in a packing operation, a chute allows for the collection and accumulation of units until such time the order is
complete and ready to be packed into a carton for shipment. A system with a greater number and variety of diverts will cost more because it requires more time, effort, and materials to implement than a system with fewer and less-varied diverts.

4. Required System Throughput

Your warehouse or DC’s required throughput will depend largely on the circumstances of your operation.

The rate of sortation required will impact the cost of your system, with high rate systems (400–500 pieces per minute) necessarily costing more than low rate systems (fewer than 50 cartons/items per minute).

Systems with higher handling rates require specialty induction systems in order to optimize the gap between parcels as they enter the sorter, and to minimize the gap (or air) in an order, which consumes capacity.

Know What to Expect

Budgeting for any large project is always easier when you know what will impact the final costs.

When it comes to implementing a new sortation system for your Distribution Center, everything from the length/size of the system, to the type of sorter applied, to the quantity and types of diverts, to required throughput will have an impact on the ultimate cost of your new system.
Thank you for reading our guide on selecting a sortation system for your distribution center—we hope you found it informative.

If you’d like to learn more about Sortation, AS/RS, or other solutions for your order fulfillment or materials handling operation, let’s have a conversation.

Book A Consultation