July/August 2017
Vol.25 No.3

what's new in food technology & manufacturing

Spaghetti science

PP100007395

Bakery, cereal & grains | foodpro 2017 | Transporting food

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July/August 2017

READ ONLINE!

This issue is available to read and download at

www.foodprocessing.com.au/magazine

Better get your skates on if you want to get to foodpro 2017

As this magazine reaches you, foodpro 2017 is happening! Yes, right now — well, actually from July 16–19 at the ICC, Darling Harbour, Sydney.

At this trade-only event, the largest foodpro ever, innovations across the entire food and beverage processing industry are the order of the day. You won't just see the same old, same old — there really is some nifty stuff out there.

Entry to foodpro is free for those in the industry but entry is faster if you preregister. Just visit www.foodproexh.com to register.

Having been responsible for organising foodpro since 1993 (yes — nine foodpros), event director Peter Petherick insists that the rate of change in the food industry has never been faster as new technologies become more affordable and easier to implement.

"We're seeing the creation and development of products that are responding to industry problems with sophisticated solutions. What was once blue-sky thinking is now a reality as the likes of advanced robots and 3D printing become commonplace in food warehouses and factories, and the innovations on display at this year's event represent the next wave of technology to sweep the food processing and manufacturing industries. The show floors of foodpro will make visiting mandatory for anyone with an interest in the future of food processing and technology," said Peter.

When you come to foodpro you'll find the exhibitors spread over two floors of the ICC. Make sure you 'do' both.

On level 1, come and visit the *What's New in Food Technology & Manufacturing* stand (P20). We are celebrating our quarter century and have cakes and dancing cow stress balls to give away. More importantly, we can reregister you to make sure you continue to receive this magazine and associated eNewsletters and our sister title, *Prepared Food*, for free.

I know you have already been sent this magazine, but the rules are that unless we can prove you are real at least once every three years we drop you from our mailing list!

So come to foodpro and come to see us as well.

Janette Woodhouse
Editor
jwoodhouse@wfmedia.com.au
www.foodprocessing.com.au

foodpro 2017
When: 16–19 July 2017
Opening hours: Sun: 11 am – 5 pm; Mon & Tue: 10 am – 5 pm; Wed: 10 am – 3 pm
Where: Sydney International Convention Centre Exhibition Building Darling Harbour
Registration: Register online for free entry at www.foodproexh.com

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Food FOR thought

Opportunity for NSW food processors to show their wares at Fine Food Australia

Fine Food Australia gives food and beverage processors an opportunity to show their fine food products to potential purchasers.

The exhibition attracts almost 27,000 visitors, 4500 buyers and more than 1000 Australian and international exhibitors. It presents new and innovative products from around Australia and from more than 45 other countries, as well as live demonstrations, masterclasses and industry-recognised competitions.

This year's Fine Food Australia will be held from 11–14 September at the International Convention Centre Sydney at Darling Harbour.

And your company can be there. Up to 16 selected NSW food businesses will be able to be part of the NSW Department of Industry's stand at the exhibition.

But you need to get in quickly as the closing date to register your interest is next Friday, 31 March.

"This event is Australia's largest trade exhibition for the food and beverage industry, so it presents a great opportunity for food businesses to promote their products and services to a very large, targeted audience," said Graeme Cuthbert, NSW Department of Industry Skills and Economic Development acting deputy secretary.

"At Fine Food Australia, NSW companies can meet potential buyers, get up to date with the latest trends and check out their competition. Participants on the NSW stand in 2016 reported that they generated leads from both overseas and interstate. I encourage NSW food producers who want to grow their business to submit their expressions of interest now."

"Fine Food Australia is an opportunity to get exposure to retailers as well as meet customers from overseas locations like Singapore or Hong Kong that we wouldn't normally meet, as it draws those people. It is definitely an opportunity to raise profile and allow us to continue to build brand awareness, as well as giving us the ability to show new products," explained Martin Talacko, founder of previous Fine Food exhibitor Saldoce Fine Foods.

As a Sydney-based manufacturer of allergen-sensitive and gluten-free foods, Saldoce is exporting about 20 varieties of product to countries including China, Hong Kong, Malaysia, the USA, Taiwan, Thailand, Singapore, New Zealand, India, the Philippines and Papua New Guinea, as well as the Middle East. The company reports continued growth in exports, which expanded about 30% last year alone.

For more information and to register an EOI, go to www.industry.nsw.gov.au/finefoodaustralia.

AIP to host the 2018 WorldStar Awards

During Interpack 2017 it was formally announced that AIP will be the host World Packaging Organisation (WPO) member for the 2018 WorldStar Awards.

The WorldStar Awards are run by the WPO and are intended to demonstrate innovations in the state of packaging design and technology, exemplifying a living standard of international packaging excellence.

WorldStars are presented only to those packs which, having already won recognition in a national or regional competitions, are compared by an expert panel of judges to similar packs from around the world. The 2018 WorldStar Awards will run as a part of the biennial AIP National Conference, which will be held from 2–3 May 2018 at the Marriott Hotel, Surfers Paradise, Queensland.

Campylobacter doesn't like the cold

A patented rapid chilling process has been found to help poultry processors and retailers reduce *Campylobacter* contamination.

Campylobacter, a very common cause of food poisoning, is prevalent in fresh poultry. Now, extensive trials followed by a full commercial installation have shown that Air Products' Freshline SafeChill system can achieve significant results in reducing *Campylobacter*. This outcome has been verified by an independent laboratory.

The automated intervention system uses super-chilled air to reduce *Campylobacter* on poultry carcasses after evisceration.

The Freshline SafeChill system can be used alone to reduce *Campylobacter* presence in poultry or in combination with other interventions to ensure security of treatment depending on the levels of *Campylobacter* contamination.

For processors, the technology can be easily integrated into existing production lines and offers flexibility in the treatment programs based on the factory's needs and the level of contamination of the poultry. The system is modular, can operate three shifts a day and supports current and future production line speeds. The treatment time lasts 30 to 50 seconds and maintains the quality of the poultry meat and skin at all times.

Sensor technology helps detect aflatoxin

TOMRA, a manufacturer of sensor-based sorting machines for the food industry, has collaborated closely with food manufacturers and processors to help detect aflatoxin from the food manufacturing process to ensure food safety.

Identifying contaminated food with the dangerous toxin aflatoxin, which can contribute to developing liver cancer, is technically avoidable but often cannot be directly controlled by members of the public.

Aflatoxin, a toxic natural substance produced by fungus and mould found in certain foods, can be found in a number of food types but is most commonly found in grains such as rice and corn, soybeans, certain cooking oils, nuts and particularly peanuts. It generally grows in damp environments such as storehouses that are not kept below a certain humidity level and can quickly spread once it develops, infecting other food and products.

As it is colourless and tasteless, it can be extremely difficult to recognise. The substance can also withstand temperatures up to 280°C, meaning it cannot be destroyed or removed by cooking or boiling. As a result, many traditional methods are ineffective at detecting or removing aflatoxin.

Aflatoxin is not only a major health threat, but also a commercial and logistical issue for many food exporters. Grains and nuts exported from some countries, such as China, are frequently rejected by customs officers at international borders due to excessive aflatoxin levels. This is further compounded by the differing restrictions on permitted levels in many zones, ranging from 2 µg/kg in the EU to 20 µg/kg in the US.

TOMRA has worked closely with food manufacturers and processors to conform with the strict food safety standards enforced by many importing countries. The Detox laser utilises a special optical design that can find aflatoxin contamination. It works by identifying the extremely low intensity of light reflected by the aflatoxin mould and fungus in a variety of food types, from peanuts, almonds and hazelnuts to dried fruit such as figs. Infected food can then be removed and eliminated from the production process, helping to ensure a compliant end product.

Packing PET bottle multipacks without secondary film

Nature MultiPack, developed by NMP Systems and KHS, has been getting a lot of attention in Europe because it obviates the need for any visible secondary packaging for multipacked PET bottles, as the bottles are held together by dots of adhesive. This system offers considerable savings in materials and won the German Design Award for outstanding communication design and sustainable packing in 2016.

However, recyclers were concerned as to whether or not the specially developed adhesive for the dots would impact on the quality of recycled PET.

Following testing, the European PET Bottle Platform (EPBP) has confirmed that the glue can be fully recycled. It seems that the dots are removed by friction during the washing process and then separated from the PET flakes because the dots float to the surface of the cleaning medium.

EPBP's interim approval is valid until 30 June 2019, with permanent approval expected after further testing.

Rabobank to invest in early-stage food and agri companies

Rabobank is launching the Rabo Food & Agri Innovation Fund, a venture capital fund for innovative food and agricultural companies that is part of Rabo Private Equity. The fund plans to invest in high-potential, early-stage food and agricultural companies in Western Europe and in the United States. One of the fund's objectives is the promotion of innovation in the food and agricultural space.

"The fund focuses on companies that are in support of Rabobank's Banking for Food strategy. This strategy focuses on contributing to food security in the context of a rapidly growing world population, changing demographics and consumption patterns, and an increasingly complex food system," says Lizette Sint, global head of Rabo Private Equity.

"We consider investments all along the food and agri value chain, with a particular focus on ambitious companies that operate in sectors in which we can optimally leverage the bank's knowledge and expertise, network and position to help create shareholder value," said Richard O'Gorman, who leads the investment initiative as part of Rabo Private Equity.

The fund's investments will consist of more than just financial support. Rabobank will be a close investment partner and provide companies it selected full access to the bank's food and agricultural experts and networks in order to build long-term value together.

Food FOR thought

Ingestible sensors pass human trials

At Digestive Disease Week, to be held in Chicago in May, RMIT researchers will announce the successful completion of phase one human trials of ingestible capsules. These ingestible smart capsules, the size of a vitamin pill, journey through the gut and measure gas levels in the gastrointestinal tract.

The ingestible technology has demonstrated several thousand times more sensitivity to gut gases than alternative techniques and has the potential to revolutionise the prevention and diagnosis of gut disorders and diseases.

"Currently, one of the only methods for diagnosing gut disorders, such as malabsorption of carbohydrates, irritable bowel syndrome and inflammable bowel disease, is to measure hydrogen concentrations in the breath," said the pill's co-inventor, Distinguished Professor Kourosh Kalantar-zadeh.

"However, breath tests are mired by a lack of sensitivity and specificity and are unable to provide the necessary gold standard for diagnosis."

Co-inventor Dr Kyle Berean said: "Ingestible sensors also offer a reliable diagnostic tool for colon cancer, meaning that people won't have to undergo colonoscopies in future."

A key finding from the initial trials was just how safe the new technology is.

"Smart pills are harmless and there is no risk of capsule retention," Berean said.

An added advantage is that the capsules can be synched with smartphones, meaning results are easily accessible by users and doctors online.

The potential applications from this technology are profound.

"The sensors allow us to measure all the fluids and gases in the gut, giving us a multidimensional picture of the human body," Kalantar-zadeh said. "Gas sensing is just the beginning."

The human trials were undertaken in collaboration with colleagues from Monash University, who have since been praised by Kalantar-zadeh.

"We have been lucky to have Monash medical academics helping us on this journey," he said. "Without their input, we would not be able to proceed."

A paper by the Centre for Advanced Electronics and Sensors (CADES) research team outlining the future of ingestible sensors has been published in the April issue of *ACS Sensors*.

Wheat farmers offset climate change impact with technology... but for how long?

Technological advances have enabled Australian wheat farmers to offset the effects of climate change in the past 25 years; however, a reduction in yield potential over that time indicates a future risk to the $5 billion industry, CSIRO research has found.

Australia's average wheat yields, which more than tripled between 1900 and 1990, did not increase from 1990 to 2015. The research found that during this 25-year period, the nation's yield potential actually declined by 27%.

CSIRO team leader Dr Zvi Hochman said the study found that Australia's wheat-growing zone had experienced an average rainfall decline of 2.8 mm or 28% per cropping season, and a maximum daily temperature increase of around 1°C from 1990 to 2015.

These observations are consistent with the higher end of future climate change projections for the wheat zone over the coming 26 years.

The findings, published in the journal *Global Change Biology*, indicate a risk to the future prosperity of Australia's wheat industry, which contributes around 12% of the total wheat traded globally.

Dr Hochman said despite the adverse trend in growing conditions, wheat farmers have so far managed to maintain yields at 1990 levels of around 1.74 tonnes per hectare. He said this indicated wheat farmers were making the most of developments in farming technology; however, their best efforts were merely enabling them to keep pace with the impacts of a changing climate.

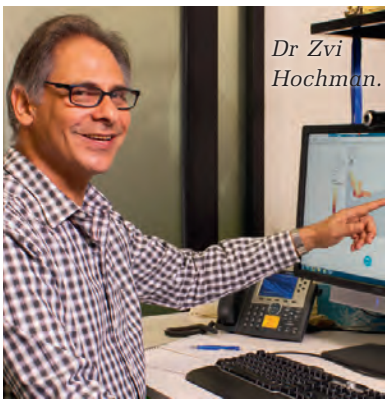
The study analysed 50 weather stations with the most complete records across Australia's wheat-growing regions, spanning five states from the east to the west coast.

Wide annual variation in climate, yield potential and actual yields are normal in Australia; however, the probability of seeing the trends shown by this study across 50 weather stations over 26 years through random seasonal variability is less than one in 100 billion.

"Assuming the climate trends we have observed over the past 26 years continue at the same rate, even if farmers continue to improve their practices, it is likely that the national wheat yield will fall," Dr Hochman said.

"We estimate that the recent average yield of 1.74 tonnes per hectare will fall to 1.55 tonnes per hectare by 2041.

"The 2016 season is expected to result in a bumper crop; however, our preliminary estimates show that yield potential in 2016 was about the same as in 2010. So, yield potential was high, but not exceptional."



Dr Zvi Hochman.

Credit: CSIRO

Although the study focused on wheat, the CSIRO said the findings would be broadly applicable to other cereal grains, pulses and oilseed crops, which grow in the same regions and same season as wheat.

Considered introducing a Drug and Alcohol testing program at your workplace?

Pathtech are Australia's largest supplier of saliva based detection devices within Australia with extensive experience in the Food Production and Manufacturing Industry. Our devices can be used to support an in-house testing program, or alternatively, we can assist with identifying a testing provider for your workplace.

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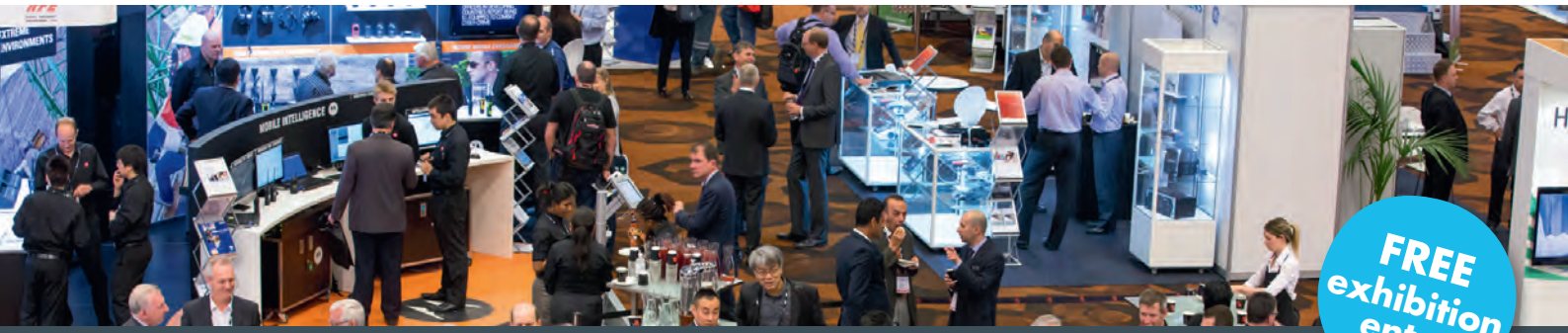

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Dr Karen McDonnell
Immediate Past President
IOSH
(United Kingdom)

Stephen Woolger
Manager Health & Safety
Gold Coast 2018 Commonwealth Games Corporation

SPEAKERS INCLUDE:

Glenn Barlow
Product Services Global Sales Manager
SAI Global

Michael Tooma
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Tim Fleming
General Manager HSE – Australia Hub
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Anna Blaikie
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what's new in

Food

technology & manufacturing

bulk handling

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The rigours of transporting food safely

A prevailing trend in the cold chain is the focus on quality and product sensitivity. With an increase in demand for premium products, shippers must maintain the integrity of these loads.

A change in temperature may jeopardise the quality and taste of these goods. Not only do shippers, loaders and receivers need to ensure the temperature settings are correct for transport and arrival, but they also have to combat:

- Exterior heat — When temperatures increase outside, the metal of trailers absorbs this heat and transfers it inside. Reefers must be calibrated to handle heat increase or spoilage will occur.
- Residual heat — Once heat rises within a trailer, it tends to remain. The insulating materials within work together with the load to capture and radiate the heat within.
- Infiltration heat — Any opening or holes within a trailer allow for warm air to enter and cold air to exit, increasing the likeliness of spoilage.
- Respiratory heat — Natural heat produced by product respiration is standard. However, certain products give off more than others. Respiration can be mitigated by keeping these items at cool temperatures. However, if your trailer is compromised, your delivery will be, also.

If these types of heat issues end up compromising the shipment, they become known as 'excursions'. Excursions are typically unwanted temperature events that occur during manufacturing, storage, transportation and distribution.

When these events occur, they must be properly recorded for official record keeping. This process is both time consuming and labour intensive. Typically, a member of Quality Assurance (QA) will begin to collect all required data, determine if the parties involved addressed the data outcome and whether or not the information was recorded correctly. While this synopsis of the process portrays it to be brief, the reality is that this process can take up to 30-plus days to complete.

The amount one excursion event can cost a business is staggering. Consider this: 5–10% of shipments experience excursions. So depending on the volume of shipments a business does each year, these costs can quickly add up to an exorbitant amount, further hurting profitability.

However, the loss of product quality isn't the only issue an excursion may cause. They also increase the odds of product recalls and food waste.

Recalls

Inconsistent temperature monitoring not only damages products, but the bottom line, too. For a more informative view, examine food recalls. Since recalls are mandated by regulatory requirements, they prevent human and financial disasters that would have occurred otherwise. The impact of those food recalls is widespread and costly. In a survey of 36 major

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With average processing facilities charged with moving many thousands of products per day, the importance of optimising production, while satisfying strict FSANZ sanitation standards, is critical. The types of drive systems you run are key to determining the level of your operation's success.

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> *The amount of waste created along the supply chain each year is enough to feed the hungry and malnourished people of the world three times over. While waste is inevitable, even a 50% improvement would be able to feed those most in need.*

international food companies by the Grocery Manufacturers Association (GMA), more than half (55%) reported experiencing a product recall in the five years prior, with the cost of many of these recalls reaching well into the tens of millions, some even costing more than $100 million.

Behind these numbers lurks a bigger problem for which there is no accurate financial estimate: loss of consumer trust. Recent surveys, such as the 2015 Food Value Equation Survey by Deloitte Consulting LLP, find consumers are seeking more reassurance about their food. There are significant numbers of inquiries regarding where and how food is being manufactured and distributed. Failure to meet these changing consumer expectations can result in serious consequences, and impact a business's brand through negative public exploitation on far-reaching social media platforms.

Waste

While covering a lettuce farm in central California, *National Geographic* discovered that numerous loads were dumped each day due to procedural mistakes like: improperly filled, labelled and sealed containers. Due to the mishaps, the loads were then dumped. Between April and November that year, the local Waste Authority landfilled 4–8 million pounds of fresh vegetables from those fields. These numbers are not only staggering but they illustrate the seriousness of this issue. Many of these mishaps occur when standard recording procedures are done manually, which leads to improper documentation that invalidates the integrity of shipments — to which the numbers above illustrate and corroborate. But can shippers, loaders, receivers and the like secure their procedures and eliminate wasted product by implementing stricter digital HACCP solutions?

Lost food

While improper execution of the best practices above can lead to FDA imposed sanctions and profit loss, it also perpetuates the problem of food waste globally. This issue has become an epidemic and one that greatly affects the lives of many.

In a recent *National Geographic* article, the Food and Agriculture Organization (FAO) suggests that one-third of food produced for human consumption worldwide is annually lost or wasted along the supply chain, which equates to 2.8 trillion pounds of food lost each year. That is enough to feed 3 billion people per year!

The amount of waste created along the supply chain each year is enough to feed the hungry and malnourished people of the world three times over. While waste is inevitable, even a 50% improvement would be able to feed those most in need.

We understand the nature of business is overcoming competition while expending the least capital possible, ultimately leading to profit. However, food-related businesses along the supply chain must ask themselves are they their own competition? Are best practices being properly executed? How can they ensure this in order to mitigate waste?

Ultimately, however, it becomes a human issue. Companies must be responsible and possess the empathy to understand this. Domestically, we may not feel the effects of global hunger as much as other third-world countries, but these businesses must be aware of the epidemic in order to elucidate this topic, while simultaneously maximising its businesses potential.

Remedies

As we can see, the issues discussed above are real. However, we can turn to technology to solve them.

Food safety technologies have the capability to maximise business potential. They will improve operational efficiency while reducing the amount of wasted food by digitising food safety practices and providing real-time business intelligence to provide actionable data.

Checklist management best practices guide employees and ensure they complete tasks the right way. While completing these, all information is recorded then stored in the cloud for impeccable record keeping and easy retrieval, ensuring seamless productivity from 'Farm to Fork' — further protecting our businesses, consumers and global food chain.

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W211841, 05.2017

Spray nozzles

M-Series C.I.P spray nozzles are designed to provide high-quality tank cleaning results at low operating pressures.

As a direct replacement for spray balls in standard pressure applications, the M-Series rotating action utilises flow-step technology — concentrated streams of higher impact liquid delivering more efficient distribution, greater impact and faster C.I.P cycles. This means less wastewater and chemical treatment costs, saving time and money.

The M-Series rotating tank washer makes spray balls virtually redundant. The typical spray balls found in storage tanks are mostly inefficient and costly to operate. This is because they require large volumes of water and chemical just to reach, wet and cover the tank interior. With inefficient reach, the wetting, washing and rinsing performance is severely compromised, resulting in excessively long wash times. Poor impact efficiency also compounds this problem.

Patented self-cleaning features of the M-Series tank washer have allowed for major improvements towards trouble-free operation. This is achieved via a special bearing system that allows typical fluctuations in water pressure to purge any obstructions away from the bearing surfaces. Competitive washers can readily allow obstructions to jam within the bearing surfaces and impede rotation. No lubrication is required other than the cleaning fluid itself and there are no ball bearings to lock-up, corrode or break down.

Features include self-cleaning, therefore addressing the problems of clogging and loss of impact at high pressures associated with other tank washers; increases cleaning efficiency, leading to shorter cleaning cycles and thus reducing operational costs; uses less water; can be used for portable and fixed applications; and available in various materials.

Applications include dairy and beverage storage tanks, freezer tunnels, wine tanks and any storage vessel.

Spray Nozzle Engineering
www.sprayingsolutions.com.au

Grease trap dissolved air flotation system

The Hydroflux grease trap dissolved air flotation (GT-DAF) system is designed to effectively manage the increase in volume of greasy wastewater being discharged into sewers.

The product is a separation device that is more energy efficient, smaller in size and designed specifically for the treatment of greasy wastewater from food courts.

While a traditional DAF system can be more effective than a conventional grease trap in commercial environments, the DAF systems are often larger in size, consume high levels of energy and often require elevated loads of chemicals.

The GT-DAF has incorporated components from traditional GT and DAF systems. It features a two-stage separation process which involves a free grease gravity separation stage followed by the addition of dissolved air and demulsification agents.

The product can be up to 30% smaller in size to a grease trap and an alternative to traditional DAF systems. It focuses on minimising the size of the unit, improving the performance and overcoming operational problems of conventional systems.

Hydroflux Industrial Pty Ltd
www.hydrofluxindustrial.com.au

Magnetic separator and metal detector

For difficult food industry applications requiring the highest level of protection against metal contamination, Eriez recommends its rare earth magnetic separator, powered by the RE7 Xtreme magnetic circuit, alongside an Xtreme Metal Detector.

The company's Xtreme RE7 magnets are said to be 13–40% stronger than other magnets on the market today, as indicated by head-to-head pull tests. The product is available in all Eriez magnetic tubes, grates and liquid line traps.

The Xtreme Metal Detector is recommended for food processing applications. With technology that minimises false trips, the unit is able to detect the smallest of metals in challenging production applications.

The 'double team' concept of combining the Xtreme Metal Detector with the Xtreme RE7 magnetic separator results in a solution that provides maximum protection while maintaining higher product yields. Together, the RE7 magnetic separators and Xtreme Metal Detector provide great protection against dangerous, unwanted metals in products or process flows.

This powerful approach will help users avoid expensive equipment downtime and product recalls while ensuring compliance with HACCP International Food Standards is maintained.

Eriez Magnetics Pty Ltd

en-au.eriez.com

Seafood processor opts for Flowfresh flooring

Wholesale seafood and fish processor Three Hooks Seafood required a floor finish that was robust, hygienic and safe for its facility in the Sydney suburb of Marrickville.

Flowcrete Australia supplied 300 m² of Flowfresh SR (9 mm), which was applied across the facility's processing and packaging areas as well as in the cold room.

The highly durable polyurethane system is robust enough to withstand the demands of intensive food and beverage environments, including foot and trolley traffic, low temperatures, impacts, thermal fluctuations, cleaning, water exposure and point loading.

Flowfresh Sealer completed the project, giving the floor a glossy aesthetic. Different colours were chosen to differentiate parts of the facility, with a bespoke black applied in the loading and cold room areas and a light blue used in the processing zone.

The Flowfresh range is HACCP International certified. Its seamless and impervious properties make the flooring easy to clean and coving was added to avoid contaminants getting stuck between the floor and wall. The flooring incorporates the antimicrobial agent Polygiene, which eliminates up to 99.9% of bacteria in contact with the floor.

As Three Hooks Seafood knew that water and ice would inevitably end up on the floor, the antislip nature of Flowfresh SR was important to create a safe working space for its employees.

Flowcrete Australia

www.flowcrete.com

Refrigerated vehicles for hire

Refrigerated Transport Hire has a fleet of refrigerated vehicles available for hire including 1- to 28-tonne trucks equipped with either 10 A, 15 A or three-phase with the 10 A, so hirers can plug the vehicles in to household/factory electrical supplies or most generators.

Refrigerated Transport Hire is manned 24/7 so users can be assured of service and assistance at all times. For example, if a company's own vehicles break down, Refrigerated Transport Hire can provide and deliver a replacement vehicle and even assist with the loading of this vehicle.

The vehicle hire service structure is flexible and can be customised to meet individual needs. Discounts are available for 10-day plus rental but the days do not have to be consecutive, so hirers can tailor the hire to coincide with their needs and still receive the discount.

Having been established for 21 years, Refrigerated Transport Hire has offices in Melbourne and Sydney. Its vehicles are well presented and the company does most of its own repairs, uses quality refrigeration equipment and offers a 24/7 on-site service.

With trucks and vans specially designed to suit different applications, Refrigerated Transport Hire has vehicles suitable to meet the needs of the largest to the smallest retail and wholesale food and distribution companies.

Refrigerated Transport Hire Vic Pty Ltd

www.refrigerated.com.au

Tray packer chain

Tsubaki has developed a special chain for tray packing machinery widely used in the food and beverage industry. It is internally lubricated so that it is clean in use and does not require regular re-lubrication.

The Tray Packer Chain is a development of the company's Lambda solution, which uses a special sintered oil-impregnated bush.

Like the Tsubaki Lambda lube-free chain, the Tray Packer is impregnated with NSF-H1 food-grade lubricant as standard.

Tray packing machinery is common in the food and beverage industry and fits cardboard trays or boxes to items, often to create 'multipacks', before distribution. Hygiene is vital and a standard lubricated chain can cause contamination of the machine, floor and end product, possibly resulting in increased maintenance requirements, damaged products and reduced profit.

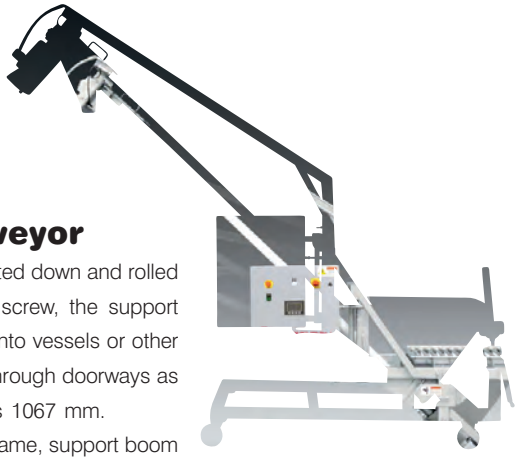
With the Tray Packer Chain, the internal lubrication cannot transmit to products, which eradicates contamination. Also, the consistent internal lubrication combats the risks of uneven wear and elongation, and does away with the need to apply expensive food-grade lubricants.

The product is slightly narrower than the standard Lambda chain, a requirement for most tray packing machines. Additionally, the machines require pushers to be fitted to the transport chain and for this Tsubaki's designers have developed a bespoke solution in which the attachments are mounted by an engineered extended pin that allows flexible spacing so that different packing configurations can be accommodated.

The product is supplied with Tsubaki's Match & Tag service to guarantee a minimum length tolerance between chain strands that run parallel for conveyance purposes in, for instance, packaging machinery.

Tsubaki Australia Pty Ltd

www.tsubaki.com.au



Sanitary flexible screw conveyor

Flexicon's sanitary flexible screw conveyor can be tilted down and rolled to serve multiple functions. Using a manual jack screw, the support boom and conveyor can be raised for discharging into vessels or other process equipment. Fully lowered, it can be rolled through doorways as low as 2134 mm in height and aisles as narrow as 1067 mm.

The sanitary features include: a castor-mounted frame, support boom and hopper grate constructed of 316 stainless steel, sanitary quick-release clean out cap, quick-disconnect discharge box access cover, stainless control panel with stainless conduit and liquid-tight compression fittings, allowing washdown during changeovers and/or conveying of corrosive materials.

HMI controls allow manual and automatic start/stop and speed adjustment.

Material flows through the hopper into an adapter that charges the conveyor. As the flexible screw rotates in the material, it self-centres within the tube, providing ample clearance between the screw and the tube wall to eliminate or minimise grinding. The flexible screw is top-driven beyond the point at which material exits the conveyor, preventing contact with bearings or seals.

The conveyor transports bulk materials from submicron powders to large pellets, while the gentle rolling action of material prevents the separation of blends.

The rugged inner screw is the only moving part contacting material, resulting in reduced maintenance and increased reliability. A broad range of screws with specialised geometries is available to handle free- and non-free-flowing materials, including products that pack, cake or smear in other types of conveyors.

The conveyor frame can be finished to sanitary industrial standards or constructed of carbon steel.

Flexicon Corporation (Aust) Pty Ltd

www.flexicon.com.au

Floor cleaning discs

3M Trizact Diamond HX Discs polish and refurbish worn surfaces to restore them to their best condition. They are suitable for marble, terrazzo, polished concrete and other porous stone floors.

Featuring proprietary 3M technologies and manufacturing techniques, the abrasives leave consistent scratch patterns, maximising efficiency and reducing the number of steps in the restoration process. They are designed to minimise subsurface damage but still maintain speed, consistency and control.

3M Trizact Diamond HX Discs are compatible with standard floor cleaning equipment and are made to work with aqueous coolants. They are available in varying levels of abrasiveness to match different floor conditions.

3M Commercial Services Div-Cleaning & Workplace Safety

www.3m.com/au/facilities

Safety for forklift operators

Dematic's ColbyRACK range focuses on safety for forklift operators removing pallets from high storage levels in warehouses and distribution centres. The Colby Retrofit Pallet Guide increases safety for forklift operators removing pallets from high storage levels in warehouses and distribution centres.

The solution is primarily intended for retrofitting pallet guides to single deep selective racking. While the use of pallet guides is common in double deep racking, the use in single deep racking is not as common. The pallet guides provide a visual cue that encourage forklift operators to slow down and align pallets more accurately.

The retrofit pallet guide can be installed onto existing selective racking beams, avoiding the expense and inconvenience of changing over to new, cleated beams. The pallet guides can be used for storing European pallets on Australian racking and can be relocated within a warehouse as storage needs change.

Dematic Pty Ltd
www.dematic.com.au

Hygienic, easy-to-clean flooring

Flowfresh Coating Satin is a four-component, solvent-free, coloured polyurethane concrete coating that creates a satin finish to not only improve the floor's appearance but also make it easier to clean when compared to a standard matt polyurethane system.

Flowcrete Australia designed the product in order to provide a solution that delivered on the top three priorities for floors in the food industry — hygiene, durability and aesthetics. The distinctive satin finish minimises dirt pick-up and makes the cleaning process a quicker and less labour-intensive task.

This addition to the HACCP International certified Flowfresh range is able to withstand the complex challenges that daily activity in food and beverage facilities will throw at it. Flowfresh Coating Satin is hard wearing and is resistant to intermittent heat spillages of up to 110°C. It can withstand exposure to organic and inorganic chemicals.

To further enhance on-site hygiene levels, Flowfresh Coating Satin contains the antimicrobial additive Polygiene. When incorporated in a Flowfresh floor, this silver-ion based agent meets the ISO 22196 standard for antibacterial effectiveness.

Flowfresh Coating Satin is available in a wide range of colours.

Flowcrete Australia
www.flowcrete.com

what's new in Food technology & manufacturing

packaging

Packaging NEWS

Systech upgrades anti-counterfeiting technology

Systech International has upgraded its UniSecure product authentication solution.

Unisecure creates a unique identifier from an existing barcode or QR code that cannot be copied or duplicated. No changes are required to existing packaging, and real-time authentication is available via any smartphone.

The update provides greater visibility to an item's path through the supply chain, plus better collaboration between brand owners and consumers. As well as tracing an item throughout the supply chain, the technology can confirm or deny its authenticity, as well as capture, share and update identity information specific to that item, such as status, geolocation or shelf placement.

"Counterfeiting is a global problem — one enabled through legitimate supply chains and e-commerce marketplaces. Fraudulent products continue to enter the market undetected, and companies are realising any label or barcode (even those serialised) can be copied," said Lou Arace, president and chief operating officer at Systech.

How safe is your ink?

Siegwerk has taken a further step in its global commitment to product safety by launching its Ink Safety Portal.

The portal is all about knowledge sharing. More specifically, the expert platform offers condensed knowledge on crucial product safety and regulatory topics with regard to printing ink ingredients, regulatory affairs, exposure assessments and safety evaluations.

This results in a diverse collection of the key elements relating to the subject of safe printing inks and safe food packaging. Siegwerk is thus bundling its expertise, making it available to customers and interested parties.

A central element of the portal is to demonstrate how Siegwerk performs safety evaluations for individual ink ingredients — even down to trace levels and specific packaging applications. Various parameters have to be taken into consideration: intrinsic toxicological properties of the substance, migration behaviour, surface/mass (packaging/food) ratio and even food consumption patterns. These types of safety evaluations are especially relevant for substances, which are not in the scope of respective regulations, including NIAS (non-intentionally added substances).

Siegwerk's product safety guidance includes global regulatory initiatives, brand owner requirements and safety and risk assessments targeting raw materials to end-use applications. This is not only reflected in the company's portfolio of safe printing inks, but also in the launch of the Ink Safety Portal.

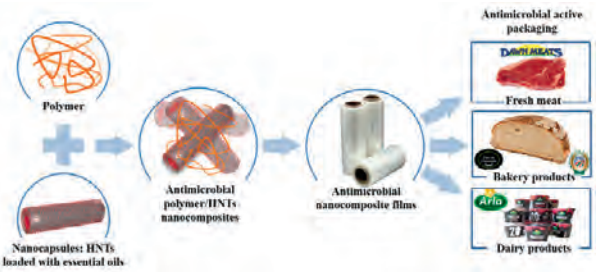
Nanotechnology project to develop antimicrobial packaging

A project to introduce nanotechnology-based antimicrobial packaging, in order to enhance food safety and reduce waste, has received 7.7 million in funding from the European Union.

The NanoPack project, led by the Technion – Israel Institute of Technology, aims to develop state-of-the-art packaging solutions based on natural nanomaterials.

"NanoPack will demonstrate a solution for extending food shelf life by using novel smart antimicrobial surfaces, applied in active food packaging products," said Dr Ester Segal, NanoPack's coordinator and associate professor at the Technion. "NanoPack will enhance food safety for consumers by significant growth inhibition of foodborne microbes, which in turn will prevent foodborne illness outbreaks and early spoilage."

Using nanotechnology, the project will employ polymer composites based on natural halloysite nanotubes (HNTs) as reliable and safe carriers, capable of tailored release of bioactive payloads. Due to their size, HNTs are unable to migrate from the food packaging into food. Maximising safety, HNTs in the NanoPack food packaging slowly release minute amounts of potent, volatile, natural and EU-approved essential oils into the packaging headspace. The oils exhibit both antimicrobial and antifungal properties and can be tailored to inhibit growth of most foodborne microbes.



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Turning up the heat on innovation in packaging

Jason Bezzina, Business Development Manager, Tetra Recart

The Australian packaging and food processing market is overdue for an innovation injection. Consider the humble tin can, which is still one of the most dominant forms of packaging in this country — even though it was invented over 200 years ago.

Tetra Recart.

Induction sealing.
Below: Carton loading.

New solutions are now available here which present a step change for producers, manufacturers and consumers. One of the most significant of these is retortable packaging, which has been widely adopted in the US and Europe for the last 10 years and is now available for the first time in Australia.

To give you the official definition (and we should know because we invented it), the retortable carton allows the sterile packaging of a wide variety of food. It is a modern alternative to traditional canning methods and can cater to everything from vegetables and beans to tomatoes, pet food, soups and sauces.

The benefits of these cartons range from being more attractive to consumers to being more cost-effective and environmentally friendly for producers and retailers. Also, interestingly for the agribusiness sector in this country, this new approach provides the opportunity for producers to take a fresh look at how to add value to their raw materials. Why sell a tomato when you can sell tomato soup in a retortable carton?

Winning ways with consumers

This form of packaging has proved overwhelmingly popular with consumers. Research has shown that consumers perceive paper-based packaging as premium and also think highly of the companies that package their products this way. There are many examples of manufacturers using the packaging to refresh their brands and extend and modernise their product ranges. One great example from Ireland is the food brand I AM SOUPER, which has differentiated itself by producing a high-protein soup in a recart carton branded with a vibrant and eye-catching graphic design.

In a highly saturated marketplace, a point of difference is requisite for a company to stand out amongst the noise of competitors. Being amongst the first to switch from tin cans to retort cartons will be refreshing and bold. It will draw in the attention of consumers and retailers, making the switch impactful and worthy of investment. Food manufacturers who make the switch are indicating to their domestic and export markets that they are willing to invest in and implement changes to offer the best available products.

Taking eight trucks off the road

Benefits for manufacturers include a better carbon footprint and savings in transportation. For every nine trucks of empty cans, you only need one truck of flat-packed Tetra Recart cartons. Made from renewable sources, and designed for logistics efficiencies, food manufacturers can easily reduce fuel consumption, food miles travelled and carbon emissions.

The innovation explained

Tetra Recart is retortable carton designed with a proprietary multilayer paperboard, foil and polymer laminate structure, which enables the cartons to withstand conventional retort temperatures (up to 130°C for up to 2 h).

and processing in Australia

The Tetra Pak R1 is a packaging platform built with high levels of automation and designed for high-volume production, running up to 24,000 packages per hour depending on the filled product. Speeds can be varied across five settings, which enables different food to be packaged with the same line.

An automatic carton loader function frees up operators' time to perform other tasks, as carton blanks are fed into the form and seal machine automatically. The cartons are sealed by induction, where the aluminum foil is heated under tight control, melting the plastic in the packaging material. The package is sealed using pressure. The machinery can monitor the right levels of temperature and pressure, and stops when incorrect parameters are detected.

A software tool called the packaging line monitoring system (PLMS) monitors and logs the performance of the packaging lines, and data can be analysed to understand detailed production data and spot areas for corrective improvement. The R1 is equipped with the Tetra Pak Operator Panel with an intuitive touch-screen interface, with large windows enabling operators to watch production directly.

The Tetra Recart and Tetra Pak R1 not only enable food manufacturers to process and package food efficiently, but also delivers savings in transportation, retailing and storage, benefiting each stakeholder in the value chain.

Taking a fresh look

With new innovation coming into the market, an opportunity presents itself for everyone including growers, producers, manufacturers and retailers to take a fresh look at how they are doing business. Starting with reinventing your approach, from the packaging up, can be a great route to exciting new ways of working and open up significant new commercial opportunities.

Tetra Pak Marketing Pty Ltd
www.tetrapak.com/au

Tray sealers

Proseal's comprehensive tray sealer range includes both semiautomatic and automatic models designed for a wide variety of food production and packing line requirements with sealing speeds of up to 210 packs/min.

Proseal has a variety of advanced technical enhancements — E-Seal, Pro-Motion and I-Film — intended to deliver significant energy savings and increased throughput.

E-seal delivers high-quality seals while achieving a 92% reduction in energy usage. Pro-Motion enables trays to feed continuously into the sealer without stopping, providing a 30% increase in production throughput. I-Film stores the film settings for individual trays in the tray sealer's memory to ensure the accurate positioning of preprinted film after every tool change.

Proseal machines are manufactured to food industry-approved hygiene standards with full washdown protection. The advanced lightweight and high-strength 'Auto Tool' connection system enables tool changes to be carried out in around 5 min. Downtime is also minimised by the use of quick-change conveyor belts and an auto-lock film reel holder.

Proseal Australia

www.prosealaustralia.com

3D vision sensor

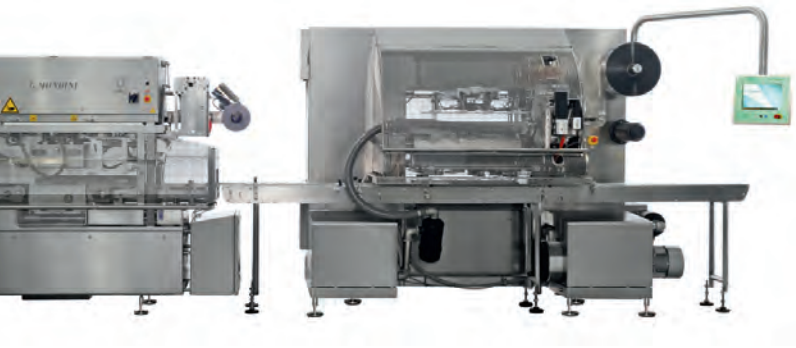
The TriSpector1000 from SICK is a 3D vision sensor designed for industrial use as a standalone solution, with intelligent inspection tools. It is suitable for a diverse array of applications relating to the quality control of consumer goods and packaging. The image-processing sensor has a high resolution for the detection of the most subtle features, easy configuration and operation, and the ability to output directly usable measured values in millimetres for all inspection dimensions. It has an autonomous operating principle and a Gigabit Ethernet interface, which can be integrated into smart processes in accordance with Industry 4.0.

The image-processing capability is already integrated into the TriSpector1000, delivering up to 2000 3D profiles/s. These high-resolution measurement results are converted directly into millimetre values by the vision sensor without the need for another PC and output in real time over the Gigabit Ethernet interface. The TriSpector1000 offers all capabilities for intelligent quality controls used to ensure, document and track flawless products and processes, eg, in the consumer goods and packaging industries.

The product makes it possible to manage numerous 3D inspections of dimensions, quality and completeness in the food, pharmaceutical and packaging industries. It features a rugged, anodised aluminium housing resistant to a variety of media, offers the choice between IP65 or IP67 enclosure rating, and is available with a front screen made of either glass or break-proof PMMA plastic. With laser triangulation, measurement is independent of product factors such as colour, shape, gloss, brightness, patterns, surface texture or any moisture on the product. Intensity data can be recorded by the vision sensor, allowing it to check for the presence of labels or imprinted patterns.

SICK Pty Ltd

www.sick.com.au



Forming trays on demand

By combining the Mondini Trave with the Mondini Platformer a packaging line becomes what could be defined as a thermosealer — a thermoforming and/or tray sealing line. With this combination the lip forming done during the sealing process generates platformed trays of high quality and users can switch between thermoformed inline trays from a reel or premade trays at any moment in time during production, according to the needs of the business.

Platformer technology transforms the concept of tray forming by cutting the tray's footprint before the forming process occurs, reducing the scrap to just 1%. An additional benefit of this process is that the tray format changeover time is less than 10 min with only two components needing to be changed.

Select Equip

www.selectequip.com.au

Coffee packaging with built-in venting

Amcor has introduced the VentoT, a packaging system with built-in venting control for ground coffee and whole beans.

The high-performance degassing system is integrated directly into the packaging laminate, enabling coffee producers to capture the flavour and aroma of freshly roasted coffee without hard valves, extra machinery and extra process steps.

Users can benefit from reduced downtime and less production waste, while the system removes the risk of faulty application.

The high barrier coating prevents oxygen from entering the pack. As coffee starts to degas, the pressure inside the pack pushes a small venting layer open and CO_2 flows out. As soon as degassing is complete, the venting layer returns to its original position, preventing oxygen from entering and keeping the coffee fresh.

The system is up to 87% lighter than hard valves and allows energy savings by eliminating the need to power an applicator machine, decreasing the overall carbon footprint for a 250 g pack by up to 8%, according to the company.

Improved shelf appeal is achieved by allowing brands to place the vent on the back of the pack.

Amcor Global

www.amcor.com.au

Question time ...

Just what is information-driven manufacturing?

What is information-driven manufacturing it? Who's it for? How can you start? This quick Q&A gets down to basics.

Q. What is iDM?

A. Information-driven manufacturing (iDM) is about having a fully connected production line.

Q. Why?

A. Every machine and system in your production line generates and holds a wealth of data, iDM is about connecting with your machines to get to that information and then using it to unleash more productivity and efficiency across your business.

Q. What's the ultimate goal?

A. To create a closed-loop network where the production line is connected to the business systems, making manufacturers better informed and more agile in decision-making, especially re cap-ex, QC, and managing suppliers and raw materials.

Q. And so the name....

A. ....is because the information drives the manufacturing.

Q. Don't you need to be big to use iDM?

A. Definitely not. Large, medium or small, iDM is for any manufacturer wanting to become more competitive and agile. Regardless of size, many businesses are finding iDM is a competitive advantage necessary to stay ahead and thrive in our technology-driven world.

Q. Is there a link with Industry 4.0?

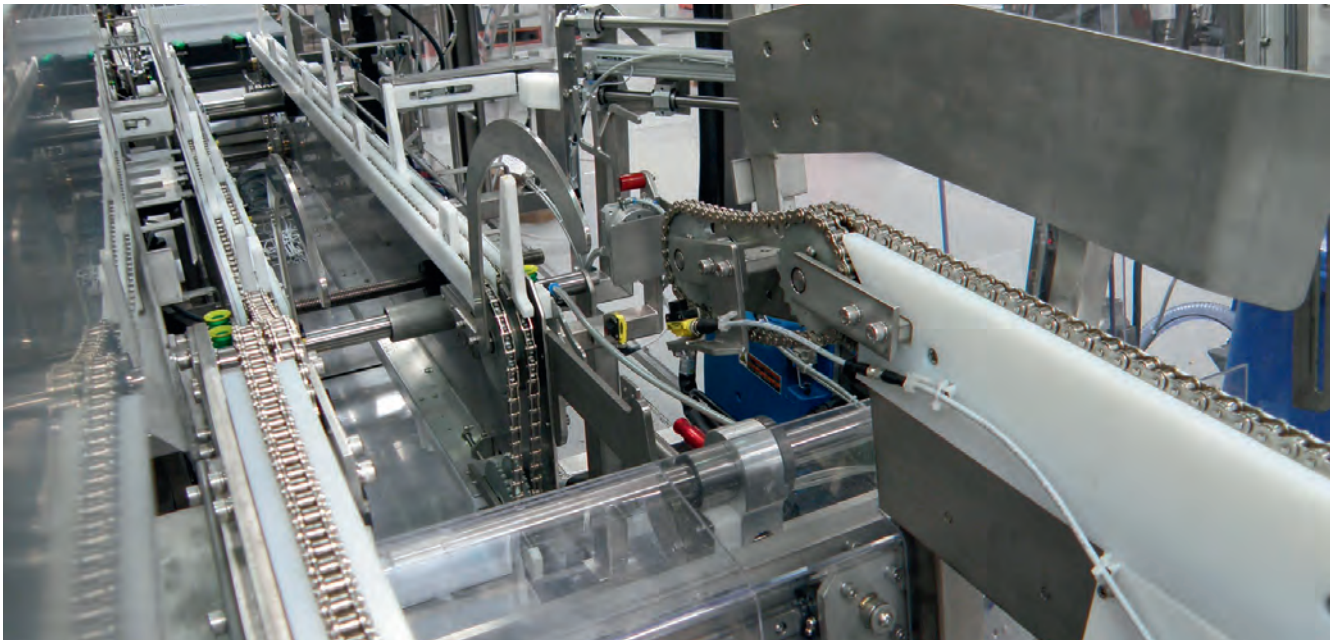
A. The best way to think about iDM is as 'Industry 3.5', because it's the stepping-stone to realising the gaps while working towards Industry 4.0. And it's by taking steps towards iDM that manufacturers can identify where opportunity to optimise, change and improve truly lies.

Q. But nothing's wrong with our current systems...

A. One of the biggest challenges to iDM is the mindset of "if it ain't broke, don't fix it". But the fact is disruptive technologies are changing business models, creating new opportunities and creating new competitors at a pace faster than ever before. Sitting still means getting left behind.

Q. How should I begin?

A. While you need to think about disruptive technologies and future innovation, look at improving what you are doing right now. Think about: how you can improve efficiency and productivity, what information you need in real time to take better decisions, how you can automatically capture this information, can you automate any manual processes and which automated processes can you network for real-time visibility and control?



Shelf-ready packing with speed and precision

Having all the products on the supermarket shelf neatly packed with labels facing forward used to be a labour-intensive task, but now, thanks to advances in technology, bottles can be positioned into cartons, forward facing as a fully automated process.

A global food manufacturer asked Hot Melt Packaging Systems (HMPS) to provide such an end-of-line solution for its high-speed condiment production line.

To meet growing demand, the manufacturer had previously upgraded its main condiment production line to produce twice as much product in half the time. Bottles are sterilised, filled, capped and labels applied. The production line produces different sized and shaped bottles ranging from 500 mL to 4 L. To accommodate this, there is a multiple range of case sizes, pack configurations and bottle shapes.

According to Warren Booker, NSW state manager at HMPS, "In Australia, manufacturers are challenged by having to produce so many different products in the one machine. In countries with larger populations, like the US and Europe, one machine can be dedicated to a specific product, which makes the machine design more simplistic. The Australian market has a unique requirement where they need a machine to be flexible to grow with the business and pack a range of different products in different packing arrangements."

HMPS worked closely with the customer to design a fully automated system that meets all the requirements for this application today but also has the flexibility to meet future demands.

The challenge ahead was to pack bottles that are coming off the production line at 100 bottles/min into a six by three pack configuration with labels forward facing. "There were fundamental considerations that required attention in the design phase to achieve this with a key focus on detailed simulation to make sure the advanced level of motion control required could be achieved," explained Booker.

Given the large range of products being produced and the need for shelf-ready cartons, this production line had clear and precise requirements which HMPS had to comply with. Using the latest technology and working closely with the customer-specified needs has allowed this project to be a smooth transition into full production speed maintaining high efficiency and reliability.

Having worked on previous projects with Rockwell Automation, HMPS knew that the Integrated Architecture system would provide the best solution for this application. Allen-Bradley CompactLogix uses a common control engine and integrates safety, motion, discrete and drive capabilities in the case packer system.

Advanced motion control is provided by Allen-Bradley Kinetix 5500 Servo Drives and PowerFlex variable speed drives. Given the high-speed packing requirements of the system, safety door switches and guarding was provided by Allen-Bradley industrial components.

In addition, the case packer system has integrated control, drives and safety capabilities via Ethernet using Stratix 5700 Ethernet switches. PanelView Plus 7 provides high-quality HMI for the system. "The Rockwell Automation solution provides a completely integrated and reliable system for the case packer and also provides the framework for a smart machine for HMPS to leverage the Connected Enterprise," said Michael Vlahos, OEM sales manager at Rockwell Automation.

"To futureproof the machine, a degree of adjustment in the machine had to be considered. Due to the need for relatively quick changes, we have supplied a fully automated system," commented Booker.

All the SKUs or product range are listed on the main screen so the operator can go to see the core product and the machine will automatically resize at a touch of a button. In this way, the machine can apply the resize down to just using the one operator. In addition, the machine won't run until everything is in exactly the right position and all guards and doors are in the safe (closed) position.

"We have a modem in the machine that looks at running time and reliability factor. In this way we have a track record of parameters as part of the control system, how it's been running, how long etc. We have the software which allows us to log in remotely," added Booker.

HMPS
www.hmps.com.au

Ink-jet blank labels

Metromatics is making ink-jet receptive blank labels on a roll.

The labels are suitable for most ink-jet label printers on the market such as Quicklabel's Kiaro, Primera, Colordyne, Epson and other printers that use the Memjet Ink-Jet technology.

Metromatic's slitting machine is capable of converting a wide range of stocks such as gloss paper, matte paper, textured papers and some synthetic materials such as polypropylene and polyester into rolls of labels suitable for an ink jet label printer.

A large range of sizes and shapes is available or exact requirements can be met with a custom die.

Depending on which material type is chosen, the labels can feature water, chemical, scuff and tear resistance.

Metromatics Pty Ltd

www.metromatics.com.au

Food labelling software

Zubi is a cloud-based food labelling software that takes the stress out of creating compliant labels and managing an ingredient/recipe database.

Zubi has modernised food labelling and now has an improved version available to the Australian food industry.

The product takes the hassle out of doing complex nutrition calculations. It automatically orders ingredient listings, tracks all allergens and can format entire labels displaying all the detail needed to meet FSANZ standards.

Using Zubi is a three-step process: find ingredients using their database (or add one), build a recipe or formulation in Zubi and then download/print completed reports or labels.

Recipes and ingredients are easily editable allowing for continuous updating of compliance information so products are correct.

Having access from any location, at any time removes the annoyance of being placed with software on one electronic device or with licensing limitations.

Zubi Ltd

www.zubionline.com

Encoders and inclination sensors

Encoders from SICK monitor and secure motion sequences and are designed to ensure precise and efficient processes. They detect the exact speed, revolution, path or angle of a movement and deliver the result to the process control or the cloud in data that can be used for further calculations.

The AFS60 Inox has a high resolution of 18 bits and the AFM60 Inox has 30 bits, along with a large selection of programmable parameters. With features such as high resolution, high IP enclosure rating and stainless steel housing, they can be used in applications with harsh ambient conditions and strict requirements regarding resistance to aggressive media such as cleaning agents or salt.

The encoders are equipped with the SSI interface; the AFM60 Inox is also available with combined SSI + incremental and SSI + sin/cos interfaces. Both encoders can be programmed via the PGT-08-S PC-based programming device or the PGT-10-Pro handheld programming device.

The DFS60 Inox is a high-resolution incremental encoder with a diameter of 60 mm in stainless steel design. It offers a range of mechanical and electrical interfaces and can be programmed by the user if desired. The rugged mechanical design, the wide temperature range as well as an IP67 enclosure rating make the DFS60 Inox suitable for applications in harsh ambient conditions. There is a range of options for programming the electrical parameters, such as the output signal level, the number of pulses per revolution and the zero pulse width.

Both encoders are suitable for the use in the food and beverage industry, packaging machines, medical technology and outdoor applications in port and offshore plants.

The SICK encoder app supports the user with an interactive encoder selection tool. The tool lists all of the details about the various products, including ordering information, sketches, product information and CAD files. The integrated barcode reader can be used to call up app product information.

SICK Pty Ltd

www.sick.com.au

Traceability and anti-counterfeit solution

IDlocate offers producers a way to protect their brand. The authentication platform uses a company's source data and prints in real time on every unit. With one easy scan of a unique QR code printed on every product, consumers can verify the product's authenticity, learn more about the product and brand, and even check product recall status to a single unit. By giving the consumer and distribution network the ability to verify a purchase or product in a market, in-store or in the home in real time, counterfeiting is disrupted, and the consumer can engage with a product like never before.

The additional benefits to brand owners is the ability to check supply chain and distribution without the need for third-party feedback and the ability to engage with consumers and deliver brand messages in real time.

Because the platform is web based, there is no need for a specific code reader or app. It does not matter what model smartphone or what social media application or code reader a consumer is using.

Result Group

www.resultgroup.com.au

Vertical packaging system

tna's performance 5.0 is a high-performance vertical packaging system, high-speed multihead scale and a case packer for flexible bags. The case packer for flexible bags is capable of speeds of up to 300 bags/min.

tna performance 5.0 offers food manufacturers production line output efficiency. The ultra-high-speed equipment, advanced equipment integration and intuitively designed, self-learning technology has the potential to double productivity. The packaging system is made so customers can maximise production flexibility with faster changeovers and more product capabilities in a single system.

tna solutions Pty Ltd

www.tnasolutions.com

Linerless self-adhesive labelling system

Le Mac is a supplier of a linerless labelling system that is self-adhesive for trays of meats, ready meals, salads, etc. Linerless labels are an environmentally friendly innovation as they do not use backing liner like traditional labels, which cannot be recycled and does not decompose in landfill.

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Edible inks

POLYtrust edible UV invisible and visible inks offer growers or wholesalers the ability to print with HACCP certified edible inks that can be either invisible or visible to the consumer.

The cost of applying a best before date, picked date or even a logo for growers on individual fruit such as apples, oranges, stone fruit and kiwifruit is low — allowing more transparency for consumers when it comes to perishables.

The edible UV invisible and visible inks use polymer thermal inkjet technology where the ink can stick onto fruit and vegetables and not be easily rubbed off.

Also available is POLYtrust, an anti-counterfeit APP and IT system. This procedure doesn't attract a 'scan per code' if the company's POLYtij HP thermal inkjet printers are used for printing the encrypted QR codes.

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Spaghetti science

Andrew Spence Banner

A pasta industry more than 15,000 km from Italy is thriving thanks to a collaboration between farmers, durum wheat researchers and a major food manufacturer.

Almost no durum wheat was grown in southern Australia until the 1990s when Adelaide-based San Remo Macaroni Company and a handful of growers approached the University of Adelaide about developing varieties that could handle the often harsh conditions in South Australia.

Two decades and several new varieties later and the southern region of Australia is producing durum wheat and pasta of such high quality it is being snapped up around the globe.

San Remo has been manufacturing pasta in the South Australian capital since 1936 but relied on durum wheat grown in northern New South Wales, about 1500 km from Adelaide, for many years.

Durum wheat breeder Jason Able from the university's School of Agriculture, Food & Wine said the 'closed triangle' relationship between researchers, growers and San Remo had allowed the southern region to rival the much older northern Australian region in production and quality.

He said the relationship also allowed San Remo to operate more efficiently, manufacture a 100% durum wheat product and build an association in conjunction with growers.

"We're very fortunate that through the grower association and the end user San Remo we've got a very unique relationship here where the breeding program works closely with the growers and San Remo," Associate Professor Able said.

"We've got the basic fundamental science where it starts, which then feeds into the breeding program, followed by the growers, buyers and end users — the whole supply chain."

South Australia is the driest state on the driest continent on earth.

The durum breeding program was started at the University of Adelaide by Professor Tony Rathjen, who used traditional non-GMO breeding methods to cross-breed germplasm from arid regions such as the Middle East and Turkey. The program now uses markers to identify genetic signatures, in particular germplasm, for traits such as salinity and boron tolerance.

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It takes 8–12 years, many trial sites and quality evaluation to develop a new variety through to commercial release.

"In those early days it was tough and Tony did a lot from a breeding point of view to develop suitable germplasm for our conditions and I guess we've been able to take it another step with some of the technologies we've been able to incorporate from a molecular level," Assoc Prof Able said.

San Remo's specifically designed durum wheat mill in Adelaide is one of the largest and most sophisticated in South-East Asia and Australia and is used to test the manufacturing value of new varieties.

"Before we even release a variety we generate enough grain — 30–50 tonnes — so San Remo can make product and give it their tick of approval," Assoc Prof Able said.

"We can then move forward with confidence knowing that we are delivering something that the growers are going to want because San Remo wants it.

"Why is it that Italians would want to buy San Remo pasta when they know it is an Australian company? Because they know it is top shelf durum that's being used."

Australia has a huge grain industry dominated by the production of bread wheat and barley. But flat world prices have many farmers looking to plant alternative grain varieties such as durum, which still accounts for less than 5% of Australia's wheat production.

Bread wheat is currently selling at about AU$230 a metric tonne while durum is fetching AU$330 a tonne.

The durum breeding program at the University of Adelaide has ongoing support from many industry stakeholders with major supporters including the Grains Research and Development Corporation (GRDC), South Australian Grain Industry Trust (SAGIT), San Remo, Southern Australia Durum Growers Association (SADGA) and the NSW Department for Primary Industries.

The university has released four new varieties since 2010, including DBA-Aurora in 2014, which has been hailed as a 'turning point'. The new Aurora variety has led to increased yields in more marginal areas and greater resilience to disease. Assoc Prof Able said the

> *The next durum variety will more than likely be released by the university in September 2018 with a further variety due for launch in 2020 or 2021.*

gains from Aurora had made durum even more attractive to farmers. But he said significant breeding programs for bread wheat and barley in Australia meant it was a constant challenge to develop varieties which will be competitive in the marketplace.

The next durum variety will more than likely be released by the university in September 2018 with a further variety due for launch in 2020 or 2021.

"I think we laid the golden egg a couple of years ago with the Aurora variety, which is doing very well, but we can't rest on our laurels," Assoc Prof Able said.

"We need another variety that matches it or is better because if we rely solely on one or two varieties it is a disaster waiting to happen."

The rise of the southern region, which includes South Australia, western Victoria and southern New South Wales, has helped San Remo become Australia's largest pasta manufacturer producing some 750 products and exporting to more than 30 countries, including Italy.

Durum has been grown in New South Wales since the 1950s in areas that have higher rainfall and more nutrient-rich soils than southern Australia.

Global durum production is typically between 30 and 40 million metric tonnes a year.

Australia exports a little over half of the 500,000–600,000 MT of durum wheat it grows a year. But it is the high quality of the clean, green grain, including protein levels consistently greater than 12%, that has Australian durum in demand globally.

The Australian industry was hit hard by a crippling drought and issues with crown rot disease in the 2000s, but more favourable conditions and the release of new varieties has seen the quality and quantity of durum produced in recent years increase.

San Remo Milling Manager John Stuart said the company soon recognised that a "cut and paste" of the NSW durum industry was simply not going to have long-term success in South Australia.

"What was required was a strong collaboration with the SA breeding industry to ensure that growers had access to world-class genetic material that met our local needs, as well as developing effective partnerships with growers who were prepared to grow with us as the industry progressively developed," he said.

Stuart said niche crops in Australia such as durum needed support to maintain their appeal not only against more mainstream cereal crops but against the large durum producers such as North America and Europe.

"To ensure that Australian origin durum can be manufactured into pasta and be competitive globally, our breeders need to be supported," he said.

"San Remo is happy to play a part in that support and does so not simply by financial contributions, but also in practical ways with in-kind services such as test milling."

San Remo enters into land-based contracts with growers in southern Australia, locking in prices and quantities before harvest. While this means the company consumes much of the southern crop each year, the surplus left over for export markets is not known until after harvest.

Grain marketing company Mellco works closely with domestic and international durum wheat processors.

Managing Director Steve Mellington said while the quality of durum from southern Australia was not in question the lack of continuity of international supply was a potential issue.

"The premium end of the market actively seeks out Australian origin durum," he said. "The international market is happy to embrace our product but they need to get that continuity to buy with confidence."

Mellington said increasing production through a continued coordinated approach was the best way to shore up export volumes.

SADGA Chairman Alwyn Dyer first planted durum in the Kaniva district near the South Australian/Victorian border in 1994 and has had a contract with San Remo since 1995.

He said the development of better varieties had coincided with improved farming techniques as growers gained experience with durum in new environments.

"The relationship between the association and the university has been able to fast-track the release of newer varieties that perform better in hostile environments and tough seasons," Dyer said.

"Especially Aurora, it is a bit more tolerant and farmers have learnt to manage their durum crops better.

"If San Remo hadn't put the money in early on to support the industry and help get it off the ground along with the university, the industry would not have developed the way it has."

Dyer said there was an increasing amount of uncontracted durum in southern Australia this season, meaning there would likely be greater volumes available for export following the November harvest.

He said while many growers liked the security of fixed-price contracts, the larger and more stable supply for export markets would lead to greater competition among buyers.

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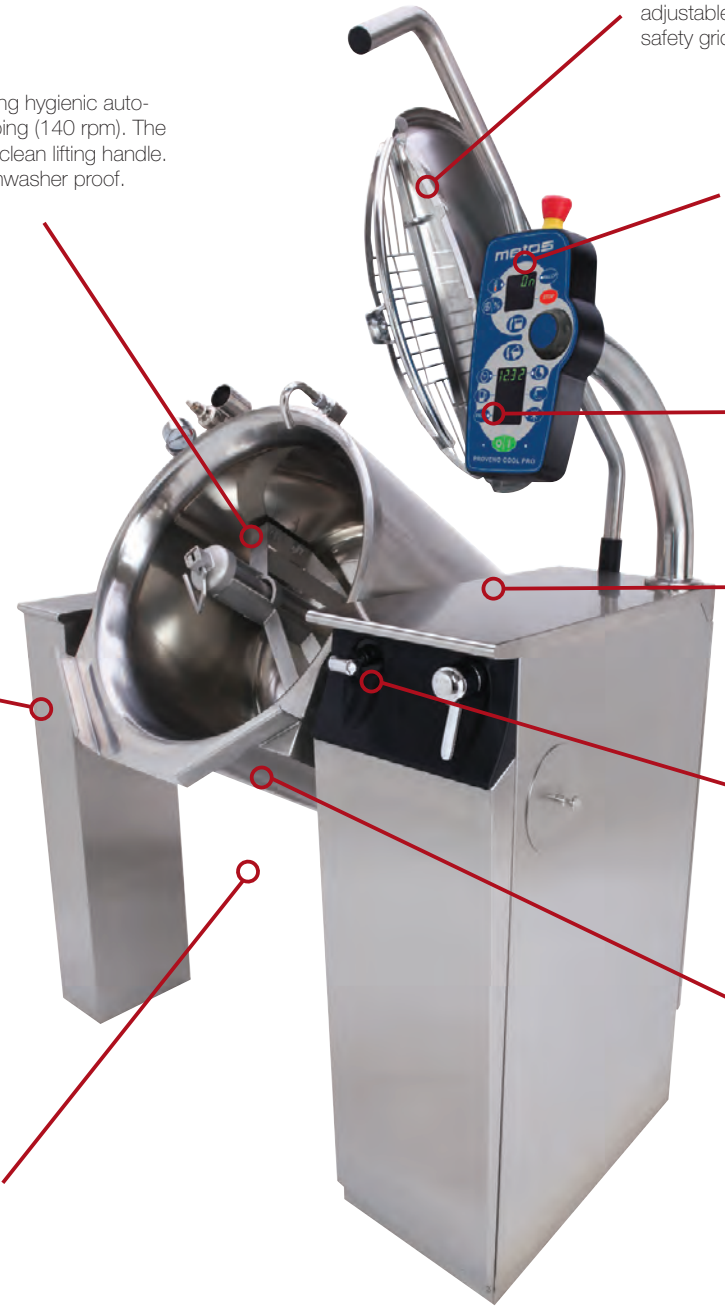

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These pasta shapes were caused by immersing a 2-D flat film into water.

Shape morphing pasta – just add water

Jennifer Chu

"Don't play with your food" is a saying that MIT researchers are taking with a grain or two of salt. The team is finding ways to make the dining experience interactive and fun, with food that can transform its shape when water is added.

The researchers, from MIT's Tangible Media Group, have concocted something akin to edible origami, in the form of flat sheets of gelatin and starch that, when submerged in water, instantly sprout into three-dimensional structures, including common pasta shapes such as macaroni and rotini.

The edible films can also be engineered to fold into the shape of a flower as well as other unconventional configurations. Playing with the films' culinary potential, the researchers created flat discs that wrap around beads of caviar, similar to cannoli, as well as spaghetti that spontaneously divides into smaller noodles when dunked in hot broth.

The researchers presented their work in a paper at the Association for Computing Machinery's 2017 Computer-Human Interaction Conference on Human Factors in Computing Systems. They describe their shape-morphing creations as not only culinary performance art, but also a practical way to reduce food shipping costs. For instance, the edible films could be stacked together and shipped to consumers, then morph into their final shape later, when immersed in water.

"We did some simple calculations, such as for macaroni pasta, and even if you pack it perfectly, you still will end up with 67% of the volume as air," said Wen Wang, a co-author on the paper and a former graduate student and research scientist in MIT's Media Lab. "We thought maybe in the future our shape-changing food could be packed flat and save space."

Wang's co-authors are Lining Yao, lead author and former graduate student; Chin-Yi Cheng, a former graduate student; Daniel Levine, a current graduate student; Teng Zhang of Syracuse University; and Hiroshi Ishii, the Jerome B. Wiesner Professor in media arts and sciences.

"This project is the one of the latest to materialise our vision of 'radical atoms' — combining human interactions with dynamic physical materials, which are transformable, conformable and informable," Ishii said.

Programmable pasta

At MIT, Wang and Yao had been investigating the response of various materials to moisture. They were working mostly with a certain bacterium that can transform its shape, shrinking and expanding in response to humidity. Coincidentally, that same bacterium is used to ferment soybeans to make a common Japanese dish known as natto. Yao and Wang wondered whether other edible materials could be designed to change their shape when exposed to water.

They started playing around with gelatin, a substance that naturally expands when it absorbs water. Gelatin can expand to varying degrees depending on its density — a characteristic that the team exploited in creating their shape-transforming structures.

Yao and Wang engineered a flat, two-layer film made from gelatin of two different densities. The top layer is more densely packed, and thus able to absorb more water, than the bottom. When the entire structure is immersed in water, the top layer curls over the bottom layer, forming a slowly rising arch.

The researchers looked for ways to control where and to what degree the structure bends, so that they might create

> *"The edible films could be stacked together and shipped to consumers, then morph into their final shape later, when immersed in water."*

Image credits: Michael Indresano Production

different three-dimensional shapes from the gelatin sheet. They eventually settled on 3D printing strips of edible cellulose over the top gelatin layer. The cellulose strips naturally absorb very little water, and they found that the strips could act as a water barrier, controlling the amount of water that the top gelatin layer is exposed to. By printing cellulose in various patterns onto gelatin, they could predictably control the structure's response to water and the shapes that it ultimately assumed.

"This way you can have programmability," Yao said. "You ultimately start to control the degree of bending and the total geometry of the structure."

Designing for a noodle democracy

Wang and Yao created a number of different shapes from the gelatin films, from macaroni- and rigatoni-like configurations, to shapes that resembled flowers and horse saddles.

Curious as to how their designs might be implemented in a professional kitchen, the team showed their engineered edibles to the head chef of a high-end Boston restaurant. The scientists and chef struck up a short collaboration, during which they designed two culinary creations: transparent discs of gelatin flavoured with plankton and squid ink, that instantly wrap around small beads of caviar; and long fettuccini-like strips, made from two gelatins that melt at different temperatures, causing the noodles to spontaneously divide when hot broth melts away certain sections.

"They had great texture and tasted pretty good," Yao said.

The team recorded the cellulose patterns and the dimensions of all of the structures they were able to produce, and also tested mechanical properties such as toughness, organising all this data into a database. Co-authors Zhang and Cheng then built computational models of the material's transformations, which they used to design an online interface for users to design their own edible, shape-transforming structures.

"We did many lab tests and collected a database, within which you can pick different shapes, with fabrication instructions," Wang says. "Reversibly, you can also select a basic pattern from the database and adjust the distribution or thickness, and can see how the final transformation will look."

The researchers used a laboratory 3D printer to pattern cellulose onto films of gelatin, but they have outlined ways in which users can reproduce similar effects with more common techniques, such as screenprinting.

"We envision that the online software can provide design instructions, and a start-up company can ship the materials to your home," Yao said. "With this tool, we want to democratise the design of noodles."

This research was funded, in part, by the MIT Media Lab and Food + Future, a start-up accelerator sponsored by Target Corporation based in Cambridge, Massachusetts.

Wheat genome finally reveals its secrets

Globally, wheat is one of the most important staple crops, providing a fifth of daily calories across the world.

As such a huge contributor to the global food supply, it is vital that wheat yields increase if global food security is to be ensured into the future. Indeed, the Food and Agriculture Organisation of the United Nations has calculated that global crop yields will need to be doubled by 2050.

However, crop yields have remained fairly stagnant since the mid-1990s. It is hoped that sequencing the wheat genome will give agronomists insight and facilitate the development of higher yielding cultivars.

This sequencing has not been straightforward. With 17 billion bases, the wheat genome is five times larger than the human genome and has a hexaploid structure. Also, nearly 80% of the genetic material is repetitive, making it even harder to sequence and analyse.

Now the genome has finally been sequenced by an international team led by Matthew Clark, head of of technology development at the Earlham Institute, and including scientists from the ARC Centre of Excellence in Plant Energy Biology (University of Western Australia), John Innes Centre, European Bio-informatics Institute, Rothamsted Research and Plant Genome and Systems Biology, Helmholtz Center Munich.

The sequencing of the bread wheat genome identified complete sets of genes and proteins essential to important agronomic traits, including the location and detailed annotation of over 100,000 wheat genes. More than a fifth (22%) of these were either completely absent from earlier assemblies or found only as fragments. The work has been published in *Genome Research*.

The UWA researchers led the protein analysis research that provided direct evidence that many of the genes coded for molecular machinery important for wheat growth and development, protection of wheat from diseases and resistance to harsh environments.

Over 1000 wheat disease-resistance genes and their locations in the genome were revealed by the study. The knowledge will greatly aid marker-assisted breeding of wheat disease traits. Also identified were over 100 gluten genes, the analysis of which will be vital to changing gluten content in wheat.

Lupins and toxicity

Once primarily an animal food source, lupins are increasingly entering human diets. As a high-protein legume the beans, interestingly, do not contain starch and they are particularly useful in gluten-free formulations.

However, while lupins have been a source of human and animal nutrition for thousands of years, they can come with a sting in the tail. So called 'bitter lupin' varieties contain toxic alkaloids that can affect the nervous, circulatory and digestive systems in humans. These bitter lupin beans are preferred by many Mediterranean cultures, but if not prepared properly the anticholinergic alkaloids can remain in the beans and cause poisoning. Traditional means of removing the toxins is by leaching in water.

'Australian Sweet Lupins' (*L. angustifolius*) lack any bitter taste and do not need any 'debittering'. However, recognising the dangers of cross-pollination between the sweet, low-alkaloid variety and the wild bitter plant, the presence of one bitter bean per hundred sweet beans is considered unacceptable and a wide quarantine zone is maintained around lupin-growing croplands to prevent wind-blown wild pollen from having a large influence on crop toxicity.

In Germany there have been isolated reports of poisoning caused by bitter lupin seeds with the Federal Institute for Risk Assessment (BfR) receiving data from the Poison Information Centres on around 30 instances between 2010 and 2016. Most of these cases were attributable to the inadequate debittering of the bitter lupin seeds in private kitchens.

The BfR is now recommending to the producers of foods containing lupin seeds that they only market lupin seeds which can be consumed without the need for any further debittering processes at home. These can be sweet lupin seeds, which have naturally low alkaloid levels, or bitter lupin seeds, which have already been sufficiently debittered by the manufacturer. Where flour made from lupin seeds is sold to consumers, the manufacturers should ensure that it was made from lupin seeds which were low in alkaloids or sufficiently debittered.

The BfR has published a detailed risk assessment of alkaloid levels in lupin seeds in its Opinion No. 003/2017.

what's new in Food technology & manufacturing

testing

Faster, cheaper food pathogen testing

Janus droplets consist of two equally sized hemispheres, one a fluorocarbon and one a hydrocarbon. When the droplets sit on a surface the hydrocarbon hemisphere, being less dense, is always at the top. When oriented like this the droplets are transparent, but if their orientation changes the droplets become opaque.

Researchers decided to utilise this fact in creating some sensors. They designed a surfactant molecule containing mannose sugar to self-assemble at the hydrocarbon–water interface. These molecules can bind to a protein called lectin, which is found on the surface of some strains of *E. coli*. When *E. coli* is present, the droplets attach to the proteins and become clumped together. This knocks the particles off balance, so that light hitting them scatters in many directions and the droplets become opaque when viewed from above.

This change in transparency is so obvious that it can be seen with the naked eye or using a smartphone. In a demonstration the researchers put the droplets' Petri dish atop a QR code that can be scanned with a smartphone. When *E. coli* were present, the droplets clumped together and the QR code couldn't be read.

This novel approach to food pathogen testing could ultimately result in cheaper, faster testing for food manufacturers.

The research team included scientists from MIT, the Max Planck Institute of Colloids and Interfaces and the Max Planck Institute, and has been published in *ACS Central Science*.

The molecule that protects against aflatoxin

Researchers at the University of Arizona have found a promising way to prevent the loss of millions of tons of crops to a fungus each year, offering the potential to dramatically improve food security, especially in developing countries.

The team's approach uses transgenic corn plants that produce small RNA molecules that prevent fungi from producing aflatoxin, highly toxic substances that can render an entire harvest unsafe for human consumption even in small amounts.

Despite being infected with Aspergillus *fungus, this transgenic corn cob is not contaminated with aflatoxin, thanks to its defence line of RNA molecules that shut down the toxin production in the fungus.*

Crops all over the world are susceptive to infection by fungi of various *Aspergillus* species, a fungus that produces secondary metabolites known as aflatoxins. These compounds have been implicated in stunting children's growth, increasing the risk for liver cancer and making people more susceptible to diseases such as HIV and malaria. The results of the study, published in *Science Advances*, showed that transgenic corn plants infected with the fungus suppressed toxin levels below detectable limits.

Unlike in the US, where crops intended for human consumption are tested for aflatoxin and incinerated once levels approach 20 parts/billion (equivalent to one drop of water in a 22,000-gallon pool), no testing is available in many developing parts of the world, especially in Africa, where millions of people depend on consuming what they harvest. There, toxin levels up to 100,000 parts/billion have been measured, said study leader Monica Schmidt, an assistant professor in the UA's School of Plant Sciences and a member of the UA's BIO5 Institute.

"Aflatoxin is one of the most potent toxins on the planet," Schmidt said. "Usually it won't kill a person outright, but it can make you very sick."

Funded by the Bill and Melinda Gates Foundation, Schmidt and her team set out to study whether a naturally occurring biological mechanism called RNA interference could be used as a weapon against the *Aspergillus* toxin. That approach, called Host-Induced Gene Silencing, or HIGS, builds on previous work by other researchers who discovered that during the infectious process, the host plant and the fungus exchange small nucleic acid molecules.

The HIGS approach has a distinctive advantage over existing efforts to keep aflatoxin out of the human food chain, because it prevents the fungus from making toxin in the first place while the crop is growing in the field, as opposed to protecting crops only after they have been harvested and stored. Such approaches include solar-powered fans that suck out air from storage facilities or sealing crops in huge storage bags creating airless conditions so fungus cannot grow.

In their experiments, the team infected corn plants with *Aspergillus* and let them grow for one month. While untreated control plants were found to harbour toxin levels between 1000 and 10,000/billion, toxin levels were undetectable in the transgenic plants.

"The detection limit is not zero, but low enough for the corn to be safe to eat," Schmidt said.

"This corn plant would be like any other," she said. "The only trait that sets it apart is its ability to shut down the toxin production. It shouldn't have any other effects, but obviously, a lot of downstream testing will be required before it could be grown in the fields."

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In addition to these dedicated food analysis ranges, Pathtech also supplies a wide range of general laboratory equipment and accessories, applicable to many of the Food Technology and Manufacturing areas including:

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For more information, visit www.pathtech.com.au/foodscienceandtesting/ or contact the Pathtech team on 1800 069 161

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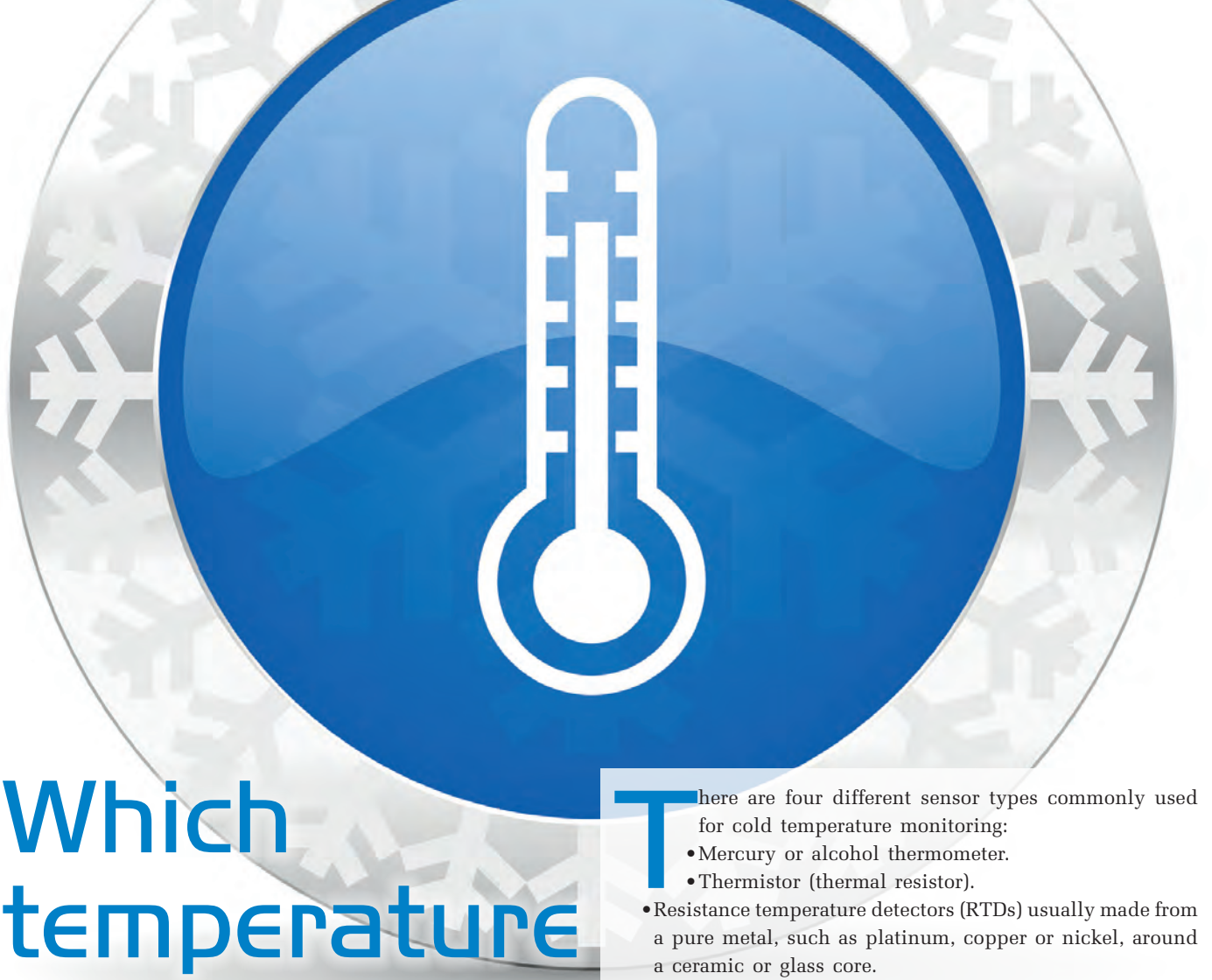

Which temperature sensors are best for your application?

Chamber v room monitoring

Paul Daniel

Many chamber applications are cold temperature applications and usually temperature is the only parameter monitored. Cold air cannot hold much moisture so it is uncommon to use a humidity sensor in a cold temperature situation.

There are four different sensor types commonly used for cold temperature monitoring:

- Mercury or alcohol thermometer.
- Thermistor (thermal resistor).
- Resistance temperature detectors (RTDs) usually made from a pure metal, such as platinum, copper or nickel, around a ceramic or glass core.
- Thermocouple, two wires of different metals. The junction between the two metals will show a voltage change from a change in temperature.

In our experience, when folks want to monitor cold temperatures, they simply select a vendor, then accept the sensor type that the vendor has decided will work best in that particular application. So, in many cases the decision of what sensor to use is based on your choice of vendor. Monitoring does not require a high accuracy sensor for most applications, especially for cold temperatures, so most types of sensors can be used with equal efficacy. However, it can be valuable to understand how each of the four types of sensors work in case there are variables in your environments that will cause one sensor to function better, last longer, and measure more accurately.

Glass thermometers, while simple, reliable, and inexpensive, are used less often in industrial applications because they require human labour for daily checks, data recording, and manual reporting. Obviously these tasks are rife with opportunity for error. However, thermometers are still used in emerging nations where labour is inexpensive and higher tech solutions are prohibitively expensive. Thermistors, RTDs (Resistance Temperature Detector), and thermocouples are electronic versions of the thermometer. The temperature causes the electrical characteristics of the sensor to change, thereby allowing us to determine the temperature by measuring an electrical value, such as resistance.

These devices vary widely in terms of cost, initial accuracy, long-term stability, and range. For most applications in monitoring cold temperatures (8°C to -80°C), a device equipped with an RTD or a thermistor would be selected. For instance, the Vaisala Wi-Fi data logger HMT140 uses RTDs that measure from -200°C to +200°C with good accuracy (±0.5°C over that range).

For very cold applications, such as liquid nitrogen cryogenic applications, a thermocouple can be used due to the extreme cold (as low as -196°C).

Here is a rough breakdown of the differences between the types of temperature sensors. These are general, and subject to disagreement.

- Thermocouples — inexpensive, linear response to temperature changes (easy to calibrate), relatively low accuracy, low stability, very wide range of temperatures that can be measured, durable, energy efficient (takes little energy to operate). Good for extreme temperatures like freezers, very low temperature applications, ovens, etc.
- Thermistors — inexpensive, non-linear response (harder to calibrate), high accuracy, high stability, narrow range of temperatures, durable, energy efficient. Excellent for ambient, controlled room temperature.
- RTDs — expensive, linear response, high accuracy, high stability, moderate range of temperatures, fragile, energy inefficient (needs external power). Also good for controlled room temperature, ambient monitoring.

The measurements from these electronic sensors are typically measured by a device like a chart recorder or a data logger. Chart recorders — due to the labour requirements of changing charts and the real possibility of mechanical failure — seem to be disappearing from the field, though they are still quite popular in some countries. We have a chart recorder replacement calculator tool that shows the costs of running these, versus the cost of data loggers.

Currently the most modern method is to collect the data from the electronic sensor and store it in a logger for later collection and download. The data logger is generally considered to be superior because there is a very low risk of data loss. The downside of the data logger is that we need to download the data. This disadvantage of the data logger was mitigated with the advent of automated monitoring systems where data is automatically downloaded over a network connection. No more walking from sensor to sensor, no more compiling manual reports.

Humidity is another beast altogether

Humidity is measured in both ambient and chamber applications, although as stated, because of temperature dependency it's rarely measured in low temperatures. As a parameter, humidity is both simpler and more complex. It's simple because when you measure humidity, you will almost always use sensor based on a thin-film capacitor. It's complex because the sensors are prone to drift. Achieving accuracy in humidity sensors is time consuming and expensive because, unlike a temperature sensor, the sensor is degraded by the environment. When both temperature and humidity are measured, a thin-film capacitor humidity sensor is combined with a thermistor or RTD.

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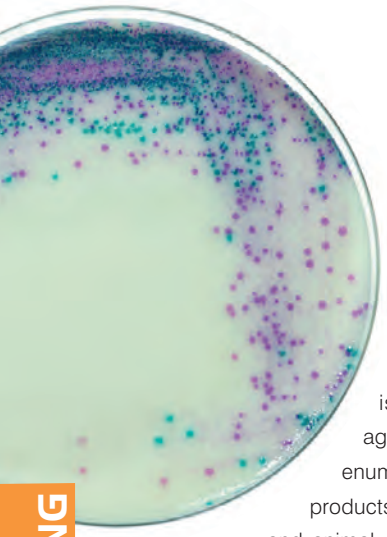

Salmonella medium

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The high specificity and high selectivity of the medium are due to a combination of enzymatic activities and the inhibition of contaminating food flora.

Bio-Rad Laboratories Pty Ltd
www.bio-rad.com

Refrigerated incubators

The Thermo Scientific refrigerated incubators for temperature applications ranging from 4 to 60°C utilise compressor technology designed to provide favourable temperature conditions for applications that require thermal stability and uniformity above, around or below the usual ambient laboratory temperature.

The systems are fit for standard 37°C incubation applications in warm laboratory environments. They can be used in pharmaceutical, life science, water treatment, biological research and microbiology applications — including incubation of bacteria and yeast, water testing, hatching of insects and fish, sample storage at specific temperatures, and biochemical oxygen demand testing.

Thermo Fisher Scientific
www.thermofisher.com.au

Luminometer

The LM1 Clean-Trace Luminometer from 3M has a re-engineered system, offering greater sensitivity, more powerful and intuitive software, wireless connectivity and a rugged, user-friendly ergonomic industrial design.

The product uses photomultiplier technology to amplify any luminescence and boost the likelihood of detection. This is an important element in the luminometer's re-engineering, applying techniques used in medical devices, medical imaging, aerospace and other fields of science to improve efficiency.

It has a new user interface with a streamlined and more intuitive dashboard to make navigation easier, minimise the amount of clicking between displays and generate reports more quickly. The LM1 Clean-Trace Luminometer offers users wireless connectivity, with the capability of transferring data via Wi-Fi or Bluetooth technology to the device or computer where it will be analysed by the system software.

The housing and structure of the LM1 Clean-Trace Luminometer are now tougher and more ergonomic in use.

3M Food Safety
www.3m.com.au

Sulfide-resistant analytical pH sensors

Electro-Chemical Devices' S10 and S17 Analytical pH Sensors monitor pH in water-based solutions and are sulfide-resistant. The sensors' replaceable cartridge electrode features a pH range of 0 to 14 at temperatures from -5 to 130°C and survives pressures up to 300 psi at 25°C. It has been tested to sulfide ion concentrations of up to 25 ppm.

The product line consists of two sensor designs and replaceable electrode cartridges. The S10 Sensor is an immersion- or an insertion-style sensor, and the S17 is a valve retractable-style sensor. They are fully rebuildable and feature a 316 stainless steel body that incorporates the sensing cartridge, a temperature module and a signal conditioner with cabling.

The cartridges provide specific solutions for the measurement of pH, ORP, specific ion (pION), dissolved oxygen, conductivity and resistivity in a wide range of industrial process applications.

The pH and ORP cartridges are available with either Radel (PES) or PEEK construction configurations with full crown, double or single tine-style pH bulb protection. The pION cartridges with solid-state, glass or PVC sensing membranes are suitable for continuous online measurement. The DO electrode is a galvanic cell with a lead anode, silver cathode and Teflon membrane. The conductivity and resistivity electrodes are designed in both contacting and toroidal sensor configurations for application flexibility.

The immersion/insertion sensor is designed with a 0.75″ MNPT compression fitting. The retractable sensor is designed with a 1″ MNPT ball valve, a 1-x-0.75″ reducer and a 0.75″ MNPT compression fitting.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

pH test strips

Macherey-Nagel pH-Fix Test Strips enable even non-laboratory personnel to quickly and simply determine pH at the point of interest. The strips are suitable for use in the food industry, including sanitising solutions, milk, wine, beer, juices etc.

The strips, which cover the entire pH range, are available in 14 different measuring ranges to cover many applications and varying levels of sensitivity. Four distinct colour pads per test strip improve accuracy.

The dyes in pH-Fix test strips are chemically bound to the test pads and so the indicator dyes cannot bleed or mix with neighbouring test pads and colours can be precisely matched to a colour scale.

Also, pH-Fix technology prevents contamination of the sample by dye, so the solution can be re-used for further analysis. Even in weakly buffered solutions, pH-Fix test strips can be immersed for a long time until the final reaction colour has developed.

Test Strips Online
www.teststripsonline.com.au

Food safety solution

The PAR SureCheck Advantage is a handheld, food safety IoT solution designed for food quality and task management. The Advantage enables the integration of multiple functions in an all-in-one handheld device. It is suitable for use in or grocery, restaurant, food production and food logistics environments.

The 5″ handheld hardware device powered by Intel Atom Processor technology offers high performance with low power consumption designed for food quality and task management. SureCheck Advantage provides increased operational efficiencies with its integrated temperature probe, barcode scanner and RFID infrared temperature readers.

SureCheck assures HACCP compliance and is claimed to improve operational efficiencies by 60% compared to traditional pencil and paper. The software-as-a-service model and cloud-based enterprise server helps maintain accurate records for auditing and analytics.

The system provides a convenient display of the HACCP checklist, prompts when a task needs to be completed, keeps track of relevant safety and recall alerts, flags missed steps and violations, issues corrective actions and delivers a complete audit trail broken down by operator, name, location verification and timestamp. It is designed to be used across both simple and complex food handling and preparation processes, eg, heating food, or heating food and then cooling it within a specified time frame.

ParTech Inc

www.partech.com

Rapid aerobic count plate

Aerobic count bacteria are present in a variety of food matrices and serve as indicators for food spoilage. Getting accurate aerobic bacteria counts in raw materials, finished product and production environments is critical to making time-sensitive decisions that impact process control, cleaning decisions and, ultimately, product quality and safety.

3M Petrifilm Rapid Aerobic Count Plates are a fast, accurate and easy way to expedite critical business and product-release decisions. Proven as reliable as the SMA plate method, the plates help agar users avoid costly retesting and delayed results due to interpretation issues caused by spreader colonies.

Faster results and less labour mean users have more time to monitor their process, ensuring tighter process control and a higher quality product.

A sample-ready, culture medium system, the plates contain nutrients, a cold water-soluble gelling agent and a dual-sensing indicator technology that facilitate colony enumeration in 24 hours for most food matrices.

Thermo Fisher Scientific microbiology solutions aim to meet all microbiological food safety and quality needs, from culture media and diagnostic kits, to quality control organisms.

Thermo Fisher Scientific

www.thermofisher.com.au

Temperature and humidity monitoring

The testo Saveris 2 cloud-based Wi-Fi temperature and humidity data logging and monitoring system allows users to store and access information remotely. This means users can monitor and react to issues from anywhere in the world. If temperature or humidity levels fluctuate beyond acceptable levels an alert is sent by both email and SMS to the parties responsible, allowing action to be taken to prevent any loss of product.

The system can be used for monitoring temperature and humidity values in storerooms, workrooms and even trucks in transit. It consists of Wi-Fi data loggers and a cloud data storage system. The data loggers record temperature and humidity at adjustable intervals and transmit the readings directly to the Testo Cloud via WLAN. The readings stored in the cloud can be analysed anytime, anywhere, using an internet-enabled smartphone, tablet or PC.

Limit value violations are immediately reported via email or optionally via SMS. Similarly, Wi-Fi data loggers can be programmed via the Testo Cloud and analyses set up.

Testo Pty Ltd

www.testo.com.au

Using X-ray diffraction to identify ingredients

The ingredients in foods can be difficult to identify. After all, usually you are not interested in specific molecular compounds but actual ingredients which themselves are complex organic mixtures.

Rigaku has published an application report describing the analysis of pancake mix. The analysis described was performed using the Rigaku MiniFlex general-purpose X-ray diffractometer and highlights the capacities of the instrument's analysis software.

X-ray diffraction (XRD) is very useful in the analysis of complex organic mixtures. By comparing XRD patterns of unknown samples to patterns obtained from known materials, complex ingredients can be recognised.

In the pancake mix case, primary ingredients such as brown sugar, baking powder and flour are the important factors to control in the production process, rather than the molecular compounds that make up the ingredients.

Although the primary database for these XRD patterns is compiled and maintained by the International Center for Diffraction Data (ICDD), the preferred XRD patterns for the primary ingredients may not all be present in the database.

In such cases, the MiniFlex analysis software allows users to make their own databases based on user-collected patterns from common or significant materials in the process.

Phase identification and quality control of the pancake mix can therefore be done by collecting XRD patterns of the individual ingredients and adding them to the user database of the software.

The results displayed in the report are derived from the individual raw ingredients being scanned and overlaid.

Each of the individual raw materials was scanned and the patterns were saved to a database.

The results show the overlay of newly added patterns to the database with the original XRD pancake mix pattern, confirming the identity of the individual compounds.

The pancake article, along with other food science-related XRD analyses, can be seen at www.rigaku.com/en/products/xrd/miniflex/apps/2.

AXT Pty Ltd

www.axt.com.au

What's new in

Food

technology & manufacturing

processing

Your one-stop parts supplier for your industry needs

Get all your parts from a one-stop supplier...

Who understands your industry needs.

With over 70 years of global experience serving the needs of the Food & Beverage manufacturing industry, RS is continually improving and expanding our range of products and services. RS has the widest breadth of brands & technologies in the market suitable for the Food & Beverage industry.

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RS

Synchronous drive system

The Gates PolyChain GT drive system is particularly suited to food industry applications thanks to its high torque load capability which is claimed to exceed that of roller chains.

The system needs no ongoing lubrication and therefore stays much cleaner — a huge consideration for food production and packaging environments.

Being a toothed-belt (synchronous) drive technology, the PolyChain GT runs more smoothly and quietly than roller chain and sprocket systems. It is also more energy efficient.

The carbon fibre reinforcement provides virtually zero stretch thus eliminating the need for re-tensioning and reducing maintenance costs.

Rydell Beltech Pty Ltd
www.rydell.com.au

Milk pump motor

TEMA has released a stainless steel IP67 milk pump motor that is suitable for the dairy industry. It is designed and manufactured to operate in extreme conditions with high or low temperatures, high humidity, steam, water, etc. It can be hosed down with any caustic cleaning solution and will remain in good condition.

The mechanical design of the motor is claimed to be completely different to any motor in the world. It is suitable for any food processing company that has to wash down its machines to keep them clean.

Lafert Electric Motors
www.scorpionstainless.com.au

Digital sorters

The VERYX B140 from Key Technology is a medium-capacity belt-fed sorter with a 1400 mm-wide inspection zone — which is 15% wider than comparatively sized sorters, according to the company — to attain a higher throughput within a similar footprint and better singulation of product on the belt.

It features innovative system architecture and inspection technology to maximise the detection and removal of foreign material (FM) and product defects based on objects' colour, size, shape and/or structural properties while minimising false rejects to enhance product quality and increase yields.

Suitable for production lines running 5–10 t of product per hour, the product complements Key Technology's existing range of chute and belt-fed VERYX sorters of various widths. All belt-fed VERYX sorters can be configured for wet and frozen potato strips and specialty potato products as well as fresh and frozen fruits and vegetables, leafy greens, potato chips and other snack foods, confections and seafood. Chute-fed VERYX sorter configurations are suitable for nuts, dried fruit, IQF products and other free-flowing foods.

The product uses multisensor Pixel Fusion — a feature that combines pixel-level input from multiple cameras and laser sensors sharing the same line of sight to clearly differentiate good product, defects and FM. Sensor types, sensor positions, lighting, the ejection system, product handling and software are designed to meet each processor's requirements and can be easily upgraded in the field with additional or different sensors as customer requirements evolve over time.

Key Technology Inc
www.keyww.com

How ISO standards can increase trust

in the quality of your food products abroad

In much of the developed world, there is a great deal of mistrust surrounding the food industry and food safety in general.

If you're looking to export food to other countries, it's essential to take local consumer opinion of the food industry into account. Here, we'll look at how food exporters can increase trust in the safety of their food using ISO 22000, and how ISO 9001 can help prove your food products adhere to high quality standards.

Consumer trust in food quality is low around the world

Australia and New Zealand are uniquely positioned in the world, with a high level of consumer trust in local food supplies. However, citizens realise that food security is a major issue, and elsewhere in the world, the level of trust in food producers remains low.

In the USA, for example, the percentage of consumers who trust food companies is at a mere 34%, despite being up from 19% back in 2012. Similarly, research by Mintel reveals that consumers in the UK also lack trust in the food and drink industry, with few believing either retailers or manufacturers have complete information about their supply chains.

Thanks to Australia and New Zealand's reputations as premier food exporters, food manufacturers are in a strong position to fill the void in trust left by local producers. However, reputation is not enough — evidence needs to be given to help assure to international buyers that as suppliers, your products are safe.

This is where ISO 22000 comes in, which is an internationally recognised food safety management system, designed to keep food safe from producer to consumer.

How does ISO 22000 help?

ISO 22000 helps food producers improve communications along their supply chains, delivering safe and healthy food to your customers. This is done in three stages. The first is to document all of your processes to create a Food Safety Management System. This ensures all management, planning and day-to-day activities are conducted with food safety in mind.

Next, prerequisite practices are put into place. This involves anything to do with your production environment, ensuring it is suitable for making food safely, and may cover the layout of your factory or production facility, as well as personal hygiene for your team. ISO 22000 requires that any hazard that may be reasonably expected to occur in the food chain is identified and evaluated.

Finally, the standard includes a Hazard Analysis and Critical Control Plan (HACCP). This is especially important for companies involved in food manufacturing or processing to eliminate food safety hazards in the products, which might include biological or chemical contamination, or physical hazards.

The standard is especially valuable to food manufacturers and distributors as a solution to offer assurance to its customers that they perform to the highest standards, taking food safety seriously.

World-class quality assurance

While ISO 22000 proves that your products adhere to the highest standards of food safety, ISO 9001 offers proof that your food products are produced to a high standard. This standard can be used by food producers to streamline processes, reduce errors, free up management time and improve internal communications, all with the objective of creating consistently better products.

ISO 9001 works similarly to ISO 22000 in that it establishes a management system for your business, documenting processes to be followed at all stages of production. Because this reduces the amount of errors in production, your customers can be sure of the consistent high quality of your products.

On top of that, it's a great help for highlighting your ability to deliver as a supplier. Many larger companies looking for white label suppliers for their products will run a tender process to determine who should supply them. ISO accreditation is a great way to stand out from the competition, giving evidence that your product is not only of superior quality, but also that you'll be consistent in supplying good-quality products.

Wrapping up

Expanding into overseas markets can be difficult, but food producers in Australia and New Zealand are well placed to do so if they make use of the opportunities that ISO accreditation can offer them to prove their products are not only high quality, but safe too.

QMS International
www.qmsuk.com

Expanding output within a busy operational environment is a challenge faced by many processors.

At a large-scale meat processing plant, current production levels were fast becoming unsustainable without expanding operation in the key area of boning. But with operations running continuously at the facility, the challenge was to find a solution that could be implemented with minimal impact on the business.

For any successful business functioning in a production-critical industry, the need to expand operation is often tempered by the prospect of lengthy, unscheduled downtime, disrupted productivity and diminishing profits during the expansion period. The impact of an expansion project can weigh heavily on many companies' short-term profitability and often delays the decision to expand at all, limiting a business's growth and, ultimately, its success.

Advanced technology working hand in hand with existing equipment

The existing boning room at the plant was operating at full capacity but simply couldn't meet current processing demand. All variable frequency drives are housed in the temperature-controlled motor control centre.

Scott designed, manufactured, installed, modified and commissioned a complete turnkey solution for the plant's process equipment electrical control system. From project inception Scott worked closely with project managers, all the major equipment manufacturers and the plant's staff: positive and open communication was the key to an effective control system solution designed for the success of the expansion project.

Developing a thorough understanding of all aspects of design fundamentals and operational functions was an essential component in ensuring that Scott manufactured and programmed an operation and control system that would be user friendly, safe and functional within the plant. The control system was designed to incorporate all new and existing equipment to ensure commonality of component supply, operations and controls.

System integration achieved without interruption to beef processing

In order to achieve installation without unscheduled downtime, Scott pre-wired and pre-programmed the equipment prior to installation. Due to the size of the facility, and the location and quantity of I/O required, a fieldbus communications system with distributed I/O incorporating IP66 plug and cable connection systems for I/O devices was used to minimise the amount of field cabling and termination required, and to simplify fault finding and maintenance.

Due to the production-critical nature of the plant, all hardware and software designs focused on ease of fault location, speed of fault resetting by the operator using a touch screen and 'workarounds' for when equipment

How to expand your plant
without disrupting production

failures occurred. Variable frequency drives networked on DeviceNet were installed in the majority of motors; this ensured the plant operators could tune the operation to various production environments from a user-friendly touch screen.

Maximising downtime minimises disruption: planning for prompt installation

With uninterrupted operation a priority for this project, the installation was scheduled during the only window of opportunity available to them — the Easter public holiday shutdown. Throughout the entire project period the existing boning room, with the exception of the public holiday, remained fully operational. The new boning room meanwhile was readied and in full operational mode in the month prior to Easter to allow for prompt connection of the existing boning room to the new boning room during the public holiday shutdown. Product integration and commissioning followed.

Packaging pork chops.

Adding up the benefits

The prompt and fully operational turnkey solution for the process equipment electrical control system expansion project delivered a range of benefits including:

- A user-friendly, safe and functional operation and control system, using proven technology and advances in automation systems.
- Ease of operator use with all faults logically displayed on the touch screens and able to be reset without maintenance involvement.
- Disruption-free plant operation.
- Completion within all project timeline requirements.
- Compliance with all relevant Australian Standards and client specifications.
- Total system reliability and safety.
- Detailed occupational health and safety records and work procedures.

Technology at work

- The system comprises a high-speed, high-performance Allen Bradley ControlLogix PLC platform, featuring common program architecture and common communication networking using DeviceNet for drives and I/O devices.
- For easier connectivity and communication speed, the human machine interfaces (HMIs) utilise Ethernet capabilities; the HMIs are constructed from stainless steel to withstand the 82°C washdown environment.
- The safety system is designed using a Pilz PSS to uphold all safety requirements without diminishing the practicality of overall system operation.
- The complete system is designed in a modular format to provide easy expansion and modular replacement capabilities for maintenance or future system enhancement requirements.
- Where practical all devices and modules comprise a plug-and-replace style format providing quick replacement functionality in the unlikely event of component failure.
- The functional design layout of the Motor Control Centre (MCC), operating consoles and enclosures, and incorporated air-conditioning units ensure ease of operation; the air-conditioned environment within the MCC enclosures provides a stable operating temperature.
- Standardisation of control devices ensures straightforward servicing.
- Where practical, all control concepts remain similar to the existing installation to provide common operational procedures and reduce training requirements.

Scott Automation & Robotics Pty Limited
www.scottautomation.com

Above-ground bioreactor

BioGill technology offers food and beverage processors a green-tech, low-energy solution to improving on-site treatment of high-BOD wastewater.

The product is called the BioGill Tower. It is an above-ground, attached-growth bioreactor that is highly effective in reducing soluble nutrients such as BOD, COD and nitrogen, as well as fat, oil and grease. The technology is also easily retrofitted to existing wastewater treatment plants to boost capacity, lift performance and reduce odour.

Microorganisms are nature's best recyclers and decomposers, according to BioGill, growing best in a high-nutrient and high-oxygen environment. The patented nano ceramic gills inside every tower provide the right support media to grow a thick and active treating biomass. Scientifically designed, the tower provides a suitable liquid/air environment for microorganisms to thrive and maximise BOD reductions. Heat generated by the biomass creates a natural airflow inside the tower, so no powered aeration or energy-hungry blowers are required.

Improved on-site wastewater treatment can lead to significant savings in discharge fees and help companies achieve environmental targets.

BioGill Operations Pty Limited

www.biogill.com

Air nozzle options

WindJet YBLW air nozzles for blower systems are suitable for use in blow-off, drying and cleaning applications. The air nozzles are designed to convert low-pressure air into high-velocity and a high-impact air stream. Should the air nozzles accidentally be placed against a flat surface, the recessed orifices allow for the air to escape.

The air nozzles can be attached to a spray header which is suitable for spraying wide areas. Adjustable stay-in-place hoses allow for the spray header to spray an uneven surface or complex-shaped target.

The air atomising Blower Mist spray nozzles are able to provide a fine mist spray and are suitable for humidification, misting and cooling applications. The possibility of clogging is reduced due to the large size of the spray nozzle orifice.

The air atomising spray nozzles are constructed from stainless steel and the bodies are made from nickel-plated brass. The assembly of the nozzles includes a VeeJet flat spray nozzle. Different spray distances and spray coverages can be achieved by replacing the spray nozzle.

Spraying Systems Co Pty Ltd

www.spray.com.au

Sanitation sachet

ChillSafe is a simple-to-use sanitation sachet that provides the agribusiness, food manufacturing and hospitality industries an advanced hygiene and mould reduction technology that provides increased levels of facility hygiene and safe storage of fresh produce.

The product is an environmentally activated sachet that absorbs water vapour and releases a low dose of hydrogen peroxide vapour within a cool room or refrigerated space. ChillSafe is also safe for protecting organic produce; it is Biological Farmers of Australia certified in collaboration with the team at Australian Certified Organic and it is HACCP Australia Certified. The product benefits post-harvest, freight and foodservice companies in Australia and worldwide.

The product is designed to manage problems associated with cool room hygiene and the produce stored within cool rooms.

Coolsan Australia Pty Ltd

www.coolsan.com.au

High-capacity slicer and shredder

The TranSlicer 2510 Cutter, from Urschel, represents the largest footprint of the TranSlicer line of cutting machinery. Suitable for leafy vegetables, applications include romaine, iceberg, kale, radicchio, cabbage, spinach, celery, cucumber, eggplant, honeydew, rock melon and leek.

The product features several interchangeable 635 mm-diameter cutting wheels (slicing, crinkle slicing, shredding and julienne) to produce a full range of slices, shreds and julienne cuts at the highest capacities found in the TranSlicer line. An optional static hold down assembly is available for feeding assistance.

The device accepts firm products up to 171 mm in diameter and leafy-type products up to 203 mm in diameter. To accommodate different types of products, the machine offers a choice between three feed belt configurations: primary belts only, primary and secondary belts, or full-length primary belts. The machine operates via a variable frequency drive (VFD). The feed zone is completely separate from the mechanical zone to promote sanitation.

The replaceable feed belt guide eliminates the need to replace an entire assembly. Optional overlapping belt guards, belt lead-ins and belt slide extensions assist with positive product feed and increased yield.

Heat and Control Pty Ltd

www.heatandcontrol.com

X-ray inspection systems

The Xavis FSCAN series of X-ray inspection systems offers affordable high-speed and high-performance inline inspection for detecting foreign materials that may have been introduced during the production process. Each system can automatically detect undesirable contaminants such as metal, stone, ceramic, glass or plastic with high density. The system can detect missing or broken product, leakage, seal integrity and fill level — as standard via the easy-to-operate software.

The FSCAN has integrated network compatibility, allowing remote access by the production supervisor to monitor the line or by technicians for quick error diagnosis and support. This helps to reduce unnecessary travel costs for minor software-related issues such as product set-up. The intuitive user interface allows for quick and easy set-up of products without requiring special training or previous X-ray knowledge. Once a product is set up it is stored in the product library for easy recall, minimising downtime during product changeovers. FSCAN is equipped with an automatic memory function that will record each image in a secure database that can be analysed after or while the system is inspecting, to determine the defect. All inspection data is embedded with a time/date stamp for secure traceability.

Designed for wet area use, the hygienic design of the FSCAN makes cleaning an effortless task. All components are designed to have quick-release mechanisms for easy disassembly during cleaning to minimum downtime on your production line. There are various rejection methods available on request. Xavis supplies a full range of X-ray inspection systems for the entire food industry.

OFI

www.ofiinspection.com.au

Nuts and dried fruit sorted

Key Technology's Pixel Fusion improves the accuracy of digital sorting, reducing the number of sorting passes required to make grade. It eliminates false rejects, which maximises productivity and yield while consistently achieving the target product quality level.

The Veryx sorters equipped with Pixel Fusion identify and remove loose and embedded shell fragments, membrane material, broken nuts, product with surface scratches or insect damage, moisture-related defects, mouldy product, colour-based defects and foreign material including wood chips, stems, rocks, glass and subtle product defects such as wormholes to satisfy consumers' zero tolerance for impurities.

The equipment is available in a variety of widths to meet the need of low- to high-capacity nut and dried fruit processors. With inspection zones that are 15% wider than comparatively sized sorters.

The product can be installed as a standalone sorter, either inline or batch-fed, and in arrangements comprising a cascading line of multiple sorters, depending on the needs of the processor.

Key Technology Australia Pty Ltd

www.keyww.com

Hydration system

The Tecpro Humi Food System is a flexible, cost-effective solution for a range of retailers. It is designed to optimise shelf life for selling fresh foods and produce.

Its compact and energy-efficient hydration system prolongs freshness for up to 72 hours.

The Humi Food System is easy to install. The unit connects to 240 V power and regular water supply. The built-in, FDA-approved water steriliser is designed to prevent bacteria breeding in the moist, humid conditions. The unit is 50 x 50 x 15 cm and can fit under the counter with silent operation.

Included is a timer so the fresh food receives a fine mist in short bursts. This prevents saturation of the produce and reduces the risk of water pooling. The system is set to operate for a few seconds every 5–10 min; however, operation can be set to work from 1–60 s at a time with pauses of 1–60 min duration.

The Humi Food System can also be installed with a humidity status sensor that monitors the humidity levels around the food for optimal freshness. It uses 125 W when in operation and 12 W on standby.

Each Humi Food System can be customised to suit individual retail layouts, for produce aisles, refrigeration counters for meat and fish as well as storehouses.

Tecpro Australia

www.tecpro.com.au

Dry goods hose

Gates Food Master Dry Goods hose, formerly known as 690SB (Bulk Commodity), provides a solution for the bulk transfer of dry goods. The hose is designed to transfer bulk food products via suction, pneumatic or gravity systems where FDA sanitary tube is required. The natural rubber, sanitary FDA white 3/16″ thick tube is suitable for products such as flour, sugar, syrup and edible grains.

The hose is reinforced with steel wire helix and has a corrugated cover, ensuring strength and flexibility with a vacuum rating of 30 in. Hg.

The Food Master Dry Goods hose is suitable for temperatures of -40 to +66°C continuous service and comes in a variety of sizes, from 38 to 152 mm inside dia.

A range of fittings is on offer to complete a hose system, including Malleable or Brass Pin Lug, a Combination Nipple or Tri-Lokt and an extensive range of Quick-Connecting couplings.

Gates Australia Pty Ltd

www.gates.com/australia

Mixers for test bakeries and laboratories

Baker Perkins has added two machines for test bakery and laboratory applications to its range of Tweedy bread dough mixers. The Tweedy 8 and Tweedy 20 have maximum batch capacities of 8 and 20 kg respectively.

The mixers have been designed for use by high-output bakeries for development work on new products, ingredient suppliers working on new formulations to improve high-speed mixing and research organisations studying high-speed mixing and other aspects of the breadmaking process.

The small batch size is intended for research and testing purposes — a viewing port in the lid means the mix cycle can be monitored and process parameters can be changed to analyse and measure results. The batch size may be reduced by up to 50% without affecting the process.

The control features on the production mixers include variable speed control and pressure-vacuum mixing for texture control. This allows replication of the process of production-scale systems, enabling new product developments to be scaled up to full production.

The machine is compact with an integrated control panel and mounted on wheels for portability. The mixing bowl has an electric tilt mechanism for easy discharge. Control is by an HMI with full process visualisation, and there is network connectivity for data capture.

Baker Perkins
www.bakerperkins.com

Labeller

Domino has launched the M230i Print and Apply labeller, incorporating Domino's intelligent Technology (i-Tech) features and QuickStep user interface.

The system is designed for secondary and tertiary packaging applications across a wide variety of industry sectors.

The print-and-apply units offer a modular solution to the various case and pallet labelling needs of manufacturers. High-resolution online coding allows for the application of barcodes, text and graphics on packaging labels, ensuring GS1 supply chain compliance.

The labeller provides simplified operation with a colour user interface and intuitive software. Increased print head life improves operational efficiency, while full label area printing reduces wastage and decreases consumable costs.

Domino (Australia) Pty Ltd
www.domino-printing.com

Magnetic separators

Aurora's FORCE 10 range of high-performance magnetic separation equipment is designed specifically to prevent foreign matter contamination of products for food and dairy industries.

FORCE10 magnets remove metallic foreign matter and contamination from product streams.

They can be used in both wet and dry product applications across an array of industries. The FORCE10 range includes separators for products ranging from powder, granular, liquid, viscous and fragile across a range of process conditions including pneumatic transfer, gravity, high-pressure, high-temperature, high volume/bulk and ultrahygienic.

Aurora Process Equipment
www.aurora-nz.com

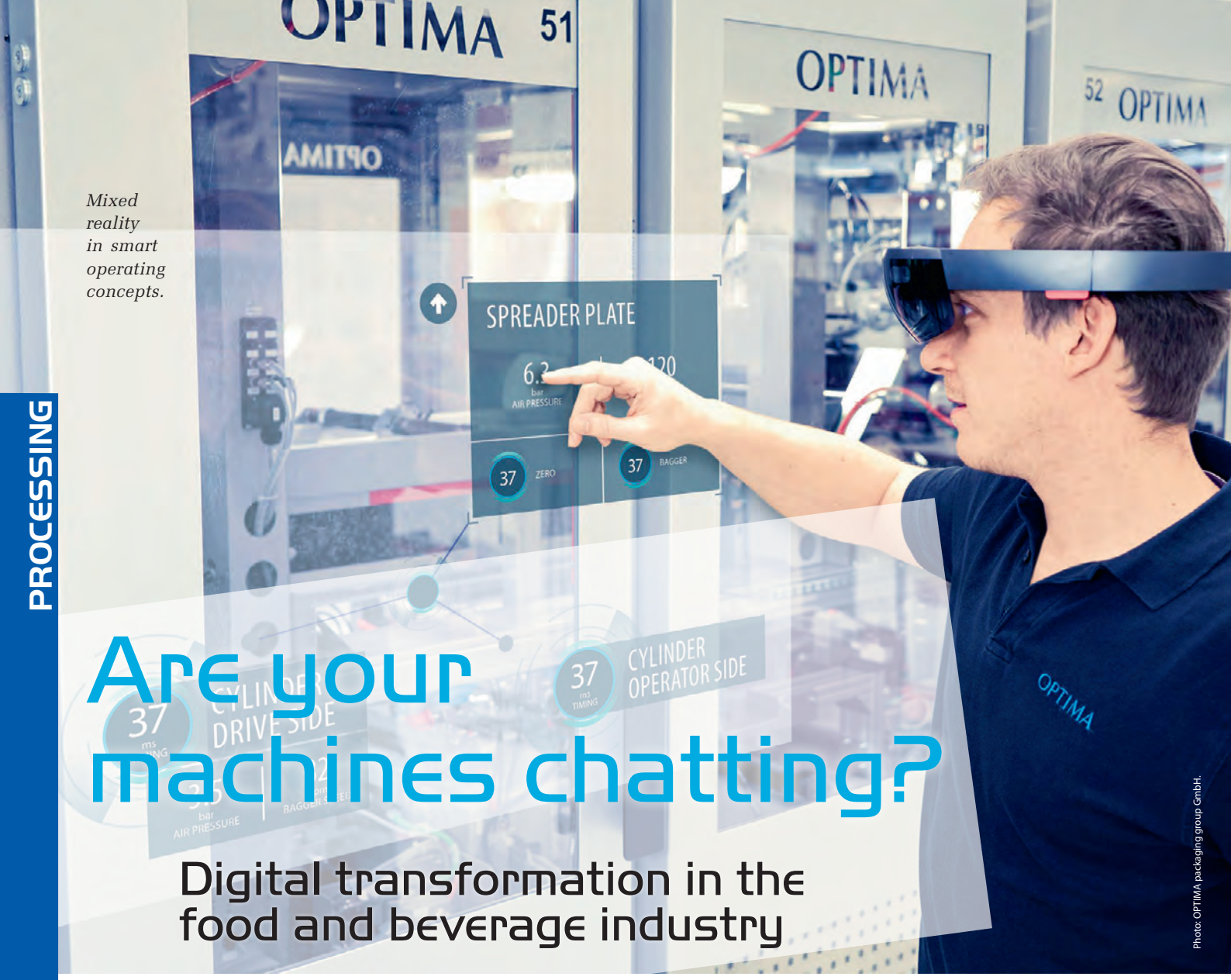
Proximity sensors

Turck has released its latest range of 8 mm barrel inductive proximity sensors. The technology of the ferrite core sensors has evolved, increasing the sensing range by up to 50%. Flush-mounted solutions can now be offered with an extended sensing range of 3 mm as well as with the conventional sensing range of 2 mm. The non-flush sensors are likewise available with a 3 or 5 mm sensing range. The sensor electronics allows Turck to produce devices with an ultrashort 15 mm design.

The modular development approach of the sensor series has led to a broad range of variants that allows users to find the correct 8 mm barrel sensor for their application. The sensors are available in 15, 22, 30 and 40 mm lengths. On the connectivity side,Turck is offering M8 or M12 connectors as well as sensors with a cable outlet, which in turn can be ordered with a 3- or 4-wire connection as NC or changeover contacts.

The sensors with a cable outlet are provided with a cable suitable for E-chain use and a semitransparent LED ring at the sensor end, which shows the sensing state from any viewing angle. The sensors are IP67 rated and have an operating temperature of -25 to 70°C.

Turck Australia Pty Ltd
www.turck.com.au



Mixed reality in smart operating concepts.

Photo: OPTIMA packaging group GmbH.

Are your machines chatting?

Digital transformation in the food and beverage industry

Hans Peter Fritsche, freelance trade journalist, Redaktionsbüro H. Fritsche

Product and process monitoring, labelling technology, packaging, logistics, maintenance and repair can already all be optimised through the Internet of Things (IoT). But are they?

Firstly let's backtrack a bit. What are the 'Things' ubiquitous to the IoT? They are the sensors, RFID (radio frequency identification) chips, devices, machines and plants. In future, these things are not only expected to deliver information on all important process and system conditions independently and continuously but they are also expected to communicate with each other via the internet and intervene in manufacturing processes to correct and optimise them without human intervention.

The basis for this web-based communication is the Internet Protocol (IP) with its unique-identifier IP addresses. The old Internet Protocol IPv4, however, was only capable of delivering an address space of just under 4.3 billion IP-addresses — and these had already all been allocated as early as 2012 — to PCs, notebooks, tablet-PCs and mobile phones. This is why the new standard IPv6 was developed which has an address space of 3.4 x 10^{38} IP addresses. So a lack of addresses is no longer a worry.

The changeover to IPv6 is still in full swing. So the challenges are not so much the things as such and their addresses but rather the flood of data they cause when one fine day billions of sensors will be transmitting thousands of data per second to host computers. This data then has to be evaluated for visualisations and simulations and to be saved for documentation purposes (traceability).

So the IoT is primarily about data; about the information retrieved from this data — to be precise. And this is the domain of software and algorithms. What can be achieved with this alone should be reason enough to actively drive this transformation. The following examples show applications that pay off in the short term.

Paradigm change in maintenance

Damaged bearings, transmissions, pumps or filling and dosing systems do not occur out of the blue but 'give notice' long before the damage actually occurs by unusual vibration and temperature deviations or by changed power consumption, a loss of pressure and the like. These deviations detected by sensors as part of condition monitoring can today be evaluated and visualised in real time thanks to highly complex

analysis and simulation programs and therefore be seen in the process engineering context.

On the basis of this information, machine and plant operators can intervene in the system by remote control in a targeted manner and above all location-independently with a view to always running systems in the optimum mode, to introducing program changes or to installing new applications and control software. Furthermore, simulation results permit precise forecasts regarding the remaining service life of critical machine parts, which opens up completely new perspectives for maintenance.

This means we are moving away from the reactive as well as preventive maintenance with its cycle-based component replacement intervals and towards predictable, precisely plannable maintenance measures — to so-called 'predictive maintenance'. The benefits are a higher machine and plant availability, substantially reduced downtime risks, higher operational and production safety as well as considerably lower maintenance costs.

Beyond this, predictive maintenance is a key element in sustainability. It is true that operators always played it safe when replacing components at set intervals but they also wasted valuable remaining service life of expensive components because they lacked reliable part behaviour data. Today, the knowledge about material behaviour, continuous stress under alternating loads and the like is far more advanced than 20 or even 10 years ago. Another aspect is the significantly higher computing performance available today as well as smarter analysis, FEM (Finite Element Method) and simulation software. They allow the remaining service life to be determined and predicted with a high degree of precision — and this knowledge benefits predictive maintenance.

> *These deviations detected by sensors as part of condition monitoring can today be evaluated and visualised in real time thanks to highly complex analysis and simulation programs and therefore be seen in the process engineering context.*

Chatting with machines

The increasing performance, flexibility and intelligence of machines and plants results in ever more complex systems posing the greatest of challenges for the developers of concepts for operating human-machine interfaces (HMI). By HMI hardware we mean terminal devices with touch-screen functionalities that most people know from their smartphones or tablet PCs. This means they can build on existing knowledge for learning to handle these machines and plants — this motivates and definitely shortens familiarisation time.

One central aspect in the development of graphical user

Condition monitoring delivers information on the individual machines or complete lines in real time. Based on predefined alarm and failure limits, deviations can be detected and eliminated early on. Photo: Bosch Packaging Technology.

interfaces is to ensure that these machines can also be safely operated by people without specific vocational training and often also without sufficient language skills. To avoid operating errors the developers of GUIs rely on intuitive graphical elements instead of language. Also up and coming are photorealistic 3D CAD displays of machines, plants and components.

Furthermore, HMIs have to live up to the needs of various users — in line with their skills and authorities. Therefore, machine operators see different graphical user interfaces to shift managers, maintenance staff or production managers. This means, every user only sees the data that corresponds to their area of responsibility and is of relevance to their specific situation. Furthermore, the data is limited to the essentials; this ensures an easy-to-grasp display and an instant presentation of the key machine parameters and production data.

Other characteristics of modern HMIs are mobility and consistency. There is a trend towards mobile devices with which the user can control machines and equipment remotely depending on their authority level. This saves time and travel expenses especially in the field of service and maintenance.

Working in virtual worlds

When it comes to the IoT, there is hardly a topic that currently causes as much a stir as virtual, or rather digital, twins. The technical basis for virtual twins is high-performance 3D CAD, simulation and analysis software programs as well as virtual 1:1 copies of real machine and equipment control software. Based on such software tools, digital twins map the complete manufacturing process including components, machines, plants and their controls as a virtual model — complete with all the physical data required for the simulation. In addition to this, digital twins permit offline programming. All of this makes virtual twins universal tools for developers, operators and maintenance staff.

Thanks to these near-reality simulations, design errors and/or weak spots can already be detected and eliminated in the development stage without having manufactured a single real part beforehand. This also applies to the programming and optimising of controls.

One of the most important applications, however, is virtual commissioning or start-up. This is not only a virtual trial run but also serves to familiarise the operator in charge of the machine with the properties and possibilities of the system in a targeted manner. In other words: the digital twin is the 'flight simulator' for industrial processes, machinery and equipment. The virtual pre-start-up before the real commissioning pays off in more ways than one. Should there still be any bugs in the system or control concept, they can be remedied without causing damage to real system components. Offline programming, in turn, allows production planners to virtually test various operating modes. The most important aspect, however, is that the virtual twin brings together the expertise of many specialists, which can later also be used for other projects.

In a nutshell: thanks to the sophisticated simulations, plant manufacturers and users can achieve significantly shorter project lead times, faster start-ups and marked efficiencies for the development of similar plants and processes. This saves time, but above all resources, energy and manpower.

Standardised interfaces a must

Standardisation continues to be a major challenge because most machinery producers still rely on their own interfaces. However, integration is the decisive feature in the IoT. This integration requires especially consistent data and information exchange between machines — both vertically and horizontally. And this makes open standard protocols necessary. Therefore, there is a trend towards Open Source solutions since these offer high security of investment and independence being non-proprietary systems. One example is the OPC Unified Architecture (OPC UA), a package of specifications for linking machines of various manufacturers. OPC UA ensures security through authentication and authorisation, encryption and data integrity.

This means OPC UA is ideally suited for a safe, reliable and non-proprietary transport of raw data and pre-processed information from the manufacturing level to superior production planning or ERP systems.

Even old systems can handle the IoT

Many older machines, lines, motors and compressors are not equipped with the sensors and communication technology for the IoT — sometimes not even for operation as part of networked systems. This does not mean that these systems are obsolete in view of digital transformation.

Here — as an entry-level solution for the IoT — smart sensors can be retrofitted. They regularly measure important condition parameters of the machines and systems and transmit the data via built-in communication interfaces wirelessly to the HMIs and/or employees' smartphones or tablet PCs for evaluation. With these and other simple methods, companies can enter the world of the IoT inexpensively and still benefit from reduced downtimes, longer machine uptimes as well as lower power consumption and the like.

At interpack 2017, the VDMA Food Processing and Packaging Machinery Association organised a special exhibition on the topic of the IoT featuring examples of solutions in packaging machinery and process engineering and opening up new opportunities for applications in security, traceability, copying and counterfeit protection as well as in customised packaging.

Mixproof valves

The Alfa Laval Mixproof valves are pre-built valve matrices customised to meet individual requirements to ensure efficient flow management, using as few components as possible to deal effectively with key issues including thermal cycling, cleanability, drainability and flow control.

Alfa Laval valve matrices can be supplied preassembled and pretested as well as fully wired, with all the necessary pneumatic tubing, junction boxes and control panels preconnected. This means users can bring complex installations online as quickly as possible, saving time and avoiding lost revenue associated with on-site assembly, troubleshooting and downtime.

The valves are designed for product safety with good cleaning conditions, no risk of cross-contamination and to rule out the opportunity for human errors, which can occur using manual connection of lines and handling of swing bends.

The valves are manufactured for a reduction in water and energy use for processes in hygienic industries, such as beverage, food, dairy, pharma and personal care, to optimise flow management without compromising flexibility, plant safety, product quality or hygiene.

Alfa Laval Pty Ltd
www.alfalaval.com.au

Spiral oven

The Stein TwinDrum Spiral Oven is an all-in-one oven solution featuring high capacity, uniform temperature and good roasting capabilities.

With two independently controlled cooking zones, the oven has been designed to give good results while maintaining low running and maintenance costs, according to the company.

JBT FoodTech
www.jbtfoodtech.com

Guarding your safety

— functional safety for food processors

Jorgen Saxeryd, Safety products and functional safety advisor

An engineer was trapped by machinery while examining a conveyor belt, suffering major injury and ongoing nerve damage. After an investigation revealed that had a guard been in place this accident could have been prevented, the employer, a large UK food manufacturer, was fined £800,000. The moral of this — every food and beverage processing plant must develop and have comprehensive safety procedures in place.

Across the globe, there are a variety of different regulations for food processing plants. Most countries have strict regulations for safety in these potentially dangerous environments. This also applies to the safety of employees in the processing plants, and employers who fail to make adequate safety considerations can face large fines. Not only can these authorities enforce these in the case of accidents, they can also be enforced during regular inspections.

In Europe, the Machinery Directive 2006/42/EC requires machinery to be designed and built so it can be used safely. In food processing plants, there are many dangerous machines for which plant managers should follow safety regulations, or the plants may face closure or high fines. Machines such as decanters operate at high centrifugal forces and it is not unknown for the machine's g-forces to reach more than 2000 times gravitational force. This is clearly a dangerous environment for employees to work in; however, as these machines are essential for use, the key concept is the management of risk.

In the 1970s, the increase in heavy machinery such as the creation of the steel press led to increased safety guards. Since then, many safety-conscious companies undertake a risk analysis in the initial stages of machine development. In the case of decanters, it is not possible to remove the risk, but it is possible to mitigate the risk to an acceptable level by putting safety guards such as enclosures or emergency stops into place.

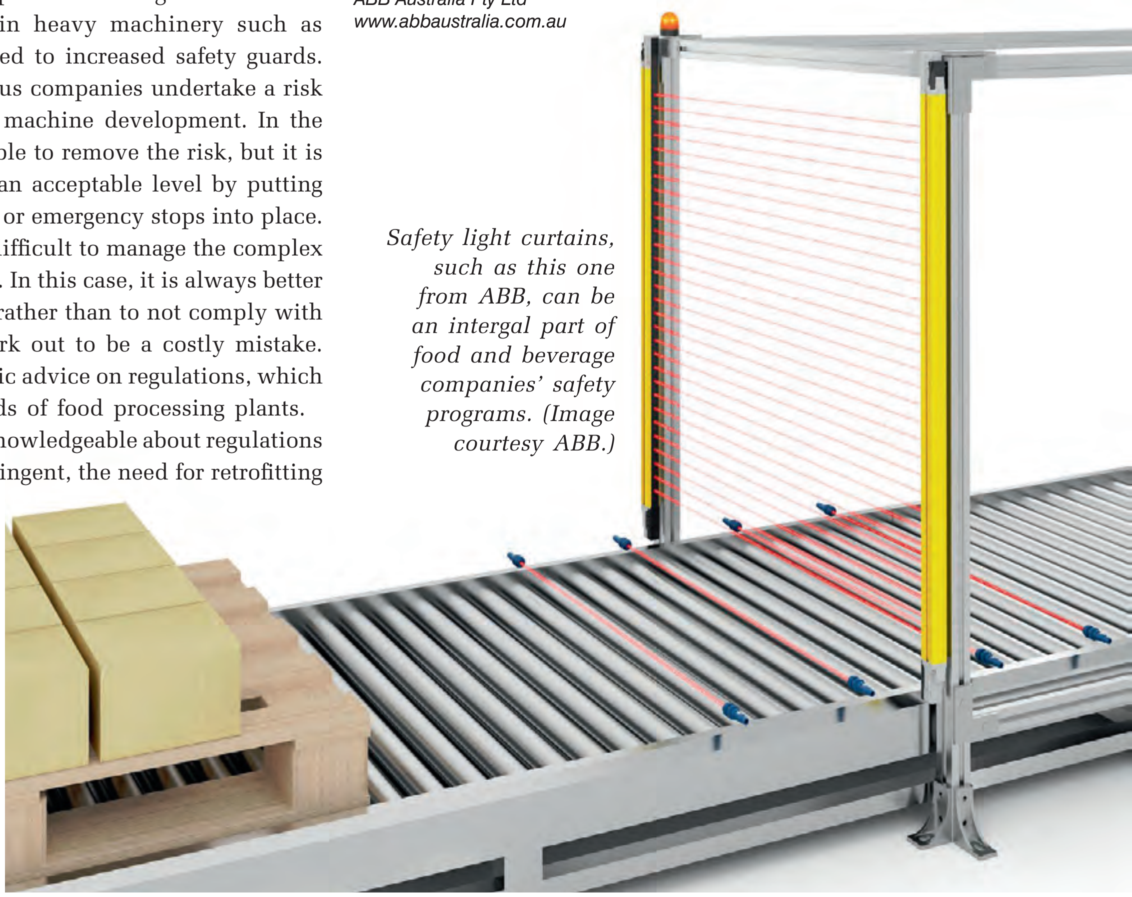
Often, companies find it too difficult to manage the complex world of safety regulations alone. In this case, it is always better to consult professional services rather than to not comply with the regulations, as this will work out to be a costly mistake. ABB's experts can provide specific advice on regulations, which also takes into account the needs of food processing plants.

As companies become more knowledgeable about regulations and regulations become more stringent, the need for retrofitting old equipment with additional safety measures may arise. Although it may seem instinctive, where there is a dangerous moving machine, the safest answer is not always to shut it away behind an enclosure or barrier.

In the food processing industry, companies should consult functional safety experts who have experience in the sector. The experts will, for example, suggest equipment such as light grids, which perform an emergency stop on a machine when a light grid is broken by an object. These devices are more appropriate for the food processing sector than using physical guards or barriers as they allow easier access for maintenance and washdown, which is essential for hygiene in food processing plants.

Managers of food processing plants in all countries, regardless of the country's regulations, should consider safety as a priority in their plant. From the safety of single pieces of equipment to line safety and then plant safety, plant managers need to be aware of what they can do to mitigate risks. Plant managers not only have a responsibility to put in place an accurate safety strategy to protect their employees, but they also need to protect their businesses from costly infringements of worldwide safety regulations, as proven in the many cases gone by.

ABB Australia Pty Ltd
www.abbaustralia.com.au



Safety light curtains, such as this one from ABB, can be an intergal part of food and beverage companies' safety programs. (Image courtesy ABB.)

Breader

The GEA MultiDrum breader can be used to produce authentic looking natural bone-in and boneless products with a crunchy golden coating. The latest version of the breader features a larger belt width and more robust features.

Products can be bulk loaded to the machine, obviating the need for additional converging machines, which would add cost as well as make the line longer. As the products rise up on a chain belt, they are naturally divided into three channels, one for each drum (two for the 600 mm version).

An adjustable level of flour on the flour bed is constantly maintained so that the right amount of breading falls into drums with the products.

Tumbling the products in a drum ensures a home-style appearance, and there are no augers in the design so the potential for blockage is minimised. After tumbling, excess flour falls through slits and is constantly cycled back into the machine.

The design is easy to clean, and due to the GEA OptiAir technology, the amount of dust in the work environment is reduced. The GEA MultiDrum is available in a three-drum configuration (1000 mm wide) and a twin-drum configuration (600 mm wide).

At the outfeed, products exit evenly spread across the belt and there is no need for additional spreading machines or manual workers.

The drums on the GEA MultiDrum can automatically be lifted to a special cleaning position, enabling thorough cleaning of the whole machine, including the normally difficult-to-reach areas below the drum.

The machine is simple to operate and easy to understand. The control panel is placed at an ergonomic position, featuring push-button controls and speed readout.

GEA Australia

www.gea.com

Dry scroll vacuum pumps

Dynapumps' range of scroll pumps are oil-free, compact, quiet and capable of creating high levels of clean, dry vacuum by utilising the oscillation of two intertwining scrolls. The range includes both single- and two-stage scroll pumps and includes bearing purge ports and gas ballast valves as standard. Dynapumps can also supply a range of 'smart' scroll pumps with in-built frequency inverters allowing optimal control of pumping speeds.

The addition of IDP-10 and IDP-7 scroll pumps brings quality and performance to applications such as freeze drying, glove boxes, sample prep, SEM and more. They are also suitable for backing a turbo pump and load lock applications.

The full range of pumping speeds lets users optimise their system configuration for maximum performance at the lowest possible cost.

Dynapumps

www.dynapumps.com.au

A matter of time

A Unilever-owned factory in Poland is 3D printing replacement parts for its equipment and making significant savings of time and cost in the process.

Katowice Beverages and Foods Factory in Poland is responsible for producing hundreds to thousands of bags of Lipton Tea every day. Thousands upon thousands of products are made, labelled, checked and shipped out nonstop with automated machines and sensing systems dominating the factory. Mateusz Loska is the professional maintenance specialist charged with improving the production efficiency of the factory's systems — including anything from extending machine life to speeding up machine processes — all to save money and improve the machines at the same time.

At factories like this, quick turnaround time is essential to keeping machines running. The incentive of new ideas is driven by the promise of higher production rates, both in quantity and quality.

"We need to improve our machines in very short amounts of time," Loska said.

"Sometimes there are parts that aren't working... we used to just model the part, send it to a third-party company and wait for the results. It costs us time and money to fix a part. We've decided that we wanted to make this process shorter to make some improvements."

Also if a new idea needs to be tested, it can take weeks to get the parts back from a machine shop. This was one of the processes Loska wanted to improve.

	Cost*	Time
Replacement Part	$51.13	1 week
Printed on Markforged	$23.01	1 day

*Comparing the numbers. *Conversion rate from PLN to USD as of 8/30/2016.*

Priming for production

The factory had started with an ABS 3D printer at first, but it hadn't quite lived up to their expectations: "We decided that we needed something more, that would produce parts stronger, that we could use during normal production, not just in testing," Loska explained.

After hearing about Markforged, Loska was convinced: "We decided to test it... we saw that we could make models very quickly with the 3D printer, get stronger parts; not only with fibre materials like fibreglass or carbon fibre, but even with just nylon, we get much stronger parts."

The prospect of a 3D printer that could create production quality parts was appealing to the entire team: "We realised this would save a lot of time for us... and everyone who was involved in this kind of work with our machines can see that 3D printing just makes the time shorter for developing new parts or new ideas through to production." The Markforged printer gave the factory the ability to produce production prototypes at the push of a button.

Top of the line

When Loska and his team find potential areas for process improvements, they can now go straight to their Markforged 3D printer. "We start looking for any ideas, and during this process all the time we are 3D printing parts," Loska explained.

Once they discover which part of their manufacturing set-up requires improvements, they can use the printer to not only prototype ideas, but to test and load their concepts in a real-world environment before finalising, and printing, the finished product.

With the capabilities of Markforged, the printer helps develop quality parts in a fraction of the time it would take otherwise.

From sensor mounts to new production ideas, Loska improved many factory processes using Unilever's Markforged printer. Instead of waiting for weeks for a part to come in, this process now takes only a single day. "We make the 3D model in our CAD program, we send it to a third-party company... it's about one week until we get back a good part," he explained. "When we want to develop this part by ourselves, it takes 24 hours.

"These parts are developed very quickly, and it's about one night to print a few parts for the machine. They are much stronger and more durable than any parts printed on a normal 3D printer."

The parts the printer has produced can hold up in a factory environment, and that isn't the only benefit: "Normally it'd be about $50 if we want to send it to another company to make it for us," Loska said. "The same part costs about $10 on the 3D printer."

Saving cost and time, the part strength Markforged provides has extensively improved production efficiency at the company: "These parts are developed very quickly, and it's about one night to print a few parts for the machine. They are much stronger and more durable than any parts printed on a normal 3D printer.

Markforged's 3D printing systems are capable of automatically reinforcing engineering plastics to aluminium levels of performance and beyond so businesses can easily manufacture parts with structural strength right on the desktop. The Mark Two Industrial Strength 3D Printer empowers professional users to affordably create workhorse 3D parts that solve real problems, as well as realise reinforced structures never before possible.

Markforged is represented in Australia by Emona Instruments Pty Ltd.

Emona Instruments Pty Ltd
www.emona.com.au

Glaze spray system

Glazing baked goods can enhance the appearance of the product after baking. The AutoJet Glaze Spray System is suitable for bakeries that require an automated glazing system that is able to coat with even the most viscous of coatings.

The system utilises precision spray control (PSC) to apply an even and consistent amount of glaze to baked goods such as breads, pies, pastries and more. PSC allows for the pressure of the spray nozzles to remain undisturbed, which means the spray angle, coverage and drop size do not change. Misting and overspray are minimised, if not eliminated completely, due to the consistent pressure level of the spray nozzles. The reduction in misting also leads to improved worker safety due to the cleaner state of the floors.

Added benefits of the system include reduced glaze use and product scrap, reduced clean-up time and lower production costs. The system features an alarm to alert line staff of low liquid levels in the holding tank. Refilling the tank can be done on the go and operators do not need to stop production to do so.

The system's high-precision hydraulic PulsaJet spray nozzles are able to spray viscous coatings including glazes, oils, slurries, peanut butter, caramel, butter, gels and more. The spray nozzles can be arranged in sanitary manifolds to suit a variety of conveyor widths.

The optional recirculation line and eductor enhances in-tank agitation, which maximises liquid circulation leading to a decrease in spray nozzle clogging.

Spraying Systems Co Pty Ltd

www.spray.com.au

EHEDG-certified flowmeter

KROHNE's H250 M40 all-metal variable area flowmeter is EHEDG certified as well as 3A and FDA certified.

It can be used for hygienic process applications such as the measurement of cream or milk. It is also suitable for installation in utility systems for the measurement of carbon dioxide or nitrogen/air consumption. The flowmeter does not need a minimum conductivity and through its modular system it can be upgraded on-site from a simple gauge to a true process meter.

KROHNE Australia Pty Ltd

www.krohne.com.au

What IP ratings actually mean

So your new bit of gear is 'waterproof'. What does this mean? Can it be submerged under a metre of water, survive washdown in your plant or barely make it through a light shower?

All you need to do is look at the Ingress Protection (IP) rating. IP ratings are especially relevant in the food and beverage industry where hygiene is paramount and equipment has to survive sanitation procedures, washdown environments, direct and incidental hosing, dust and more.

There are four characters in IP ratings. The first two letters, IP, are just short for ingress protection.

Following these letters are two digits. The first gives a measure for the equipment's level of protection against infiltration from solids — principally dust. The second digit indicates the level of protection against liquids (water).

Protection against solids

Levels of ingress protection against solids are 0–6. These levels denote the size of particles that the object is able to keep out. If it can only keep out large objects, it will have a lower rating. The higher the rating, the smaller the particle sizes that will be excluded.

- 0: No protection against contact or ingress.
- 1: Effective against objects >50 mm. Protects against large surfaces of the body (such as incidental brushing with the back of a hand) but no protection against deliberate contact.
- 2: Effective against objects >12.5 mm. Fingers or similar objects are kept out.
- 3: Effective against objects >2.5 mm. Protects against tools, thick wires, etc.
- 4: Effective against objects >1 mm. Wires, small hardware, large insects, etc will be kept out.
- 5: Dust protected. Some dust might get in, but not enough to hinder operation.
- 6: Dust tight. Complete protection against the ingress of dust.

Protection against liquids

Levels of ingress protection against liquids are 0–9K. These levels denote the movement, depth and pressure of water the device is capable of withstanding. The higher the number, the greater the water resistance. The 'K' designation indicates protection even with increased water pressure.

- 0: No protection against liquid ingress.
- 1: Protects against vertically dripping water, an equivalent of 1 mm rainfall/min for 10 minutes.
- 2: Protects against dripping water when tilted up to 15°. Even if the device is slightly tilted, it is still safe against the same amount of vertically dripping water as above.
- 3: Protects against spraying water. The device is safe from water lightly spraying at any angle up to 60°.
- 4: Protects against splashing water. There will be no damage from brief splashing from any direction.
- 5: Protects against water jets. Water projecting from a 6.3 mm nozzle from any direction will not cause damage.
- 6: Protects against powerful water jets. Water projecting from a 12.5 mm nozzle from any direction will not cause damage.
- 6K: Powerful water jets with increased pressure. Water projected in powerful jets (6.3 mm nozzle) from any direction, under elevated pressure.
- 7: Protects from immersion up to 1 m deep for up to 30 minutes.
- 8: Protects from immersion more than 1 m deep for extended durations.
- 9K: Protects against powerful high temperature water jets. Protected against close-range high-pressure, high-temperature spray downs.

Especially for high-pressure, high-temperature washdown applications IP69K

An IP69K rating indicates the item is both dust-tight and able to withstand high-pressure and steam cleaning. The test specifies a spray nozzle that is fed with 80°C water at 8–10 MPa and a flow rate of 14–16 L/min. The nozzle is held 10–15 cm from the tested device at angles of 0°, 30°, 60° and 90° for 30 seconds each. The test device sits on a turntable that rotates at 5 rpm.

Automatic thermometer measurements

The Fluke 64 MAX IR Thermometer captures measurements without technicians present. Temperature events rarely occur while operators are around to capture them, complicating the troubleshooting of electrical, HVAC, and industrial equipment.

The Fluke 64 MAX IR Thermometer features auto capture, allowing technicians to set time and intervals to record up to 99 data points, so it can capture elusive temperature events — eliminating the need to manually record measurements.

The product can be mounted on a standard tripod using a tripod mount accessory for unattended measurements.

Additional features are: precise laser technology for more accurate (up to ±1°C or ± 1% of reading whichever is greater) and repeatable measurements; 30 h battery life to capture measurements over a long period of time; IP54 rated for extra protection against airborne contaminants in harsh, dirty environments; a flashlight and large, easy-to-read backlit LCD display for easy viewing even in dark settings.

The 64 MAX displays minimum, maximum or average temperature, or the difference between two measurements, and features Hi and Lo alarms for rapid display of 17-16 measurements outside set limits. It can survive a 3 m drop and continue to operate, making it suitable for industrial and field environments.

Fluke Australia Pty Ltd
www.fluke.com.au

X-ray machine for raw and unpackaged poultry

The Eagle Product Inspection RMI 400 X-ray machine is designed for the inspection of contaminants in raw and unpackaged poultry prior to further processing.

The machine addresses poultry processors' hygiene and cleaning methods.

It has been designed using NAMI construction standards and complies with IP69 ingress protection standards. Unobstructed sightlines, open and contoured surfaces minimise potential material harbourage areas while ensuring fast and convenient visual inspection. The entire machine can be disassembled by a single person in a matter of minutes for thorough sanitation and quick reassembly to maximise production uptime.

The RMI 400 is designed to safe electrical and mechanical machine standards for Category 3 (EN954), PLd (EN13849) operation. A hazard-based risk assessment compliant with ISO 12100:2010 is also available.

Food Processing Equipment Pty Ltd
www.fpe.net.au

Metal-detectable belt cleaner

Ammeraal Beltech's UltraScraper, made of high-quality co-extruded materials, can be used on most conveyor frames and is suitable for different belt types (synthetic, homogeneous or plastic modular belts). The product has good cleaning effectiveness due to its soft lip feature, which is aligned to belt hardness. It is said to extend belt and scraper lifetime by placing less stress on the belt and splice.

The cleaner offers antimicrobial properties with silver ion technology, reducing bacteria build-up. It is metal detectable for increased food safety and comes in blue colour for easy optical detection. With a working temperature of -30 to 83°C, it offers EC, EU and FDA regulatory compliance.

Rydell Beltech Pty Ltd
www.rydell.com.au

Dealing with corrosive environments when processing shellfish

Frequent drive replacements used to be the order of the day at Krijn Verwijs, one of Europe's foremost suppliers of shellfish products and blue mussels.

Live mussels are put into basins with a constant flow of clean salt water and then conveyed wet along the processing lines. This aggressive, humid, salty environment means that all unprotected metal parts along the processing line swiftly corrode. Brand new, conventional cast iron geared motors start showing rusty spots within weeks and need to be replaced within a year or two. Special coatings or varnishes only partly offset the damage caused by the harsh environment.

Stainless steel motors are a very expensive alternative and are also impractical as they need cool-off time before every hosedown.

A solution to this dilemma was provided by NORD DRIVESYSTEMS' nsd tupH surface treatment technology. This technology enables aluminium geared motors — which can very comfortably be washed down — to achieve stainless steel-grade resistance to corrosion.

While the price of the aluminium drives is higher than that for conventional cast iron units, studies have shown that they will typically last the better part of 10 years in these harsh environments. When weighing up the total cost of ownership and the increased uptime combined with the reduction in health and safety hazards due to paint chipping that occur on conventional units, the decision was easy.

The nsd tupH provides physically ingrained protection. There is no application of a coating but rather a surface conversion that produces a base layer permanently bonded to the substrate. Based on an electrolytic process, this treatment renders aluminium cases similarly unsusceptible to corrosion as stainless steel. The scratch-resistant surface also becomes more than six times as hard as untreated alloy and a thousand times as hard as paint.

It offers a smart alternative to stainless steel. Lightweight, compact and self-draining, the nsd tupH system provides a cost-effective and safe solution for the food industry.

The units are able to handle harsh washdown chemical and cleaning agents including acids and alkaline solutions as well as high-pressure cleaners.

The nsd tupH surface treatments are universally available for all NORD aluminium products.

NORD DRIVESYSTEMS (Aust) Pty Ltd
www.nord.com

How to improve OHS

When health and safety is done well, it is not a business overhead but a facilitator of continuous improvement practices that add value to the business.

Photo: Monica Schmidt.

With 20% of Australian employees taking time off work each year due to stress, anxiousness or depression, occupational health and safety management is becoming increasing important. In fact, mental health issues in the workplace cost Australian businesses $10.9 billion each year. Added to this, food and beverage processors also need to be informed about the processes and technologies they can implement to ensure their employees' physical safety in the workplace.

Luckily help is at hand. The upcoming Safety in Action tradeshow will tap into these key health and safety topics and is introducing three new dedicated Safety Zones. Each zone will include free, tailored seminar programs to educate today's OHS professionals. Next to the Safety Innovations and Mental Health & Wellbeing program, the third safety zone will focus on case studies of current Major Safety Projects in Australia, to stay on top of the latest developments.

- **What:** Safety in Action Tradeshow
- **When:** 5–6 September 2017
- **Where:** Melbourne Convention & Exhibition Centre
- **Registration and more information:** www.safetyinaction.net.au
- **Cost:** Free for bona fide trade visitors

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Cool news about handwashing

Hygiene is absolutely critical in the food and beverage industry, and usually all research is bad news for factory hygiene practices. However, for once the news may not be as bad.

A recent Rutgers-New Brunswick university study has found that hot water is not essential for handwashing — washing hands in cool water for 10 seconds was found to be just as effective in removing bacteria as washing in hot water.

To establish this assertion, Rutgers researchers put high levels of a harmless bacteria onto the hands of 21 participants and asked them to wash their hands in 15.5°C, 26°C or 37.7°C water using 0.5, 1 or 2 mL volumes of soap. This process was repeated multiple times over a six-month period.

Washing the hands for 10 seconds significantly removed bacteria from the hands at all of the water temperatures.

"This study may have significant implications towards water energy, since using cold water saves more energy than warm or hot water," said Donald Schaffner, distinguished professor and extension specialist in food science at the university.

The amount of soap used did not affect the results, but the researchers believe that more research could be useful to establish the optimal type and amount of soap that reduces bacterial loads. This information would be particularly beneficial in the foodservice industry.

Currently the FDA guidelines recommend that water for handwashing should be 37.7°C in food establishments and restaurants, but it seems this may not be an essential criterion.

The Rutgers study has been published in the June issue of the *Journal of Food Protection*.

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