# WHITE PAPER

# 5 ways to reduce **product damage**

## And increase profits

Products of any kind have to face multiple touch-points throughout the supply chain before they are placed onto a shelf for sale.

**Damage can occur at any stage of the journey: packaging, transportation, warehousing, distribution and retail merchandising.**

Primary (typically the retail unit) and secondary (cases, shippers, tray/shrink, bundles) packaging design and material strength is the first line of defence and often the initial focus of attention. Packs are then combined into single 'unit loads that can be easily moved around, usually on pallets.

Ideally, systems-based design is employed to ensure that the individual products and or cases are combined into single unit loads that:

- minimise the amount of material used to protect the product,
- are safe to handle and transport, and
- reduce the use of non-recyclable content.

Good systems-based unit load design will also take into account how the packaging, pallet and material handling equipment will interact.

Five areas of product handing with significant potential to reduce product damage throughout the rest of the supply chain are:

- conveyor function
- case packing
- palletising
- pallet wrapping and
- line integration and control.

### CONVEYING

**Reduce product damage with the right conveying system for your packaging/ production line and the products you are running. Accumulation and buffering should ensure minimal impact force between items.**

Experienced conveyor engineers and manufacturers will consider all the parameters such as line speed, machine efficiencies, type of product and available space to design the best overall production line with maximum throughput.

UP TO

**11%**

of cases arrive at distribution centres damaged.

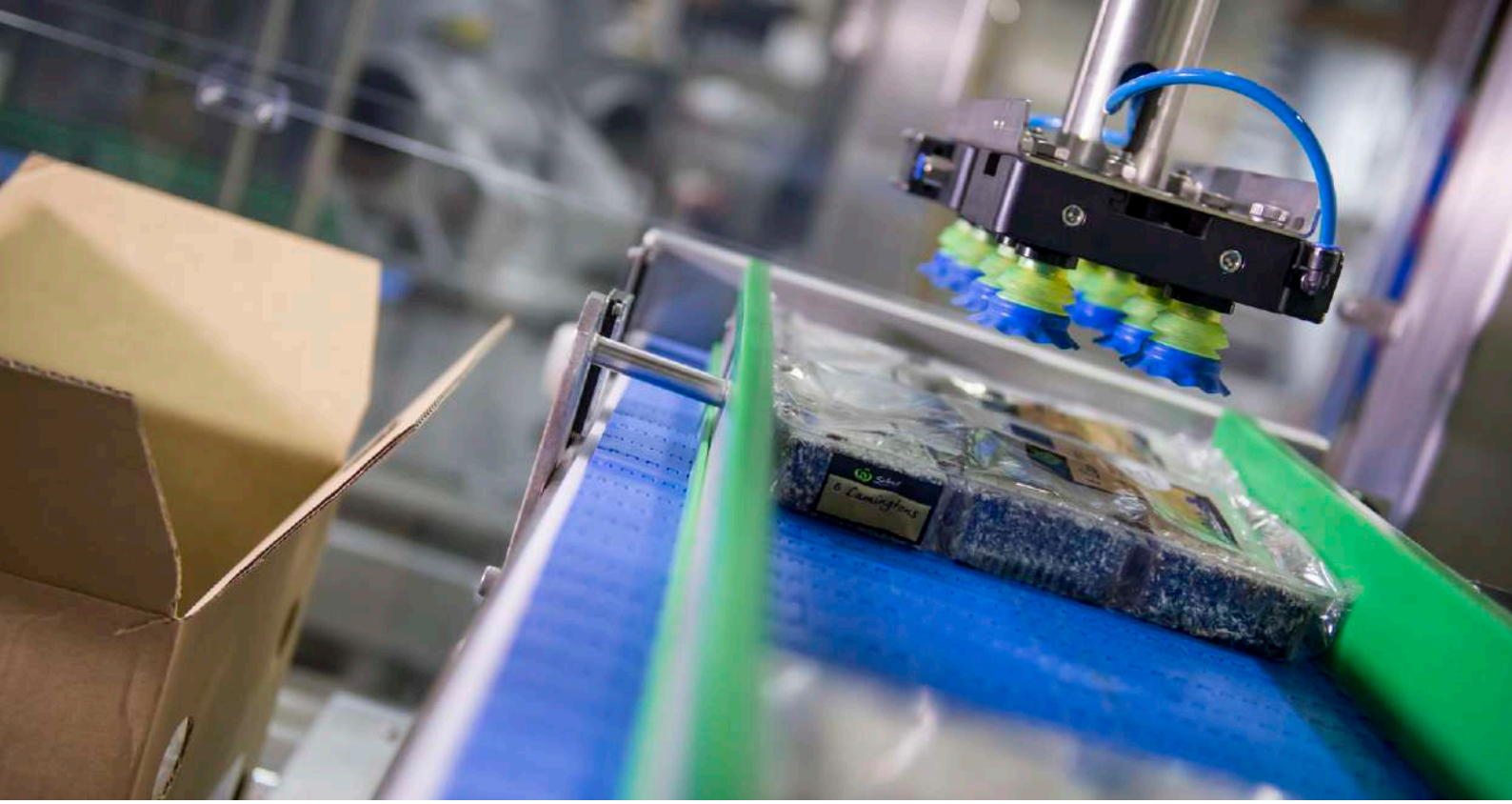
Save

**$$$**

by getting the basics right.

FOODMACH

Automation | Robotics | Integration | Turnkey Projects



Choose a conveyor manufacturer with expertise in your industry. The type, design and capacity of the accumulation equipment and the conveyors themselves are specific to your application.

## CASE PACKING

**Case packing is the most prevalent form of secondary packaging across FMCG. Tray and shrink, shrink-only bundles and reusable crates are less common in the supply chain but can represent significant volumes in some industries and product types.**

Product stacking strength is a key factor in deciding on a secondary packaging format. Cases (and crates) are the best option for products with any risk of crushing under palletising or pallet block-stacking requirements.

Retailers shelf-ready requirements further complicate secondary packaging. Shelf-ready packaging typically involves smaller product counts per pack, often single or dual-facing (how the product presents to the customer on the shelf) requirements and easy opening for presentation– think perforation of a case to allow the merchandiser to remove the top portion.

Design of the secondary packaging, correct sizing, proper loading of the case and the closing and sealing are all critical to getting your product to the customer undamaged, cost-effectively and with the approval of all stakeholders in the supply chain.

Robots and vision continue to find application in case packing, allowing automated solutions for products previously deemed too difficult to handle. Selection of the appropriate packaging format, material and design AND the machinery is of paramount importance. The sign of a quality machine is its ability to run less-than-perfect materials.

## PALLETISING

**Good pallet handing starts with a good quality pallet. Broken or damaged pallets, protruding nails or uneven pallets can all negate your efforts in good primary and secondary packaging design.**

Slip sheets or pallet sheets can assist with minimising issues with products of varying quality.

The use of robotic arms provides a greater range of product handling options (compared to mechanical palletisers), such as grippers, vacuum and fork-style end of arm tooling. Sensors and software can anticipate the crush-ability factor of products/cases and adjust the picking motion to retain their integrity.

Where possible, the pallet pattern should be so tight as to leave no gaps between cases that are stacked next to each other. Gaps allow case sides to deflect, reducing their stacking strength and increasing the potential for product damage.

Rotation of layer patterns interlocks the stack giving increased stability, though cases are always strongest where the sides of cases in each layer are aligned. Layer sheets can be used to stabilise loads but at the cost of extra material.

Using an HMI-based pallet pattern programming software gives operators more control over pallet pattern accuracy, without having to call in help from maintenance or the original equipment supplier or risk running a less-than-optimal pattern.

This software also allows operators to ‘tweak’ a pattern if they see variability in the secondary packaging.

## PALLET STRETCH WRAPPING

**Stretch wrapping is the process of securely wrapping the pallet with stretch wrap to protect and unitise the product. It is essential for secure transport through the supply chain. The process can be manual, semi-automatic or fully-automatic.**

It is estimated that as much as 11% of unit loads arriving at a distribution centre have some level of case damage.

Approximately 50% of damage that occurs during transportation of products is due to ineffective stretch wrapping.

Manual pallet wrapping is time and labour resource intensive. Automated pallet wrapping can improve efficiency, save money through using less film, less labour and further reducing product damage and make your production line safer.

**The benefits are delivered through:**

1. Higher efficiency and productivity:

Automated pallet wrappers can wrap up to 130 pallets per hour to keep up with the fastest production lines.

Even if your output is on the lower side, automated wrapping can significantly reduce the time taken to wrap each pallet, while using less film to wrap the pallet securely and professionally, saving you money.

It also requires no operator intervention so your staff can be more productively deployed.

2. Improved safety:

Measures can be taken to isolate stretch wrap machine operation with proper guarding devices and enclosures such as fixed fencing and automated barrier doors.

This makes for a safer working environment for employees as well as forklift drivers. In addition, automatic pallet wrapping eliminates the back strains and other injuries associated with manual handling.

3. Reporting:

An automated solution can be networked to an integrated line control and/or warehouse management solution, and finished goods reporting can be completely automated for real-time reports.

Furthermore, an automated SSCC pallet labelling solution can also be integrated with a fully-automatic pallet wrapper.

**How do you ensure stretch wrapped product arrives at its final destination in perfect condition?**

The magic lies in getting the containment force right. This is the pressure holding the load together and is created by the number of revolutions of the stretch film multiplied by the tightness of the wrap called the wrap force. The minimum threshold level of containment force on a load determines its success. If the containment force is too low, the risk of an unsecured pallet is high.

There is a trade-off between the wrap force, layers of stretch wrap and throughput. Pre-testing is usually required to get the optimal solution to ensure an effective and efficient wrap pattern.

**Three factors that can build the case for an automated solution:**

- Current and anticipated output: If you have over ten pallets a day and are planning to increase production, you could potentially see a return on investment in a year or so.

- Spend on consumables such as film: You can achieve an average of 250% or more pre-stretch on your film with an automated wrapper, leading to significant savings on film costs alone..

- Cost of damaged goods: Hand-wrapped pallets are inconsistent and can cause product damage, costing you money. Monitoring how much damaged goods in loading and transport costs you can help build a case for automated pallet wrapping.

### Sustainability

Sustainable manufacturing is all about being resource-efficient. It can be about reducing costs by reducing the amount of materials from an input perspective or reducing the cost in terms of disposal costs without compromising the product quality. Manual wrapping methods can at best achieve a stretch of 10 or 20%.

Automated pallet stretch wrapping solutions can pre-stretch the film from between 250% to 450%, saving you material, and money, by up to 55%.

They also wrap without any operator intervention up to 130 pallets per hour, and so they improve efficiency and productivity. If you are using fewer resources and produce less waste, it's going to cost you less.

### What to look for in a pallet wrapper

Your product range, palletiser type and line configuration determine the type of automatic stretch wrapping solution you will need.

Look for multi-level variable pre-stretch, the ability to place film strategically and corner compensation, which eliminates the need for corner posts.

## LINE INTEGRATION & CONTROL

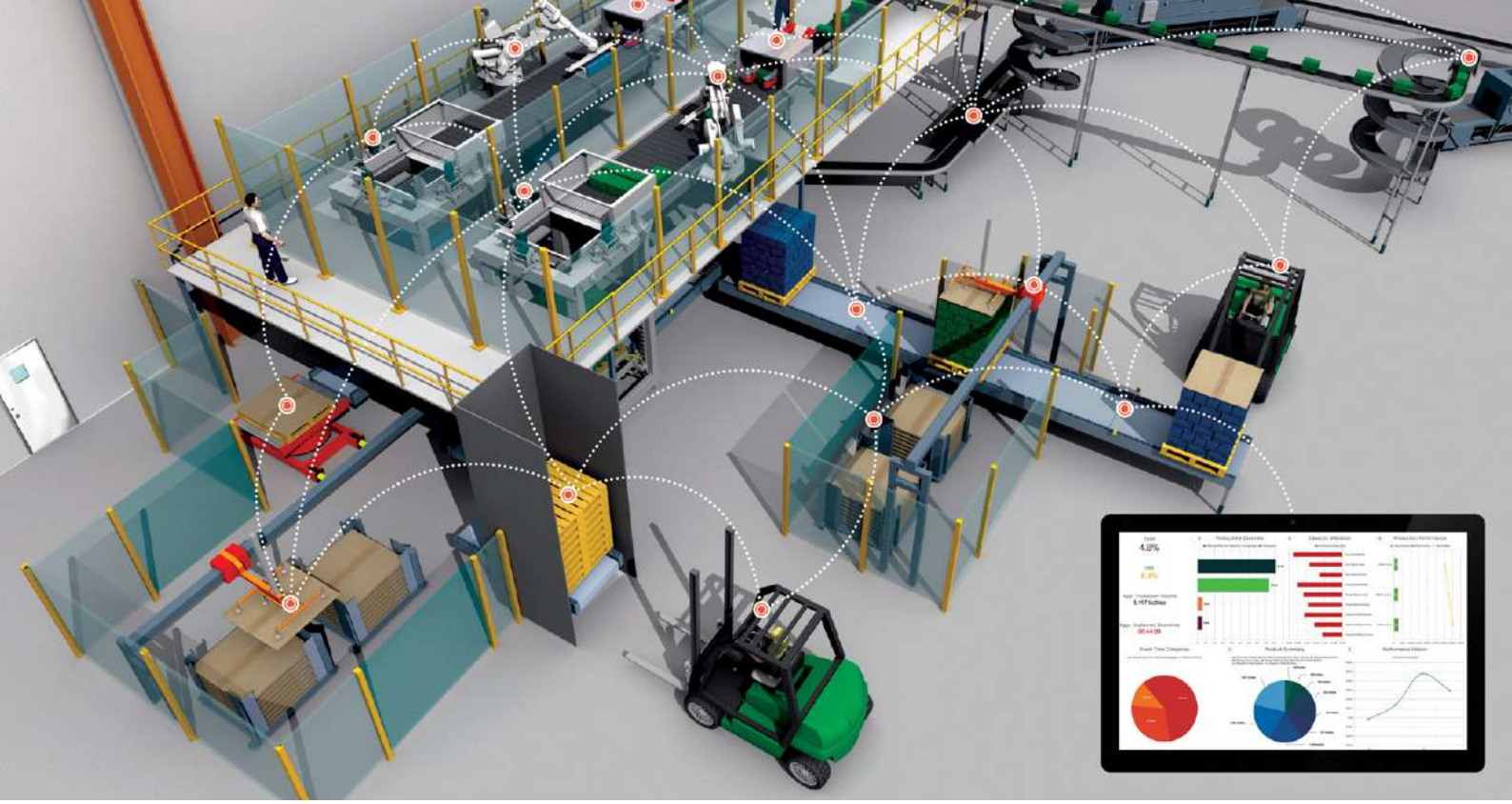
**Overall line performance is dependent on both the equipment and the way the equipment works together. An experienced team of controls engineers and programmers can take an under-performing installation and maximise its productivity.**

Fully automated lines—with automatic changeovers where possible—reduce manual labour so that human resources can be better utilised elsewhere.

All equipment, sensors, software and data analytics are connected through the IoT (Internet of Things) and controlled by a system that can visualise the whole production line and recommend or make decisions independently.

This is where an experienced horizontal integrator comes in. Older machines can be locked into original equipment manufacturer IP and hard to integrate.

A specialist integration team with skills in machine language (OMAC/PackML) can unlock the potential of existing equipment and connect it to a line management system with industry 4.0 capability.



Data collected through the packaging line data can then be vertically integrated with high-level control architecture and consolidated with enterprise resource planning (ERP), manufacturing execution systems and quality management software.

Data-driven manufacturing enables line managers to take effective action based on the information at hand and optimises processes and machine performance.

Quality control and safety are improved, product damage reduced, changeovers are optimised, changing trends in packaging are catered for with minimal disruption and the opportunities for small batch production can be met.

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This list is not exhaustive.

AGVs and AMRs (Automated Mobile Robots) have the potential to reduce damage to products as they are moved around factories and warehouses.

Warehouse and transport damage reduction techniques can and should be used throughout the supply chain.

However, getting the packaging and unitising right will go a long way toward waste reduction.

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Consider getting an audit done on your existing production line to see where improvements can be made.

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*Small tweaks or innovative thinking can reduce rates of product damage without the need for significant capital expenditure.*

FOR MORE INFORMATION


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