

shape

The Gurit Magazine
Issue 12, March 2013

Lighting masts for Poole's
Twin Sails Bridge

New Balsa block factory in Ecuador

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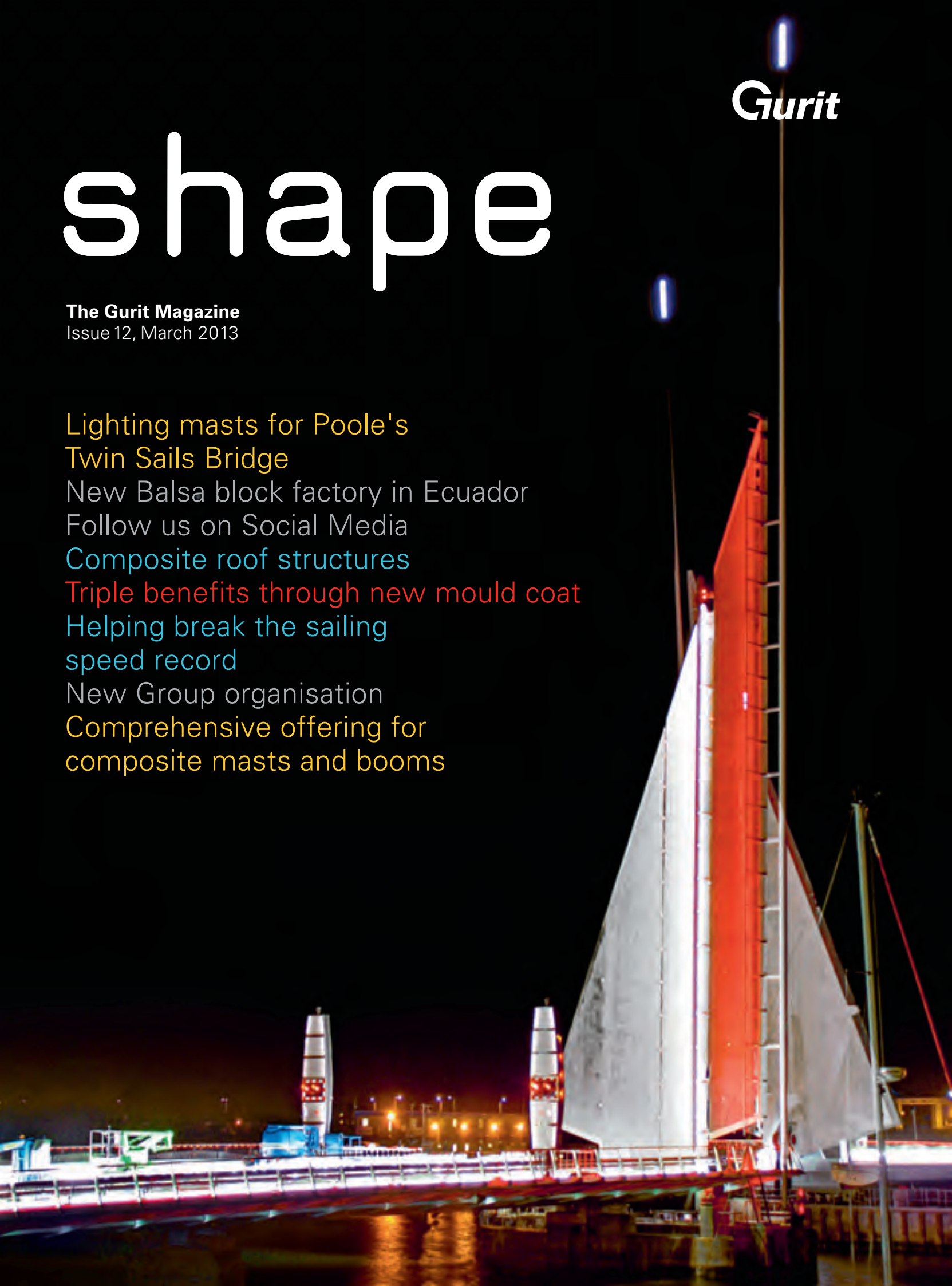
Composite roof structures

Triple benefits through new mould coat

Helping break the sailing
speed record

New Group organisation

Comprehensive offering for
composite masts and booms





Dear Reader

In 2012, Gurit achieved annual sales of CHF 351.0 million, which is an increase of 1.8 % in reported Swiss francs. After three quarters with remarkably strong growth, Wind Energy sales which had benefitted from strong general demand in the America witnessed a strong drop in the last quarter, as the production tax credits – a major subsidy for wind energy in the US – ran the risk of expiry. Tooling sales remained low throughout the year reflecting the hesitant investment mood of the global wind energy market. Transportation sales benefitted from rising build rates and increased composite content per aircraft and saw dynamically growing sales of finished automotive parts. The sales increase in Marine reflects renewed activity in the super-yacht and race boat market but is mostly attributable to materials sold to non-marine industrial applications.

While managing this challenging situation in the final months of the year, Board and Management initiated further strategic steps towards a more balanced materials sales pattern across all our markets and towards strengthening our presence as a composite systems supplier and engineering partner in new market fields.

With the new Group Organisation we announced early this year and the globally unified branding strategy, we systematically target newly emerging opportunities where industries convert from traditional materials to composites or where new options for composites arise. To meet these trends more effectively, Gurit is now organized in two business units: *Gurit Composite Materials* covers all composite material needs of our traditional and new customers and target industries. *Gurit Composite Solutions and Engineering* focuses on composite tooling, the manufacture of finished parts and solutions as well as composite structural engineering.

This edition of SHAPE again features a broad palette of exciting composite projects. Be inspired by our composite stories and find out how your industry can benefit too from the almost unlimited opportunities these materials present. Let Gurit deliver the future of composite solutions to you!



Yours sincerely
Rudolf Hadorn CEO

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Thank you for your feedback at SHAPE@gurit.com

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Concept and Design Gurit Group Communication and Eclat AG, Erlenbach



GURIT PROLONGS SUPPLY CONTRACTS FOR AIRBUS AIRCRAFTS

In 2012, Gurit agreed a series of new multi-year supply contracts with all key customers specialising in different interior and secondary aircraft structures and contributing at various tier levels to the full range of the large Airbus aircraft family.

The aircraft industry remains at the forefront of adopting advanced composite solutions for an increasing range of applications. The new contract for Airbus aircraft is worth some CHF 50 million and covers prepreg materials for a variety of applications in aircraft interiors and in secondary structures for passenger aircraft.



In addition, Gurit has also won new qualifications for floor materials from smaller European aircraft manufacturers. Aiming both at exceeding existing physical requirements and achieving lower overall cost, material innovation is gaining importance. Gurit has introduced a series of lower cost material solutions based on changes in applied raw materials. These new material concepts should allow aerospace customers to increase their own profitability.

GURIT (AUTOMOTIVE) WINS ACCLAIM FOR EMPLOYEE DEVELOPMENT AND INNOVATION

Gurit (Automotive) scooped up two important awards in 2012: One for employee development and one for innovation. Congratulations to a team that has more than doubled its business volume in 2012.

The two awards Gurit (Automotive) received in late 2012 are important signs of recognition and underline Gurit's commitment to industry leading innovation and quality. This approach not only resulted in important customer and project wins but has also allowed Gurit (Automotive) to increase its sales in 2012 by 76%.

In late November, Gurit (Automotive) received an award for excellence from the Isle of Wight Chamber of Commerce, Tourism and Industry. The award commended Gurit's achievements in terms of employee development. Martin Starkey, Automotive Managing Director, comments: «We are delighted to have been presented with this award. Gurit (Automotive) operates in an industry that is at the cutting edge of product design and manufacture, and we are truly committed to a comprehensive approach to our employee development. This award recognises all the hard work and dedication of our team.»



This award followed Gurit (Automotive)'s success at the Composites UK Innovation Awards 2012, when the team was honoured for its innovator role in the manufacture of carbon composite car body panels. From the creation of innovative composite materials and the advanced manufacturing process we use today, to our new press technology that allows the manufacture of larger component series, innovation is a constant at Gurit (Automotive).

GURIT (CANADA) IS AWARDED SILVER MEDAL FOR ITS BEST BUSINESS PRACTICES PROJECT

Over 40 companies presented a continuous improvement project at the 2012 Best Business Practice convention in Montreal. Nearly 2,500 business leaders and workers visited the kiosks of companies including Bombardier, Pratt & Whitney, BRP, GE Aviation, Esterline CMC Electronics, IBM Canada Ltd., and Gurit (Canada). The project presented by our Canadian colleagues won a Silver Medal.

The Quality Movement of Quebec in collaboration with the Ministry of Finance and Economy of Quebec organised a Best Business Practices convention at Montreal Convention Center, where over 40 companies presented continuous improvement projects on November 8, 2012. The project presented by Gurit (Canada) was about increasing the line speed of a prepreg production line. A multidisciplinary group, including technical support from Gurit (UK), used the Six Sigma methodology to conduct the project. The «Design of the

Experiments» (DOE) approach was used to identify the key variables in the impregnation process.

All projects presented at the «Salon des Meilleures Pratiques d'Affaires» were carefully evaluated: Public votes made up 40 % of the ranking, while 60 % were determined by the official jury, comprising six representatives from the manufacturing, services, consultancy and government sectors. Their votes were based on components such as the quality of the project, the quality of the information provided, the methodology, the results, and the enthusiasm of the presenters. We congratulate our colleagues of Magog for bringing home the silver medal for their project and achievement.



FOLLOW US ON SOCIAL MEDIA

Social Media has changed the way we communicate – privately and professionally. Most of you already know Facebook, YouTube, Twitter or Flickr and use these tools frequently, seeking and sharing content and talking about things you care about with a wider public. Gurit too will use these tools selectively.

Last year, we developed our own social media strategy and formulated Social Media Policies and Guidelines. The strategy defines how Gurit as an organisation will use Social Media while the policy and guidelines set out how Gurit's employees should use these platforms, especially when talking about our company. Our guidelines are published here <http://www.gurit.com/corporate-information.aspx>

Our Social Media strategy defines how Gurit will use the new communication channels. We want to reach out to audiences who are interested in learning more about Gurit as a company, our core business of composite technology and the future of the global composite industry and the manufacture of lightweight and strong components. Gurit will use these communication channels to «push» content out to customers, rather than «pull» them into our website to view content. This way we can reach out and engage with our audience where they spend most of their online time.

Social Media is about sharing interesting content. Group and Marketing communications are thus making a lot of Gurit's fascinating world of composites available on the new social media platforms. Over the past months, we have been busy selecting, curating and uploading exciting content onto our selected social media platforms. We have created pages, profiles, or accounts that reflect the general Gurit design look and feel. We invite you to join, subscribe, share, and hopefully like our new presence on social media.



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GURIT COLLEAGUE WINS FERNAND-CLOUTIER AWARD

Gurit (Canada) congratulates Liette Haché from the Finance Team in Magog on winning the prestigious Fernand-Cloutier award.

Every year, the team of candidates who gets the best results in the final stage of their Chartered Accountant in Management (CMA) accreditation process is presented with this award. This year's winners are Liette Haché from the Finance Team in Magog together with her teammate. The award crowns their two-year CMA Strategic Leadership Programme which culminated in a written report and an oral presentation to the CMA Board of Directors. The award specifically commends the outstanding performance of a student team in their final report and oral presentation and consists of an honorary medal and a cash award of 6,000 Canadian dollars divided between the members of the winning team. Congratulations Liette!





67.74
KNOTS AT
PEAK!

ROCKET POWERED

On Friday, November 16, 2012, on the shores of Walvis Bay in Namibia, the outright world speed sailing record was broken at an amazing 65.45 knots. No wonder the boat is called Sailrocket!



The outright world speed sailing record is set by taking the average speed of a craft between two points set 500 metres apart. Sailrocket, a custom-made boat manufactured on the Isle of Wight, broke the previous world record set by a kite surfer of 55.65 knots (around 64 mph or 103.06 km/h). Sailrocket's peak speed during the record-breaking run was an amazing 67.74 knots or 125.45 km/h.

The Sailrocket project had first started in 2002. Gurit was involved for the whole duration of the project, supplying materials and expertise in its construction. Materials supplied included Ampreg 22, prepreps from Gurit's SE 84LV and SE 70 product ranges and some dry reinforcements, along with technical services to the project.

The record-breaking boat was the second version of a design first proposed in 2002. The first Sailrocket took to the water in 2008 in an attempt to break the record and managed an unofficial reported speed of 52.22 knots. The project continued to develop with an update to the design and an official launch of the new boat in 2011, which Gurit staff attended. Sailrocket 2 was designed to be significantly faster than its predecessor with the craft based on a unique stabilising concept with the sail and keel elements positioned so that there was virtually no overturning movement and no net vertical lift.

The Sailrocket team then made their next attempt at the record in 2011 but were unsuccessful with winds not strong enough for a shot at the record. Finally in November 2012 the team decamped again to Walvis Bay, chosen for its flat water and strong winds, for the ultimately successful attempt at the record.





GURIT BUILDS INDUSTRY-LEADING GLUED BLOCK FACTORY IN ECUADOR

Converting naturally grown balsa wood into uniform and homogeneous balsa core material requires various processes: The trees grown in the plantations are first converted into sawn wood. These planks are then kiln-dried and glued together into blocks. The glued blocks are eventually converted into panels. In building its own balsablock factory, Gurit has made an important backward integration.

Gurit's new balsablock factory is located in San Carlos, near Quevedo, the capital city of the Los Rios province in Ecuador. This province is a prime location for balsa wood plantations. Gurit (Balsablock) MFG, as the new entity is called, has been built right next to the existing site of Gurit (Balsaflex) MFG where Gurit converts the balsablocks bought on the market into panels.

A GREEN FIELD OPPORTUNITY

«The new green field investment gave us the opportunity to select a works layout that ideally suits our workflow, is designed for maximum labour efficiency and least possible waste generation», says Sergio Sesa, General Manager of Gurit (Balsa). In addition,

the building features a temperature and humidity controlled atmosphere to guarantee the best possible quality.

«Our people are proud to work in the best glued block factory in Ecuador», commented Alfons Teixidor, Gurit (Balsa) Industrial Director.

CONTROLLING THE WHOLE SUPPLY CHAIN

From a supply chain and value-adding point of view, the new facility is a key element allowing even better control of the whole process. The ability to produce a percentage of glued blocks in-house allows Gurit (Balsa) to produce blocks according to specific customer requests.



RAMPING UP PRODUCTION

The factory is now being ramped up. The key focus in this phase is on quality and consistency, not yet on maximum output. «We ran specific training programmes for our employees in December, as this whole process is new for each and every one. We started with 35 colleagues working in the new unit – some decided to join the new manufacturing unit from Gurit (Balsaflex) and some are new hires», concluded Hugo Andrade, Managing Director of Gurit (Balsaflex). By March, the team at Gurit (Balsablock) had already reached 40 members of staff. Gurit is planning to gradually increase production over the coming months.

CUSTOMERS BENEFIT THROUGH GURIT'S NEW ORGANISATION

Gurit is introducing a new Group Organisation and rolling out a globally unified brand strategy. Both measures are designed to best serve our existing markets and customers on the one hand and to seize future growth opportunities on the other. All existing and future customers will benefit from our all-encompassing approach to composites.

Lightweight, high performance composites are increasingly finding their way into a growing array of industries. We believe that by leveraging our composite expertise, technological capabilities and industrial capacities in a consistent and targeted manner, including also into market areas beyond the current ones and into new applications, the addressable composites market will considerably increase over the coming years. We want to seize these additional growth opportunities both as a supplier of a unique and comprehensive range of composite materials and, progressively, as a systems and engineering provider supplying composite tooling equipment, engineering services and select finished parts and components.

ONE GLOBAL GURIT BRAND

Previously non-Gurit-branded companies or market facing entities will now all feature Gurit as a defining element in their names. This best reflects the comprehensive materials, services and component offering that Gurit delivers globally to its customers across the existing key target markets and an ever widening array of industries converting from traditional materials or concepts to next-generation advanced composite solutions. Gurit has also chosen a new motto which underlines its corporate mission and vision:

Delivering the future of composite solutions

The biggest brand change will be seen in the worldwide marine markets where the combined SP-High Modulus brand will change to the global Gurit brand. This move reflects the fact that many of the market leading marine products are also increasingly being used in non-marine industrial markets and applications. Red Maple, the Tooling business of Gurit, located in Taicang/China will be called Gurit Tooling (Taicang) going forward. While moulds for large wind energy turbine blades remain the biggest business in the tooling market, Gurit Tooling is now starting to offer its tooling capabilities also beyond the Wind Energy market. The Balsa wood business will cease to use its former company name Balseurop to adopt Gurit (Balsa) as its new identity, and China Techno Foam is now called Gurit (QingDao).

With this step, we want to ensure Gurit is recognized as the leading provider of composite materials and composite solutions, because if it's composites, it's Gurit.



NEW GROUP ORGANISATION WITH TWO BUSINESS UNITS

With a view to continuously best serving our existing customers, as well as to cover and better penetrate all global regions and to promote the use of our composite materials and systems in additional markets, novel applications and in industries which are now converting to composites, we are introducing a new global organisation comprising two new business units.

Gurit Composite Materials covers the materials business of the existing target markets Wind Energy, Transportation and Marine and all other and newly emerging applications. This business unit covers the material categories prepregs, core materials and formulated products. Gurit Composite Materials will be led by Stefan Gautschi who has joined Gurit on February 1, 2013.

Gurit Composite Systems and Engineering is the name of Gurit's second business unit bringing together the existing Tooling, Automotive systems and Engineered Structures businesses. Over the past few years, Gurit has evolved from a mere materials supplier to a true systems provider and components manufacturer. We believe that this will be a key growth area for Gurit going forward. Rudolf Hadorn leads this unit in addition to his function as CEO of Gurit; the business managers report to him.

Gurit customers will benefit from this reorganisation through our all-encompassing approach to composites. As Gurit, we are committed to «Delivering the Future of Composite Solutions»! In the day-to-day business, customers should not experience any distraction as we strive to seamlessly phase in the new organisation.

The Gurit Executive Committee (i.e. Group Management) thus comprises since February 1, 2013 Rudolf Hadorn as Chief Executive Officer and General Manager Gurit Composite Systems and Engineering, Markus Knüsli Amacker as Chief Financial Officer and Head Investor Relations, Stefan Gautschi as General Manager Gurit Composite Materials, and Damian Bannister as Chief Technology Officer. The smaller Executive Committee will allow Gurit to co-ordinate more easily and to act even faster.

Ruedi Gerber, General Manager Wind Energy, has decided to leave Gurit by mid-year to pursue other professional opportunities. Ruedi was a key contributor to the creation of our new organisation and is fully committed to it and will support Gurit until his departure. The Board of Directors and Group Management would like to thank Ruedi for successfully leading this key business unit during the past five years and especially for extending its product range to the full line offering we have today. We all wish Ruedi personally and professionally all the best.

Kees Reijnen, General Manager Transportation, and Paul Goddard, General Manager Industrial and Marine, will assume new responsibilities within the Gurit Composite Materials as Regional Sales Directors. Graham Harvey, General Manager Engineered Structures, and Bing Chen, General Manager Tooling, will continue to manage those activities as before.

NEW GENERAL MANAGER GURIT COMPOSITE MATERIALS



Stefan Gautschi

Stefan Gautschi is a Swiss citizen born in 1968. He holds an MBA from the University of Arkansas/USA and brings with him extensive international management experience. He held various management functions at Georg Fischer Piping Systems from 1995 until 2012, including Head of Division Utility (2011–2012), Chief Operating Officer (2009–2011), CFO and CIO (2004–2009), Managing Director China, in China, (2001–2004), and CFO and Controller Georg Fischer Sloane Inc. in the USA.

It's composites...
It's the future...
It's Gurit.

TWIN SAILS GREET PASSING BOATS

The Twin Sails Bridge in Poole on the South Coast of the UK isn't just a second crossing designed to reduce traffic pressure in one of the world's largest natural harbours. When the bridge opens, the tapering triangular decks mirror the shapes of racing yachts passing through, making it a stunning landmark in the region.

Designed by architects Wilkinson Eyre and bridge designers Ramboll, the bridge opens almost hourly for maritime traffic. It is configured as a simple bascule with a flat deck and two hydraulically operated lifting sections with skewed joints that enable the unique design when the bridge opens.

COMPOSITE LIGHTING POSTS HEIGHTEN DRAMATIC APPEAL

It is not only the mast design that makes the bridge a sight to behold. The bridge's open profile includes thin lighting masts which form a continuation of the steel mast elements, reaching 25 metres into the sky above the tip of the deck when it is open. Jonathan Speirs was in charge of the lighting design. Speirs was a leading proponent of the use of lighting to add to the aesthetic appeal of bridges. Part of the bridge's lighting scheme includes bright LED lighting over the top two metres of the lighting masts.

Design of the lighting masts required a lightweight structure, with a complex tip moulding in order to integrate the LED lighting strips. The properties of advanced fibre reinforced composites enabled a solution to the challenges of the mast, and so the design team approached AM Structures on the Isle of Wight for the fabrication of the masts. «Gurit has already worked hand in hand with AM Structures on a number of stunning architectural mast structures in the past and so we were delighted to work with them again

to solve the challenges of this landmark project», says Dr. Mark Hobbs, Senior Engineer at Gurit (UK) Limited.

DRAWING FROM FORMER ENGINEERING PROJECTS

Design of the mast called for consideration of a number of load states: Detailed checks on the deflection of the mast during lifting and lowering ensure that the mast would not clash with any adjacent structure when lowered in high wind speeds. Additional checks ensure that the mast can withstand accidental loading from people or even from boats mooring to the mast when the bridge was lowered.

Gurit carried out initial design and optimisation of the main tube laminates using design tools which were developed for the Windwand and Lightwand sculpture projects: tall upright sculptures which stand completely straight in calm weather but start to sway in even the most gentle breeze. (See also lightwand picture on page 2 and SHAPE 5, October 2009). Detailed analysis and final optimisation were then carried out using finite element analysis to make sure deflections of the mast were within the specified limits, and that the strains in the mast tube were within acceptable levels. In addition, the finite element models were used to check the dynamic behaviour of the mast to confirm that it would not be at risk of aerodynamic excitation under the design wind

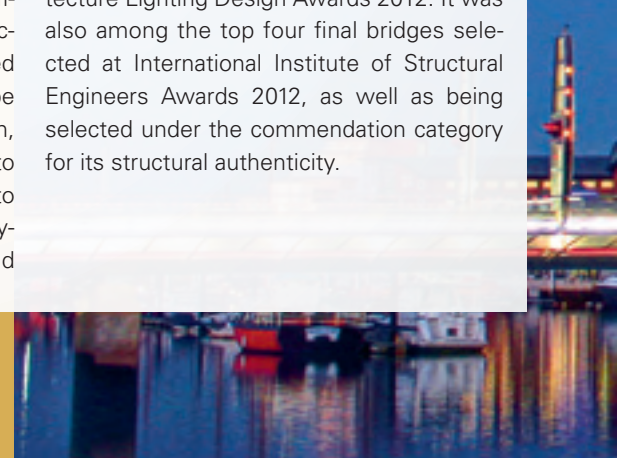
conditions. Gurit also carried out detailed design of the fixation to the main structure steelwork and the joint details in the mast.

BROAD RANGE OF GURIT MATERIALS USED

Lamination of the mast was carried out by AM Structures using Ampreg 21 resin, with a mixture of glass and carbon reinforcements supplied by Gurit. The mast's shell was manufactured in two halves in female moulds and then bonded using Spabond 340LV adhesive.

Mast tip units, including the LED strips were manufactured as separate units which were mechanically fastened to the main tube to allow removal for easy maintenance of the lighting units. Epoxy resins were used to provide the fatigue resistance and high working strains which help ensure a suitably long life for the structure.

The masts were installed in 2012, and the bridge has been recognised with a number of awards, including the outstanding achievement award for exterior lighting at the Architecture Lighting Design Awards 2012. It was also among the top four final bridges selected at International Institute of Structural Engineers Awards 2012, as well as being selected under the commendation category for its structural authenticity.





TE AWA

A recent construction project by Tainui Group Holdings, a company whose single shareholder is the commercial arm of the Māori iwi (tribe) Waikato-Tainui, has been undertaken to ensure returns for the investor, but also to ensure the security of a growing community asset. The 30,000 m² Te Awa retail complex in Hamilton, New Zealand, incorporates a number of traditional cultural elements, whilst using modern engineering and design solutions to achieve its goal.





For early Māori, rivers offered landing sites, harbours and a source of fresh water. They were instrumental in the way the Māori went about their lives as they travelled and explored, gathering food and resources, and they often built settlements at the mouth of a river.

Whilst commercial imperatives drove much of the Te Awa development, Tainui Group Holdings' vision was a design that incorporated the cultural identity of the people. The development's name Te Awa means river, stream or creek; the nearby Waikato River was a significant inspiration, with sections of the complex modelled around a waka (traditional canoe).

MAXIMISING NATURAL LIGHT

Part of the design philosophy of Te Awa was to give shoppers the sense of being outdoors, so maximising natural light coming in to the complex was critical. Cutting-edge roof technology was at the heart of the development's unique visual representation. The spine of the roof is formed by sixty moulded triple-layer panels containing 3,500 square metres of EFTE (ethylene tetrafluoroethylene). The translucent membrane maximises natural light inside the building, absorbs radiation and reduces heat loss. It is also incredibly lightweight – about one percent the weight of glass – which significantly reduced the size of the wishbone steel structure needed to hold it up, compared with glazed systems typically used in other retail constructions.

Either side of the central spine is a series of double curvature composite domes that complete the roof over the main concourse, and form a striking saw-tooth pattern when viewed from underneath. The structural

domes have a short span of nearly 6m, and a finished thickness of only 30mm from the waterproof outer surface to the inner cosmetic surface.

Gurit engineers worked with the fabricator's designers to optimise the laminate design to meet strength and stiffness requirements. Finite element analysis was used to take advantage of the domes' curved shape whilst making the most of cored composite construction. As well as optimisation of the core thickness, specific areas of directional reinforcement were applied in strategic locations to maximise performance at minimum cost. The engineers also provided specific composite detailing to help the components seamlessly connect to the conventional structure. The result: domes, which were fabricated in single units off site, with no joins requiring weather-tighting, and light enough to be easily lifted into place for installation.

QUALITY ASSURANCE BY B³ SMARTPAC

A full package of Corecell™ foam and glass reinforcement fabrics was supplied to the composite fabricator as a B³ SmartPac, with each piece CNC-cut to the exact size and shape required, along with a construction manual. The use of the B³ SmartPac ensured that the engineering design was easily and repeatedly translated into the finished parts, helping with quality assurance and reducing the overall build time.

FRP (NZ) Ltd manufactured the finished 8.1 x 5.7m parts, which were then transported to the building site in single units.

CONSTANT DIMENSIONS AND PROPERTIES

«By opting for a one-piece moulded construction technique using the B³ SmartPac, rather than handcutting material and then joining laminated panels together, you know that each component is going to have exactly the same dimensions and properties,» comments Tony Stanton, Asia Pacific Engineering Manager at Gurit. «So there wasn't a concern about variability and whether the domes would attach to the main structure in the same way each time. This afforded the developer greater confidence in having the parts manufactured offsite and also helped speed up the installation time on site.»

A 14 metre-high pou (carved post) stands at the entrance to the Te Awa retail complex, with three threads – white, black and red – spiralling up around it to a canopy above. The pou represents the Waikato/Tainui proverb of the Eye of the Needle, which was passed down from the first Māori King and is said to symbolise unity and inclusiveness. This retail complex, whilst representative of the hustle and bustle of everyday modern life, makes reference to Māori history and traditions, many of which are upheld as part of 21st century New Zealand life today.

ALL THAT GLITTERS IS NOT GOLD...

Capturing the light – and the attention of passers-by – at Sydney's Central Park, is the giant glistening yellow ring, Halo. Measuring 12m in diameter and attached to a 6m long silver arm, which is atop a 13m tall silver pole, Halo is activated by the power of the wind, tilting and turning in response to the ever-changing speed, direction and gusts.

Gurit's structural engineering team was called upon to help turn this unique design, created by two of Australia's pre-eminent public artists, Jennifer Turpin and Michaelie Crawford, into a tangible piece of public art. With unusual requirements and tight tolerances to ensure the end effect was as the artists envisaged, it made for an interesting and challenging project, bringing together experts in many fields.

FLOATING IN MID-AIR

Halo has an eccentric balance point so that it appears to float in mid-air, providing an interesting movement relative to the pole, with the weight of the ring and arm balancing on a tiny ceramic bearing, the size of a small glass marble. The artists' design called for thin tapering sections, which needed to be as light as possible to maximise movement in the wind. The geometry of the halo (it tapers dramatically from the root to the far

side), as well as the requirement for it to appear to sit flat at rest, resulted in very tight deflection criteria. After the initial structural design concept had been developed, Gurit engineers utilised advanced finite element analysis to run a series of design optimisations, which investigated optimum laminate placement to achieve the desired results.

A TASK FOR CARBON PREPREG

The supporting arm for Halo is shaped like a crescent in the cross-section to help provide a directional driving force when the wind blows. Once again, the dimensions of the section were to be kept to a minimum, the weight had to be low, and there were very tight tolerances where the part interfaced with the metal end brackets.

Through their analysis, the structural engineers determined that carbon prepreg was the only feasible material for the arm.

DRAWING FROM GURIT'S COMPREHENSIVE PRODUCT RANGE

Innovation Composites manufactured the arm out of Gurit SE 84 LV prepreg, and the ring out of Gurit double bias carbon with E-glass cloth and carbon tapes, hand laminated with Ampreg 22 epoxy resin. The plug and mould for the part were made by Mouldcam using Gurit T-Paste 70-2.

This exciting project, which brought together many experts under the project management of Partridge Event Engineering, was opened to the public in December 2012.

NEW PREPREGS WITH OVER TWO MONTHS SHELF-LIFE AT UP TO 35 °C

The need to transport and store prepregs in cooling containers and chilled storage rooms has in some cases been a barrier to adopt the use of prepreg technology and it has been a considerable cost factor. Gurit's latest iteration in prepreg resin technology extends the shelf-life of unchilled structural prepregs to over two months at 35 °C.

The global demand for larger composite structures is ever increasing across a wide range of industries. Designers are now investigating the benefits of new globally available prepreg materials. In 2012, Gurit launched SparPreg™ Airstream™ featured in the last issues of SHAPE to efficiently manufacture high quality thick laminates with unparalleled low void contents at ambient production hall temperatures of up to 35 °C. Now in 2013, Gurit has further enhanced its structural prepreg range such as e.g. SE84LV, SparPreg or WE91-2 and others by developing a special long-life resin chemistry, which enables low cost tooling, minimises cure time and most notably eliminates the requirement for chilled storage.

For many years, Gurit structural prepreg has been supplied to the composites industry for a wide range of applications including spar components for wind energy blades, boat hulls, civil engineering projects and many more. Gurit's structural prepreg Resin has benefited from continual development and innovation to ensure the best possible performance for out-of-autoclave processing. The latest iteration of these well-known systems is now available with two exciting new characteristics:

Long Shelf-Life A key barrier to prepreg adoption has been the requirement for chilled storage and transportation. Gurit structural prepreg resin now benefits from latent curing technology that provides a much longer shelf-life at 21 °C and over 2 months at 35 °C.

Shelf-life @ 35 °C	SE84LV Resin	SparPreg™ Resin
Standard System	20 days	20 days
Latent System	2+ months	2+ months

Contact gurit@gurit.com
for more information.

Low Exotherm The enthalpy of an industry standard 120 °C curing prepreg resin has traditionally been around 200 – 300 J/g. Innovative curing technology has enabled Gurit Prepreg Resin to reduce the enthalpy as low as 150 J/g. Such a technology step opens the door for standard prepreg materials to be cured using infusion grade, water heated tooling without the risk of excessive exotherm or lengthy curing cycles for thick section laminates.



Shut the coolers off! The next generation of Gurit prepreg does no longer requires chilled storage.

SPARRING WITH THE BEST

Gurit has played a major part in the field of composite design and technology solutions for sailing yacht spars for over 20 years. Working alongside the world leaders in spar manufacture, we have invested heavily in research and product development to support these customers with cutting edge design solutions and materials technology. The resulting range of services and products enables us to offer a complete end-to-end solution to customers around the world.

Gurit's composite structural design team has been involved in many custom spar programmes, and in addition has developed standard systems, construction techniques and details for series production builders to efficiently build ranges of customisable carbon masts and spars.

DESIGN CONSIDERATIONS

Whether we're talking about a boom for a 150ft sailing superyacht or a mast for a 50ft race yacht, the spars and overall rig system see significant loads. As such it is absolutely critical that the initial design is well thought through, accurately analysed, and that the requirements are fully understood. As with other structural design projects, the process employed by Gurit for the structural design of spars is rigorous. Taking the shape from the spar manufacturer, the boat's characteristics from the naval architect, and considering all the other requirements such as load cases, tube shape, fittings, budget and so on, the structural design is an iterative process to establish what

materials are to be used where, and in which way, to get the optimum outcome for the project.

To assist with this process, Gurit has invested heavily in its own in-house design tools for masts and booms. Our internal research programme has resulted in a model for the efficient design of complex combined loadings in the masts and booms of standard sized yachts without the use of finite element analysis. For larger masts and booms, finite element analysis FEA becomes an extremely useful tool for the optimisation of laminate placement and extents, and for detailing fittings, designed to take enormous working loads. Using such laminate optimisation tools and processes, significant savings are possible. Nowhere is this truer than in large furling booms, which are exposed in normal operation to a wide range of load cases, so optimisation of laminates enables the spar maker to deliver a high confidence product whilst meeting exacting weight requirements.



1

1 50m Superyacht mast in the 60m custom built paint booth at Southern Spars

2 Southern Spars 9000sqm factory floor



2

TAKING THE TIME OUT OF TOOLING

A more recent addition to the Gurit portfolio for spar manufacture is tooling fabrication. We supply high quality infused epoxy/fibreglass moulds, with the surface prepared prior to shipping to the customer. There is an option for integral electrical heating, allowing for component cure outside of an oven, with the heating system tailored to the specific part's laminate design. Through our extensive experience in the wind energy sector we are well placed to meet requirements of the spar industry. We supply large narrow moulds for wind turbine blades to be used with a variety of fabricating processes. They range from 10m to 70m with relatively tight tolerances of ± 1 or 2 mm, and have process markings for reduced in-mould time and shortened assembly times.

«We have worked hard at Gurit to develop a tooling process that ultimately adds value to what our customers are doing,» says Matthew Muhlenkamp, Gurit Tooling Sales and Service Manager. «At a time when spar manufacturers are looking to streamline their own processes and increase overall efficiency to remain competitive, Gurit can supply tooling that not only has an option for integral heating system and process markings, but is also designed to be shipped via container in 10-11m sections and assembled on site; and we believe that our lead-time for new tooling is very competitive, even compared with tooling fabricators local to the spar manufacturer.»

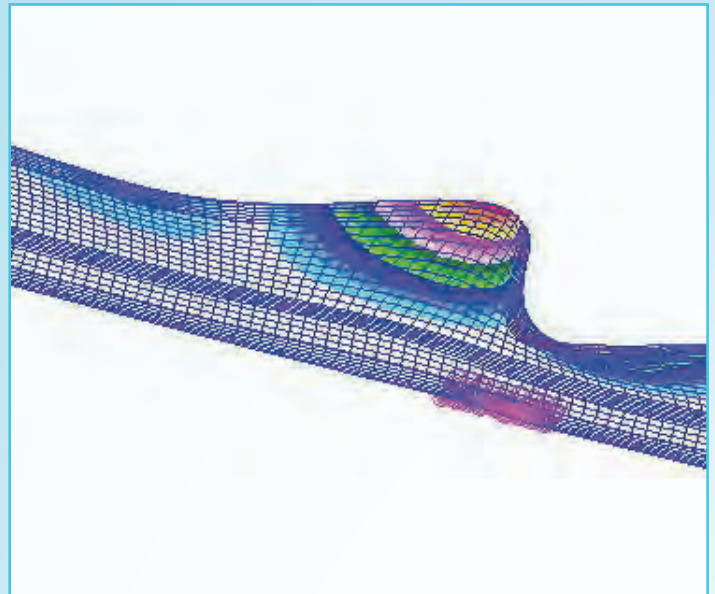
PROCESSING THE PART

Undoubtedly the most common material and processing technique for composite spars is epoxy prepreg, consolidated by vacuum bag or autoclave. Other options include towpreg (this is effectively filament winding using narrow prepreg tow), wet filament winding and, to a lesser degree, wet laminating and vacuum infusion.

Why is prepreg the most efficient way of getting the best value out of the carbon fibre? The prepreg manufacturing process aligns the fibres perfectly, and holds them in column, whilst the heated epoxy resin matrix impregnates the individual carbon filaments under tension. Once the impregnation process is complete, the resin is cooled back to room temperature, which turns it from a low viscosity liquid back to a lightly tacky semi-solid, locking the fibres in position as it does so and thus maintaining the straightness of the carbon fibre. This straightness is vital to getting the best mechanical performance out of the carbon fibre for spar manufacture. Additionally, with prepreg, because you do not have to add low viscosity diluents to allow room temperature impregnation, you can use higher performance epoxy resins than when wet laminating or infusing. Whilst many spar manufacturers opt for autoclaving their prepreg, some have turned to vacuum-only processing. Although in this case the quality of the final component is directly related to the level of skill employed and care taken in laying up, in the hands of skilled laminators



Finite Element Analysis was used by Gurit in its research into the buckling stability of a furling boom.



the final component quality can often be indistinguishable from that coming out of an autoclave. However, achieving this level of quality does increase the time required for the lay-up.

Wet systems also have the challenge of fibre alignment and maintaining consistent fibre tension, resulting in reduced tensile and compressive properties in the laminate. This alignment is compounded by the fact that for ease of handling, the individual carbon tows need to be stitched together to produce an easily handled width of tape, which introduces some off-axis fibre and a degree of crimp or 'waviness' into the carbon, which diminishes performance in tension and compression.

Filament winding, whether wet winding or using prepreg tow, suffers from the limitations of the filament winding process: the main issue being that it is not possible to make a section which has fibre truly in the 'zero' degree direction down the length of the mast, where its properties of strength and stiffness are at their optimum. Prepreg masts have approximately two thirds of the fibres oriented at zero degrees to best take the compressive loads; filament wound tubes effectively have no fibre at zero degrees. Even going a few degrees away from zero, means a significant decrease in mechanical properties, resulting in the addition of material to compensate, and thereby increasing weight. As decreasing weight is the reason people turn to carbon fibre in the first place, this is clearly not the optimum approach.

MAKING THE MOST OF MATERIALS

SE 84LV is one of Gurit's primary prepreg systems for masts and other spars. Used in this application for over 20 years, it has very well established handling and processing characteristics, and yet is

still at the technical forefront for its combination of excellent mechanical performance and ease of use. This proven technology, combined with its long open-time on the shop floor at room temperature, makes SE 84LV suitable for both thick and thin sections, large and small components, and for vacuum or autoclave processing.

SparPreg™ is a Gurit unidirectional prepreg that has been specifically developed to reduce cost in the lamination process of spars. SparPreg produces thick laminates of exceptional quality with low void content, without the need for an intermediary debulking process or additional dry fabric reinforcement to aid air removal. It can, with some control of the laminating conditions, produce a low void content laminate quality more usually associated with high pressure autoclave processing. It can be cured at temperatures as low as 85°C, but can also be used at 120°C for the rapid manufacture of components. The net result is that it enables spar manufacturers to eliminate production steps and redundant materials, and increase production capacity.

On very large booms – those greater than 15m in length – a core material is often used for the entire shell and the inner shelf, producing a stiff sandwich laminate, thereby avoiding local panel instability under large compressive and shear loads. Gurit's Corecell™ M-Foam offers excellent tolerance to local impact loading from 'flying' hardware, and has close to zero long-term water absorption. In addition, Corecell™ M-Foam is easy to lay-up, particularly if thermoformed, and is compatible with prepreps. Another core option is Nomex, which also has high stiffness and low water absorption; it is lighter than Corecell™ M-Foam, however, it is a more costly alternative.

SMARTER SUPPLY AND COMPLETE SOLUTION

Gurit prepreg and core materials are often supplied in roll and sheet format. However, some customers are now opting to use Gurit kitting services. Our products, whether core material, reinforcement fabrics and even prepreg, can be supplied in a package of CNC-cut and labelled materials, making for a quicker and easier lay-up. In addition, the manufacturer doesn't have the issue of storing and disposing of waste, making for an overall cleaner working environment. As Aristotle said 'the whole is greater than the sum of its parts': whilst all of our materials and services offer value and benefits in their own right, by working with us on a complete technology solution, where we can fully integrate the experience and expertise across all of our disciplines, our customers can make significant gains in the efficient production and improved performance of their composite spars.

BUILDING OPEN FURLING BOOMS

Gurit has undertaken research initiatives to ensure its structural design principles for spars remain current in, and relevant to, today's changing and increasingly demanding market: The open furling boom has become the industry standard when it comes to handling the enormous sail areas on today's superyachts. These booms allow easy stowage and setting of sails, and are designed so that the sails can be safely reefed during high winds. Whilst seemingly simple, the systems and structures involved are actually quite complex. The opening at the top of the boom (as opposed to a 'traditional' enclosed boom) means that it has free edges on a surface that is subject to large amounts of compression. Gurit carried out a research programme into the buckling aspects of an open section boom, comparing finite element analysis alongside mechanical testing. The primary goal of the research was to develop a robust and inexpensive method for the design of such open section structures, so they can be optimised to minimise weight, cost and construction time.

BEARING STRENGTH IN COMPOSITE FITTINGS

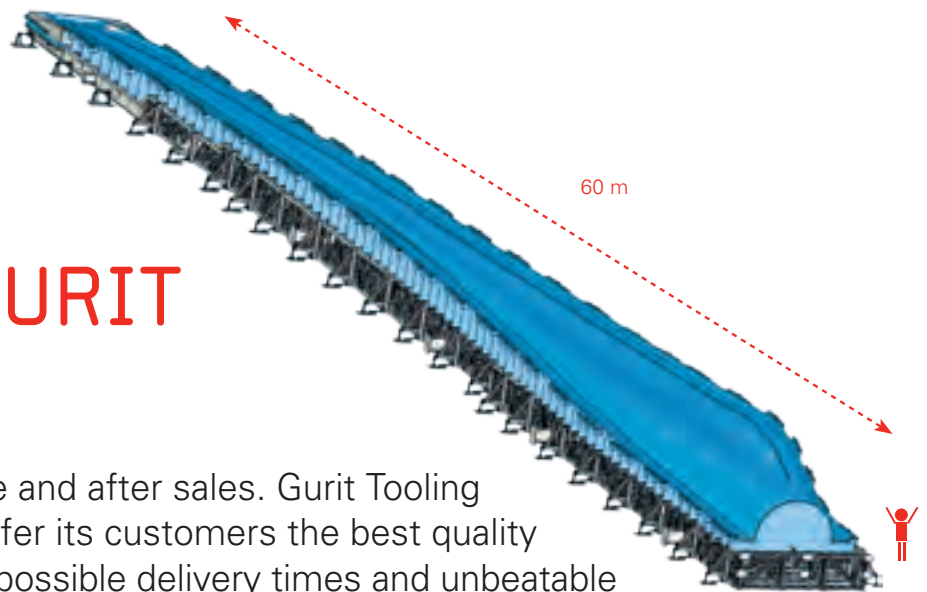
Reducing weight aloft is key to the performance of large sailboats, as this can increase stability, and thereby improve the overall performance – for a cruising yacht this may simply lead to a more comfortable ride; for racing yachts this allows increased sail area and therefore more horsepower. Specifying a carbon composite mast provides the opportunity for significant weight reduction for the same resistance to buckling, when compared with aluminium. However, the detailing at each fitting attachment (a tang or a sheave box) offers further opportunity for weight reduction, with many of the fittings for composite masts also now manufactured of carbon. One of the considerations when designing composite fittings is the bearing stress i.e. the part's ability to deal with the applied load. Gurit, in collaboration with one of its customers, conducted a study to develop an improved understanding of the bearing strength of thick carbon prepreg laminates. The aims were a) to investigate whether current accepted values for bearing strength were too conservative and therefore whether the weight (and cost) of the part could be reduced, and b) to investigate whether the required large clearances that lead to costly customised solutions could be reduced to enable the use of more cost-effective 'off the shelf' fittings.

If you are interested in more detail about these research projects, please contact Gurit per email at gurit@gurit.com.



AFTER-SALES CUSTOMER SERVICE AT GURIT TOOLING

Customer service is key – before and after sales. Gurit Tooling (Taicang) continually strives to offer its customers the best quality moulds available at the shortest possible delivery times and unbeatable prices. To further improve its after-sales service, Gurit Tooling visited Chinese customers to see how their moulds perform.



During the last summer months, service technicians of Gurit Tooling visited ten factories of eight domestic customers in China to take a thorough look at their installed tools. «In the course of these inspections, we checked 23 sets of hinges and electrical control systems. We wanted to learn about the continuous performance of our moulds and mould parts and pre-diagnose any potential future issues», explains Bing Chen, General Manager Tooling at Gurit. «This proactive maintenance service action is part of how we define our role as solution provider. It was well received by our customers and we would like to thank them for their openness and all their positive and valuable feedback.»

While the maintenance technicians of Gurit Tooling exchanged a component here or there, adjusted some parameters and uploaded software updates for the hinge and clamping control units and the electric heating systems, standing at the moulds together with the people who actually operate them day-to-day was a great mutual learning experience. «We were able to show customers better ways of operating their valuable tools and we could bring key control parameters again to their attention. We believe this will extend the usability of their capital expenditures. At the same time, it showed us where we can still improve certain control functions of our hinges and heating systems.» The personal visits established trusted relationships which facilitate in the day-to-day operation quick multi-channel and remote technical support.



Being Gurit

BECAUSE A TEAM IS MORE THAN THE SUM OF ITS MEMBERS

When you produce huge machines like moulds to manufacture large composite structures such as wind turbine blades, technical know-how, managerial skills on all levels and seamless team work is essential. Last year, Gurit Tooling (Taicang) Co. Ltd. – formerly known

as Red Maple, the Tooling Business of Gurit – launched a special training programme for its team leaders and supervisors. It consisted of a well balanced mix of lectures and management skill trainings as well as team building and communication classes.



The team leaders met twice a week for internal lessons taught by production line supervisors who themselves were confronted with the new challenge of teaching and lecturing. Off-site team building events held at the beginning of the three-month training period got the colleagues better acquainted with each other and led to the formation of study teams which stayed together for the whole programme.

While there was obviously a fun element included in the training, the achievements were seriously evaluated against benchmark criteria for attained level of knowledge and work performance, an assessment which most – but not all – successfully passed.

Exceptional trainees and teachers were presented with the opportunity to go on day tours and some financial reward. While those day excursions were greatly welcomed by the individuals to see more of their own country, the greatest return, was the contribution to the continuous improvement process throughout the whole organisation.



A BOND ACROSS GENERATIONS AND NATIONALITIES

Gurit Tooling (Taicang) Co. Ltd. formerly known as Red Maple, the Tooling Business of Gurit, engages in culture and art education as a means of promoting a broader appreciation for the traditional Chinese culture across generations and nationalities.

Just before the Mid-Autumn Festival and the Chinese National Day 2012, Gurit Tooling (Taicang) converted its training room into an exciting calligraphy and painting workshop. The event was organised together with the local Taicang Government's Retired Officials Bureau. With their astonishing art painted and then exhibited that day, the senior citizens created a wonderful learning and cultural sharing experience not only for the younger generation of Chinese Gurit employees but also for their Western colleagues. «Everyone was deeply impressed by what they saw and learned that day», Bing Chen, Managing Director of Gurit (Tooling), explained.

The artistic guests of the Retired Officials Bureau of the Taicang Government enjoyed the day at Gurit and were happy to pass on an aspect of the rich Chinese culture. They presented the company and individual Gurit employees with some of the masterpieces created that day. These works of art will decorate the walls of many rooms and remind the authors, owners and viewers of this great aspect of Chinese culture and of an extraordinary teaching and learning experience.



UVOTEC™ – GURIT UNVEILS THE NEXT GENERATION OF BALSA MATERIALS

Gurit has developed the next-generation of Balsa core materials for the manufacture of ever lighter and lower-cost sandwich panels. Paul Spencer, Product Development Manager, and Olivier Allemand, Lead Composite Processing Engineer, told SHAPE how Gurit met crucial challenges head on with the development of UVOTEC™.

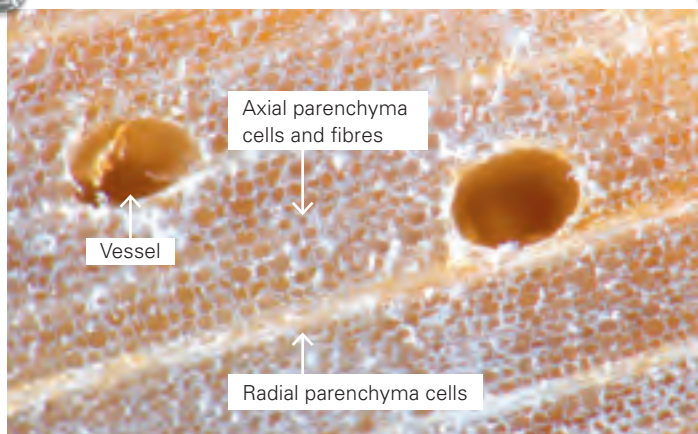


Figure 1

Balsa structure microscopy in the transversal plan (Keyence KHX-2000 with adjustable illumination adaptor at 200x magnification)

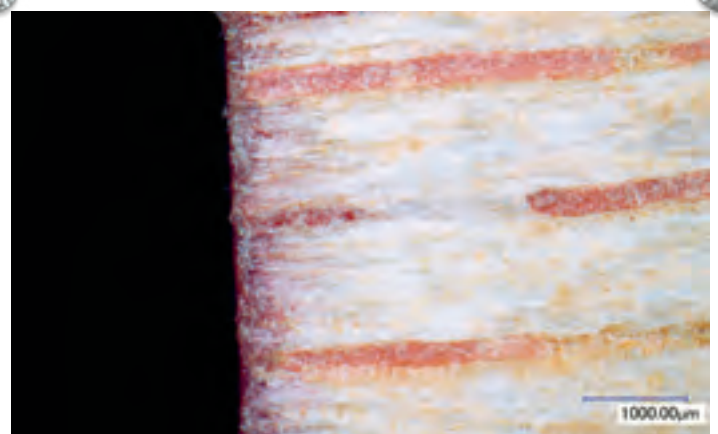


Figure 2

Infused Balsa with pigmented resin (red) taken by KHX-2000 at 50x magnification.

Gurit is a leading supplier of end-grain Balsa wood for use as a core material in composite sandwich panel construction. Balsa offers a good balance of shear and compressive properties against cost and panel weight but also presents a few challenges. Paul Spencer, Product Development Manager, explains: «Balsa is a natural material classified as a hardwood and has a complex cellular structure. Unlike synthetic structural foam, Balsa differs with regard to structure.»

UNDERSTANDING A NATURAL MATERIAL

Under a microscope (see figure 1), it quickly becomes clear that Balsa wood is comprised of a three-dimensional structure made of four main elements: (1) vessels are acicular cells that form the major part of the Balsa water transport system. They measure typically 0.2 mm to 0.4 mm in diameter and connect both faces of the Balsa panel. The remaining three elements in Balsa wood are described as radial (2), axial parenchyma cells (3) and – obviously – wood fibres. The latter cell structures are much smaller in size (0.02 to 0.04 mm respectively) and are not continuous throughout the Balsa structure.

A LOOK THROUGH THE MICROSCOPE

Balsa is a natural material and has an inherent capability to transport and absorb liquids. When used in resin infused sandwich panel construction, this can result in absorption of infusion resin into the Balsa structure. Olivier Allemand, Lead Composite Processing Engineer, elaborates further: «Absorbing too much resin into the Balsa core has two effects: firstly, the net weight of the infused panel is increased and secondly, the quantity of resin required to infuse the whole sandwich panel structure is greater.» This of course increases the material costs associated with the infusion. Let's look again through the microscope: The micrograph in figure 2 shows an infused Balsa panel, at x50 magnification. To highlight the resin absorption more dramatically, the infusion resin used was pigmented red. Data derived from empirical studies such as shown in figure 3 allowed Gurit Product Development Engineers to calculate that approximately half of the total amount of the resin needed for a sandwich panel infusion occurred in the vessel cells. This portion of the resin uptake is structurally not needed and just enhances weight and cost of the finished panel.

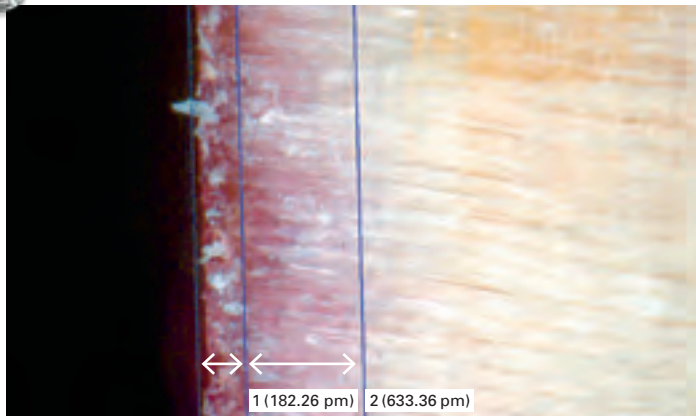


Figure 3

Infused Balsa with pigmented resin (red) taken by KHX-2000 at 100x magnification with polarised lenses in the radial plan. The thin resin film on top of the core is 0.182 mm and the resin is absorbed by the open cells up to 0.633 mm in.



Figure 4

Infused Balsa with pigmented resin (red) taken by KHX-2000 at 50x magnification with polarised lenses in the transversal plan. The latewood (middle dark section) is clearly visible from the earlywood (clear sections in top left and bottom right).

CALCULATING THE RESIN UPTAKE

The amount of infusion resin absorbed by the Balsa panel during an infusion can be estimated using the following model:

$$PRU_{\text{Balsa}} = PRU_{\text{Vessls}} + PRU_{\text{Cells}} \quad (\text{Equation 1})$$

$$PRU_{\text{Vessls}} = P_{\text{mix}} \times t \times V_R \quad (\text{Equation 2})$$

$$PRU_{\text{Cells}} = P_{\text{mix}} \times 2t_{\text{inf}} \quad (\text{Equation 3})$$

Where:

PRU = Panel Resin Uptake (increase panel weight due to absorption of infusion resin)

P_{mix} = Mixed resin density

t = Thickness of panel

V_R = Vessels ratio (between 0 and 1)

t_{inf} = Infused thickness; resin absorbed by the open cells

Using empirical data derived from Gurit's microscope studies, such as shown in figure 3, t_{inf} was established as 0.6 mm. Using this data PRU_{Cells} for a 25.4 mm thick panel infused with Gurit's PRIME™ 20 LV infusion system was calculated as 1.3 kg m⁻². V_R was estimated as 0.045 allowing PRU_{Vessls} to be calculated as 1.2 kg m⁻². This resulted in a total panel resin uptake (PRU) for the Balsa panel of 2.5 kg m⁻². This showed that approximately half of the resin absorption during an infusion occurs in the vessel cells.

Figure 4 reveals another interesting aspect of Balsa wood: There are considerably more vessels in the so called latewood. This is the wood that grows towards the end of the growth period, i.e. in the dry season. This darker wood region is typically more lignified and thus heavier than the earlywood grown at the beginning of the growth cycle. Yet latewood contains more vessels. Thus Balsa has a very different behaviour compared with synthetic core materials: denser synthetic cores usually absorb less resin while denser balsa absorbs more resin instead.

DEVELOPING THE NEXT GENERATION

With half of the resin absorption literally being excess resin uptake, Gurit's Product Development Group has found a new challenge: We initiated a development to research ways to modify the surface of the Balsa core to reduce the quantity of infusion resin that is absorbed into the Balsa cell structure. We understood that fully sealing off the Balsa surface should significantly reduce the resin uptake of the panel. What about the adhesion between the laminate skins and the core material? Paul Spencer, Product Development Manager, illustrates: «Tests showed that sealing the balsa surface off impairs the adhesion properties. We therefore worked to develop a unique chemistry that would modify the Balsa surface topography to significantly reduce the quantity of resin absorbed during an infusion without negatively compromising the skin adhesion properties.» At the end of this development process is now a next generation of Balsa core materials.

The lower resin uptake properties allow users of Balsa cores to reduce the net weight of infused structures without having to change the infusion processing methods they are familiar with. In addition, the lower resin uptake is also a considerable saving in terms of material cost. Olivier Allemant, Lead Composite Processing Engineer, is happy with the result: «The new product which we launch at JEC in Paris is called UVOTEC™ and addresses two major customer needs at once.»

ENSURING THAT ONLY THE GOOD GUYS USE GURIT'S LEADING-EDGE MATERIALS

Gurit materials are generally used for civilian purposes only such as the manufacture of wind or ocean energy, yachts, cars, aircraft interiors or lightweight bridges, to name just a few. Yet, some of our leading-edge advanced composite materials may also qualify as so called «dual use goods.» Gurit has processes in place to make sure our materials don't fall into the wrong hands.

Materials that can be used both for civilian and military purposes are referred to as «dual use» materials or goods. The sale of such goods is restricted and controlled by the law of various national, international and supranational jurisdictions and authorities. As a globally operating and worldwide active company, Gurit devotes a lot of attention to fully comply with this delicate aspect of international trade. Wherever processing orders and wherever materials are being packed and shipped, the identity and nature of all existing and potential customers or intermediate receivers of shipments are carefully analysed and double-checked. The standard Gurit Terms and Conditions of Sale also hold purchasers responsible for ensuring that the goods comply with the laws and regulations of the country to which they re-

quire the goods to be supplied and for timely obtaining any required authorisation, such as an export license, import license, foreign exchange permit, work permit or any other governmental authorisation, even though such authorisation may be applied for by Gurit. The purchaser expressly acknowledges and agrees that it will not divert, use, export and/or re-export any goods contrary to any applicable export laws and/or export, re-export, or provide any goods to any entity or person within any country that is subject to any sanctions, and/or export, re-export, or provide any goods to entities and persons that are ineligible under applicable export laws.

When deemed necessary, the relevant national and international authorities are actively

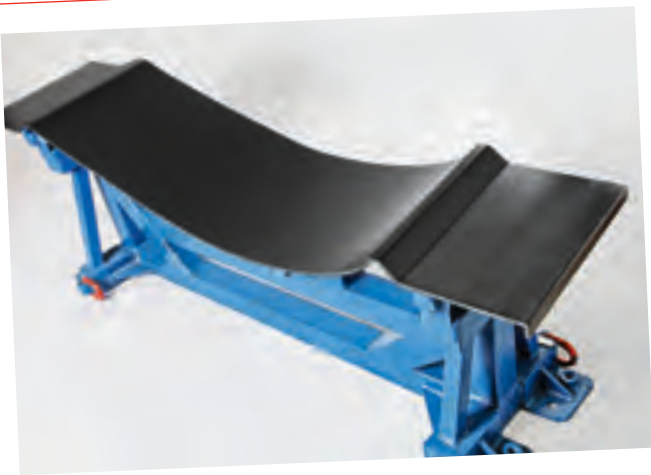
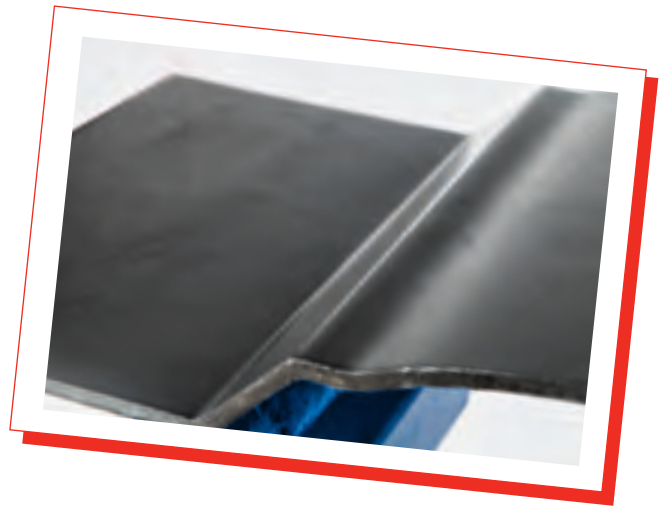
involved at the earliest possible stage to seek advice. Gurit pro-actively provides all necessary information to support the international control measures in order to obtain the required export licences.

«We develop and manufacture leading-edge technical materials which are used in highly demanding civilian applications. They could potentially also be interesting for military purposes, criminal usage or other ends deemed critical from an international perspective», explains Rudolf Hadorn, CEO of Gurit. «We have a well-structured process in place to make sure we understand where our materials are used and what they are being used for.» With these measures, Gurit contributes to making our world a safer place.

NEW MOULD COATING BRINGS TRIPLE BENEFITS

Gurit Tooling is committed to continuous improvements and seeks to maximise the competitiveness of its tools by optimising the user experience and the cost of ownership over the full life-span of the moulds for its customers. ILATECH® Tooling Coat, an innovative coating surface developed by Swiss Looser Group, is improving the longevity of the moulds, shortens the production cycles and provides safer de-moulding.

Production moulds for large composite structures such as wind turbine blade shells or boat hulls are significant investments for our customers. At Gurit Tooling, our goal is to maximise the benefits of these tools for our customers. This optimisation task has many practical dimensions: First of all, our clients want to make best use as long as possible of their investments. So the longevity of the mould is one key variable to maximise. Another important performance driver is the cycle times at our customers' production: The shorter the time needed to manufacture e.g. a blade shell, the more blades can be manufactured in a given time. A third optimisation dimension in the manufacture of large composite structures is a safe and reliable manufacturing process.



Gurit Tooling will present the new mould coating at JEC in Paris.

A new surface coating for Gurit Tooling moulds addresses all these goals at once: «ILATECH® Tooling Coat not only creates a perfectly smooth, strong and durable surface and thus enhances the life span of the mould, it also speeds up cycle times at the customers and reduces process costs for our customers. We manage to address three key concerns with one single new product», explains R&D and Process Engineering Manager Aaron Zhu Feng of Gurit Tooling (Tai-cang). The improved surface quality greatly reduces the required release force when the finished parts are de-moulded. Its superb chemical resistance makes it more durable. Easier, quicker de-moulding translates directly into a safer process: The risk of damaging the finished parts is greatly reduced thanks to the new coating. What is more, after de-moulding the moulds featuring the new innovative coating, no longer need to be cleaned and sanded – two rather time-consuming and labour-intensive jobs.

GURIT AGENDA 2013

Gurit will showcase its wide range of composite materials and its abilities as systems and engineering partner at a trade show near you.

The Gurit teams look forward to meeting you and introducing you to the latest in advanced composite at the following shows:

2013

» **JEC Europe 2013, Paris/France**

12–14 March 2013

» **ICERP, Mumbai/India**

4–6 April 2013

» **Aircraft Interiors Expo, Hamburg/Germany**

5–8 April 2013

» **Wind Power AWEA 2013, Chicago/USA**

5–8 May 2013

» **ACMA Corrosion, Mining and Infrastructure Conference, Denver/USA**

15–16 May 2013

» **Sanctuary Cove International Boat Show, Gold Coast, Australia**

23–26 May 2013

» **Monaco Yacht Show, Montecarlo/Monaco**

25–28 September 2013

» **Auckland On Water Boat Show, Auckland, New Zealand**

26–29 September 2013



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