

WHITE PAPER

Is cobot palletising right for you?

→ How to decide



As a small-medium FMCG manufacturer, automated palletising can take your business to the next level.

Palletising is the crucial final step in the packaging process before warehousing and shipping.

Traditionally, palletisation has relied on manual labour to place goods or materials onto pallets or bins near conveyor belts or in convenient locations.

Automating this process can benefit to your workforce's health and safety, production costs and product quality.

However, there is much to consider when making the move to automated palletising, for example:

- Reconfiguration of your factory
- Return on investment
- Potential delays to production
- The impact on your staff.

In addition, the type of palletising you'll need is somewhat dictated by the products you make and the production speeds you want to reach.

Workforce considerations

The COVID-19 pandemic has prompted businesses to reassess how they deploy their workforce across their operations.

The era of surplus labour is over, and our ageing workforce is dwindling. The younger generations of workers, accustomed to the fast-paced world of social media and personal communication devices, expect their careers to keep up with technology.

In today's competitive market, where companies vie for a share of the shrinking labour pool, you want to be able to offer exciting job roles that are less about physical work and potential injury and more about adding value to the finished product.

Automated palletising can help you redeploy human resources to other value-adding areas such as machine management, production management and quality control.

Automated Palletising



Protects staff



Protects products



Helps you scale up your business

FOODMACH
TECHNOLOGY PRODUCTS



One could argue that humans are quicker, smarter, stronger or more flexible than machines. Depending on what type of palletising we're discussing, human hands may indeed be faster. However, studies show that automated palletising improves overall efficiency, improving productivity by up to 67%.¹

As well, human bodies are more susceptible to injuries related to poor ergonomics and repetitive movements. No one wants the fall out of a workplace injury, least of all your employees.

Automated palletisers are immune to factors such as fatigue, ergonomic limitations and payload restrictions (within their capacity).

Product quality benefits

A well-stacked pallet protects products so they arrive at their destination safely and in good condition. Automated systems can be programmed to optimise pallet layouts, which can help to reduce wasted space and improve the stability of the load.

In the case of robotic palletisers, robot arms can be customised to handle just about any production challenge and lift a wide range of objects gently without risk of dropping them.

The overriding benefit of automation is consistent accuracy.

A machine can stack a pallet with precision every single time, 24/7, without the need for breaks.

Advances in automation

Automated palletising has historically lacked flexibility. Current-day programming of the robots for new pallet patterns can be as simple as using a drag-and-drop function on an intuitive HMI.

Types of palletising technology:

There are various types of palletisers used in the FMCG industry, including:

High-level palletisers: Receive products from a high-level conveyor and can handle multiple products simultaneously. They are suitable for high-speed production lines and when space is limited.

Low-level palletisers: Receive products from a low-level conveyor and can handle one product at a time. They are slower than high-level palletisers and can require more floor space, but they provide easier maintenance access and are ideal for close coupling with case packers or sealers.

Mechanical palletisers: The transfer system typically consists of a series of conveyors and pushers that move the product loads onto the pallet in the desired pattern. Once the pallet is fully loaded, it is automatically removed from the palletiser and replaced with an empty pallet.

Robotic palletisers: Use robots to pick and place cases, crates or products on pallets. They are flexible and can handle a variety of product sizes and shapes. They are also precise and can handle delicate products without damaging them.

Hybrid palletisers: Combine robotic and conventional palletising techniques. They offer the flexibility of robotic palletisers and the high capacity of conventional palletisers, typically used in high-capacity applications.

CoBot palletisers: Collaborative robots are designed to work safely alongside human workers without safety barriers or fencing. Typically easier to program and



operate than traditional robots, reducing the need for specialised skills and training—and more affordable.

The choice of palletiser will depend on a manufacturer's specific needs, including product type, product weight, production speed, floor space, and budget.

Types of Palletising Systems:

There are two main types of systems: centralised and decentralised.

Centralised palletising involves consolidating all goods produced in a single location where palletising occurs. One main robot or mechanical system has multiple conveyors feeding into it.

This system can handle more conveyors without issue and works well when product lines remain constant.

However, if the palletising system goes down, production stops completely. Additionally, one program must be changed for varying products.

Centralised palletising is most beneficial for companies with large-scale operations that require high-capacity palletising.



Decentralised palletising

involves multiple independent stations located throughout the factory floor where convenient for production. One or two conveyors feed multiple smaller mechanical or robotic palletisers.

This system is useful when fewer conveyors are needed or can be accommodated and when product lines are changeable. The program can be altered for one robot while the others remain the same, and if one robot goes down, production does not come to a complete standstill.

Decentralised palletising is best for companies with smaller operations or those that require greater flexibility in their palletising operations.

Mechanical or Robotic?



One of the significant benefits of mechanical palletisers is the lower initial investment cost.

Mechanical palletisers are typically less expensive to install than robotic palletisers. They are also easier to maintain, and maintenance costs can be relatively low.

Mechanical palletisers are also more straightforward to operate, requiring minimal operator training. They have a

high production capacity and can handle heavy loads without difficulty.

For specific high-speed applications with rigid, cube-based shapes, they can perform at very high speeds, up to 100 cases per minute or more.

However, there are some downsides. Mechanical palletisers lack flexibility and may not be suitable for handling different product sizes and shapes.

Additionally, mechanical palletiser can be less accurate in placing products on pallets than robots. They also require more floor space than their robotic counterparts, which can be a disadvantage in facilities with limited space.

On the other hand, robots, and their cousins, collaborative robots, known as cobots, offer:



Flexibility: Robots and cobots can handle a wide range of product sizes, shapes, and weights without requiring additional tooling or modifications. This flexibility enables them to handle different products without significant downtime or reconfiguration.

Precision: Robotic palletising is precise. Robots can stack products more accurately, reducing the risk of damaged products and rejected loads.



Speed: A drawback of a pick and place robotic system is speed—cycle time constraint may limit speed to around ten cycles per minute. When used in a hybrid robot/conventional palletising system, however, speeds of up to 80-120 cartons per minute can be achieved, enabling companies to increase production speed and output.

Efficiency: A single robot or cobot is potentially able to assemble multiple pallets simultaneously. Also mixed pallets if used with a vision system.

Floor Space: Robots and cobots require less floor space than mechanical systems, which is beneficial for companies with limited space or looking to optimise their floor space. Cobots in particular are space-saving, in that they don't require safety fencing at lower speeds.

Customisation: Robots can be customised to meet specific requirements, including palletising patterns, product types, and speeds, for a more efficient and effective palletising operation.

Selecting a palletiser

It really depends on the products you need to palletise. **Assuming that you're a small to medium-sized manufacturer,**

you'll no doubt be tight on space, require a lot of flexibility and will most likely benefit from a decentralised system that uses robots.

Robot selection

There's literally a robot for every application. Robots are specified according to the speed at which the packaging line must advance in cases per minute, the required reach, and the weight of the products in the cases. It's also essential to choose the correct robot end effector to pick and place your products.

Cases can usually be picked up by a vacuum gripper, though trays and crates will require a mechanical gripper. The correct choice will ensure effective gripping and won't damage your product packaging with markings.

Other important factors to consider are whether the robots will handle slip/tier sheets or pallets and how the system will adapt to future packaging changes.

Speed of deployment

Supply of a robotic palletiser generally involves calculating the correct centre of mass and payloads for products, determining the robot arm reach to

maintain the centre of gravity and, unless it comes with excellent software, minimising changes in the pallet configuration. However, this approach can be time-consuming and complex.

Cobot palletising opportunities

A smart cobot solution offers several advantages.

The software-managed centre of mass and payload values are based on the end effector's capacity and can be easily adjusted.

The reach and limitations of the cobot arm are also managed by software and an online simulator can be used for layout and testing purposes.

Overall, a smart cobot solution offers a more economical, streamlined and efficient approach to palletiser deployment, saving time and reducing complexity.



Cobot palletising provides

Flexibility:

- To handle multiple products that require:
 - Different pallet layer stacking patterns for different SKUs.
 - Flexible gripper systems, (i.e. interchangeable foam pads, suction cups or mechanical grippers) to suit different package styles.
- To suit variable production, i.e.:
 - Palletisation capacity requirements can fluctuate on a weekly basis.
 - The palletiser needs to be moved around to suit production schedules.
 - Pallet dimensions and weight require frequent adjustments.

As well:

- Efficient cobot systems feature a simple interface to make changes without any prior experience in programming.
- Mobile versions do not require the entire factory to be reconfigured.
- They're an economical way to see if automated palletising is a fit for your business.

Until recently, the drawback with cobots has been a low payload (generally less than 10kg*) and lower speeds (approx. 10 cycles or units per minute).

*However, there is now a cobot palletiser on the market that can handle up to 18kg at 10.5 cycles per minute and can palletise to two SKUs to two locations simultaneously with automatic layer sheet placement. Requiring no programming or teaching, it wheels into place and opens up the possibilities for small-medium manufacturers.

Instant Palletiser Model	Description	Pay-load	Cycle Rate cases/min	Pallet Stack Height mm
S	No zone scanners	18kg	6.5	1,550
HS	Includes zone scanners	18kg	10.5	1,550
THS	Includes zone scanners and telescopic mast	18kg	~8.0	2,500

For more information: <https://foodmach.com.au/capabilities/packaging-technologies/cobot-palletising>

Extra Costs to Factor in:

To accurately calculate the return on investment (ROI), all costs associated with implementing a palletiser solution need to be factored in.

In addition to the initial purchase price, you'll also want to consider:

1. Maintenance
2. Spare parts costs
3. Costs of safety features such as fencing
4. Delivery times for critical parts
5. Regular software updates or changes when new SKU's require new layer patterns.

The cost of conveyor line controls that shut down the system in case of palletiser malfunctions should also be taken into account, especially if there is no human interface nearby to monitor the system.

All necessary programs should be included in the initial purchase price, without the need for add-ins.

Additionally, the palletiser should be able to orientate barcodes and QR codes in a readable way for the warehouse and shipping department, as well as any transportation companies involved—such as trucks, trains or sea vessels—and the final customer.

It's essential to consider programming code flexibility to address minor production problems and ensure the palletiser can adapt to changes in package variety.



Workforce Buy-In

If you're considering introducing automation to your business, the first reaction from staff will be concern about their job security, which is understandable and valid. Conversely, most employees do not enjoy monotonous and unchallenging tasks and will be glad to see them gone. Assuming that, like most Australian manufacturers, you're struggling to find enough staff and very much want to keep the employees you do have, you'll want to help them understand the benefits automation can provide—for a safer and ultimately more satisfying workplace.

Choosing a partner

Your palletising partner will need to engage with employees at all levels, from engineering to production to operators and line workers.

Doing so will ensure your new system is fully integrated into the production process and meets all performance requirements. The selection of palletising technology that's perfect for you involves conducting on-site visits and observing the existing process flow, from the initial stages to the final shipping system.

In Summary

There's a palletiser solution for any application, whether big or small. Automated palletising is no longer only suitable for high-volume manufacturers. Decentralised cobot systems have opened up new applications for palletising, making it more accessible for both large and small companies.

To ensure the successful implementation of a palletiser, partner with a solution provider or integrator who can work seamlessly with your production team.

About Foodmach Technology Products

The Foodmach name is synonymous with palletising in Australia, with over 50 years of experience in the fast-moving consumer goods industry. Our Technology Products division finds the world's best packaging technology to complete our turnkey packaging line offer and delivers it to our customers with exceptional levels of service and support.

References:

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