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- Supporting scientific research in Antarctica
- Innovation in action
- The growth of offshore wind
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COMPOSITES: ENABLING THE **NEW** GENERATION OF FOILING BOATS



WELCOME

Welcome to this issue of OneGurit magazine

Our magazine is a platform where we discuss industry trends, celebrate successes within the company and with our customers, as we continue to provide market-leading composite solutions.

This issue also introduces you to various members of our Gurit Team: they are representative of the many colleagues not featured in this issue, who have equally contributed to the progress we have made across many areas of the business.

We invite you to join us in celebrating just some of the successful initiatives and projects which our people have led or been involved with over the past few months, made possible in part due to our ability to adapt and respond as needed. Flexibility is an essential capability, along with others such as responsiveness, speed and creativity, and we are fortunate to see these come to the fore through our team at Gurit.

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

OneGurit Editorial Team

Sian Stimson, Emilia Bergquist,
Sara Watson, Dave Russell,
Monique Norris, Thomas Nauer



Title photo ©: Antoine Auriol

CEO VIEWPOINT: MITJA SCHULZ



Dear Readers and Colleagues,

2022 has been a year in which Gurit has had to remain agile, able to respond to external factors whilst ensuring we continue to move forward with our strategic objectives and build a strong platform to continue to position us as an innovative solution provider for 2023 and beyond.

The Chinese domestic wind markets have experienced strong growth this year, and Gurit has been well placed to take advantage of this, resulting in us being among the top three suppliers for both PET and rotor blade moulds. The marine and industrial markets also remain on a strong growth trajectory. Our Kerdyn™ structural PET foam is gaining traction in lightweighting sectors like transportation and building & construction, where customers are replacing conventional materials with more sustainable manufacturing materials like fully recyclable PET. The marine industry continues to be energetic, tracking towards well above pre-pandemic levels, and we are delighted to be at the forefront of innovative developments, not only in terms of material supply but also through our structural engineering design capabilities.

A key challenge this year continues to be our business with Western wind customers, which has been weaker than 2021, driven by lower US market momentum and Western wind turbine manufacturers consolidating their activities and exiting certain regions. This has particularly impacted on our core materials, kitting and mould businesses. In addition, we continue to be confronted by inflation, which is affecting energy prices, as well as raw material supply levels and costs.

In response to this, we consolidated our kitting production in Europe at the Gurit sites in Spain and Turkey. These sites are strengthened by our Ringkøbing facility in Denmark, which is being converted into an innovation hub for the wind industry and now hosts a wind innovation centre. And throughout the organisation we have initiated

a series of cost-out programmes to ensure that every activity we undertake adds value to the products and services we offer our customers, and that we have streamlined processes and effective systems in place.

We believe that the longer-term market outlook for wind energy remains strong, driven by an increasing demand for renewable energy and recently announced international support policies. So it has been particularly pleasing to see our new wind campus in India enter full operation this year, notably the sites in Chennai and Ahmedabad, delivering significant volumes of PET and kits to local customers and now also to overseas customers.

By working as a cohesive and nimble team, and in close collaboration with customers, Gurit continues to deliver competitive composites solutions to wind energy and various light weighting sectors.

I'd like to thank our staff across our sites for going the extra mile throughout the year. It is through your responsiveness, actions and strategic focus that we keep moving forward, and look to a bright future as One Winning Gurit.

Best regards

Mitja Schulz
CEO, Gurit Group

GURIT INDIA REACHES NEW MILESTONES



Gurit Chennai, which was inaugurated in June this year (all photos)

Gurit is delighted to be successfully serving the Indian and global wind turbine industry with innovative and sustainable solutions from two new sites in India, both of which have reached new production milestones.

Chennai campus fully operational

Gurit Chennai facilitates PET extrusion, core kitting, tooling and manufacturing solutions as well as structural profiles. It is our youngest site and also one of Gurit's largest production plants, set up over 65,000 sqm of land.



Since its inauguration in June 2022, the plant has successfully produced and dispatched thousands of m³ of PET core material. Two sets of tooling scaffolding have been dispatched and, at the time of writing, a flat mould is nearly ready for dispatch.

First PET core kit exported from Ahmedabad

The Gurit core kitting site in Ahmedabad is proud to celebrate the first export delivery of PET core kits which have been shipped from Gurit Ahmedabad to East Asia.



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

#GuritCares

WIND BLADE REPURPOSING

Nowadays wind turbine structures are around 90% recyclable, and the last element to be included in the recyclable chain are the blades. Today we would like to share some excellent re-purposing examples with you.

Reusing blades

Wind blades are being used in landscape architecture and to decorate urban spaces and parks that will last several dozen years. Other uses include furniture, strengthening slopes, building houses, bicycle and pedestrian bridges.

Re-using blades as useful elements for local communities is an eco-friendly and energy-efficient solution and the costs of using wind blades are much lower than using traditional technologies.

Local solutions

A company very involved in this area is GP Renewables Group. They recycle wind turbine blades without high transport costs or CO₂ emissions. Their services include:

- Checking the possibilities of re-using blades in towns surrounding wind farms
- Turbine dismantling and re-purposing or disposal of all turbine parts.
- Re-using blades as useful elements for local communities, e.g. bridges, playgrounds, furniture.

Revolutionary geotechnical blocks

GP Renewables has discovered further fields of repurposing. Cut wind blades can be widely used in geotechnics as strengthening slopes around roads and other infrastructure such as wharfs and port entrances. They can successfully replace concrete blocks or gabion filled with aggregate in all retaining structures.

The possibilities of re-purposing and using recycled blades seem to be endless. Do you have ideas for further applications?

 www.gp-renewables.energy



“Recycling in our way by rebuilding into engineering supplies or furniture offers many environmental benefits. First it is very energy-efficient; second, by producing furniture or bridges from wind blades, we avoid emissions related to the need to produce them from standard materials such as steel or concrete.”

Wojciech Wilczynski
GP REBLADE CEO

Photos courtesy of GP Reblade



OneGurit 12/2022 Wind Blade Repurposing



LOOKING FORWARD TO AN ERA OF OFFSHORE- WIND GROWTH

In the last issue of OneGurit, we highlighted that new offshore wind capacity is expected to dwarf new onshore capacity within the next decade. Here we look at offshore wind growth plans, the advantages it offers, and the challenges faced in reaching the numbers.

Aggressive growth plans around the world

Currently China is the driving force behind the growth in offshore wind. In 2021, global capacity went past 50GW, with China deploying more capacity in one year (13GW) than the entire world has installed in any previous year. In the first half of 2022, China installed 75% (5.1 GW) of the new global capacity that came online.

Other evidence of growth from around the world includes:

- **Europe** has big ambitions, with the European Commission plans to increase wind capacity five-fold from 12GW (in 2020) to 60GW by 2030 and 300GW by 2050
- The Victorian government announced **Australia's first offshore wind targets** of 2GW of production by 2032
- The **United States government** has goals of 30GW of offshore wind by 2030 and net-zero US electricity production by 2035
- Reports anticipate offshore **turbine sizes** will reach 20MW in the next decade

Favourable conditions

Offshore wind is now recognised as one of the principal energy sources to combat climate change, but why is that?

- More consistent wind conditions are present offshore which lead to more predictable and effective energy production
- Offshore turbines can be larger than land-based turbines, which increases productivity and reduces costs
- The technology has been around and in use for the past 30 years, therefore posing a lower risk than newer technologies
- Over the past few years, there has been a significant reduction in offshore wind costs per MWh
- Some countries such as the UK can benefit from offshore engineering experience gained from the oil and gas industry

Location, location, location

However, installing large turbines offshore isn't without its challenges.

- **Costs** – offshore wind power is more expensive to install than land-based
- **Choice of site** – it is essential to accurately study the depth of the water, the type of soil and the wind conditions (power, direction, flow), as well as understand region-specific risks e.g. typhoons or hurricanes; safe access is required (both for the people working there, and to easily make repairs)
- **Longevity** – turbines are expected to operate for 20+ years in very challenging conditions
- **Substation quality and reliability** – this is the nerve centre of the power plant, collecting the electricity collected by the turbines and increasing the voltage so it can be fed into the mainland power grid.

Successful together

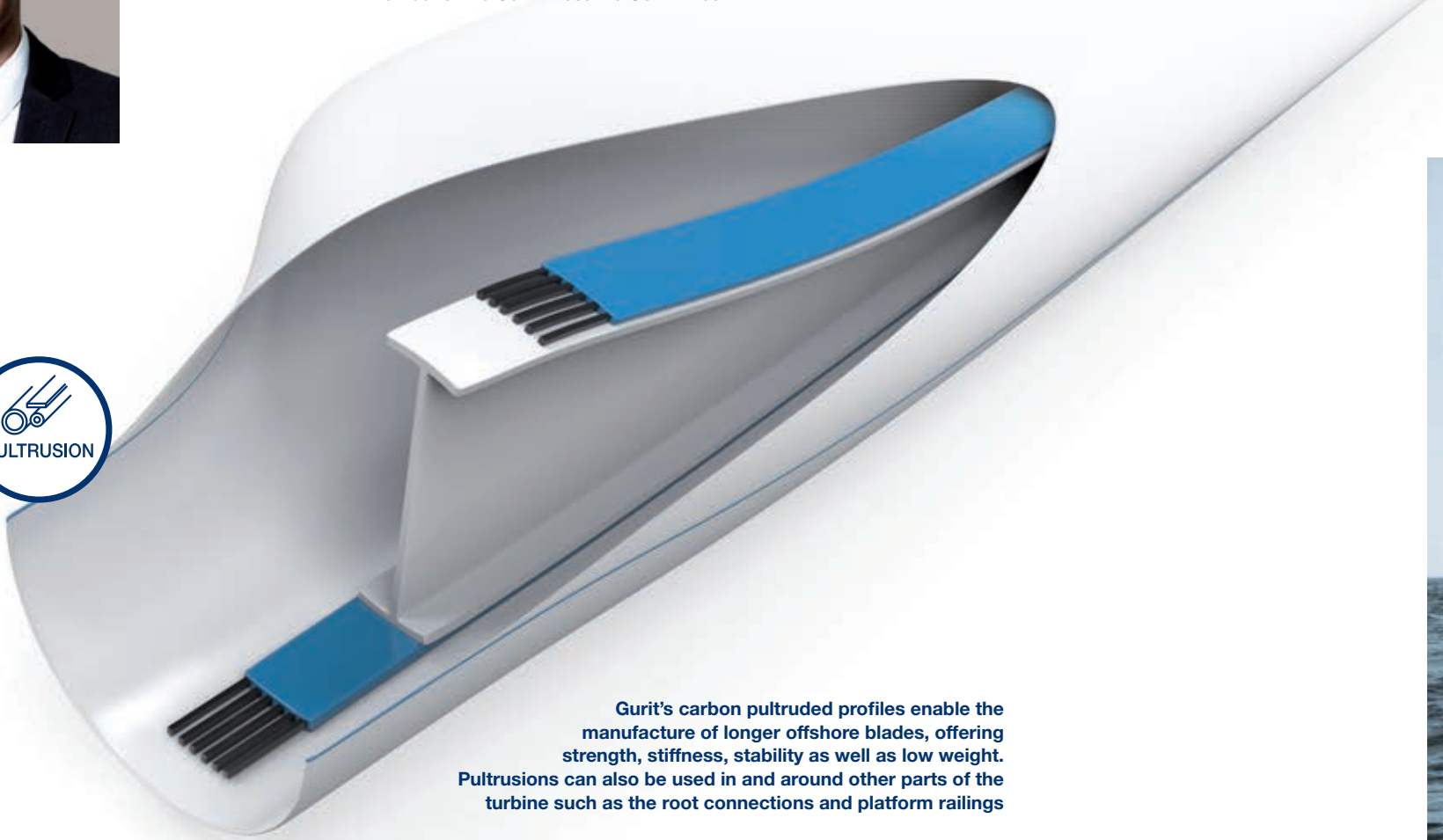
Gurit's comprehensive set of materials, developed over 25+ years of supplying the wind energy sector, are ideally suited to offshore wind development. Our advanced composites offer a lightweight solution for building longer blades, they remove the risk of corrosion in a salt-water environment, and have an inherent longevity, with the additional availability of practical and effective in-field repair solutions in the event of leading-edge erosion or lightning strike damage.

 www.gurit.com/wind



“Offshore will be a primary driver for carbon pultrusion demand in the coming years for which we are well positioned.”

Lars Fuglsang
CEO Fiberline Composites and
Member of the Gurit Executive Committee



Gurit's carbon pultruded profiles enable the manufacture of longer offshore blades, offering strength, stiffness, stability as well as low weight. Pultrusions can also be used in and around other parts of the turbine such as the root connections and platform railings

Technology highlight: Floating offshore wind

Floating offshore wind is a relatively new technology expected to gain prominence in our future energy mix. **Floating turbines will allow access to even deeper waters where wind speed is typically higher and more consistent. Floating turbines have a lower environmental impact and are easier to pre-manufacture and install. The floating platforms can be assembled on-shore before being towed to their wind park site.**

Despite being still at the demonstrator stage, and no-one having yet established a floating wind supply chain, floating turbines are anticipated to achieve cost parity with fixed-bottom technology through economies of scale and growth.



Gurit's RENUVO™ system moves in-field repairs from a two-day operation to a four-hour operation, saving on up-tower trips, allowing for completing several repairs in a shorter time and reducing the cure time from hours to minutes, all beneficial in an offshore environment

This vessel for servicing offshore windfarms, a so-called SWATH (Small Waterplane Area Twin Hull) has been built by Danish Yachts with structural engineering, core and infusion materials supplied by Gurit



CUSTOMER SUCCESS STORY

A RACER-CRUISER COMBINING THE BEST OF TRADITION AND INNOVATION



Elida's elegant hull cutting through the waves

Elida is a 48' racer-cruiser, intended as a modern classic with racing speed as well as having room and comfort for family enjoyment. She is capable of performing well in IRC (International Rating Council) and ORC (Offshore Racing Council) events, with the owner's regatta schedule including the Fastnet race.

Designed by Thomas Tison, and built in Germany by Jan Brügge Bootsbau, Elida features Gurit materials provided by Gurit authorised distributor CTM GmbH. Corecell™, Ampreg™, and Spabond™ were all incorporated into this exceptional yacht. Thorben Will, Managing Director at CTM, says, "The craftsmen from the yard love to work with Gurit materials because of their ease of use and great quality."

The project was a six-year labour of love for Thomas Tison and the owners. Invited to create a contrast to the family's existing boat, Tison initially hand-sketched ideas which sparked interest in the mind of the owner.



Thorben Will
Managing
Director at CTM
(authorised
Gurit distributor
in Germany)

 www.ctmat.com

Versatile features

With a lifting keel, water ballast, and retractable propulsion system, Elida is designed to be equally at home on the racecourse as providing relaxation for her owners.

A unique design, featuring Gurit composites

Elida's design is a subtle blend of curves and tensed lines, following the shapes of nature. Showing a contrast between the lightness of teak to the dark varnished mahogany, along with the technology of Corecell foam and her mechanical systems, Elida was built to consider both tradition and innovation.

Successfully launched in July

The yacht launched at the end of July 2022 in Hamburg, Germany, and was out sailing the following day. With her light displacement, flared aft topsides and responsive sailplan, Elida is an object of joy for her happy owner, surfing effortlessly in the waves at speeds near 30 knots. Her classic wood-finished hull and many advanced features ensure that Elida will maintain her value as a source of pleasure and beauty for generations.

 www.thomastison.com



Elida 48ft racer cruiser.
Photos courtesy of Thomas Tison

VIEWPOINT: ROD FOGG

In this issue of OneGurit, we speak with Rod Fogg, Principal Engineer at Gurit, about his heritage and path to engineering, how the field has changed over the last 30 years, and the biggest challenge facing engineers going forward.

“It’s hard to track where my interest in all things maritime first started. It really is in my blood. My father, his brothers and both my grandfathers and my brother were all in the Royal Navy. I was born close to the beach in Kent but despite moving far from the coast, at varying times I aspired to be a marine biologist and an officer in the Royal Marines.

Technical drawing captured my attention in my late teens. The school then started an A level design course and that’s what I studied, along with physics and maths, for my school leaving exams. Whilst my Dad was building us a Fireball dinghy, sailing then was limited to crewing dinghies at the local reservoir. My interest in all things water-based became windsurfing, which was in its infancy at that time. An A-level Design project took me to a conference at the Royal Institution of Naval Architects, of which I eventually became a member.

My first job was for Walker Wingsails – I started on the shopfloor, then moved into the drawing office, where I worked alongside an aerospace engineer, and that was really my first insight into

structural engineering. Structures was the subject every student loved to hate, but having gone from laminating to specifying, I developed a new interest. Having worked alongside the builders helped not just my understanding but also being able to collaborate with them.

When I joined SP Systems (now Gurit) three decades ago, composites design was a very different world – there was a lot of on-the-job learning. Nowadays we expect graduates to come to us with a decent appreciation of composite theory.

Balancing the theoretical and the practical

Being part of a composite materials company means that we are expected to know how the materials are best used. Our team is made up of engineers who not only have theoretical knowledge but also practical insight, and for the more involved questions on processing or chemistry, we have our colleagues close to hand. To be able to build rapport with a builder, to discuss the details of design and build and understand the shop-floor challenges and limitations, goes a long way towards the success of our work.



Rod sailing the windsurfer which he designed and built (with some help from his Dad) for his A-level Design major project.



Photo: Baltic Yachts and Carlo Borlenghi

Visione, Baltic 147 superyacht, launched in 2002 and still performing well

Adapting to changing needs

Things have changed over the 30 years I have been with the company, and I certainly don’t feel I know it all yet – “every day is a school day”. There is a much greater understanding of composites amongst our client base, the projects have increased in complexity, and there is a greater desire for certainty. Our service offering and scope of work have expanded, and the expected level of professionalism is much higher than in the early days. But ultimately the builder still wants to know the simplest and most practical way to build the part.

Good structural design is about fulfilling all requirements as closely as we can – a part that meets the performance and classification requirements, that is practical and within budget to build, and adheres to the designer’s/client’s vision. There is always a compromise but that’s what is so fascinating.

Designs that stand the test of time

My proudest moments are when I step onboard the boats that we designed years ago, and they still look purposeful. I recall visiting Visione in 2014, a Baltic 147 fast cruising boat that was considered ahead of her time when she was launched twelve years earlier. The boat had been well looked after by the crew and still enjoyed by the same owner. She continues to perform incredibly well and is often considered the yacht to beat in regattas. This demonstrates the longevity of great composite design – consistent long-term performance and a happy long-term owner.



Rod celebrating 30 years at Gurit

Engineering for maximum life and minimum impact

Continuing to design and build for a long life is certainly how we can do our bit to mitigate some of the environmental challenges that the world is facing. We still have the challenge around what to do when boats and other composite components come to the end of their life.

No matter what we do or which materials we build with, there is an impact. However, if we can understand the impact of the construction, we can assess the options and make choices to minimise the environmental impact. From an engineering perspective, we can use our materials knowledge, modelling tools and testing capability to help builders and clients see what’s possible. It’s an important role as we navigate the ever-changing landscape of materials and the environment.”

VERSATILE MATERIALS MEETING MULTIPLE NEEDS

There is a growing need in the building, construction and architecture industries for high strength, lightweight, environmentally conscious materials with longevity and design freedom characteristics. The Gurit advanced composites product range has been developed to meet these needs, and many businesses in the sector are already taking advantage.

GURIT KERDYN™ GREEN PET – A GOOD FIT FOR MANY BUILDING & CONSTRUCTION APPLICATIONS

Gurit Kerdyn™ Green is a highly adaptable, recyclable, thermoplastic core material with a good balance of mechanical properties and cost for a wide range of applications and processes.



1. Thermal bridge-free installation of windows and balcony doors (according to DIN4108 – Supplement 2)
2. Separation walls in wet and damp rooms
3. Door inserts for wet rooms
4. Windowsill connection profiles
5. Window frame extensions
6. Window & door base junctions
7. Front doors
8. Carrier boards for plaster, tile and gypsum
9. Tile & kitchen counters
10. Secure connection of insulation to concrete upstands
11. Wallboards

Epoxy-based solutions complete the offering

Gurit's advanced epoxy know-how as composites market leaders allow us to offer award winning, low toxicity chemistry, bio-based products and sustainable supply chain. As well as Gurit's own formulations, we offer bespoke formulation, private label or toll manufacturing services. Applications are many, including:

- Chemical anchors & wood/metal repair
- Grouts & putties
- Building adhesives
- Crack repair & laminating

MEET OUR STAFF

JOSEP FÀBREGAS, PRODUCT MANAGER PET



Gurit recently welcomed Josep Fàbregas to the role of Product Manager for our PET and Balsa core materials range. He took over this role from Luisa Gaiero who is now a Key Account Manager. Josep is based at Gurit's Girona office in Spain. The food and sports lover, and holder of an EMBA and a Degree in Industrial Engineering, has held various technical and operational roles at Gurit since he joined the company in 2017, before which he worked in the wind energy industry for a further ten years.

"Lean manufacturing and digital transformation are passions of mine, and I am looking forward to working alongside our manufacturing and strategy teams to see how and where we can continue to develop these approaches in our core material development."



CASE STUDY

DESIGNING FOR CHALLENGING ENVIRONMENTAL CONDITIONS IN ANTARCTICA

There is a network of observatories around the world, known as INTERMAGNET, that monitors the changes of the Earth's magnetic field over the long-term. Scott Base Geomagnetic Observatory operated by GNS Science in Antarctica is one of the most important geomagnetic observatories in the world due to its proximity to the South Pole.

As well as supplying data for smartphone orientation, geomagnetic measurements from Scott Base are used for air and ship navigation, monitoring space weather, aurora forecasting, and modelling the Earth's geological and geophysical activity.



Render credit: Hugh Broughton Architects
Photo credit: Hugh Broughton Architects / Robert Songhurst

Antarctica New Zealand's Scott Base Redevelopment project

GNS Science conducting surveys at the new geomagnetic huts

New Zealand's Scott Base is undergoing a major redevelopment – Antarctica New Zealand is replacing the aging infrastructure with a safe, fit-for-purpose, and sustainable research facility that will continue Aotearoa's presence on the ice and science programme for 50+ years.

Located 3800 km from its Antarctic gateway city, Christchurch, and exposed to 260 km/hour winds, and minus 60 degree temperatures, **Scott Base requires robust and reliant systems that can deal with the extreme environment.**

Gurit has been working alongside world-renowned Hugh Broughton Architects - who specialise in Antarctic and Arctic buildings - to deliver **custom GRP cladding panels which will be used where the design of the new base calls for significant curvature to reduce wind loads and snow build-up.** The GRP panels offer extreme levels of insulation designed to help the structure meet aggressive energy efficiency targets, and are made with a fire-retardant resin for improved safety.

The installation of the new geomagnetic observatory was one of the first steps in the redevelopment project – the relocation of long-term science experiments located around the base to safer areas. It was critical that it was established in a magnetically quiet location and wouldn't be impacted by the rest of the base's new buildings, which will in part be made of steel.

The new geomagnetic huts were designed by Hugh Broughton Architects, WSP, and Steensen Varming and were built in Aotearoa by New Zealand Structural Insulated Panels (NZSIP).

The huts feature Gurit structural foam core as a non-magnetic solution, which also helps meet insulation and weather tight integrity challenges.

 www.antarcticanz.govt.nz

CASE STUDY

IMPROVED THERMAL AND ENVIRONMENTAL PERFORMANCE

The energy efficiency of a building is heavily influenced by how the gaps are bridged between its windows and doors, and the surrounding frames and profiles. The material used to do these jobs must not only be durable and strong, but also have significant insulating and fire retardancy properties.

In addition, **voids between the windowsills and the building can lead to water ingress** and mold forming, causing significant structural damage. It can affect both new and renovated buildings and is a serious consideration in the specification and design stage.

Manufacturers are now adding sustainability to their list of requirements when selecting materials.

Kerdyn™ Green can provide the answer: made with up to 100% recycled content, it has high compressive strength, reduces the risk of deterioration and rotting, and significantly improves thermal properties.

When Blumer Techno Fenster AG was asked to provide lift-and-slide doors for a new apartment block in Altendorf, Switzerland, **the goals were large picture windows made with high quality materials for an exquisite finish.** The company turned to Geweco-Klebit AG as its partner to supply the prefabricated custom components for the frame extensions.

 www.geweco.ch



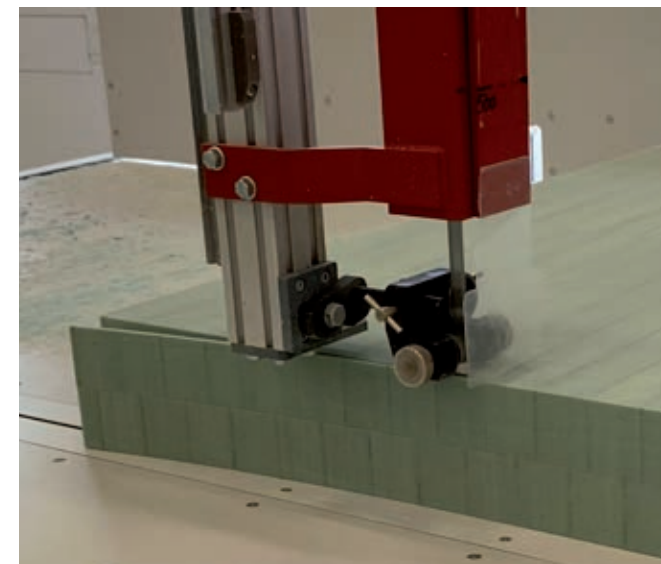
Geweco-Klebit chose Gurit PET for custom window components



"We've been in this industry for 30 years, and finding the right materials for frame extensions has always been a challenge. We're delighted to work with Gurit's Kerdyn Green PET, which meets the demanding mechanical properties, sustainability profile and can be used with a variety of adhesives."

René Stoll

Managing Director of Geweco-Klebit AG



Manufacturing frame extensions from Kerdyn Green PET, Photos courtesy of Geweco-Klebit AG



COMPOSITE ENGINEERING FOR A FLYING PERFORMANCE

When the word 'foiling' came up in conversation 10 years ago, it was with a look of awe as people discussed the America's Cup and the AC72s that broke the mold of the historic event. The boats sailed fast, and they sailed on the edge, the sailors wore crash helmets, carried spare air and safety nets. A far cry from the Thomas Lipton days of collars, ties, and pipe smoking.

These days, foiling is not only an accepted (if still a somewhat adventurous) approach to sailing; it has also made its way into the motorboat realm.

What is it about hydrofoils that fascinates us and inspires us to get a piece of the action, to be on a boat that quite literally flies?

An upside-down aeroplane?

Hydrofoils work in much the same way as aerofoils. Imagine an upside-down aeroplane, with one big foil on either side (the wings), a smaller fin at the back which is for stability, and a rudder for direction. The wings, fin and rudder are all foils. As are conventional centreboards, rudders and keels on a boat, and we have seen their evolution in the way of canting keels, and the Dynamic Stability System.

What has garnered interest more recently in the marine world, however, has been lifting foils.

The power of hydrofoils

A lifting hydrofoil is usually a thin section that is connected to the main hull, helping create a pressure differential between the upper and lower surfaces, thereby creating a lift force (and a drag force) that can be harnessed for better performance. The main hull then appears to be 'flying' above the water's surface. Foils come in various designs, shapes and sizes, depending on what the desired outcome is. However, in general, there are two types of lifting foils:



Typical cross section of hydrofoil-supported vessels: Fully submerged (left), Surface piercing (right)

- Surface piercing – which is self-regulating and designed to self-centre to achieve the desired performance. They are usually U shaped
- Fully submerged – which requires an operator's input. They are usually T or V shaped.
- Or a combination of the two (like the International Moth).

Their purpose is to reduce the displacement of the boat (thereby reducing the resistance).



Chase Zero 'flying' in the Hauraki Gulf



ETNZ's AC72 created a lot of renewed interest in lifting foil vessels

What sort of boat can benefit from a lifting foil?

Boats with some levels of speed are best suited to foils, as they need flow over them to work.

The AC72s which raced in 2013 are the best-known foiling hulls of our time, but the benefits are not just limited to F1-style race yachts. International Moths were using foils well before then and have contributed to foiling reaching the general population.

Cruising catamarans may look to foils to help them get to their destination quicker, especially in times of inclement weather.

We're seeing new electric ferries being designed as foil-assisted. This can help them achieve the same speed/range with fewer batteries, which are heavy and take up space.

And of course, foils can now be seen on a full array of watersports equipment such as paddleboards, jetskis and wingfoil set-ups.

Photos on this page courtesy of Emirates Team New Zealand



Malizia, one of the latest 60ft IMOCA* race yachts engineered by Gurit to feature lifting foils

Photo ©: Antoine Auriol

Challenges to overcome

There are, however, considerations to be made when designing a foiling vessel.

- The cost, weight and interior space needed for the foiling system may be prohibitive to the project.
- Hitting a submerged object with a foil will have a greater impact and more significant outcome than without a foil.
- As the hull of a power boat lifts, so do the propellers, which then has the opposite effect and slows the boat down.
- Draught and operation into harbours, and transporting on trailers, may be affected.
- The thinner the foil section, the more efficient; but the higher the stresses on the foil.



"We have seen an increasing demand for hydrofoiling vessels in the last couple of years. Not just for performance sailing yachts, but power boats and commercial vessels. These types of boats are not necessarily looking for speed, but often a reduction in diesel costs or a reduction in the number of batteries they carry."

Tony Stanton

Engineering Manager – Gurit Asia Pacific

The composite advantage

The beauty of composite materials is their versatility and the ability to design a part that meets the exact criteria. Gurit Engineers can help owners and project managers overcome what initially present themselves as limitations and get the performance advantage from foils they are looking for.

Regardless of whether it is a performance sailing yacht wanting to go as fast as possible on a very limited energy source (the wind), or an electric ferry wanting to hit a certain transit speed with a minimum amount of installed energy, keeping the total platform weight down is a key consideration. Weight, strength and formability play a big part in the success of a hydrofoil, so often carbon fibre is the enabler. Less weight means less vertical force and lower drag. And modern materials are making these design advancements feasible.

In Gurit's recent work on the latest generation of IMOCA* projects, this technology is going to the next level, and these boats push the envelope in terms of foil geometry and performance. The lessons learned on the race track are brought to bear on commercial and leisure power boats, including several exciting vessels now in design, featuring carbon lifting foils to drive efficiency.

Vessels such as ETNZ's Chase Zero, to which Gurit provided materials and structural engineering services, are opening the doors to an exciting new world for commercial and leisure craft, one where the boat operates at minimum power demand while flying calmly and smoothly above the ocean waves.

*The International Monohull Open Class Association manages the class of 60-foot (18.28 metres) open monohulls, who compete in the Fastnet Race and the Vendée Globe.

#GURITCARES

CONTRIBUTING TO OUR LOCAL COMMUNITIES

As part of Gurit's sustainability strategy, our sites are engaging in local community initiatives, which may include environmental education or social wellbeing goals. Here are a couple of programmes our team has recently been involved with.

Cleaning the green & inspiring greater good

Earlier this year, an enthusiastic group from Gurit Italy **cleaned up a green area** adjacent to Chico Mendes Park, just 15 km away from the company's Volpiano site. After 4 hours of hard work, the team of 22 volunteers, collected **more than 200 kg of waste, including plastic, glass, mixed waste and cigarette butts**. The work has inspired the municipality to allocate additional resources to **continue the clean-up and to completely restore the area**. What a great result!



The Gurit Italy team after removing 200kg of waste

Environmental education & supporting biodiversity

Local community collaboration continued with the Gurit team from Zurich who **helped clear a wetland area** in a protected zone on the outskirts of the city.

Cutting back the reeds and removing some grass allows for the various species to thrive side by side. The team was fortunate **to learn more about the habitat and wildlife** that reside there, whilst enjoying a day outside in the sunshine and fresh air.



We are successful together and we care about the communities where we operate.

#GuritCares

WITH PASSION FOR A SUSTAINABLE FUTURE

Gurit

TRANSFORMING PLANTS INTO COMPOSITE PRODUCTS

It is an exciting time for composites as environmentally-friendly options gain traction in the market place.



The Canadian-based start-up company INCA Renewtech is a pioneer in natural fibre composites. Its ambition is to market sustainable products that will sequester carbon while meeting and exceeding material properties.

Bio-core materials

One of their products in the pipeline is a hemp-based core material with properties and the strength required for use in wind turbine blades as well as some marine and other industrial applications.

High ambitions for a carbon-negative product

Gurit is supporting INCA Renewtech with materials testing and advice for this promising new bio core. The material has been independently assessed by GreenStep Solutions, who concluded that it generates 107% fewer greenhouse gas emissions than cutting and milling balsa wood, reduced waste generation by 93%, and water consumption by 93%.

 www.incarenewtech.com

Bio-based core materials will hopefully contribute to even more sustainable wind turbine blades – among other applications – in the near future

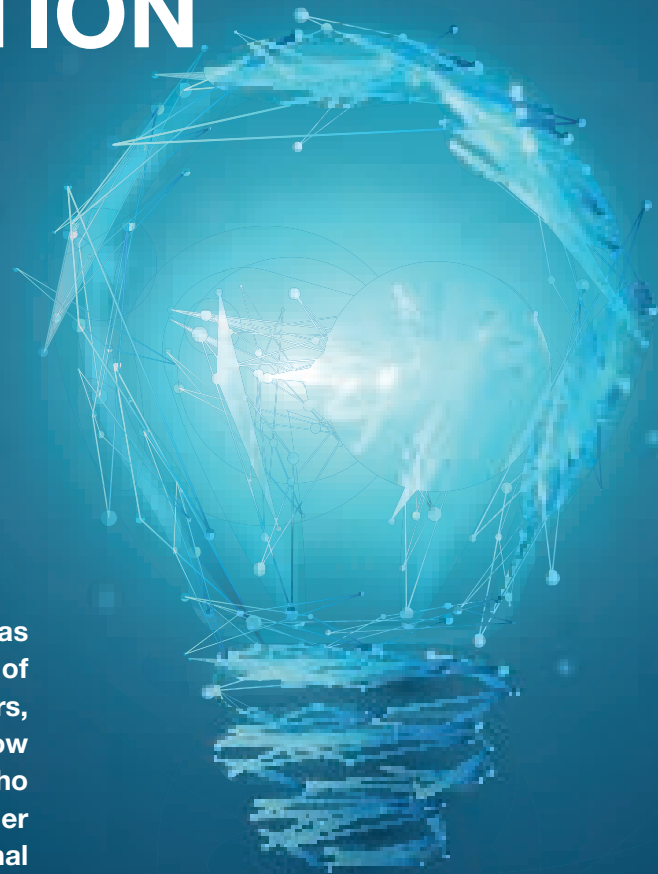


“When ramped to capacity, INCA's new operation will purchase 54,000-tonnes of bio mass per year generated from farmers growing hemp for plant-based protein. We will process this renewable resource into highly refined fibre. The short fibre will be transformed into bio core material. The long fibre will be manufactured into other products for the RV and automotive industry. This puts the waste bio mass to productive use and provides farmers with an additional revenue stream.”

David Saltman
CEO of INCA Renewtech



THE POWER OF OPEN INNOVATION



Traditionally, innovation has been seen as something happening within a closed group of technical professionals. In more recent years, however, it has changed character and now the most innovative companies are those who democratise innovation, include the broader employee base and support cross-functional collaboration of new ideas. The most innovative combination is reached by bringing together creative minds from across the spectrum of roles and functions.

Sowing the seeds for change

Open-mindedness and a non-blaming approach are essential in enabling the growth and development of a healthy and successful innovation culture. Freedom to pitch ideas in an environment that values out-of-the-box thinking and can celebrate success, as well as failure, forms the foundation for ground-breaking ideas.

There are several ways to harness the innovative minds within a company, and engage people from different fields, with diverse experience and expertise to break the silos, which often hold back valuable cross-functional collaboration.

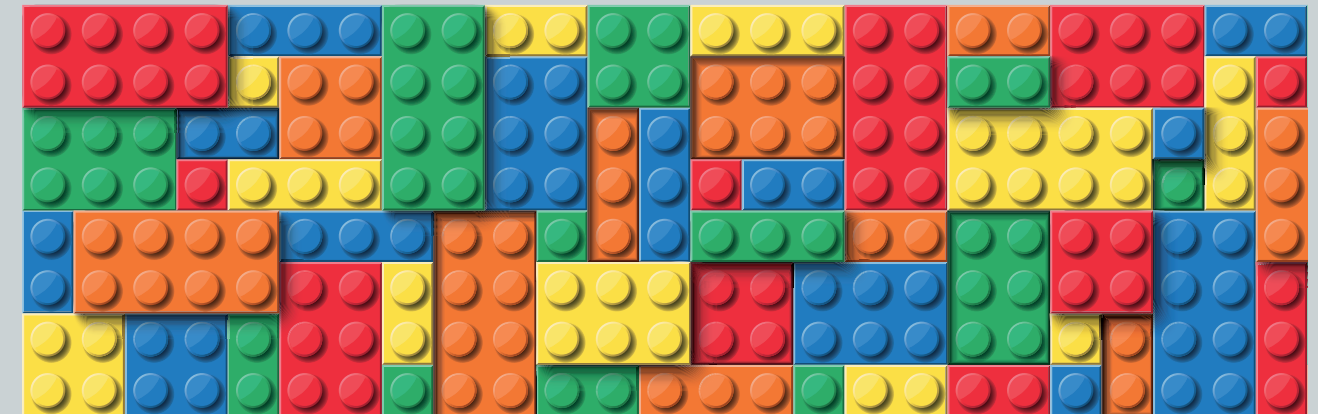
Innovation for all

One way, which is being adopted by Gurit, is the introduction of an open innovation approach. This is where any employee can submit their idea and get feedback from other employees and from the teams responsible for driving the suggestion from idea to project. This helps innovative thinking to flourish and allows ideas to be improved along the way.

Open innovation can be applied within a company, between different companies, with experts or by involving the general public.

How do other companies manage innovation?

You can consider taking inspiration from companies in completely different sectors to see how their views and ideas around innovation practice and idea implementation can be modified and re-utilised to work in your business.

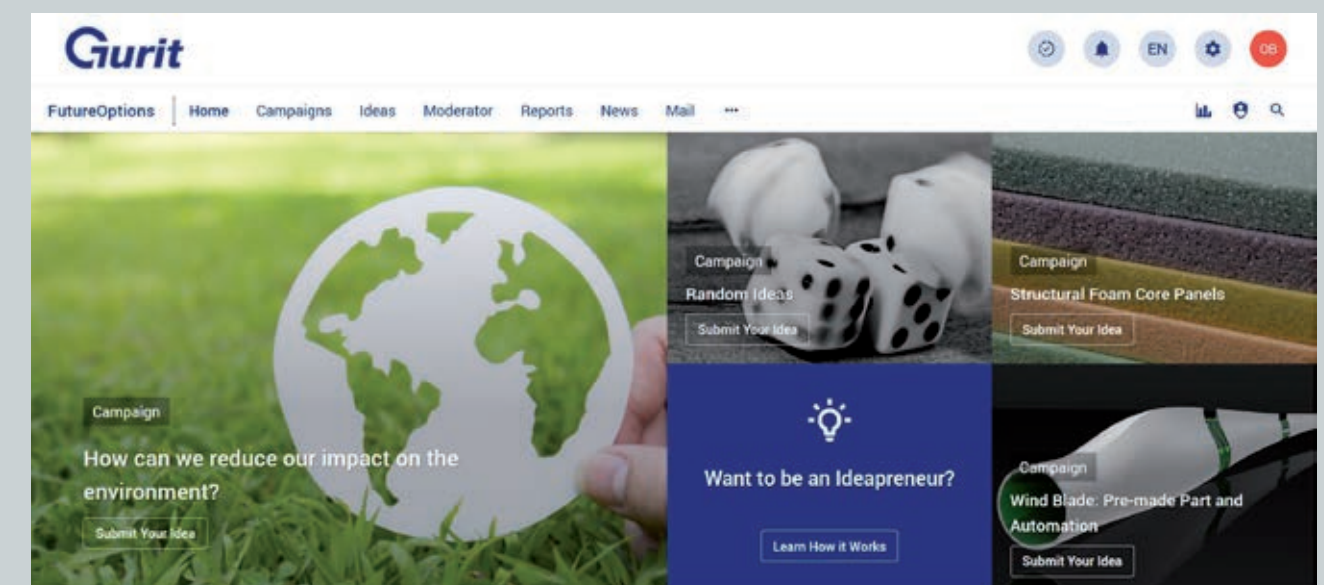


Lego applies open innovation by reaching out to their community of product users for ideas and inspiration for new product releases. Other users can check out the submitted ideas and express their support, helping decide whether the ideas are taken further.

Johnson & Johnson promotes open innovation by using a Crowdsourcing platform to launch challenges targeted at external audiences. Entrepreneurs, companies, and students can submit their latest ideas with the possibility of monetary support to pursue the project, supported by experts from within Johnson & Johnson.

Future Options at Gurit

Gurit is currently preparing a company-wide launch of the platform **Future Options** which will allow us to collect, collaborate on, and harness the innovative power of our employees, for specific areas in need of improvement, but also out-of-the-box ideas on any topic where a new solution is waiting to be discovered.

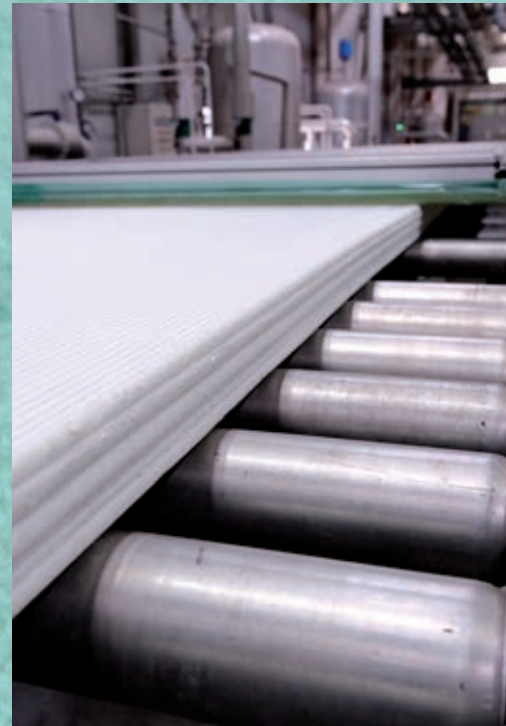


Screenshot from the Gurit Future Options online platform

CHINA TEAM DRIVING PET INNOVATION



Chris and his team inspect the PET flatness



PET extruder in action

Our team in Tianjin, China, kicked off several very promising PET process innovation projects during 2022.

Extrusion efficiency

After much research and planning, they completed installation of four new extruders this year. Following the success of the first one, three larger units were installed. The result has been significantly increased output, and now Tianjin is operating our most productive extruder along with three very efficient production lines. Additionally, the team around Site Manager Chris Yang have undertaken various optimisation measures along the process, both in Tianjin and – under the lead of former site manager Carter Zhang – supporting other sites around the globe.

Reducing waste and energy consumption

There continues to be a commitment to saving energy and reducing emissions and waste in Tianjin. As a proactive team, they re-designed the pressing unit to improve the flatness of PET planks. This resulted in fewer offcuts, as well as less process variance and manual input required.

Against the background of high energy prices, the team innovatively applied the nano aerogel coating upstream of the extruder, thereby reducing heat loss and saving power consumption by an impressive 20%.

Congratulations to the team for their continued efforts in process innovation!



“We are proud to have established ourselves as a leading player in the PET market, both in China and globally. We were successful together as our colleagues from Tianjin and Gurit globally have collaborated and set the foundation.”

Bing Chen
Member of the EC and
Head of our China Operations



“I am proud of our team in Tianjin, they have done a great job and many of their solutions and improvements we will now happily replicate at other sites within our Group.”

Keith Netting
Senior Head of Product Line PET

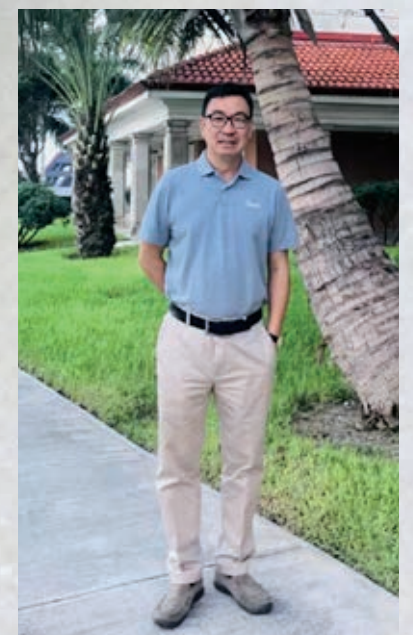


“It’s awesome to watch our PET operations grow vigorously. We are proud that innovation is a central core competency at our site.”

Chris Yang
Site Manager, Tianjin



Tianjin team working on efficiency improvement



Carter Zhang, Head of Process Engineering Upstream, is supporting various Gurit sites around the globe with his expertise on industrialisation and extrusion of PET

BETTER UNDERSTANDING OUR IMPACT AND OPPORTUNITIES FOR CIRCULAR PRODUCTS

Gurit is conducting Life Cycle Analysis for PET and other products. OneGurit chats with Paul Spencer, Gurit's Head of Materials, to find out what LCA involves and the impact it has on our future product developments and technology.

Can you explain to our readers what LCA is?

PS: LCA stands for Life Cycle Analysis which is a methodology that allows us to assess the impact our products, processes and activities have on the environment from conception, through to use, through to end of life. It could measure, for example, the amount of greenhouse gasses such as carbon dioxide are released into the atmosphere.

We're able to use this data to drive changes within our product development process, so that the environmental impacts can be minimised. It allows us to be credible in our environmental claims and contribute to our sustainability goals as a company.

As part of the activities of our Sustainability workstream on Circularity, we combine the principles of the circular economy with LCA methodologies: we can measure the environmental performance of various product and supply chain configurations, and compare circular strategies (e.g.

recycling, reusing or other end of life options) to find our best fit.

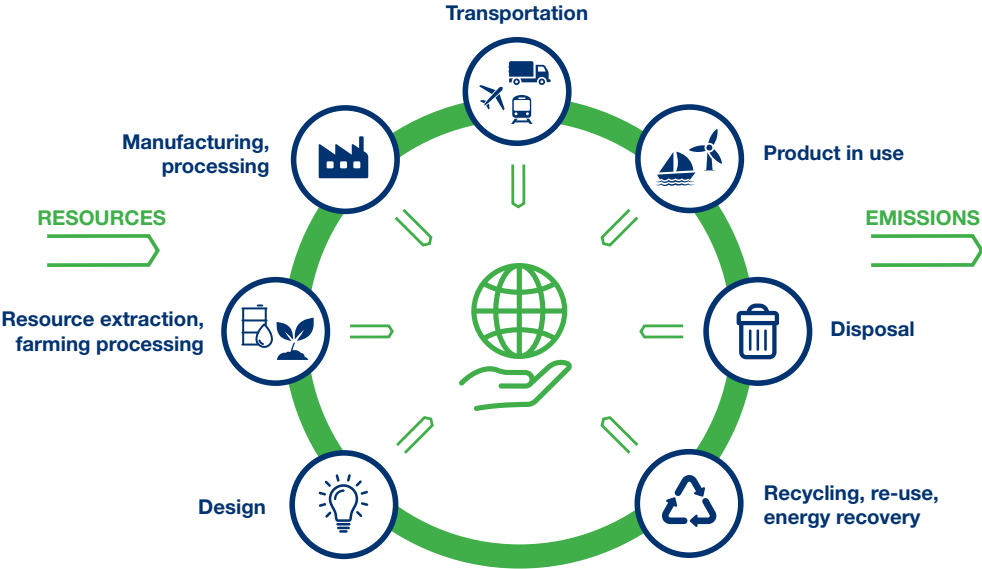
There are different types of LCAs, aren't there?

PS: Yes, that's right. The three main types are Cradle to Gate, Cradle to Site and Cradle to Grave. The diagram below shows which stages of a product's life are assessed within each type of LCA.

Cradle to Gate and Cradle to Site are the stages that Gurit has the most control over. And working with the wider industry, we can indirectly impact the other stages.

What progress have we made so far?

PS: Gurit has undertaken Cradle to Gate LCA on Kerdyn™ Green PET, comparing the impact of recycled PET versus virgin PET in our bill of materials. We are now widening our use of LCA and are running a pilot project, due to conclude this year, which expands our LCA capability across all products including core, formulated and prepreg. We're starting with gathering LCA data to demonstrate the benefits of our bio-based formulated and prepreg product ranges (specifically for PRIME™ 37 and SE75). And then we aim to expand this to other product ranges from 2023 onwards.



LIFE CYCLE THINKING



Paul Spencer
Gurit's Head of Materials and
Leader of the Sustainability
Workstream "Circularity"

Can you give an example of how an LCA has helped us to date?

PS: When we compared the environmental impact of using recycled versus virgin PET we considered the raw material, transportation of raw material and the product manufacturing process. We found that using recycled PET foam in our manufacturing process reduces CO2 emissions by up to 60%.

As we work to decarbonise our activities, we plan to use LCA to demonstrate with data the benefit of using plant-based or recycled chemicals in our products. It will also allow us to optimise our manufacturing processes to reduce our environmental impact.

With regards to our supply-chain, Michelle Hodgkinson from procurement has been using LCA data to change to lower carbon supply-chains or reduce transportation emissions.

In engineering, we anticipate the use of LCA data to allow us to engineer structures not only for weight and performance but also for environmental impact. Something customers are increasingly demanding, which combined with product LCA data, will increase the value that Gurit products and services bring.

Finally, a key challenge surrounds end-of-life solutions for composite structures. The use of LCA will allow us to assess different technologies and innovations to ensure that we invest in environmentally credible solutions.

Is there a standard LCA process for all products?

PS: At present, there are no clear guidelines on applying LCA to our industry. The LCA process involves calculations based on a range of factors, including impact contributions from inputs such as raw materials purchased, transportation, energy use in our plants, packaging, and waste. A challenge, therefore, is to ensure all the assumptions are aligned to provide reliable data.

Challenges can exist where LCA data gaps exist for upstream materials that we purchase. To do this, Gurit has purchased specific LCA software and datasets. Amy Ferris in our product development team is leading the pilot project with support from functions across the business, including procurement and product and process engineers. Following the pilot project, we plan to roll out a scheme of training and awareness to integrate more readily into our daily business activities and decision making.

LCA TYPE	PRODUCT STAGE			CONSTRUCTION PROCESS		USAGE STAGE	END OF LIFE		BENEFITS & LOADS BEYOND SYSTEM BOUNDARY
	RAW MATERIAL	TRANSPORTATION OF RAW MATERIAL	PRODUCT MANUFACTURING PROCESS	TRANSPORTATION OF PRODUCT TO CUSTOMER	CONSTRUCTION / INSTALLATION PROCESS		DECONSTRUCTION AND TRANSPORT	WASTE PROCESSING/ DISPOSAL	REUSE, RECOVERY, RECYCLING POTENTIAL
	Cradle-to-Gate								
	Cradle-to-Site								
				Cradle-to-Grave					

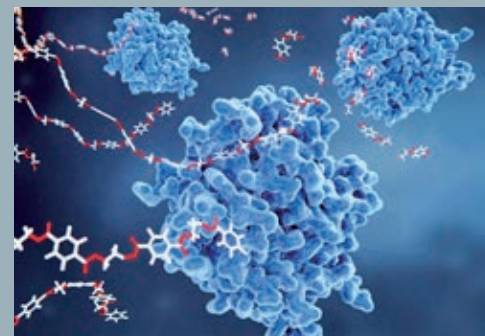
The three types of Life Cycle Analysis

CIRCULARITY

ENZYMES: A POTENTIAL SOLUTION FOR PLASTIC RECYCLING



Earlier this year Gurit was delighted to attend the grand opening of the University of Portsmouth's Centre for Enzyme Innovation (CEI). The CEI is a world leader in the research of enzyme-enabled solutions for the circular recycling of plastics. It is home to 30 scientists across a range of disciplines and custom laboratories.



“The CEI’s research is now expanding to address a diverse range of plastics, including mixed waste streams and composites, materials that are often incinerated or end up in landfill and leak to the environment. Gurit is delighted to be collaborating with such innovative and groundbreaking work.”

Paul Spencer
Gurit’s Head of Materials

The NEW Gurit Formulated Series



LESS IS MORE

Gurit products are known for reducing weight.
Now, we’ve reduced complexity too.
So you have greater efficiency, fewer products taking up space, and improved health and safety.

BUILDING A GREAT PLACE TO WORK

COLLABORATION PAVING THE WAY FORWARD

In December 2022, Gurit kicks off its “Building a Great Place to Work” initiative with workshops held at sites around the globe. This is a follow-up on the Gurit Together employee survey results and aims to provide a regular forum for further discussions. It is essential for these workshops to include perspectives from different roles and functions, therefore volunteers from throughout the organisation are encouraged to join.

Employees who wish to participate in the local workshops and play a key role in improving our working environment are invited to contact their local HR representative.



Creating a productive and happy workplace is an ongoing process that requires attention and active participation from leaders as well as employees. It's essential to check in with your team regularly, and allow everyone to voice their opinion in a non-judgmental environment. Then ensure actions and progress are communicated effectively, and provide the opportunity for feedback.



MEET OUR STAFF

FANG WU – HELPING US THRIVE

Making the most of available talent is something close to the heart of Fang Wu, Human Resources (H.R.) Business Partner Manufacturing Solutions and HR Manager China.

“Recruiting strong candidates; then seeing them grow and have a positive impact on the business is why I do what I do,” says Fang who has been in the HR field for over 20 years and joined Gurit in January 2020.

“We have a pool of passionate, skilled and knowledgeable people within Gurit. I am excited about working with employees and management to make Gurit a great place to work, to help individuals contribute to the company’s success and to fulfil their own potential.”

MAKING BEST USE OF OUR SKILLS

“Lean Thinking is the culture of relentlessly eliminating ‘waste’ to ensure all processes, services and products are safe, high quality, available at the time required and delivered at the appropriate cost.”

The 8 wastes of Lean are often referred to as the acronym ‘TIMWOODS’, which stands for: Transport, Inventory, Motion, Waiting, Overproduction, Overprocessing, Defects and Skills. **The 8th waste, Skills, is the waste of human potential** – the waste of not fully exploring and utilising our people’s knowledge, capabilities, talents, and interests.

Gurit UK has introduced a Formulated Ideas Scheme to facilitate bottom-up continuous improvement, and to maximise our teams’ potential.

New ideas are actively encouraged and can be raised by all employees as either a physical T-card, placed within the ideas scheme board located at the entrance to Formulated Production, or online via a Microsoft Teams App. These new T-cards/tickets are then reviewed by the steering commit-

tee and either approved into the planning stage for the working committee to action or rejected with feedback to the employee.

So far, **140 ideas have been raised by our employees**, with 18 ideas fulfilling the **scheme’s Plan-Do-Check-Act process**, and 39 ideas currently in progress.



“In addition to many Safety, Quality, Delivery and Sustainability improvements, the Newport team has also achieved a significant amount of direct cost savings via the scheme.”

Josh Murray

Leader of the working committee, who take action on the new ideas

BEHIND THE FRONTLINE

Behind our operations, sites and sales teams, four people keep a keen eye on our governance. You may never cross paths with them, or have a need for their guidance and support, but rest assured they are working hard to ensure we have a solid and compliant foundation on which we can operate and grow the rest of the business.

The **Legal Department**, comprising Valerie Collaudin – Group General Counsel, and Pol E. Culubret – Senior Legal Counsel, are responsible for all legal matters related to contracts, litigation, compliance, purchasing, technology, and provide legal support directly to the business units.

“Contracts are like seat belts. Putting them on takes a bit of time and energy and on most trips they serve no useful purpose. However when an accident happens they become your most important accessory.”

Valérie Collaudin
General Counsel

Hao Wang – Head of Group Treasury and Benoît Bongard – Assistant Treasurer are our **Treasury Department**, responsible for the Group’s funding, liquidity, banking relations and financial risk management. They support the sites with various financial initiatives, such as transfer price processes and documentation, as well as manage our insurance programs.

“Treasury involves the management of money and financial risks. We manage the company’s financial resources in a similar way Gurit manages other resources – making effective use of cash and other financial instruments, robust processes and risk management, whilst being sustainable and compliant. With the ultimate goal of helping Gurit meet its business objectives.”

Hao Wang
Head of Group Treasury

SPOTLIGHT ON DIGITAL TOOLS & DATA

Gurit is committed to Sustainability and has set up an internal organisation along 5 strategic sustainability pillars and 8 dedicated workstreams to drive actions. This year has seen the implementation of several new digital tools to help us understand our current activities, risks, opportunities and to assess possible new approaches. This enables us to take the next steps more confidently through data-driven decision making.



ELIMINATING HARMFUL CHEMICALS

Chemicals are used throughout Gurit facilities, from production areas, test and research labs, as well as maintenance and housekeeping departments. They must all be continually evaluated and managed to ensure our employee and customer safety.

This year, we began the roll out of a **comprehensive chemical safety management system**, which allows us to understand the chemicals used at Gurit, **identify areas where the most harmful chemicals are used, and target their elimination.**

Our system, called GOLD FFX, **helps us assess chemical risks** according to the Internal Labor Organisation (ILO) model, looking at the current hazard profile and exposure risk, as well as the impact on these if we were to make changes.

Sites with large maintenance, production and technology facilities were targets for the initial roll out. **Three sites – Newport, Volpiano and Ecuador – have now implemented the system**, with a full Group roll-out planned for 2023.

Risk Matrix							
LIKELIHOOD			Consequence severity (Hazard)				
			Low	Minor	Moderate	Major	Critical
			1 (A)	2 (B)	3 (C)	4 (D)	4+ (E)
	Almost certain	>30	4	2	3	4	4
	Likely	15-30	3	1	2	3	4
	Possible	4-15	2	1	1	2	3
Unlikely	0.5-4	1	0	1	2	3	
Rare	0.5 or less	0	0	0	1	2	

Screenshot of a risk matrix in the GOLD FFX platform

RISK MAPPING OUR SUPPLY CHAIN

Typically, the majority of a company's greenhouse gas footprint is generated outside the factory gates – in the supply chain. This amounted to three quarters of Gurit's emissions in 2021. This highlights the importance of engaging with our suppliers, identifying hotspots, influencing action-taking, and ultimately reducing these indirect emission sources.

To help with this and other sustainability related goals, the Gurit Procurement Team is developing a robust **risk mapping management system**, which allows us to assess risks related to the **environment, greenhouse gas emissions, health & safety, human rights, social practices and business ethics.**

The new **SEDEX platform**, which is being used in conjunction with the existing procurement framework, started its rollout in September this year. The Procurement team will now inform suppliers about our sustainability expectations and engage them in our supply chain risk mapping.

During the second phase of the roll out, the suppliers will be asked to answer a questionnaire within the SEDEX platform. Their responses will help us to build a supply chain risk map and manage related risks according to our sustainability priorities.

Our sustainability risk maps will become an integral part of our sourcing and selection process.




Pre-screening: The SEDEX platform helps us assess inherent risks based on a supplier's location and sector. If further assessment is required, suppliers can fill in a questionnaire directly in SEDEX to produce a site risk assessment.



"Sustainability is an integral part of our entire value chain. Therefore, developing relationships with supply partners, who are aligned with our corporate social responsibility ethos and ethical practices, will help us provide solutions, which support our customers in reducing their impact on environment."

Sudhir Tukra

Site Director and Sustainability Workstream Lead Responsible Supply Chain



Water is a valuable resource. Let's take care of it together.

#GuritCares

WITH PASSION FOR A SUSTAINABLE FUTURE

Gurit

INSIDE GURIT

#SAFETYFIRST

Safety matters at Gurit and our sites around the world. Here are some examples of what we do and how we care:

Safety sensors to reduce machinery-related risks

At our site in Newport, UK, laser sensors have been installed as an emergency control to stop certain machines if they are not working correctly. The aim is to minimise the risk of an operator, visitor, or contractor being injured through accidental or intentional interference with the machine whilst in operation.

For example, light curtains and interlocking doors have been installed around the 150 tonne press at this site, to prevent anyone from getting close to the machine whilst it is in operation. Light bars are positioned around the front of the machine with signs on the floor denoting the restricted area. The machine will shut down if the doors are opened or the light bars are crossed, which removes the possibility of someone being injured by any moving parts of the machine.



First aid for chemical burns

If you or anyone around you suffers a chemical burn, it should be dealt with immediately to avoid serious injury or long-term consequences.

1. Generously wash the skin with **plenty of WATER** (shower for 20 to 30 minutes).
2. During the shower, **remove all objects that are in direct contact with the skin**: glasses, clothes, shoes, rings, bracelets, watches and other jewellery.
3. Wrap the injury with clean gauze or clean cloths, moistened with water. **The bandage should be loose.**
4. **Always seek medical attention for chemical burns**, especially for 2nd or 3rd degree burns. In addition, **always inform your supervisor or local H&S manager immediately**. They will quickly identify some initial Containment Actions to assure that no further incidents can occur.

Coming soon! Safety Awareness workshops for operative staff

Preparations are ongoing for workshops for our operative staff. Real life examples of incidents/accidents will be presented, then discussed as a group to understand what we can learn from them and to evaluate what can be done differently to prevent similar events from happening in the future.

The live workshops will be held in local site languages and will also be shared through different channels.



ONE WINNING GURIT



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