



# BULKY, AWKWARD ITEMS: SOLVING THE NON-CONVEYABLE CHALLENGE

## ABSTRACT

Good news! That new exercise bike you ordered arrived. Bad news! Now you have to move it upstairs.

The flat-pack box is lean, but also long and wide – so much so, that it barely fits up the stairs. What you’re experiencing in the struggle of moving such a bulky, irregularly shaped item through your house is reminiscent of the challenges that distribution centers face handling such items every day.

Whether furniture, sporting goods, outdoor equipment or something else, large, irregularly shaped items are described as “non-conveyable” when their physical characteristics prevent them from being handled by automated conveyor and sortation systems, necessitating alternative workflows.

### Common characteristics of non-conveyables include:

- The length of an item, like a golf club, causing it to get stuck on an incline
- The inconsistent center of gravity of a round item, like a bowling ball or packaging tube, preventing it from starting and stopping on a conveyor
- The size and weight of items like furniture or exercise equipment simply exceeding the dimensions possible for existing automation

Handling such items is not a new challenge. However, growth in online ordering and direct-to-consumer models have changed who is responsible for moving such items, and how frequently. In the past, rather than shipping directly to consumers, logistics operations moved large items like appliances and furniture for retail replenishment. Retailers then took the baton with their own established last-mile delivery method, or consumers simply hauled items home themselves.

The expansion of e-commerce shifts the burden of handling such non-conveyable items throughout logistics networks. Businesses solely dedicated to online ordering and direct-to-consumer delivery of products like furniture and outdoor equipment are creating logistics operations wholly focused on handling large, irregular items. But the impact does not stop there – the downstream effect of greater non-conveyable volumes affects parcel carriers, too.

This white paper examines legacy manual approaches to handling non-conveyable items and new, alternative solutions that leverage automation.

## **DISADVANTAGES OF MANUAL HANDLING**

From an operational standpoint, facilities take steps to consolidate items to more efficiently manage material flow throughout the facility and keep the dock organized. But how do you handle large, irregular parcels?

The show must go on, even with non-conveyable items, so operations employ alternative means to take care of the consolidation process, such as loading those parcels onto carts. But no matter the workflow, moving large, bulky items through the distribution and fulfillment process comes with major drawbacks. Transporting non-conveyables from point to point can lead to lots of lift truck or tugger traffic, bringing safety risks, delays and ultimately congestion and disorganization on the dock. It also uses a significant amount of labor, with employees required to manually lift and awkwardly twist in ways that can lead to repetitive stress injuries.

The U.S. Bureau of Labor Statistics reports nearly **150,000** back injuries per year in the workplace – and the business impact of each back strain adds up quickly. Direct costs attributed to medical and legal costs as well as OSHA fines can add up to thousands for each injury, though the amount an employer pays depends on its workers' comp policy. But employers are always on the hook for indirect costs, which can also reach tens of thousands of dollars through lost productivity and damage to equipment and facility infrastructure. Productivity is diminished both by the time that the employee is out of work as well as the less efficient performance of a new employee who lacks the same level of training and experience as the employee they replace.

In total, **OSHA estimates businesses spend \$170 billion per year on costs associated with occupational injuries and illnesses.** Preventing manual non-conveyable item handling can help reduce that burden.

## EVALUATING WORKFLOWS FOR AUTOMATION

Investing in automation to handle non-conveyable items can bring a quick return on investment and significant savings, including reduced risk of on-the-job injuries and related labor costs. Operations should take inventory of the rate of non-conveyable items to be handled, identify all the workflows involved in the handling process and estimate the associated labor requirements. That information together can help enable the most efficient deployment of automation possible – utilizing the right technology to target the right part of the handling process.

The guiding principle is to **automate the most mundane, repetitive part of the process** and leave employees to take care of tasks that require the unique capabilities of humans.

For example, automate repetitive, point-to-point transportation with a low-cost automated guided vehicle (AGV) solution that avoids the risks associated with having employees maneuver loads through congested travel paths. Shield workers from such injury-prone movements and instead allocate them to tasks like quality assurance inspection that benefit from the mental acuity of humans.



## **CUSTOMIZING THE AUTOMATED SOLUTION**

No one-size-fits-all solution exists to automate the handling of non-conveyable items. Due to the different product types, movable obstacles and rate requirements, an automated solution requires an inherent degree of customization. For example, a robotic arm may be necessary to load heavy items onto an AGV or a custom package of several more specialized automation pieces like right-angle transfers may be necessary for conveyor systems to accommodate long items.

Each type of non-conveyable item and warehouse environment presents its own unique challenges. This requires finding the right balance between meeting requirements and overwhelming your operation with additional functionality that is both unnecessary and costly.

To make an analogy, despite what teenagers might say, they do not need a Ferrari to go to and from school every day. In fact, something more practical and affordable is perfectly capable. For the purposes of handling non-conveyable items, the imperative is to develop a solution purely based on the site-specific realities – without bias toward a particular technology or bending operational reality in order to match a specific product.

## **TRYING THE SOLUTION ON FOR SIZE**

A pilot program offers an important step to get a solution for non-conveyables off the ground. It provides an opportunity to not just anticipate but answer key questions about AMRs or AGVs before a full implementation, such as:

- How will employees interact with them?
- How well do they avoid obstructions and manage traffic?
- How do they react to mistakes by employees and manually operated equipment?

And at a high level, a critical question is the ability of automation to scale. For example, “flexible” automation like an AMR or AGV system that leverages several individual equipment assets enables you to add vehicles, change paths and shift workstations with relative ease. Compare that to “fixed” automation, which can require shutting down systems or even removing and reinstalling rigid infrastructure to accommodate the same level of change. Operations can expand a sorter, but that requires taking it offline. Adding more AMRs, however, does not require shutting down the rest of the fleet.

Last but not least, the deployment process for automated systems is an important consideration. Conveyor-based, fixed automation projects can include wait time from suppliers, engineering, installation and commissioning – easily extending lead times to six months. But automation projects that leverage the flexible paradigm of AGVs and mobile robots can significantly reduce wait time, enabling businesses to get up and running and then add new vehicles as available.



## **FINDING THE RIGHT AUTOMATION PARTNER**

Regardless of whether non-conveyables account for a facility’s core business or are simply a growing “necessary evil” they must deal with, finding the right partner to manage them is critical to success. A partner should have access to a range of automated technologies to build a best-fit solution based purely on operational requirements, rather than forcing a fix out of a limited technology set.

To learn more about handling non-conveyables, **visit our website** or **reach out to a solutions expert.**