THE ULTIMATE GUIDE TO CREATING A FLEXIBLE AUTOMATION CONVEYOR APPLICATION SOLUTION

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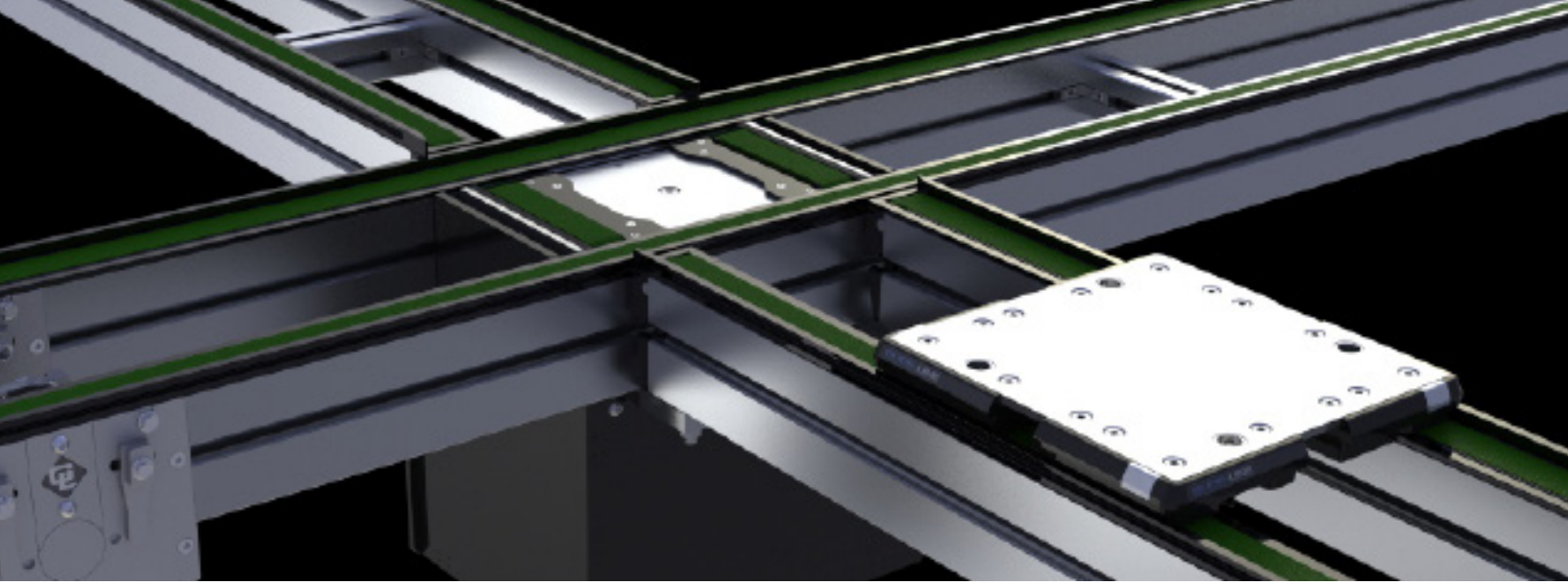


INTRODUCTION

Conveyor flexibility in an automation application is the freedom to modify or configure an existing standard product instead of customizing a solution from scratch. Flexible solutions will take less time to engineer, manufacture and assemble, are less costly, and can often accomplish your goal in a more efficient manner without compromising the design.

You may be wondering, 'why use a conveyor at all?' Instead, you may be considering highly customized equipment using dial tables, particularly if your client manufactures very high precision or high-rate based applications in the electronics, medical devices, or other assembly-based products.

But technically advanced pallet-based conveyors, when you're partnering with an expert in flexible conveyor designs like Glide-Line, can be designed and configured to handle fragile precision products as well as sturdy, robust products. You may have worked with more traditional conveyor manufacturers in the past; in that case, you'll be used to compromising your design to fit a standard available conveyor. Or worse yet, you may be accustomed to paying for costly customizations to fit exactly what your client needs.

Our goal in this ebook is to present innovative conveyor options capable of meeting or exceeding your expectations of a conveyor alternative or of a traditional conveyor system. Think outside the traditional belt when it comes to your designs, space, functionality, and capabilities for your automation conveyor application solutions with our ultimate guide.

CHAPTER 1

The Big Conveyor Problem

The Inherent Problems with Engineering a Conveyor in Your Customer's Application Solution

Traditionally, conveyors cause inherent obstacles around the machines they are automating. Because they can hinder movement within a manufacturer's space, they require you to design the machine around the conveyor itself. This compromising shows up in a number of places: from the conveyor you select, the options available to modify it, the access points, and even the design process itself.

There are also inherent issues on the manufacturing floor itself with conveyors. Floor space, maintaining control of the product, added costs to accommodate standard conveyor options in a non-standard space – all of these conditions can lead to additional compromise.

Compromising on Conveyors & Their Parts

If a machine is being designed, special care is taken to design around the conveyor and its drive. Typical conveyor drives and cross members cannot be moved in the design process. Later, we'll explore a flexible option where you're able to control this.

When designing with a pallet-based conveyor system, one hindrance is it can only be used at certain speeds due to the mechanics of stopping a pallet, singulating it, getting it into position, and locating it. Other styles of indexing conveyors can be faster as there are fewer steps during this stop/start process.

Finally, a machine builder must design around the maintenance access points of the conveyor. Service will be required at some point during the life of the application, and it's important for the client's maintenance team to be able to quickly and easily access all areas where adjustment may be necessary.

Issues in the Design & Sales Process

The engineering process required to design a conveyor system using typical configurators is also a point of contention. Not only is there a lack of flexible, configurable options on the market today, but typical configurators lack the flexibility necessary to create and design solutions quickly. It's difficult to get accurate and timely information, pricing, and models, and each design change requires a conversation with a salesperson and documentation trading back and forth, no matter how small the change.

These compromises throughout the concept or design engineering phase of building an automation conveyor application solution may not seem like a big deal because you've acclimated to this environment and accepted it as the norm. But modifying your optimal design to accomodate things you currently know exist in the market isn't the way to go. Instead, keep reading to explore new ways to add flexibility and creativity into your automation conveyor application solutions.

CHAPTER

2

Enter:
Flexible Automation Application Solutions

What We Mean By "Flexibility"

Conveyor flexibility in an automated conveyor application is the ability to adapt an existing standard product as opposed to building and customizing a solution from scratch. Flexible solutions fit multiple needs, take less time to engineer, manufacture and assemble, are less costly, and can often accomplish your goal more efficiently without compromising the design.

As our founder Kevin Mauger puts it, "Flexibility means we have the ability – and desire – to adapt to our customers, to do things that haven't been done, to break the rules. Our goal is to be a great partner to you, to be the easiest part of your project, and even help you win business with creativity and ingenuity."

Flexibility means we have the ability – and desire – to adapt to our customers, to do things that haven't been done, to break the rules.

As a result of our commitment to flexibility in our conveyors, we're able to be much more collaborative with applications engineers and designers. We're not tied to the norms in conveyor solutions; we're able to break boundaries in design and technology, bend rules in conveyor manufacturing, parts, and assembly, and inspire unique solutions for our customers. Let's dive into these flexibility options.

Traditional Conveyor Rules We've Bent

Rule 1: You must design around maintenance access points.

Innovations in conveyor belt applications have been made in recent years. Instead of disassembling entire parts of conveyors to access the underside, Glide-Line's conveyors are easily accessible by simply removing and reinstalling the belt from the top of the conveyor. Belt replacement is significantly faster and easier than all other methods. Maintenance mechanics love this, pure and simple – and this gives designers much more freedom when designing any peripheral equipment.

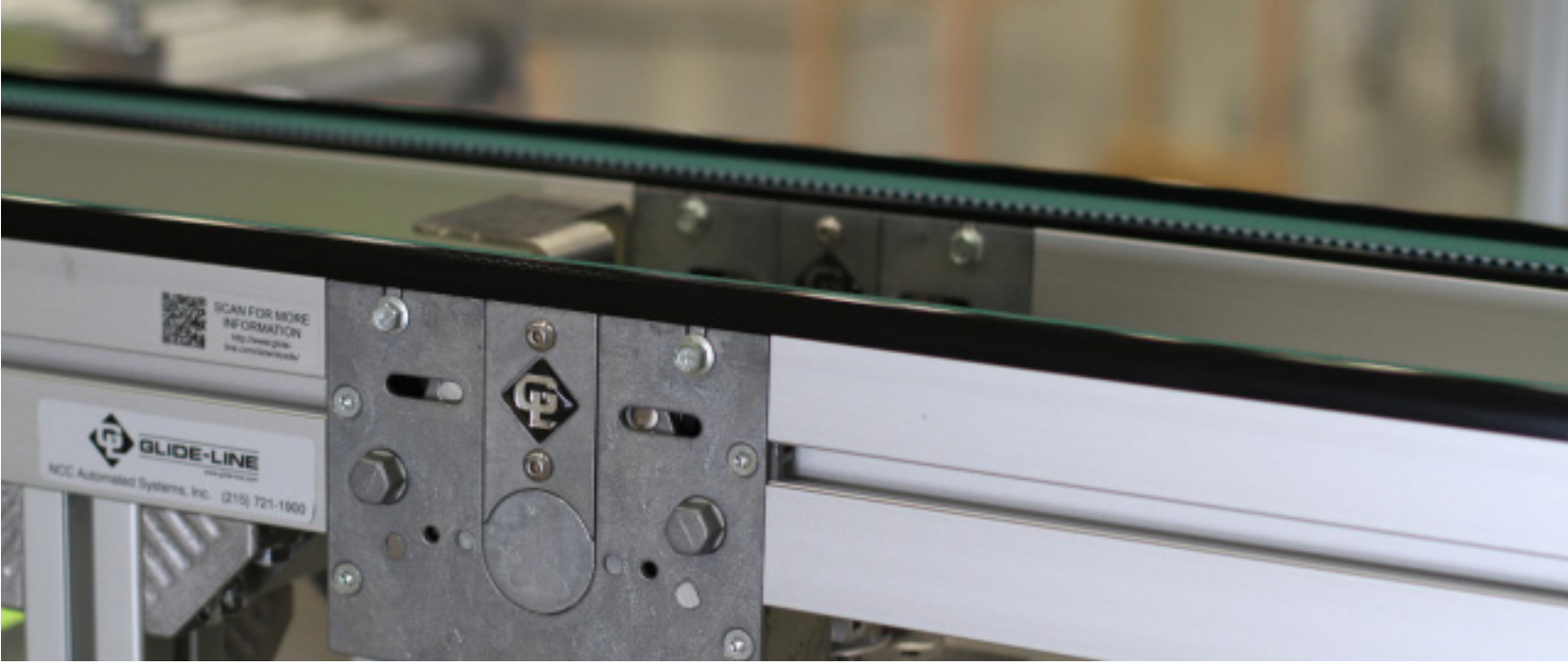
Rule 2: You must engineer machinery around the conveyor and its parts.

We have removed this rule altogether by standardizing products configurable to any situation or need, leading to faster lead times, faster assembly, and lower costs. We collaborate with our clients' applications engineers and understand their needs – far more than they expect us to! The variety of parts available, the flexibility of our conveyors, gearboxes, motors, and additional parts, means you're no longer held back by "standard" conveyors available. Creativity can dictate your design. Your conveyor is bespoke, designed specifically by you, for your client alone, and there is never another exactly like it.

Customer Story: Top Access VTU, a Modified Standard

When a customer wanted to precisely locate products on a vertical transport unit, we configured the VTU to be open-ended on the top side. Their automated assembly process could continue to perform at any height their process required.

We implemented a servo-based timing belt driven 360 vertical transport unit and incorporated a lift and locate device onto the conveyor deck to create an open-top style of VTU for access by a robot. This flexibility wasn't available through any other conveyor manufacturer unless it was custom-made; with our product line, this a slight modification to our standard design, without compromising on our client's side.



Rule 3: Configurations of a conveyor design must involve engineers from the manufacturer.

Customizing a conveyor typically drives the process through a manufacturer's engineering department to design and detail customized parts not stocked. This all contributes to longer lead times and higher costs. In most cases, this is not the case with Glide-Line. Using our IMPACT! configurator technology, the only engineers required are your own. You're able to design, update, and change any conveyor solution you create, pair it in SOLIDWORKS, and receive instant updated model numbers and pricing – all without consulting an engineer from our manufacturing team. This configuration drives our manufacturing process and we've skipped a time-consuming step, saving time and cost.

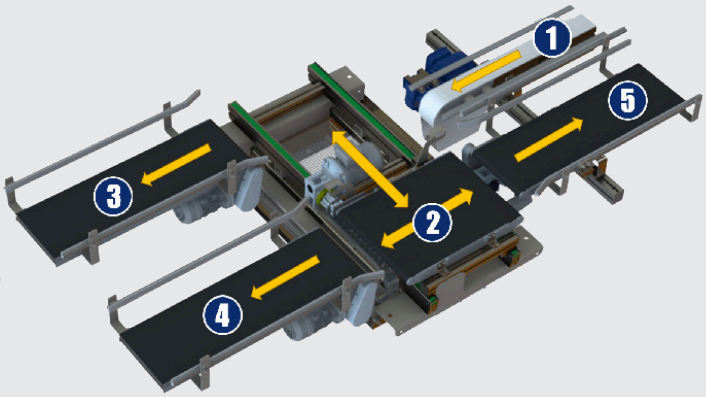
Rule 4: Delivery of a conveyor must be open-ended and piece-mailed for assembly.

By this time, you're aware that flexibility = creativity when it comes to your designs. But flexibility also applies to the logistical side of conveyors. We've reinvented the manufacturing process, starting from the moment an order is placed, to cut the time in half from order to delivery. And, we deliver a fully-assembled conveyor directly to the manufacturing site, eliminating the need to use an engineer's time to document and supervise assembly of the system after delivery.

Customer Story: 1 Input, 3 Outputs, All Standard

A customer wanted to create a shuttle system that could receive product from one location and send it to one of three output locations. We installed a shuttle and put a reversible conveyor on the deck of one of our conveyor options, the Glide-Line 360, which served as a switch gate to transport to one of three discharge locations. This was a much simpler solution than other proposals and was all standard. We saved the customer the time, money, and labor of a customization.

1. One conveyor brings the product to the distribution point. There are three discharge locations.



2. A reversible Glide-Line 360 conveyor on a pallet-like deck is added at the distribution point. It is able to reverse directions automatically, and slides between the three discharge locations easily. The product from Conveyor 1, the main line, is evenly discharged to conveyors 3, 4, and 5 automatically and simply using this Distribution Conveyor.

3. Conveyors 3, 4 and 5 smoothly take the discharged product from the Conveyor 2, the Distribution Conveyor, to continue the assembly process. Note that Conveyor 5 is moving in an opposite direction from 3 and 4 to maximize the available space, but causes no disruption because of the flexibility in Conveyor 2.

How Innovations Keep Solutions Growing at Glide-Line

Glide-Line is focused on innovation to meet customer needs and working to systematically change the world of multiple strand and pallet-based conveyor systems. We have a stake in making sure we're being innovative, breaking barriers, and making our customers happy by taking on unique projects.

We've broken industry rules. We're doing more things with our conveyors due to our flexibility than people are able to do with our competitors, at least without customizing a solution from scratch. We've brought innovation to the market with unique automation conveyor applications.

Applications engineers need the ability, even in the conceptual stages, to deal with rapid changes and layouts. Each and every one of our conveyor systems was created because a customer needed the flexibility – and they weren't the only ones. Our collaborative approach, from challenging our clients to get to the root of each conveyor need to assisting with outside-the-box solutions, is what our clients value about working with us.

The next chapter is all about applying various flexible automation conveyor solutions through innovations, creativity, and the flexibility of different conveyor solutions to meet our clients' needs.

CHAPTER

3

Flexible Solutions in Action

Zoned Conveyor Systems

Pallet conveyor automation systems typically experience backpressure during product accumulation when pallets further upstream successively bump into each other as they stack up behind the lead pallet. This backpressure can generate hundreds of pounds of force and, worse, can compromise the integrity and quality of the products being accumulated.

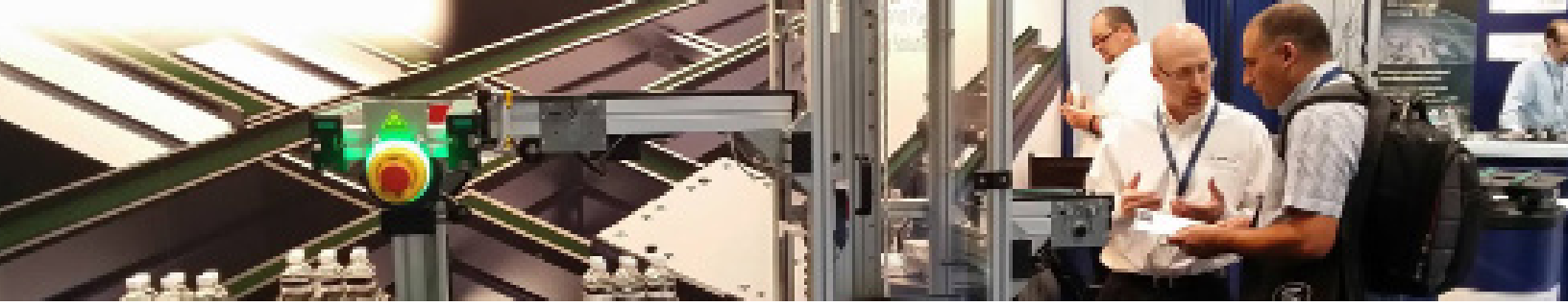
A traditional conveyor, consisting of a longer belt, single motor, and pallets, will hit a stop and the pallets will accumulate behind one another, with one pallet bumping into the next. With a zoned conveyor, instead of a single belt and large motor running constantly underneath pallets (including those stopped and backed up in a process), Glide-Line conveyors have small, individual, discrete 24V brushless DC motors motors distributed throughout the assembly with a series of shorter belts.

These individually self-controlled motors can independently turn on or off small sections of the overall conveyor system. The technology will sense when a pallet is stopped downstream and will proactively stop the next pallet before it hits a stopped pallet. No contact, no pressure, and one pallet per zone; this is referred to as zero pressure accumulation.

Eliminating friction and running the motors and conveyor media only when needed drastically reduces energy consumption and wear and tear on the conveyor as well as eliminating damage to product. Learn more in our white paper on this, How to Manage Backpressure from Accumulation.

Customer Story: Precision Products Benefit from Zoned Conveyor System

A client's customer needed to convey specialty refrigerator doors through an assembly process. These highly polished and finished doors required incredibly smooth handling to avoid dents or scratches, without belts moving underneath a statically located door. We placed the doors directly on a soft belt surface, and by controlling zone to zone movement with the **Glide-Line Zero Contact Zoned Conveyor**, were able to significantly reduce the amount of damaged product annually.



Bypass Elevators

Typically, introducing a bypass to a conveyor line will be on the same horizontal plane as the original conveyor, but will take up twice as much space. However, using pallet elevators in the conveyor to lift the part above the belt while the traffic continues underneath saves space while fulfilling the original manufacturing objective.

For example, let's say your client needs a section of conveyor to perform an operation, such as putting screws in via a robotic arm with a screw gun. Increasing production by five times means adding five robots to perform the function. In a typical setting, you'd have several drilling stations working simultaneously, but you'd need several offshoot conveyors to remove the part, install the screws, and then return the part to the original trunk line.

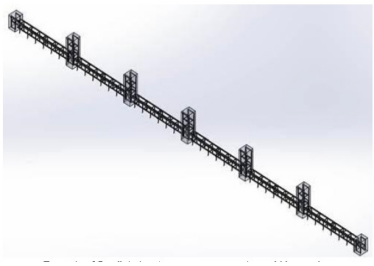
Instead, a bypass with elevators can remove the part vertically, bringing it above the original line and then back to the trunk line without the need for offshoot conveyors and without the need for more space. Spreading the work up, not out, uses the space more efficiently.

Customer Story: Bypassing with an Open Center Pallet Elevator

When our client's customer required a process to be performed on each individual product, the typical solution would be to build a bypass around the workstation to keep the products moving upstream while the process was performed. Instead, we built an open center pallet elevator with a second bypass conveyor. This way, the product would rise up in an elevator to have a process done eight feet up. Within that same elevator, another pallet would keep product moving through the elevator at the trunk line. While one was being processed, the product could keep moving to additional elevators along the conveyor.

Vertical Transport Units

VTUs are typically offered to handle lightweight, medium, and heavy-duty loads. Some of our clients' most innovative solutions have come from using a vertical transport unit to save space in their application engineering.



One example is a pass through design for the VTU – a lift within a lift. This particular design saved one customer thousands of dollars, since they could accomplish the same goal and avoid more expensive bypass conveyors around pallet elevators.

Typically, when a pallet goes into a VTU lift, it lifts up and unloads. But in this case, the product coming along the bottom had to wait for the pallet to come back down. Instead of bypassing the elevator with the waiting product, we built the "lift in a lift" VTU.

This solution has four upright vertical corners, and two conveyors traveling up or down within the lift. The top conveyor lifts a pallet up to be unloaded, and the conveyor underneath simultaneously lifts up to the position of the top one to allow the continuous flow of production. No stopping to wait for the top conveyor to drop back down into place.

Pictured: Pass through design for the VTU - a lift within a lift (bottom) and Example of 5 pallet elevators on a conveyor to avoid bypassing (top).

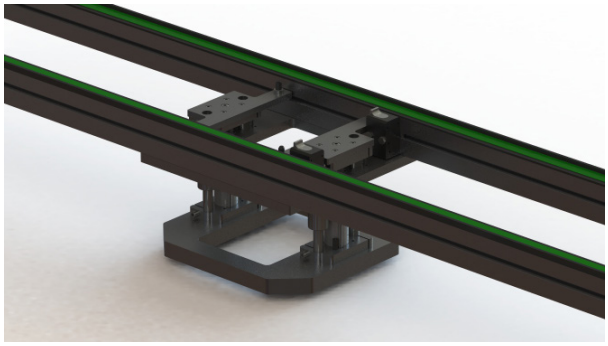
Accumulation Zone Designs

Accumulation is an essential part of many processes since it allows for asynchronous operations to work together. You design accumulation zones throughout an operation so the product upstream isn't halted because of a maintenance issues, batching operations, or machine attention requirements downstream. Accumulation helps keep production efficiency up and eliminates production issues caused by asynchronicity.

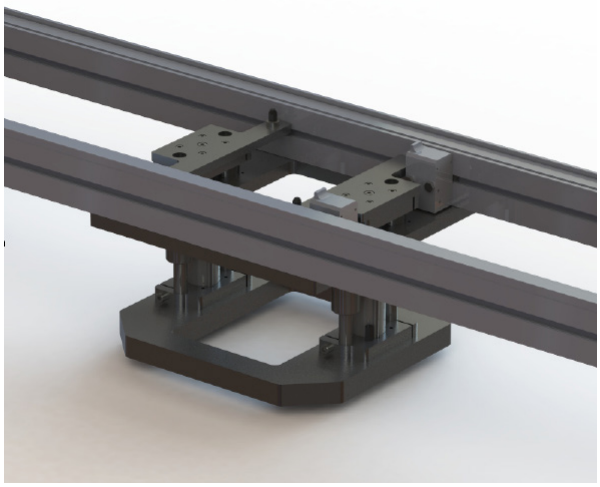
Accumulation zones are essential, but they take up a lot of floor space. Sometimes you're forced to compromise on accumulation because of space limitations. Instead, rethink how the accumulation zones work by thinking vertically. We've designed unique accumulation buffers where the zone is lifted above the trunk line in layers (as many as are needed), instead of a long area of the main line dedicated to accumulation. This saves space and allows for as much accumulation as your client's process requires.

Open Center Designs

When your client needs access to both the top and bottom of their product for work, or their assembly process requires assembly of a product to hang lower than a typical flat surface, an open center design may make the most sense for your client's product.



Expanding access to the product while it's in one position via an open center modular conveyor design eliminates the need to flip the product over to complete work on the bottom side with a specialty handling system. This can save a lot of hassle and costs on your overall automation system and simultaneously reduces the risk of damage to the product.



Vision systems can be installed to inspect the parts from underneath. You're also able to assemble elongated products (such as medical supplies with tubes or protruding shafts) all in one place with a stabilized pallet, since there are no obstructions underneath the conveyor. The entire process can be accomplished without moving, lifting, or destabilizing the product.

Customer Story: Visibility through an Open Center Lift & Locate Device Saves Money

A customer wanted to access the bottom of their part on the pallet. They were going to utilize a robot to lift up the product and place it on an external fixture for processing. Instead, we developed an open pallet and an open center lift and locating device to allow them to access the bottom of the pallet while still in the original fixture. This saved them the cost of purchasing another robot and fixturing for their process.

CHAPTER

4

Flexibility Tips for Automated Assembly Conveyors

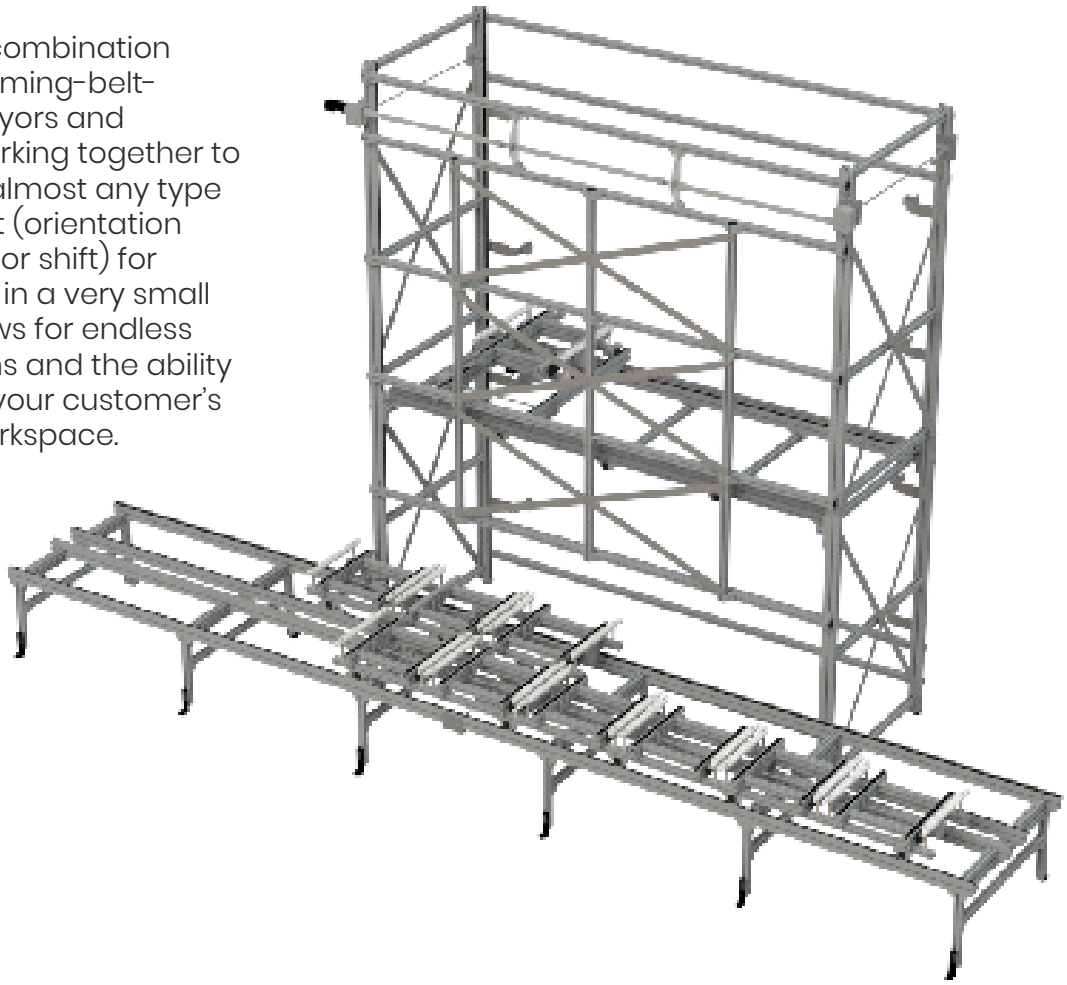
Modular conveyor systems offer endless possibilities for configurations. When you're in need of some inspiration to solve your customer's challenging process needs, look no further. Follow these tips to add unique solutions to your automated assembly conveyor designs.

Build up, not out.

Like building a city, we encourage applications engineers to think about building systems up, instead of out. When pressed for space, it makes sense to add a third dimension to assembly conveyor systems. However, not all conveyor manufacturers can accomplish this without customizing the conveyors themselves.

One of the most configurable (read: flexible) conveyors on the market today is our own Glide-Line 360. It boils down to this: the 360 is a tightly integrated conveyor and linear actuator combination. It allows the conveyor to be creatively moved to solve interesting challenges. To do this, we turn our base timing belt-driven conveyor into an actuator for a seamless conveyor-actuator solution.

The 360 is a combination of powered timing-belt-based conveyors and actuators working together to accomplish almost any type of movement (orientation change, sort, or shift) for your product in a very small space. It allows for endless configurations and the ability to maximize your customer's assembly workspace.



Consider alternatives for conveying products.

When your client's product requires special handling, consider conveying directly on a belt with a customized belt surface.

Customer Story: Specialized Belt Surface Eliminated Product Damage

As an example, a client of ours has large exposed and highly polished sheet metal panels requiring assembly that could not be be jostled along the conveyor route, since this causes them to be bent, scratched, dented, or scuffed. We developed a specialized surface for the belt to achieve the grip needed without scratching the surface. The result? No need for a pallet or fixture. The client formerly lost a million dollars per year in damaged product due to this issue; this flexible solution with the customized conveyor belt material put the money back on their books.

Instead of an entire customized conveyor system, only one element – in this example, the belt – was customized to accommodate the client's unique product. That flexibility cut down the cost of the conveyor and eliminated the damage to the product.

Keep your customization costs to a minimum by partnering with a conveyor manufacturer skilled in flexible automated assembly conveyors delivering standard configurability and flexibility.

CONCLUSION

We've found our unique assembly conveyor layouts can be apply to nearly any industry, but some industries more than others require unique solutions more frequently. If you're an applications engineer working with a client in one of these industries, consider stepping outside the norm and exploring a more creative way to build automation conveyor systems.

1. The automation industry frequently reinvents ways to accomplish manufacturing processes, and as such, is often a perfect fit for unique and flexible conveyor layouts.
2. Panel manufacturers (sheet metal, glass, plastic), such as those for the solar or appliance industry, find our conveying solutions for precision products are a great fit for their needs.
3. Large panel product manufacturers, for workpieces like garage doors, often choose our multi-strand conveyors due to the flexibility of sizes offered.

Flexible conveyor systems are the perfect solution for challenging manufacturing processes. Customizing some conveyor systems can be cost prohibitive and time intensive, but a flexible conveyor system can deliver millions of standard configurations perfectly suited to meet your exact needs.

ABOUT THE AUTHORS

Kevin Mauger

Kevin Mauger is the President of NCC and started his career here days after his college graduation in 1994 in the Applications Engineering department. In 2006, he purchased the company, instilled a new philosophy and has grown the company six-times over since.

His vision for NCC is to continually support the entrepreneurial spirit of his team and to create a positive and inspiring culture for both employees and customers. Outside of work, he enjoys spending time with his wife Danielle, children Kyle, Madison and Kelsey, deep sea fishing, and watching his Philadelphia Eagles.

Craig Newberry

Craig Newberry is a Product Specialist for Glide-Line. His past involvement in a variety of competitive sports along with current passion for obstacle course races spills over into his desire to drive business forward. Concurring challenges motivate him on daily basis, while his family fuels his desire to succeed in life. Although a bit of an adrenaline junky, he also tries to live by a brilliant statement made by Ferris Bueller "life moves pretty fast, if you don't stop and look around once in a while, you may miss it."

Ron Schwar

Ron Schwar is the Godfather of Glide-Line. A machine designer by trade, with experience designing everything from bottle cappers to fiber optic embroidered apparel and even unmanned helicopters, he has seen it all. His passion is to develop innovative products for engineers that are easy to design with, easy to design around, and set the bar for industrial automation. He loves a challenge and does anything he can do to make Glide-Line the best it can be.

ABOUT GLIDE-LINE

Glide-Line solves problems other conveyor systems manufacturers won't. We developed Glide-Line from the ground up with a few key, driving factors in mind. First, our conveyors had to be robust and reliable. Second, they would be simple – easy to maintain and service. Finally, we insisted on flexible configurability, creating an efficient, hassle-free customer experience. We've built the most versatile multi-strand panel and pallet-handling solution available for the assembly automation industry.

Glide-Line aims to be dependable from all directions. We want our customers back. We'd like them to call us in a pinch because they know they'll be getting a comprehensive solution after a collaborative, thought-provoking conversation with industry experts who think outside the box. If you have a challenge, throw it our way and we'll do whatever we can to make it happen.

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