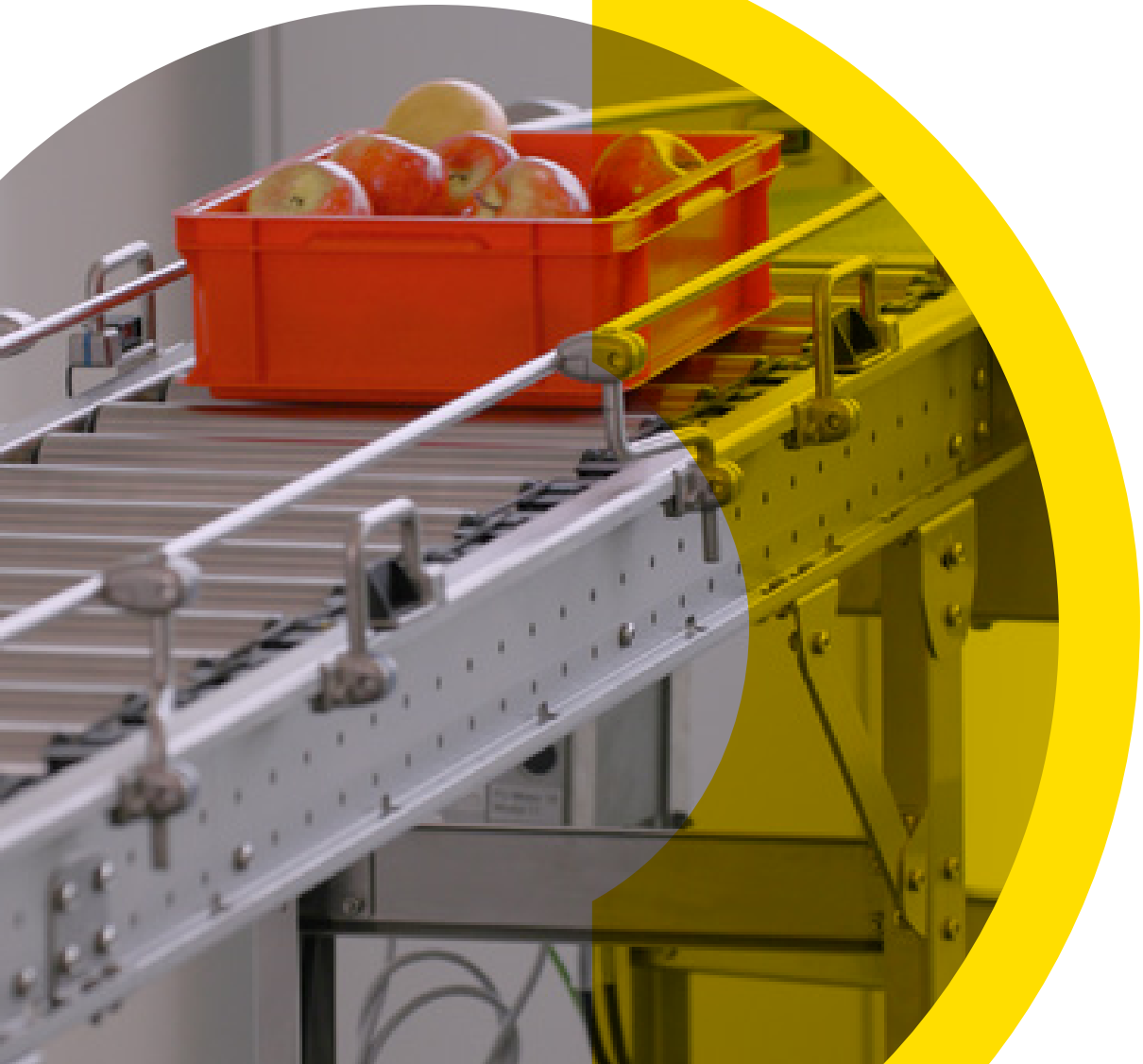
WHITEPAPER

Streamlining food packaging production

Achieve maximum efficiency and zero bottlenecks with the right hygienic conveyor technology



Executive Summary

Food packing at scale relies on conveyors – and success as a Line Manager relies on keeping them effective and productive. But **the issues aren't just operational**.

Your people need to be kept safe, as well as your products. And the choice of fixed or modular components can affect productivity in a big way. Even energy costs loom surprisingly large. While a host of factors that add incremental improvements – ease of cleaning, integrating control systems, reducing wear and tear – contribute to the percentage points that make the difference between plain cost and cost effectiveness. Reduced downtime, improved throughput, and higher product quality are all part of it.

Of course, all these pain points interest **Interroll** – so after conversations with many Line Managers, we wanted to produce a report summarizing your biggest headaches and how to solve them. We hope you'll find it understands your problems and suggests some solutions.

CHAPTER 1

The mission of the production line

If the production line is at the heart of food packaging operations, conveyor systems are the arteries. Moving, sorting, and guiding according to strict schedules, as products are wrapped and batched for other destinations. When it works smoothly, it's as beautiful as any symphony. But you already know that smoothness doesn't happen by chance.

Balancing the demands of cost, schedules, production, and people is daunting enough even without external factors in the mix – and of course the world outside does affect your decisions.

- Energy costs are rising, thanks to supply squeezes and an uncertain economy.
- Maintenance schedules need adapting to circumstances, as machinery ages and abrasion shortens lifecycles.
- Lines need reconfiguring when work profiles change, and there's downtime to deal with at every stage.
- Complex equipment and processes need trained experts to conduct repairs and replacements – professionalism that isn't cheap.
- And you're probably responsible for finding people to staff your line – which means a focus on safety is vital, too.

We don't pretend to have all the answers. But consider this: what if **one** part of your food packaging process – your **conveyor system** – could actively mitigate your challenges rather than add to them?

Interroll has been producing material handling solutions for over 50 years – and is now bringing its expertise in parcel and warehouse operations into the food sector.

We've engaged with thousands of companies all over the world, discussed challenges and problems with thousands of professionals like you and your colleagues. And we hear the same issues coming up over and over again, whether you're packing fish in Spain, processing beef in Australia or sorting eggs in Southeast Asia. So we thought we'd sum them up – in the hope it'll give you some ideas for solutions.

In this paper we've shared the biggest practical factors to consider when you're setting up or modernizing your conveyor operation – with strategies that minimize the chances for disruption to arise while maximizing the opportunities to boost throughput and productivity metrics. **We hope you enjoy the ideas ahead.**

CHAPTER 2

Common challenges with conveyor systems for food applications

Let's start at the human level: the everyday issues people in the food packaging business face. Talk to any Line Manager in the food industry, and you'll start hearing the same themes – yet despite the best intentions, many conveyor systems still act more like barriers than enablers.

Through conversations with professionals like you, we have identified six key challenges that create bottlenecks in almost every food industry facility. Let's walk through them—because the first step toward a smoother line is knowing what's holding it back.

- **Managing energy efficiency** is an important topic. Industrial energy bills are rising, but the cost of fuel isn't the only cost factor. Many systems in today's production process lack "smarts": there's no technology in them to adjust or stop during bottlenecks and go-slows, meaning you're spending money on machines when they're doing nothing.

- **Working with inflexible components** is another commonly heard complaint. While many factory systems claim to be modular, few are as simple as snapping parts together. For most Line Managers, reconfiguring remains a time-consuming task taking skilled professionals to do properly – made worse when old parts aren't able to fit into a new layout when the business scales up.

- **Automation** is also a hot topic, but putting it into practice is harder than it should be – with too many conveyors operating as standalone units without working together. This means a lot of time goes into sorting out problems where they interconnect – everything from unwanted accumulations to mismatched input and output speeds.

- While **maintenance** is an everyday part of a Line Manager's job, it can have a big impact on operations if a minor upgrade needs a full day of downtime – even if it's a routine cleaning. Simply being able to plan ahead for maintenance interruptions is a major pain point for many in food packaging.

- **Keeping the product viable** … a materials handling system needs to deal with lightweight empty boxes and heavy packed ones – and it can be hard to ensure it works with both. Every crushed carton, every split crate caused by a conveyor is a productivity issue.

- … **and line workers safe.** There's no escaping the fact that food packaging has a high turnover of employees. Each needing training on health and safety – and the risks of a materials handling system aren't obvious. For a conscientious Line Manager, even a single accident at work is too many.

Smart materials handling systems—like Interroll's MCP CleanLine—are designed with many of these challenges in mind. But before we dive into solutions, let's explore each challenge in more detail. Because solving a problem starts with understanding it.

CHAPTER 3

Six ways to solve food packaging challenges with better materials handling systems

Conveyor systems have brought value to materials handling for decades, but there's more than one type of conveyor – and some are better for food packaging than others. As we go through your principal challenges, you'll see some suggestions for improvement. First: the issue of energy.

1. Energy efficiency: managing electricity costs and usage

Many industrial conveyors operate on 400V. Fine for heavyweight applications where more power makes sense. But it's also common to see 400V systems in use with lighter loads down the line – like final assembly and outer packaging. Meaning you're throwing too much power at a problem: a significant cost at today's prices. And 400V components are expensive in any case.

Switching from 400V AC to 24V DC can reduce energy costs 50%

And that's only one issue. Assess your systems with a critical eye, and you'll see many "friction factors" that eat extra energy: conveyors that don't stop but slide under cartons, wasting energy and abrading equipment; over-engineered cabling and connections that need specialist care; even CSR people asking about your contributio to sustainability goals.

Our pro tip
consider 24V DC
for outer packaging

Energy sinks in conveyor systems are found in continuous operation when it isn't needed, surge losses when stop/starting, and overcoming resistance in a jam. So look for **run-on-demand** alternatives that only operate when there's product on the line – preferably with zone-based power feeds to minimize those long cable runs that cause resistive loss.

Interroll's MCP CleanLine, for example, uses 24V direct current drawing up to 50% less power in use than a 400V AC equivalent. Meaning lower losses to heat and friction, a lower carbon footprint for your CSR and ESG efforts, and above all a "right-sized" materials handling system without over-engineering, able to move up to 50kg/m in normal conditions – making it suitable for a huge range of food applications.

2. Staying flexible with modularity: boost efficiency as systems scale

There are some great conveyor solutions on the market – but many were designed with a "once it's in, it's in" mindset: not easily taken apart and reconnected in different ways. While reconfiguration is possible, it's complex. Conveyors aren't Lego pieces, and modifications to a fixed layout often lead to lengthy downtime.

There's a further aspect. Control modules often serve a single conveyor at a time, increasing

True modularity enables reuse – protecting conveyor investments

complexity for operators; if you can't synchronize a batching line upstream with final packaging further down, it leads to bottlenecks on the line, taking time to manage. And when your business succeeds and the plant expands – what happens if the conveyor system isn't flexible enough to change with you?

True modularity – which means being capable of disassembly, reconfiguration, and reassembly without being limited by size, space, or shape – needs three characteristics: standardized modules, plug-and-play connectivity with drives and control units, and integrated power and control systems for easy scaling. And – of course – the modules need to cover all use cases, with straights, curves, and transfer units interlocking by design.

One system that achieves this is the MCP CleanLine from Interroll. Fulfilling the above – easy to expand or change by adding, removing, or moving sections – it lets you plan and execute changes with minimal downtime and low cost, letting you take advantage of new market opportunities sooner. It's future-proofing for your packaging line.

Our pro tip
Look for a modular philosophy designed-in

3. Staying flexible with modularity: boost efficiency as systems scale

"Automation" isn't a cure-all – there are even cases where it isn't a benefit. An "automated" line without the right data feeding it can mean blockages, collisions, pile-ups, and/or product damage. Moreover, many packaging and distribution centers contain multiple non-integrated conveyors, so workers are managing handovers from one belt to another manually.

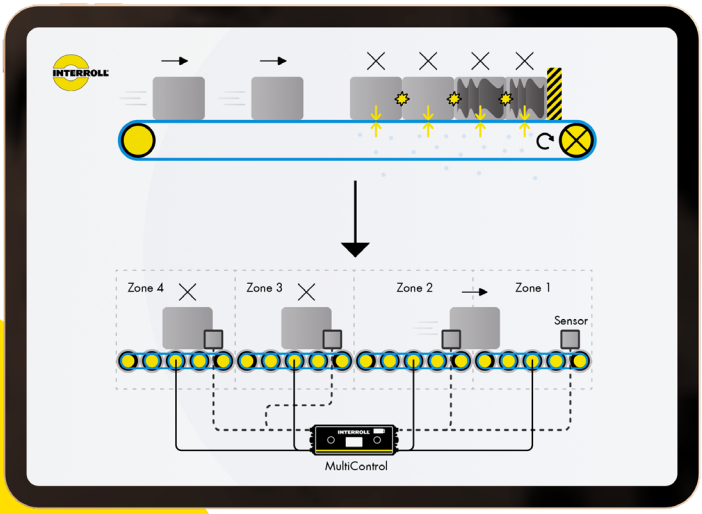
See ZPA in action on YouTube

What's more, many conveyors use centralized drive systems, with a single unit powering the whole conveyor – making it hard to optimize parts of the packing process separately. Success means combining **automated actions** with **intelligent design** and **seamless integration**, allowing line managers to make continuous improvements in detail. But how?

Our pro tip
Integrate Zero Pressure Accumulation into your system

A ZPA system differs from a centralized drive in a critical aspect: it's divided into **zones** of several rollers with one driven roller (Interroll's MCP CleanLine uses 24V RollerDrives) per zone. Sensors detect if each zone is empty or occupied – with the drive only starting when a carton enters it. This means cartons don't pile up uncontrollably at the end, risk impact damage – the line only operates as fast as its loading and unloading allow. Increased automation also reduces the need for forklift activity, which can either lower staffing requirements and/or boost throughput..

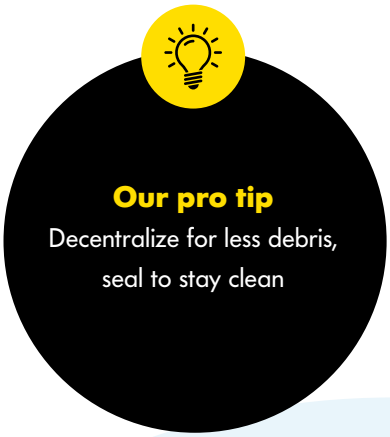
Interroll's established ***MCP*** *platform is the basis of its MCP CleanLine for food packaging, handling standard E2 crates with ease. Adding intelligence into the system is the MultiControl, integrating different conveyors into a seamless process – with MultiControls daisychainable via a fieldbus cable, making an MCP CleanLine infinitely scalable. It automates diverse packing processes without jams or friction – and frees managers to manage.*



4. Ease of maintenance: simplify maintenance to maximize uptime

The less maintenance, the more productive uptime. But conveyors are complex systems with many moving parts – with everything from debris to dust wearing down components, jamming machinery, and putting frequent holds on the packaging process. Repairs to 400V systems often need specialized skills and large inventories of spare parts on hand. Often maintenance is reactive – acting when things go wrong, rather than planning ahead based on expected component life.

Stainless steel and smooth surfaces mean less contamination



In the food sector, maintenance has another angle. Even packaged items are subject to strict environmental hygiene rules, meaning materials handling systems need regular cleandowns – which take time and care. Fortunately, the right approach to design can help.

In a zone-based system with decentralized drives, one drive failing doesn't affect the rest of the system – in the ideal setup, it should be possible to swap standardized parts like a replacement drive in and out while other conveyors continue rolling. And don't stop there: look at the fastenings and fixings. Quick releases for belts mean maintenance can happen faster. And smart use of data – collected from an integrated system – means predictive maintenance becomes a normal, scheduled part of line management, with less unexpected downtime.

In the MCP CleanLine (and many others from Interroll) components are designed for low maintenance and ease of cleaning: smooth stainless steel with few places for debris to collect, compliant with hygiene standards like HACCP and water resistant to IPX5. The vast majority of parts need no lubrication, while of course ZPA technology leads to lower abrasion from friction. It's your way to cut downtime and keep conveyors rolling productively.

5. Integrity of product: preventing collisions, bottlenecks, and damage

For major retailers and packaged food buyers, Quality Assurance extends to outer packaging – and a crushed outer box can be cause for rejecting a whole batch. Of course, the solution is to not let packages come into contact under pressure or stop while the belt underneath keeps moving – which ZPA answers. But the problems are more complex than they look.

ZPA maintains carton quality across the whole process

From cardboard boxes to E2 crates, packing media don't stay the same throughout the process: cartons get heavier as they're filled, boxes deform within limits when moving. Effective management means taking account of the stages of the packaging journey, not just a focus on the individual food items within them.

The goal is to keep cartons moving as quickly and smoothly as possible without endless collisions or pile-ups. A smoother conveyor experience, with all the parts – straights and curves – designed to interconnect is a big success factor. However, the biggest win for product integrity lies in how you connect the different zones of your conveyor together with logic.

Sensors on the MCP CleanLine's Zero Pressure Accumulation system prevent most collisions by default: if a conveyor zone is empty it stops. But when those zones are integrated into a system, the benefits combine too. Effective use of Multicontrols lets the zones operate intelligently, using information gathered across the system – leading to fewer impact incidents.

Our pro tip
Look at collision hotspots and manage them away

6. Safety: mitigating risks for workers on the factory floor

Of course, many tasks in food packaging remain the work of human beings – and where people and machines interact, there are always risks. From injury risk to excess noise, work safety was the last of the six big concerns we hear from Line Managers – but not the least.

24V DC and sealed designs prevent injuries on the job

There's more than one type of risk, too. Traditional conveyor drives contain pinch points and dynamic gaps where stray hands can wander; 400V systems carry a greater risk than any household electrical supply. Also, turnover of workers in these jobs is high, meaning safety briefings need to be comprehensive and repeated time and again.

Great design includes great safety – and we've discovered what keeps food safe is safe for humans, too. Hygienic design choices like stainless steel surfaces and sealed drive systems largely eliminate both cross-contamination issues and crush injuries, with no openly accessible chains or shafts; it keeps operations quieter, too. While lower 24V DC means electrical systems can be accessed by non-specialists without risk.

Lower injury rates and a more pleasant work environment don't just keep workers safe; they keep them happier, too. And happier workers stay longer, reducing staff turnover and the need for on-boarding briefings. All delivering line management goals: more productive hours, fewer sick days, and greater worker satisfaction.

Our pro tip
Use human-safe voltages and food-safe parts

CHAPTER 4

Summary and conclusion

Six areas of challenge – and six ways to address them. That's how we see line management in today's food packaging sector: never an easy job, but one with opportunities for improved performance and reduced risk … if you choose a conveyor system that answers your needs. Let's summarize:

- **Costs go beyond the conveyor**
  but energy inputs can be managed, too
- **Business evolves – and so must materials handling.**
  Modularity is the key.
- **Smart Control is more than automating what's manual.**
  It's an end-to-end approach that pays back in volumes.
- **Great maintenance starts with smart choices.**
  Swappable parts, sealed systems, safe surfaces all contribute.
- **Preventing pile-ups prevents business losses, too.**
  ZPA technology and MultiControl integration stops problems before they start.
- **Happy workers are more productive.**
  And they're happiest if you keep them safe.

We'd like to show you how the Interroll MCP CleanLine can answer all six for you. Download our booklet **'energy efficiency in food conveying applications'** to discover the cutting-edge technology of MCP CleanLine and all its other characteristics:

Request MCP CleanLine booklet

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About Interroll

The Interroll Group is the leading global provider of material-handling solutions. The company was founded in 1959 and has been listed on the SIX Swiss Exchange since 1997.

Interroll provides system integrators and original equipment manufacturers (OEMs) with a wide range of platform-based products, solutions and services in these categories: Rollers (conveyor rollers), Drives (motors and drives for conveyor systems), Conveyors & Sorters as well as Pallet Handling (flow storage systems).

Interroll products and solutions are used in express and postal services, e-commerce, airports, the food and beverage industry, the fashion and automotive sectors, and many other manufacturing industries. Among the end users are leading brands such as Amazon, Bosch, Coca-Cola, DHL, Nestlé, Procter & Gamble, Siemens, Walmart and Zalando.

Headquartered in Switzerland, Interroll has a global network of 36 companies with sales of CHF527.1 million and approximately 2,300 employees in 2024.

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