

# A U S T R A L I A N DAIRY FOODS

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Responses in lockdown

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2003



2016



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# Can you future-proof your packaging line with today's pack formats?

Consumer demand for portion control, convenience, packaging innovation, sustainable packaging and authentication has led to a bewildering array of smaller-sized and cleverly designed dairy-packaging formats. Phil Biggs looks at a how-to guide for dairy packagers.

While the range of what's now available in smaller pack format is potentially disorienting, on the positive side there's increased use of renewables in primary and secondary packs. Supermarket shelves are filled with exciting shapes that draw the eye, containers that stack well in the fridge or in lunchboxes, and that are also easy to hold, use and consume.

However, there are drawbacks for the automated packaging of new styles, where an increased number of formats requires frequent changeovers and more flexible handling than most older lines can accommodate.

Given the current progression in plant-based packaging and plastic alternatives, it seems there's no end in sight to the changes that packagers will be required to accommodate. In addition, recycled materials tend to contain more variations and can be harder for equipment to handle. Then there's the headache of traceability



*An investment in equipment is fraught with risk if packaging formats keep changing. The solution is twofold: packaging automation needs to be flexible, and equipment needs to be carefully integrated.*



**Phil Biggs**  
Director  
Packaging Partners

## About the author

Packaging Partners is a packaging-automation system integrator. With its own IP around palletising and de-palletising, its umbrella spans several machinery manufacturers and distributorships, with a focus on the dairy, food & beverage sectors.

and applying coding to different shapes and substrates. Shelf-ready packaging is almost a given in some product categories – which is an extra hurdle. Increased demand requires increased production rates, so extra speed is needed as well.

With the introduction of Industry 4.0, where data from each product and machine on a packaging line is fed into higher-level management systems, managers are under pressure to modernise their packaging lines. The march of progress is inevitable – Industry 4.0 creates full transparency across supply chains and is a requisite for traceability initiatives. Most older machines are locked into legacy protocols that make it difficult to connect them to an Internet of Things (IoT) solution to mine their valuable data.

At a time when the dairy industry is hardly feeling flush with cash – certainly compounded by COVID-19 – huge capital outlay for an all-new digitised packaging line isn't an option for everyone. And any investment in equipment is fraught with risk if packaging formats keep changing.

So what's the answer?

The solution to the problem is twofold: packaging automation needs to be flexible, and equipment needs to be carefully integrated.

## Flexibility

The equipment itself must be flexible enough to be upgraded over time to suit new packaging formats, speed, safety, hygiene, traceability and reporting requirements. Retrofitting is sometimes possible. Safety upgrades are always recommended and required by law if machines are relocated.

For handling a wide range of products in random or frequently changing patterns, robotic arms with tailored end-of-arm tooling are the safest option. Pick-and-place loaders can organise products that arrive in a random order from upstream processes. Vision technology adds a set of “eyes” and ensures that products and packages are positioned correctly and meet quality standards.

Robotic de-palletising, palletising and case packing offer fast changeovers and easier packing or palletising pattern adjustments. Packing cases on an angle uses gravity to prevent products moving within the carton, enabling historically difficult products to be packed automatically, and thus reducing costly labour. Fancy new stackable cheese packs, we’re looking at you!

Look for compact equipment with small footprints to reduce overheads. Consistent human-machine interfaces, or “HMI”, make it easier for operators to manage the line and minimise changeover times. Multi-functional machines are convenient, but make it harder to upgrade just one of those functions further down the line. Sometimes separate pieces of equipment are warranted.





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*Integration refers to both the conveying that connects equipment and machine-to-machine communication.*

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Well-designed machines can handle all the vagaries of recycled and alternative materials without jams and stoppages. Choose a system that handles the broadest range of discrepancies and can very quickly handle rejects to avoid delays.

Smart conveyor design can account for accumulation and buffering issues, keeping the line moving and downtime minimised. Optimised line speed is not just about faster machines with faster changeovers. Buffering and accumulation are the keys to maximising line output. Accumulation is the temporary collation of product for downstream processes. Buffering is the process by which the collated products are delivered to downstream processes at a different rate to what they are received.

Conveyors and accumulators can be designed with buffering capability, which helps to account for minor stoppages in upstream and downstream equipment without causing downtime. Although short delays for setting up machines or correcting jams are a normal part of any production line, if they cause the line to stop they can add up over time.

And if manual packing is still the order of the day, but it's unable to keep up, new automation can quickly pay for itself. For example, automated pallet wrapping can save up to 55% on film costs and free up staff for more critical jobs. With a bit of clever thinking around production line layout and timing, one pallet wrapper can be used for multiple lines.

## Integration

Success in end-of-line packaging also depends on how well the various pieces of equipment used in the process are integrated. Getting each of the machines – fillers, case erectors, shrink wrappers, labellers, case packers and sealers, conveyors and the like – to do their job at the right time and the right speed is a bit of an art form. Without proper integration, at the very least backlogs and equipment jams develop; at worst, the line stops altogether. Small stoppages add up over days to hours of lost production.

*Well-designed machines can handle all the vagaries of recycled and alternative materials without jams and stoppages.*

Integration refers to both the conveying that connects equipment as well as machine-to-machine communication. When choosing an integrator, be aware that not all integrators handle all mechanical, electrical, software and automation aspects of a project. Getting all the equipment on a line “talking” to each other is a top priority. The best integrators will ensure that the machine software is correctly programmed, that it works together with every machine on the line, which in turn works with all the others. At every juncture, there will be an electronic “handshake” that signals the next piece of equipment to take over. If the timing isn't perfect, a fault could be detected and operations suspended.

Machine-to-machine communication is the basis for digitisation and Industry 4.0. Equipment is connected through the Industrial Internet of Things (IIoT) to provide data for management systems.

It is possible to integrate both old and new equipment on a packaging line, but it does require a particular skillset. It's inadvisable to use a band-aid approach by layering a simple data-mining protocol on top of old equipment to create an IoT solution. Legacy machines were not designed for the multiple data points required by modern IoT and management systems, and the security risks outweigh the benefits.

In general, you'll want to look for an integrator with experience in OMAC (Organization for Machine Automation and Control) and/or PackML (Packaging Machine Language) for connecting machines on a packaging line. PackML standardises machine interfacing and tag names. It is considered an important step towards Industry 4.0 – open-source communication standards that simplify system designs. PackML enables operators to obtain consistent data from different machine brands with different control systems, maximise performance, isolate issues and make changes without calling in a software engineer.

Combined with the skill of the integration team, PackML provides a way to unlock the potential of legacy equipment and connect it to a line management system with Industry 4.0 capability.

Line Management Execution Systems, or LMES, link all the equipment together, creating paths for data and vertical integration with higher-level management systems such as supervisory control and data acquisition (SCADA) systems, manufacturing execution systems (MES) or enterprise resource planning (ERP) level systems. This can be done through the cloud or through via an on-site system for further analysis.

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Integrators with Industry 4.0 expertise can bring older packaging lines closer to full digital integration for less investment.

As a side note, when it comes to the all-important product traceability equipment, it's vital to consider a software platform for your packaging line that can integrate any brand of coding and labelling equipment into a central code management control platform.

### Beware the juggle

Finally, managing a line upgrade and juggling several different OEMs (Original Equipment Manufacturers) can be a complicated task.

OEM equipment – both old and new – may have different compliance standards for machine coding, and it can be costly to request each one to upgrade their equipment. Older machines on the factory floor, as well as new equipment from overseas, often do not meet Australian safety standards and need documented safety upgrades. Importing new equipment comes with its very own challenges.

Using a turnkey project manager that handles all the OEMs, manages timelines, importation and does the integration and safety compliance for you will save time, money and more than a few grey hairs. Start with a line audit and see what can be achieved within your budget. ■



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