



JOANNE COCKERILL ATTAINS CPP



The AIP would like to take this opportunity to congratulate Joanne Cockerill, Dip.Pkg.Tech. MAIP, CPP, for attaining her Certified Packaging Professional (CPP) Designation. The AIP asked Joanne a few questions about her career and packaging education and why the CPP designation is so important for the industry...

Q: How long have you been in the industry? What are your areas of expertise?

A: I have been involved in the industry for over 16 years; specifically in packaging development, mainly in aseptic packaging, aluminium cans, flexibles, corrugated, FFS tubs and lids, paperboard cartons, glass/plastic bottles, caps and labels.

Q: What made you apply for the Certified Packaging Professional designation?

A: I wanted to achieve the highest possible accreditation I could within my packaging studies. I am also a graduate of the Diploma in Packaging Technology so education is important to me. I was attracted to the fact the CPP is globally recognised and accepted where ever I choose to go.

Q: How important is attaining the CPP designation to you as an individual?

A: It is extremely important to myself to understand theoretically what I produced day to day at work. I am now very proud to be able to add CPP to the end of my title as a Packaging Professional.

Q: How important is the CPP designation for the greater recognition of packaging professionals?

A: It is extremely important to gain a detailed understanding of all formats of packaging and be able to work anywhere in the world where your accreditation is recognised by the IoPP, AIP and WPO.

Attaining the CPP® designation is an excellent investment in your professional development and the credential defines the packaging professional and allows organisations to seek out and hire the right professional based on verified knowledge, skills and industry contributions. Using the CPP® program to assess and evaluate one's professional competency validates you as internationally proficient as a packaging professional; a cut above your peers. The Certified Packaging Professional (CPP)® designation is a registered trademark of the Institute of Packaging Professionals (IoPP) and is now internationally recognised by both IoPP and AIP.

[CLICK HERE TO FIND OUT MORE ABOUT THE CPP](#)

NEW MEMBERS

The AIP would like to welcome the following new Members.

NAME	GRADE	STATE
Asif Iqbal	Member	VIC
Jason Bezzina	Associate	VIC
Ad van Dijk	Member	VIC
Pratik Vimal Surana	Associate	SA
Ryan Naylor	Member	VIC
Peter Bourke	Associate	VIC

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ALL MEMBERS ARE INVITED TO ATTEND ANY EVENTS ACROSS AUSTRALIA & NEW ZEALAND

To register to attend any of the events simply email info@aipack.com.au or visit the events page on www.aipack.com.au

SMC PNEUMATICS SITE VISIT

NZ



When: Wednesday 15th of February
Where: Mt Wellington, Auckland
What: AIP Members will have the opportunity to visit the SMC Pneumatics manufacturing facility, national warehouse and engineering design centre. SMC Pneumatics is recognised as the world leader in the design and manufacture of pneumatic components, and is continually developing new products to satisfy the growing demands for pneumatic and control technology.

BLACKMORES SITE VISIT

NSW

BLACKMORES



When: Wednesday 15th of February
Where: Warriewood NSW 2102
What: Attendees will also see the Blackmores primary packing facility, smart warehousing and distribution which will provide a clear understanding of the code of good manufacturing practice, under the Therapeutic Goods Administration.

ABBE CORRUGATED SITE VISIT

VIC



When: Tuesday 21st of February
Where: Coolaroo Vic 3048
What: ABBE Corrugated is an independent Australian manufacturer and converter of corrugated cardboard, cardboard boxes and other associated packaging products. Attendees will have the opportunity to visit ABBE Corrugated and see their new digital printing technology. This single pass printing technology, known as Impression, is the latest in 4 colour high speed process printing.

AUSPACK A PACKAGING & PROCESSING WEEK EVENT

NSW



**COME AND SEE THE
AIP ON STAND 122**

When: 7-10th of March
Where: Sydney Showgrounds, Sydney Olympic Park
What: AUSPACK is Australia's largest and most prestigious exhibition on the packaging and processing calendar, bringing together thousands of leading professionals and key players in the global processing and packaging arena.

PIDA AWARDS A PACKAGING & PROCESSING WEEK EVENT

NSW



When: Wednesday 8th of March
Where: Novotel Sydney Olympic Park
What: The Packaging & Processing Innovation & Design Awards have been established for Australia that will recognise companies and individuals who are making a significant difference in their field. They are the exclusive entry point for the WorldStar Awards.

NATIONAL TECHNICAL FORUMS A PACKAGING & PROCESSING WEEK EVENT

NSW



When: 7-10th of March
Where: Sydney Showground
What: Following a number of highly successful National Technical Forums over the last seven AUSPACK exhibitions, the 2017 National Technical Forum will be designed to deliver a four-day educational program that will cover a broad range of topics relating to the theme Innovation & Design.



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LINPAC SITE VISIT

VIC



When: Wednesday 26th of April

Where: Truganina 3029

What: With over 50 years of experience in food packaging design and a deep understanding of the demands of today's fast moving consumer goods industries, LINPAC, and its sister company Infia srl, lead the global packaging industry in the development and production of innovative packaging solutions. Attendees will have the opportunity to tour the manufacturing and warehouse operations at the Truganina site.

SMC SITE VISIT

NSW



When: Wednesday 10th of May

Where: Castle Hill 2154

What: SMC is a global leader in pneumatics and automation. With customers in almost every industry, there is hardly an application which they have not seen. Through their international network SMC has access to R&D and the products are constantly being updated and developed according to customer requirements.



COME AND SEE THE AIP ON STAND 122



IN CONJUNCTION
WITH PACKAGING +
PROCESSING WEEK



AUSPACK.COM.AU

SYDNEY SHOWGROUND
SYDNEY OLYMPIC PARK

THE WHOLE PROCESS IN ONE PACKAGE

AIP PARTNERS



AIP TO BE REPRESENTED ON NEW APC BOARD



At the recent Annual General Meeting of the Australian Packaging Covenant six new directors were welcomed to their Board. This includes two brand owner directors - Jason Goode FAIP, and Renata Lopes, one industry association (AIP) director - Jackie Smiles MAIP and three independent directors - Anne Astin, Trent Bartlett and Sam Andersen. Jackie Smiles MAIP will be representing the AIP on the APC Board and we look forward to contributing to Covenant development. In addition the AIP also has two other Members on the APC Board in Jason Goode FAIP and Jacky Nordsvan MAIP.



Pictured left to right in the photo we have: Trent Bartlett, Anne Astin, Jackie Smiles MAIP, Jason Goode FAIP, Renata Lopes, Trish Hyde, Sam Andersen, Jacky Nordsvan MAIP and Tanya Barden. Grant Musgrove(absent).

AIP WELCOMES NEW MEMBERS

WHY DID YOU JOIN AIP AND WHAT BENEFITS YOU BELIEVE AIP OFFERS THEIR MEMBERS?

AD: I joined the AIP after a recommendation from a team member at LION. The benefits I see are as the saying tells us, 'if you want to go fast 'go alone,' if you want to go far 'go together..'

PS: AIP is a well-known Institute in the Asia Pacific Region for anyone who is interested in studying Packaging. It is also known for the knowledge it imparts to its graduates as part of their training and education. AIP understands that learning theory is one part of the journey, but a key part of the learning process is the mentoring program it offers to its graduates to become a packaging technologist. AIP offers access to resources that are not easily available to everyone, especially events like webinars and insight into industry practice and future plans of packaging. AIP certification is recognised around the globe. This opens up a lot of opportunities for graduates to grow in their careers.

HOW LONG HAVE YOU BEEN IN THE INDUSTRY AND WHAT ARE YOUR AREAS OF EXPERTISE?

AD: I have been in the FMCG market for 35 years in various functions from which a number of years managing a packaging manufacturing site with foil extrusion, injection moulding, 5 colour IR and UV ink printing, thermoforming as well as blow-moulding up to 6 layers. I received the Dutch ION award for innovative packaging.

PS: I have been working in the food manufacturing industry for the last 6 years. I have been working within a QA role for the entire period. My areas of expertise are: Quality Control and Assurance, Process/continuous improvement, Project Engineering, Change Management, Building Relationships, HACCP, Training

WHAT IS CURRENT ROLE AND WHAT ARE RESPONSIBILITIES?

AD: I am in the Lion Dairy and Drinks QR&D team managing the packaging and technology site of the business.

PS: Currently I work for the Beerenberg Farm in Hahndorf, South Australia. My current role is Quality and Packaging Manager. My role and responsibilities are: Production Support, Create and maintain Work Instructions, Internal Auditing, manage all packaging (new and existing). I currently look after all packaging on site that is assisting production if they are having issues with packaging like glass or laminated films, trial improvement or new packaging materials and provide feedback to procurement team. I also look after the following quality programs: Cleaning and Sanitation, Pest Control, Calibration, Approved Supplier and Preventative Maintenance.

Ad van Dijk MAIP
QRD Packaging and
Technology Director
Lion LDD



Pratik Surana AAIP
Quality and Packaging
Manager
Beerenberg Farm

**MARK THESE
DATES IN YOUR
DIARY!**

**INNOVATION & DESIGN
2017 NATIONAL TECHNICAL FORUMS
A PACKAGING & PROCESSING WEEK EVENT**

7th to 10th March
in conjunction with AUSPACK 2017, Sydney Showgrounds, Sydney Olympic Park



JUST SOME OF THE 42 SPEAKERS...



Sara Agostino
Euromonitor International



Michael Dossor MAIP
Result Group of Companies



Tanya Barden
Australian Food and Grocery Council AFGC



David Hodge
Plastic Forests



Chris Vains
Siemens



USA

Paul Irvine
PMMI: The Association for Packaging
and Processing Technologies



SWITZERLAND

Ben Gunneberg
PEFC International



Najib Lawand
Food Innovation Australia Ltd (FIAL)



Melindee Hastie
University of Melbourne



GERMANY

Jonas Komitsch
Behn & Bates



ITALY

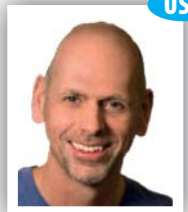
Giulio Ghisolfi
Idealpack Srl



Trish Hyde
Australian Packaging Covenant



Michael Lee
Meat & Livestock Australia (MLA) Limited



USA

Steve Davies
NatureWorks



GERMANY

Philip Trauboth
ALPMA



Rym Kachouri
FOODMACH

Following a number of highly successful events that have been run over the last seven AUSPACK exhibitions, the 2017 National Technical Forums will be designed to deliver a four-day educational program relating to the theme Innovation & Design. The 2017 Packaging & Processing Week National Technical Forums will attract delegates from all facets of the packaging and processing industry of both technologist and management levels (such as design, development, marketing, production, engineering, supply chain and logistics personnel) to equipment suppliers, raw material providers, users of packaging, retailers and consumers. All of industry is invited to attend.

MEDIA PARTNERS



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SENIOR PACKAGING TECHNOLOGIST

- Bring your passion for designing and developing
- Work for an incredibly well known Australian brand
- Mentor and guide others
- Based in Rural Victoria, 1.5 hours drive from Melbourne CBD

A demonstrated track record of implementing innovative solutions, a passion for designing and developing, strong stakeholder engagement and exceptional communication skills is what our client is looking for in their next packaging technologist – these attributes combined are our proven recipe to finding the right candidate.

Working alongside the sourcing manager (based at a separate site), you will find yourself in a fast-paced environment undertaking projects, maintaining packaging artefacts, identifying and selecting suppliers, working in collaboration with the sourcing and purchasing team, and running multiple trials.

Key responsibilities of the role will include but are not limited to:

- Running packaging development trials
- Completing packaging specifications
- Identify, evaluate and select external suppliers for the procurement of packaging materials
- Develop quality control procedures
- Undertake research into packaging technology
- Working across teams to ensure packaging innovation is being developed and delivered to the business correctly

To be successful in this role you will need to demonstrate:

- Bachelor's Degree in Engineering, Packaging, Materials Science or Similar
- Experience in a similar role, ideally within the food industry (but not essential)
- Project Management Experience
- Experience in packaging development
- Exceptional communication skills with the ability to build strong internal and external stakeholder relationships
- Broad knowledge of current packaging technologies

In return our AMAZING client can offer a competitive salary package and STI incentive, possible relocation costs, an excellent working environment and the ability to learn and grow with a well-known and respected Australian owned company.

To find out more, please contact Wendy Terry on 0419 963 163 or email your cv to:
wendy@qualityassuredrecruitment.com.au

At Quality Assured Recruitment, we do things a little differently, and we are proud of it. No matter what role family we recruit in, quality must always be the foundation of our process, system and outcome.

[CLICK HERE TO APPLY](#)



PACKAGING TECHNOLOGIST

Campbell Arnott's...The ingredients to be extraordinary. Where icon brands thrive. People are valued. And you can make a difference.

We currently have a fantastic opportunity for an experienced Packaging Technologist to join Campbell Arnott's in a permanent role in the Arnott's Biscuits team

As a technical subject matter expert it is your primary responsibility to know and own the packaging specifications. You will need to project manage the technical feasibility and commercialization of new specifications as well as changes to existing specifications.

Apart from your technical skills you are also required to learn and understand the environment where your packs compete in every day, acknowledge the key drivers and attributes that matter so that you can put your creative mind to work and identify new innovative packaging formats that can make a difference.

This role is based at our North Strathfield site and some inter-state travel may be required as part of the role.

Key elements of the role

- Develop and technically approve new packaging formats + changes to existing formats as required by the respective category strategy.
- Support and coordinates all relevant trials and ensures all projects are documented and relevant systems are updated.
- Identify and implement value engineering opportunities
- Operational support that require a change to packaging specifications
- Maintain packaging systems (Specifications, artwork, bill of materials, etc.)
- Learn and understand the retail environment where we compete and give input to the long term strategies
- Participation in pipeline building and development based on strategic marketing plans.
- Proactively strengthen key internal partnerships such as the wider Packaging team, Marketing, Supply Chain, Research & Development, Quality Assurance and Consumer Insights
- Establish and build external partnerships with Packaging Vendors to help drive differentiation, innovation based on defined pipeline needs
- Professional development – courses, exhibitions, industry networking, etc.

The ingredients you need to be extraordinary in this role

- Tertiary qualification in a science related field;
- Diploma/degree in packaging development is preferred but optional depending on experience;
- Minimum 3 years' experience in FMCG or Packaging manufacturer environment in a development, technical, quality or engineering role;
- Proficient knowledge of Packaging Technology: Preference given (but not compulsory) to the following pack formats i.e Flexible packaging, Plastic Trays, corrugated board, carton board. Demonstrated ability to lead and/or participate in a project team that consist of multifunctional professionals ranging from "hands-on" operators on site to creative marketing agencies
- Being able to effectively communicate to a range of stakeholders at all different levels
- Passion for our products and the packaging;
- Desire to learn and understand that drivers that make consumers buy our products;

So, if you want to take on a Packaging Technologist role in a fast-paced, extraordinary business, click on the 'apply' button below to submit your details to us!

[CLICK HERE TO APPLY](#)

Consumers of 2017 will be more demanding of products, services and brands than ever before and will use digital tools to articulate and fulfill their needs.

The 2017 consumer is harder to characterise, not least because identity is multidimensional and in flux, with shoppers more likely to have a hand in defining themselves and their needs. Consumers want safety in a perceived volatile world, particularly for their nearest and dearest, and look to tech tools as aids in this quest. They want to shop faster and to secure the swiftest convenience. They want authenticity in what they buy and expect elements of personalisation in mass produced as well as upscale items. Consumers who are 'beyond average' in terms of size or dietary needs, for instance, are pushing to see their needs better met.

The global cultural reverence for wellness has many consumers regarding it as a status symbol, particularly as the significance of material things as indicators of achievement has paled. Consumer requirements even extend to the post-purchase experience; to their relationship with brands once the transaction has happened Younger 'consumers in training' have a voice that goes beyond 'pester power' (the ability of children to pressurise their parents into buying them things). This gives them a more active role in what is purchased, often turning them into functioning in-house shopping consultants.

Consumers aged over 50, the most vocal and youngest of whom are part of a generation known for their outspoken views, the baby boomers, are themselves living a changed ageing narrative with articulate 'ambassadors' and organisational advocates with greater faith in their abilities and purpose. Which consumer trends will reign around the world in 2017?

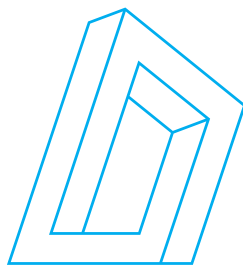
1. AGEING: A CHANGING NARRATIVE
2. CONSUMERS IN TRAINING
3. EXTRAORDINARY
4. FASTER SHOPPING
5. GET REAL: THE ALLURE OF AUTHENTICITY
6. IDENTITY IN FLUX
7. PERSONALISE IT
8. POST-PURCHASE
9. PRIVACY AND SECURITY
10. WELLNESS AS STATUS SYMBOL



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A PACKAGING &
PROCESSING WEEK EVENT



PIDATM
PACKAGING & PROCESSING
INNOVATION AND DESIGN
AWARDS



**YOU ARE INVITED TO ATTEND THE INAUGURAL
PIDA AWARDS GALA DINNER
WEDNESDAY THE 8TH OF MARCH 2017
NOVOTEL SYDNEY OLYMPIC PARK, OLYMPIC BOULEVARD, NSW 2127**

TIME: 6.30 PM PRE-DINNER DRINKS
DRESS: COCKTAIL ATTIRE

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CARLSBERG BEER TAPS INTO THE MEN'S GROOMING CATEGORY

INNOVATIVE FEATURES

- Brands are finding packaging can be a key component to extending their reach outside of their core categories and aisles
- Leveraging a familiar logo on a new or unique package format can help maintain shopper familiarity and extend brand trust while showcasing a brand's creative chops

CONSTRUCTION MATERIALS

- This multi-pack offering includes colored glass bottles with pump-style dispensers and tins with screw-top lids

In Germany, venerable beer brand Carlsberg introduced a men's grooming set under the Carlsberg Beer'd Beauty brand. This limited edition set of shave cream, aftershave, and moustache cream is housed in a combination of plastic spray pump bottles, metal tins and paperboard cartons. The line extension exploits the familiar logo, font and emerald green color found on Carlsberg beer packaging.

Initially launched as a limited edition extension, but since expanded due to its success, Carlsberg dialed into key consumer insights to expand its well-known beverage brand into premium skin care. Carlsberg understood that men were in serious need of masculine grooming products. According to Carlsberg consumer research, 40% of men admit to using their wife's or girlfriend's beauty products weekly, and 67% of Carlsberg drinkers are interested in grooming products that contain beer. Taking those insights to heart, Carlsberg leveraged the 'beautifying properties' of its beer's main ingredients along with a packaging line-up that tied directly to their famous green beer bottle and vertical logo display.

According to Mintel's Extend My Brand trend, brands in declining or heavily regulated markets are being forced to extend into new territories and new sectors to survive. However, some companies are embracing this challenge and are going all out with their brand extensions as a way to show off their creative chops. Branching out into sectors or demographics that are completely removed from their main line of business can act as a form of attention-grabbing self-promotion that will cause people to take notice and spur purchasing decisions.

While price is a key factor in consumers' purchasing decisions, brand trust also plays a pivotal role. Repurchase consideration based solely on brand familiarity can reach as high as 70%.

As outlined in Mintel's upcoming 2017 Packaging Trends Report, brands can use that sense of loyalty to extend their product portfolio well beyond their traditional categories, and the development and exploitation of unique and functional packaging decorated with clear, on-pack messaging can be a primary motivator of the purchase-decision process.

Yet while price has invariably played an enormous role in consumer decision-making, so too has another critical factor: trust. And it's the tried and true brands which have the advantage in that regard. As such, established brands have begun to leverage that trust in new ways; namely, by extending it into new categories.

The Carlsberg Beer'd Beauty limited edition range was been created through a partnership between the Research and Development branch of Carlsberg Breweries with cosmetics producer Urtegaarden, and offers male grooming products made from real Carlsberg beer, which contains natural ingredients such as barley, hops and yeast, rich in vitamin B and silicium, said to have beautifying properties for both hair and skin.

The grooming set, which was created in support of Movember to raise funds and awareness of vital men's health issues, comprises shaving gel, aftershave cream, and moustache cream.

PACKFOCUS

Brand & Product Name	Carlsberg Beer'd Beauty
Primary Package	Plastic and metal
Secondary Package	Paperboard carton
Product Category	Men's Grooming
Package Details Innovative Factors	Emulation of Carlsberg's signature emerald bottle and vertically positioned logo

Mintel Packaging Analyst's Points of View

- Package structure, functional components, even unique, use-occasion-appropriate sizes can help disrupt a category or aisle into which size a brand is looking to extend its reach.
- Leveraging a familiar logo on a new or unique package format can help maintain shopper familiarity and extend brand trust while showcasing a brand's creative chops.
- When a brand looks to extend its reach, consumer engagement is paramount. Tying in such brand cues as logo design or an "owned" color can be key.
- Prominently placed on-pack messaging regarding a package function, convenience, or lifestyle can help ensure shoppers/consumers both see and understand what benefits or advantages the new brand has vs. entrenched offerings.
- In many cases, younger generations are exposed to brands from their parents early on. Take advantage of that legacy or heritage association by utilizing specifically designed packaging to engage these younger generations separately in order to expand new offerings.

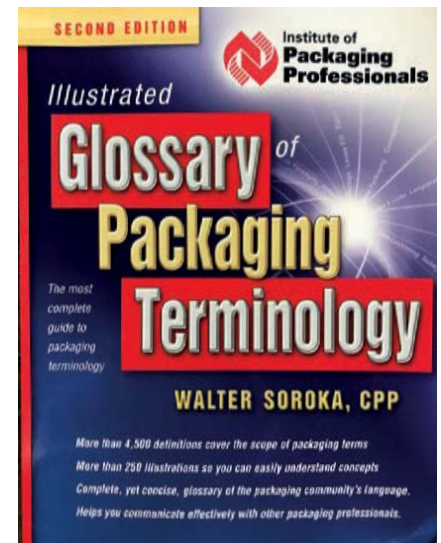
Mintel is the world's leading market intelligence agency. David Luttenberger is Mintel's Global Packaging Director. He has 25 years of diverse global packaging experience.

For more information, please visit: <http://www.mintel.com/packaging-market-research>

GLOSSARY OF PACKAGING TERMINOLOGY

The Second Edition of the **Illustrated Glossary of Packaging Terminology** by **Walter Soroka CPP** is a comprehensive guide to packaging terminology. More than 4,500 definitions cover the scope of packaging terms with more than 250 illustrations so readers can easily understand packaging concepts.

The Illustrated Glossary of Packaging Terminology is a glossary of the packaging community's language that helps you communicate effectively with other packaging professionals. This book brings together all the disparate terms of packaging into one concise, focused edition.



TRANSPORT PACKAGING - THIRD EDITION

The Latest Edition of **Transport Packaging** is here and available through the **AIP Bookstore**. Transport Packaging, Third Edition, provides significant updates and new information from the Second Edition, published in 2004, which is out of print. It was reviewed and updated by packaging industry veteran Robert Meisner, CPP-Fellow, with contributions by subject matter experts-both individuals and organisations-around the transport packaging industry. The book has been revised throughout to reflect new and updated regulations and standards, and best practices, adding to previous editions compiled the late Alfred H. McKinlay, CPP.

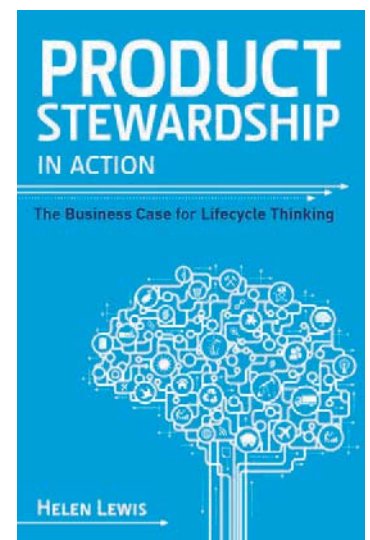
Other enhancements in the new book:

- Updated and expanded discussion on sources of package testing methods.
- Expanded discussion on wood pallets.
- Revised and expanded appendix of resources, including online contact information.
- New, sharper photos and illustrations throughout!
- Expanded and updated packaging terminology section.

PRODUCT STEWARDSHIP IN ACTION

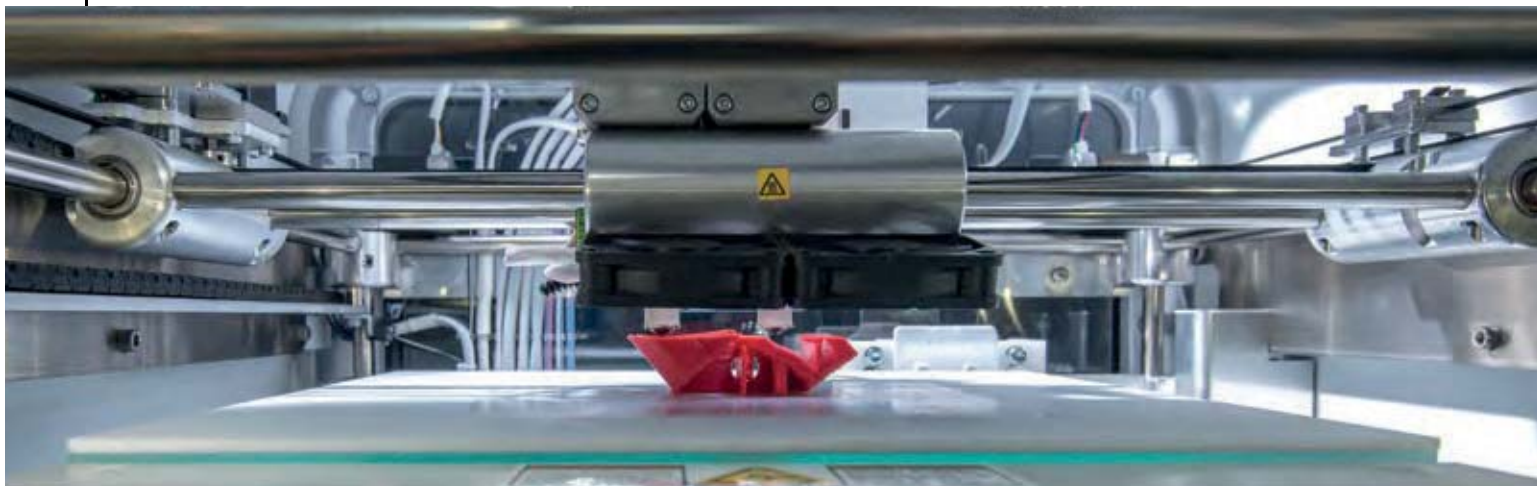
The AIP is pleased to advise that **Dr Helen Lewis, who is a Fellow of the Institute, has written a new book Product Stewardship in Action: The Business Case for Lifecycle**. Product Stewardship in Action describes how and why leading companies are taking responsibility for the environmental impact of their products and packaging. Product stewardship, often referred to as 'extended producer responsibility' or EPR, is the idea that everyone that benefits commercially from a product, including manufacturers, distributors and retailers, has a shared responsibility to minimise its environmental impacts.

Written primarily for a business audience, it draws on the knowledge and experience of industry practitioners and other experts to provide a structured approach to product responsibility within firms. This will help those new to the field, as well as more experienced practitioners, to develop an effective response to stakeholder concerns about the environmental impacts of their products and packaging.



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One shape does not fit all



3D printing has meant packaging engineers can approach design with the end user in mind, writes Michael van Dord.

THE needs of our population are changing because the average age of our population is constantly increasing. This change brings with it increasing cases of Alzheimer's and arthritis. The Australian population over the age of 65 has risen from 11.8 per cent to 14.7 per cent and this has occurred over the last 20 years. Furthermore, the number of people over the age of 85 has risen by 153 per cent over the same period. This is a problem that must be recognised and acted upon sooner rather than later.

Jill Gault is a grandmother who enjoys her cups of tea in the morning and working in the garden in the afternoon. Unfortunately, she often forgets it has been two hours since she made her morning cup of

tea, which then goes cold. She is not as strong as she once was, and often drops or knocks things off tables.

Jill is one of 350,000 Australians who are living with arthritis today, a number predicted to rise to 900,000 by 2050.

Jill needs specific products which are designed with the end user in mind. For example, Jill could use a plastic cup that shows changes in temperature as well as being insulated and small enough to grip easily.

Current products are often designed to reduce material and costs while improving the functionality for a strong and fit user. Unfortunately, one shape does not fit all, and while it may be suitable for the majority of users, it will not be functional for someone with a debilitating disability.

However, it's often too expensive for a smaller manufacturing company to develop a new concept to the point of production tooling, which will enable true user feedback on the product.

Fortunately, there have been developments within the world of 3D printing that will enable the end user to get their hands on a product, which can simulate 95 per cent of the functionality of a product long before costly tooling is started.

Previously the world of 3D printing has been the domain of highly expensive professional 3D printers, which often start at \$10,000 and rise well into the hundreds of thousands. This eliminated 3D printing as an effective tool for most companies. But developments in printing over the last 10 years have seen the reduction in cost of 3D printing to the point where a basic low resolution printer can be accessed for \$1000, and printers capable of printing detail finer than a human hair can be purchased for around \$5000.

This advance allows a new concept to be developed and prototyped in time frames never imagined a few years ago. The prototype can then be put in the hands of the final user to gain valuable feedback on the strengths and weaknesses of the chosen design. This cycle of design development can be reduced from weeks or months of work down to days.

This technology is just the tip of the iceberg, with companies like Carbon 3D creating a continuous printing method which reduces the time to print an object from 10 hours down to 10 minutes. If this type of progress continues apace, we will be using 3D printing for larger scale market testing and it will enable a filling and capping line



Caps and Closures' 38mm twist-and-pour cap at three stages of the design process: 1. Solidworks CAD Assembly 2. Rendered image and 3. 3D Printed Functional Part.



THIS ARTICLE WAS REPRODUCED WITH PERMISSION FROM PKN PACKAGING NEWS

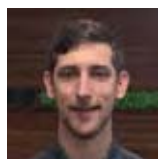
to produce a new shape of bottle and cap to test the compatibility of the new products before the final tool has been started.

Furthermore, the world of 3D printing is not limited to plastic polymers. If you combine small particles of metal with a laser you'll find that 3D-printing a metal object is not only possible but is currently being used in the medical field to replace destroyed bones with custom-designed implants which are 3D printed out of titanium and inserted directly into the human body.

Metal 3D printing will revolutionise the way tooling is created for injection moulding, blow moulding, and compression moulding. It will reduce tooling costs and improve the functionality of the final tool through creating intricate waterways that are not possible with current machining techniques. This combination of new techniques will allow the final cost of the product to be reduced through cutting the costs involved in design, development, tooling, trial production runs, and final mass production.

As we as an industry continue to strive to meet the growing requirements of the ageing population, people like Jill will one day be able to go to the supermarket and find a product on the shelf that fits their need and doesn't require a tool or a knife to open.

In the future, manufacturers will be using 3D printers just as they are currently using a normal paper and ink printer. The products of today will be forgotten and the variety of products available tomorrow will be truly exciting. ■



Michael Van Dord (MAIP) is the technical support and design engineer at plastic components manufacturing company Caps and Closures, based in Dandenong South, Victoria. This article is based on content he presented at a recent AIFST/AIP lecture evening. Michael can be contacted via email: michael@capsandclosures.com.au



Deep dive into smart manufacturing

ON a recent site visit to Rockwell Automation's Sydney facility, AIP members were briefed by OEM Lead Michael Vlahos on how smart manufacturing and the connected enterprise is impacting the way OEMs design machinery and manufacturers run their plants.

Vlahos shared Rockwell's experience and global best practices supporting OEMs to design, develop and deliver new machines with improved performance, safety, diagnostics and connectivity to meet end-user expectations.

The expectation from end users that OEMs must innovate and keep pace with their requirements is a given. But today, in the era of Industry 4.0 and smart manufacturing, end users want to optimise their production and supply chain by bringing together islands of information – and they want OEMs to help.

"Retrieving data from machines is nothing new," Vlahos said, "and today we have access to even more of it. But the data is irrelevant if you don't actually do something with it, or what we call 'contextualise' it – so you can use it to make decisions that will lead to improved processes."

Vlahos said that it's the OEM who is

ABOVE: The site visit ended with a walk-through of Rockwell's assembly facility where the company provides local configuration, customisation and load testing for automation, motor control and drives systems.

best placed to analyse data retrieved from a machine or a manufacturing line. The knowledge to optimise the process typically does not reside with the machine operator, but rather the OEM.

"Using current automation and control technology, we can present the information to the OEMs, so they can analyse it, and then optimise the process on the machine they have designed. And with the technology we have access to today, we can make this data available securely," he added.

"If [as a local industry] we want to be globally competitive, we have to tap into the knowledge that we have inherently in the workforce."

Vlahos noted that for local OEMs competing with less expensive machinery being developed in Asian markets, designing smart machinery is the way to differentiate their products. ■

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How is smart packaging smart?

Prof Pierre Pienaar MSc, FAIP, CPP, Education
Director - AIP, Vice President Education - WPO



Intelligent packaging is an extension of active packaging. While active packaging is designed to take action in order to extend the shelf life of a product — such as releasing or absorbing substances, thereby extending the duration of high quality for any given product — intelligent packaging goes further. Here, the purpose of the design is to monitor the condition of the product and to communicate to the consumer any changes in the product.

Intelligent packaging should provide more reliable information than just the expiry date printed on the packaging. It should monitor certain aspects of a food product (for example, shelf life) and report information to the consumer. Some of the chief purposes of the intelligent packaging system are to improve the quality or value of a product, to provide more convenience or to provide tamper or theft resistance to the pack.

There are currently three major types of intelligent packaging technologies employed:

- Sensors (biosensors, gas sensors).
- Indicators (temperature, freshness).
- Data carriers (barcode, radiofrequency identification or RFID).

There is a great variety of indicators used in each of these types, which shows great opportunities for developments.

As an example, time-temperature indicators (TTIs), one of the commonly used indicators, can be classified as:

- biological
- physicochemical
- chemical
- enzymatic
- diffusion-based
- polymer-based.

Time-temperature indicators

Diffusion

Based on Fick's law, diffusion-based TTIs are widely used. The diffusion rate of a liquid material is higher at higher temperatures and the extent of diffusion shows the total influence of environmental temperature.

Chemical

The applied principle of chemical TTI is a temperature-dependent chemical reaction. This type of TTI includes polymerisation-based, photochromic-based redox reaction-based TTI depending on the different reactions utilised.



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Biological

This relates to biological reactions referring to enzymes or microorganisms. Enzyme-based indicators present colour change caused by the reaction between enzymes and substrate with a pH change. One part includes lipolytic enzyme solution, lipase and a dye with pH indication. The other part is a substrate, predominantly triglyceride. The indicator will be activated when the gap between enzyme and substrate is broken so that two parts are mixed.

Photochemical

This type of intelligent packaging contains thermochromic ink consisting of dye, reagent and solvent. UV light activates the indicator because the ink absorbs photons with certain wavelengths, and activates them to excited states and forms free radicals or ions.

Controlled permeability packaging

A less expensive alternative to modified atmosphere packaging (MAP) is controlled permeability packaging (CPP). In this type of packaging, no gas is flushed out or injected, but rather the produce is packaged within a film that controls the quantity of O₂ and CO₂ flowing into and out of the package. This type of packaging is suitable for small-scale suppliers in developing countries, where pure MAP might result in the product cost being too high for the average consumer. This packaging produces shelf-life results close to, but not as high as pure.

Controlled permeability packaging could be the solution to food waste, especially in developing countries where suppliers might not be able to afford pure modified atmosphere packaging machinery and processes, and also where the average consumer might not be able to afford modified atmosphere packaged produce.

Nanotechnology

Nanotechnology is a form of active packaging that utilises bio-nanocomposites consisting of nanoparticles embedded into a biopolymer matrix — with dimensions less than 100 nm.

Antimicrobial nanoparticles

Antimicrobial action of silver nanoparticles

The antimicrobial action of silver nanoparticles is attributable to their high surface area-to-volume ratios which favour their interactions with microbial cells. These silver nanoparticles cause direct damage to the cell membranes of harmful microorganisms by interacting with negatively charged biomacromolecular compounds with disulfide or sulfhydryl groups and nucleic acids. This results in cell membrane deformation, inactivation of metabolic processes and cell death.

Barrier properties of nanoclay

Nanoclays consist of montmorillonite silicate layers also known as nanoplatelets which are in a stacked arrangement with a nanometric thickness of 1 nm and a structural dimension of 100 nm.

These nanoclays are incorporated into the matrices of a polymer to delay the flow of gases such as O₂ and CO₂ from the external environment to the internal environment. Nanoclays exhibit excellent barrier properties due to their high rigidity, aspect ratio and affinity as a result of the interfacial interaction between the matrices of the polymer and the dispersed nanoclay.

Nanosensors

Nanosensors as microorganism detectors

Nanosensors are excellent microorganism detectors as they are able to monitor the safety and quality of food products at various stages of the food supply chain. These sensor systems have the ability to accurately detect food spoilage or microbial contamination in food by interacting with the external and/or internal environment of the food, thus producing a response in the form of a visual signal such as colour indicators on nanosensor labels which correlate with the current state of the food product.

Active and intelligent packaging are the ultimate aspects that extend food shelf life, enhance quality, ensure safety and monitor or acquire information regarding product performance through the supply chain. Nanotechnology has the potential to be the next 'big thing' in the science of smart packaging.

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