Whitepaper

RYSON
ROYAL APOLLO GROUP

Vertical Modernization: Upgrading Legacy Conveyors with Modular Solutions

A Whitepaper for Operations, Maintenance and Executive Leaders in Production Facilities and Distribution Centers.

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Executive Summary

Facilities built years ago face new pressures. Real estate costs climb. Order profiles grow more complex. Aging vertical conveyors struggle to keep pace and often drive downtime.

Replacing lifts, inclines, and fixed-welded spirals with modular spiral conveyors frees floor space, lowers total cost of ownership (TCO), and keeps operations ready for tomorrow's demands.

This paper outlines key factors to consider and explains why a modular approach offers strong returns without a long payback period.

Downtime costs per year

$1.2 - $4.8 Million*

On a national industry scale, unplanned downtime costs for manufacturers and large distribution centers in the United States are estimated to be around **$50 billion** per year.

Loss of employee productivity increased downtime

18.2%

Old material handling equipment slows down facilities by causing significant productivity losses and increased downtime. Surveys indicate that when systems reach the end of their useful life companies report an average loss of employee productivity and downtime of about 18.2% each.

+80%

Space Savings

Ryson Spiral Conveyors can increase space savings by up to 80-90% compared to traditional incline conveyors because they use a very compact vertical footprint, freeing up valuable floor space for other operations or expansions within existing facilities.

*Downtime in facilities and warehouses due to conveyor and related material handling equipment typically costs from $5,000 to $50,000 per hour depending on the size and type of operation. For a medium to large warehouse, annual downtime losses can easily reach several million dollars—case studies show annual downtime costs of $1.2 million to $4.8 million or more for complex systems such as overhead or mining conveyors.

1. The “Brownfield” Challenge

Older distribution centers and plants carry useful equipment, yet many vertical conveying systems have reached the end of their reliable life. Frequent repairs, limited parts availability, and safety concerns push maintenance budgets up. At the same time, network redesigns and growth add pressure to fit more capacity within the same walls. Leaders must find improvements that slot into the existing footprint with minimal disruption.

2. Space Utilization: Why It Matters

Every square foot now has a clear cost. High pallet positions, wider pick aisles, and automated storage systems compete for the same floor area. A single modular spiral conveys product vertically in the footprint of a pallet or two.

The cost of wasted space:

Let’s calculate using average numbers:

A mid-sized warehouse is typically about 100,000 square feet
Cost per square foot per year: average **$9/sf/year**

$900,000

The impact of a Spiral

Let's say a warehouse currently uses traditional horizontal conveyors that occupy about 10,000 sf of floor space. If these are replaced by spiral conveyors, the conveyors would only need about 2,000 sf, freeing 8,000 sf of space.

80-90%

Cost of wasted space

A spiral could free up around 8,000 sf of floor space worth roughly

$72,000 per Year

Replacing a long incline belt or curved shoe sorter saves dozens of linear feet and can free a full dock position or work cell. This recovered space often supports additional SKU storage or a new value-added process, driving direct revenue gains.

3. Investment Perspective: ROI and TCO

Modern spiral conveyors cost more than a welded unit from twenty years ago, but the economics look different when viewed over the life of the asset:

- **High uptime**

Standardized modules and non-proprietary components speed repairs and cut parts stock levels.

- **Energy efficiency**

A balanced chain or belt design runs on a small motor, trimming utility bills.

- **Scalable design**

Adding or removing modules adjusts elevation and layout without cutting and welding.

Customers that track these factors report payback in 12–24 months and a service life that extends well beyond ten years with planned maintenance.

4. The Shift to Vertical Operations

E-commerce and mixed-case fulfillment raise SKU counts and order turns. Most sites cannot simply grow outward. Moving product up and down efficiently becomes a core strategy. A spiral's continuous flow handles cartons, totes, and trays at speeds that match modern sorters.

When real estate costs are measured in dollars per square foot per year, a compact vertical lane often beats an expansion or mezzanine build-out.

5. Building for Longevity and Sustainability

Modular equipment supports circular use. Instead of scrapping a welded frame when process heights change, teams can swap or relocate spiral modules. Fewer discarded machines mean less landfill impact and lower embodied carbon.

Energy use also falls thanks to lighter weight tracks and optimized drive packages. Sustainability targets are met not just through lower emissions today but by avoiding premature obsolescence.

6. Modular Spiral Conveyors in Practice

Ryson pioneered the modular spiral conveyor in North America more than two decades ago. Today, thousands run in food, beverage, parcel, and third-party logistics sites. While this paper avoids a hard sales focus, it is worth noting key design features that matter to maintenance and operations teams:

- Low-friction slat chain that minimizes wear on loads and the spiral itself.
- Overlapping modular tracks that can be re-configured on site without specialized welding.
- Small continuous chain contact area enabling smooth starts, stops, and accumulation, reducing product gaps.
- Standard drive assembly located at a convenient height for safe service access.

These choices support quick installation and long service intervals, both critical in brownfield retrofits.

7. Key Considerations for Replacement Projects

1. **Define the constraint.** Measure downtime, capacity, and space tied to the existing conveyor. A clear baseline clarifies the return.
2. **Plan tie-ins during off-hours.** Modular sections can be staged and assembled while the line runs, then connected during a scheduled window.
3. **Train operators early.** Short familiarization sessions reduce misuse and extend component life.
4. **Schedule preventive maintenance.** A simple quarterly routine often suffices and prevents unplanned stops.

8. Conclusion

Vertical conveying is no longer an afterthought. In today's tight footprints, it is a lever for capacity, cost control, and resilience. Replacing legacy lifts, inclines, and curved lines with modular spirals converts wasted space into productive square footage. The investment pays back quickly through higher uptime and lower energy consumption, while built-in flexibility keeps assets useful as business needs shift.

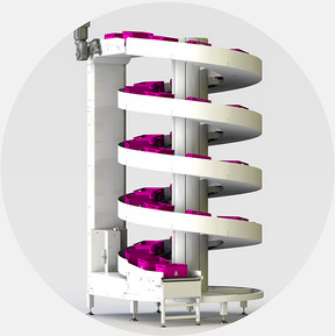
About Ryson

Ryson International, Inc. designs and manufactures spiral conveyors in Yorktown, Virginia. Our focus on modular construction, robust components, and responsive service helps facilities modernize with minimal risk.

Ryson is a member of the Royal Apollo Group, established in 1847 and headquartered in the Netherlands. Ryson manufactures in USA and supports North America. We have manufacturing in Netherlands, USA, and Thailand with service operations in Netherlands, USA, Thailand, China, India, and Mexico. As one global company, we are the world's leader in Vertical Conveying!

Learn more at **www.ryson.com**.

Our Portfolio



Unit Load Spiral Conveyor

Our standard model for cases, boxes, totes, etc.

Efficiently transports cartons, cases, trays, or totes vertically in a continuous flow, featuring a compact footprint. This machine has low maintenance needs, and offers high reliability for packaged goods handling.

Multi Level Spiral Conveyor

The space-saving solution, that moves product between different levels

Allows loads to enter or exit at several different elevations, making it ideal for multi-tiered warehousing, E-Com and order picking systems while saving floor space and streamlining product flow.

High Capacity Spiral

For heavier loads like big totes, heavy boxes or bags

This conveyor is specifically designed for demanding applications. It's able to convey larger or heavier loads to greater heights, with a robust build and capacity up to 3,200lbs, while still occupying minimal floor space and offering high product throughput.

Bucket Elevator

For bulk materials like grains, powders, screws, etc.

A versatile bulk material conveyor, combining vertical and horizontal movement in a fully enclosed system with overlapping pivoting buckets to prevent spillage. It's suitable for gentle handling in industries like food, pharmaceuticals, and chemicals.

Find more information on **www.ryson.com**