the official magazine of Composites Australia

Connection Magazine

Issue 68 • September 2025

Inside

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Wagner Composites Fibre Boardwalk, Dalby Queensland

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Contents

Issue 68 • September 2025

Feature Article

CST Composites has engineered, built and automated sovereign capability in one of the most exacting areas of advanced composites: carbon fibre towpreg. **Page 8**

Front Cover

This issue:
DSA team inspects fibre-reinforced polymer (FRP) infrastructure for service condition monitoring, with safety harness and confined space protocols. **Page 6**

Wagners CFT Engineered high-speed automation producing composite crossarms every 69 seconds — adaptable to 200+ designs. **10**

Composites Australia

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President's Letter

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Lynden Vikingur, **President**

It is a pleasure to introduce this edition of Connection, which highlights the engineers and engineering achievements shaping Australia's composites industry. The opening article, Composite Engineers: Australia's competitive edge, sets the scene. It recognises that composite engineers bring expertise not only in materials science but also in design, analysis, manufacturing, testing, and application — translating materials into real-world performance across aerospace, defence, energy, infrastructure, marine, transport, water and wastewater.

The articles that follow show the breadth of that contribution. ATL Composites highlights engineers behind case studies where design standards, classification codes and resin chemistry intersect. At CST Composites, engineers have gone further than securing sovereign carbon-fibre towpreg capability: they designed, built and refined the specialised machinery needed to precision-process carbon fibre, delivering the process control and repeatability required for automated manufacturing.

The team at Dennis Southam & Associates bring decades of experience in engineering analysis, design and specification, ensuring composite infrastructure performs reliably in demanding environments such as mining, water, wastewater and energy. The engineering ethos at Wagners Composite Fibre Technologies underpins the design and automated manufacture of composite products that are replacing legacy materials including steel, aluminium and timber.

Global collaboration and capability are consistent themes across this edition. Gurit shows how international expertise is applied locally, with Australian engineers contributing to projects that demand high-end design and manufacturing. DIAB delivers complete sandwich solutions — from Divinycell cores and CNC-kitted parts to panel systems and adhesives — supported by an experienced engineering team that strengthens laminate design, processing and compliance.

Carbon Revolution shows how Australian composite engineering translates directly to performance in global automotive platforms, where weight reduction and stiffness deliver measurable dynamic gains. RPC Technologies illustrates multi-sector engineering capability — from large-scale water and wastewater infrastructure to defence and transport — underpinned by disciplined design, manufacturing and project delivery.

The edition closes with Advanced Composite Structures Australia. Its evolution from CRC research to a commercial enterprise supporting aerospace, defence and industrial clients demonstrates the long-term value of linking research with industry needs. The profile on Murray Scott, Chair of ACS-A, illustrates that Australian engineering leadership is recognised globally, and that individual careers can strengthen both national capability and international standing.

Of course, the engineers and companies featured here represent only part of the story. Across Australia, many others work without fanfare, applying mathematics and science to design, build and improve structures, machines, materials, systems and processes.

Engineering in composites is not abstract — it is the day-to-day design, analysis, and production that keeps projects moving, assets performing, and industries competitive. This edition is a reminder that the profession's value is measured in outcomes that endure.

Warm regards,
Lynden Vikingur,
President, Composites Australia

Composites Australia

VIEWPOINT

Composite Engineers: **Australia's competitive edge**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

The Australian composites engineering profession is skilled, talented and deeply capable, touching almost every aspect and discipline of composites manufacturing across the country. Composite engineers drive technological advancement and foster productivity - they are the essential link between ideas and implementation. Every major export of Australian-made composite products—from components for Boeing Aerospace Australia to commercial, racing and pleasure marine craft, carbon fibre wheels, infrastructure components and energy transmission assets—has been engineered by Australian expertise.

Composite engineers contribute directly to sustainability by applying materials that influence positive environmental outcomes. Through engineered solutions that are lighter, stronger and resistant to corrosion, they extend the service life of assets and reduce the frequency of resource-intensive maintenance. In transport, the lightweighting of aircraft, vehicles and marine vessels delivers significant fuel savings and lowers emissions. In sensitive environments—such as wetlands, coastal zones, and waterways—engineers design composite structures that require less intrusive foundations, can be prefabricated off-site and installed with minimal disruption. These choices ensure infrastructure performance while safeguarding Australia's unique environment.

Looking ahead, composite engineers are also enabling Australia's ambitions in hypersonic flight and rocket launch systems, where lightweight, high-strength structures are critical to withstand extreme forces and temperatures.

Becoming a Composite Engineer usually begins with a bachelor's degree from one of Australia's 35 universities that offer engineering programs. However, careers are built through practice, including internships, graduate research, and, increasingly, postgraduate study in composite specialisations. Government policy supports pathways that connect vocational training with higher education. Currently, students may advance to Certificate IV and then to higher-level qualifications such as the Advanced Diploma of Engineering (MEM60122). RMIT, for example, offers an articulation agreement that recognises the Advanced Diploma for entry into the Bachelor of Engineering (Aerospace Engineering) (Honours), granting credit equal to 1.5 years and reducing the degree to 2.5 years.

According to the report 'Engineering Tomorrow', released in April by Engineers Australia, the gender balance of the engineering profession is improving. Women made up 16 per cent of the engineering-qualified population in 2022, up from 13.6 per cent in 2016. While progress is steady rather than swift, the profession is on a path toward greater balance.

Australia's engineering capability is a national asset. Composite engineers, in particular, represent a profession that links advanced materials with real-world performance, enabling lighter, stronger and more sustainable structures. Their expertise underpins exports, supports sovereign capability and opens new frontiers.

The Shipwreck Coast walking tunnel, engineered with DIAB composite sandwich panels to deliver lightweight strength and durability in a coastal environment.

dsapl.com.au

DSA: Engineering for Long-Term Performance in Composite Infrastructure

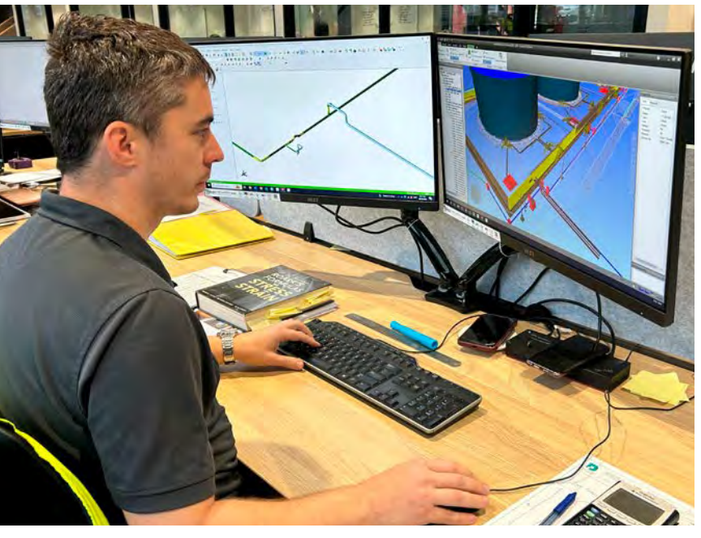
Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

Few names in Australia's composites sector carry the enduring weight of Dennis Southam — one of the country's early practitioners of composite engineering. After a formative career with Ceilcote and later Transfield, known for landmark projects such as the Sydney Harbour Tunnel and Gateway Bridge, Southam established his own firm in 1991 to service the composites industry in Australia and overseas. Now operating as Dennis Southam & Associates (DSA), the company provides specialist engineering services in design, inspection, asset management and quality assurance of composite systems across the defence, water, wastewater, energy and mining sectors.

A long-standing authority in corrosion protection, Southam has specialised in fibreglass-reinforced plastics (FRP, GRP, GRE) for chemically aggressive environments. His expertise has helped shape the application and regulation of composite materials internationally and his influence remains evident in the work of composite consultants across Australia.

Today, DSA operates as part of the vertically integrated Novafast Holdings Group, which—together with Novafast and Basetec Services—specialises in turnkey composite engineering projects. The firm continues to provide consulting, design, failure analysis and inspection services across the mining, wastewater, water, energy and oil and gas sectors.

Tom Murphy, DSA Design Engineering Manager



DSA's engineering team is led by Tom Murphy (MIEAust, CPEng, NER, RPEQ), whose background in aerospace and mechanical engineering brings strong analytical rigour to the assessment of composite structures. His project experience spans sectors including mining, oil and gas, defence, water and infrastructure, with clients such as BHP, Worley, Bechtel, Fluor, BAE, Newmont and Sydney Water. Under his leadership, DSA has been engaged to engineer or assess composite systems exposed to high pressures, chemical environments, thermal extremes and long-term structural loading.

A recent project involved the forensic investigation of FRP equipment damaged during a major industrial fire overseas. DSA was engaged to determine whether the equipment could be repaired to meet its original service requirements—offering a faster, lower-cost alternative to full replacement, which would have cost the client millions in lost production. "It was clear the failure was specification and process-related, caused by several factors aligning at once," notes Tom Murphy. "Our role was to assess the residual strength and propose a safe path to reinstatement through inspection and material characterisation."

DSA undertook a rigorous testing regime in its Adelaide laboratory. Combined with analytical design assessment, the data enabled DSA to develop a repair program that restored functionality within original design parameters—avoiding premature scrapping and allowing plant operations to resume months earlier than a full replacement strategy would have allowed.

Another investigation involved a composite bore casing that failed during installation several hundred metres underground. With only the upper section available for inspection, the team reconstructed the failure timeline using installation logs and physical

Left. Dennis Southam established Dennis Southam & Associates (independent consultancy within the Novafast Holdings Group) shaping engineering standards in composites

Above. DSA field engineering team preparing access to a composite tank for internal assessment

evidence. Working with incomplete data presented challenges: the team had to hypothesise all plausible failure modes and methodically rule them out through testing, design analysis and interviews with personnel on site. The analysis concluded that the original design had not adequately accounted for frictional forces in the bore's annular space. Once those forces were overcome, a sudden load transfer to the casing wall caused localised overstrain and structural rupture from shock loading.

Alongside project work, DSA contributes to the development of national and international standards for composite materials, including ISO 14692, ASME RTP-1 and NM-2, BS EN 13121 and AS 3571. These standards underpin the design and maintenance of equipment used in chemically aggressive environments. "Standards aren't just documentation — they're the reason many assets can operate safely for decades," says Murphy. "Contributing to that work is a professional responsibility." Murphy sits on Standards Australia's PL-044 committee for Reinforced Plastics Pipe Systems, Tanks and Vessels, which is currently seeking to revise AS2634 (1983)—a long-serving but now outdated standard at risk of withdrawal.

Beyond formal standards submissions, DSA supports adoption through training, inspection protocols and lifecycle planning aligned with international regulatory frameworks. Its work is grounded in field experience and backed by in-house laboratory testing, including hydrostatic pressure, tensile and flexural strength, IMO jet fire exposure and laminate cure analysis via DSC. As material testing becomes increasingly central to new standards, these capabilities are integral to modern composites work. DSA also provides factory surveillance, specification development, pipe stress analysis, drafting services and condition assessments for ageing FRP equipment.

While part of the vertically integrated Novafast Holdings group, DSA operates as an independent consultancy—allowing it to provide design reviews, failure investigations and asset audits without conflict of interest. Its integration of design, fabrication, surveillance, inspection and materials testing ensures full traceability from concept to commissioning, particularly in projects requiring strict technical and quality compliance.

DSA's approach continues the principles established by Southam early in his career: that composite engineering must prioritise long-term performance, especially where failure poses operational, safety or environmental risks.

DSA WITHIN THE NOVAFAST HOLDINGS GROUP

DSA operates as an independent engineering consultancy within the Novafast Holdings Group — a vertically integrated Australian-owned group specialising in industrial composites.

NOVAFAST: Novafast manufactures composite pipes, fittings and pressure-retaining systems for clients in the oil and gas, water infrastructure, defence and energy sectors. Operating from an automated production facility, Novafast fabricates to international standards, including:

ISO 14692 – GRP	Piping for petroleum and natural gas industries
ASME RTP-1	Reinforced thermoset plastic equipment
BS EN 13121	GRP tanks and vessels
AS 3571 – GRP	Systems for chemical and water applications

BASETEC SERVICES: Basetec delivers construction, installation and project management services for composite infrastructure. The company specialises in GRE/GRVE/GRP systems, tanks and chemical processing equipment, with project delivery across civil, energy, resources, wastewater, water and defence sectors.

While aligned with group operations, DSA retains the independence to undertake external consulting work, including failure investigations, design audits and compliance assessments.

cstcomposites.com

CST Composites: **Sovereign Capability in Towpreg Engineering**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

In an industry where tolerances are measured in fractions and repeatability defines reliability, CST Composites has built sovereign capability in one of the most exacting areas of advanced composites: carbon fibre towpreg. CST has delivered what General Manager Chris Dixon calls "a step-change in composites engineering" — pioneering Australia's first sovereign carbon fibre towpreg line.

Top left. Precision placement of carbon fibre towpreg — accuracy at this stage underpins reliability in filament winding and automated fibre placement.

Top right. CST's new-generation performance masts are engineered with sovereign carbon fibre towpreg.

Towpreg—continuous carbon fibre tows pre-impregnated with resin—serves as a high-precision feedstock for automated composite manufacturing. Unlike prepreg fabrics, which are supplied as woven sheets, towpreg is an impregnated tow in a semi-cured 'B-staged' state that can be placed, wound or braided at speed. Control of resin content, fibre distribution and consistency is fundamental. Accuracy at this stage determines reliability in filament winding and automated fibre placement used in aerospace, hydrogen storage, defence and high-performance marine structures.

The primary technical challenge is not simply wetting fibres with resin but achieving uniform impregnation across thousands of filaments at line speed. Resin viscosity, bath temperature, tow tension and roller pressure all must be tightly controlled. Any deviation risks voids, uneven resin content or compromised fibre alignment.

Consistency in resin content and fibre bandwidth is equally critical. CST's closed-loop feedback and control system, integrated into the resin impregnation line and proprietary software, monitors these parameters in real time to ensure a lower co-efficient of variation than traditional sampling methods. The result is verifiable uniformity throughout the production run, giving designers confidence in tighter tolerances and leaner structures.

Imported material typically maintains a resin tolerance of ±3%. CST's proprietary line has more than halved this variability, consistently achieving ±1%. "Each line is an engineered precision instrument," says Dixon. "We design them to run with the accuracy of a laboratory system but at industrial scale. That's what ensures every metre of towpreg meets the standard required for high-performance winding."

CST's bandwidth tolerances approach those achieved with slit tow — a far more expensive product. With a 12K tow, the company achieves a standard deviation of ≤0.1 mm, and with a 24K tow, ≤0.2 mm. This level of accuracy directly translates to fewer defects in automated manufacturing, reduced downtime and scrap, and greater structural reliability in demanding applications such as pressure vessels. It is also essential for use in highly automated processes such as Automated Fibre Placement (AFP), paving the way for aerospace, hydrogen storage and defence.

CST's move into towpreg production was as much necessity as ambition. During COVID-19, imported feedstock faced 16+ week lead times., unpredictable delivery, high refrigerated freight costs and limited shelf life. "We found ourselves in a position where we couldn't guarantee supply of a material that is fundamental to our business," Dixon recalls. "So we decided to engineer our own solution."

By impregnating resin only when required, CST has built a just-in-time system that removes the cost and risk of importing shelf-life-limited material. The company is very vertically integrated — from raw tow through to tooling, finished tubes, spars and pressure vessels — ensuring supply continuity and control.

The company currently operates two Towpreg production lines, with two more under construction and a further expansion planned to bring the total to six by late 2025. This scaling delivers redundancy and throughput, while allowing resin chemistries and tow widths to be tailored for different industries. "Having our own line means we can control the interaction between fibre and resin at the most fundamental level," Dixon explains. "We are not just buying feedstock; we are engineering the feedstock to optimise the downstream process with each line a precision instrument."

Towpreg production is one part of a broader precision environment at CST. The company designs and builds its own filament winding machinery, enabling fibre angles from 0° to 90° and variable wall thickness in tapered tubes. Finite Element Analysis (FEA) predicts stiffness, weight and thickness within 2–3% accuracy before manufacture, with results validated against in-house testing.

To support this, CST invests in centreless grinding and metrology technologies capable of finishing tubes within ±30 microns — and in some cases as tight as ±5 microns. Laser-based sensors verify tolerances. This combination of material control, process control and measurement creates a closed-loop system rarely matched in global markets.

"Automated composite manufacturing depends on towpreg," Dixon says. "Without it, you are dependent on imports, with all the cost and uncertainty that implies. With it, you can scale production, improve quality and compete globally."

CST Composites' towpreg initiative represents the convergence of material science, machine design and process control. Strategically, it is a foundation for sovereign resilience in advanced composites manufacturing.

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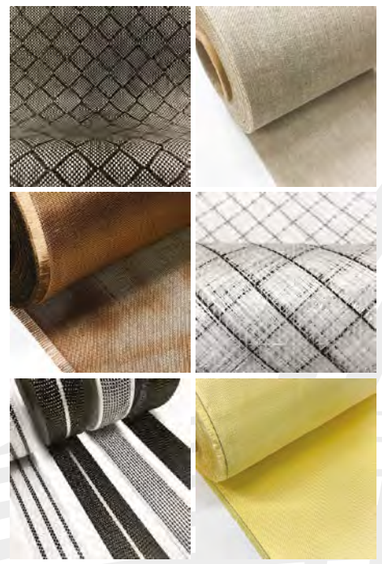


wagnerscft.com.au

Wagners Composite Fibre Technologies: **Engineering for Resilient Infrastructure**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

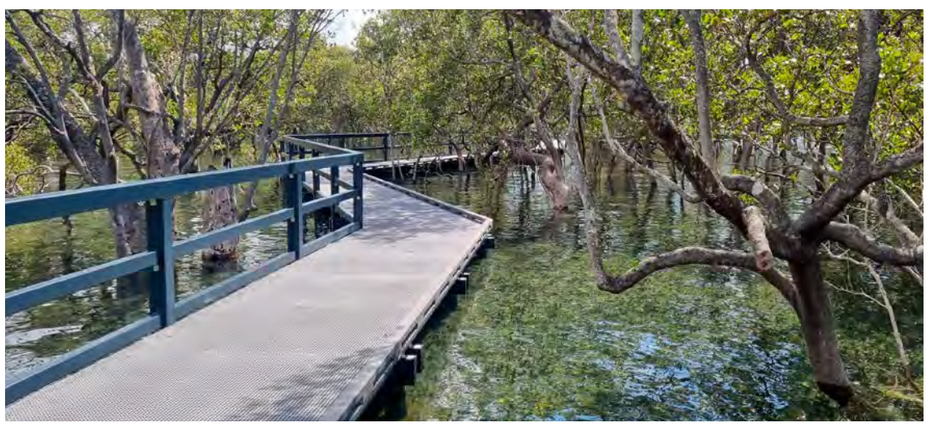
In the world of civil and marine infrastructure — from bridges, utility poles and pedestrian structures in inland bushland to wharves, piers and coastal defences — assets are exposed to environmental extremes and significant loads. In marine settings, structures embedded in the seabed or exposed to seawater face accelerated degradation, while inland installations must contend with bushfires, termites and aggressive soils. High UV exposure is a shared challenge for both inland and marine applications, demanding materials engineered for durability, safety, load capacity and long-term performance.

Wagners Composite Fibre Technologies (CFT) was founded on the manufacture of crossarms for utility poles. In 2003, engineers Kevin Skerman and Greg Valler led the development of Wagners' proprietary pultrusion process and machinery to produce these crossarms — a product line that became the backbone of the CFT business. Skerman's precision-engineered "insert" for bolted connections in civil engineering infrastructure transformed the use of composites, with around 750,000 inserts now produced annually for use in more than 110,000 crossarms each year. Today, over 1.4 million Wagners crossarms are installed across the Australian electricity distribution network.

Continued investment in precision engineering, people and proprietary manufacturing technology has grown the Toowoomba facility from a three-man start-up into a thriving production hub housing numerous advanced composite production lines, including automation for electrical crossarm manufacture at a rate of one every 69 seconds across more than 200 designs. In-house R&D, materials testing and fire-rating capability enable rapid prototyping and compliance verification, with products achieving BAL-40 bushfire ratings and performance properties engineered through resin chemistry and fibre architecture.

Michael Kemp, Chief Technical Officer, leads the company's drive to engineer new products from composite technology that replace legacy materials such as steel, aluminium and timber. Working with his team of engineers, he advances the design and manufacture of FRP infrastructure systems that provide whole-of-life value, outperforming legacy materials in corrosive, high-load or high-UV environments.

Wagners CFT's proprietary technology and product portfolio are now being applied beyond Australia, with manufacturing operations established in the United States to service North American infrastructure markets. This expansion enables the company to supply FRP structural solutions to regions facing similar environmental and durability challenges, while supporting local economic development and strengthening global supply resilience.



Composite boardwalk at Huskisson in Jervis Bay Marine Park, NSW — engineered for durability in tidal mangrove environments.

Above. Wagner CFT FRP utility poles ready for delivery — built to last with an 80-year design life, BAL-40 fire rating, UV-resistant coating, and engineered precision.

Left. Engineered high-speed automation producing composite crossarms every 69 seconds — adaptable to 200+ designs.

Wagners CFT is one of the few composite manufacturers globally to hold an independently verified Environmental Product Declaration (EPD) for pultruded FRP products — the first in Australia and only the second worldwide. The EPD provides transparent, third-party verified data on the environmental impacts of their products over their full life cycle, enabling asset owners to quantify and reduce embodied carbon in line with 2030 climate targets.

Their FRP products are an alternative to traditional materials with higher carbon footprints, while their Earth Friendly Concrete® — a cement-free geopolymer concrete — further reduces emissions in infrastructure projects. Wagners operates under ISO 14001 environmental management, ISO 9001 quality and ISO 45001 occupational health and safety certifications, reinforcing a company-wide commitment to sustainability and workplace standards.

Extensive environmental testing confirms that Wagners' fibre composites can deliver service lives exceeding 100 years, minimising replacement needs and reducing waste over time. This combination of verified data, long-life performance and low-carbon design positions Wagners CFT as a rare example of transparent, sustainability-led manufacturing in the global composites industry.

For Kemp, the future lies in scaling production and expanding the catalogue of FRP solutions while continuing to mentor and grow his engineering team. "Our products are precision engineered to meet or exceed required load capacities and comply with domestic and international standards, giving asset owners confidence in long-term structural performance. We're seeing accelerating adoption as networks seek to lower risk and increase resilience," he says.

From regional Queensland to global markets, Wagners CFT is demonstrating that engineering leadership, backed by a capable technical team and a clear vision for material performance, can transform the way infrastructure is designed, built and sustained.

KEY WAGNERS CFT PRODUCTS

Trident Marine Pile Pultruded FRP pile system engineered to resist biofouling, hydrodynamic forcesand UV degradation.
FRP Utility Poles80-year design life, BAL-40 fire rating, UV-resistant coating, consistent parallel cross-section.
FRP Crossarms Installed in more than 1.4 million positions across the Australian electricity grid, with precision-engineered inserts.
Electrical Infrastructure Components Live-line lifting beams, hurdle frames, substation infrastructure, arm braces, stay insulators, riser arms, isolation platforms.
Composite Bridge Components FRP beams, decks and U-girders for pedestrian, road and marine bridges, including hybrid systems with geopolymer concrete.
FRP Fender and Light Poles Corrosion-resistant components for marine, coastal and public infrastructure.

diabengineering.com.au

DIAB: **Engineering Lighter, Stronger, Smarter Structures**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

Founded in 1950 in Helsingborg, Sweden, DIAB has been a pioneer in composite core materials for more than six decades. Today, the company serves customers in over 30 countries through its global manufacturing network and its Composites Consulting Group (CCG) technical teams.

While the Divinycell range is widely used in marine, wind energy, aerospace, transport, civil and industrial markets, DIAB's strength lies as much in engineering expertise as in material supply. Over 30 engineers and technicians collaborate across continents, with the Australian team frequently called on for international assignments. This validates their capability while also providing Australian projects with direct input from colleagues in Europe, the United States and Asia.

DIAB engineers approach projects from first principles: structural analysis, material selection, laminate schedules, joining strategies and process optimisation. This work has supported applications as varied as retractable components for autonomous vessels, aerospace structures and competitive racing yachts.

In yacht racing, DIAB has provided long-term engineering support to the Wild Oats programme, contributing to upgrades on both the 100-foot Wild Oats XI and the 66-foot Wild Oats X. To improve trim and performance on XI, the rig, keel and rudder were shifted aft. This required removing an 11.2-metre section from the bow and a 2-metre section from the stern, followed by the addition of a new 13.2-metre bow.

Eco 44 racing yacht designed by Matteo Polli and built in Estonia. Composite and keel fin engineering by CCG's Warren Miller and Brenden Egan.

THE AUSTRALIAN ENGINEERING GROUP IS LED BY:

VALERIO CORNIANI Vice President, Asia Pacific & Managing Director, ANZ, with global experience in marine aerospace and renewable energy.

BRENDEN EGAN Senior Naval Architect, specialising in composite engineering across high performance vessels and infrastructure.

WARREN "SKIP" MILLER Senior Design Engineer (BSME, Florida, USA), marine and architectural composite specialist.

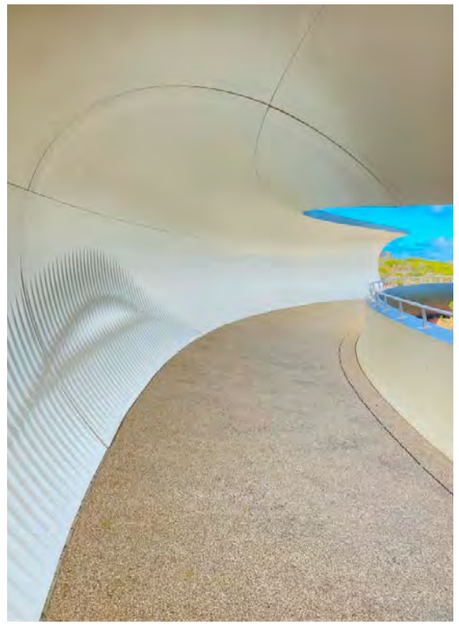
Installation of the prefabricated DIAB composite tunnel on Victoria's Shipwreck Coast. Off-site fabrication and lightweight panels enabled efficient transport, assembly, and resilience against high winds.

Fabricated by McConaghy Boats in Gosford, the new bow included redesigned internal structures and fittings—developed and executed with close collaboration between engineers, naval architects, and McConaghy's in-house team. The build demanded extensive analysis and laminate design to ensure structural integrity and optimal performance. As Skip Miller notes:

DIAB's expertise extends beyond the water. For the Shipwreck Coast walking tunnel in Victoria, working in collaboration with engineers from Arup (site engineering) and Shapeshift (construction), Brenden Egan designed a composite pedestrian structure for a geologically sensitive site exposed to high winds. Off-site fabrication enabled lightweight components to be transported and assembled efficiently, with finite element analysis ensuring the structure met stringent strength and deflection criteria.

Sustainability is embedded in DIAB's engineering philosophy. Recycled raw materials are incorporated into production and end-of-life recovery strategies are developed with customers. A notable example is the Eco 44 racing yacht, designed by Matteo Poli and built in Estonia. CCG engineers Warren Miller and Brenden Egan contributed to composite and keel fin engineering for ballast and stability and hydrodynamic efficiency. The yacht itself showcases next-generation recyclability. Constructed using Arkema's Elium thermoplastic resin and DIAB PET cores, the laminates can be recovered by melting the resin matrix—enabling full material recyclability. The Eco 44 placed third at the Garmin ORC World Championships in Tallinn August 15, 2025.

The Divinycell family delivers high compressive and shear strength, fatigue resistance, low resin uptake and consistent quality. Compatibility with polyester, vinyl ester and epoxy systems, together with suitability for hand lay-up, infusion and resin transfer moulding, gives designers significant flexibility. Pre-cut kits streamline production, reduce waste and ensure repeatability, while finishing services enable complex curvatures and geometries.



> *With new models continually introduced and production increasing to keep pace with demand, our staff numbers and contractors have grown yearly. As a result, training remains an ongoing commitment—not just for the essential skills it brings to the company, but for the profound effect an apprenticeship qualification can have on a young person's life.*
> **Warren "Skip" Miller – Senior Design Engineer**

Selecting the right core material defines structural performance, but achieving targets requires a holistic approach. DIAB integrates materials, processes and engineering design to ensure reliable outcomes in demanding environments. Whether it is a composite bridge deck, a patrol vessel or a racing yacht, DIAB applies engineering intelligence to the challenge of making products lighter, stronger and smarter.

Left. Interior of the Shipwreck Coast walking tunnel, engineered with DIAB composite sandwich panels to deliver lightweight strength and durability in a coastal environment.

rpctechnologies.com

RPC Technologies: **A Culture in Engineering**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

"What defines RPC is its engineering culture," says Managing Director Tony Caristo. "We operate across multiple boundaries/entities and countries as One RPC, a strategic initiative designed to integrate our engineering, manufacturing and operations, standardise our processes, and enhance collaboration across our group to tackle complex engineering challenges in water, wastewater, defence, transport, asset services and infrastructure sectors. By consolidating our expertise, technologies, and capabilities into a single cohesive framework we provide more efficient, consistent, and innovative solutions to meet the evolving needs of our customers."

For more than 50 years, RPC Technologies has built its reputation on this culture. The company brings together multidisciplinary teams of engineers, material scientists and specialists across its facilities in Australia (Newcastle, Geelong), Indonesia and India, applying composites expertise in glass reinforced plastic (GRP), glass reinforced epoxy (GRE) and carbon fibre reinforced polymer (CFRP) to projects in defence, transport, mining, and civil infrastructure.

DEFENCE CAPABILITY

Among RPC's long-standing defence programs are the acoustic windows for the Collins Class submarines and the sonar domes for both Collins submarines and ANZAC frigates. These precision-engineered composite laminates house and protect sensitive sonar equipment while allowing acoustic energy to pass through with minimal distortion — a property known as acoustic transparency. The structures deliver the strength and durability required for decades of naval service, while reducing weight and extending service life compared with metallic alternatives.

Virginie Murphy. Engineering Manager

With the Collins Class fleet now scheduled to remain in service into the 2040s, RPC will continue to support the fleet including re-engineering, repair and replacement of acoustic windows and ANZAC sonar domes. The program involved extensive R&D into new materials, construction techniques and validation processes to meet evolving naval requirements, underscoring the role of engineered composites in acoustic signature control — a defining factor in the survivability and operational effectiveness of Australia's maritime force. Sea capability also includes sustainment and specialty composite parts for LHD, yardarms, flag bins and handrails.

RPC also contributes to Land platforms including the Bushmaster and Hawkei vehicles, manufacturing ballistic protection systems, dashboards and lightweight assemblies where composites reduce mass without compromising safety or durability.

TRANSPORT AND FIRE SAFETY

RPC manufactures interior and exterior systems for Australia's major passenger rail fleets, including Waratah, OSCAR, Millennium, X'trapolis 1, VLocity, Sydney Metro, Melbourne's E-Class trams and currently the Perth MetroNet, NGT and Xtrapolis 2. Products range from seating, toilet modules and wall panels to driver cabs, train fronts and ballistic-rated cab masks. Each design is validated against stringent fire and impact standards ensuring reliability and safety in operation.

Composites Australia

Cooling tower installation with FRP piping and supports engineered, manufactured and supplied by RPC Technologies, delivering durability and reliability for industrial operations.

The company's expertise in fire performance standards — from BS6853 to the current EN45545 framework — has positioned it as a trusted supplier of fire-rated composites for rolling stock. By combining materials science, mechanical engineering and compliance know-how, RPC has expanded the use of lightweight composites in public transport while maintaining passenger comfort and safety as a priority.

ENGINEERING LEADERSHIP

VIRGINIE MURPHY. ENGINEERING MANAGER

Based at RPC's Broadmeadow facility, Virginie Murphy leads programs across rolling stock, mining and defence. Her qualifications span a Materials Engineering degree from Polytech' Montpellier, a Master in Advanced Materials Science from Cranfield University, and a Master of Engineering Management from the University of Newcastle.

The team manufactures composite components for passenger rolling stock, from interiors to safety-critical structures such as cab fronts. Murphy is also instrumental in continuing innovating of carbon fibre mine vent ducting and corrosion-resistant Permaglass pump columns for deep-well water extraction. Her role in finite element analyses of electrical enclosures for Ampcontrol illustrates how RPC applies advanced simulation to enhance structural integrity in demanding environments.

Murphy has also guided Defence programs through materials obsolescence, verification and tooling development. Her contributions have been recognised with the Hunter Manufacturing Awards' Rising Star Award and the title of 2024 Engineer of the Year.

SIMON KARPELES. HEAD OF ENGINEERING

Since joining RPC in 1990, Simon Karpeles has led multidisciplinary teams delivering major infrastructure and defence projects. Trained as a civil engineer with a background in materials science, he combines laboratory analysis with applied engineering across mining, chemical processing, power generation, marine, wastewater and defence.

His teams specialise in advanced composites fabrication methods — including filament winding, resin transfer moulding and vacuum consolidation — using glass, carbon and aramid reinforcements. Under his direction, RPC has delivered Australia's largest GRP vessels and stacks, turnkey cooling water systems for power plants across the Asia-Pacific, major odour control facilities, and landmark civil works such as GRP risers for desalination plants and deep maintenance shaft structural liners for New Zealand's Central Interceptor project. His leadership in applying Australian, US, British and international standards has ensured these assets meet the highest benchmarks for strength, durability and corrosion resistance.

Karpeles holds a Bachelor of Civil Engineering (Hons), is a Registered Professional Engineer of Queensland (RPEQ), and a member of Engineers Australia. He was named 2025 Engineer of the Year in recognition of his leadership in advancing composite infrastructure and defence capability.

Virginie Murphy and Simon Karpeles represent RPC's engineering depth, but their achievements are part of a collective effort. They work alongside other senior specialists such as Technical Services Manager Leigh Spencer, who has overseen materials R&D, laboratory development and mentoring of engineering staff for more than two decades. Around 30 per cent of RPC's workforce holds an engineering degree, reflecting the company's ethos. Together, this capability strengthens Australia's sovereign industrial base and has driven RPC's adoption of advanced composite manufacturing methods improving both the efficiency and scalability of production.

gurit.com

Gurit: **Global Expertise, Regional Engineering**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

Gurit's Asia Pacific team, led by Tony Stanton, provides composite engineering, testing and modelling to projects from America's Cup yachts and solar race cars to electric ferries, bridges and infrastructure.

The team focuses on lightweighting and materials optimisation, supported by one of the region's most comprehensive accredited composite testing facilities. This combination gives Gurit a unique capability to apply composite materials effectively across demanding sectors.

Gurit's operations span five continents, delivering advanced materials and engineering services. Structural engineering design has been a longstanding focus, enabling composites to be applied in marine, transport, infrastructure, aerospace and industrial markets. Global manufacturing hubs supply structural cores, prepregs, resin systems, adhesives and optimised core kits to projects worldwide.

The Asia Pacific team is headquartered in Australasia, with the engineering design office based in New Zealand, serving the wider region.

The engineering team includes specialists in naval architecture, civil engineering, yacht design, structural plan approval, composite processing, sustainability and fluid-structure interaction. Expertise in finite element analysis, kit design and digital manufacturing ensures customers can bridge the gap between design and production with confidence.

Engineering Manager for Gurit Asia Pacific, Tony Stanton, leads regional engineering activities from New Zealand. A qualified mechanical engineer and naval architect, his early career designing performance yachts and long-range powerboats gave him a deep understanding of the balance between weight, structural performance and cost.

His entry into engineering coincided with a defining era in New Zealand's marine industry — the nation's first America's Cup win in 1995 and its successful defence in 2000. The event transformed the country into a hub of naval architecture expertise, attracting international talent, driving innovation and establishing a marine technology cluster that remains today.

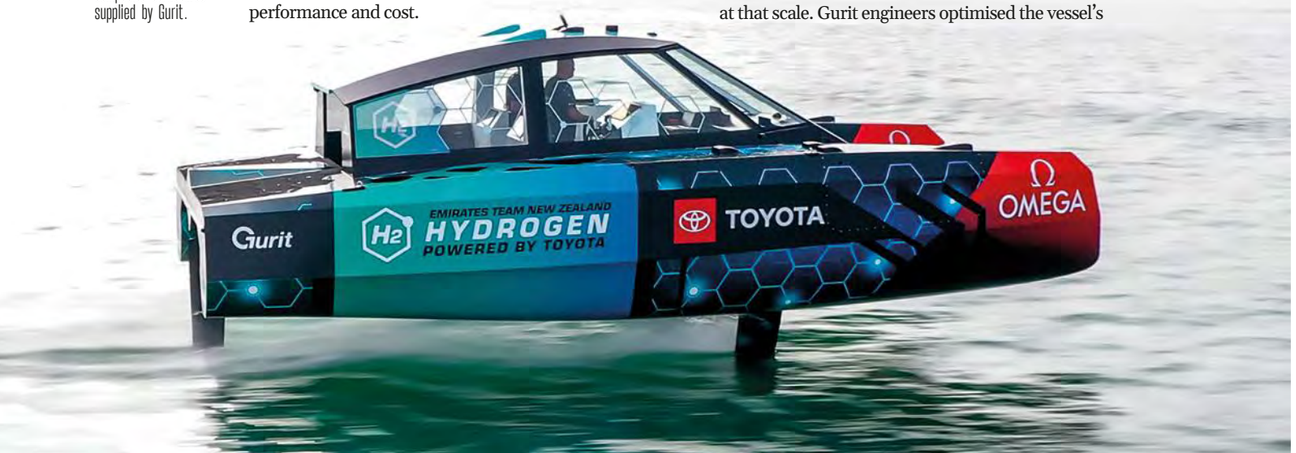
Stanton reflects: "What excites me is seeing how composites have developed in this region — from high-performance race yachts to now being applied across industries. We're involved with RVs and buses, buildings, sculptures, medical equipment, and agricultural components. All our customers are looking for performance or production gains and we can bring our breadth of engineering expertise to make that happen."

ENGINEERING IN PRACTICE – CASE STUDIES

MARINE ELECTRIFICATION

Emirates Team New Zealand's (ETNZ) Chase Zero hydrogen prototype and the East by West electric ferry in Wellington marked a step-change in marine propulsion in the region. Both vessels showed how composites enable new energy technologies by reducing structural weight and increasing efficiency. Gurit provided structural engineering and materials support, ensuring the designs could meet commercial classification standards while maximising performance.

The East by West ferry was a technical breakthrough — the first vessel in the Southern Hemisphere to integrate a fully electric commercial powertrain directly into service at that scale. Gurit engineers optimised the vessel's platform and designed an innovative removable battery cage system that allowed individual battery strings to be safely installed and removed from the lower hull. Digital manufacturing with CNC-cut panels and core kits streamlined construction, while electrical integration progressed in parallel. The success of these pioneering vessels has positioned the region as a hub for the development of electric ferries and marine transport.



Hydrogen foiling chase boat on water – Emirates Team New Zealand's Chase Zero, the world's first hydrogen-powered foiling chase boat, engineered with composite structures supplied by Gurit.

SOLAR CARS

For the last decade, the Gurit engineering team has supported Australian universities competing in the Bridgestone World Solar Challenge, a 3,000-kilometre endurance race spanning the continent from Darwin to Adelaide and powered entirely by the sun. Requiring the ultimate in weight reduction, these carbon fibre and honeycomb vehicles must not only survive the journey but also protect the occupant at speeds of around 100 km/h. Chassis designs integrate roll cages and crash protection into lightweight structures.

Working with RMIT University, Western Sydney University (WSU) and the Australian National University (ANU), Gurit has contributed to chassis optimisation, roll hoop integration and crash safety while mentoring students in analysis and fabrication — building the region's capability in advanced composites.

INFRASTRUCTURE

FLUIDRA POOLS AND MARKY INDUSTRIES

For more than 15 years, Gurit has supported the design optimisation of composite pool bulkheads used in major Australian aquatic centres. These large-span structures, over 25 metres long, subdivide pools for competition events and can carry the weight of up to 40 people while being supported only at the pool edge.

Through successive iterations, Gurit has contributed to structural analysis and material optimisation to reduce build time and cost while maintaining performance. Current development work is focused on the next generation of bulkheads, applying advanced composites to keep this Australian-made product competitive in the global market, with prototype production underway at Marky Industries' Crestmead site.

A PARTNER FOR ADVANCED COMPOSITES

From supplying engineered core kits to delivering complex structures, Gurit provides a vertically integrated capability in Australasia and beyond. Its engineering and testing expertise supports reliable specification and certification, while ongoing R&D into materials behaviour and design advances industry understanding. Gurit's global network ensures customers benefit from international best practice, rapid delivery and proven solutions for demanding applications.

Eric Desjardins: **Engineering Performance Across Oceans and Sectors**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

From racing yachts slicing through Sydney Harbour to tactical vessels tested by the U.S. Marine Corps, Eric Desjardins has spent two decades at the forefront of high-performance crafts and composites engineering.

CONSTRUCTION OF ADVANCED COMPOSITE RACING YACHTS

In March 2021, Eric Desjardins presented Construction of Advanced Composite Racing Yachts to Engineers Australia, hosted by the Royal Institution of Naval Architects (RINA) and the Institute of Marine Engineering, Science and Technology (IMarEST).

He traced the step-by-step process behind the manufacture of a number of high-performance yachts, explaining the role of carbon-fibre composites, boatbuilding processes and the regulatory standards that govern competitive fleets. The session continues to serve as a teaching resource via YouTube.

CLICK HERE TO WATCH THE VIDEO

Wild Oats XI with its highly engineered hydraulic canting keel canted to windward, boosting stability and speed for multiple Sydney–Hobart line-honours wins. Image credit Andrea Francolini.

With a Master of Science in Naval Architecture from the University of Southampton and a Master of Engineering from Arts et Métiers ParisTech in France, Eric built his career on the convergence of naval design and advanced composites manufacturing. Since arriving in Sydney in 2005, Desjardins has contributed to some of Australia's most demanding projects in yacht racing, defence and exploration.

During his near 20 years tenure at McConaghy Boats, Desjardins managed teams of experts through projects that pushed the limits of yacht performance. "The most successful projects all involved a committed and highly skilled group of specialists, working relentlessly from design to delivery to achieve the owner's vision. These projects are the most satisfying ones… albeit in hindsight I might add!".

These yachts are built under special regulations requiring strict hull construction processes to comply with ISO standards, as well as with third party certification and class rules specific to each racing category. Wild Oats XI underwent a significant refit under Eric's management in 2015, its hull cut and extended to shift the centre of gravity and maximise sail power. In 2017, Blackjack underwent a similar refit and received the first 100-foot prepreg hull cured at McConaghy's new Gosford facility. In the last 20 years, McConaghy-built yachts have taken 11 Rolex Sydney to Hobart line honours, a strong reflection of both the yard's and Desjardins' ability to deliver high performance crafts that meet uncompromising standards.

One of McConaghy's most challenging undertakings was participation in filmmaker James Cameron's deep-sea submersible program. As part of an Australian specialist team, McConaghy assembled the composite backbone of the sub using advanced infusion techniques and engineering that had to keep James Cameron safe under extreme pressures – close to 110 MPa. Desjardins also guided McConaghy into new fields, as the company produced prototypes for CSIRO radio-astronomy projects, for the transport industry, and for defence applications.

In 2023, Desjardins joined The Whiskey Project Group as Program Manager, taking on the delivery of next generation multi-mission combatant crafts to U.S. Marine Corps operators. The role required stabilising evolving designs, managing the integration of defence sensors and systems and directing multidisciplinary teams across continents under tight schedules.

The result was the acceptance of the lightweight carbon fibre prototypes after rigorous sea trials and engineering inspections by adhering to Naval Sea Systems Command (NAVSEA) specific standards. Delivered within a USD $20-million program, the project established readiness for full-scale production and strengthened Australia's sovereign capability in composite watercraft design and manufacturing.

Desjardins has also shown a rare ability to explain complex engineering. His 2021 Engineers Australia lecture, hosted by the Royal Institution of Naval Architects (RINA) and IMarEST, gave a precise account of how an advanced racing yacht is built — from concept to final fit-out. The presentation, now on YouTube, remains a reference point for students, sailors and engineers seeking to understand the craft behind high-performance composites.

Across racing yachts, submarines, astronomy prototypes and defence craft, Desjardins' career highlights the role of composites in solving complex engineering problems. The projects he has contributed to are united by technical precision, adherence to strict standards and the ability to convert ambitious concepts into structures that perform in the most demanding environments.

Outside of work, Eric remains connected to performance through fencing, where he is representing Australia internationally, and through sailing, his lifelong interest.

Looking back across two decades, Desjardins reflects not only on projects but also on the broader industry he has helped shape: "In Australia, I've seen composites move from niche applications to a recognised industrial capability across a multitude of sectors. Even in traditionally conservative industries, designers and stakeholders have understood what's possible with lightweight and strong composites, and increased their willingness to push boundaries. That culture of innovation is what keeps our industry moving forward."

Composites Australia

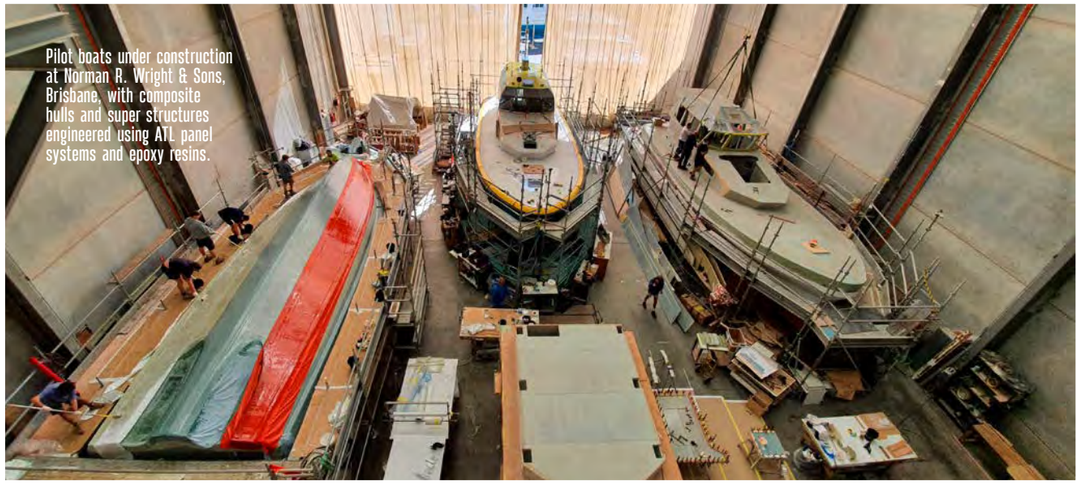
atlcomposites.com.au

ATL Composites: **The Engineers Behind the Materials**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

From ocean-going yachts and automotive components to surfboards and architectural structures, ATL Composites has applied engineering expertise in advanced composites for 45 years. The company manufactures proprietary composite materials and provides engineering and technical support for the construction of high-performance structures in Australia and internationally.

The business began in 1977 manufacturing WEST SYSTEM® epoxy products under licence from Gougeon Brothers Inc., USA. Overtime, ATL developed in-house capability to formulate epoxy resins for demanding applications, including high-performance laminating systems, structural adhesives and industrial tooling compounds. ATL engineers addressed the challenge of reducing construction time without compromising structural integrity in the 1990s with the development of DuFLEX® Composite Panels. Standard panels are manufactured with a variety of structural cores laminated with high-performance epoxy resin and reinforced with multi-axial E-fibreglass .Fibre orientation and ply schedules are based on design and engineering specifications to best meet weight targets, stress and impact loads and other design parameters. For projects requiring greater stiffness-to-weight ratios, engineers specify combinations such as carbon skins with foam or aramid honeycomb cores. That adaptability has seen DuFLEX applied in marine, transport, architectural and industrial projects around the world. ATL operates from Molendinar on the Gold Coast, Queensland, with international partnerships extending to Sweden, Germany and the USA. The company is directed by Lorraine Duckworth and Nicholas Cossich. Duckworth's introduction to composites came through competitive sailing on Sydney Harbour, where her interest in boat-building methods drew her into materials development. Cossich is an aerospace engineer, holding a Bachelor of Engineering (Aero) (Hons) and a Master of Philosophy completed under a Lloyd's Register of Shipping scholarship at the University of Southampton. His research examined the mechanical behaviour of sandwich structures. ATL is certified to ISO 9001:2015, the international quality management standard, and holds approval from DNV (Det Norske Veritas), the Norwegian-based classification and certification society, for the manufacture of fibre-reinforced plastics (Approval#AMPM000003M).



Pilot boats under construction at Norman R. Wright & Sons, Brisbane, with composite hulls and super structures engineered using ATL panel systems and epoxy resins.

ATL's team of structural engineers have a thorough understanding of all aspects of composite technology. Their expertise extends to worldwide marine code compliance including CE/ISO, Lloyds Register, ABS, DNV-GL, BV and USL/AS4132. Outside of the marine field, ATL has experience in numerous industries with wide and varied projects including buildings, bridges, sporting goods & automotive components. There are three engineers on the team, including Nick, Justin McDermott and Kai-Yih Lee who both hold a Bachelor of Engineering (Mech)(Hons). "Engineering capabilities are fundamental and essential in supporting our composite materials offering to ensure application and customer success," Cossich explained."At an engineering level the work is never done in isolation, and we all obtain a significant amount of complementary support, especially on a practical basis, from every level of the team at ATL. "R&D has been critical to our growth and we have a significant number of staff members involved in all aspects of composite materials and process research, as well as epoxy chemistry 'engineering' for our business. Their expertise is also essential at a technical level."

CASE STUDIES

DEEP SEA CHALLENGER

James Cameron's The Deepsea Challenger was an engineering feat — a custom-built, single-person submersible designed for a solo dive to the Challenger Deep, the ocean's deepest point, in 2012. ATL's R&D chemists focused their laboratory efforts on formulating a system that would achieve the critical engineering parameters required to withstand 16,500 psi/114 MPa of sea pressure at the maximum depth. The result was a customised epoxy formulation that exhibited outstanding compressive strength and impressive toughness.

ATL's engineering team also worked closely with the designer, project manager and builder during the construction process, contributing to the development of various proprietary methods used in the epoxy bonding and manufacture of composite parts for the project.

PILOT BOATS FOR PNG PORTS CORPORATION

ATL Composites undertook the composite engineering for a series of 14.2-metre pilot boats built for Papua New Guinea Ports Corporation Limited.

ATL Composites engineered the pilot vessels to meet DNVGL: 1A HSLC R2 CREW and worked closely with Norman Wright & Sons naval architects and master tradesman to integrate unique composite construction, combining resin-infused and pressed GRP cored panels with DNV-GL approval.

The design allows for a reduced centre of gravity for superior stability enhancing pilot safety when alongside ships, along with wide, flush, uninterrupted side decks around the entire vessel for optimum safety.

Deepsea Challenger on the Mariana Trench seafloor. Pressure resistant composite structures engineered with ATL epoxy technology enabled the submersible to withstand the extreme conditions of the worlds deepest ocean. atlcomposites.com.au

> *I've always dreamed of diving to the deepest place in the oceans. For me it went from a boyhood fantasy to a real quest,*
> **James Cameron, Film Maker & Adventurer.**

acs-aus.com

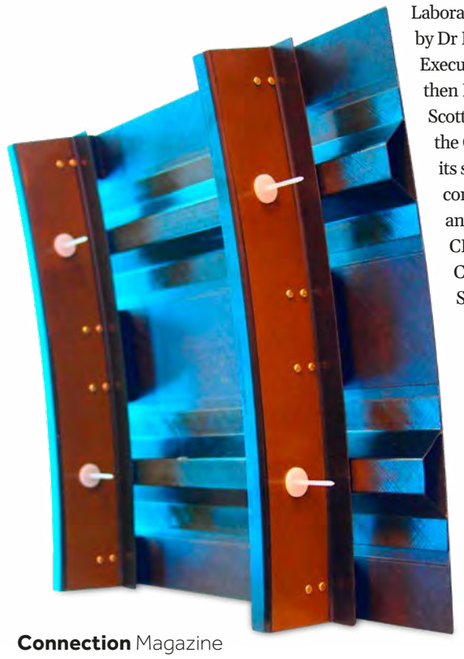
ACS-A: From CRC Breakthroughs to Global Supply Chains

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

Pioneering work in composite materials and processes developed by the Cooperative Research Centre for Advanced Composite Structures (CRC-ACS) has led to lasting applications across aerospace, defence, oil and gas. A notable example is the technology developed with what is now Boeing Aerostructures Australia, which helped secure from Boeing Commercial Airplanes, headquartered in the United States, a sole supplier contract for the Boeing 787 Dreamliner worth up to $5 billion over 25 years.

Over its 24 years from 1991, CRC-ACS became one of Australia's most successful and longest-running Cooperative Research Centres. Its objective was to bring together Australia's leading technical specialists and facilities to develop new world-class research capabilities and technologies for industry. Early partners included the Defence Science and Technology Group and four Australian universities, with directors from Hawker de Havilland and AeroSpace Technologies of Australia (now Boeing Aerostructures Australia) contributing aerospace design and manufacturing expertise. The Centre later attracted additional partners, including Airbus Australia, the German Aerospace Center, and Petronas in Malaysia.

The CRC for Aerospace Structures was initially led by Dr Gordon Long from the Aeronautical Research Laboratories, followed by Dr Ian Mair as Chief Executive Officer and then Professor Murray Scott in 2003. In 1997 the Centre expanded its scope to advanced composite materials and became the CRC for Advanced Composite Structures.



Composite Fitting Attachment (COFA) demonstrator — thermoplastic bracket ultrasonically welded to thermoset panel, developed by ACS Australia.

ADVANCED COMPOSITE STRUCTURES AUSTRALIA
ENGINEERING, INNOVATION & MANUFACTURING

Advanced Composite Structures Australia Pty Ltd (ACS-A) was formed in 2008 to manage the CRC's growing commercial activities. When CRC-ACS concluded its final funding round in 2015, ownership transferred to directors and employees, enabling ACS-A to continue as a commercial operation. Several of the original engineers and researchers who helped shape Australia's composites capability three decades ago remain with the company.

Today, ACS-A is an ISO 9001-certified engineering and manufacturing firm. Managed by Dr Paul Falzon, General Manager, the company combines this legacy with his expertise across engineering, technical and business roles. Dr Rodney Thomson, Engineering Manager, is recognised in the aerospace and composites sectors in Australia and internationally. ACS-A is governed by a board of directors and a management team that oversees projects from concept to delivery.

THE COMPANY OFFERS END-TO-END COMPOSITES ENGINEERING, INCLUDING:

Design & Analysis – modelling, crash and impact simulation, optimisation of composite structures
Product Development & Testing – prototyping, additive manufacturing, and full-scale assembly evaluation
Manufacturing & Assembly – precision tooling and composites for high-value production
Inspection & Repair – 3D scanning and sustainment solutions for aerospace, transport, energy and renewables
Breakthrough Technologies – thermoset welding, composite clamping systems, and high-temperature composites for hypersonics and space

To support growth, ACS-A is establishing a new 3,600 sqm facility in Melbourne for large-scale composites manufacture and assembly. The facility will include CNC machining, additive manufacturing, robotic trim and drill and other advanced processes, enabling delivery of specialist solutions for aerospace, defence, marine, renewable energy and other sectors.

ACS-A participates in national innovation networks. It is a partner in the Blue Economy CRC, contributing engineering and manufacturing expertise to renewable energy and aquaculture projects such as wave energy converters and MoorPower™ demonstrators. It is also a member of the Australian Composites Manufacturing CRC, focused on building sovereign composites manufacturing capability through Industry 4.0 transitions and workforce training. More recently, ACS-A has collaborated with RMIT University and industry partners through the Economic Accelerator Innovate Program on smart wind turbine blades, and with the University of Queensland through the Australian Research Council's Industrial Transformation Research Program to develop series manufacturing of high-temperature composites.

ACS-A also supports future talent. Through the Defence Industry Internship Program, engineering, manufacturing and technology students apply their university learning to Defence projects while working alongside experienced professionals. The company also invests in apprenticeships to strengthen its technical workforce.

ACS-A demonstrates how research and industry collaboration can deliver competitive advantage, build domestic capability, and extend Australian engineering expertise to global markets.

PROF. MURRAY L. SCOTT ENGINEERING LEADERSHIP COMPOSITES AND AEROSPACE

Murray Scott's career spans more than four decades of aerospace engineering, composites innovation and international collaboration. He graduated from RMIT in 1978 with a BEng in Aeronautical Engineering and then obtained an MSc in Aircraft Design from Cranfield in the UK. His early work as a design engineer with the Commonwealth Aircraft Corporation (CAC) – now Boeing Aerostructures Australia (BAA), followed by an engineering role at Northrop (now Northrop Grumman) in the United States, gave him a global focus that would shape his contributions to advanced composite materials and their application in industry. A highlight of his period as an active researcher was the development of design and manufacturing technologies for integrally-stiffened post-buckling composite structures, which were validated on full-scale wing control surface demonstrators.

He led the Cooperative Research Centre for Advanced Composite Structures (CRC-ACS) for 13 years, guiding collaborations that delivered globally competitive composite technologies, including those adopted for the Boeing 787 Dreamliner. Since 2016, he has chaired the board of Advanced Composite Structures Australia, steering its role as both an engineering services provider and a composites product manufacturer for sectors including aerospace, defence, mining, transport and renewable energy.

Prof. Scott's influence extends well beyond Australia. He served as President of the International Council of the Aeronautical Sciences (ICAS) and continues to contribute as an Honorary Fellow and Programme Committee member. He is also a World Fellow and past President of the International Committee on Composite Materials (ICCM). In Australia, he founded the Australian Composite Structures Society (ACSS), which hosted the ICCM conference for the first time in the southern hemisphere in 1997 on the Gold Coast [ICCM-11] and subsequently again in 2019 in Melbourne [ICCM-22]. He currently chairs the Joint Board for Aerospace Engineering, a collaboration between Engineers Australia (EA) and the Royal Aeronautical Society Australian Division (RAeS), and last year was bestowed the rare honour by EA of Honorary Fellowship.

He has long worked with RMIT University as Professor, Adjunct Professor and industry adviser, linking research with application and supporting future engineers. He also serves on boards and committees in sustainability and manufacturing, including the R&D committee of Paintback Ltd, the paint industry's product stewardship body.

Prof. Scott's recent election as a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), recognised in Washington, DC in April, reflects the international calibre of engineering expertise developed in Australia.

carbonrev.com

Carbon Revolution: **Engineering the Essence of Performance**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

An automotive wheel is one of the most highly and complexly loaded automotive components in a vehicle. While pressurised from the tyre, and bolted to the vehicle, it must cope with pothole impacts, cornering loads, 1,000 °C brake rotors, hundreds of thousands of kilometres of fatigue loading and the ravages of the external environment like salted, sandy or ice covered roads — while remaining perfectly balanced and continuing to transmit power, braking and steering inputs with absolute precision. It is both structural and aesthetic — carrying the weight of the car and the personality of the brand.

Carbon Revolution is the only company in the world producing one-piece carbon-fibre composite automotive wheels at OEM scale. Each program demands not only aerospace-grade materials science but also a design philosophy that matches a car's unique aesthetic signature with its performance personality.

FORD MUSTANG SHELBY GT350R – THE BEGINNING OF OEM ADOPTION

Carbon Revolution's first OEM program was forged through a four-year collaboration with Ford, culminating in the 2015 Shelby Mustang GT350R. At the time, no global validation standards existed for carbon-fibre automotive wheels, so Ford benchmarked the Carbon Revolution wheels against the same strict testing criteria for its OEM aluminium wheels. The wheel endured the full suite of OEM tests — curb and pothole strikes, radial and cornering fatigue, thermal cycling beside red-hot brake rotors and NVH analysis — proving that a one-piece carbon-fibre composite wheel could not only survive, but outperform aluminium in production cars.

"The GT350R program was an important opportunity for our engineering teams," explains Dr Ashley Denmead, Chief Technical Officer and co-founder. "It required us to demonstrate that carbon-fibre composite wheels could meet the most demanding OEM standards. The knowledge we gained in fatigue behaviour, thermal management and manufacturability has allowed us to continually optimise performance and efficiency. In parallel, we've refined our manufacturing processes and automation to work hand in hand with the product technology and which has culminated in the Mega-line and its ability to produce a range of different wheels concurrently, bespoke to our OEM customers needs without compromising production consistency and quality."

The GT350R's aesthetic signature was unapologetically muscular and aggressive and Carbon Revolution's engineers had to deliver a wheel that amplified its performance personality — raw power, race-bred durability and track-tuned precision.

Three years later, Ferrari became the next marque to adopt Carbon Revolution's technology. The 488 Pista, unveiled in 2018, was already 91 kilograms lighter than its predecessors. With optional 20-inch carbon-fibre composite wheels, a further 40 percent of wheel mass was saved. For Ferrari, the priority was razor-sharp response: in a car capable of 0–200 km/h in under eight seconds, every gram matters.

On the production line at Waurn Ponds: Carbon Revolution manufactures Shelby GT500 one-piece composite wheels, validated for fatigue, thermal and impact performance using equipment engineered for bespoke OEM production.

For the Ferrari wheel, Carbon Revolution's engineering team focused on immediacy and precision. Their task was to reduce rotating mass while ensuring that the wheel's structural and thermal performance supported the responsiveness expected of a car of that calibre, and do it quickly. The 488 Pista wheel brought about further refinements to the design and validation processes as Carbon Revolution worked with the most famous performance marque.

Carbon Revolution's wheels ensured that the Pista's responses translated directly to the road, achieving the level of visceral precision demanded of Ferrari.

Shelby GT500: launched in 2019 with Carbon Revolution carbon-fibre composite wheels—Ford's third CR program—and the first application of Diamond Weave Technology™

Close-up: 23-inch Carbon Revolution carbon-fibre composite wheel on the 2025 Range Rover Sport SV Carbon—one element in a 76 kg total mass saving

The marque's unique aesthetic signature — elegant yet purposeful — was married with a performance personality defined by agility, immediacy and speed.

For Range Rover Sport SV, Carbon Revolution engineered a 23-inch carbon-fibre composite wheel validated for high load ratings and composed performance on and off road. Nearly four years of collaboration between JLR and Carbon Revolution engineers produced the world's largest OEM carbon-fibre composite wheel. Each wheel is around nine kilograms lighter than its aluminium equivalent, reducing unsprung rotational mass by 41 percent. That saving enhances ride comfort and agility while meeting the robustness demanded of a 467 kW (626 hp), twin-turbocharged V8 SUV with a top speed approaching 290 km/h.

The Range Rover's aesthetic signature — bold, muscular and refined — was married with a performance personality defined by strength, composure and versatility across any terrain.

LOOKING ACROSS THE FLEET

From the muscle of Ford's Shelby GT350R, to the precision of Ferrari's 488 Pista, to the scale of the Range Rover Sport SV, Carbon Revolution's engineering journey demonstrates how wheels can embody a car's unique essence in parallel with optimising performance. Other OEM programs have carried the same philosophy: RenaultSport's Megane Trophy-R, built for Nürburgring dominance; Chevrolet's Corvette Z06, E-Ray and ZR1, designed for American supercar performance; and Lamborghini's latest Temerario, where Carbon Revolution's Diamond Weave™ technology reflects the sculptural aesthetic of Italy's most extroverted marque.

As Dr Denmead reflects, "Every OEM has a unique signature. Our role is to translate that into the wheel, so the car's character is enhanced and never compromised. Whether it's a supercar, SUV or EV, the principles are the same — engineering composite wheels that optimise value for our customers"

Range Rover Sport SV Carbon (2025) — 467 kW twin-turbo 4.4-litre V8; composed performance on and off road, top speed ~290 km/h featuring wheels engineered and manufactured by Carbon Revolution.

Composites Australia

ENDPOINT

Engineers and Engineering: **In Australia**

Written by Kerryn Caulfield, Executive Director, Composites Australia Inc.

Engineering is one of the most diverse and internationally connected professions. In Australia, occupations are formally structured into three accredited categories that align with international accords to ensure global recognition. A Professional Engineer holds a four-year Bachelor of Engineering (Honours) degree, recognised under the Washington Accord. The Engineering Technologist pathway is built on a three-year bachelor's degree accredited through the Sydney Accord. At the applied level, an Engineering Associate completes a two-year Associate Degree or Advanced Diploma in Engineering, with the Dublin Accord providing international recognition for technician-level qualifications. Together, these accords establish comparability of qualifications across borders and support professional mobility. Engineers Australia, the peak body, is a founding signatory to all three and sets national accreditation standards.

The combination of categories ensures a balanced workforce where theoretical knowledge, applied practice and technical skills work in tandem.

PROFESSIONAL RECOGNITION

While qualifications provide the foundation, professional recognition further strengthens an engineer's standing. To achieve Chartered status, engineers must be members of Engineers Australia with at least five years of professional experience. Assessment is based on demonstrated competence across personal commitment, community obligation, workplace value and technical proficiency. For those with more than 15 years in the profession, the process is streamlined, while mutual recognition agreements allow overseas Chartered credentials to be recognised in Australia.

At its foundation, engineering is the disciplined application of mathematics and science, guided by standards, critical thinking and empirical evidence, with attention to logic, patterns, industrial systems and economic operation. By aligning qualifications to international accords and maintaining pathways to professional recognition, Australia ensures its engineers remain competitive on the world stage while serving the needs of local industry and communities.

Looking ahead, the profession will require not only more engineers in general but also specialists in composites. As materials and technologies evolve, composites engineers will be needed to steward step changes in applications that have not yet been identified, turbo charging advanced manufacturing and design.

> *Chartered status is the profession's highest credential — a signal of trust, competence and career progression..*

Chartered engineer Tom Murphy (MIEAust, CPEng, NER, RPEQ), Design Engineering Manager at DSA, inspects FRP infrastructure for service condition monitoring, applying safety harness and confined space protocols

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