Issue 52 • May 2020

Connection

The official magazine of Composites Australia

Inside

allnex is the market leader in the manufacturing and distribution of composite materials in Australia, New Zealand and the Pacific Islands. We are the largest and only local producer of composite resins such as gelcoats, flowcoats, and unsaturated polyester and vinyl ester resins.

Our materials are used in a diverse range of composite applications and products such as boats, swimming pools, truck bodies, tanks, roof sheeting, pipelines and many more.

We pride ourselves on offering the region's most comprehensive product portfolio and end-to-end service ranging from research and product development to application advice and ongoing technical support.

Our local R&D operations are complimented by our global innovation network. By listening to our customers, identifying trends in the market place, and understanding the specifics of our customers' challenges, we make sure that we undertake development activities that deliver commercially viable solutions.

Globally, allnex is a leading producer of coating resins and additives for architectural, industrial, protective, automotive and special purpose coatings and inks with an annual revenue of €2.2 billion.

With 33 manufacturing facilities, 23 research and technology support centres and 6 joint ventures, the allnex group is present on four continents and serves customers in over 100 countries.

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Colan Australia has specialised in weaving industrial textiles from technical fibres since 1954. It developed the first specialised fibreglass fabrics for boat builders and surfboard manufacturers, the earliest adopters to Glass Reinforced Plastics (GRP). Read how Colan is now creating materials that will provide a combination of endurance as well as performance and aesthetics.

7&8

Front Cover

Our story on Spa International demonstrates how Rob Kruber, CEO applies logic, consistency and continuous improvement across all areas of his manufacturing plant.

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Composites Australia

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President's Letter

Needless to say that COVID-19 is a transformational force that is having an enormous impact on our world. I hope you are safe, healthy and protected from infection. As a manufacturer, this has been a time of fast learning, and having to adapt quickly to the changing rules and considerations that are required to keep everyone safe. As an 'essential business' it is particularly important to keep staff safe, as they cannot work from home and return to their families after every workday. It has also been heartening to see the nation and its leaders becoming more aware of the importance of Australian manufacturing and the strength and ingenuity of Australian manufacturers.

Along with thousands of other events worldwide, we took the sensible precaution to postpone our annual conference scheduled for 28-29 April until later in the year. At this stage, our intention is to hold the event on 21-22 October at the same venues in Toowoomba with similar speaker line-up and tours. In the spirit of optimistic country commitment, Denis Wagner, Director of Wagner Corporation, confirmed his keynote address and the tour of Wagners CFT will go ahead, so too the tour of the Centre for Future Materials at USQ.

In the meantime, I hope you enjoy this edition of the Composites Australia magazine which features heartening stories on Australian composite companies, most of which are family companies that have collectively been operating for over 250 years - all of which validates the importance of manufacturing in our island nation.

Our feature is on Spa Industries, Australia's largest spa manufacturer. Earlier this year, Rob Kruber, CEO, generously hosted over 30 people who came from as far as Perth to tour the company's manufacturing facility in downtown Hallam, Victoria. For me it was fascinating to see firsthand how Rob and his team have streamlined systems and minimized waste while simultaneously maximizing productivity. Our AGM was also held that day, thanks to the hospitality of Spa Industries in allowing us use of its boardroom.

The story on GMS Composites is also a fascinating 80 year journey of adaptation, investment and innovation to becoming an epoxy prepreg composites producer supplying the rapidly expanding high performance fibre reinforced composites markets in Australia and Asia Pacific.

Those who follow Colan Australia on Instagram would be aware of the creative and inventive use of the company's range of fabrics, braids and NCF's by the surfcraft sector. The story demonstrates the versatility of industrial textiles made for performance in applications from submarines to surfboards and the beauty that clear epoxy laminates can bring out with creative uses.

The story on Advanced Composite Structures Australia's step-change composite joining and assembly technology that eliminates fastening and secondary bonding, demonstrates the knowledge and talent of our domestic industry. Now patented, the Thermoset Composite Welding (TCW) process should reduce composite component assembly costs as well as enable rapid assembly.

During our time in Seoul for the JEC Asia exhibition during mid-November last year it was apparent that messaging apps have quickly deconstructed traditional forms of communication and are now a central platform in the business landscape. In our COVID-19-crisis new way of interacting, I invite you to keep in touch with us and each other through LinkedIn, Facebook and Twitter. We would love to hear from you, to share your stories, the lessons learned, the good and the bad. Composites Australia is a forum for this industry; its past, present and future.

Leona Reif
President

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Facebook: @compositesaustralia
Twitter: @CompositesOz

Spa International

Logic, consistency & continuous improvement

Written by Kerryn Caulfield, Executive Manager of Composites Australia Inc.

Entrepreneurialism is described as a mindset that embraces critical questioning, logic, innovation, service and continuous improvement. While Rob Kruber, CEO of Spa International describes himself as a sparkie turned businessman, the description of 'entrepreneur' could also be added to his CV.

Pre COVID-19 picture of Rob Kruber and Composites Australia tour delegates in the Spa International show room.

Spa International is Australia's largest spa and swim spa producer that markets throughout Australia under a suite of brands as well as exporting to Asia and Europe. The company produces up to eight spas per day as well as two swim/spas at its 4½ acres manufacturing site in Hallam, south-east of Melbourne.

Over the 26 years that Spa International has been making spas, the environment in which it does business has advanced considerably. The materials used have improved, consumer demand has changed, safety regulations are stricter, and technology has provided unimaginable auxiliaries. "The drive for efficiency is unrelenting. Logic, consistency and continuous improvement across all areas is fundamental to everything we do." says Rob.

While it is counterintuitive for firms to reduce their product range, creating efficiencies within the manufacturing process required a critical analysis of the company's offering. Rob says, "Previously 90% of sales came from 20% of product. We halved the range while making sure the spas on offer were stepped according to the right price, size and add-ons, all the while looking at production flow. For example, when we introduced the eight metre pool, we reorganised the floor so that the lifting jigs, track and trolleys could handle them and deal with their size."

According to Rob, continuous improvement and reducing waste go hand-in-hand. His ultimate goal is to identify and eliminate waste in productive

Spa International
Continued

equipment and labour-hours. "Plant and machinery are liabilities when not run to their potential productivity. For example, we changed the chopper gun feeder lines to do both the 1st and 2nd coats. The process runs faster and we were able to reduce our spray booths from four booths to one booth. In turn this reduced our equipment liabilities, freed up space and gave us greater manoeuvrability which allowed more efficient production flow and for new products to move through the factory," said Rob.

With landfill levies having increased 10 fold, reducing the company's waste bill was a prime target. As Rob lamented, "It is crazy to buy something only to send it to landfill. We were cutting our cladding to a range of lengths on-site. We redesigned our product to reduce the choices and now we buy pre-cut cladding in three set lengths. Our trips to landfill are down from twice per week to once a fortnight. While shrinking our landfill costs, we've also improved consistency and reduced errors."

In another strategy to remove the potential for imprecision and confusion, the factory is now a tape measure free zone with the introduction of standardised visual location identifiers. The vacuum forming moulds now have index markers which are subsequently cast into the heated acrylic. Mounting points are also confirmed by laser markers with only one measurement.

Manufacturing a spa or swim spa requires considerable precision to eliminate the possibility of equipment failure in the products they sell to the public. Equipment failure says Rob, is a liability that costs both money and reputation. "For example a jet can have five possible leak points. There can be up to 90 jets in a spa which accounts for 450 potential leak points. Our equipment failure rate is currently running at .001% leaks per waterjet - a result of designing-out product malfunction by designing-in consistency in the manufacturing process." At water testing stage, all spas undergo a complete FAST (Final Acceptance Spa Test) 100 point computer analysis of all the working components of the spa. This 100 point check verifies that the spa pool has passed all checkpoints and that all electrical components are working in the correct amperage parameters.

We expect ourselves, our staff and our products to consistently perform at a high level. We've had to work through all production points with our employees and their work cells to encourage the most efficient practices possible in order to level out production and provide a consistent workflow where no one is rushed or poorly informed. Everyone has been and will continue to be involved with the process of improvement - everyone is engaged.

Rob Kruber, CEO, generously hosted over 30 people who came from as far as Perth to tour the Spa Ind. manufacturing facility. Rob provided us with a detailed account of how the company has continued to manufacture in Australia by continuously streamlining systems and minimizing waste while simultaneously maximizing productivity. An advocate and practitioner of lean manufacturing, Rob says that "lean manufacturing is the discipline of 'logic' that has a throughput effect on productivity that in turn creates a harmonious workplace."

Colan
The beauty of advanced materials

Written by Kerryn Caulfield, Executive Manager of Composites Australia Inc.

Surfing is a set of the physical principles of gravity, buoyancy, torque and waves enabled by lightweight low density materials. Surfers catching the perfect wave rely on years of experience and learned intuition to navigate wave turbulence that imposes chaotic hydrodynamic forces of their cherished surfboards. The choice of surf board design and input materials are a complex trade-off between board strength, flexibility (flex) and weight.

Colan Australia has specialised in weaving industrial textiles from technical fibres since 1954. It developed the first specialised fibreglass fabrics for boat builders and surfboard manufacturers, the earliest adopters to Glass Reinforced Plastics (GRP). The company's Huntingwood mill in NSW is now Australia's only manufacturer of advanced technical fabrics using Carbon, Basalt, Aramid (Kevlar) and Glass fibres for composite fabricating.

Damien Bensley, General Manager for Colan Australia, advises that "As an industrial textile manufacture we've always looked for fibre properties and fabric construction as a solution to performance in applications from submarines to surfboards. Surfcraft, be they surfboards, sail or kite boards, have a unique set of performance requirements. Ideally, the board needs a balanced flex/strength ratio that provides a smooth ride, increased control and longevity. Key areas such as the rail and deck are subject to the most damage from impact and load forces so they need to be reinforced. The tail is used to generate speed by flexing and returning back to shape so this needs to have stiffness. We aim to create materials that will provide a combination of endurance as well as performance and aesthetics."

Carbon fibre is strong, predictable and extremely lightweight and has a strength to weight ratio almost twice that of E Glass fibres and when used on the rails or tails can alter the flex pattern of a board. Damien, says: "Different materials and how they are placed on a board will affect the hydrodynamic function. The direction the fibre should be laid to maximize strength and rigidity in a specific direction.

Haydenshapes "Holy Grail" - Parabolic rail application of Carbon UD tape for stringerless EPS Epoxy construction. The "FutureFlex" system was designed and patented by Haydenshapes founder Hayden Cox which paved the way for the multitude of popular surfboard technologies available today.

Colan
Continued

The stringers, both central and parabolic, provide a myriad of functional and compensatory qualities that address the competing challenges of board strength, flexibility (flex) and weight. The central stringer placement of fibres ensures the strength and rigidity of the board. The parabolic placement will reinforce the rails and provide flex memory that will make the board feel like new for much longer.

Left: Multi Fabric Thumbnails and Stacey "Machine Head"- Unique fabrics designed specifically for surfboard construction using Basalt, Innegra, Glass & Carbon in complex weave patterns.

Right: Centre placement of a custom Carbon & Glass UD tape by Stacey Surfboards used as a lightweight replacement for the traditional timber stringer.

Hervé "Siamese Dream" Recent example of an "Eco-Board" from Ryan Hervé using woven Flax cloth and Basalt UD tape as substitutes for the traditional Glass and Carbon fibres. These materials can still provide enhanced performance whilst being more friendly to the environment and creating a unique aesthetic appeal.

Most of the newer "stringerless" construction techs have incorporated carbon fibre as a feature, which looks fantastic, but is also critical to providing the lively performance which is expected from an EPS Epoxy board."

Colan Australia was one of the first companies in the world to back Innegra™ fibre because of its light weight and toughness properties. Innegra™ is usually white or sometimes black and doesn't go clear when wet out like glass. The weave pattern is consequently visible in clear laminates and becomes a design feature, particularly when woven as a hybrid with carbon fibre and or basalt.

"Top surf brands like Chilli and JS are now using Innegra™ hybrids on every single board, not to mention a bunch more incorporating it into their tech constructions" said Damien. Over time, Colan has developed over 100 variants of cloths, tapes and non-crimp fabrics using Innegra™.

The surfcraft industry has always been drawn to the environment as well as being fuelled by independent resourcefulness. Sustainability involves opting for more organic, recycled, sustainable, ethical and durable input materials. Damien says, "We're weaving with sustainable fibres such as Flax, Hemp, Recyled PET Polyester and Basalt which has great mechanical properties like S-glass but also a natural resistance to corrosive environments so it is well-suited to marine applications. Combined with a bio resins and recycled EPS foam, surfboards can be built using more environmentally conscious materials that still perform well and have a distinct "Eco" appearance."

While the fibres are used primarily for their performance, a clear epoxy laminating system amplifies their beauty and makes them visually pop. But this comes with the responsibility that all fabrics, tapes and braids have to be woven to precision with no defects of variables, as any imperfections are also amplified.

Damien like me, geeks out on materials. There is no limit to the creative applications of hybrid fibre compositions in roll goods, tapes and braids – they simply make beautiful stuff.

E-SPHERES®
Exceptionally functional fillers

Written by Kerryn Caulfield, Executive Manager of Composites Australia Inc.

In principle, a vacuum has no properties as it contains no air or other gas – it is devoid of matter. Sound can't be carried in a vacuum as there just aren't enough molecules for the audio vibrations to move through. There is no air in a vacuum to expand in heated conditions, nor matter to create weight. For hollow spherical shaped ceramic microspheres, the centres of which are a vacuum, the property of "no properties" is what makes them exceptionally functional fillers.

Hollow ceramic microspheres are integrated into composite parts as an additive or reinforcing filler for a variety of product enhancements and process improvements, including to lower the product density, reduce weight and shrinkage, improve flow and wetting of fibreglass with resin, increase impact strength, and thermal insulation and resistance. They can be used in all standard processing methods for thermoset composites including spray-up, hand lay-up, resin transfer moulding, and have found end uses in applications as diverse as fibreglass-reinforced materials, automotive brake components and engineered syntactic foams.

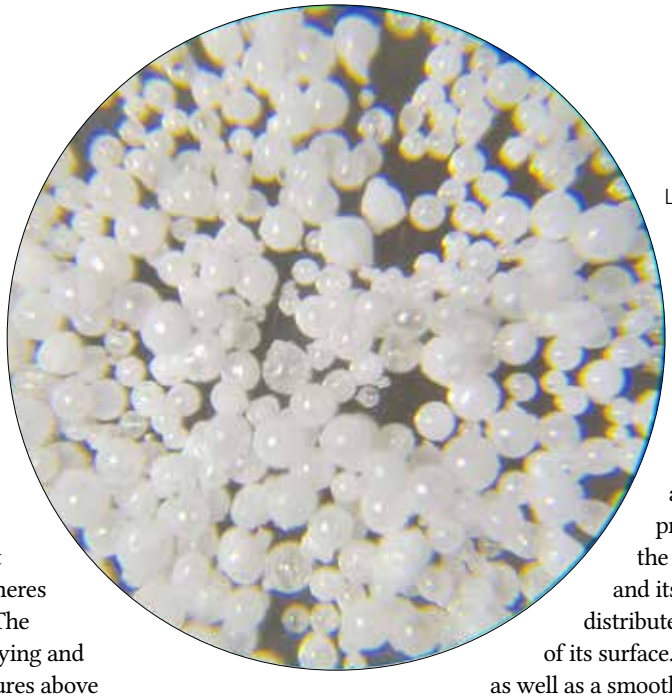
E-SPHERES® is the registered name for the hollow ceramic microspheres manufactured by Australia's own Envirospheres in the South Burnett district of Queensland – just over 200 km north/west of Brisbane. The Envirospheres factory site is a major private employer within the community where it has operated for over 20 years.

The chemical composition of what some call aluminosilicate microspheres is mainly silicon dioxide SiO2 (Silica) 55 – 60%, and Aluminium Oxide Al2O3 (Alumina) 36 – 40%, with a small amount of iron oxide Fe2O3 (Hematite) 0.4 – 0.5%, and titanium dioxide (TiO2) 1.4 – 1.6%. Silica is a combination of silicon and oxygen, two very abundant, naturally occurring materials.

E-SPHERES® work hard for a material that is effectively a chemically unreactive inert substance.

Composite wall architectural system
Pic. Stonini Australia

E-SPHERES®
Continued

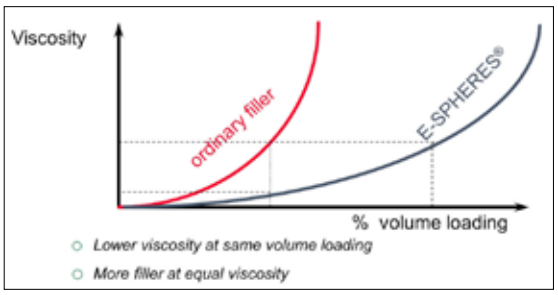


Largest particles shown in the photograph: 150 microns in diameter

Due to the ceramic composition, E-SPHERES® are flame-retardant and non-combustible, which are key properties for many industrial applications including composites. Manny Samano, Business Development Manager for Enviraspheres Pty Ltd advises that, "The processing includes drying and sterilising at temperatures above 400° C which produces an absolute pure product, ensuring that the microspheres are suitable not only for composites applications but also in many water based products such as coatings and construction materials."

The micro-shell structure of E-SPHERES® can survive compressive pressures over 4800 psi, contributed to by its spherical shape, wall thickness and ceramic nature. A sphere is the only shape that has no single weakest point and no single strongest point; anywhere you apply pressure, the stress on the sphere will be the same and its strength is evenly distributed around the entirety of its surface. "Spherical geometry, as well as a smooth surface, improves resin penetration allowing it to penetrate voids in complex moulds, all of which improves cycle times. E-SPHERES® are compatible with all epoxy, polyester, vinyl esther, phenolic and hybrid resin systems," advises Manny.

Example Resin Matrix Mix Design					Matrix Viscosity cP (Brookfield, 4/20)
Resin (g)	$CaCO_3$ (g)	E-SPHERES (g)	Total Filler Volume (ml)	Total Matrix Weight (g)	
1000	1000	0	370	2000	5800
776	700	77	370	1553	5800
700	500	130	370	1330	5800
654	0	260	370	914	5800



Test using E-SPHERES SLG grade, conducted by the University of Southern Queensland 2005

Appearing as a fine white powder E-SPHERES® have a unique pale pearl-like colour and have a refractive index of 1.53 which means they can even be used in transparent applications. They range in particle size from 20 to 500 µm in diameter - by comparison, a human hair is approximately 75 µm in diameter. The size of the sphere influences formulation of the part, ultimate finish and end use application.

Manny says that as well as density reductions, cost savings can also be achieved thanks to resin extension. "Light weighting composite end products through the use of hollow ceramic microspheres brings both environmental and cost saving benefits, including resin optimisation, lower transport, handling and installation costs." As non-combustible, non- flammable, non-reactive, non-corrosive and nontoxic, E-SPHERES® are not classified as dangerous goods boosting their environmental credentials.

Applications in composites vary from syntactic foam systems such as deepwater buoyancy and ballistic applications, architectural wall panels, swimming pools and polymarble, to automotive components for trucks and buses.

GMS Composites

Making resin systems for 50 years

Written by Kerryn Caulfield, Executive Manager of Composites Australia Inc.

GMS Composites which is based in the Melbourne suburb of Dandenong South, Victoria, and whose business origins date back more than 80 years, first started manufacturing prepregs for internal use back in the 1970's. Today the company is a modern epoxy prepreg composites producer focused on supplying the rapidly expanding high performance fibre reinforced composites markets in Australia and Asia Pacific.

Sam Weller, Managing Director of GMS Composites is the third generation to lead the company. "In the very early days, the company manufactured and supplied spark plug insulators for the Spitfire aircraft during WWII and over the decades has continued to evolve and adopt new materials which led us to where we are today."

GMS services a range of market segments including aerospace, defence, motorsport, sports and leisure, marine, and rail and road transportation. In addition to its standard prepregs, the company's portfolio of step-change systems includes resin films, low-temperature prepregs, tooling, ballistic, fire retardant and toughened high impact prepregs. GMS also distributes a full range of technical fabrics, resin systems, cores, vacuum consumables, adhesives, tooling products and mould releases. In addition, this one-stop shop also offers through its network, compression/press moulding of prepreg parts and sheets as well as CNC machining and finishing of composite parts.

"Australian made prepregs are increasingly a viable supply choice" says Sam. "We formulate and develop fibre reinforced custom prepreg systems that are engineered to meet specific needs and performance requirements. Domestic production reduces the risk of volatility associated with transporting prepregs over long distances and having to commit to large volumes that require cold storage. We also have comparatively fast lead times compared to imported goods. Our OEM customers are able to accelerate new product development programmes that enable them to bring new products to market faster."

With Australian composite manufacturers continuing to exploit niche markets on the global stage the attraction of using prepregs due to their ease of use and cleanliness is becoming ever more apparent. Well suited for production of parts in volumes of <5000 p.a., prepregs also help remove a lot of the hidden production costs in regard to handling, storing, mixing and disposal of resins from production facilities.

Sam Weller, Managing Director of GMS Composites - Australian made prepregs are increasingly a viable supply choice

GMS Composites
Continued

While GMS Composites' standard and bespoke manufactured prepreg products are researched and developed in house, Sam believes in partnering with established R&D organisations to create step-change. "It's a process of harnessing the best minds and equipment to ensure we are able to compete at a global level." The company's primary research partner is Deakin University but it also works with other institutions such as Swinburne University, Monash University, UNSW and CSIRO, among others.

GMS's EP540 prepreg was recently specified and consumed by a leading GT racing team in Japan. The team required a flame retardant product that was certified to UL94 V0 which the GMS EP540 had already obtained. After initial trials and testing the product was subsequently used in various parts throughout the vehicle. "It was certainly very satisfying to be part of that GT program in a country which has traditionally been a global leader in advanced composites" added Sam.

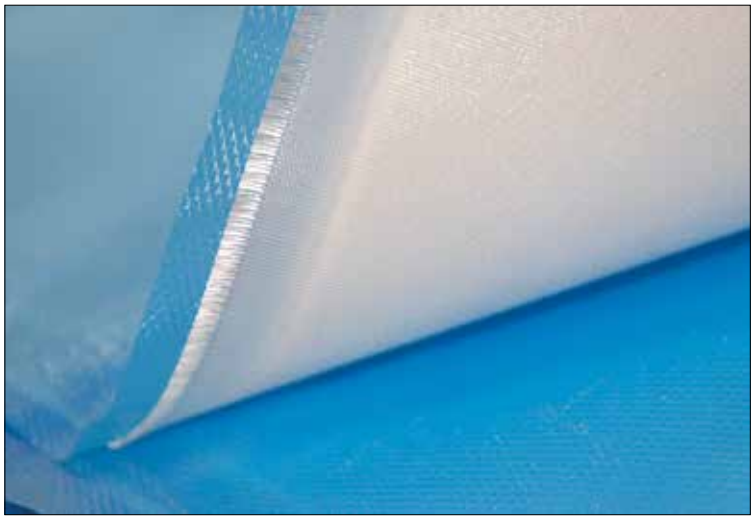
GMS's range of resins systems meet various Australian and International standards. The company has 15 standard prepreg resins systems for fabricating both high performance composite tooling and finished composite parts using vacuum production processing. The Glass Transition Temperature performance of standard resins ranges from 70°C up to 310°C.

Sam says that, "The traditional curing environment would be an autoclave which has both temperature and pressure controls. But we've developed a range of low-temperature cure prepregs with a choice of epoxy resin systems that can be cost effectively processed at low pressures out of autoclave (OoA) using lower cost tooling and less energy. In addition, we offer a range of resin films for those wanting to use a resin film infusion process."

Large automotive OEM's are driving the composite industry to reduce cycle times so as to meet the high volume production requirements associated with the industry. GMS has addressed this trend by recently developing a snap cure prepreg system with a cure cycle time down as low as three minutes. The system is designed for press cure processing where high pressure and heat can be rapidly applied to the part.

Both 'in' and 'out of autoclave' (OoA) prepregs and resin films are available, with a range of cure temperatures from 55 °C to 250 °C. All standard high performance prepreg resin systems and resin films can be combined with a wide range of woven and multi-axial technical fabrics and reinforcement fibres based on: glass fibre, carbon fibre and aramid fibre, as well as other specialty fibres and hybrid fabrics to suit application performance needs.

This one stop shop is also ISO 9001:2015 accredited and welcomes both low volume development projects and prototypes or high volume production orders.



Top: GMS Carbon Prepreg 4 x 4

Bottom: GMS Carbon Fibreglass prepreg

ACS Australia

Develop step-change assembly technology

For some time, Port Melbourne based Advanced Composite Structures Australia has endeavored to develop step-change composite joining and assembly technology that eliminates fastening and secondary bonding. Now patented, the Thermoset Composite Welding (TCW) process has proven to reduce composite component assembly costs as well as enable rapid assembly. TCW also results in a joint that has better environmental resistance than many adhesive joints, as the thermoplastic also has high performance in chemical and ultraviolet environments.

Aircraft rib demonstrator with welded stiffeners

The TCW Technology

To enable the welding process, a bespoke thermoplastic polymer layer is integrated onto the surface composite thermoset parts during the fabrication process. During the heating and curing process, the thermoplastic layer and the epoxy resin become mutually soluble and a controlled amount of diffusion takes place across the interface. The thermoplastic surface becomes well attached to the carbon-epoxy laminate. The interface between the thermoplastic layer and the epoxy becomes stronger than the epoxy resin itself. TCW-ready components engineered with thermoplastic surfaces can then be welded together under moderate heat and pressure, with welding times in the order of minutes.

The TCW process allows the use of innovative tooling and heating arrangements, and therefore provides greater flexibility in the design and scheduling of the assembly process. Welding can be done using a variety of heating and tooling systems, such as an oven or autoclave, or using direct weld-line heating methods often used for joining thermoplastic composites (such as resistance or induction heating). In many cases, the team at ACS Australia has found that the most efficient heating method for TCW appears to be simple local contact heating through one of the laminates to be joined, combined with local application of pressure.

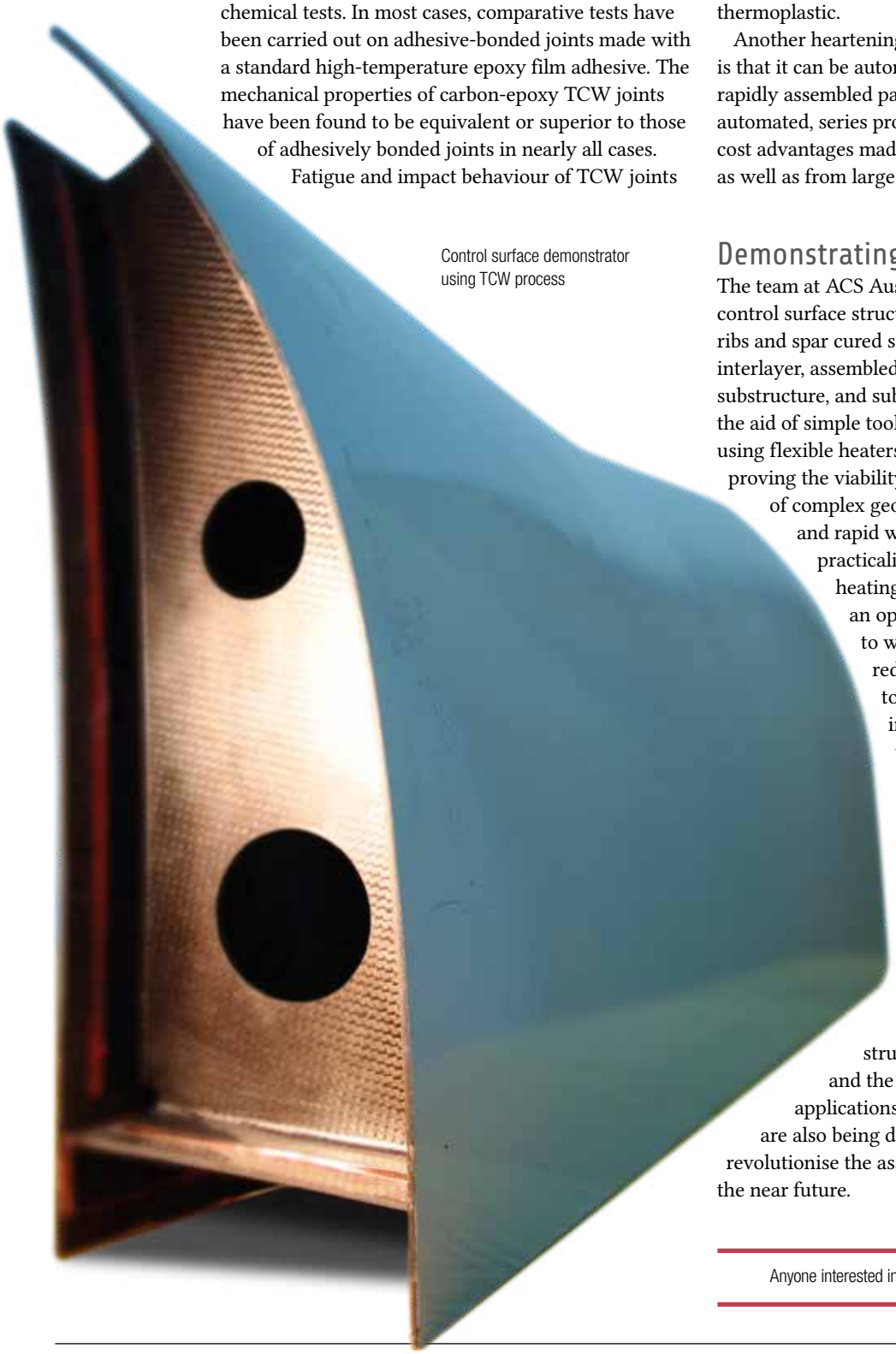
ACS Australia
Continued

The Benefits of Welding Composites

The performance of the TCW joint has been inspected and assessed using many types of mechanical and chemical tests. In most cases, comparative tests have been carried out on adhesive-bonded joints made with a standard high-temperature epoxy film adhesive. The mechanical properties of carbon-epoxy TCW joints have been found to be equivalent or superior to those of adhesively bonded joints in nearly all cases.

Fatigue and impact behaviour of TCW joints were better than adhesive joints, as the thermoplastic used for the weld material is a tough engineering thermoplastic.

Another heartening aspect of the TCW process is that it can be automated to produce high quality, rapidly assembled parts. Studies on TCW in automated, series production have revealed significant cost advantages made from savings in assembly costs as well as from large reductions in assembly time.



Control surface demonstrator using TCW process

Demonstrating the Technology

The team at ACS Australia has manufactured aircraft control surface structure prototypes with the skin, ribs and spar cured separately with thermoplastic interlayer, assembled into a self-supporting substructure, and subsequently welded together with the aid of simple tooling. The welding was conducted using flexible heaters with multiple heater zones, proving the viability of the process for assembly of complex geometry structures. The simple and rapid welding process confirmed the practicality of local through-thickness heating. With appropriate tooling and an optimised process, it was possible to weld many joints simultaneously, reducing the assembly cycle time to just over 20 minutes. Ultrasonic inspection of the welds verified the joints to be sound.

The Future of Composites Assembly

The TCW process has great potential for significant cost and time savings in assembly of composite structures in a large variety of applications, from aerospace and automotive structures to consumer goods and the oil & gas industry. Further applications and adaptations of the technique are also being developed at present, which could revolutionise the assembly of composite structures in the near future.

Anyone interested in the technology www.acs-aus.com

ATL Composites

Celebrating 40 years of innovation in composites

ATL Composites is celebrating 40 years of operations, supplying innovative composite products to the marine, automotive, industrial and construction industries in Australia and around the world.

Arnie Duckworth established the business in New Zealand in 1977. Paying tribute to Arnie and the efforts, expertise and ingenuity contributed by ATL staff over the decades, Director Nicholas Cossich said "Without question, 40 years would have been impossible without the dedication, hard work and skill of our past and present talented staff.

"Success to date would not have been achieved without the firm support of our valued clients, distributors, dealers, colleagues, engineers, designers and naval architects to whom we are grateful."

The origins of the company are decidedly in boat building, in the late 1970s when Mr Duckworth, an avid sailor, relocated to NZ after a period working for the legendary Gougeon Brothers Inc in the US.

The Gougeons had developed the WEST SYSTEM epoxy system, that was revolutionising timber boat construction, by stabilising the moisture content of the wood. Back in NZ, Mr Duckworth observed a market for epoxy products to supply to the expanding marine industry, manufacturing WEST SYSTEM epoxy products under licence to Gougeon Brothers for the Asia Pacific region.

In 1980, ATL Composites expanded its footprint, opening a facility in Australia, in Brookvale on Sydney's northern beaches, to service the professional boat-building market.

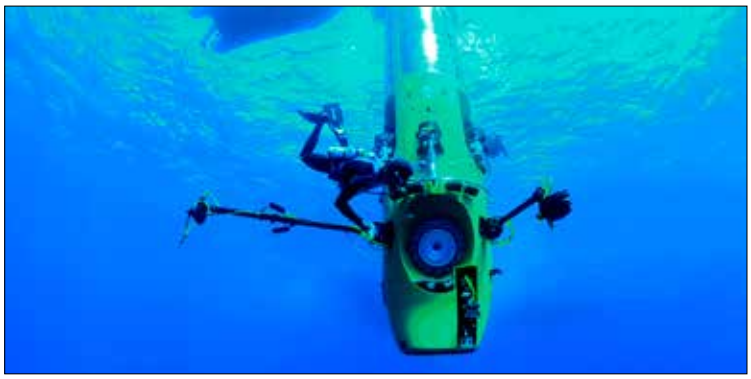
WEST SYSTEM was embraced by Australia's leading boat builders and designers including McConaghy Boats and Lock Crowther Designs. ATL's investment in R&D led to rapid evolution and an expanded product range.

In 1989, the Australian operation re-located to Queensland, doubling its turnover in the first 12 months.

The 1990s were characterised by a boom in the design and manufacture of multihulls in Australia. With its experience in epoxy resins and composite materials, reinforced by solid relationships with leading Australian multihull designers, and a personal interest in racing cats, ATL became a leading player in material supply for construction of both racing and cruising multihulls.

Titanic director James Cameron's Deepsea Challenger. ATL Composites customised the KINETIX® epoxy formulation for the craft that was designed and built to withstand 16,500 psi / 114 MPa of sea pressure at the maximum depth.

ACTL Composites
Continued



Surface image of the Deepsea Challenger

During this time, ATL's DuFLEX Composite Panels were developed and introduced into marine and industrial markets, immediately finding a niche and becoming the industry standard.

The TECHNIREZ® range of industrial epoxies was also developed and introduced to provide versatile and economic solutions for tooling applications with a full range of laminating and coating systems, filled casting resins, thixotropic gelcoats, surfacing compounds suitable for CNC machining, and laminating pastes.

In the late 1990s, ATL expanded distribution into Asia, with Oceanic Link in Singapore and Piercey Marine in Hong Kong, both of which continue their distribution to this day.

The decade of the 2000s was marked by an expanding market for multihull construction by both professional and amateur builders, whose designs were specified around the DuFLEX Building System. ATL used its knowledge and experience of composite materials to diversify into other markets including automotive, architectural and surfing/sporting equipment and transportation applications.

An outstanding achievement in 2012 was the development of a range of unique epoxy systems with extremely high compressive strength and toughness for the construction of James Cameron's Deep Sea Challenger, a 7.3-metre deep diving submersible that made a record breaking 11 kilometre descent to the bottom of the Mariana Trench.

ATL is certified to ISO9001 and has attained approvals under DnV-GL for delivering world-class product quality and performance. They are well supported by an extensive Distribution/Dealer network in every State and Territory of Australia and also throughout Asia in Thailand, Japan, Singapore, Vietnam, Malaysia, Indonesia, Philippines, Hong Kong, Papua New Guinea and Korea.

Since 2012, ATL has enjoyed a fruitful joint venture partnership with MuH von der Linden of Wesel, Germany forming vdL Composites GmbH to manufacture DuFLEX panels for the European market. After showing the DuFLEX and Featherlight range of panels at the 2019 Marine Equipment Trade Show in Amsterdam, vdL went on to appoint distributors in Italy, Turkey and France.

"The 40-year marker is an important milestone. We continue to leverage our solid foundation of expertise and technology in our key marine business into new growth markets including defence, automotive, architectural and civil," said Mr Cossich.

"Our long-standing international and domestic supplier relationships will continue to allow us to complement our own product ranges by offering world leading advanced composite materials to the Australasian market."

More at www.atlcomposites.com

The ATL Team with Lorraine Murray, Director (centre in white)

Proving slamming performance

Crucial to the design of high-performance structures within any industry is knowing how the materials will perform under various conditions. For boats, including high performance racing yachts and superyachts, materials are required to withstand rapidly changing hydrodynamic loads and the extreme physical phenomena of slamming.

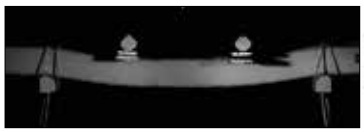
Gurit® Corecell™ M is a structural foam core material using a SAN polymer base (Styrene-co-acrylonitrile) that was developed over ten years ago for use in high impact marine applications. Compared to styrene polymers, SANs are said to have better chemical and solvent resistance, heat stability, mechanical properties and a higher heat-deflection temperature. The copolymers also have improved creep resistance and weatherability compared to polystyrene. Gurit® Corecell™ M was developed with SAN technology as a single solution for all marine applications to provide a combination of high shear strength with low density, high elongation, high temperature resistance and low resin uptake.

Gurit engineers recently collaborated with the academics at the University of Auckland Centre for Advanced Composite Materials and at Gurit's internationally accredited mechanical testing laboratory to re-prove the product. They undertook static and dynamic testing on SAN, PVC, and PET foam cores.

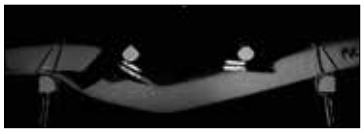
The 'Static' test used the ASTM C393 test method which determines flexural strength, core shear strength and facings compressive and tensile strengths in the direction the core would be placed in a structural construction. The 'Dynamic' test method was conducted on the University of Auckland's Imatek drop weight impact test machine that has a drop weight of 50–2000 mm. The test showed that dynamic energy absorption rather than shear elongation is the most suitable measure to determine a core material's ability to survive a slamming impact. The team proved that Corecell™ M Foam was able to absorb more than twice the dynamic energy - absorbed by the generic PVC foams of equal density - and more than ten times that absorbed by PET foam; conclusive evidence of withstanding marine impact loads.

Mark Richards, CEO at Grand Banks Yachts & Palm Beach, Motor Yachts Australia. "We have used Corecell™ in the manufacture of our luxury motor yachts for years. Corecell™ is chosen due to its superior performance and cosmetic benefits. We trust it."

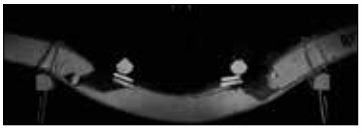
Contact Gurit: info-au@gurit.com www.gurit.com/corecell



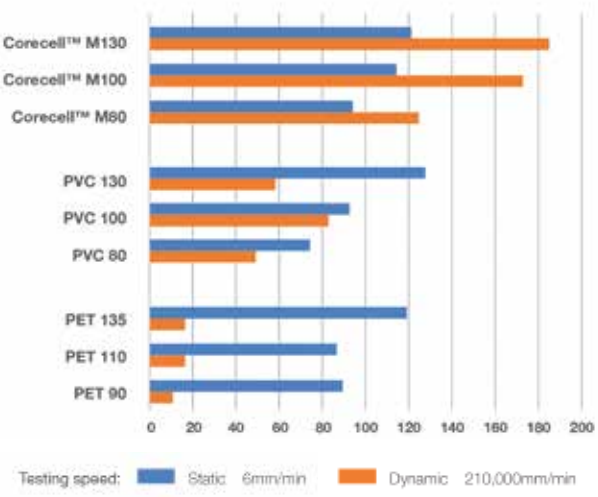
Corecell™M



Generic PVC



PET



Static: Low speed industry standard
Test Standard: ASTM C393
Test machine: Instron, Universal Testing Machine 3360
Velocity: 6mm/min (0.0001m/s)
Peak force: 50kN
Data acquisition: 10 samples/second

Dynamic: High speed advanced drop tower test
Test Standard: Custom
Test machine: Imatek Fully Instrumented Drop Weight Impact Tester IM10-20
Drop height: 50-2000mm
Drop mass: 8-44kg, 1.0kg increments
Velocity: 1.0-20m/s
Energy range: 2.5 - 2000j
Peak force: 60kN
Data acquisition: Up to 3,000,000/ second

Shifting sands, headwinds and COVID-19

Written by Kerryn Caulfield, Composites Australia Inc.

The sands were already shifting before COVID-19 hit the world. Disruption of complex supply chains for manufactured products that rely on globally sourced inputs and componentry can immobilise workforces as well as capital investment, and costs vast amounts of money.

The trade war between China and the US that began in 2018 was already disrupting and changing the flow of international trade in manufactured goods. The battle over technology, IP and tariffs between two of the world's great buying nations was a clarion call to global industries to broaden and diversify production bases into other parts of Asia and, indeed, hopefully within Australia's borders.

Another defining shift in alignment is a result of the tensions between Japan and South Korea, which played out at the 2019 JEC Asia exhibition in Seoul last November. A few months earlier, Japan had announced it was going to remove Seoul's favoured trade partner status and proceeded to impose export controls on its important electronics sector. Japan has played a key role in the growth of the composites market, particularly in the area of carbon fibre where it is the world's largest manufacturer controlling close to 70% of global demand. In this context, Japan's low profile at JEC was telling. To add to the tension, the South Korean government made a strategic announcement during the exhibition of an unprecedented investment in carbon fibre manufacturing and RDI designed to "reduce reliance on Japan." South Korea's commitment to its national advanced manufacturing sector was clear.

Consequently countries in South East Asia were attempting to capitalise on the opportunity presented by these conflicts and positioning to become 'trade war' manufacturing havens as well as securing their own manufacturing capabilities. Some said that China's loss was to be Vietnam's gain. Thailand was also priming for future growth in advanced manufacturing.

On the Beaufort Wind Force Scale, COVID-19 is at 12 for industrial manufacturing across the world. Supply chains have been disrupted further by the global virus-related lockdowns and there is acute uncertainty surrounding the reality awaiting the world on the other side of the crisis. In the meantime, shortages in medical equipment and simple personal protective equipment galvanised the Australian government into reassessing national self-reliance. It is hoped that once the panic eases, this fundamental policy shift will continue to serve our national interests.

The 'no brainer' response to such challenges is to ramp up the purchasing power of state and Federal Governments to support Australian manufacturing. The call to leverage government procurement by recycling tax dollars into taxpayer financed expenditure on locally-sourced products has been a feature of countless industry reviews and reports for many years. But post-COVID-19 there are positive signs that the sands will continue to shift towards national self-reliance and onshore manufacturing to support economic reconstruction.

Uncomplicated technologies in the global business landscape

Written by Louise Lane

Update: When I wrote this article at the beginning of 2020, I could not have imagined the world in which we live today. There is no doubt that COVID-19 has rapidly changed our daily lives, with shifts in the landscape happening rapidly and with such totality. At such a time I invite you to join the conversation with Composites Australia on LinkedIn, Facebook and Twitter. We would love to hear from you, to share your stories, the lessons learned, the good and the bad. Whatever the question, whatever the situation, whatever the case study or first-hand experience, Composites Australia is a forum for this industry; its past, present and future.

LinkedIn: @compositesaustralia
Facebook: @compositesaustralia
Twitter: @CompositesOz

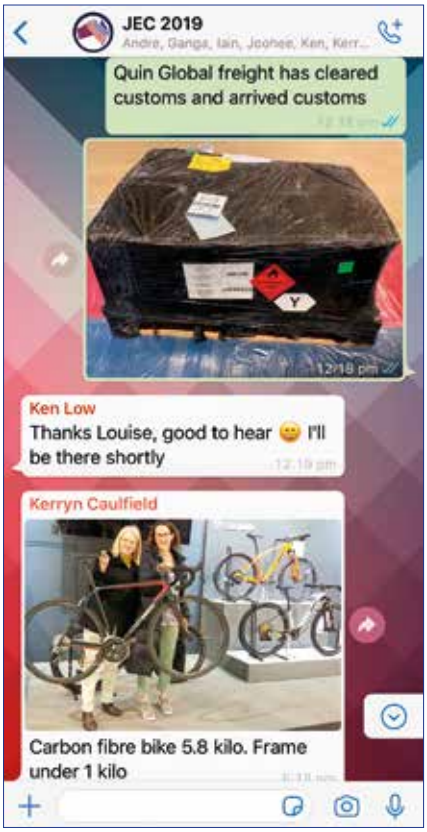
Citing the massively popular business messaging app Slack, which has 12m+ daily users, business communication has evolved beyond email. In our age of globally-distributed organisations, and large conference infrastructures, it is important to harness uncomplicated technologies that are simple to understand and use. When this is achieved not only are people well informed about critical information, but we can lay the foundations for a broad range of outcomes including improved communication, collaboration, engagement, innovation and delivery of strategic outcomes.

At JEC Asia 2019 - an event attended by 6,000+ visitors - we were able to quickly manage, engage and facilitate clear communication both with, and for, the Australian Pavilion delegates through the digital messaging service WhatsApp. Of paramount importance was the ability to have efficient, inclusive 24/7 access to a central point-of-contact for all enquiries, meeting updates and conference timings. Without an instant messaging service this would have been near impossible to achieve.

This modern approach to communications was selected based on the multiple devices in use, data needs, familiarity and security (including working with an active VPN and phone security tools). WhatsApp worked to create a successful space in which both individual and team participation could occur, and both work and social updates were shared, discussed and commented on.

> Digital networking applications have quickly deconstructed traditional forms of communication, and this is readily apparent in the global business landscape.

Messaging apps have quickly deconstructed traditional forms of communication (particularly in East Asia) and are now a central platform in the business landscape. Australian firms should familiarise themselves with the preferred and native platforms in each country. The latest figures suggest that 2 billion people in over 180 countries use WhatsApp. Whilst these are impressive figures, the standard recommendation of using platforms that adhere to the privacy and security requirements of your business should always be taken into consideration. We all communicate on a daily basis, but how we do it, who we do it with and in what platform/medium we use can have huge ramifications for how the message is received.



WhatsApp between delegates of the Composites Australia Trade Mission to JEC Asia 2019

FAST FACTS

Across the globe, 4.5 billion people use the internet and there are 3.8 billion social media users.

As of January 2020, there were 49.21 million internet users and 44.73 million social media users in South Korea.

WhatsApp has over 2 billion users in 180 countries.

Globally, WhatsApp is the highest ranked app by global monthly active users, however in South Korea that title belongs to KakaoTalk.

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