Connection

Issue 53 • September 2020

The official magazine of Composites Australia

Inside

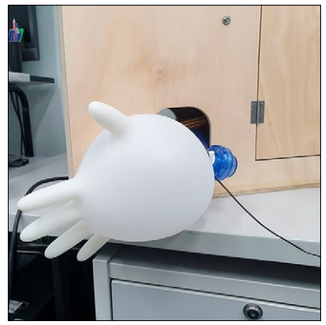
Composites Australia

Contents

Issue 53 • September 2020

Front Cover

A heartening story of the Whiskey Project - the development of the 8.5 metre tactical watercraft 'Whiskey Alpha', launched in the shadow of the pandemic. Image by Salty Dingo courtesy of The Whiskey Project.



Feature article

From marinecraft to ventilators – Vikal meets the challenge. With global supply chains compromised, and a limited manufacturing capability of ventilators in Australia, hospitals were desperately trying to procure supply. For Lynden Vikingur, Director of Vikal International, the WA-based superyacht tender manufacturer the impending crisis was a call to action.

8 & 9

Publisher:
Kerryn Caulfield
Chief Executive

Editorial inquiries:
magazine@compositesaustralia.com.au

Advertising inquiries:
Kerryn Caulfield

Design:
Stefan Morris
stefan.morris@smasheddesigns.com.au

Connection Magazine
is the official magazine of Composites Australia Inc.
ABN 28 611 244 813
Next issue: December 2020

Composites Australia

Kerryn Caulfield
Composites Australia Inc.
0412 556698
admin@compositesaustralia.com.au
compositesaustralia.com.au

President's Letter

Welcome to this latest edition of the Composites Australia *Connection* magazine. As I write, we are all still working under COVID19 conditions. The strict measures to curb the spread of the virus including physical and social distancing, sanitizing practices, temperature checks before entering premises and compulsory face mask-wearing are likely to be the 'new normal' until a viable vaccine for the virus is developed. High demand for face masks in particular are a problematic addition to the day to day running of our businesses. For this reason we have featured a story on Pages 16 & 17 on how to identify fake masks that have made their way into our supply chains.

Our feature article on The Whiskey Project Group which recently launched its first boat, the 8.5 metre tactical watercraft Whiskey Alpha is an exciting story of cutting edge design technologies, team building, supply chain development and strategic product placement in the competitive arena of defence procurement.

For Lynden Vikingur, Director of Vikal International, the WA-based superyacht tender manufacturer, COVID19 and an impending shortage of respirators was a call to action. Our article on page 8 is a heartening story of ingenuity to produce the first ready-to-use ventilator, end-to-end from locally sourced components, and in the shortest possible time frame.

The story on Marky's Industries production system transformation from LRTM to reusable silicone vacuum bags is a candid account of converting and adapting new systems for better manufacturing outcomes. Blaise Visconti, Composite Technical Manager for Marky Industries has generously shared his experiential learning. For my own company, FDP Composites, we too have adapted a new vacuum system in recent times. Our companies are therefore on parallel journeys to improved part-to-part quality and accelerate part turnaround time.

Now more than ever, our industry needs a trusted training system that can deliver workers with high quality, relevant skills that can support rapid upskilling and reskilling in a post COVID19 environment. Pages 10 to 15 feature articles on the training and the skills shortage including the in-depth study undertaken by Kerryn Caulfield on skills in the composites sector in Western Australia. As in all states, the industry for some time has experienced a persistent skills shortage, the reasons for which are multifaceted. The following article explains the skills shortage and features graphs on enrolments for industry qualifications which are an ominous indication of the foreseeable future.

Following these stories are two heartening case studies of regional firms committed to training apprentices. Both stories feature real-time flexible learning. As Alan Steber, Managing Director of Steber International explained that being in a regional area, they have always had to look at ways to train up as skilled people were unlikely to walk in the door.

Earlier this year we took the sensible precaution to postpone our annual conference which was rescheduled for October. Australia's leading **Advancing Composites Innovation Conference** will now take place **20 – 22 April, 2021**. I urge you to join us in the beautiful region of Toowoomba, Queensland for two days that will be filled with stimulating presentations from composites practitioners and thought-leaders. 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, keep safe and enjoy this edition of the Composites Australia magazine.

Leona Reif
President

LinkedIn: compositesaustralia
Facebook: compositesaustralia
Twitter: @CompositesOz

Composites Australia

RPC brings breakthrough FRP testing to Australia & SE Asia

By Joanne Crowley

RPC Technologies has secured the exclusive licence to UTComp's UltraAnalytix™, a non-destructive Pulse Echo Ultrasonic system enabling inservice condition assessments on fibre-reinforced plastic (FRP) assets such as tanks, pipes and other glass-reinforced polymer (GRP) structures while they are still operating.

Tony Caristo, RPC Managing Director, says he is excited to bring this capability to asset managers and owners in Australia, NZ and SE Asia. "Combined with RPC's FRP/GRP experience, UltraAnalytix™ is an effective tool to help clients manage all their FRP/GRP assets without the need for expensive and time-consuming shutdowns as well as the ability to make informed value decisions and better risk management," he said.

The UltraAnalytix™ system is based on more than 60 years of research originally conducted by NASA. The system combines ultrasonic data collected in the field, external visual inspection and analysis using a proprietary algorithm.

It is more than conventional ultrasonic thickness testing: innovative post-processing of the raw ultrasonic data provides accurate, quantifiable and repeatable results. These results have been validated by UTComp's internal research and by independent research at the University of Alabama and York University in Toronto, Ontario.

For assets or products and components that are already in operation, the benefits include:

- FRP/GRP assets of all ages can be evaluated without original information such as design specifications or engineering diagrams.
- The commencement of regular scheduled inspections creates an integrity-life curve.
- Proactive and regular inspection minimises the risk of unforeseen failures thus improving safety and avoiding costly unbudgeted repairs and clean-ups.
- Data is collected from an external surface, often while the assets are in operation, thereby limiting or eliminating the need for confined-space entry and avoiding shutdowns.
- Cut-test samples from the asset are not required, allowing the structural integrity to remain intact.

For new products or components in the manufacturing stage, the benefits include:

- A baseline at time of manufacture or installation can be established for ongoing inspections.
- Provides measurement for acceptance criteria and verifies the quality of manufacture.

The testing process kicks off with an initial briefing as well as a review of existing data on the assets to be inspected. Following the submission of an agreed inspection plan, the assets and their environment will be examined by RPC's inspectors who then conduct the inspection using the UltraAnalytix™ Pulse-Echo Ultrasound system.

The process of analysing the data, assessing the asset's condition and composing and submitting an asset report on detected faults, estimated Remaining Service Life (RSL) and recommendations for remediation or maintenance takes approximately three weeks, although can be fast tracked in the case of an emergency.

The licence to RPC was issued by UTComp because of its significant experience in designing, engineering, manufacturing and installing composite assets across the water, wastewater, odour control, mining and industrial, transport and defence sectors across Australasia.

The take up of the service has been rapid with more than 50 inspections completed in the past 12 months and major asset owners now looking to adopt the technology for ongoing regular testing.

UTComp's UltraAnalytix™, a non-destructive Pulse Echo Ultrasonic testing insitu.

Tony Caristo cited the 2019 Australian Government Infrastructure Audit which highlighted that overall, infrastructure asset management was not well-reflected in planning processes and could be vastly improved in the Australian market. "Quality asset management has become key to owners and managers to maximise the ROI on their investments and to ensure quality and safety of delivery to the communities those assets serve," said Tony. "Asset management has become the critical line-of-site from the boardroom to the asset. Utilising UltraAnalytix™ as one of our 'tools', onboarding digitisation and the IoT, and leveraging our deep experience, RPC is bringing a full suite of FRP/GRP asset management services to the market."

The Whiskey Project Group

Realising a grand idea

- .... . / .-- .... -.- . -.-- / .--. .-. --- .--- . -.-. -

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

The Whiskey Project Group Ltd is a young Australian-owned tactical watercraft design and manufacturing company, founded by former Defence Force officers to build the boats they'd always wished for.

Co-founders Darren Schuback, Managing Director and Ryan Carmichael Chief Operating Officer, have over 40 years of Defence Force service ranging from counter terrorism to clearance diving. Formed through experience, their 'grand idea' was to design, develop, test and bring to market a next-generation tactical watercraft that will compete for the $5 billion in planned investment in Australia's military small watercraft over the next 20 years. The strategy includes a team with the finest talent, using cutting edge design technologies and a robust supply chain.

Darren is a former executive level military officer with over 24 years of operational management experience in the Australian Defence Force (ADF). During his defence career, he had operational oversight of a warfare operation command centre, a military training institution, naval warships and a special operations counter terrorism unit, and capability management of multiple disciplines within Defence.

Ryan's career in the Defence and the Public Sector, includes more than 15 years of decorated service as Clearance Diving Officer with the Royal Australian Navy (RAN). He has worked globally with both government and industry, and established and commanded Australia's first operational maritime autonomous systems unit. He also served distinguished tenures embedded with the Australian Special Forces (2nd Commando Regiment) and the Royal Navy (UK).

The Whiskey Project Group's first boat, the 8.5 metre Whiskey Alpha, was launched in the shadow of the pandemic. It is designed for use by the military, police or other state agencies that require watercraft with multi-role offshore capability in all sea conditions as well as low-speed manoeuvring for ship boarding, recovery or disembarking.

The Whiskey Alpha 85 was built by Brett Van Munster, at his custom racing boatbuilding facility in Morrisett on the shores of Lake Macquarie, NSW.

Images by Salty Dingo courtesy of The Whiskey Project

A second generation boat builder, Brett said that the boat was a dream build, enabled by "a fantastic and effective core crew and supply chain."

"We used a vacuum consolidated wet preg epoxy which is a cost effective method of building that also provides a good structural outcome. The fibre matrix is a combination of Hexcel's unidirectional and multiaxial carbon fibre to provide the lightest strongest structure possible. The subfloor framing, cockpit floor and console area among others are ATL's carbon fibre Duflex™ foam panels that were delivered pre-cut ready to drop into shell to save time. We also used Gurit's Ampreg™ new 31 resin system in which we have confidence."

The hull is new technology SeaBlade hull which Brett says is "an amazing ride, the advantages of which include good stability, a high waterplane area, stability and fuel economy." The hull design is said to reduce the slamming load impact on personnel and equipment by up to 40 percent compared to legacy hulls.

The design and build team included the lead architect from Farr Design, Britton Ward; marine composites engineer and America's Cup winner Brett Ellis, and computational fluid dynamics system and hull specialists from Navatek Hawaii, a research institute funded by the US Government to build military craft.

The modular layout is fit for a multi-role purpose. Designed so that seats and other operational equipment can be quickly installed, shifted or removed depending on the scenario the team is responding to, ensuring maximum versatility and optimising the larger deck space. The technology platform, from weapons and combat to autonomous systems, creates an interoperable versatility that is futureproof.

Having established and commanded Australia's first operational maritime autonomous systems unit for the RAN, co-founder Ryan is also recognised as one of Australia's experts in the field of unmanned surface vessels and Autonomous Underwater Vehicles. It is therefore no surprise that his experience and knowledge will be applied to future vessels including the Whiskey Bravo that is being developed to operate as optionally crewed.

In a strategic move to secure sovereign design and industrial capability for military and specialist watercraft, the Group recently announced the acquisition of two companies, the boat manufacturer and government supplier Yamba Welding & Engineering (YWE), and globally-renowned maritime design company Naiad.

The team says the "whiskey" in The Whiskey Project's name comes from the NATO phonetic alphabet, as within Australian Special Operations all water operators have a call sign beginning with 'w' (or 'whiskey').

Specifications

Model: **Whiskey Alpha 85**
Length overall: **9.38m**
Length waterline: **8.50m**
Beam: **2.90m**
Draft: **0.60m**
Displacement: **3180–5140kg**
Engines: **Outboard/inboard stern drive /inboard waterjet**
Fuel: **650L**
Passengers: **12**

From marinecraft to ventilators

Vikal meets the challenge

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

Fear struck the nation in March this year with the realisation that our critical supply lines for healthcare products could be overwhelmed as COVID-19 spread through our communities.

Among the list of acute shortages were ventilators. This medical device takes over the body's breathing process when the disease has caused the lungs to fail and which is said to provide the patient time to fight off the infection and their best chance of survival. With global supply chains compromised, and a limited manufacturing capability of ventilators in Australia, hospitals were desperately trying to procure supply.

For Lynden Vikingur, Director of Vikal International, the WA-based superyacht tender manufacturer the impending crisis was a calling. "With a global medical crisis looming, we had no choice but to address the challenge to produce the first ready-to-use ventilator, end-to-end from locally sourced components, and in the shortest possible time frame."

"As boat builders, we are trained to think laterally. A qualified shipwright understands the science of materials with which they work and has transferable skills that can adequately build structures and components other than boats.

"Indeed, many of the components we produce for our boats are actually more complex than the moving parts and flowing air of a ventilator, so it wasn't difficult to fabricate our first working prototype. By the end of May, we had completed four different original prototype ventilators," advised Lynden.

The first Vikal ventilator prototype was manufactured largely from CNC cut MDF, bonded and sealed with epoxies and structurally reinforced with fibreglass. The second prototype had the housing, cams and lever arm mechanism manufactured from CNC cut acrylic, all bonded together with 401 Loctite®.

Part of the Vikal team, assembled their Bibra Lake facility

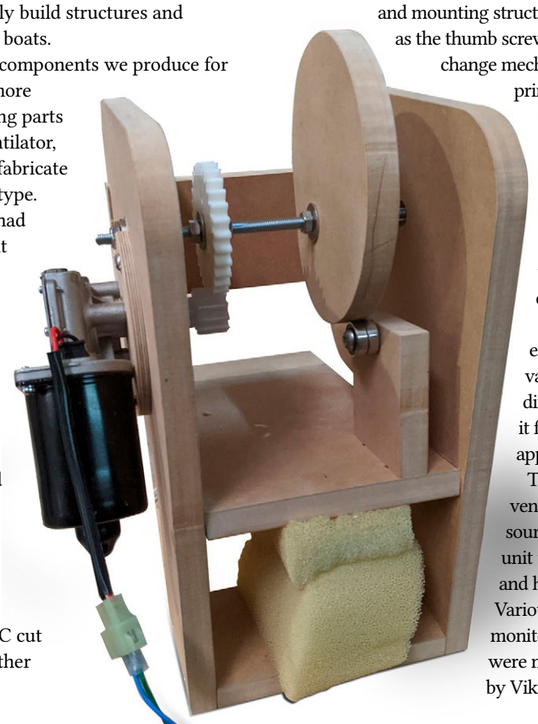
Subsequent prototypes (3.0 and 4.0) were manufactured using marine ply for the housing and lever arm that were sealed and bonded and painted with epoxies.

The ventilators required 316 stainless steel fixings including return springs and the main shaft.

Many of the components were made from the five large format 3D thermoplastic filament based printers in which Vikal has invested. The motor mounts, adaptor and mounting structure/bracketry as well as the thumb screws and cam quick change mechanism were 3D printed. As well as all the gearing - main gear/flywheel and reduction gearing mechanism(s) – along with the cams and cam assembly and various other internal custom components.

The team experimented with various filaments and different plastics until it found what was appropriate.

The motor driving the ventilator was a locally sourced 12v automotive unit that is low geared and has high torque. Various custom electronic monitoring and controls were manufactured in house by Vikal: 12v PWM based.



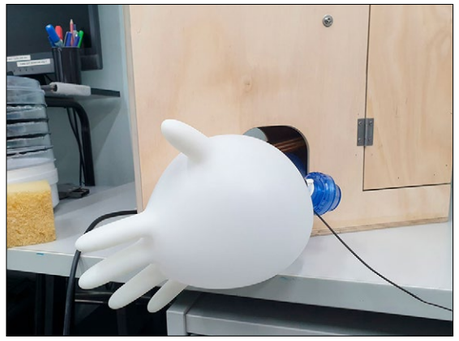
The first Vikal ventilator prototype - run by a window wiper motor - manufactured largely from CNC cut MDF, bonded and sealed with epoxies, with some structurally reinforcement in fiberglass.

The WA Chief Scientist, Peter Klinken, was able to connect Vikal with the Department of Health to fast track the development of the ventilator. A modest government grant also part-funded the company to test its prototypes The next step is to take the concept to the Therapeutic Goods Administration to explore larger scale manufacturing opportunities.

Western Australia's swift and strict border closure obviated the crisis and the state's need for ventilators is now less urgent. Though according to Lynden, the need remains to support and enable all our domestic supply chains for essential, high-tech products like ventilators. "There is no need to rely on complex international supply chains. There are lots of SMEs in WA with capability to manufacture high tech products, all of which could translate into export opportunities. Most of us have the resourcefulness to adapt and pivot quickly," says Lynden.

Prototype version 4.0, with front cover open, showing cams and actuation assembly.

Working to a constricted time frame under COVID conditions required ingenuity, Vikal workbench testing for basic flow rate calibration.



Composites Industry of Western Australia
Skills Scoping Study

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

Earlier this year, Composites Australia commenced a scoping study on skills in the composites sector in Western Australia. The objectives were to obtain an understanding of the value and contribution of the composites industry in Western Australia to the state's economic base by mapping the key features of the industry, its existing labour force, skills and training provision, and future predicted needs.

The study was initiated by The Resource Industry Training Council which is a state government funded joint venture between Chamber of Minerals and Energy and the Australian Petroleum Production and Exploration Association Ltd.

Over a period of months the consultants held interviews with selected stakeholders, conducted an online survey and analysed data and industry reviews that have gone before this one. International and national case studies were also analysed for best practice and context. Enrolments and completions of AQF accredited courses were also reviewed.

The WA composite manufacturing industry has unique origins and a proud history of innovation. WA's fibreglass surfcraft, sailboard and pool makers of the 1960s were pioneers fuelled by a sense of independence and 'can do' resourcefulness. At this time the eastern states seemed distant and irrelevant. The culture of the early adapters has provided a level of self-reliance and resilience in a slim and volatile market, qualities which are reflected in how composites companies in WA have approached training and skills development.

Following is a snapshot of the current size, shape and value of the WA composites industry:

- Composites fabrication firms: > 80
- Workforce: ~ 1,200 people
- The top 12 firms employ a total of over 700 people
- Around 40 firms employ under 5 people
- Turnover: ~ A$300 million

There are five major market sectors: swimming pools and spas, marine craft, defence, transport (including a nascent advanced technology cluster), and industrial products (targeting the mining, oil and gas and agriculture industries). The vast majority of composites companies in WA operate from premises within the larger Perth metropolitan area, with a large cluster in the southern suburbs industrial zone. Companies are mostly privately owned SMEs, and only one listed company. Almost half are micro enterprises employing less than five employees.

The industry has experienced a skills shortage for some time, the reasons for which are multifaceted.

The resources boom and the subsequent economic decline in WA since 2015 and the ongoing changes to the VET sector has suppressed apprenticeship demand. As a result, the low enrolment and completion rate of apprentices has led to the parlous shortage of locally qualified and skilled labour. Until recently many employers sourced workers through the Skilled Migration Program which has now been curtailed.

The research revealed an appetite for training within the industry. However, currently only the marine craft sector is employing apprentices. In other composites manufacturing sectors, skills training associated with composites fabrication is being done by the companies themselves, generally by experienced production managers using quality standards guidelines and operational manuals developed inhouse. This system of 100% on-the-job training is a heavy impost on employers and also means that workers are denied the opportunity to gain formal trade qualifications that will provide them a sustainable career path.

SMTAFE is the only WA training provider offering composites manufacturing skills training through its two apprenticeships (Marine Craft Construction and Composites Trade) and some customised fee-for-service training. Emerging from this consultation, attitudes of the composites industry towards formal VET training can be summarised as "too slow, too rigid and too removed". Concerns relate to perceived deficiencies in training content, flexibility of delivery, and training facilities.

Surprisingly, there is evidence that the industry is almost completely disconnected from the available employment services including government subsidies, information and support services and GTOs for labour sharing. There is also little contact between the higher education sector and the composites manufacturing industry. Unlike the eastern states, there is no dedicated university-based collaborative research and development centre pertaining to composites.

Despite this, WA composites manufacturers are engaged users of computer-aided processes, such as CNC machines, Computer Aided Design (CAD), and 3D printing. However use of robotics processes associated with Industry 4.0 is limited and generally viewed as cost prohibitive. Those who work within the sector are a resilient mob that have survived changing consumer trends and many 'boom and bust' economic cycles, as well as being marginalized in the procurement practices of government and the resources sector in recent times. Despite these headwinds, over 80 percent of those surveyed were optimistic about the future and 85 percent expected to increase their workforce in the next five years, including composite/fibreglass technicians. A rebound in the resources industries and government support for boosting local industrial capability has fuelled this optimism.

Electrical engineer repairs a laser cutting head on large CNC computer numerical control printing and cutting machine

Finishing a composite part.

The report concludes with 28 potential solutions to address the key findings. Of particular importance is the need to tackle the skills shortage by enabling cost effective and flexible training delivery that meets the skills needs of the industry.

A copy of the Scoping Study can be found on the Composites Australia website compositesaustralia.com.au

Explaining the composites skills shortage

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

The federal government has flagged skills training as one of the key focus areas to get our economic recovery moving. While the details of state and federal policies are still rolling out, any indication that priority be given to developing skills for composite manufacturing is timely and welcome as these skills have been in short supply for many years.

For composites manufacturing, formal VET[1] qualifications are generally a three to four-year Certificate III apprenticeship, which combines 'off-the-job' training with practical industry experience. The following are the three main VET qualifications used by composite companies:

1. **Certificate III in Engineering – Composites Trade (Code: MEM31119)**
   Nationally, this qualification is currently on scope as a four-year apprenticeship with two TAFE providers, GOTAFE(Vic) and SMTAFE (WA).
2. **Certificate III in Marine Craft Construction (MEM30719)**
   A three-year (39 months) apprenticeship that is currently delivered by TAFE in four states: SMTAFE (WA), GOTAFE (Vic), TAFE Queensland (Coomera campus), and TAFE NSW.
3. **Plastics, Rubber and Cablemaking training package (Cert II to Diploma in Polymer Processing. Codes: PMB20116 30016, 40116, 50116 and 60116).**
   A number of TAFE colleges, private and enterprise RTOs across several states deliver the polymer processing qualification (or elements of). The states with the highest enrolments and completions for these qualifications are Queensland and Victoria.

A recent analysis of the takeup and completion numbers for the above qualifications shows an unsettling decline in numbers since 2008. For example, national enrolments for Marine Craft Construction peaked during the 'boom' years leading up to the GFC, reaching a high of 637 in 2008 before declining by 65 percent in recent years. In Western Australia (WA), Marine Craft apprentice enrolments have fallen steadily from 63 in 2007, down to 10 in 2020. There were only 23 national completions in Marine Craft in 2018, sadly none of which were in Tasmania or South Australia.

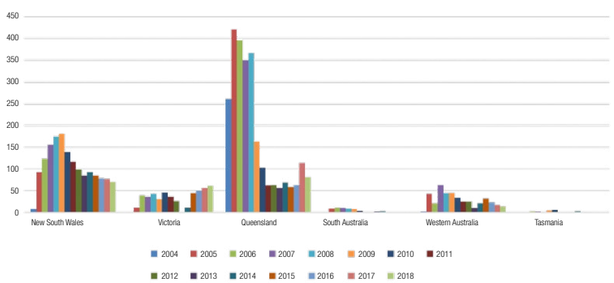
The numbers are just as parlous for the Polymer Processing qualifications with only 37 national completions in 2018. This also includes nil completions in Tasmania or South Australia.

The numbers are sobering and go a long way to explaining the national skills shortage.

A recent survey by Composites Australia of WA composites firms[2] revealed that the most common pathway to becoming a skilled Composite Technician or Tradesperson[3] is employer-funded on-the-job-training. Over 70% of respondents to the survey confirmed that they frequently provide "On-the-job-training", 74% use "External short courses" and over 68% use "Accredited qualifications", but only sometimes. However, ninety percent of companies sponsor workers to obtain other required work tickets and licences either frequently or sometimes.

It is essential to provide the skills and training and workforce development programs to assist all manufacturers to develop the workforce they need to be productive. However the current decline in training for traditional trades is an ominous indication that the skills shortage is likely to continue for the foreseeable future.

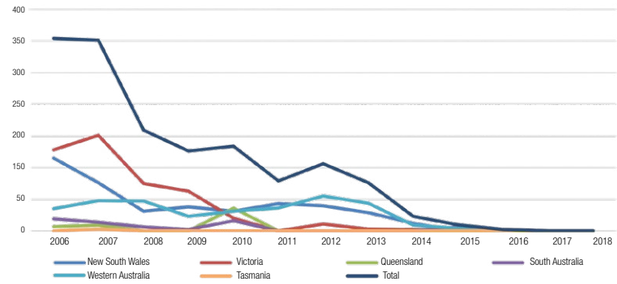
Enrolments: MEM30603 & 30705 Certificate III in Marine Craft Construction (Government funded only)



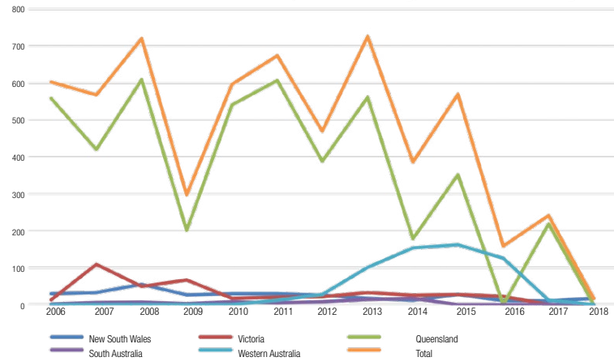
1. Vocational Education and Training
2. Composites Industry of Western Australia: Scoping Study 2020, Resources Industry Training Council WA
3. Alternative titles can include Laminator, Composite Fabricator, Fibreglass Technician/Tradesperson, and Shipwright

Composites Australia

Enrolments: PMB Certificate II in Plastics/Polymer Processing, All States (Including VIS)



Enrolments: PMB Certificate III in Polymer Processing, All States (Including VIS)



The Australian vocational education and training (VET) system is designed to provide people of all ages with the work-ready skills and qualifications needed to keep Australia's industry sectors productive and competitive. It is a system based on a strong government-industry alliance and is underpinned by the Australian Qualifications Framework (AQF), which is the national policy for regulated qualifications in Australia. The AQF combines qualifications from each education sector – schools, VET and higher education – into a single comprehensive framework. VET is one of two tertiary education pathways available to students when they finish compulsory schooling in Australia – the other tertiary pathway is higher education. The Australian VET federal and state and territory governments provide funding and policy direction, while employers shape the qualifications needed by their industry.

Websites:
Australian Government Department of Education and Training https://www.education.gov.au/
Australian Industry and Skills Committee https://www.aisc.net.au/
Australian Qualifications Framework https://www.aqf.edu.au/
Australian Skills Quality Authority https://www.asqa.gov.au/
My Skills https://www.myskills.gov.au/

Training Case Study
Steber International

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

The fibreglass boat manufacturer Steber International operates from a four acre site in Taree, a regional town on the Mid North Coast of NSW, where it manufactures high quality boats for fishing, charter, patrol, sea rescue, medical support, surveillance and general boating use.

Managing Director Alan Steber says: "Being in a regional area, we've never been able to rely on trained people walking in the door. We've always had to look for ways to train up. Indeed, since the mid-1970s we've trained over 150 apprentices. I'm proud to say we currently have nine apprentice shipwrights on our books."

Government commissioned Naval boats and commercial vehicles are a large part of Steber's business, for which the tender process requires demonstration of a qualified workforce. The apprentices are employed directly by the company and enrol in a Certificate III in Marine Craft Construction (MEM30705) with NSW TAFE.

"I'm proud to say we currently have four apprentice shipwrights in full time employment. Five recently attained tradesman level."

Located many hours from TAFE training facilities, the company prefers that the apprentices are trained onsite.

The apprentices, whether first, second or third year, attend weekly lessons which are delivered online using video conferencing and other media in the company's boardroom The TAFE lecturer is located over 300kms away at NSW TAFE's Ultimo Campus.

Alan says: "Though our training model was born out of circumstance, distance learning resonates with young people who find traditional learning tedious and uninspiring. They have left school for a reason and if the teaching mimics the school system they lose concentration."

Alan says that while the students never visit the TAFE College, the lecturer is available at any stage for "real-time learning" which is knowledge acquisition based on immediate needs. "The guys love making use of their mobile phones by taking photos and facetiming with the trainer as they use a piece of equipment – under supervision of course. The TAFE trainer now visits the factory once a week for face-to-face teaching as well."

Alan believes that training in their place of work is ideal. "The apprentices get to do their practical assignments on the floor, using our equipment and our materials supervised by a co-worker - who we've also trained on the procedures. You'd be hard pressed to find a TAFE with the breadth and quality of equipment that we have. We find that quite often our guys are teaching the TAFE teacher. Having said that, we have a buddy system and it's all very collegiate."

Alan plans to employ more apprentices towards the end of the year, however he stresses that this commitment will be determined by the level of support from Government incentives and projects on the books.

Steber International apprentices in their Taree workplace. Image taken by A. Steber.

Alan Steber Managing Director. Steber International: steber.com.au/ **NSW TAFE:** tafensw.edu.au/

Composites Australia

Training Case Study
Compass Pools

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

Compass Pools has been manufacturing fibreglass swimming pools in the regional town of Tomago NSW since 1980. A Workforce Skills Survey undertaken in 2019 by the state's peak business organisation, the NSW Business Chamber, found that over 64 per cent of Hunter Valley businesses were experiencing skill shortages – the second highest of all regions in NSW. Compass Pools was also affected by the shortage.

CEO Anthony Cross says: "We were facing a revolving door of short-term workers that seemed to have no end – so we decided to train up. Our options were limited as Hunter TAFE had ceased delivering training for boatbuilding and composites qualifications in 2013, so we decided to approach HunterNet for a solution."

HunterNet is a network of manufacturing, engineering and specialist service companies located in the Hunter and Central Coast regions of NSW. Through its Group Training operation, HunterNet43 undertakes the attraction, interview and recruitment process for apprentices, as well as the induction, OH&S training and pastoral care. The apprentices are then placed with local businesses that provide the required on-the-job work experience.

Anthony Cross says the partnership with HunterNet and GOTAFE has exceeded all expectations: "The first year we put on two composites apprentices and this year we are taking on another two. They are productive and adding to the capabilities of our workforce."

Currently there are four composites apprentices employed through HunterNet's cooperative and flexible training and employment program. Using distance education delivery mode, GOTAFE's Ross Mitchell is now training 11 Composites apprentices and six Boatbuilding apprentices across the Central Coast.

"The first year we put on two composites apprentices and this year we are taking on another two. They are productive and adding to the capabilities of our workforce."

In the case of Compass Pools, the apprentices taken on will eventually qualify with a Certificate III in Engineering - Composites Trade (MEM31119), and at the end of their training contract will be employed as fulltime workers for the host company. Still, with no accredited composites course on offer in NSW, providing off-the-job training was a challenge. HunterNet struck on the idea to engage the services of GOTAFE (Goulburn Ovens Institute of TAFE), which has been training composites technicians in regional Victoria since 2015.

Seasoned composites lecturer Ross Mitchell, from Hunter Assessment and Training, was engaged by GOTAFE to deliver the apprenticeship training by distance education. Ross says that "There is a lot of flexibility in the model. Online distance education is a necessity in regional areas and is also efficient and student-centred." The training model involves online teaching, augmented with onsite tutorials and assessment. Ross visits each host employer regularly and is known to spend a day on the tools working side-by-side with his apprentices. He says that you lose students fast if they are expected to learn in isolation and regular follow up helps to maintain motivation.

Compass Pools 8.2 metre slim line in-floor glass windowed pool made in Tomago in the Hunter region of NSW.

Compass Pools/GOTAFE/Hunternet
Compass Pools: compasspools.com.au
HunterNet: hunternet.com.au/about-us-gt/
GOTAFE: gotafe.vic.edu.au/
Ross Mitchell: Hunter Assessment and Training

Is your mask for REAL or just a FAKE?

Written by Jane Whitelaw FAIOH Certified Occupational Hygienist (COH)® CIH®, University of Wollongong
and Kate Cole MAIOH Certified Occupational Hygienist (COH)® CF, Cole Health

By the time COVID-19 hit our shores earlier this year there was already a shortage of P2 disposable respirators due to the 2019/2020 summer bushfires. A sudden influx of counterfeit and non-approved respirators subsequently entered the supply chain creating confusion and concern as to whether the respirator was "for real" or a "fake".

Failure of respirators to meet approved regulatory manufacturing standards may leave workers unprotected from harmful respiratory hazards in addition to giving wearers a false sense of security.

The wrong choice of respirator is also of concern. For example, a P2 respirator is suitable for thermally generated particles up to ten times the workplace exposure standard, but will not protect against the organic vapours or acid gases commonly found in the composites industry. A combination respirator is required in this case.

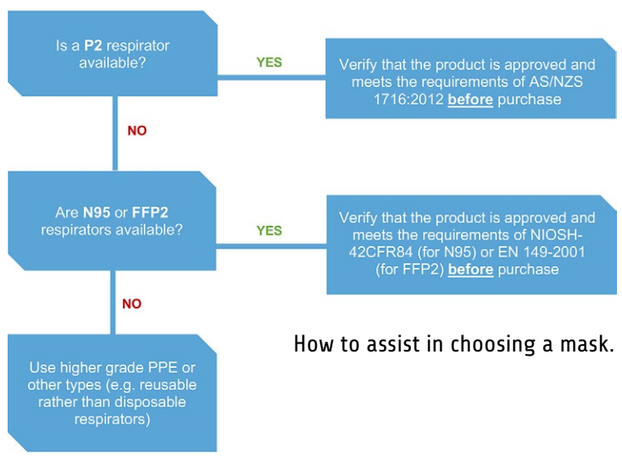
The Standards Australia publication AS/NZS1715:2009 Selection, use and maintenance of respiratory protective equipment, which is available for purchase online, is worth reviewing for information on how to make choices on which respirator is suitable for specific purposes in your workplace.

Safe Work Australia's Work Health and Safety (WHS) legislation and 'hierarchy of control' stipulates that it is mandatory to work through higher-order controls before choosing and using Personal Protective Equipment (PPE) such as respirators.

In times of short supply, N95, FFP2 and KN95 masks have generally been considered equivalent if they meet international standards. In response to the short supply of these products in the early months of this year the Therapeutic Goods Administration (TGA) – the regulator of medical devices (not respirators for industry) - opened the floodgates by suspending their normal due diligence and listed hundreds of face masks in a month without verification that they were fit for purpose. These masks made their way into industry, hardware stores, chemists and the healthcare sector.

What to look for in a respirator

For the Australian and New Zealand markets the preference is always to purchase respirators that meet the local Standard (e.g. AS/NZS1716:2012). Caution is advised for those without sound technical understanding when purchasing respirators claiming compliance with other international standards.



How to assist in choosing a mask.

How to identify a fake

Identifying fake and non-approved respirators can present a challenge. All P2/N95s have head bands. Ear loops therefore are an indication of non-compliance. Currently there are no NIOSH or AS/NZS 1716:2012 certified respirators with ear loops. Though many KN95 masks have ear loops, an assessment of this design shows difficulty in achieving a proper fit. Respirators with ear loops are therefore not recommended as a P2 equivalent and at present, KN95 respirators are not recommended for use in Australian or New Zealand work environments.

It is important to know that listing on the Australian Register of Therapeutic Goods (ARTG) is not a standard for respiratory protection. The TGA does not certify respirators and a "TGA Certificate" or listing on the ARTG does not verify that the product has been certified or is compliant to an acceptable respiratory protection standard.

To address the issue, a purchasing guide was developed by the authors to help select disposable P2 respirators for workplaces in Australia and New Zealand. The guide was based on commonly engaged practice under national and international advice and endorsed by the OHS Professional Association, State regulators and the ACTU. A detailed guide to purchasing approved P2 respirators is available for download at respfit.org.au

Just to be sure....a tight fitting respirator will only protect you if there is a good facial seal. Facial hair, head coverings, and other PPE may affect the fit of the respirator. Fit should therefore be tested before use and then at regular intervals. A national scheme to accredit fit testers is available through RESP-FIT and you should refer to the website for an accredited tester.

2020: The year to transform production systems for Marky Industries

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

No one could argue that 2020 is a year of massive change. For industrial composites manufacturer Marky Industries, 2020 is the year the company made the bold move to transform its entire production system from LRTM (Light Resin Transfer Moulding) to reusable silicone vacuum bags.

Blaise Visconti, Composite Technical Manager for Marky Industries, is a closed moulding specialist who relocated from the UK to work for the company and its production transition in 2019. "We've done a lot of inhouse R&D on the system over the past two years. Our progression and improvements in the silicone bagging system mean we can now easily tackle moulds with difficult 3D geometry using additional locators built into the bags to assist with vacuum sealing and support the weight of the silicone."

Blaise explained that the company's efforts have resulted in the ability to maintain a better vacuum source for the entire cure period. It is done right at the heart of the infusion without losing resin and with a dry breather system that completely eliminates the requirement for catchpots. This has resulted in substantial improvement in material usage while producing a noticeably better consolidated laminate. The system overcomes the inherent flaw in the infusion process whereby a vacuum bag can slightly relax after fill when all perimeter breathers are choked off by the liquid resin.

"We have also improved the resin runner system making it far more user friendly and much quicker to install. The old system was very fiddly and demanded much work after being fitted to the bag. The new system has all the work moulded into the runner and is simply bonded into position. We have also created multiple runner junction types for building ready to go resin flow networks, whereas before you would need to cut and paste any junction features from the flimsy channel section."

Another very important development is the relationship of the thickness of the bags verses resin exotherm. Marky's development team discovered that thicker silicone bags actually work against you, especially with gelcoat finished parts, due to the thermal mass of the silicone. This can hold and insulate the heat from the resin exotherm causing gelcoat blister and rework. Marky now manufactures much thinner bags supported with more reinforcement mesh to alleviate this issue. The bags are lighter and easier the handle which in turn keeps costs lower and produces better quality parts.

"The system needs less resin and glass and makes stronger parts. We've improved part-to-part quality, cut down on consumables and reduced our waste stream. The system doesn't require release agents and there is no maintenance. Turnaround times have also decreased significantly," advised Blaise.

Blaise advises that the two types of silicone rubber are 1) Tin (condensation) cured and 2) Platinum (addition) cured silicone rubber. Both types have advantages and disadvantages and neither are compatible with one another. Silicone rubber is an excellent choice for making moulds in that it has excellent strength, flexibility, and is self-releasing.

Olympic class dive starting block complete with adjustable track start, insulated backstroke bar and non-slip matting.

The only thing RTV (room-temperature-vulcanizing) silicone will stick to is silicone itself. Tin (condensation) cured silicone rubber uses tin salts as a catalyst and uses moisture in the air to transform from liquid to solid. Platinum (addition) cured silicone rubber uses a platinum catalyst and uses heat to transform from a liquid to a solid.

The company only uses the highest quality two-component platinum addition cured silicone which has a high chemical resistance to the aggressive components found in some resins and a high resistance to wear and tear. It has a high level of accuracy in reproducing detailed parts and is dimensionally stable over time with non-deformability. Its non-stick properties are also considerable at high temperatures, resistant to ageing and can sustain perfect negative pressure.

One product where the reusable silicone bag system has proved itself as an efficient and economic production system is the iconic swimming starting blocks that Marky manufactures for the export market.

The International Swimming Federation (FINA), sports bodies such as the Australian Institute of Sport (AIS) and pool equipment manufacturers have driven design changes to give swimmers a speed advantage when diving into the pool. The most significant development is the adjustable slanted footrest, allowing swimmers to use the crouch start with the rear leg at a 90 degree angle at the knee. The blocks are now designed to accommodate both the track start where the swimmer positions one foot in front of the block and one foot at the rear, as well as the standard start where the swimmer positions both feet and hands at the front of the block.

As Blaise says "The design, shape and materials of the starting blocks enable athletes to gain propulsive energy and underwater trajectory. And, as a superpower in the sport of swimming, it is realistic that an Australian company should manufacture state of the art aquatic equipment in a suburb halfway between Brisbane and the Gold Coast and export to the rest of the world."

Dive block mould rapidly filling with resin during resin injection

Nested track start mould, 4 parts in one shot, preparing for resin injection.

LOOKING FOR AN ADDITIVE THAT WILL ENSURE DESIGN INTEGRITY?

IMCD: Advanced Materials

Our in-depth knowledge of the composites production chain allows us to offer you innovative solutions at every stage of the process. Our products will ensure the right level of quality so that you produce the best possible product. Through our expanding partnerships with suppliers, we can offer you an extremely comprehensive speciality plastics product portfolio. **We offer Organic Peroxides from Nouryon, Additives from BYK and Mold Releases from Stoner amongst our vast product range.** Call us to find out how our expertise can bring value to your business. **www.imcdgroup.com**

Nouryon

BYK Additives & Instruments

Stoner

IMCD

Value through expertise

IMCD Australia Pty Ltd
P: +61 3 8544 3100, E: cs@imcd.com.au,
Customer Service: 1300 130 295