Gurit

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- Sustainability trends in composites
- Electrification in marine
- Bringing an artist's vision to life
- And more…

TOOLING UP FOR WIND – ON LAND AND AT SEA

OneGurit

Magazine for employees and friends
July 2023 – English

WELCOME

Welcome to OneGurit magazine

With OneGurit, we're delighted to share insights into various aspects of life at Gurit, from innovations within our own business units, to customer successes, the talents of our people, and in this issue, we share viewpoints on several market trends.

The composites market, and Gurit in particular, is well placed to take advantage of a global shift, one towards increased sustainability awareness and action taking. We share with you how this shift is impacting the wind sector, with blades leveraging lighter material to facilitate the build of bigger turbines which can generate more wind power; you can learn about how the composites market is responding to calls for greater sustainability in its products; and discover more about how a focus on energy efficiency and reduced emissions is driving change in various sectors of the maritime industry.

Gurit is proud to have sustainability at the heart of what it does.

Last but not least we would like to thank our colleagues contributing to this issue, in particular Jesper Sloth, Monique Norris, Sara Watson, Dave Russell, Amy Moram and Paul Spencer.

If you have an idea for a story in the next issue, contact us at **marcom@gurit.com**

OneGurit Editorial Team

Thomas Nauer
Head Sustainability,
Marketing-Communications

Sian Stimson
Co-editor, Marketing Manager

CEO VIEWPOINT: MITJA SCHULZ

Dear Readers and Colleagues,

In 2023, Gurit continues to lead the way with its innovation, sustainability efforts and comprehensive solutions for both wind energy and lightweighting. As we hear greater calls for sustainability within our industry, it's encouraging to know we are already playing our part, using our depth of materials knowledge, our strong customer relationships, and innovative mindsets to make progress.

After two challenging years, we have seen some stability return. The Chinese wind sector remains strong; subsidy programs to support renewable energy have been released and western wind customers are ordering new blade moulds which we expect to translate into material sales over the next few years. Interestingly, despite the Western's current focus on carbon pultruded blade structures, we expect blades with glass pultrusions to emerge, something we have seen in the Chinese sector for some time. And we are starting to see a greater use of composites in other parts of the turbine, in particular the roots, for which we have developed in-house pultruded glass root solutions.

Our marine business continues to grow, and we proudly bring our expertise as a materials supplier and technology & engineering partner to all sectors. The drive for more sustainability within the maritime sector is clear to see, and we are at the forefront of developments here, in terms of materials development, tooling solutions, and structural engineering designs. It's exciting to read about the range of projects we are involved with, from performance raceboats to electric workboats, and now even bringing composites to large cargo ships.

Lastly, we see an increasing demand for recycled PET addressed by customers in Europe and North America, to be used in industrial panels for transportation, interior applications and building & construction purposes.

I want to thank our global teams for their continued efforts to support our customers and striving to deliver on our united goals with a strong commitment to our Gurit values.

Best regards

Mitja Schulz
CEO, Gurit Group

EYE ON WIND

PULTRUSION TRENDS IN WIND

Jesper Sloth, Chief Sales Officer at Gurit's Structural Profile business, Fiberline, analyses wind market trends and explains how Gurit and Fiberline are proactively investing in solutions for the next generation of wind turbines.

Jesper Sloth, Chief Sales Officer, Fiberline

When there's a downturn in a cyclical market, it's an ideal time to look at trends, evaluate your product portfolio, and anticipate whether it's likely to grow above, at par or decline when the market recovers. That is, ask whether the products and solutions you offer are aligned with the anticipated developments.

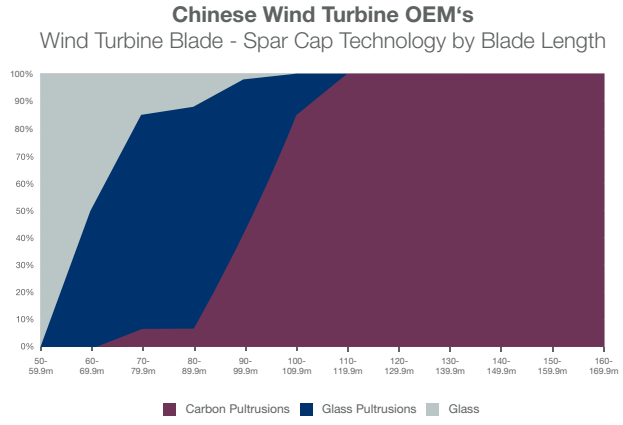
Whilst the cyclical Western wind market is currently experiencing a downturn, there is strong evidence that wind turbines continue to grow, and the race for the biggest is on between the wind turbine manufacturers.

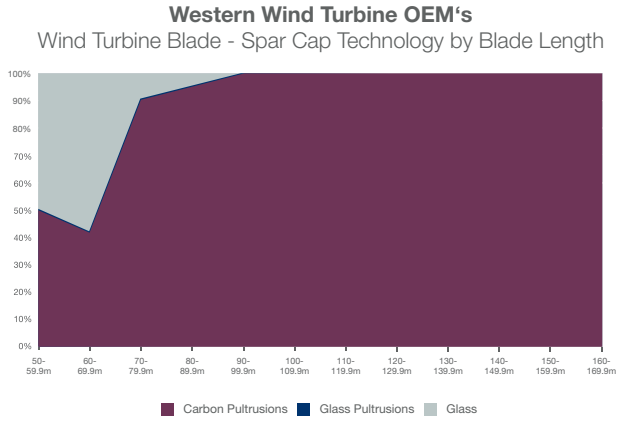
For Gurit's structural profile business, it is especially important to look at which technology is being applied to win this race. These are three trends we are seeing:

Trend 1: Moving towards pultrusion standardisation

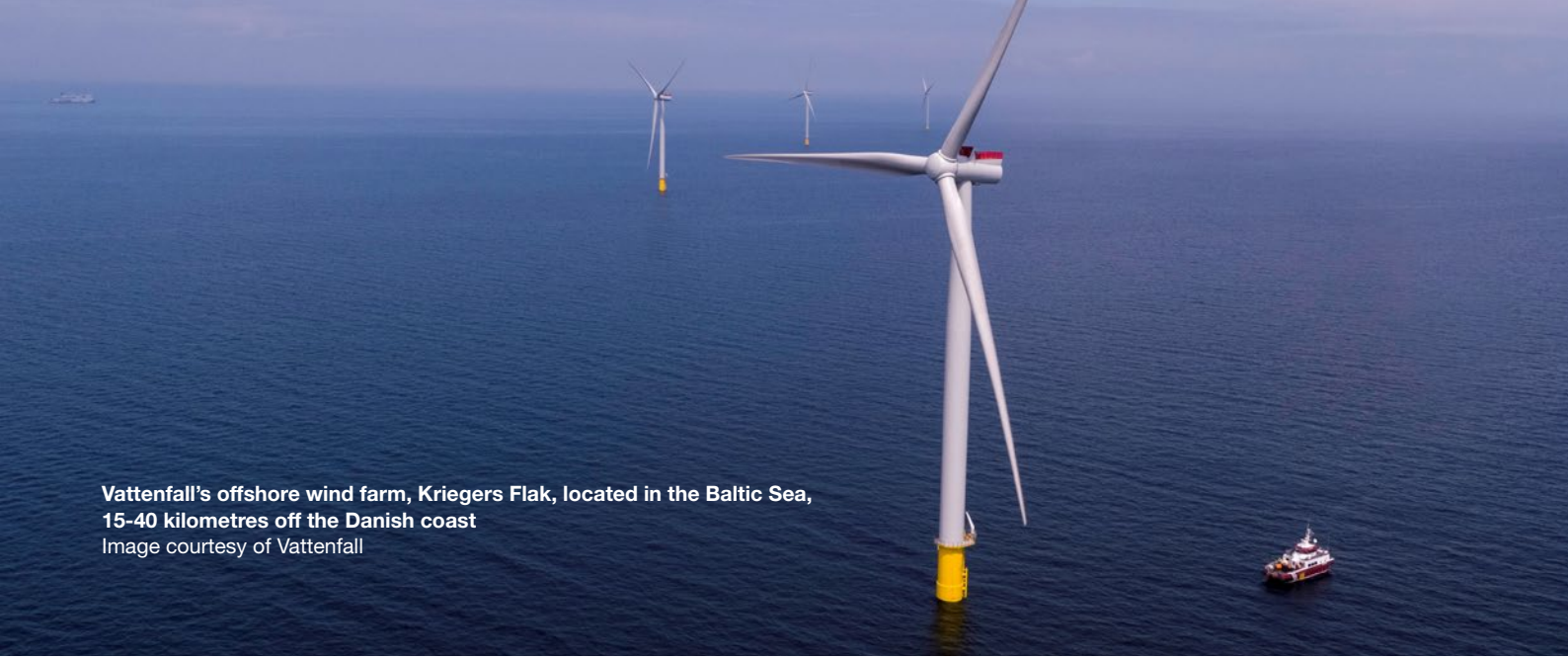
All Western wind turbine OEMs are using carbon pultrusions in the blade spar caps of the wind turbine blades currently in their design pipelines - a trend which ultimately could drive a supply gap in the industry when the market picks up. And despite talk of standardisation and industrialisation in the industry, the OEMs continue to customise the specifications and dimensions of the pultrusions.

To limit cost and complexity in the supply chain, suppliers with technology capabilities should take a role in standardising specifications and dimensions, which requires a partnership mentality with the wind turbine OEMs. To support this, Gurit continues to invest in expanding our technology capabilities and building an in-house accredited test centre at Fiberline.





Background data from Brinckmann, Global Wind Turbine Technology Forecast, 2022; Glass Pultrusions and Glass fabrics data from Gurit



Vattenfall's offshore wind farm, Kriegers Flak, located in the Baltic Sea, 15-40 kilometres off the Danish coast
Image courtesy of Vattenfall

Trend 2: The emergence of spar cap glass pultrusions in the West

Interestingly, none of the Western wind turbine OEMs have taken the intermediate step of using glass pultrusions, which has been the dominant technology for 70-100m blades in China, creating an intermediate low-cost step prior to implementing full carbon.

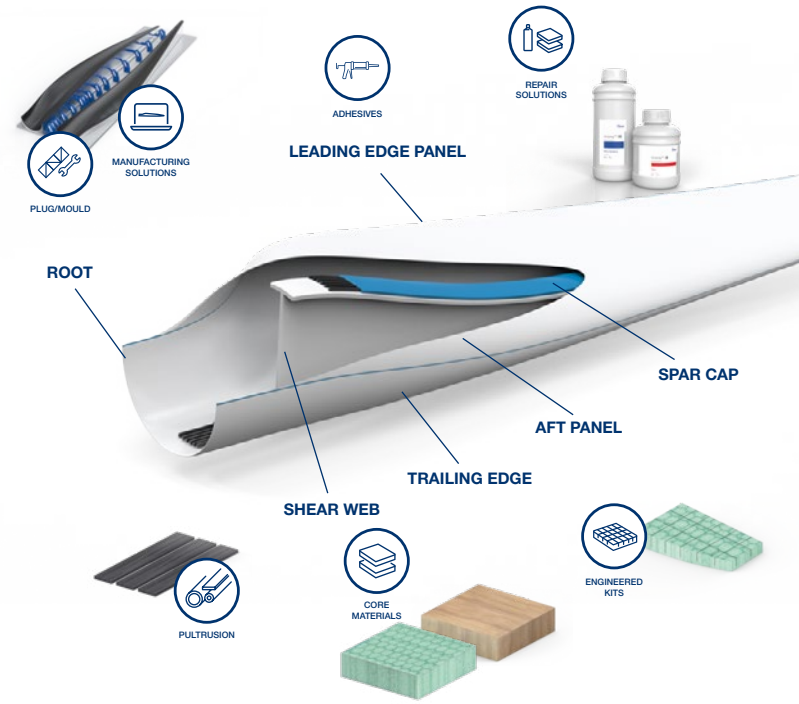
The race in China has been focused on designing the longest possible blade with a glass spar cap to keep the blade cost down, and has been seen as advantageous despite the significant weight difference between glass and carbon.

Despite the Western's current focus on carbon, we expect blades with glass pultrusions to emerge. To promote and support this trend, Gurit has entered into a strategic partnership with Owens Corning to supply pultruded glass spar caps to Western wind turbine OEMs.

Trend 3: Pultruded glass elements for blade roots

For structural and logistical reasons, as blades increase in size, the industry is moving towards more advanced root designs to increase the root strength without increasing the bolt circle diameter.

Increasing the size of the blade root would require a proportionate increase in the size and weight of the rotor hub and therefore the overall turbine structure. It would also cause logistical issues due to height restrictions when transporting wind turbine blades on road.



Gurit offers a full range of composite product and technology solutions for wind turbine blades

The industry is therefore moving away from T-bolts for example, and into more sophisticated roots with pultruded glass elements, ensuring that the bushing can be placed closer together. To support this trend, Gurit has built a strong and specialised capability in pultruded glass elements for a variety of root solutions, and invested in developing an in-house root solution, which can be used across wind turbine OEMs.

For more information about Gurit's solutions for wind turbine blade manufacture, visit:

www.gurit.com/wind

For more information about structural profiles, visit:

www.fiberlinecomposites.com

PET RECYCLING

IT'S EASY TO BE GREEN

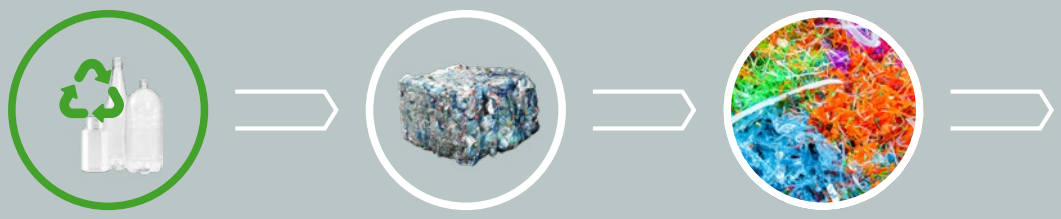
WHEN YOU CAN USE ALL THE COLOURS OF THE RAINBOW

Now, we're expanding our feedstocks so that we can recycle even more plastic bottles into Gurit Kerdyn™ PET core material, which means including **bottles of all colours.**

In 2022, we saved

1.4 billion

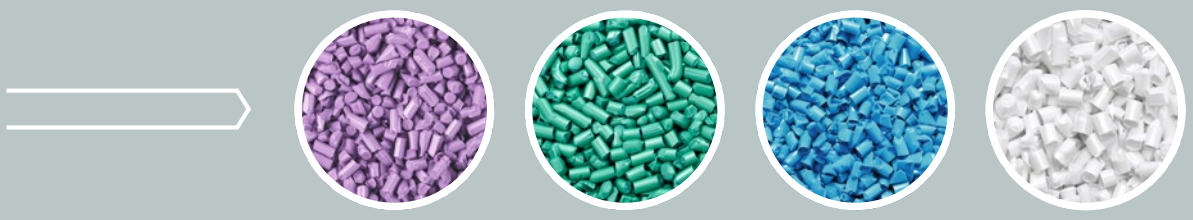
post-consumer PET plastic bottles from landfill or incineration



PET BOTTLES

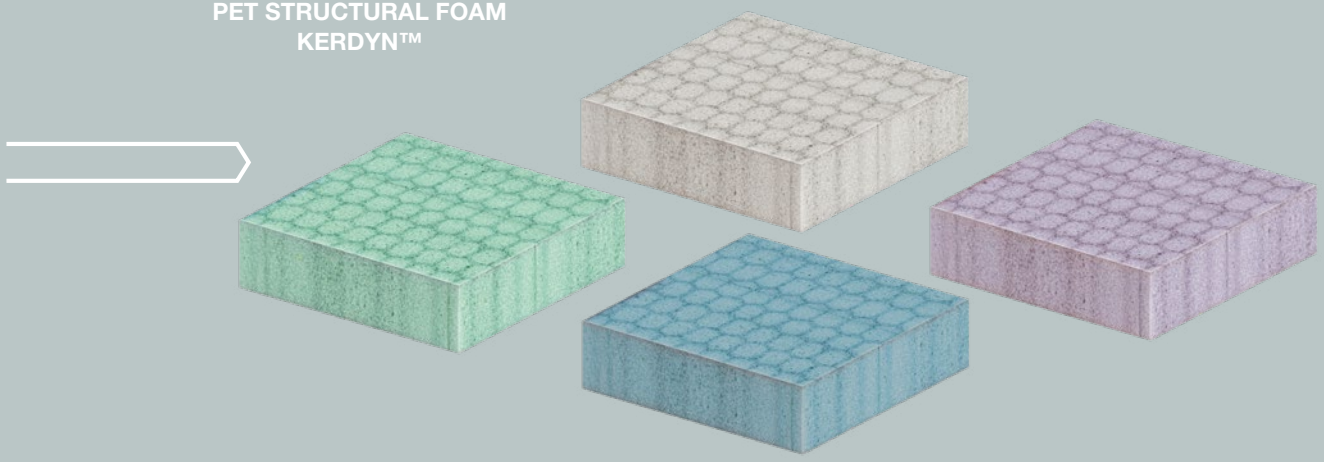
SOURCING OF PET BOTTLES

RECYCLED PET FLAKES



RECYCLED PET GRANULES

PET STRUCTURAL FOAM KERDYN™



The material quality and mechanical performance of Gurit PET remains the same. However, customers may notice a colour variation in their delivered stock, as we prefer not to add chemicals to the process for cosmetic purposes only. As always, customers should ensure the product is fit-for-purpose for their specific application.

Whatever the physical colour of your Gurit PET sheets, you can rest assured that the product retains the 'green' sustainability characteristics you've come to expect from Gurit.

Gurit manages the PET manufacturing process from start to finish. We bring in post-consumer bottles to produce flakes and granules, which are later extruded into Kerdyn PET core. Through this, we secure quality and cost-effective raw material supplies. Plus it enables us to more easily identify and implement greater efficiencies, and ensure we are recycling waste generated during our own block slicing, trimming and kitting back into the process effectively using our own extruders.

GURIT-INTERNAL PET WASTE RECYCLING PROCESSES

"Our R&D activities further improve the properties of our PET foams. We also collaborate with our Procurement colleagues to identify the best recycled PET available in the market, meeting both sustainability and cost requirements: we tested over 40 different types of recycled PET in our laboratory in Italy and qualified several suppliers of recycled feedstock.

Furthermore, our R&D Team is investigating on how to extend the recyced PET feedstock from drink bottles to any container used for personal care and detergents products.

We found the right correlation between foamability and recycled feedstock composition. The collaborations with different universities, research centers and testing labs helped us to select the best testing techniques. I am very happy that Gurit is strongly committed to reduce its carbon footprint and I am proud to actively contribute to this with my day by day activity: extending the sources of recycled PET makes our processes more sustainable in many ways."

Marco Aurilia
Product Development Manager PET

INNOVATION EXCELLENCE FOR PET CORE MATERIALS

CRADLE-TO-CRADLE INNOVATION TO REDUCE EMISSIONS – KERDYN™ PET

Gurit is committed to reducing emissions and has set ambitious reduction targets to achieve climate neutrality, and our continued investment in and innovative approach to the development of our Kerdyn™ PET is a key part of our plan to get there.

Gurit Kerdyn PET foam is produced using significant proportions of post-consumer waste PET. This is recycled primarily from waste bottle sources that otherwise we can see contaminating our environment at road sides, in cities, oceans and rural areas. Gurit has the ability to conduct this recycling of waste PET post-consumer bottle from internal and external means, converting the recycled PET (rPET) into Kerdyn PET core material with diverse market uses as lightweight composites or energy saving insulation. The wide range of end products produced by our customers using PET includes wind turbine blades, boats, vehicles and buildings.

Let us recycle and make use of our planet's resources responsibly.

#GuritCares

Our focus is not just on the recyclable raw materials but on each stage of Kerdyn PET's lifecycle, making sure we are reducing waste, reducing emissions, and are developing options for end-of-life. We are using our materials knowledge, processing expertise and innovation to progress towards circularity.

- We manage the PET manufacturing production process from start to finish, creating greater efficiencies
- We use up to 100% recycled post-consumer PET bottles in our PET sheets
- We recycle waste PET generated through our own block slicing, trimming and core kitting back into production (in 2022 this was over 6000 tonnes of PET)
- We co-locate our PET production where possible, such as our site in Chennai (India), where our PET production is located next to our kitting facility, and is close in proximity to our customers. This reduces transportation emissions, storage requirements and facilitates recycling of our own dust and off-cuts.
- We continually assess our processes to reduce waste and improve quality, such as the redesign of the pressing unit at our Tianjin (China) site; something which is being rolled out to other Gurit sites
- We are investigating how we can recycle customers waste PET back into our process
- We are actively involved in several PET end-of-life research projects, alongside several institutions and customers, looking at how we can complete the cycle and reuse end-of-life PET core to make new core material

RECYCLABILITY
CRADLE-TO-CRADLE

Use of recycled products
Product development
for recyclability

WASTE
REDUCTION

Co-location & on-site production
optimized processes
Packaging reduction

CLEAN
TECHNOLOGY

Recycling technology
(PET / extrusion)
Modernized equipment for
reduction of emissions
and energy consumption

INNOVATION CULTURE

Teaming up for innovation

The team spirit of Gurit's global PET organisation is a highpoint for Keith Netting, who has been with Gurit since 2013, and has held several technical leadership roles in that time. As Senior Head of the PET Product Line he feels fortunate to be able to work with our PET teams around the world, who share the aim of developing a best-in-class product, whilst continuing to build on the circularity opportunities it offers.

Gurit has successfully extended its recycling feedstock to cosmetics and detergent containers

"Innovation must be related to the market need and that is front of mind for me. The challenge with PET is that it is seen as a commodity product so there is a drive for cost efficiencies; but it still fulfils a technical role so quality of raw materials, product manufacture and how it is processed by the customers all play a part in its success. I enjoy working as part of a team where we help each other rise, particularly when it comes to establishing new manufacturing sites, where the experienced teams step in to support the new ones."

Keith Netting

Team player and Senior Head of Product Line PET

MAKING THE IMPOSSIBLE POSSIBLE

BRINGING AN ARTIST'S VISION TO LIFE

Purchased in 1991 so the owner could escape the English winter, the 400 hectares of Gibbs Farm have since been transformed into a stunning open-air park containing the biggest collection of large outdoor sculptures in New Zealand.

Standing 48m tall on a ridge overlooking the harbour, the Len Lye Wind Wand is one of these impressive and eye catching sculptures. It is a kinetic sculpture constructed out of fibreglass and carbon fibre, weighing around 400kg with a diameter of just 200mm. In strong winds the Wind Wand bends more than 20 metres and the red sphere on the top contains 1,296 light-emitting diodes. A sister Len Lye Wind Wand was built some years earlier in New Plymouth.

Post-humous fulfilment of the artist's ambition

Lye was born in New Zealand but spent much of his life in London and New York, becoming known for his experimental films and kinetic sculpture.

Lye came to feel that size was important to movement but he had great difficulty in funding large works because the material and technology were so expensive. Hence, a number of such projects did not get beyond the stage of plans and small models whilst he lived. The Len Lye Foundation has, since his death, taken up the challenge to fulfil Lye's ambition.

Achieving both structural integrity and dynamic movement

Gurit has been involved in reviving Lye's vision after the original wind wand at Gibbs Farm was brought down in a storm after standing for 15 years.

As a result, the Gibbs Foundation made the decision to commission a replacement wind wand that would match the appearance and dynamic characteristics of the original Len Lye design. Gurit re-engineered the wind wand laminate to take advantage of modern production techniques, and reduce the peak working strains to maximise the lifespan of the composite laminate.

The replacement wind wand was manufactured at Hall Spars in Auckland, before being trucked out to site and craned into position overlooking the Kaipara harbour.

Wind Wand at Gibbs Farm

The Len Lye Centre in New Plymouth, New Zealand

"Initially we looked at whether it would be possible to repair the original wand tube by re-joining the two damaged sections. However, after conducting material tests in our mechanical test lab, we established that the original wand laminate was fatigued and unable to achieve a join strength that could cope with the high working strains of such a flexible structure."

James Ledingham
Design Engineer, Gurit Asia Pacific

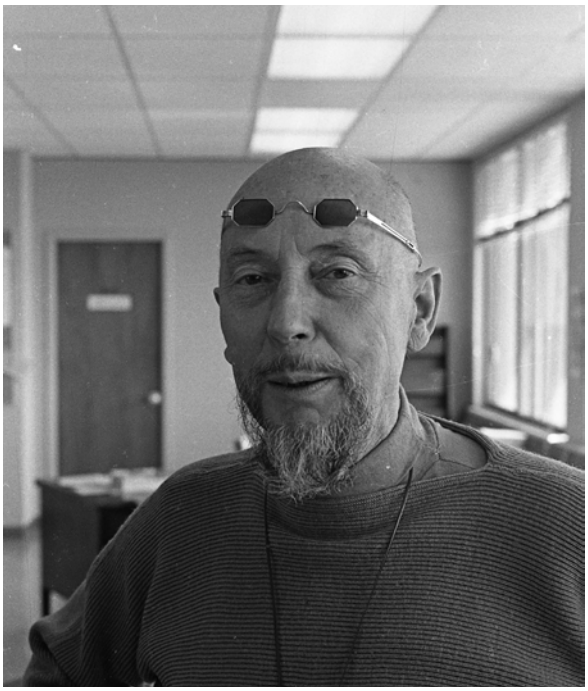
Gurit also engineered the Ron Arad-designed wind wand that was installed at Canary Wharf in London in 2000. A 50 metre high needle made of carbon fibre, it was designed to flex gently in the wind, in contradiction to the very solid and static buildings that surround it. Gurit is typically asked to engineer structures that are stiff and strong, so flexible wind wands provide an interesting and unusual challenge for the team.

www.lenlyefoundation.com

www.gibbsfarm.co.nz

"My work I think is going to be pretty good for the 21st century. Why the 21st? It's simply that there won't be the means until then, I don't think there'll be the means to have what I want, which is enlarged versions of my work."

Len Lye



Len Lye, artist and kinetic sculptor
Image courtesy of The Len Lye Foundation

About Len Lye

Len Lye was a painter, kinetic sculptor, writer, theorist, musician, experimental artist, photographer and filmmaker. He lived in New Zealand, Australia, Samoa, London and finally New York. As a young man he was one of the first sculptors in the world to work with movement; and the sculptures he made during the 1960s and 70s are among the best kinetic art of any period. Lye's sculptures and films are held in many collections around the world.

Born: 1901, Christchurch, New Zealand
Died: 1980, New York, United States


Let us recycle and
make use of our planet's
resources responsibly.
#GuritCares

FORMA

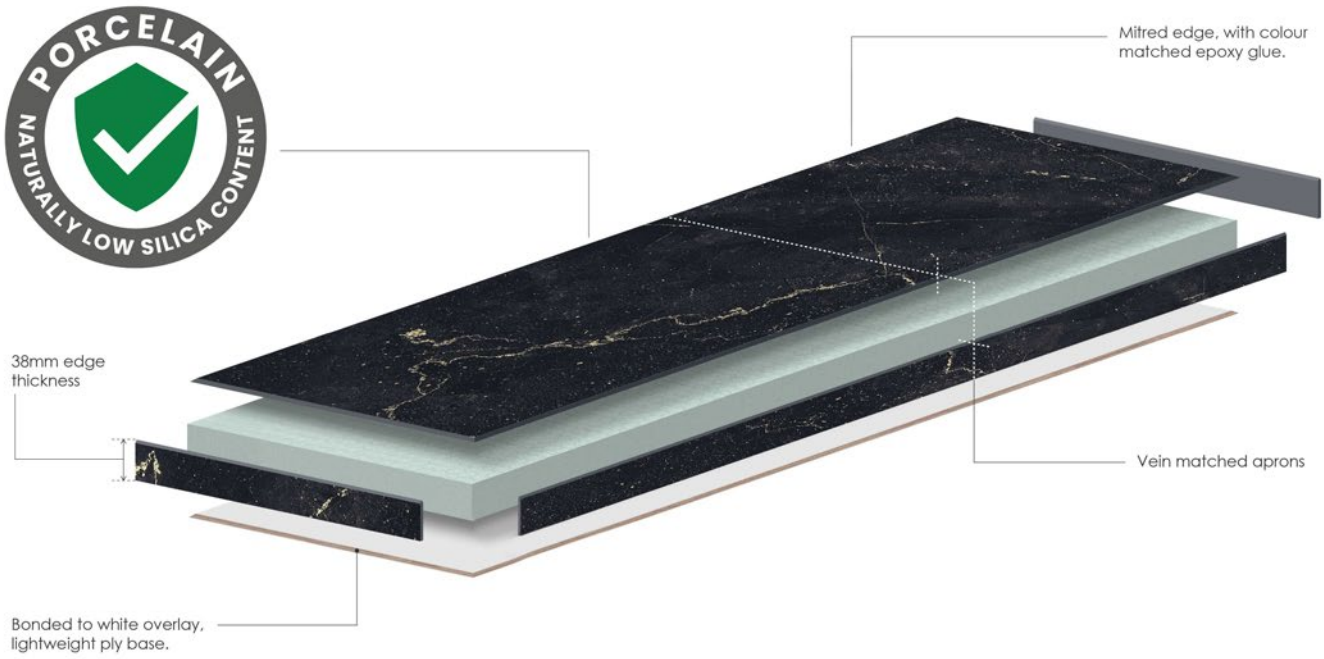
PORCELAIN MEETS RECYCLED STRUCTURAL PET FOAM

We are excited about our new collaboration with Forma in Australia who are pushing the boundaries of innovation and sustainability with Gurit Kerdyn™ PET in their porcelain benchtops.

This new product range 'Form-lite' is a lightweight, durable and luxurious benchtop stone surface with advanced engineering by Forma to include the up to 100% recycled PET foam as the substrate, bonded to porcelain surface with naturally low silica content.

Sustainability plays a central role in all that we do at Gurit and we proud to partner with organisations who share our passion for a sustainable future.

www.forma.com.au



Forma kitchen benchtop containing Gurit recycled PET core material

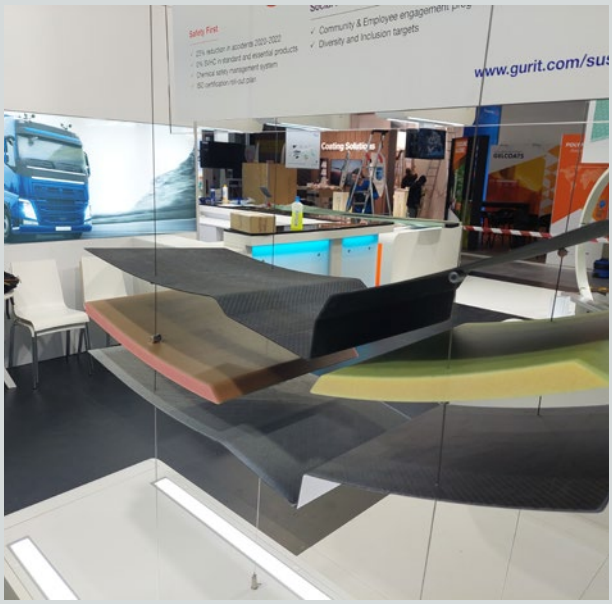
Images courtesy of Forma

JEC WORLD A GREAT SUCCESS

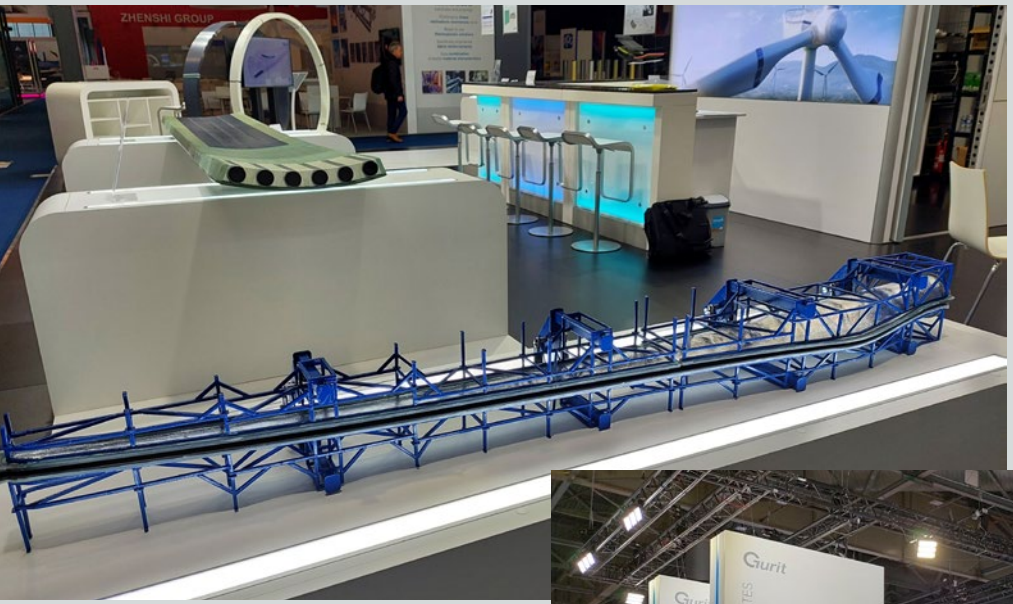
The world's largest composites-focused trade show, JEC World, took place in April in Paris, France. Over 40,000 visitors were welcomed from more than 106 countries, who visited the booths, attended the conferences, and admired the technology displays of over 1200 exhibitors.

Gurit is a long-standing exhibitor at JEC and our team was delighted to receive many visitors, clients and business partners to our booth over the three days of the show. We were able to showcase our comprehensive technology solutions for the wind blade sector, as well as our lightweighting composites products and processes for the marine and industrial markets.

Thank you to everyone who took the time to stop by and talk to us!



An 'exploded' boat hull, showcasing our lightweight materials



JEC WORLD 2023 The Leading International Composites Show
April 25-27, 2023 | PARIS-NORD VILLEPINTE

Scale models helped explain Gurit's full solution capability in large scale and now also modular tooling

SAFETY FIRST

KNOW YOUR EMERGENCY PLAN

All Gurit sites are required to have an emergency plan customised to the specific conditions, equipment and risks present at that site.

Take some time out of your day to identify where your workplace emergency plan is located and make sure that you understand the information presented – your actions could save you and your colleagues in the event of an incident.

Here's a list of what an emergency plan could include. What else might apply to your workplace?

Here's a thought:
Do you know where your emergency exits are right now?

Emergency Planning Checklist

1. Suitable fire detection system and information about where emergency alarms are located
2. A process for identifying false alarms
3. A clear understanding of who calls the emergency services and who stays behind to shut down critical operations
4. Suitable and clearly marked escape routes, kept clear of clutter, furniture and any hazards
5. Emergency doors that open easily – and emergency lighting if it is needed
6. Training to be shared so employees know the emergency procedures, with plans for regular testing
7. A detailed floor plan showing where emergency equipment and first aid supplies can be found
8. Location of the safe meeting point for staff
9. Plans for anyone who might not be able to escape quickly if there's a fire – for example, wheelchair users or people with visual impairments
10. Design a method for accounting for all employees (and visitors, if your workplace has them)

"Having an emergency plan is safety 101 at Gurit. It is organised and reviewed by each site's safety team, with trainings and the drills regularly updated. Every employee must also be familiar with the aspects of the plan that affect them, so they can act promptly and safely in case of an emergency. Keeping ourselves, our colleagues and our customers safe is a priority at Gurit."

Encarna López Córcoles
HR & H&S Manager, Gurit Spain

MEET OUR STAFF

BHARATHIRAJA NATANASABAPATHY ‘PASSION FOR QUALITY’

Bharathiraja Natanasabapathy joined Gurit in 2021 as Head EHS & Quality at our Chennai (India) site and has since then additionally taken on the global role of Customer Quality Wind – Indian customers. He has been instrumental in establishing the site as a well-respected and high performing supplier to the Indian wind sector. Today, our Chennai facility has achieved ISO9001 certification, DNV certification of its lab, and zero Lost-Time-Accidents (LTA) for 900 days.

“I believe a big part of our success has been the passion we have for maintaining standards, having strong guidelines in place and sticking to them. This is what drives my day-to-day work and I enjoy sharing this passion with our team. We use special occasions to engage our team in fun activities which help to increase awareness, highlight our vision for these areas and ensure we are all working as one team towards the same goal.”

Bharathiraja Natanasabapathy
Head EHS & Quality Chennai (India)

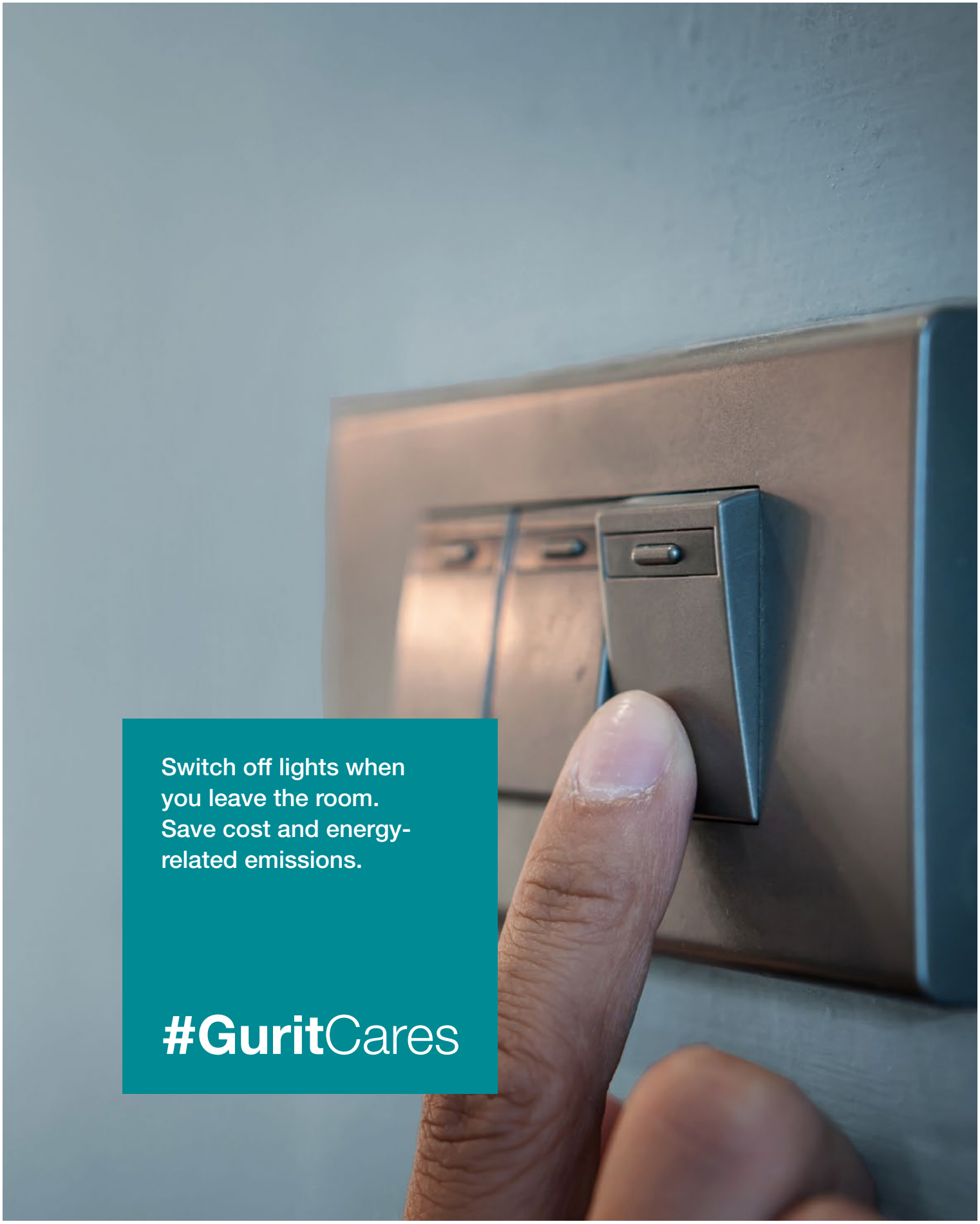
SAFETY FIRST

MAINTAINING HIGH SAFETY STANDARDS

The teams celebrate their safety achievements – Turkey (left) and Italy (right)

Our teams in **Volpiano (Italy), Izmir (Turkey)** and **Tamaulipas (Mexico)** have reached important safety milestones – Izmir achieved 600 days, Volpiano 500 days without an LTA (Lost Time Accident) and Mexico has reached the one year mark!

Congratulations to these sites – and our teams across the globe who work diligently to ensure we hold ourselves and each other accountable to high safety standards.


Switch off lights when
you leave the room.
Save cost and energy-
related emissions.
#GuritCares

VIEWPOINT: AMY MORAM

In this issue of OneGurit, we speak with Amy Moram, Global Chemical Regulatory Compliance Manager, based at Gurit UK. It quickly becomes apparent when speaking with her that she's a woman who likes to get things done. Amy explains how over the last twenty years she has influenced change through her advocacy, facilitation skills and thirst for knowledge.

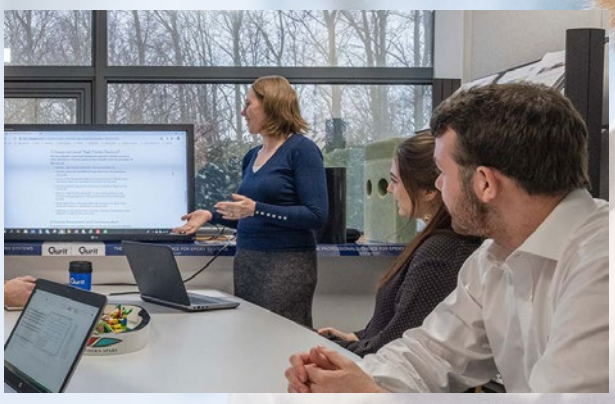
When Amy entered the workforce in the early 2000s, she was interested in science and knew that she wanted to work in a lab. So joining Gurit as a lab technician in the product development team was a perfect match.

"I was very fortunate to have some of the brightest minds in composites as mentors in those early days," explains Amy. *"I would have regular 'chemistry lessons' from our senior and experienced team members, and I grabbed every opportunity to learn, whether on a course, spending time with the technical support team, or through practical application. I guess it was an informal version of what might now be called an apprenticeship."*

Advocating for chemical compliance

"There were few regulations when I first started, but as well as lab work, I also worked on projects that involved things like Intellectual Property and safety data sheets, which rounded out my knowledge of epoxies and how we use them in our business. So when REACH was founded, I was in an ideal place to pick this up."

REACH stands for Registration, Evaluation, Authorisation and Restriction of Chemicals and came into force in 2007. It is a regulation of the



One of the highlights of Amy's role at Gurit has been interacting with many different teams across the organisation.

Amy attending an 1851 STEM Maritime roadshow

European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. Later on, further regulations such as the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) ensured the safe use, transport and disposal of chemicals.

Amy has been an advocate for chemical compliance from the outset, working as part of the regulatory team as well as continuing in the lab, until she took on compliance full time in 2013. Her broad knowledge base placed her at the centre of the project to speedily get systems in place for Gurit that would meet the increasing requirements of both REACH and GHS. As a company with a very comprehensive product range, covering many regulatory requirements, this was no mean feat; but supported by Amy's unique skillset and can-do approach, the team got it done, and it remains one of her most significant projects to date.

Combining knowledge and passion to impact Gurit's sustainability path

Her background in compliance and product development led to her becoming part of the Sustainability team at Gurit. There was a clear overlap of the company's increasing work in sustainability with her work in chemical compliance, and her role has more recently expanded. Amy is now the sustainable product lead, where she considers not only what the products are made of, but how they're made, how they're packaged, regulations, life cycle analysis, bio content and product declarations. And as further testament to Amy's ability to advocate and unite, she is also the lead for the company's resource utilisation sustainability workstream.

"At Gurit we have a proactive approach to sustainability and this sits well with my personal mindset of driving change for the better. We want to do the right thing for the environment and our global community now, rather than wait for the regulations to dictate it. It's complex with composites but we've made a start and I'm excited about what lies ahead as we think beyond the materials' first application – we are now considering what will happen at the end of their initial life. Can they be reused, repurposed, recycled.....the challenge is that composites are structurally sound for such a long time, and we have no idea what technology will be around to facilitate end of life in the future."

(Read the next article in this issue of OneGurit to get more of Amy's insights into sustainability trends.)

Making STEM careers accessible to all young people

As a woman in technology, Amy takes her role as an ambassador for STEM careers very seriously. She sees her mission to be visible, for young people to see what possibilities lie out there for them in the workforce, something she didn't have as a teenager. She wants to normalise seeing women working in labs and to ensure that all young people, but especially girls, know they can be whoever they want to be and do whatever they want to do. Amy can often be seen hosting students at the Gurit Isle of Wight site or attending career roadshows – she is even organising a 'speed networking' event later this year for young people in the local community.

"My advice for girls is to find what you're interested in and run with it. The job landscape is changing and it's hard to predict what you might be doing in 5, 10 years' time, but if you do what you enjoy and are curious about opportunities, then the right job will find you."

INNOVATION INSIGHTS

SUSTAINABILITY TRENDS IN COMPOSITES

Amy Moram, Chemical Regulatory Compliance Manager and Sustainable Products Lead at Gurit, shares highlights of the latest sustainability trends in composites.

Greater acceptance of composites within broader range of industries

Composite materials are playing an increasingly important role in meeting the world's sustainability goals by providing durable, lightweight, long-life structures. We're seeing a greater acceptance of composites in a broader range of applications: for example, the development of the new Eurocode for composites for use in construction products will provide more scope for these materials to be substitutions for traditional high carbon intensive materials such as steel or concrete.

Sustainable sourcing and addressing the End of Life

However, the use of petroleum sourced chemicals and end of life are still amongst the industry's biggest challenges. The composites industry is aware of the shortfalls and is working hard to develop the technical expertise to overcome them. A handful of technologies are coming to the fore in tackling these issues and are gathering pace at industrial scale.

Flax makes a good sustainable fibre option for some applications

- **Biomaterials are on the rise** and whilst bio-derived chemicals provide an effective direct substitution for petroleum-based substances, bio fabrics are not so straightforward. The performance properties need to be carefully analysed for the specific application before a substitution is made; in some cases, a hybrid fabric could be most suitable. Manufacturers must make sure they are able to substantiate their 'bio' claims. A harmonised internationally recognised single standard would help with this and support purchasers when assessing product options.

- **Recycling of composites** is being tackled by many companies. However, it is technically challenging, and costly both financially and in terms of carbon intensity. There are several end-of-life options available, and we'll see this increasing as technical advances are made over the coming years. (More info can be found on page 148 of our Sustainability Report 2022).

- **Getting the full picture through Life Cycle Analysis** is becoming more common and the development of ISO 14040 Life Cycle Assessment Principles and Framework begins to address the need for a standardised framework. There is an increasing expectation throughout the supply chain to conduct LCAs, which means that not being active in this area is starting to be a real disadvantage. Gurit started work in on LCAs via its Circularity workstream back in 2022.

Ratings providing orientation

It is no longer just about the product but about the company; and rating agencies may help direct customers to those who have sustainability engrained in their businesses and have a clear commitment to maintaining sustainability standards.

Overall, much action is being taken to address the sustainability challenges faced by composites. Composites are well-positioned to meet the needs of industry in the years to come but further effective regulation and standardisation is needed to ensure the right and effective sustainable choices are made.

SWISS AMBASSADOR VISITS GURIT TIANJIN

On June 5, Gurit Tianjin was honoured to welcome Juerg Burri, Ambassador of Switzerland to China, and Martin Matter, Diplomatic Officer, on their first visit to Tianjin City.

Cooperation in scientific research and commerce

The trip aimed to promote international cooperation in scientific research and commerce between Swiss companies in Tianjin and also to strengthen friendly relations between Switzerland and Tianjin City.

Gurit General Manager Bing Chen hosted the welcome meeting and introduced the delegation to the Gurit Group, sharing details of our China operations and our manufacturing solutions, with particular focus on Wind.

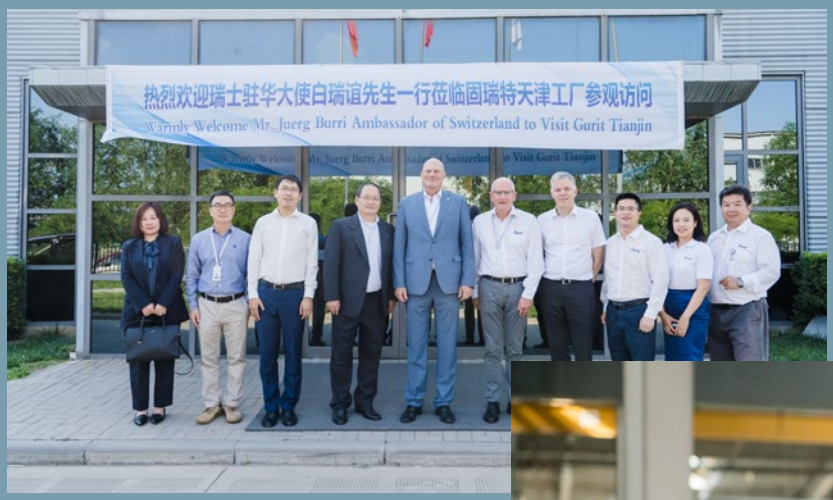
Factory visit

After the meeting, the delegation was invited on a factory tour, where Mr Burri was shown our PET production technology.

He was impressed that post-consumer bottles are processed into high-end composite materials that can be used for wind power generation, rail transit, marine and construction projects.

Recognising our sustainability efforts

He recognised the contribution that Kerdyn™ PET structural foam makes towards reducing waste and greenhouse gas emissions, and was supportive of Gurit taking care of its environment, both natural and social. He looks forward to seeing our continued innovations in this area. The ambassador's visit to the site was followed by a reception at the city of Tianjin Mayor's premises, where Yang Bing – deputy Mayor of Tianjin received the delegation.



GURIT LAUNCHES ITS NEW ‘REPORT A CONCERN’ PLATFORM

Gurit is committed to conducting its business with honesty and integrity, and we expect all staff to maintain high standards in accordance with our Code of Conduct. However, all organisations face the risk of things going wrong from time to time. A culture of openness and accountability is essential in order to prevent such situations occurring and to address them promptly, in particular to address any unethical conduct and prevent recurrence.

With this in mind, Gurit is launching its ‘Report a concern’ platform and process to further promote an environment of transparency, ethical behaviour and accountability.

Ongoing commitment to Sustainability

As a continuation of previous measures to align the company with Corporate Governance best practice and ESG performance and risk management, we have decided to add this additional communication channel.

What is the ‘Report a concern’ platform?

The purpose of this new service is to encourage the reporting of suspected wrongdoing as soon as possible, in the knowledge that any concerns will be taken seriously and investigated as appropriate, and that confidentiality will be respected. The platform is operated by an external provider, which allows anonymous reporting and provides the highest security and data protection standards. The multi-language communication channel is encrypted and password-protected.

This platform will be available to all staff from July 2023 via the Gurit website at **www.gurit.com/report-a-concern**

What concerns can be raised?

Reporting a concern is the disclosure of information which relates to suspected wrongdoing by a Gurit employee or Gurit contractor. This may include but is not limited to:

Environment	Social and Human resources	Business-Ethics	Financial Mismanagement	Cybersecurity & Data protection
Damage to the environment; product safety and hazardous materials, breach of water management guidelines, etc…	Danger to health and safety; Human rights breaches, Unlawful discrimination, workplace, or sexual harassment, breach of our policies, including our Code of Conduct	Bribery or corruption, anti-competitive behavior, unauthorized disclosure of confidential information; undeclared conflict of interest, etc…	Insider trading or market abuse, facilitating tax evasion; financial fraud, money laundering, etc…	Violation of data privacy laws and internal policies, acts or omissions compromising confidentiality and integrity of our data, etc…

"We each have both the privilege and the responsibility of sustaining the highest ethical standards. To succeed, we must all work together, discuss and share observations, stay alert and last but not least maintain communication channels like our new Report-a-concern platform."

Mitja Schulz
CEO Gurit Group

Handling process for issues reported

Once a concern has been reported, it is coordinated as below:

1. Concern will be reviewed to decide on the next steps
2. Local or global function will investigate
3. Relevant committee decides on appropriate action
4. The reporter is updated on the case
5. If required, actions will be put in place
6. Case is closed

Protection and support of reporting person

Individuals reporting a concern are sometimes worried about possible repercussions. We aim to encourage openness and will support those who raise genuine concerns, even if they turn out to be mistaken in good faith.

For more information or to report a concern, please visit: **www.gurit.com/report-a-concern** or contact our Group Legal Counsel, Valérie Collaudin.

Valérie Collaudin, Group General Counsel, is coordinating the Report-a-Concern platform together with our external partner

We want to foster a transparent business climate and a high level of (business) ethics, and thus maintain trust in our company.

For this reason, we open up this additional secure communication channel, which ultimately will also further support us to manage risks.

REPORT A CONCERN

01 Report
Report a concern using one of the reporting channels

02 Review
Report will be reviewed to decide on next steps

03 Investigate
Local or global function will investigate if appropriate

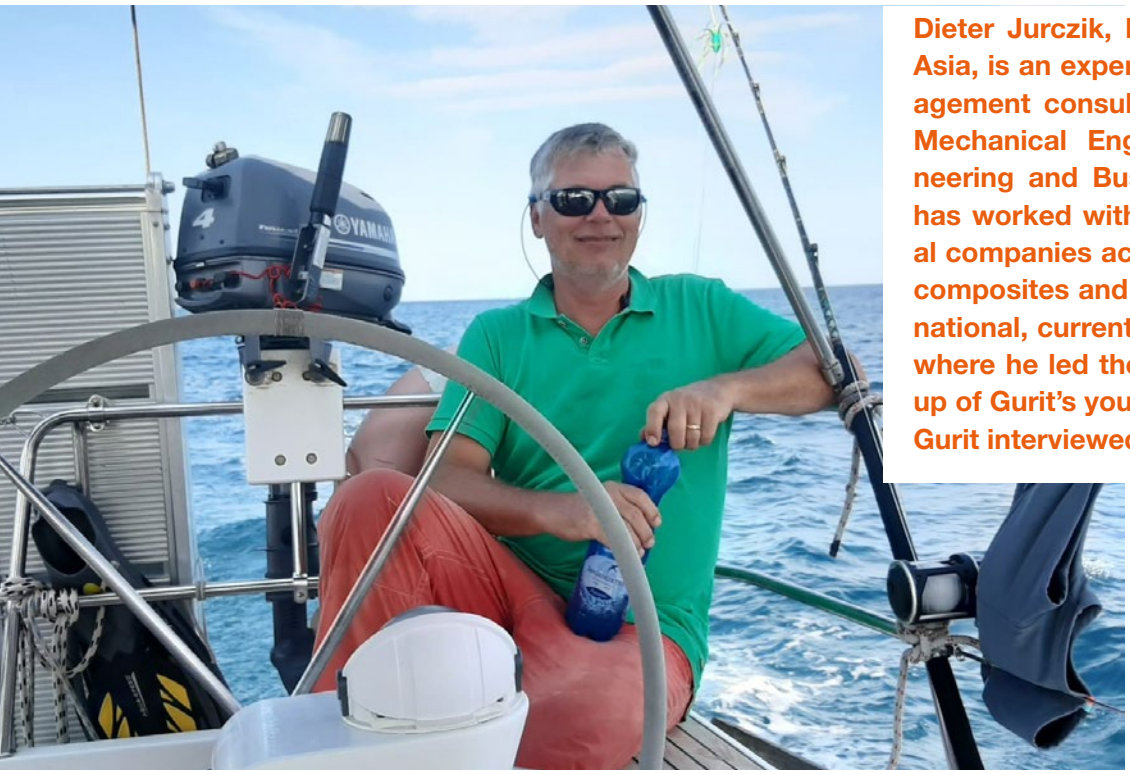
04 Decision
Is the report substantiated? Relevant committee decides on appropriate action

05 Feedback
Reporter is updated on the case

06 Action
If required, an action plan will be put in place

07 Close
Case closed

VIEWPOINT: DIETER JURCZIK



Dieter Jurczik, Head of Operations South Asia, is an experienced engineer and management consultant. He holds degrees in Mechanical Engineering, Business Engineering and Business Administration and has worked with a wide range of industrial companies active in the fields of metals, composites and hydrogen. He is a German national, currently based in Chennai, India, where he led the team to a successful set up of Gurit's youngest greenfield site. One-Gurit interviewed him to find out more.

OG: Dieter, under your responsibility, the set up of Gurit's youngest greenfield site in Chennai, India has been completed successfully. Congratulations on a job well done! Looking back, what were the main factors contributing to this success?

DJ: Most definitely the congratulations should go to everyone within Gurit who played a part in the successful set up. If the project had not been prioritised by these people, it would not have been possible. There are numerous individuals who contributed but I would like to mention two teams particularly: the extrusion team from China and the extrusion team from Italy. They spent several weeks here onsite, training our local team and getting the equipment up and running - despite COVID and other obstacles, which prevented some suppliers from sending their teams to undertake commissioning.

Coming back to your main question: key factors were the trust given to us by the Gurit management and the dedication of our local team to master the technology and ensure it met our global standards.

OG: Were there any challenges you faced and had to overcome?

DJ: The main challenge was most definitely the pandemic. It prevented equipment suppliers from travelling, extended times of quarantine for everyone coming to India, caused local lockdowns, meant that local officials responsible for licenses

were unavailable, and of course some of our team members were unwell, thankfully without severe symptoms. Personally, I spent about ten weeks in quarantine and, although I was vaccinated, I also became infected last summer while staying in Chennai.

OG: Is there anything you are particularly proud of?

DJ: Yes - there are two things to mention here. We achieved the set up without any accidents in our team or on the suppliers' side. We also achieved product acceptance and qualification by customers on the first attempt.

OG: Tell us a bit more about the operations in Chennai, what does Gurit produce there?

DJ: The PET extruder was set up and has been operational since February 2022. We also offer core kitting services, which made its first delivery this May. Following the fulfilment of several smaller orders over the past few months, we have now started mould production for a 78m long blade mould. The pultrusion side of things, which fall under our Structural Profile business unit, have also been operational since May. We are now undertaking expansion projects which will increase production capacity, ready for future products. And we have built a Global Shared Service Centre, a noteworthy engineering and testing lab, along with various other related services and backoffice functions. So we have brought all Gurit activities, with the exception of formulated products and prepregs, under one roof. That's really impressive.

OG: In your view, what makes this site different or unique from others where you have previously worked?

DJ: Over the past 24 years, since the inauguration of the first greenfield project I managed, I have had the chance to run or participate in projects in different parts of the world. Some projects were more demanding technically (this Gurit project was based on technologies that already exist within the company), but I have never run a project with such an extensive product range or under such exceptional circumstances.

OG: What do you enjoy most about living in South India?

DJ: Hah, you know me well! Surfing is a new passion of mine! To maintain some sort of work-life balance, I started to learn to surf at Mahabilipuram, a small seaside town one hour from here. It is great to do something outside of my work bubble, and I have enjoyed getting to know the people from the fishermen's colony.

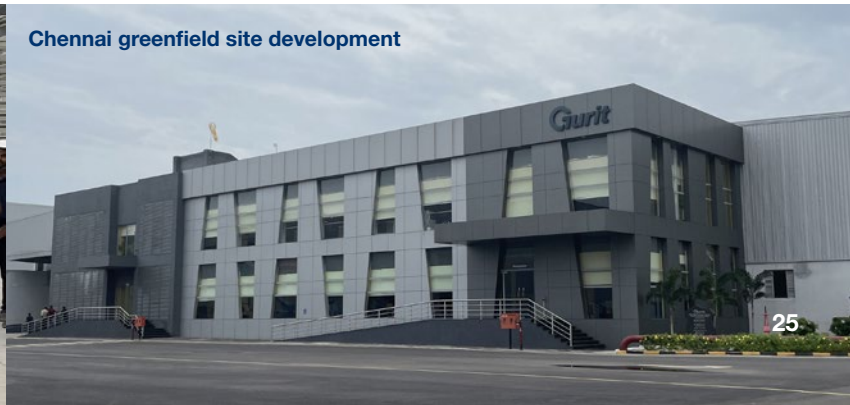
OG: How do you re-charge your batteries, where do you get inspiration from?

DJ: This question is twofold. Recharging of batteries takes place when I spend time with my family, which happens every couple of weeks. To get inspiration, I need to be doing something physically and undisturbed by others, and allow my thoughts to flow. This is normally when I have the best ideas.

OG: Are there any core values you find useful for orientation and would like to share with us?

DJ: Honesty is definitely my core value, and always pays off in the long run. The other is that nobody leaves my office without getting one step closer to the solution of their issue.

Dieter, many thanks for the interview and congratulations once more to your team on a job well done.



Chennai greenfield site development

EYE ON MARINE

COMPOSITES ENABLING ELECTRIFICATION

HOW GURIT IS LEADING THE CHARGE

The Soel Shuttle 14, designed and engineered for efficient clean solar electric propulsion with low weight playing a key role
Courtesy of Soel Yachts

Driven by environmental concerns, country and industry emission reduction targets and the increasing price of oil, interest in the electrification of maritime vessels is growing across the commercial and recreational sectors, and across boats of all sizes. But there are challenges facing adoption, including shoreside infrastructure, technology, operational issues, regulatory frameworks, and cost.

It has become evident that composites are the enabler in the development of efficient, environmentally conscious, economically viable, fit-for-purpose vessels, especially in the 10-40m workboat/ferry sector. Gurit is building up a sound knowledge base and expertise in this area.

The lightweighting advantage

Having worked on numerous electrification projects over the past few years, it has become clear to the Gurit team that achieving a lightweight composite structure is a key factor in an electric vessel achieving its performance, environmental and budget goals.

A high-strength, low-weight structure compensates for the weight of the energy and power systems, whilst still producing a boat that is lighter and therefore more efficient than the industry standard of a diesel aluminium vessel.

"We work very closely with Gurit to define our structural weight targets at the outset, and to help us monitor and manage the weight during the build process. For the Soel Shuttle 14 we decided on a production-friendly vacuum infused E-glass sandwich laminate, which balances durability and low weight."

Linda Brembs
Soel Yachts (left in photo)

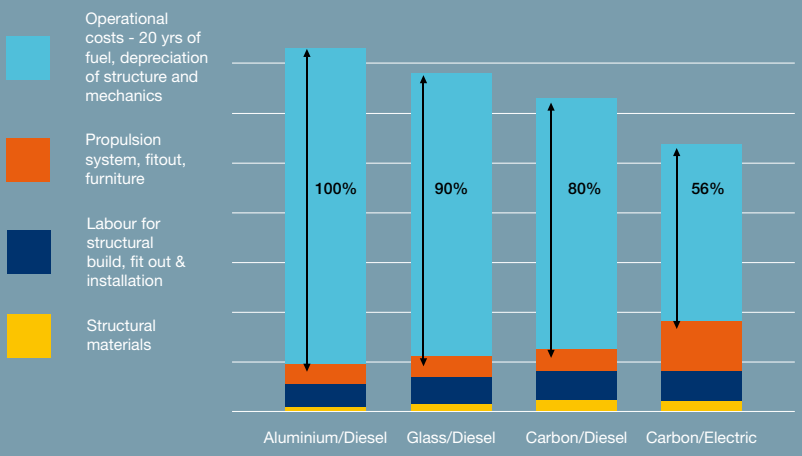
This is especially important in commercial/work-boat vessels, which demand a specific speed or endurance range. And it applies to boats across the spectrum, whether ETNZ's Chase Zero that achieves a range of 30 knots for 6 hours on a full tank of green hydrogen, or the Soel 12 passenger shuttle which travels at 6 knots for 24 hours on solar power.

Electrification brings with it additional equipment and fit-out requirements, such as cooling systems and fire barriers. Taking a lightweighting approach to the structure means this can all be accommodated without reducing the performance of the vessel.

If structural weight is managed successfully during the build, electric propulsion can significantly reduce operating costs, bringing long term economic as well as environmental gains.

Comparing different structural materials and fuel approaches

20 year life cycle analysis



Conclusions:

- Energy is the largest cost by a significant margin
- The lighter the structure the lower the energy requirements and costs - and the lower the emissions
- Electricity costs and emissions are far lower than diesel costs and emissions
- Total costs over the life of the vessel are lowest with a carbon electric solution

Cost of material offset by reduced battery unit cost

In recent projects, Gurit Engineers have evaluated various construction options through energy modelling and cost analyses, and results have shown that high strength, low weight composite construction is the enabling technology for these projects. And as speed or endurance range increases, then carbon fibre becomes the natural choice.

Although carbon construction is more expensive than the alternatives of aluminium and traditional fiberglass on a per kg basis, the weight saving offered by carbon fibre means that not only are there fewer kilos of material in the finished product, but the cost of the material can be offset by the reduction in battery unit costs that it enables.

Most significantly, however, is what carbon fibre enables in terms of return on investment over the life of the vessel.

On a conventional commercial ferry, for example, energy consumption is by far the largest cost for the operator over the life of the vessel and can easily be 4-5 times the purchase price of the ferry. And a lighter vessel with an optimised number of battery units means reduced energy requirements and therefore reduced costs.

Second to energy consumption, vessel maintenance is a significant cost for the owner. Composites have lower maintenance requirements and offer exceptional longevity due to their corrosion and fatigue resistant properties.

Lightweighting in action

The Gurit team has a wide range of design approaches, technical strategies and advanced materials at its disposal to develop the right lightweighting solution for each project.

Weight management can be achieved by integrating the interior fit out; by ensuring structural performance is exactly where it is needed, rather than overdesigning the basic structure; and by choosing material wisely, for example heavier multiaxial fabrics for toughness whilst reducing manufacturing labour.

The Gurit team also considers the practicalities of the build and recommends techniques to complement the lightweight structural design. Large format, easily-handled composite panels can be used for flat surfaces such as the hull sides and decks, resulting in fast assembly and minimal parasitic weight at the joins. Vacuum infusion offers accurate resin uptake and avoids excess weight. Female moulds along with thermoformed foam core can be used on curved areas to further reduce resin consumption and weight.

Digitally designed composites for flexible and faster manufacturing

This extreme lightweighting approach is commonplace in the yacht racing world, where much time and money is spent on iterative optimisation, the cost of the structural materials is easily absorbed into the total project costs, and there is often no requirement for a financial return.

For many of the electric projects Gurit has been involved with, return on investment has been an early topic of conversation, especially in the case of commercial vessels. We are able to help customers successfully incorporate high tech and typically more expensive material into a commercial electric project in a practical and cost-effective way.

One option is our modular construction process, with intensive use of digital manufacturing, where all aspects of the design are modeled in 3D. Relying on that single shared point of geometry ensures accuracy and allows multiple work fronts to be underway at once – a vessel can be split into modules and assembled in almost any order.

Not only does this approach meet the requirement for efficient and speedy manufacture, but it also provides flexibility for future builds and minimises the materials consumption for tooling jigs.

East by West Ferries estimate they have saved 220,000kg of carbon emissions in Ika Rere's first year of operation
Credit: Will Nelson

"As our customers look to bring low emission vessels to market, they come to us with a genuine interest in ensuring the through-life environmental performance of the vessel: they want to know how the vessel will be built, how materials will be sourced, and they want to understand its environmental performance over time. This brings structural optimisation to the forefront of the design process in terms of matching materials to a particular operation."

Tony Stanton
Engineering Manager, Gurit Asia Pacific

Courtesy of ETNZ

Chase Zero has impressive range – around 165 nautical miles at about 30 knots on a full tank of green hydrogen – and the only by-product is water

Courtesy of Bluegame

Bluegame, a Sanlorenzo Group brand, is designing and building a hydrogen-powered chase boat for American Magic, challenger for the 37th America's Cup. The 100% carbon fibre foil-assisted boat will have a max speed of 50 knots

Environmental gains

Clearly, one of the principal drivers for electrification is emission reduction. When combined with a renewable energy source, private and commercial electric vessels can achieve zero or reduced operating emissions.

Lightweighting with composites enables a vessel to be fully electric in the first place, and secondly allows the energy requirements to be optimised. Our digital manufacturing, modular design and large format panel approach ensures optimisation of materials and reduced waste.

In terms of entrained energy (energy needed to build a structure from raw materials including the energy used to extract materials from the earth and turn them into construction products), batteries are the single biggest contributor in an electric vessel. By using composites to reduce structural weight, and therefore reduce battery requirements, you reduce the entrained energy of the vessel.

End of life challenges

The composites industry is aware of the challenges it faces around the end-of-life of its structures, and more and more companies are getting involved in finding solutions. Gurit is involved in several industry initiatives investigating options, from sustainable bio-based materials which can be specified at the design stage, to the efficient recycling of composite materials at end-of-life.

Another concern often voiced is around the end-of-life of electric batteries. They have great potential to be repurposed into second life batteries for use in less demanding applications, such as stationery energy storage. And most battery manufacturers have second-life applications and/or a recycling programme for many of the battery's components.

Optimisation of the structural weight is key to successful electrification of marine vessels

Even as propulsion and energy sources improve, with batteries becoming smaller and lighter, low weight composites will remain vital if we want to continue to maximise the efficiency and environmental benefits of electric commercial ferries and workboats.

With a wide range of composite materials and technologies available, Gurit has the experience to help customers find the ideal construction solution for their particular electric vessel.

SUCCESS WITH OUR CUSTOMER

SOLVING UNDERGROUND REPAIR ISSUES

Growing cities, spreading transport infrastructures, the protection of historic sites or preservation of character buildings makes repairing or reconditioning underground waterpipes a complex challenge, and often impossible to carry out with traditional materials such as concrete or steel.

Gurit customer, Grupo Navec, who specialise in using composites in industrial projects, has developed the tecnoinvac(R) technology as a safe, effective and lightweight alternative for pipe rehabilitation.

Meeting demanding performance requirements

Four main loads are taken into consideration when specifying the required laminate and the lamination process: tensile/traction, compression, shear and bending.

Grupo Navec determined that carbon fibre vacuum infused with Gurit's PRIME™ 37 epoxy resin would provide a reliable solution with consistent quality and the mechanical properties required.

Intensive preparation process to ensure viability

Thorough preparation on-site is required for the field repair, including cleaning with pressurised water, installation of a ventilation system, dehumidification, surface preparation, before a final inspection takes place. The substrate is then primed with epoxy resin and a temporary protective fabric, before the carbon fibre and PRIME™ 37 vacuum infused repair takes place. A final coating is applied to ensure the pipe is ready to receive potable water.

"Grupo Navec chooses to use Gurit's PRIME™ 37 infusion resin for its quality and ease of use; the impregnation times and viscosity are perfect for our needs and working windows."

Francesc Robles
Director, Applied Engineering Division,
Grupo Navec

www.gruponavec.com

SUCCESS WITH OUR CUSTOMER

WORKING IN PARTNERSHIP TOWARDS OPTIMISATION

Building a carbon fibre boom at Rondal
Credit: Tom van Oosanen

Rondal, a carbon fibre specialist building spars and large components, continues on its quest for optimisation and quality.

The company's products feature on some of the world's largest superyachts, and have a reputation for durability, reliability and innovation. For over 20 years, Gurit has worked alongside the talented and experienced Rondal team as a supply and technology partner, providing structural engineering consultancy, advanced composite materials and technical support

Time-saving processes

Whilst the established and industry-standard Gurit SE84LV prepreg was originally developed for Rondal, the composite fabricator now regularly utilises SPRINT™ in its construction process. This has sped up the production process, reduced labour hours, whilst maintaining the high quality they are known for - and cost-wise it has proven to be similar to infusion.

Multi-agency accreditation

Accreditation is important to the quality approach of both companies, with Rondal's Vollenhove (The Netherlands) facility and many of Gurit's materials accredited by Lloyds, DNV and RINA. Rondal also uses Gurit's accredited testing laboratory to verify the mechanical and thermal properties of laminates for each project; and Gurit technical support team members are regular welcome visitors to the Rondal facility to discuss processes, new materials or customised solutions.

Lightweighting superstructures

Two large superstructures have recently been delivered to Royal Huisman Shipyard for sailing yacht project 404 (a 59.7m Malcolm McKeon design) and project 405 Nilaya (a 46.2m Reichel Pugh design), both high performance sloops. The use of Gurit composites has not only saved weight over the alternative aluminium construction but has also allowed the designers more freedom to create aesthetically pleasing shapes.

Credit: Tomvan Oossanen

Building a lightweight carbon fibre superstructure

Credit: Mike Tesselaar

The 61.6m tall mast for project 405 Performance Cruiser Nilaya (length 46.8m), at Rondal's facility

Optimising for scale and market demands

With the support of the Gurit technical team, Rondal has been successful in optimising and adapting its facility and processes to accommodate the increasing number of large-scale projects. The facility has one of the largest prepreg curing ovens in the world, suitable for 70m+ masts, and is currently undergoing further expansion. It also houses a large CNC prepreg cutting machine to optimise the use of materials and minimise waste. Developments like this, as well as working alongside sustainability-focused companies like Gurit, become increasingly important as Rondal observes a growing demand for sailing superyachts from more environmentally-conscious owners.

www.rondal.com

"Gurit has been a reliable supply partner for engineering, materials and technical support to us for over 20 years."

Rudy Jurg

Sales Manager, Rondal

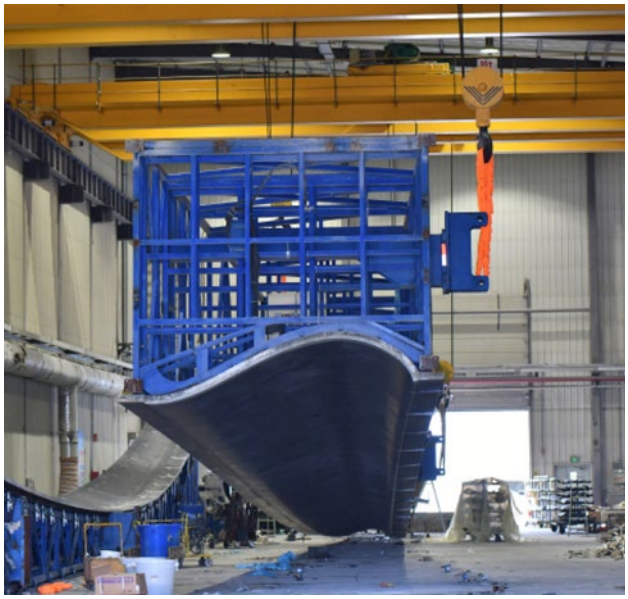
EYE ON WIND

THINK LARGE SCALE COMPOSITES – THINK GURIT TOOLING

One of the world's longest wind turbine blade moulds in build at Gurit Taicang

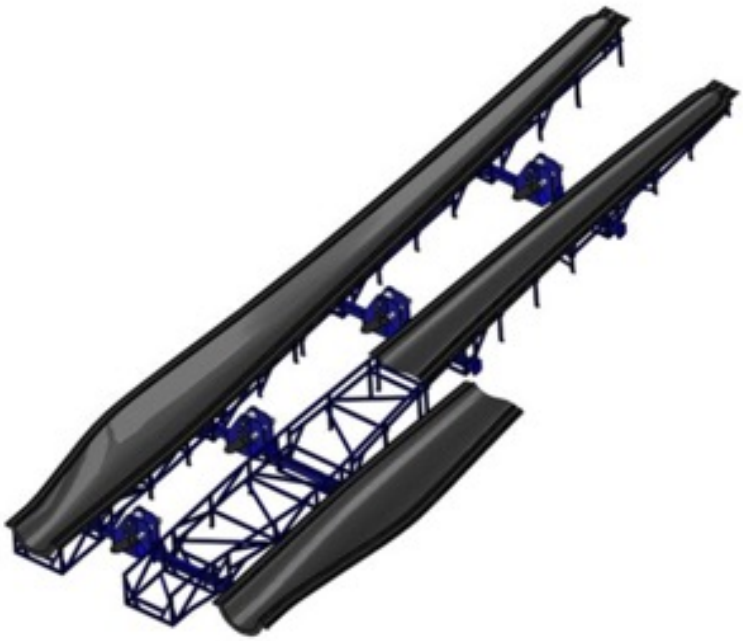
At the time of writing, one of the world's longest wind turbine blade moulds is being produced at our site in Taicang, China. At 126m, the wind turbine eventually made from this mould will have a total blade span of 260m on a tower 150m tall.

As we globally continue to harness the power of wind onshore and offshore, Gurit remains at the forefront of the technology to make this possible. When you think about large scale composites – materials which allow us to manufacture lightweight, strong and durable structures of almost any conceivable form and shape – think Gurit.



Global network of technical experts

Gurit's vast experience working with blade manufacturers worldwide gives us unique insight to help solve their specific problems. We have as a result developed turning systems, temperature control solutions and automated assembly systems as well as Industry 4.0 manufacturing system software, offering real time optimisation of the cure cycle, detection of unexpected events, online reporting and mobile push notifications.



Gurit introduced a new modular mould design for wind turbine blades at JEC World. This makes configuration conversions between blade designs simpler and faster,and allows for energy savings and shorter mould change and therefore cycle times.

Full solution provider

Independent of the chosen composite manufacturing process, plugs and moulds define the accuracy of the final composite component, and we take pride in our position as the largest independent manufacturer of plugs and moulds for wind turbine blades and other large scale composite parts.

We work with customers from the initial design stage, bringing our expertise in structural engineering, mechanical design, hydraulics, heating and automation design to the table. Our manufacturing services span welding, CNC machining, composite and metal tooling, as well as production system assembly.

www.gurit.com/tooling

CASE STUDY

WINDS OF CHANGE: COMPOSITE ROTOR SAILS SAVING FUEL

Courtesy of Norsepower

In 2020, Norsepower, Gurit and Comaxel were awarded the JEC Innovation Award in the Maritime Transportation & Shipbuilding category for their lightweight rotor sail solution

The ability to harness the wind at sea, combined with the urgent need to reduce our carbon emissions, has led to an increased interest in rotor sails for cargo and passenger ships.

Wind-powered ships are using a blend of new and old technology to reduce the need for fossil fuels and for new alternative fuels that require investment and space for shoreside infrastructure.

Norsepower has been the market leader since 2012, with eight ships already fitted with 16 Norsepower Rotor Sails™, modernised versons of the Flettner rotors. The company estimates there are a further 30,000 vessels in operation which are capable of being retro-fitted.

"A new rotor sails mould manufacturing agreement diversifies our tooling portfolio beyond wind turbine blades while contributing to the reduction of CO_2 emissions in the shipping industry."

Jorge Zazueta
International Commercial Director,
Gurit Manufacturing Solutions Business Unit

Composite and aluminum designs were evaluated by Norsepower with the composite design ultimately chosen for its lower weight (about half that of the aluminium version), and superior fatigue and longevity performance. Norsepower's composite rotor sails are not only lightweight, but also robust, reliable and well balanced, and manufacturing of the sails is being scaled up to meet fast-growing demand. European production capacity is likely to reach 20 units this year, along with capacity set to rise to 50 in China alone.

Using the wind as an additional power source, enabling a reduction of fuel consumption in the order of 5-20%, is a natural next step for the maritime transport industry. The industry aims to play its part in reducing global carbon emissions – and is now considering fleet-wide contracts for Norsepower Rotor Sails™ due to its third-party verified fuel savings between 8 - 25%, or even more.

Gurit has been working with Norsepower for several years and is delighted to continue this with the development and production of a new state-of-the-art rotor tool. The tool will add even higher levels of precision to the volume production of 35m x 5m Norsepower Rotor Sails™ in the Asia Pacific region.

Brief history of rotor sails
The first rotorship was built in the 1920s by Anton Flettner, based on technology invented by Sigurd Savonius. A retrofitted schooner with two rotors, the Buckau, was so successful that a brand-new rotor ship with three rotors, the Barbara, was built just a couple of years later. However, the combination of a global economic crash and low diesel prices meant that the rotor technology didn't take off. Fast forward to the 1980s and rotor sails started to gain interest once again. Thanks to efforts to increase fuel efficiency, driven by both the cost of fuel and a focus on reducing emissions, the last few years have seen a significant increase in the adoption of rotor sails technology.

www.norsepower.com

#GURITCARES

INDUSTRY COLLABORATION TOWARDS CIRCULARITY

Composite materials have brought many high performance applications to life, but recyclability and end of life options continue to be a challenge. Gurit is actively involved with several collaborative research projects with the aim of developing technically and economically viable solutions.

"It is vital that Gurit engages with industry players and research bodies on the topic of circularity. By working on collaborative projects that align with our market needs, we can leverage our collective knowledge and capabilities, and make progress faster than we can alone. To make a worthwhile impact, we must remain open-minded, proactive and unified in our mission to build a circular and more sustainable supply chain."

Paul Spencer
Gurit Head of Technology &
Gurit circularity workstream lead

Recycling end-of-life PET

Gurit has already established a value chain for PET – we annually recycle around 1.4 billon tonnes of post consumer PET bottles to manufacture Kerdyn™ PET core material, and have developed a process for recycling PET waste within the manufacturing process. We are now taking this a step further and, alongside several institutions and customers, investigating how we can complete the cycle and reuse end-of-life PET core to make new core material.

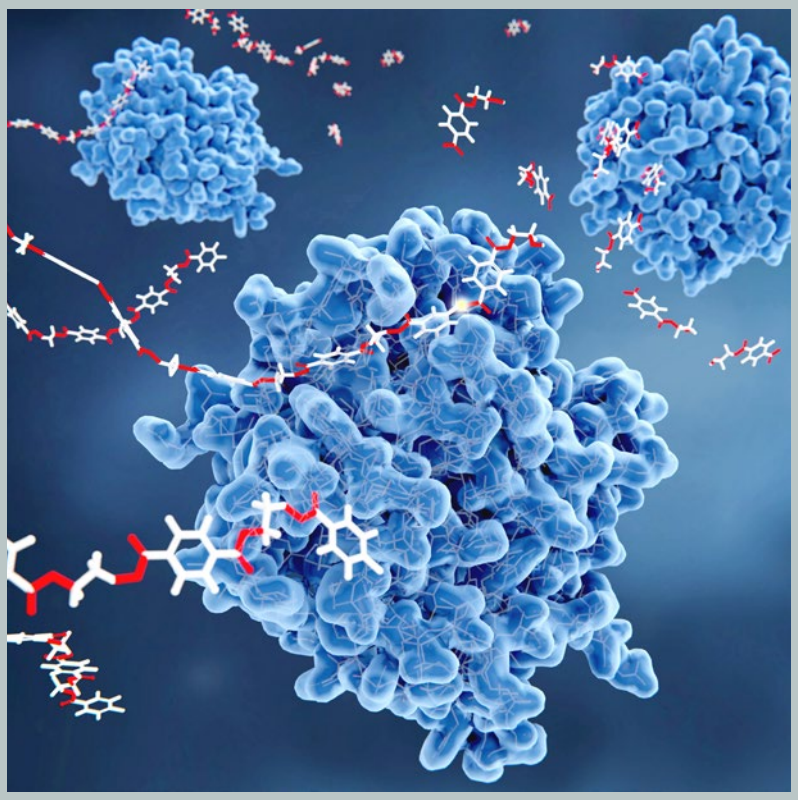
"There are some key challenges we face with this project, namely establishing a supply chain to return the end-of-life core, the technology to extract the core from the component economically, managing contamination and the quality of supply, bearing in mind we have many densities, construction processes and so on," explains Paul Spencer, Gurit Head of Materials.

Bio-based recyclable epoxies

Repoxyble is an EU Horizon-funded, 3 year project with the aim of developing bio-based fully recyclable epoxies, which have a positive environmental and economic impact.

The holistic and multidisciplinary principles of Safe and Sustainable by Design (SSbD) are being applied throughout the project, and Gurit is delighted to play an active role by providing and developing bio-carbon technology and formulated resin systems.

Members of the #REPOXYBLE consortium at the launch in January



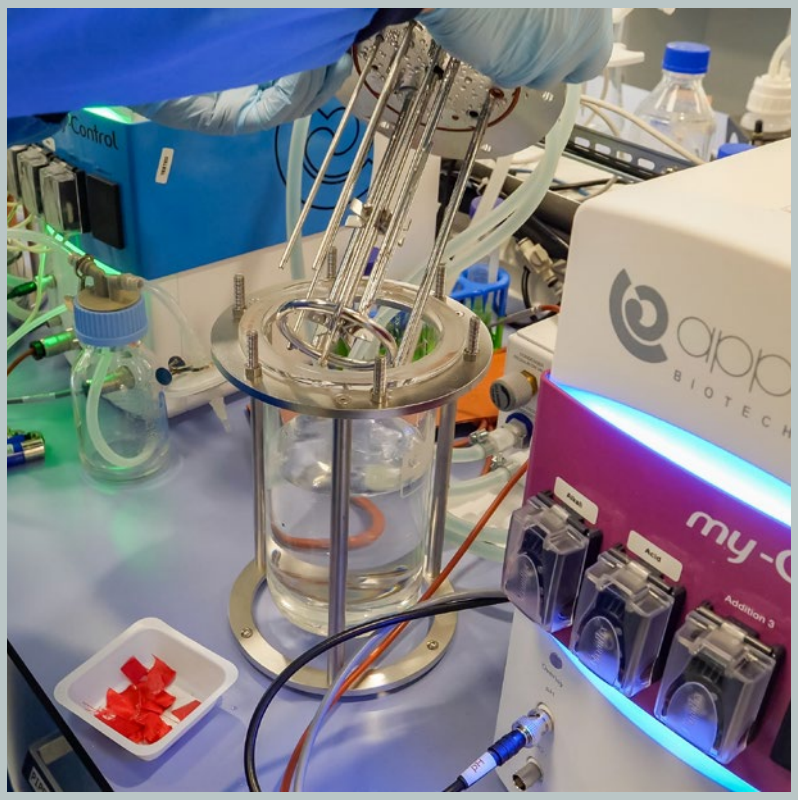
PETase, a bacterial enzyme that breaks down PET-plastic to monomeric molecules. The whole bacterial degradation process yields terephtalic acid and ethylene glycol, which are environmentally harmless.

Enzyme-based plastic recycling

The University of Portsmouth's Centre for Enzyme Innovation (CEI) is a world leader in the research of enzyme-enabled solutions for the circular recycling of plastics. Gurit is currently working with the CEI on how to genetically engineer enzymes to break down PET core into raw chemicals that can create new PET. Unlike more traditional recycling methods, the use of enzyme technology allows more economical recycling with no loss of material performance.

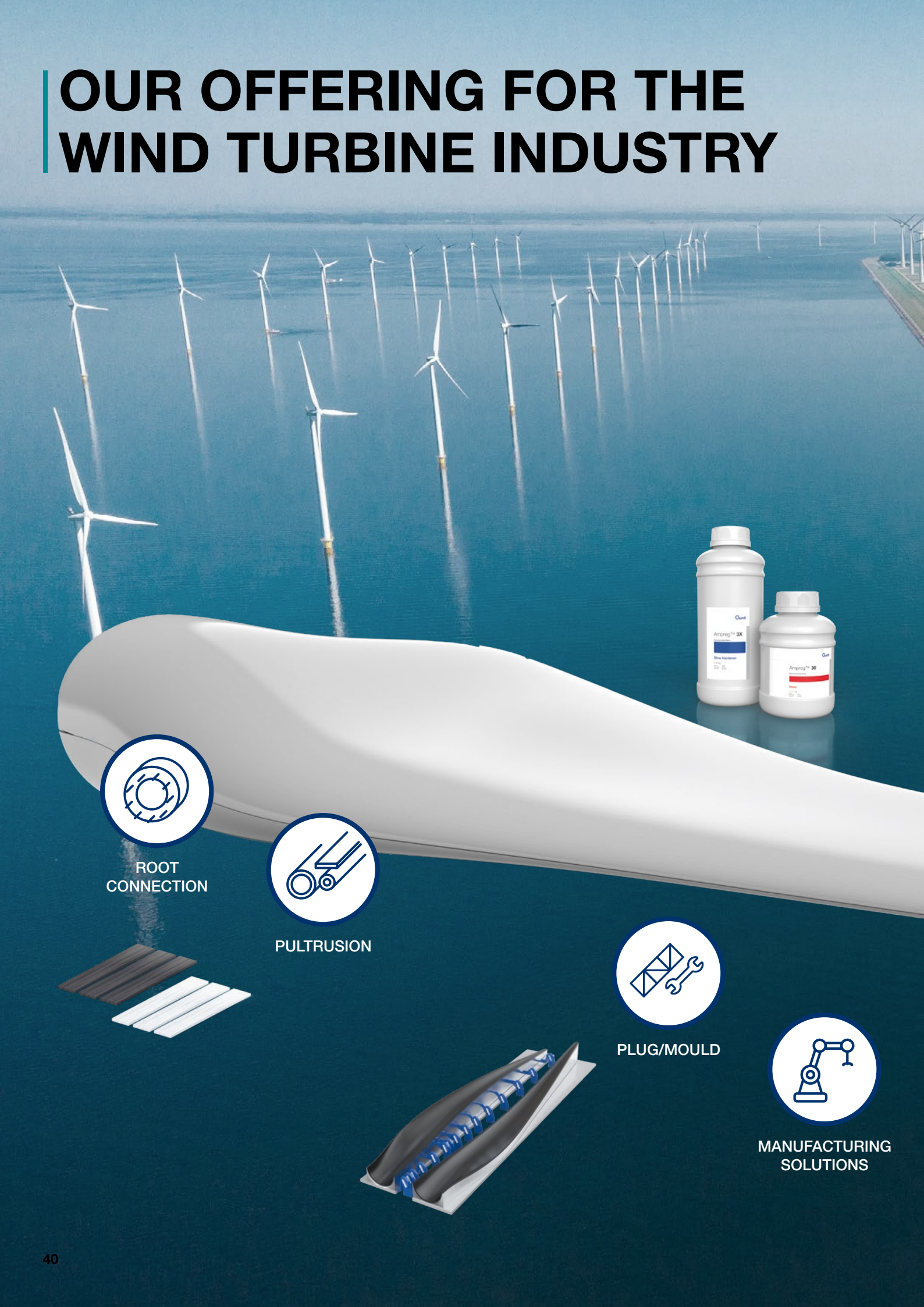
Resource-efficient materials

Gurit has recently joined the Sustainable Composites working group led by the UK's National Composites Centre and CPI. The aim is to bring together companies who want to achieve economic growth within a net zero environment and without negative unintended consequences. The plan is to do this through developing viable recycling strategies, reducing waste across the supply chain and enabling sustainable materials in new products and designs.



The CEI is pioneering research into enzyme-enabled solutions for the circular recycling of plastics

OUR OFFERING FOR THE WIND TURBINE INDUSTRY



ROOT CONNECTION

PULTRUSION

PLUG/MOULD

MANUFACTURING SOLUTIONS


REPAIR SOLUTIONS
ADHESIVES
ENGINEERED KITS
CORE MATERIALS

GURIT IN AUSTRALIA

SUCCESSFUL DOWNUNDER

Gurit has an office and warehousing facility in Queensland, Australia, from where we successfully service the Australian market with advanced composite materials.

Since 2020, from our base in Queensland we expanded our product offering, broadened our customer base, targeted new markets and improved our ability to service the composites industry with local supply and technical support.

Increasing our footprint

Six months ago, we had outgrown our premises and relocated to a larger facility, still in Yatala, Queensland, doubling our warehousing capacity.

Demand for green materials

There has been an increase in demand for bio based and recycled materials in the transportation, solar energy, recreational vehicles, architectural and marine sector across Australia and we are well positioned to serve these markets.

Gurit's product portfolio combined with engineering solutions enables us to bring these materials to the forefront of design and to help meet emission targets. Applications include shower bases, kitchens, caravans, UAV and long haul refrigerated vans - and the marine market is beginning to embrace the use of green materials in areas never thought of before.

Route to market

Working with market leaders among our customer base means Gurit products and people are influencing composites in new industrial and marine applications.

As we look to broaden our reach to further sectors, we continue to develop class-leading products, supported with our unmatched technical expertise.

Looking ahead

Promoting Gurit solutions at trade shows and industry events this year and into the future will ensure Gurit Australia is at the forefront of designers' and specifiers' minds. Gurit will be exhibiting at Indo Pacific 2023 in Sydney during November.

We look forward to meeting you there!

GURIT EVENTS

TRADE SHOWS AND CONFERENCES 2023

September

12 September 2023

China Composites Expo

12 Sep 2023 – 14 Sep 2023

www.chinacompositesexpo.com/m_en/index.php

Shanghai, China

October

03 October 2023

IBEX

03 Oct 2023 – 05 Oct 2023

www.ibexshow.com

Tampa, Florida, USA, booth 3-942

04 October 2023

Windergy India

04 Oct 2023 – 06 Oct 2023

www.windergy.in

Chennai, India

12 October 2023

CANZ Conference

12 Oct 2023 – 13 Oct 2023

Auckland, New Zealand

17 October 2023

China Wind Power

17 Oct 2023 – 19 Oct 2023

www.chinawind.org.cn

Beijing, China

31 October 2023

CAMX

31 Oct 2023 – 02 Nov 2023

www.thecamx.org

Atlanta, GA, USA, booth U63

November

07 November 2023

IndoPacific

07 Nov 2023 – 09 Nov 2023

www.indopacificexpo.com.au

Sydney, Australia, booth 4D24

15 November 2023

METSTrade

15 Nov 2023 – 17 Nov 2023

www.metstrade.com

Amsterdam, The Netherlands, booth 12,702

www.gurit.com/news-media

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