

The What, WHY and TCO of **FLEXIBLE, GRAVITY CONVEYORS**

WHITE PAPER

Optimizing Efficiency and Reducing Costs:
The Case for Flexible Gravity Conveyors in
Modern Material Handling

WHAT IS A FLEXIBLE, GRAVITY CONVEYOR?

“Warehousing and food and beverage are some of the industries where non-powered or gravity conveyors work well,” remarks Jayesh Mehta, industry group manager for MHI, an industry association for material handling, logistics, and supply chain professional. “They’re valuable in seasonal work, end of line applications, and loading and unloading trucks.”

What to look for

- Effective: Compact, evenly spaced skate-wheels for self-tracking around curves.
- Durable: Welded components and high-quality bearings extend lifespan.
- Safe: Collapsible handles reduce risks of snagging clothes or injuries.
- Versatile: Hook-and-rod couplers allow quick setup and adaptability.

At a glance

- Length: 8–36 feet (fully extended) or 3–9 feet (collapsed)
- Width: 18–36 inches
- Adjustable Height: 28–43 inches
- Weight: ~500 lbs
- Cost: Starts at \$1,500 (vs. \$30,000+for powered conveyors)

Gravity conveyors employ rows of evenly spaced skatewheels or rollers connected to side frames angled to move packages, boxes, crates, and more. The inclination of the conveyor’s frame employs gravity to move parcels from one point to another. With flexible gravity conveyors a worker can extend or collapse the unit or even curve it around obstacles, up to 180 degrees. They range in length from 8 to 36 feet fully extended, 3 to 9 feet collapsed, weigh around 500 lbs. and measure 18 to 36 inches wide with an adjustable height from 28 to 43 inches.

“Almost every industry can make use of flex, gravity conveyors,” says Terry Shaw, a long-time conveyor industry expert and founder of TMS Consulting. “For U.S. buyers, American-made conveyors have advantages versus foreign-made products: First, the construction is typically better, and second, if you do need replacement parts, you can easily get quality components from domestic suppliers.”

WHY USE FLEXIBLE, GRAVITY CONVEYORS

FILLS AN EMPLOYEE GAP

Whether a facility is large and leans on collaborative robots for its processes or smaller and less automated, workers often handle products at the beginning or end of a line. According to *Parcel* magazine, a common cause of shipping damage is a warehouse employee or driver mishandling a package. Fatigue and workplace obstacles can slow a worker's pace or cause an employee to drop or damage a package. A mishandled box containing, say, a chair might result in a single nick that prompts a customer to return a shipment. The manufacturer then incurs costs to replace the item and cover reshipping the product.

The end-of-line situations are where flexible gravity conveyors most often play a role as an economical solution for helping employees handle everything from boxes containing pharmaceuticals and canned food to clothing and furniture. A facility manager can buy a flexible gravity conveyor for as little as \$1,500. Whereas the cost of a motor-driven flexible conveyor begins at around \$30,000.

BOOSTS EFFICIENCY AT A DISCOUNT

"Moving goods between a loading dock and warehouse is an ideal place for flex-gravity conveyors," adds Shaw.

For example, minimizing the distance a worker must carry something can reduce injuries and boost productivity. Eliminating floor-level lifting with a conveyor, as noted in an article by *MHI Solutions* magazine in 2021, reduces hazards for workers. Workers with flexible gravity conveyors at the ready can deploy them to minimize carrying, lifting, and transferring loads.

Additionally, when a truck arrives with products that are boxed, not palletized, retail or grocery workers can temporarily set up a flexible gravity conveyor, quickly unload a truck, and stow the folded conveyor in a corner of the loading dock. Flexible gravity conveyors also play a role in frozen food environments where they can reliably operate in freezing temperatures around the clock, virtually maintenance free.

A PRACTICAL TOOL FOR WORKERS, EMPLOYERS

According to the Bureau of Labor Statistics, "about 1,059,000 openings for hand laborers and material movers are projected each year, on average, over the decade." Specifically for food and beverage retailers, the need for material movers is projected to be 11 percent higher by 2033. The growing need for material-handling workers coupled with consumers who regularly order products online spell the need, especially in warehousing, for inexpensive and practical ways to help employees keep pace. Flexible, gravity conveyors can boost efficiency for a short-staffed or time-pressed workforce. Using these tools doesn't require any training or particular level of fitness. In fact, deploying these systems is as easy as putting up a ladder.

¹Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Hand Laborers and Material Movers, at <https://www.bls.gov/ooh/transportation-and-material-moving/hand-laborers-and-material-movers.htm> (visited September 29, 2024).

WHAT TO LOOK FOR IN A FLEXIBLE, GRAVITY CONVEYOR

EFFECTIVE

Effectiveness might mean including individual skatewheels that allow products to self-track when gliding around curves. Plus, skatewheels flow more easily than rollers and require less effort by package handlers. Wheel density is another indicator of effectiveness. Wheel density, for example, is measured as wheels per foot, and an effective gravity conveyor ought to always have at least three axles and five wheels under any load.

“Look for conveyors with a compact wheel pattern spaced equally to provide the greatest ‘flow-ability,’” notes Pat Cucco, a process and product engineer for ProVeyance Group.

DURABLE

Casters underpin the legs on a flexible gravity conveyor and make the system movable. Cucco says domestically sourced casters are often made with stronger materials and lend themselves to greater “longevity and rollability” than components from overseas markets. He also suggests buyers pay attention to the rest of the conveyor’s construction.

“A welded leg assembly with two cross members, instead of one, lends greater support especially when you’re extending and collapsing these conveyors, sometimes multiple times a week,” says Cucco.

SAFE

Collapsible handles are another must-have feature for easily moving the conveyor yet reducing the risk that employees will catch their clothes or hands while working alongside it.

“For gravity conveyors that use rollers, the bearings can be a weak point,” adds Shaw. “But if a bearing is made with tight tolerances, then the bearing rolls smoothly, reduces friction, they wear evenly and last years. That eliminates a failure point you’ll see on less expensive, foreign-made gravity conveyors.”

VERSATILE

Look for a flexible gravity conveyor that includes standard couplers of the hook-and-rod type. Hook-and-rod couplers allow workers to quickly set up and extend units for ad hoc projects.

Cucco notes that flexible gravity conveyors are typically low-maintenance solutions, and if they’re even reasonably cared for (e.g., kept out of the elements, lubricated occasionally, prevent workers from loading packages over the conveyor’s weight limit), they can last years, even decades. That said, he suggests looking for a solution with a warranty for workmanship because if something is going to fail, and it happens within the first year, the buyer is covered.

“These solutions are low maintenance by design, but for U.S. customers, buying domestic means it’s easy to replace a U.S. component within seven to 10 days,” Shaw adds. “Some manufacturers only sell through distributors, so if you want to eliminate the middleman and get questions answered and service from the OEM, find a manufacturer who sells direct.”

WHAT IS THE TCO FOR A FLEXIBLE, GRAVITY CONVEYOR?

“The majority of our customers would choose American-made conveyors because they want something that’s going to last, and the cheapest price is not always good or best.”

Lance Phillips
Branch Manager, Motion Industries Inc.

Calculating the total cost of ownership for a conveyor involves factors beyond the initial purchase price, though. Here are some elements for calculating the TCO for a conveyor:

INITIAL COSTS

- **Purchase Price:** The upfront cost of the conveyor.
- **Training:** Cost for training staff to safely use and maintain the conveyor.

OPERATING COSTS

- **Labor Costs:** Using the conveyor requires calculating the labor costs per hourly wage and time worked.
- **Maintenance Costs:** Regular maintenance (e.g., lubrication, cleaning, inspections) and part replacements (e.g., bearings, rollers).
- **Downtime Costs:** Estimate any potential losses due to downtime for repairs, maintenance.

REPAIR COSTS

- **Unscheduled Maintenance:** Breaks or emergency repairs, including the costs of parts and labor.

DEPRECIATION

- **Lifespan of the Equipment:** Determine how long the conveyor should last (e.g., 10 years).
- **Annual Depreciation:** Calculate using straight-line depreciation (Initial Cost divided by the useful life of the conveyor).

DISPOSAL COSTS

- The cost to dispose of the conveyor at the end of its life, which might include recycling fees.

TOTAL COST OF OWNERSHIP FORMULA

To calculate the TCO, add up these elements over the conveyor's operational life:

$$\text{TCO} = \text{Initial Cost} + \text{Operating Costs} + \text{Maintenance \& Repair Costs} + \text{Disposal Costs} - \text{Residual Value}$$

Where Residual Value is the value of the conveyor at the end of its life (if any).

Phillips says he and his sales force try to show customers the value in purchasing a well-made conveyance system versus simply considering the lowest possible price.

"If they have to replace a lesser quality flex, gravity conveyor every six months for, let's say, \$500," Phillips remarks, "then they may as well spend a thousand or more for the kind of quality that lasts a lifetime."

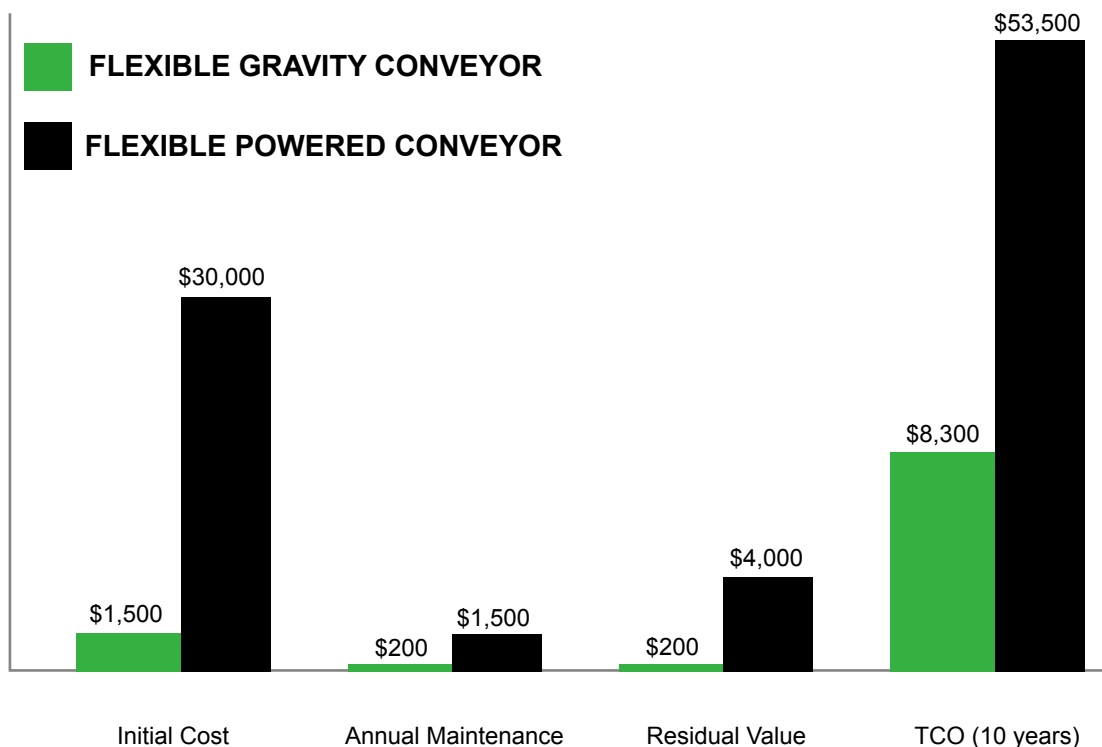
TCO for Flex Gravity Conveyor vs. Flexible Power Conveyor

A flexible gravity conveyor

TCO: \$8,300

A flexible powered conveyor

TCO: \$53,500



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