

Connection

Issue 35 • March 2014

The official magazine of  **Composites**
Australia

Inside Driving futures in the auto industry

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CME: Surviving the end
of the Aussie Holden era

Carbon Revolution's
\$23.4m production plant



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Weighing just 980kg the 2014 Nagari sets new benchmarks for the elite auto market through innovative design and use of composites.



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Driving futures in the auto industry: Surviving the end of the Aussie Holden era

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Connection Magazine
is the official magazine of Composites Australia Inc
ABN 28 611 244 813

Next issue: July 2014

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President's letter



Our members are kindred spirits in the belief that a productive manufacturing sector is a critical component of a thriving economy. Manufacturing is a highly strategic industry that generates and meets demand for skilled employment and adds value to other domestic industries. Its importance to society is measured in more than just economic value.

A considered and deliberate focus on the sustainability of Australian manufacturing will deliver tremendous returns in the form of economic, social and cultural value to the nation.

Next month's 2014 Composites Australia CRC-ACS Conference will host a number of powerful presentations that will assist our sector to look at new ways to address today's challenges

We have another sterling program of speakers and presenters, including keynote speaker Nicholas Melillo, who leads Boeing's Advanced Design Technologies Organisation within the company's research and technology business unit. His team develops and implements innovative solutions for Boeing products. Nick's keynote address should resonate with composite practitioners and researchers.

The conference will be preceded by a half-day workshop — *Engineering Fundamentals of Composite Structure Design* — with engineering consultant and senior lecturer Rik Heslehurst. Rik developed the program specifically for engineers and others who require some fundamental understanding of the structural design requirements for composites.

Faster development, agility, and lower costs during product design and development are fast becoming the mantra for not only surviving as a business but to innovate and thrive. For this reason, we have invited Brian Hughes, Managing Director of Composites Materials Engineering Pty Ltd, to make a presentation on his diversification strategy. Brian is one of a number of industry achievers who are generously sharing their knowledge and experiences with delegates, including:

- Jeff Lawrence, Managing Director of Sykes, formerly Sykes Racing
- Pierre Gouhier, Engineering Manager at RPC Technologies
- Stephen Smith, Vice General Manager of Exel Composites Australia
- Geoff Germon, Chief Executive Officer of Talon Technology Pty Ltd.

RPC are kindly hosting the Welcome Reception at their Newcastle facility, where guests will be taken on a plant tour. The annual Conference Dinner on the Tuesday night is, as always, an event you don't want to miss – bring along your spouse or partner, colleagues and staff. This year, the dinner will be held on a cruise of the Hunter River.

I look forward to welcoming you in Newcastle on the evening of Monday 7 April 2014 for two powerful days of knowledge exchange, networking and business development opportunities. More information on the conference is included in this issue and is also updated regularly on the conference **website: www.compositesconference.com.au**

The calendar of events planned for the coming months can be seen on page 19 of this edition. These events are great opportunities to learn about what's happening in the industry, perhaps see how other companies do things, meet new industry colleagues or catch up with those you know over refreshments.

We are in an ever-changing growth industry and our association's role in the future is becoming more important each year. Your participation and feedback helps to keep the association relevant and is much appreciated.



Genelle Coghlan

NEWS

Optical sensing technology for remote composites applications

Advanced Composites Structures Australia (ACS Australia) is working with British optical fibre sensing technology specialists, Smart Fibres Ltd, to develop remote monitoring systems for composites applications.

The companies recently signed a Heads of Agreement to undertake joint development of the remote sensing technology in Australia and the UK for composites applications worldwide.

Andrew Gunnion, Operations and Sustainment Program Manager at ACS Australia, says: "With the increased use of composites in remote and critical applications, such as off-shore wind turbine blades and oil and gas pipelines,



The award winning novel composite clamp developed by ACS Australia and PETRONAS for pipeline repair.

the ability to monitor the health of the structure is proving to be of significant value for the end-user."

The monitoring system, to be embedded into composite repairs of

existing steel structures, aims to reduce costs, especially for infrastructure in remote and hazardous locations, says Gunnion.

"It's a way of addressing some of the operational issues faced by the industry and gives increased confidence to use composites, potentially increasing markets and applications for composites."

ACS Australia has considerable expertise in developing composite repair technology for use in the oil and gas industry, winning a 2014 JEC Europe innovation award for its novel composite clamps for pipeline repair, developed in conjunction with Malaysian oil and gas corporation, PETRONAS.

Crean to chair Carbon Nexus board

Deakin University has appointed former Federal Minister the Honourable Simon Crean to chair the advisory board overseeing the Carbon Nexus carbon fibre research facility at its Geelong campus.

Deakin Vice-Chancellor Jane den Hollander says Mr Crean brings extensive experience and expertise to the role, particularly around industry engagement, skills and regional development.

"Carbon Nexus demonstrates Deakin's strong commitment to our region, building the research and industry partnerships to create the jobs of the future – in Geelong and across the country," she said.

DIAB partners ATL Composites

DIAB Australia has announced a new partnership agreement, for the supply and distribution of its core materials in the Australian region, with ATL Composites, a leading supplier of epoxy resins and manufacturer and distributor of advanced composite materials.

Through the partnership, the companies plan to strengthen their services to the composites industry, offering specialised

core materials and other raw materials and services, including core kitting and engineering, to a wide range of composite manufacturers.

Managing Director of DIAB Australia Todd Henry said that DIAB had a long history of being placed in the market in Australia, dating back to 1984, and would continue to have its Australasian headquarters and staff. "We will continue

developing lightweight innovative solutions and products for the composites industry and will develop and foster new segments and industries," said Henry.

Nicholas Cossich, Managing Director of ATL Composites said the alliance was key to strengthening both companies' positions in existing markets and expanding into the emerging composite markets of architecture and civil construction.

London icon enters the composites age

London's iconic red double decker buses have had a major makeover.

The new range of brilliant red buses taking to the streets are sleek, light and meeting aggressive fuel efficiency and fire safety targets, thanks to the use of advanced composites.

The manufacturer of the buses, Wrightbus, selected Composites Australia member and supporter, Gurit, as its composite expert for the design

and supply of the structurally loaded rear-end body panels.

Gurit worked closely with Wrightbus to ensure the structural design, attachments, composite materials and assembly methods met the performance requirements.

Advanced composites play a significant role in the new London buses. Image courtesy Wrightbus.



New web marketing opportunities

Composites Australia continues to expand opportunities for companies to profile their capabilities to the market.

The association's composites company directory has been upgraded and renamed as the Buyers' Guide, further strengthening its role in connecting buyers to Australian composite manufacturers and suppliers.

The upgraded Buyers' Guide directory is one of several opportunities for members to market their company and products through the popular Composites Australia website.

"The Buyers' Guide is regularly used by visitors to the website wanting to connect to Australian composite companies," Composites Australia CEO Kerryn Caulfield said.

"It is now prominently displayed on the Home Page and, with upgrades to the search options, we believe it is even more user friendly. Plus, the new feature of a short company profile that comes up in the search results better positions members in the market."

Other new features that are directly accessed through the website Member Centre include the ability for member companies to upload media releases and job vacancies.

"A growing collection of industry case studies is also raising the profile of the capabilities of the Australian composites industry," Ms Caulfield said.

"The website is prominently ranked with major search engines and traffic is growing, so these initiatives offer worthwhile opportunities for companies to raise their profile."



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TOMORROW'S COMPOSITES SOLUTIONS TODAY

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Bolwell launches new Nagari

Introducing the 2014 Bolwell Nagari – a showcase of Australian advanced composite design and ingenuity.

Designed and manufactured at Bolwell's Mordialloc plant, south of Melbourne, the high performance sports car sets new benchmarks for the elite auto market through innovative design and use of composites. Weighing in at just 980kg, it is 400kg lighter than the Porsche 911 Carrera S, and more than 800kg lighter than the 2014 Maserati Ghibli. Powered by a six-cylinder V6 engine, the 2014 Nagari accelerates from zero to 100kph in just four seconds, leaving both the Porsche and Maserati behind, according to published figures.

"The reason it's so light is there is no chassis as such. The occupant capsule, a combination of carbon fibre, Kevlar and 'glass, is very light, strong and rigid," says the car's designer, Campbell Bolwell, whose passion for sports cars led to the founding of the Bolwell Company some 50 years ago.

The author of 'Designer, Creator, Manager – an Entrepreneur's Guide to Successful Product Development', Bolwell plans to produce just six of this new edition of the Nagari a year. The first three came out of production and compliance testing in early March.

"There is a market out there of people who want something that no-one else has got. This Nagari has many special features but it is that 'uniqueness' that sets it apart," says Bolwell.

Other than the love of the creative process of designing and producing a very special vehicle, Bolwell says the main reason behind the 2014 Nagari edition is to showcase the company's technical capabilities that are the foundation of Bolwell components for transport clients, such as Kenworth Trucks and Caterpillar.

The resin infusion process the company developed in Canada some four years ago to build wind turbine blades is used to produce the Nagari occupant capsule and some truck components, as well as many other products and components manufactured at the company's plants in Victoria and Thailand, which focusses on the export market, Bolwell says.

"Safety is a real priority and from that point of view, the occupant capsule is extremely light, yet strong," he says.

It is attached front and back to lightweight metal sub-frames that support the suspension and rear engine. Bolwell says the design gives unprecedented torsional rigidity (nearly three times that of the Porsche Boxter), making handling and cornering a delight.

"It's very drivable," he says, yet he doesn't expect most owners of his newest creations to do more than 3000km to 5000km a year.

A showcase of composites capabilities: Campbell Bolwell inspects the first of his new generation Nagari sports cars in his Melbourne factory.



Surviving the end of the Aussie Holden era

Large black composite car parts dominate the meeting room at the head office of Composite Materials Engineering (CME) in Bayswater, in Melbourne's east. The largest sample — a spare wheel tub that cut 5kg off the weight of the Commodore — is an obvious source of pride and achievement for Managing Director Brian Hughes and his team.

But it is the diverse range of products that line the opposite wall that dominate Hughes' focus today. Combined with a move into national distribution at trade and retail level, they are the key to the current and future success of the business as major customer, GMH, winds down its Australian production, which is due to end in 2017.

The stunning composite wall panels, roof tiles, confectionary trays, rail and bus seats, electrical components and other projects under development, are the result of a diversification and innovation strategy that has seen CME move from 98 percent automotive to well below 50 percent over the past 10 years.

At the same time, CME has expanded production of both materials and products to become Australia's

largest supplier of composite moulded products, says Hughes.

He will share the story of that journey with delegates at next month's Composites Australia CRC ACS Conference in Newcastle, in his presentation '*Diversity beats Adversity*'.

In this article, *Connections* looks at the progressive replacement of steel with composites in Australian-made cars through the eyes of the only composites OEM supplier to the Australian automotive industry.

"Few people, even in the industry, realise how much composites are in Australian cars today," says Hughes.

It has been a long and gradual process, requiring multi-million dollar investment in new technologies and R&D with international collaborators, to develop and introduce composite components for Ford and GMH.

"We have had to compete on a commercial and technical basis, as well as demonstrate we can meet the high volume and other critical production-line requirements," says Hughes.

CME uses Sheet Moulding Compound (SMC) and their own long glass fibre propylene to press and

CME Managing Director Brian Hughes with the composites spare wheel tub that cut 5kg off the weight of the Commodore. See Page 17 for details.



punch out its automotive products – technology that Hughes says is common across the industry globally, due to the weight, cost and design advantages. He monitors developments in carbon fibre technology but says the cost differential remains a big barrier to adoption for the mainstream automotive markets.

“CME has relationships through Europe and Asia where we collaborate in composite technology transfer and bring in technology that is working in the auto sector,” Hughes says.

It’s that drive to continually identify opportunities for new products and markets and invest in development of new technologies that led to the development of the Commodore’s spare wheel tub, an innovation that sees CME as GM’s global expert.

Hughes estimates the technology required an investment in the order of \$8 million, including sending CME chemists and engineers to Europe. “We were able to take 5kg out of the current Commodore with our composite spare wheel tub – that was an enormous weight saving.” The technology was

quickly adopted by GM globally.

Similarly, the CME composite body panel on the HSV took 6kg off that vehicle range. Other composite components in today’s Australian-made GMH fleet include lightweight tailgates on the Holden utes, underbody aerodynamic shields, noise insulators, jack boxes that double as a structural cross beam, structural seating components and pocket trims.

CME had previously done a lot of work with Ford but as interest in product development in Australia dropped the company turned its attention to GMH, says Hughes.

He is not daunted by the recent GMH closure announcement. “We actually see good opportunities in the auto sector on-going, but not in the same form as today,” says Hughes.

Join Brian Hughes at the 2014 Composites Australia CRC-ACS Conference in Newcastle on April 8. See page 17.

2014




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Composite Materials – The Future History



Professor Vladimir Golovanevskiy from the Western Australia School of Mines, Curtin University, sees a bright future for composites in the resource processing industries.

It would be difficult, if not impossible, to imagine the modern world without non-metallic composite materials. In fact, many of the technical wonders we take for granted would not be possible without composites. They are integral to developments in the aerospace, automotive, defence, chemical processing, cryogenics, marine, power generation and sport and recreation industries, amongst others. The oil & gas and mining industries are amongst the most recent to start adopting composite materials as a replacement for metals.

Since the very first non-metallic fibre-reinforced composite materials in the 1940s, the use of composites worldwide has increased a hundredfold and is still increasing at an accelerating rate.

Overcoming barriers

However the uptake is slowed by several barriers and, more specifically, by the conservatism of established industries, the lack of design practices/codes,

inadequate engineering education and lack of standardisation.

A greater variety of manufacturing processes results in a greater variety of economically manufactured products, ranging from 'one-of-a-kind' to low-volume, to high-volume, high-speed automated production. Unlike metal products (with some exceptions), the properties of composite materials products – such as boat hulls, airplane wings, wind turbine blades, artificial limbs, piping etc. – are manufacturing process specific. On the one hand, this gives the designers the important advantage of producing a product that meets specific performance requirements for a specific task, with a whole array of consequent advantages that are not available with conventional materials. But on the other hand, the process dependant properties of composite materials products make their standardisation a challenging task.

Reducing raw material costs

The high cost of raw materials (reinforcements and resins) is another barrier to the adoption of composites. An examination of trends over the last

60 years shows that the cost of materials has been steadily declining and, in some cases, has been reduced by a factor of 20. With further cost reduction in reinforcements/resins and the advent of new and more efficient technologies, the cost of composite materials products can be expected to become much more affordable within the next 20 to 30 years. Design procedures/codes will undoubtedly follow. This, in turn, will result in a wider adoption of composite materials products and, at the same time, TAFE and university education giving much needed, stronger attention to composite materials. In the resource processing industry this will lead to:

- wider use of GRP (glass-reinforced plastic) piping in oil, gas and mining/mineral processing
- wider use of composite materials for repairs of steel and concrete structures
- GRP railway ore cars (approximately five tonne weight-saving compared with steel)
- wider use of composite materials in oil & gas, mining and materials handling infrastructure, especially in corrosive environments such as coastal areas.



Promoting composites at National Manufacturing Week

Composites Australia will once again be showcasing the capabilities of the industry at National Manufacturing Week to be held in Sydney from 13 to 16 May 2014.

Billed as Australia's largest manufacturing industry event and designed to strengthen industry through technology, innovation and education, the week includes exhibitions, demonstrations and presentations on opportunities in industry sectors, technological innovations and value-added solutions and services. National Manufacturing Week seeks to offer a unique opportunity for suppliers of manufacturing technology equipment, technology and services to showcase their innovative and internationally leading

products to senior decision-makers and specifiers from Australia's manufacturing industry.

As well as an exhibition booth, Composites Australia will host a seminar for industry on '*Opportunities for Government Assistance for Manufacturing*'.

The seminar will provide information, tools and inspiration to help deal with the challenges of manufacturing in today's market place.

It will feature a panel of representatives from government and other relevant

agencies plus Composites Australia members who have successfully leveraged support packages to build their businesses.

The seminar will be held from 9am to 1pm on Thursday 15 May at the Sydney Showground, Sydney Olympic Park.

Composites Australia members wanting to profile their products at our booth should contact Event Manager, Anna Civiti on (03) 9429 9884 or admin@compositesaustralia.com.au

Ultra-strong, lightweight pedestrian bridge

When Gosnell Council in Western Australia commissioned a new pedestrian bridge to span the Canning River, the solution was a unique, architecturally-designed lightweight structure made from advanced FRP composite materials.

Located in the Centennial Pioneer Park in Perth, the bridge is used by hundreds of pedestrians and cyclists a day as a link between residential areas and the Albany Highway.

single span bridge meant it could be transported and installed in one piece, with four bolts on small footings causing minimal disturbance to the fragile environment and reducing costs.

“The access to install the bridge was very limited, with only a narrow path leading to an open grassed area. We were able to project one end across the river and pick it up with the other crane on the opposite bank,” says Glenn Swarbrick.

The bridge structure is a hollow, U-shaped box made



When the substructure of an old park bridge linking residential areas and Albany Highway started to erode, Gosnell Council decided to replace it with a wider and lighter bridge specially designed for the fragile environment.

The project managers, Capital House Australasia, architecturally designed the new 21-metre span bridge and engineered the site works. Fremantle-based Swarbrick and Swarbrick Yachts, manufacturers of iconic composite infrastructure and public artworks as well as marine craft, were chosen as the builder. They contracted Composites Consulting Group (CCG), an independent DIAB Group company, to engineer the bridge construction. Employees from the two companies worked side-by-side to create a lightweight yet strong composite structure in Swarbrick’s Henderson-based facility.

The light weight of the completed 21-metre

of e-glass skins over structural cores infused with fire retardant vinyl ester resin. Carbon capping tapes running the length of the bridge add the strength and stiffness required for the long bridge span.

All engineering was performed under the relevant Australian codes and standards as well as the Eurocomp Design Code. Along with the usual load cases for bridges, which include pedestrian walking and balustrade loads, the Gosnells pedestrian bridge is also engineered to resist various flooding-related load cases – an essential design consideration in a flood-prone region.

The bridge’s pier-free span also ensures that there is no impact on natural river flows and the riverbed.

Together with an improved concrete footpath network and lighting, the bridge will further encourage public access to the reserve and provide a safer river crossing in this popular parkland.

Centennial Pioneer Park’s new advanced composites bridge – designed to be an iconic feature while meeting the needs of the sensitive river environment.

Mechanically Fastened Joints in Composite Structures



Composite Engineer's Viewpoint

By Rik Heslehurst PhD, MEng, BEng (Aero) FIEAust, FRAeS, CPEng

Part 11 – Off-Axis Loading

This is the final article in this series related to mechanically fastened joints in composite structures. In this article the off-axis loading of composite structures is discussed.

Off-axis loading is of significant importance in composite structures because laminated fibrous composite materials are general orthotropic. Thus any loading off the material axis results in general orthotropic behaviour. This has significant implications for the laminate structural design with fasteners that are loaded off-axis.

A common example of off-axis loading can be illustrated by a lug joint as shown in Figure 1. Axial and transverse loads are independently axially loaded for an orthotropic material. The combined axial and transverse loads result in an oblique loading action which is off-axis to the material and structural orthotropic axis. With composite materials this may result in a poor structural efficiency.

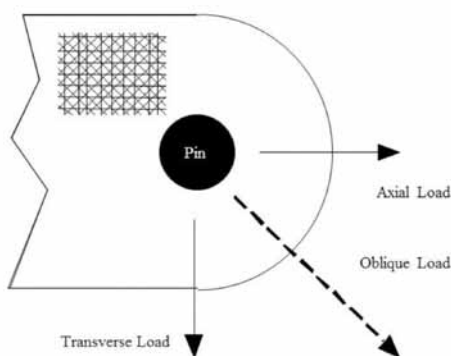


Figure 1: Off-axis Loading in Lug Joints

From Figure 1 the off axis failure modes of interest are illustrated in Figure 2. Thus the material properties against shear-out, bearing and net-tension need to be determined in the off-axis position. Initial this can be estimated by transformation of the

orthotropic strength properties to the off-axis loading angle using the 2nd order stress transformation equations (Mohr's circle equations in stress).

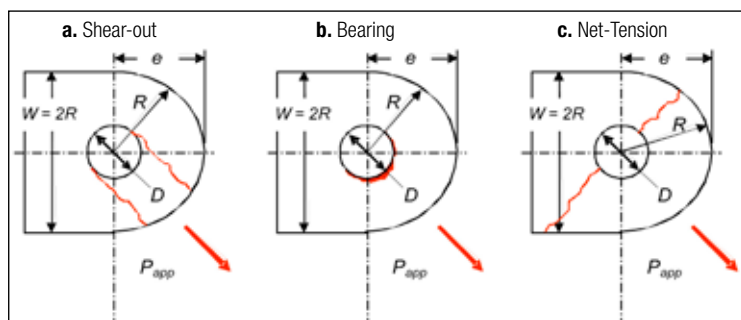


Figure 2: Oblique Composite Lug Loading and Failure Conditions

When a highly orthotropic laminate is loaded off-axis the radial stress distribution can change rather dramatically, see Figure 3 for example. A lack of appreciation of this issue will more than likely result in poor composite structural performance of mechanically fastened joint.

What is often required in the composite laminate configuration in the presence of off-axis bolt/pin loading is a near quasi-isotropic ply configuration.

Figure 4 represents the ideal range of ply percentages in the 0 degree, 90 degree and ± 45 degree directions. Whilst this may seem rather restrictive in ply selections it is a better approach for the mechanically fastened joint efficiency. However, with localised ply additions around the fastener hole the local properties can be adjusted to be near quasi-isotropic.

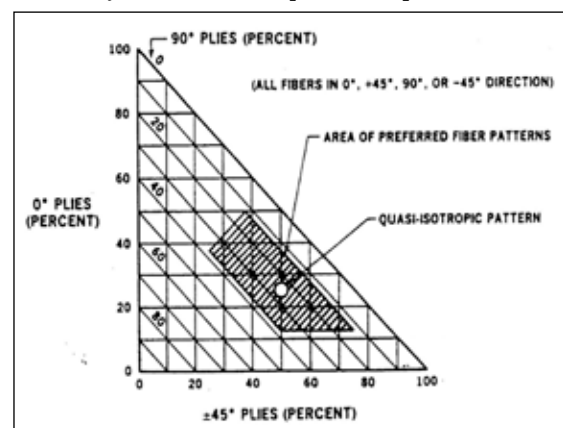


Figure 3: Circumferential Stress Distribution at Loaded Bolt Holes (Garbo and Ogonowski, AFWAL-TR-81-3041)

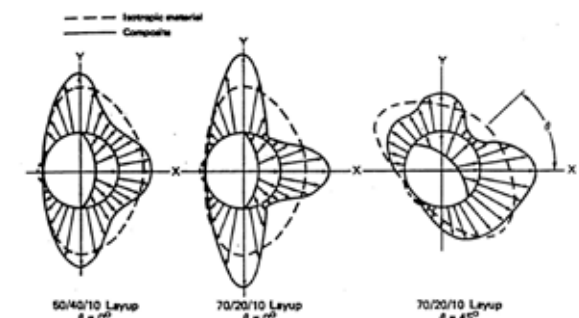


Figure 4: Preferred Ply Orientations for Mechanically Fastened Joints (Hart-Smith)

In the next article we will begin a new series that discusses 'Sandwich Structures with Composite Facings – the Design Challenges to be Faced'. I also welcome questions, comments and your point of view. I may publish your questions and comments, and my response in future newsletters.

Contact: Rik on r.heslehurst@adfa.edu.au.

Support for R&D

Research and development is now within the reach of more Australian small businesses.

The CSIRO has established the SME Engagement Centre to connect industry to research and development (R&D) expertise through government funded programs so that companies can overcome technical challenges and grow their business.

"R&D can help deliver value to composite companies in many ways, such as increasing productivity and efficiencies, decreasing costs and developing new or improved processes and products," says Michael Egan, SME Engagement Manager.

Funding opportunities include the federal government's Enterprise Connect Researchers in Business (RIB) program, which places a researcher in a business to develop and implement a commercial idea. The program provides up to 50 per

"R&D can help deliver value to composite companies in many ways, such as increasing productivity and efficiencies..."
Michael Egan, CSIRO

cent of salary costs, to a maximum of \$50,000. Placements can be for a period of two to 12 months with researchers required to spend a significant period of time working on site within the business.

"There is a tacit knowledge exchange in RIB projects where the researcher works within industry and can experience first-hand the pressure SMEs are under

and the decisions they face," says Egan.

"In turn, the company develops more sophisticated technical knowledge, which they can use to innovate and improve their business performance."

Through a team of state-based managers with technical business skills and industry experience, the SME Engagement Centre helps companies identify funding sources, identify researchers that are a good fit to the project, communicate their needs to the research organisation, and facilitate the development of project plans and commercial arrangements.

More information: www.csiro.au/sme-engagement

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Intellectual Property

What is it and who needs to protect it? by **Dr Ramon Tozer**, patent attorney



Whether large or small, a business may have Intellectual Property (IP) in its brand, products, or processes. If these set the company apart from competitors, then they are probably worth protecting.

Understanding the value of IP and integrating it into a commercial plan has proven to be smart business practice for companies large and small.

For Victorian start-up Carbon Revolution — developer of the world's first one-piece composite carbon fibre wheel — managing the company IP has been pivotal to its success in raising funds (see page 15).

"Investors are unlikely to take you seriously or invest in the company unless they can see there is some form of IP in place for the underlying technology," says founder and Director of R&D, Dr Matthew Dingle.

IP is defined as "content of the human intellect deemed to be unique and original and to have market place value, and thus to warrant protection under the law".

The type of IP relevant to a business will depend on the nature of that business.

Trademarks are relevant to most businesses in the context of business/product/service names. They identify the goods or services of a trader, as distinct from those of other traders. It is worth noting that a registered business name does not provide any legal right to stop others using that name.

In the composites industry, IP can also reside in a manufactured product, a method of making the product, or even in the equipment used to make the product. In that case, patent and/or design protection may be relevant.

Patents protect the way things work, what they are made from, or how they are made. Designs protect the way a product looks; for example, its shape.

IP rights provide a legal mechanism for a business to prevent unauthorised

copying or use of their IP. But IP provides more than the ability to enforce rights against a potential infringer.

As a business tool, IP can be used to benefit your business in various ways. For example, IP can

- be licensed or sold just like real estate
- assist with attracting investment or securing grant funding
- enhance the sale price of a business
- be used as a bargaining tool in the negotiation of business deals.

It goes without saying that IP in itself is not the key to business success; unfortunately, hard work is still required! However, if effectively managed and used to its full potential, a business's IP can be its most valuable asset.

Dr Ramon Tozer will be presenting at next month's conference in Newcastle. He is a partner at Davies Collison Cave, specialising in IP relating to polymer and composites technology.

Contact: Dr Ramon Tozer on (03) 9254 2777 or rtozer@davies.com.au or www.davies.com.au

Joint Strike Fighter Program leader visits Quickstep

US Air Force Lt. Gen. Chris Bogdan, the F-35 Program Executive Officer, met with employees and management of Quickstep Holdings Limited at their Bankstown NSW manufacturing facility in March.

Quickstep is supplying carbon fibre composite skins and sub-assemblies for the program and will manufacture

21 different F-35 parts at Bankstown. Quickstep is seeking to qualify its process for manufacturing additional parts for the program, assisted by a \$1 million federal government grant through the Department of Defence's New Air Combat Capability Industry Support Program.

"I was impressed with Quickstep's

manufacturing processes and technology, they appear to be world class," said Lt. Gen. Bogdan. "The technologies I saw have great potential to improve aerodynamic performance and help to keep manufacturing costs down. Quickstep's contributions to the F-35 program are highly valued today and will be for years to come."

Carbon Revolution's \$23.4M production plant

Victorian start-up, Carbon Revolution, developer of the world's first one-piece composite carbon fibre wheel, has secured investment and government funding to build a manufacturing plant in Geelong.

Construction started this month (March 2014), marked by a federal and state government announcement of a \$5 million grant towards the project.

In December, the company announced it had secured the backing of Swiss wheel-making giant Ronal for a \$20 million capital raising to establish the Geelong manufacturing plant.

The funding will enable the company to realise its plans to transition from boutique manufacturer to mass producer, increasing its annual output of lightweight, super-strong carbon fibre wheels from 4000 to 50,000.

Speaking after the Ronal announcement Carbon Revolution's Chief Executive Jake Dingle said: "They are putting their backing behind us because they believe this technology will be very significant for the global wheel market over the coming decade."

"This also allows us to look at the aerospace and industrial markets in the future."

Government and private investment paves the way for mass production of the world's first one piece carbon fibre automotive wheel at a new plant under construction in Geelong.

While Dingle laments the problems in the domestic car industry, he says there are opportunities for Australian companies to become hi-tech suppliers to export markets.

He says the firm is now ranked a tier-one supplier in the global auto trade and expects to be able to announce more contracts this year as its customer-base widens. The company is looking to expand into wheels for aircraft and trucks.

He said the firm's partnership with Deakin University and the nearby Carbon Nexus was a huge strategic advantage.

"No one else in our competitive space around the world has a carbon fibre manufacturing line literally on their doorstep, along with the R&D (research and development) capabilities we have with Deakin," he said.

Federal Industry Minister Ian Macfarlane says the firm is a great example of local innovation.

He says that industry in Geelong will transition to a new future post the Ford closure and "Carbon Revolution is part of that industrial revolution that's going to go on here in Geelong. There are new jobs, new opportunities and new industries, and that is the key part we are playing today; to ensure that future is secured."



Composites green surfing, skate boarding

Victorian surfer and surfboard designer Jason Wiggers, says his greatest accomplishment is creating an eco-friendly board for the marketplace that stands up against traditional fibreglass boards “while giving careful consideration to Mother Nature”.

“Surfers are very connected to the ocean we go on but here we are riding foam chemical sticks of fibreglass. I’m trying to use as many eco-friendly products as I can.”

His company, Samsara, is one of the first to work with Lavender Composites on the application of fabric woven from harvested flax fibres to create boards that he says outperform traditional fibreglass.

The flax fibre fabric (Bcomp Flax Fabrics) is one of Lavender’s growing range of products with environmentally responsible characteristics, that now include a bio-based epoxy resin with up to 56 per cent of ingredients derived from non petrochemical-sourced material (Sicom GreenPox) and a cork core material harvested from living trees (Amorim CoreCork).

Lavender technical sales consultant

Lincoln Heading enjoys the ride on his “green” skateboard.

Simon Heading, a keen board rider (on and off the water), put the materials to the test, developing a range of cork skateboards under the Archer label.

“I wanted to create something completely different, using the latest materials and techniques, and shake up people’s perception of what a skateboard could be,” says Heading.

“These are true cork skateboards, not a veneer over timber. The cork sheets are soft and flexible which creates a natural vibration dampening and acoustic barrier, and is why the boards have their unique smooth ride. Flax fibres are used for strength and are aligned to adjust the flex and feel of each board. Bonding it all together is an epoxy, made from greater than 50 percent bio-based ingredients, dramatically reducing the amount of



petrochemicals used. The raw materials are laid up dry, then resin is introduced under vacuum, reducing the amount of VOC’s [Volatile Organic Compound] exposed to the atmosphere.”

Contact: composites@lavender-ce.com

Transforming Mirage Sea Kayaks



Since buying the company less than 12 months ago, Shannon O’Brien has transformed Mirage Sea Kayaks. He has brought the company’s manufacturing back from China to Australia, rebuilt the Gosford factory, opened two other factories on the NSW central coast, doubled workload, introduced three new products to the range and established distribution outlets.

O’Brien bought Mirage on returning to Australia with his young family. Drawing on his background in business

development for a major international winter sports company, his vision is to create an iconic Australian brand of fast, stable sea kayaks to suit all types of paddlers from beginners to those seeking adventurous expeditions.

He says he is keen to test new composite materials that have potential to improve the performance of Mirage kayaks. Guided by mentor and designer Paul Hewitson, he has added carbon fibre parts to the fibreglass and Kevlar hulls; used new fabrics such as the Innegra carbon blend from Colan; experimented

with hemp. He’s also moving away from gelcoats to coloured resins.

His primary testing and distribution outlet is his company’s busy kayaking centre, Sydney Harbour Kayaks.

“We draw on the feedback and ideas from our employees, who are career paddlers, and our clients,” O’Brien says. “Customers are looking for new and interesting products.”

Contact: www.mirageseakayaks.com.au

2014




AUSTRALASIAN COMPOSITES CONFERENCE

Materials for a lighter, smarter world

April 7 to 9, 2014 Newcastle, Australia

The 2014 Composites Australia and CRC-ACS Conference is Australia's premier event for composites manufacturers, suppliers, engineers, designers and researchers.

The conference will be held in Newcastle on Tuesday and Wednesday April 8 and 9, with a workshop and welcome reception on Monday 7 April.

The conference brings together local and international speakers and attendees from key industries and fields of research, including aerospace, automotive, building and construction, civil infrastructure, defence, marine, resources and transport.

To be opened by The Honourable Bob Baldwin MP, Parliamentary Secretary to the Minister for Industry, the conference is attracting global and national industry leaders and promises delegates with two powerful days of knowledge exchange, networking and business development opportunities.

Keynote speaker, Nicholas Melillo, from the Boeing Company, will set the scene. He will give recent examples where rapid prototyping by his R&D team has led to the insertion of advanced composite technologies into future products at Boeing, resulting in reduced cost and increased performance.

Local industry achievers who will share their stories with delegates include:

- Brian Hughes, Managing Director of Composite Materials Engineering
- Jeff Lawrence, Managing Director of Sykes, formerly Sykes Racing
- Pierre Gouhier, Engineering Manager at RPC Technologies
- Stephen Smith, Vice General Manager of Exel Composites Australia
- Geoff Germon, Chief Executive Officer of Talon Technology Pty Ltd

Delegates will learn about the key mega trends that have been identified by

leading CSIRO scientists and the drivers for sustainable manufacturing from Dr Dilip Manuel.

Other topics include: new technology and processes to improve manufacturing efficiency; structural design, analysis and testing; sustainable manufacturing; 'standards' to expand composite applications; new and emerging markets for composites in infrastructure, aerospace, defence and resource industries; developments in polymers, biocomposites and advanced composites; plus the opportunities to leverage Intellectual Property in composites.

Overseas visitors

Delegates and speakers are travelling from as far afield as Finland, Austria, Germany, the USA, Malaysia and New Zealand. They include eminent composites researchers such as:

Professor Reinhold W. Lang from the Institute of Polymeric Materials and Testing at the Johannes Kepler University Linz, Austria; Dr Kalle Nattinen, Principal Scientist at the VTT Technical Research Centre of Finland; and Johannes Wolper and Thomas Schmidt from the German Aerospace Centre, Institute of Structures

and Design, Centre for Lightweight Production Technology.

Tony Stanton, Engineering Manager – Asia Pacific for Gurit Pty Ltd is travelling from New Zealand to present international case studies on the successful use of advanced composites in bridge construction projects.

Australian industry and research identities

A number of well-known members of the Australian composites industry research and technical community are also presenting at the conference, including:

Andrew Beehag and Michael Heitzmann from Advanced Composite Structures; Dilip Manuel and Russell Varley from CSIRO; Lucy and Chris Cranich, consulting materials scientists from PATH; internationally-recognised composites engineering consultant Rik Heslehurst; and Pierre Gouhier from RPC Technologies.

More information and registration

www.compositesconference.com
or call Composites Australia on 03 9429 9884.

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Promoting fibre composites in infrastructure

Introducing and implementing new materials to existing industries is a challenging activity especially in the critical field of civil infrastructure.

For this reason, over 70 people attended a forum at the University of Southern Queensland (USQ) in Toowoomba during February to present and debate the latest research and development on fibre composite



The first installation of fibre composite sleepers in the standard railway line in Australia on the Queensland Rail Line. CarbonLOC Pty Ltd developed the sleepers in collaboration with USQ.

applications in civil infrastructure, particularly for new bridges and the repair of existing infrastructure.

The forum was an initiative of the union between USQ and the Kookmin University, Korea, enabled by funding through the Australia/Korea Foundation of the Department of Foreign Affairs and Trade.

Australian and Korean intellects have been bridging a knowledge gap and learning from the bodies of work, both academic and practical applications, undertaken in each country. These projects include fibre composite bridge girders; pile rehabilitation and composite pile systems; strengthening of existing structures; and other innovative applications of fibre composites.

The technical program featured presentations from Korean academics, including Professor Sung Woo Lee who provided an overview of the applications of FRP in civil infrastructure in Korea.

Michael Kemp, General Manager for Wagners CFT Manufacturing Pty Ltd, shared some of the company's significant body of work, including work with pultruded FRP structural sections for civil infrastructure, highlighted by the replacement work carried out after the Brisbane flood disaster of January 2011. He also outlined the engineering challenges faced in delivering solutions with fibre composites.

The event was well supported by a strong contingent from the Australian composites industry, representing composites manufacturers, industry suppliers and the research community.

While operating conditions in Australia and Asia are quite different – with Asian infrastructure generally experiencing higher usage and traffic than in Australia – the technical forum concluded that learning from each other's experiences would accelerate the uptake of composites in civil infrastructure in each country.



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*Photo courtesy of Dona Francisca

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Please contact Ryan on 0433 520 332 or email: ryan.oldfield@live.com for more information. Viewing in Melbourne available to see one in full production. You can come down and see a full sized caravan front fully trimmed in under 3 minutes!!

Events Schedule 2014

April

Monday 7 – Wednesday 9
Newcastle, NSW
2014 Composites Australia and CRC-ACS Conference
One day technical workshop followed by two day conference program with more than 40 international and Australian speakers and peer reviewed papers.

May

Tuesday 13 – Friday 16
Sydney
National Manufacturing Week
Industry exhibition with opportunity to showcase members' composites capabilities and products.

Thursday 15
Sydney
Public Sector Support for Manufacturing: opportunities for the composites industry
To be held at the 2014 National Manufacturing Week venue, this seminar will feature a panel of representatives from government and other relevant agencies plus Composites Australia members who have successfully leveraged support packages to build their businesses.

Thursday 22
Western Australia
Emerging Manufacturing Techniques Workshop
One day technical workshop delivered by Mr Rowan Paton, Program Manager, Materials and Manufacturing at Advanced Composite Structures Australia Pty Ltd.

June

Monday 2 – Thursday 5
Seattle WA, USA
SAMPE Tech 2014 Technical Conference
Visit www.paper.sampe.org to submit your abstract.

June/July TBA
Victoria
Composites in Infrastructure Seminar
One day technical seminar to review success of composites in infrastructure/civil engineering; and to look to future opportunities and how these can be realised.

July

Thursday 17
Victoria
The Essentials of Textile Reinforced Composites
One day technical workshop delivered by Dr Dieter Veit, Vice Director of the Institute for Textiltechnik der RWTH, Aachen University, Germany.

August

Thursday 21
Victoria
Closed Moulding Technology Workshop
A one-day workshop for practitioners who want to explore closed moulding efficiencies and choices in equipment and material inputs considering the complexity of the shape and expected volume of the part.

September

Tuesday 2
South Australia
Practical Composites Design & Analysis
A full day technical workshop with Dr Rod Thomson, Program Manager for Design and Analysis at Advanced Composite Structures Australia Pty Ltd (ACS Australia).

Tuesday 9
Queensland
Emerging Manufacturing Techniques Workshop
One-day technical workshop delivered by Mr Rowan Paton, Program Manager, Materials and Manufacturing at Advanced Composite Structures Australia Pty Ltd.

October

Monday 13 – Thursday 16
Orlando, Florida, USA
CAMX – The Composites and Advanced Materials Expo
ACMA and SAMPE have joined forces to produce a new super industry event that connects and advances all aspects of the composites and advanced materials communities. Visit www.theCAMX.org USA

Wednesday 29 – Thursday 30
Victoria
Growth Opportunities for Composites in Australia: Leveraging global trends
A workshop with Professor Andrew Walker, CEO of the National Composites Certification and Evaluation Facility and Director of the School of Materials, University of Manchester, United Kingdom.

November

Thursday 27
Queensland
Composites Australia end-of-year function
Evening presentation and networking event

For full details and to register go to
www.compositesaustralia.com.au/events

Disclaimer: This schedule was current at time of going to print but is subject to change. Composites Australia is not liable for any loss or expenses incurred due to changes in the program.



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