

shape

Gurit

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August 2013

Fresh strawberries for astronauts

Composite roofs for the Al Haramain railway stations

Infiniti 100S – designed to outperform any superyacht

Lightweight dragon wings

Sauntering through a supercar paddock



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Design Eclat AG, Erlenbach

Dear Reader

Over the last six years, SHAPE has gathered a growing international readership, and more and more people read SHAPE online on their desktop computers, tablet PCs or handheld devices. Starting with this edition, we have thus optimised the format of SHAPE – and of our current Half-Year and next Annual Reports – to better cater to the global online readership.

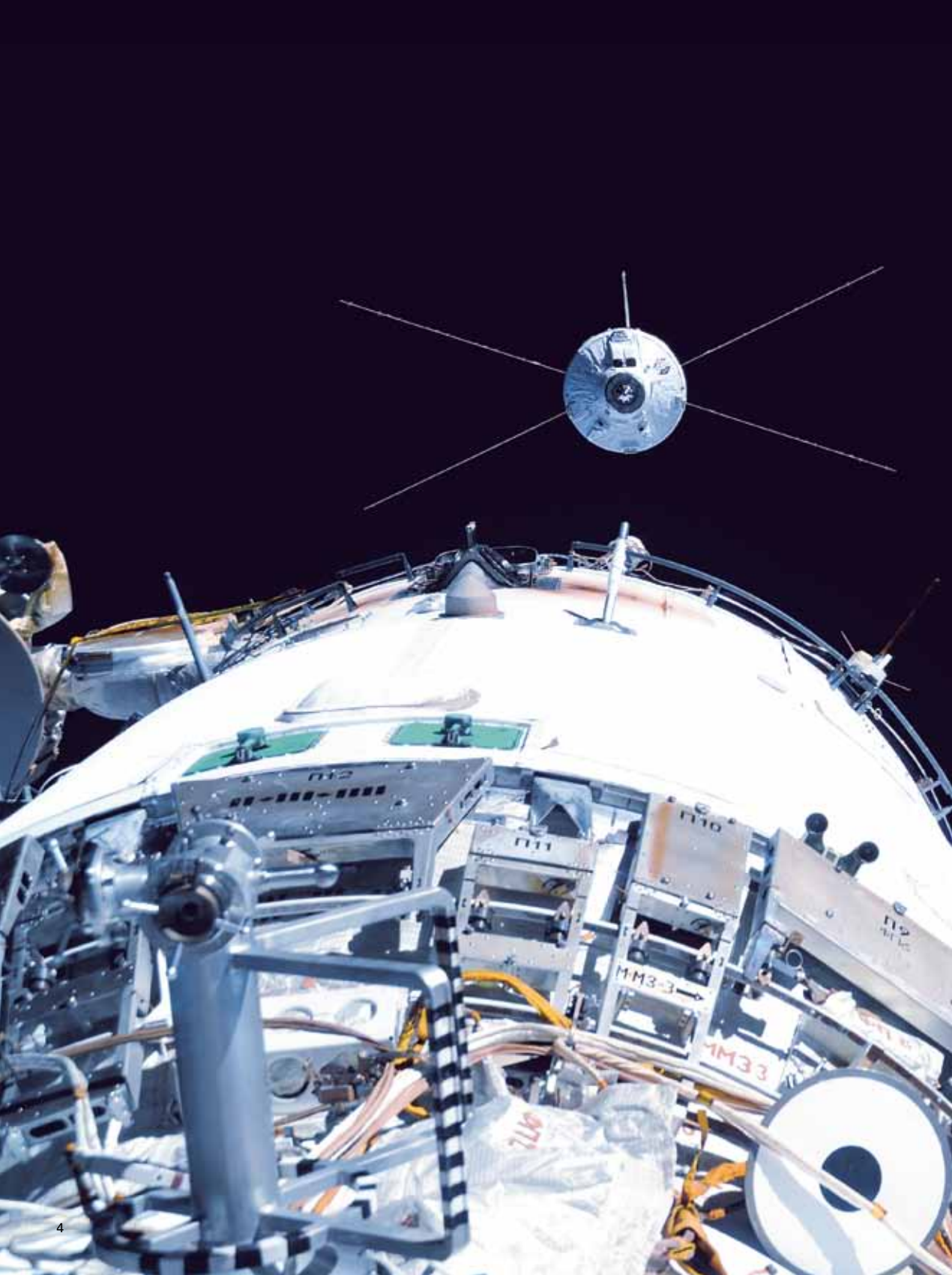
The touch up of SHAPE also comes with our new way of looking at featured projects: One group of articles primarily looks at where Gurit materials are used, a second group of articles looks at Gurit's engineering and finished parts offering, reflecting our new Group organization. The full range of the stories impressively shows how versatile composites are and what kind of astonishing tasks only these engineered materials are able to fulfill in a growing range of applications and industries.

While Gurit materials, services and finished parts are requested by an expanding range of customers, the sales development in the first half of 2013 was largely earmarked by slow material and tooling equipment sales to the largest end-market – the global wind energy industry. Overall, the half-year sales of CHF 129.7 million reflect a decline of 33.7% over the same period last year. In Asia and China in particular, overcapacities along the entire wind energy supply chain have impacted pricing and installation rates. In the USA, sales have by far missed the 2012 levels as a consequence of the late renewal of the production tax credit subsidies for renewable energies, but they are gradually picking up. Mid and longer term, the wind energy market continues to be a very promising – while short-term volatile – market.

On the very positive side, sales to non-wind energy related customers continue to grow. We have made important inroads into new applications and markets, as you can see in this edition of SHAPE. So let us take you into space, join us building one of the biggest composite roofs, have a stroll across a lightweight composite bridge, enjoy new chapters in boat building, and discover how composites are changing the automotive industry.

Yours sincerely
Rudolf Hadorn CEO

A handwritten signature in black ink, appearing to read 'Rud. Hadorn', with a stylized flourish extending from the bottom right.



Fresh strawberries for astronauts

Composites are very versatile and useful materials. But who would have thought they were vital for some people to get a taste of fresh strawberries this Spring?

On June 7, 2013, «Albert Einstein», the fourth Automated Transfer Vehicle (ATV), was successfully launched into space from Kourou in French Guiana, using a special version of an Ariane 5 rocket. Weighing just over 20 tonnes, this European cargo spacecraft is the heaviest payload ever launched into orbit by an Ariane 5 rocket. Apart from fuel, water, oxygen, clothes, spare parts and scientific

material, the ATV also carried food and personal consumables for the astronauts living on the International Space Station (ISS). Along with the usual stocks of lightweight and optimised «space food», the unmanned spacecraft reportedly surprised the astronauts with fresh strawberries, lasagne, tiramisú, parmigiano cheese, and other earthly delights.

A mission with many Swiss contributions

On the initiative of the Swiss ESA delegation, the fourth ATV bears the name of Albert Einstein, surely the most famous scientist of all time, and a Swiss citizen since 1901. We could not find out where the space-launched strawberries

were grown, but probably not in Switzerland given the meteorologically bad conditions of Spring this year. However, we do know that Gurit materials contributed to their safe journey up. The Swiss company RUAG Space built the Ariane 5 payload fairing, which protected «Albert Einstein» on its short journey through the atmosphere, with high-tech Gurit prepreg materials. Before and during launch, the ogive-shaped fairing protects the cargo spacecraft against mechanical stress, frictional heat and dirt. At an altitude of about 120 km and after just 3 minutes and 33 seconds of flight, the rocket had left the Earth's atmosphere and the payload fairing was jettisoned. For the first time,



RUAG Space also introduced a new horizontal separation mechanism on this mission, significantly reducing mechanical shocks during the separation procedure.

RUAG Space also played a major role in the construction of the cargo transporter itself. The company supplied the framework for the ATV's propulsion module, the special racks for storing the payload – including the strawberries – in the cargo hold, the thermal insulation, and the computer that monitors docking with the ISS.

Once separated from the rocket, the ATV flew on to the ISS, powered by its own propulsion system. In a fully automated maneuver, «Albert Einstein» docked with the ISS's Russian Zvezda module on June 15. The unmanned spacecraft delivered a total of 6.6 tonnes of cargo to the ISS. In its tanks, it carried 860 kg of propellant, 100 kg of oxygen and air, and 570 kg of drinking water, all to be pumped into the Station's tanks. In its pressurised cargo module, it carried over 1400 items packed into 141 bags, including 2'480 kg of dry cargo, such as scientific equipment, spare parts, food and clothes for the astronauts.

In addition to serving as a cargo transporter, the ATV is also designed to re-boost the ISS into its



141 bags containing over 1400 individual items – including some strawberries – were safely loaded into the unmanned spacecraft «Albert Einstein».

nominal orbit and serves as a temporary habitation module. The ISS now weighs more than 418 metric tonnes, including the European laboratory, Columbus. After remaining docked to the ISS, the astronauts will load the ATV with waste items. At the end of its mission, scheduled for 28 October, the ATV will separate from the Station. The following day, it will be directed to burn up safely in the atmosphere during re-entry over the South Pacific Ocean.

Gurit materials in space

Gurit and RUAG Space enjoy a long-standing partnership. Ever since 1988, when RUAG Space introduced the world's first rocket

fairing manufactured with composite technology, based on aluminum honeycomb cores with carbon-fibre reinforced skins, Gurit materials have been used for the two 180° ogive top sections and the subsequent cylindrical 90° sections that form the complete payload fairings of the European Ariane 5 rockets.

Gurit and RUAG Space are now evaluating next-generation materials to extend this successful cooperation into the future. As an expert in large composite structures, Gurit is currently working on out-of-autoclave solutions for future space launcher fairings based on its patented SPRINT™ technology.



A special kind of beach view: «Albert Einstein» is launched into space aboard an Ariane 5 rocket.



The ogive shaped payload fairings which form the top end of the rockets and protect the cargo during the flight through the atmosphere are made with Gurit materials.



Treibhaus Wagner...

... was the motto of the Zürich Festival 2013. It translates into «Greenhouse Wagner». Although it may sound a bit strange, the motto actually unites many aspects of the performing arts programme commemorating Richard Wagner's 200th birthday, and it superbly encapsulates one of the most spectacular event sites of this year – a summer pavilion built with cardboard columns and carbon beams, manufactured with Gurit prepreg, and covered with a tent roof and polycarbonate wall sheeting that very much resembles a greenhouse.



Shigeru Ban, the star Japanese architect who just saw the inauguration of the spectacular wood and glass office building he designed for a leading Swiss media group in Zürich, also designed a very special pavilion for this year's Zürich Festival. Located on the terrace of Villa Wesendonck, the lightweight pavilion features cardboard columns, ultra-light cross beams made out of Gurit carbon prepreg, a tent roof, and large polycarbonate windows.

When the windows are wide open, visitors have a wonderful view of Rieter Park that surrounds the Wesendonck villa, the city and the lake of Zürich.

Integrating the loggia and the terrace stairs, this ultra-light-weight summer pavilion turned into a prime location every night for different theatre performances, concerts, readings and discussions – mostly related to the works of Richard Wagner, who spent his years in Zürich on this hill, in the Wesendonck villa, and in a small cottage on the estate often called the «Asylum» or the sanctuary. Having left Germany for «revolutionary actions,» Wagner chose the liberal town of Zürich as his new home. It is here that he composed the famous Wesendonck Lieder; one song bears the title «In the greenhouse.» It was also here where Wagner fell madly in love with his landlord and sponsor Otto Wesendonck's wife, Mathilde. Their frantic and fatal love affair led to nothing less than the composition of the opera «Tristan and Isolde.» Against this historical back-



ground, the pavilion really is the ultimate «Greenhouse Wagner» during the Zürich Festival.

Richard Wagner's «green hill» is not only one of the focal points for Festival goers this year. It is also a must-see for architects, builders and engineers, and fans of modern architecture. Just think of it! How light a structure must be



if it rests on cardboard columns! Using lightweight materials is a constant in Shigeru Ban's work. He is one of the key heralds in architecture promoting the use of new, innovative materials. Gurit is proud that Shigeru Ban and the subcontractors, CarboFibretec, have chosen Gurit carbon prepreg to build the arching beams, which



The carbon cross beams that support the tent roofing of the Summer Pavilion rest on cardboard columns which were only «unveiled» when the roof was up. Festival goers and park visitors alike hope that the lightweight pavilion will be put up again next year.

hold the roof up and provide stiffness to the whole building.

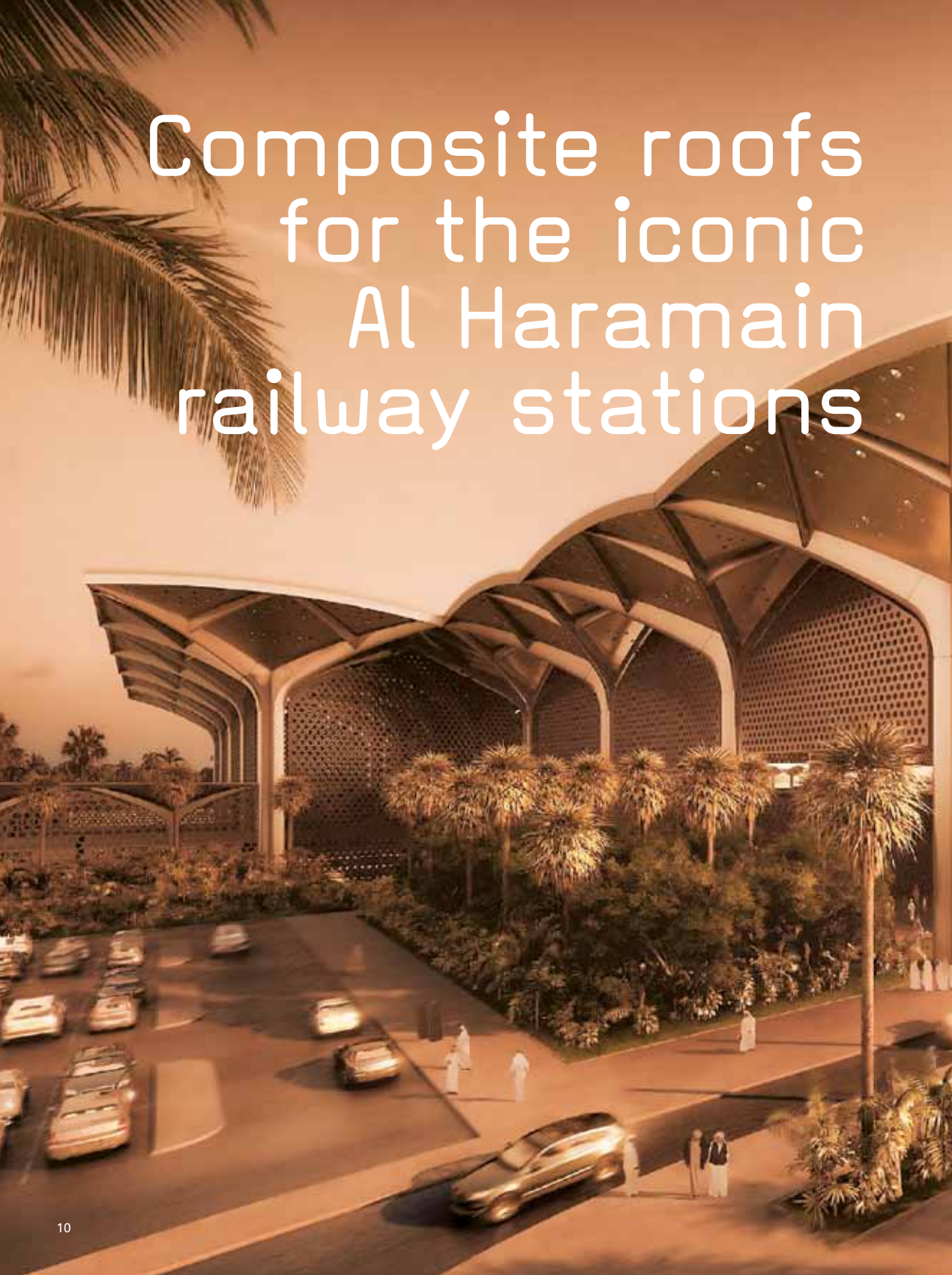
Thomas Leschik, Managing Director Technology of CarboFibretec GmbH, Friedrichshafen, is very enthusiastic about the use of innovative materials, such as carbon prepreps, for architectural structures: «We have gathered a wide array of expertise in lightweight components in applications such as aerospace, the medical industry, general industrial applications and bicycle racing. The proven advantages of carbon fibre materials are now increasingly being discovered by the leading architects of the world.» The BMW Guggenheim Lab, a mobile laboratory travelling around the world to inspire innovative ideas for urban design and new ways of thinking about urban life, features 64 carbon

fibre carriers that support a levitated roof structure. CarboFibretec has also manufactured the 10 carbon cross beams and other parts for Zürich's Summer Pavilion.

«Apart from lightweight materials with top mechanical performance, it was the superior fire, smoke and toxicity features of Gurit's materials that convinced Mr. Ban and us,» said Thomas Leschik explaining the specification of Gurit's EP 121 and EP 137 carbon prepreps for this project.

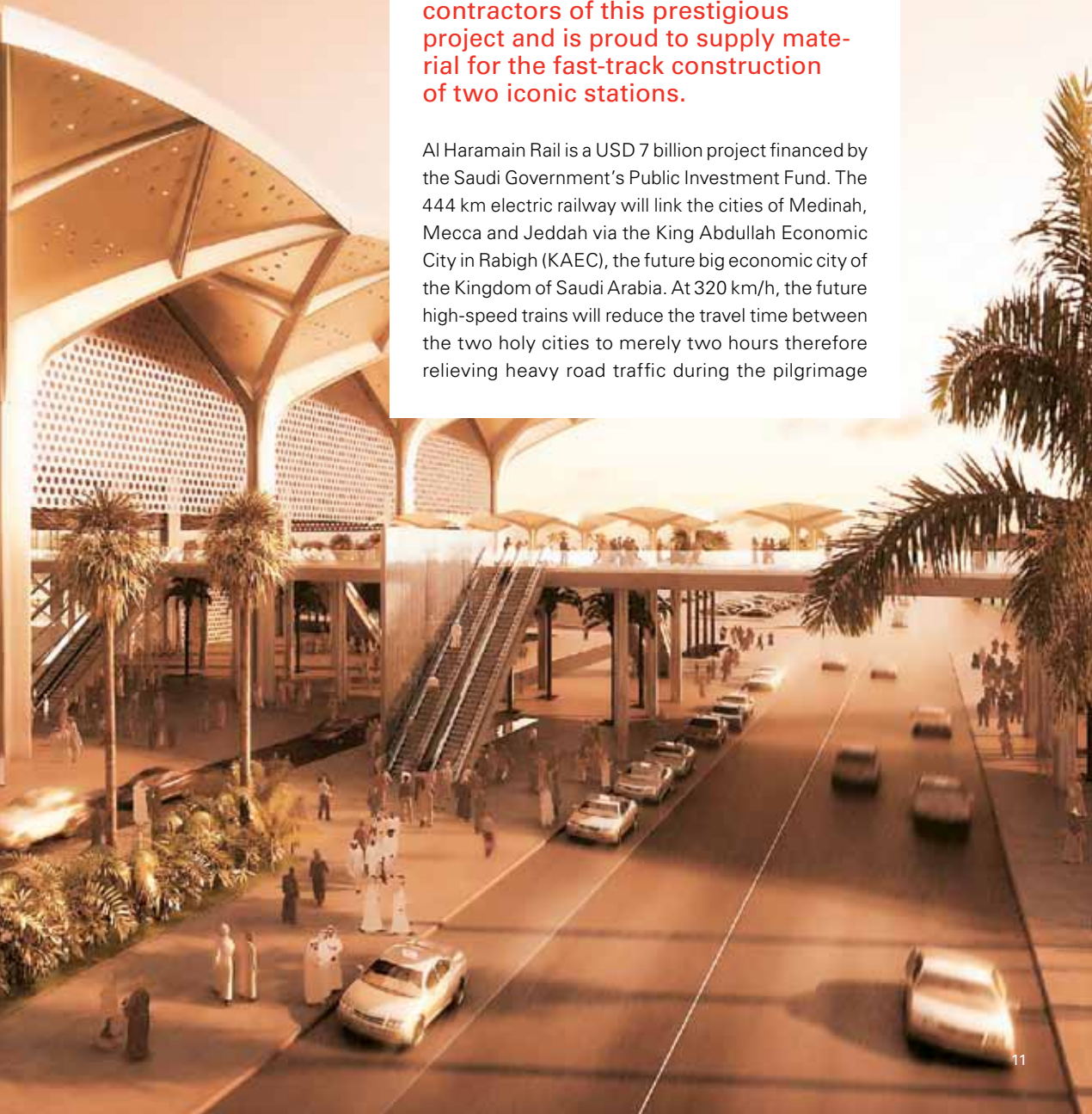
During the day, the pavilion is open to the public and serves as additional seating area for a café. Given the late Spring and wet early Summer Zürich experienced this year until July, many people enjoyed the warmth of this airy greenhouse.

Composite roofs for the iconic Al Haramain railway stations



With the Al Haramain Rail, Saudi Arabia will be the first country to benefit from high-speed train technology in the Middle East. The landmark project will also feature four ultra-modern train stations. Gurit has teamed up early with key contractors of this prestigious project and is proud to supply material for the fast-track construction of two iconic stations.

Al Haramain Rail is a USD 7 billion project financed by the Saudi Government's Public Investment Fund. The 444 km electric railway will link the cities of Medinah, Mecca and Jeddah via the King Abdullah Economic City in Rabigh (KAEC), the future big economic city of the Kingdom of Saudi Arabia. At 320 km/h, the future high-speed trains will reduce the travel time between the two holy cities to merely two hours therefore relieving heavy road traffic during the pilgrimage



period. Not only will the tracks and trains be equipped with the latest technology, the new railroad will also feature ultra-modern train stations designed to allow passengers to move about in wide spacious lanes. All stations share a common planning but will have an individual distinctive design and building envelope to represent the respective cities they serve. The stations will provide a broad range of facilities and offer a superior passenger experience. They will have different arrival and departure zones and ample circulation space. The public areas of the stations, along with the platforms, will be environmentally controlled to provide comfort and will also be illuminated with filtered natural daylight. The stations were designed by Buro Happold and Foster + Partners and feature shops, restaurants, mosques, car parks, helipads and VIP lounges.

Bespoke materials for specific solution

Launched only in 2009, the inauguration of the Mecca-Jeddah-Medina line is scheduled to be completed by 2014. This demanding timetable asks for special building technologies: Due to the fast-track construction program of the project, designers Foster + Partners have adopted a modular approach for designing the stations with a high degree of prefabrication. Weight saving advantages allowing for very elegant solutions combined with the repetitive detail in the design of the roof panels meant that advanced

composite materials were ideal for this application.

For this reason, Buro Happold and Foster + Partners had approached Premier Composite Technologies (PCT) in Dubai at an early stage to develop a number of prototypes that meet all customer requirements. The final design allows for a complete turnkey solution by integrating aluminum framed windows, reflective light shafts, suspension systems for cleaning cradles, roof cappings and external walkways directly into the panels. This results in massively shorter installation times on site. Hannes Waimer of PCT says: «Not least based on the successful cooperation with Gurit for the clock tower in Mecca, we wanted to tackle this next huge project again with Gurit's support as engineering, technology and solution partner and materials supplier.»

One of biggest architectural composite applications to date

Gurit provided structural engineering services and now supplies the composite materials to PCT for the Medina station roof. This roof comprises 32 modules, 27 m by 27 m each, creating a total surface area of 28'000 m² of composite panels. The weight of the composite structure is only about 750 tonnes and this makes it one of the most extensive uses of advanced composites in the architectural industry to date.

The technical team at Gurit was instrumental in rapidly producing very detailed material studies. «Supporting PCT with the



Haramain railway station project was a great chance to demonstrate the capabilities of Gurit's technical team and develop bespoke composite materials solutions, material samples, and folders of very demanding reports, reviews and on-the-spot answers», says Rudy Jurg, Gurit Sales Manager, Middle East & Africa. «Unlike other building materials such as concrete, wood or metal, composite solutions are engineered for a specific purpose and application. The physical characteristics of composites are thus a blend of a complex material mix where each and every component brings in an-



other set of properties. Finding the best solution for each application involves a lot of know-how and expertise.»

Different approaches

Premier Composite Technologies (PCT) located in Dubai is now supplying the roof and inner ceiling panels for the Medinah station. PCT will supply the composite roofing panels and interior ceiling for an entire surface area of 28000m². The lightweight panels are manufactured using moulds and high-end advanced composite materials so that they can be easily lifted into place and installed on

This artist rendering shows how the natural light will filter through the composite roof panels into the environmentally controlled public areas of the station.

site. The lamination of the panels is now well underway at PCT in female moulds following erection and successful testing of one quarter of a module. The correlation between this full scale test and the deflections predicted by the Finite Element model developed by Gurit engineers was very good with a difference of less than 2% between the two. The manufacture requires large quantities of the fire retardant resin Ampreg 21FR, Spabond adhesive and G-PET™ FRLITE foam core from

Gurit. PCT produces panels of some 30m² in size. On completion, these prefabricated panels are then shipped to the Kingdom of Saudi Arabia with all surface finishes in place. On site, the panels are then preassembled into larger segments at ground level before they are hoisted up by crane onto the main steel structure. In addition to the rapid building process, this approach also stands out for improved health and safety conditions.

Embracing composite technology to improve efficiencies

Owner and director of Australian-based Palm Beach Motor Yachts, Mark Richards, has a lot to be proud of. Having won 'Best New Powerboat' at the Newport International Boat Show two years in a row (for the 50ft in 2010 and the 55ft in 2011), the company is going from strength to strength. SHAPE finds out why.

SHAPE: Congratulations on your run of awards at the Newport show. What do you think differentiates your boats from others in the sector?

Mark Richards: One of the design features of all our models, from the 45 – 65ft, is a single open plan living space, which appeals to our female customers. And the state of the art equipment and performance aspects of the boats appeal to our male customers. Of course, this is a generalisation, and doesn't apply to everyone, but it's what we've experienced to date. These two aspects appear to be a winning combination for us.



The last few years have been challenging to say the least for companies in the marine sector. What key factors have enabled you to stay in business when others haven't? We have turned to newer technology and construction methods to promote efficiency in our build process. The investments we have made enable us to offer our customers a product that is excellent value for money, without compromising on quality.

One of the construction methods now employed at Palm Beach is the B³ SmartPac from Gurit. What sort of impact has this had on your efficiencies? I have been working with the team at Gurit (Asia Pacific) for 25 years now: since Palm Beach was founded thirteen years ago, and as a builder of custom sailing yachts and professional sailor prior to that. By using composite materials for our designs, we are able to achieve a fantastic power-to-weight ratio. If you want good results in terms of performance and fuel efficiency, nothing beats a composites solution. So it's great to be able to get our composite fabric and core materials supplied in a way that helps our production efficiencies too. We use the B³ SmartPac system for all of our models, and have reduced our overall lamination time by a significant 35% since introducing it a few years ago. This means that not only can we deliver boats to customers more quickly now, but the system also contributes to us being able to offer a high quality product at a competitive price – that value for money I mentioned earlier.

Gurit and Schat-Harding agreed on a joint development project to build the moulds for a next generation totally enclosed life boat.

«We realised that there was a need for a larger, totally enclosed lifeboat that could seat up to 100 people», says Eivind Kjerpeset, R&D Project Manager at Harding in Norway. Rather too big for commercial ships this type of lifeboat will mainly be used on offshore drilling platforms and so called FPSOs. These floating production, storage and offloading units are usually converted former oil tankers or purpose-built vessels anchored close to drilling platforms and used for the processing of hydrocarbons and for storage of oil. Harding regularly relies on third-party mould makers.

With a view to expand Gurit's tooling activity beyond wind energy, Matthew Muhlenkamp, Tooling Sales and Service Manager for Gurit Tooling (Taicang) got in touch with Schat-Harding. After initial contacts, Gurit proposed to launch a joint development project – technologically and commercially beneficial for both companies. Harding soon realised that they would benefit from Gurit's latest 3D and FEA analysis tools and their state-of-the-art manufacturing technology at Taicang.

«The engineering capabilities of Gurit are a true differentiator», Eivind explains, «and a very convincing argument for us.»

Contributing to safety at sea



Gu Liqian, Design Engineer at Gurit Tooling (Taicang) works on one of the moulds for the new totally enclosed life boats.

In late November 2012 when the shape of the new totally enclosed lifeboat MCB1000 was defined, Harding forwarded the files to Gurit. Howard Jones, Project Manager at Gurit Tooling (Taicang), recalls: «The complex shapes of a boat were a true challenge for our engineers, and very different from our typical wind blade moulds with

their steel tube rigs. The MCB1000 moulds feature a built-in structural foam and fibreglass structure.» There were three plugs and moulds to engineer and build: the hull, the canopy and the inner liner. The inner liner was the most challenging part as this piece features many steep angles and sharp corners. «It was a learning process for the engineers, sure, but the communication and co-operation between Gurit and Harding were excellently managed, so we never had doubts that we will end up with a super product», Eivind congratulates the Gurit Tooling team.

Asked what the biggest challenge for Gurit was, Howard explained: «To develop a high-gloss surface finish suitable to produce out-of-mould finished parts. But we learnt a lot from Harding's experience with gelcoat finishes.»

«The hull, inner liner and canopy moulds for the MCB1000 are as good as it gets», Eivind confirmed.



Harding – A short new name

The new owners led by the investment fund Hercules have merged Schat-Harding and Noreq this year to form Harding – a global leader in life-saving equipment. Harding is one of the best known brands for marine safety, with a long history. A pioneer in the development of offshore lifeboats, the company developed the world's first freefall lifeboat. With over 900 employees in 30 different locations worldwide, the Norwegian company specialises in lifeboats, davits, winches, and rescue boats.

Looking into the crystal ball

Major experts agree that there were some 240 GW of cumulative wind power capacity installed at the end of 2011 and that wind power has become a mainstream source of electricity in many countries. As we have learned during the last three years, the considerable size of the industry does not make it immune to global economic trends or disturbing impacts of the subsidy policies in some countries. What's the trend of the global wind energy market?

Views quickly diverge when experts look into their crystal balls. The Global Wind Energy Council (GWEC) and Greenpeace established two views based on the International Energy Agency's (IEA) «New Policies» scenario. That scenario «takes account of broad policy commitments and plans that have been announced by countries, including national pledges to reduce greenhouse-gas emissions and plans to phase out fossil-energy subsidies».

Different scenarios all show growth

GWEC's «Moderate Scenario» goes a step further expecting implementation of all commitments for emission reductions agreed at the UN Climate negotiations in Cancun in 2010. The «Advanced Scenario» even depicts a best-case, yet still reasonable vision assuming an unambiguous political and industrial commit-

ment to renewables. The «2DS Scenario» is the focus of IEA's Energy Technology Perspectives (ETP). It describes «an energy system consistent with an emission trajectory that recent climate science research indicates would give an 80% chance of limiting average global temperature increase to 2°C.» This scenario counts on cutting energy-related CO₂ emissions by more than half by 2050 and also includes vital changes in non-energy sectors, such as industry, transport and housing. The «Advanced Scenario» expects the cumulative wind power capacity to reach almost 1,150 GW by the year 2020 while the IEA's «New Policies» scenario expects only a bit over 585 GW to be cumulatively installed by 2020. If mankind wants to allow only a maximal 2°C global temperature increase, wind energy capacity should reach at least 655 GW by 2020, according to the 2DS. The longer the forecast period, the greater become the differences.

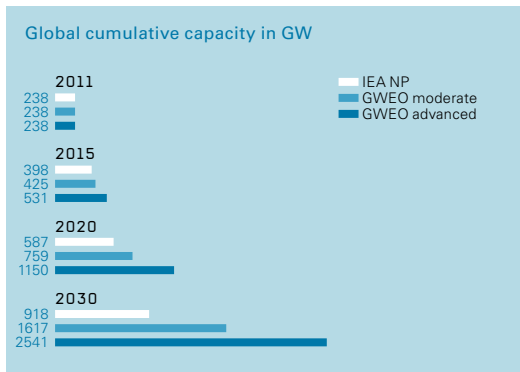
Still talking big numbers

Comparing expected growth rates depicts even sharper contrasts. Coming from yearly growth rates of well above 20% for the past 15 years, the «New Policies» scenario expects GW growth to be around 16% until 2015 and calculates that the rate will fall to 6% per year by 2020 and slow down to not more than 4% by 2030. GWEC's estimates are more optimistic with growth rates of 11%–13% and 6% for 2020 and 2030 respectively.

Even if growth rates decline, we are still talking big numbers: For wind energy to reach an 18% share of electricity production – necessary to limit global warming to 2°C – an additional 2000 GW of installed capacity will be required by 2050.

This equates to about a nine-fold increase in capacity from the end-2011 levels. The GWEC data for the various global market areas provides interesting insights, too. While China took over as the driving force when the European countries suffered from the economic crisis, experts assume China – having also sharply declined recently – will only attain substantial growth again after 2015.





Need for stable policies

To meet the targets, the IEA recommends that governments adopt transparent and predictable energy strategies, as uncertainty threatens to undermine investments. In addition to the flexibility of energy systems including smart grids, transmission and flexible generation of energy, storage should be enhanced to better integrate variable and distributed energy sources like wind and solar. The expansion of renewables into new countries is also essential to reach the goals.

Western European markets are already mature in wind energy terms. New potential may arise off shore. But «offshore» today only accounts for lower single-digit percentage rates of the overall wind energy generation. Political shifts driving electricity further away from nuclear power may also prove to be a source for growth.

Markets such as India, Brazil, Mexico, Canada and some African countries are considered to be the next important growth areas. While in 2005 wind energy generated electricity was almost exclusively an OECD feature, the picture will have changed by 2017. But while the non-OECD countries develop dynamically, these markets will not be able to make up for the slow-downs in Europe, America and Asia. So lower growth rates in the future are a given.

Overall a positive future

The key learning from these diverging and rather vague projections are:

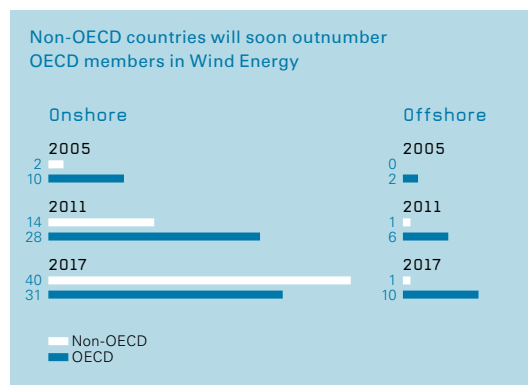
- Despite any short-term turbulence the fundamental drivers are still valid. People want secure energy supplies, stable electricity prices and are increasingly concerned about the environment and job security.

- The wind energy market is becoming global; this may better balance fluctuations in specific various key markets.
- The average capacity per installed turbine will continue to grow, asking for new materials and tooling equipment.
- Politics will play a decisive role, as it provides either a stable planning landscape or undermines the industry's willingness to invest.

Implications for Gurit

Our tooling and broad materials portfolio supports the needs of turbine manufacturers and blade builders, and all of that under one single roof. Gurit's offering remains at the forefront of innovation. The industry benefits from recent innovations, such as the ILAT-ECH Tooling Coat, which improves the longevity of the moulds, shortens production cycles, and enables safer de-moulding. The SparPreg™ Airstream™ technology has brought a new economic and efficient way to produce thick laminates, e.g. for central spars, and the development of long-shelf-life prepregs curable at ambient temperatures of up to 35°C now also puts the advantages of prepregs in the hands of those manufacturers who have no storage coolers or lack air conditioning in their manufacturing halls. Last but not least, the development of Uvotech™ resulted in a next-generation balsa core material, which greatly improved and lowered resin uptake.

Wind energy will continue to be a major composite market, and Gurit is globally well positioned to supply it.





Lightweight dragon wings



The new lifting bridge over Rhyl Harbour in North Wales, serves as an additional crossing for pedestrians and cyclists. Spanning the River Clwyd from Rhyl's West Parade to a newly created public area on the Kinmel Bay side of the river, the elegantly opening lightweight bridge named «Pont y Ddraig» has already become an iconic landmark attracting visitors. Hundreds watched the two lightweight composite decks – or dragon wings – being lifted into place in early Summer.

In response to a tender call from Denbighshire County Council, Ramboll and Dawnus developed a design proposal consisting of two mirroring, 30 meter long decks, which are hinged on a central caisson and lifted by cables running up to a central mast. Almost 50 metres tall, the mast is stayed by a rigging similar to a sail boat's and makes the bridge and the harbour



visible from miles around. The mast houses the pulley mechanism and lifting cables. To balance the lift, the decks, engineered by Gurit (UK) and built at AM Structures using many Gurit materials, are lifted simultaneously.

Lightweight and sculptured deck shapes

To give access to moorings upstream of the bridge, the new pedestrian and bike crossing is likely to open many times a day. So, the Denbighshire County Council was interested in minimising the use of energy for lifting. The use of advanced molded fibre reinforced plastic (FRP) for the bridge decks was an integral part of the design concept to save as much weight as possible to make lifting cycles fast and energy efficient. It also allowed a sculptured deck shape, which provides a striking, iconic sight when the bridge is opened.

Ramboll approached AM Structures in early 2009 to review the concept of the bridge deck construction and to provide feedback on the construction and weight estimate for the FRP decks. AM Structures asked Gurit to review the structure of the bridge, and initial studies confirmed that the bridge concept was feasible with some minor changes in the geometry, and that the FRP decks would

result in considerable savings compared with a steel structure. The design proved to be successful, and AM Structures was approached for the fabrication of the decks. Gurit was contracted by AM Structures to carry out the detailed engineering of the bridge decks, which presented some interesting challenges. The decks are very slender, partially for aesthetic reasons, but also to ensure that the inshore lifeboat would have sufficient headroom to pass under the lowered bridge at all tide levels.

Thorough analysis of dynamic behaviour

Due to the lightweight and slender structure of the decks, detailed consideration of the dynamic behavior of the bridge under pedestrian loading was required. The bridge was designed with predominantly glass reinforcements with longitudinal stiffness enhanced by local planks of carbon fibre. Gurit made extensive use of finite element analysis to carry out transient dynamic analysis of the bridge using load models from Eurocodes. A number of load conditions were analyzed, corresponding to groups of pedestrians walking and running over the bridge, in addition to a crowd loading case. This analysis led to optimisation of the laminates for both longitudinal and torsional

stiffness of the bridge decks to meet the required comfort criteria. AM Structures built the decks using Corecell™ M-Foam, Ampreg 21 resin, and a mixture of glass and carbon reinforcements supplied by Gurit. The build of the decks was already a spectacular sight. But the shipment from the Isle of Wight to the mainland, the transportation to Wales and the lifting of the decks into place, all attracted crowds.

Naming the bridge

The new crossing needed a catchy name. A naming competition was open to pupils at local primary schools. An independent panel considered over 30 names and finally selected «Pont y Ddraig», as one student had suggested. By the middle of July, hundreds of people had flocked to Rhyl with their cameras to catch the moment when the second deck – or is it a Dragon wing? – was lifted into place. A large crane hoisted the 30m long, FRP deck into place. Following installation, Gurit will now carry out a testing program to verify the dynamic behavior of the bridge, using in-house accelerometers and data acquisition equipment. The official opening is scheduled for September, when all pupils who had participated in the naming competition will lead the first walk across the bridge.



A fresh look beyond the known

Stefan Gautschi joined Gurit in February as General Manager of Gurit's Composite Materials Unit. SHAPE spoke with Stefan after his first 100 days with Gurit. Stefan has gained a lot of insight into the large potential of Gurit and is now starting to formulate new goals for the future.

SHAPE: What was your prime focus in your first weeks with Gurit? Stefan Gautschi: Because I joined Gurit from outside, I obviously needed to learn as much as possible about Gurit, as quickly as possible. I met a lot of talented people at Gurit across the whole organisation. I am also deeply impressed by our well-run factories and processes. Yet, it also became clear during my first visits that some of our production capacities are underutilised. To put it positively, our existing manufacturing set up and scope provide room for growth.

So how is Gurit going to grow its materials business? Through a series of initiatives, we need to fully leverage the potential of our global presence. This is a true differentiator in the market place. Historically, Gurit has established strong positions in a) specific industry sectors and b) mostly in those regional markets which are closest to our production sites. We clearly want to widen our reach. Therefore, we have established a new regional sales organisation with the necessary technical support to better cover all geographies across the globe. In a next step, we may also look at strengthening certain regional production

capabilities to serve respective demands. But, the initial focus is clearly on better loading underutilised capacities.

Has Gurit's market focus been too narrow in the past? I understand that Gurit has been mainly focusing on those industries which were first to adopt advanced composites as key material categories. We built a wealth of know-how and grew considerably along with our customers in these industries and remain fully committed to supporting them in the future. Today, new industries and new applications are fast discovering the versatility of composites. This provides important additional opportunities for Gurit.



How do we go about taking advantage of these new opportunities? Being a – or in some cases even the – leading materials supplier to a handful of key industries partially obstructed our awareness of

«Today, new industries and new applications are fast discovering the versatility of composites. This provides important additional opportunities for Gurit.»

other markets. During the past half year or so, Gurit has thoroughly studied and assessed new or even just emerging uses for composite materials. We believe Gurit has an important technological benefit for many new customer categories. Our regional sales force and technical support are now systematically going after these opportunities, and, as an organisation, we are committed to investing in our global sales resources. Additionally, we believe that greater exposure to new and emerging composite material end-users will greatly benefit our traditional customer base. Another terrific benefit of composites is that you learn new applications every day, and these will expand our role as an innovator in our traditional markets, also.

Where do you expect to see the biggest innovations? Composite materials are engineered, purpose-made materials. So, we will see innovation where the need for innovative materials and out-of-the-box thinking is biggest. I was impressed to see how responsive Gurit is and how we can offer solutions to pressing customer needs. We have a great research and development team. These guys have

been instrumental in positioning Gurit as the innovator in our traditional target markets. This is what we want to repeat in new areas as well. We are, to give you an example, rapidly establishing ourselves as materials and technology partner in architecture and construction. We have successfully targeted a completely new audience at trade shows and conferences. And I believe, we delivered an impressive message about how the use of composite opens up new options and possibilities. In addition, we are already working on a series of new products for specific applications and hope to be able to talk about positive results before too long.

Eventually, innovation will create new production and sales opportunities. What about operations in the shorter term? Our production plants are now controlled by group-wide operational management. This helps us roll out a joint global excellence system in all our operations. We want to share best practices at all sites and achieve an even higher consistency in terms of quality and efficiency, customer benefit and responsiveness. In every respect, we want to deliver the future of composite solutions.

Gamesa relies on Gurit materials for its new 5MW offshore turbine

Gamesa is reaching out at sea. The company has successfully installed its new 5.0 MW turbine in Gran Canaria. While its pioneer installation is land-based, the new turbine type with its 128 metre rotor diameter is designed for offshore deployment.

Gamesa currently expects the 5.0 MW offshore prototype turbine, installed in Arinaga, Canary Islands, Spain, to begin operating in the third quarter of 2013. Upon completion, certification work will commence and is expected to be

achieved in the following months. The installation of the initial offshore units is set to follow in 2014. Arinaga port is a complex piece of infrastructure, highly representative of the kinds of challenges faced at offshore wind farms. Arinaga is subject to high winds, which are excellent from the point of view of electricity generation, but which render assembly more difficult. Moreover, its characteristics as a marine port impose a series of technical limitations, which Gamesa successfully surmounted thanks to its experience in the construction of turnkey projects; this broad-ranging experience has been essential to successful execution of this project.

The result of dedicated research and engineering

This offshore turbine platform features a stunning 128 m rotor diameter and a modular, redundant design. This ensures reliability and maximises energy output. The pioneer turbine of this new family, the G128-5.0 MW, includes the technology proven and validated by Gamesa for its 4.5 MW turbine, along with the know-how and experience gained through its use. The company invested more than half a million engineering hours in the turbine's design process. According to Gamesa, over one hundred people alone worked on the blade's design. For the manufacture of the gigantic blades, Game-





The 62.5m long blades were manufactured in Aoiz (Navarra) in Spain, travelled overnight to the Port of Bilbao where they were loaded onto a ship bound for Grand Canaria.

sa relied again on Gurit as key material partner.

In late 2012, Gamesa obtained design certification for its new offshore turbine from Det Norske Veritas (DNV). The endorsement by this independent foundation, aimed at safeguarding life, property, and the environment, heralded a major leap forward for Gamesa in the system's development, guaranteeing the 5 MW turbine's launch, commercial rollout, and manufacture in the coming years.

The Annual output of a single turbine of this new type is over 23 GWh per year, enough to meet the electricity needs of some 7500 households.

Gamesa has installed its first G128-5.0 MW offshore prototype at the Arinaga Quay in Gran Canaria Island. This is Spain's first prototype offshore wind turbine.

The wind turbine's main elements, such as the tower, the nacelle and the blades, offer a spectacular sight on Gran Canaria's Arinaga Quay. The new turbine was officially commissioned on July 25, 2013.

The 62.5 metre blades feature several Gurit materials

Gurit supplied various materials including multi-axial and unidirectional glass prepregs and glass SPRINT™ materials, as well as Corecell™ structural foam for the manufacture of the large 62.5 metre blades. Each of the blades weighs 15 tonnes. They were manufactured at a Gamesa plant in Aoiz (Navarra) and hold the record as the longest turbine blades to be manufactured and transported in Spain. They are also among the largest in Europe.

The three blades all traveled one by one overnight from Aoiz to the port of Bilbao, where they were loaded with the nacelle and the tower elements onto a ship bound for Gran Canaria in the Canary Islands.

The tower measures 90 metres in total and is made by Windar – a joint venture between Gamesa and Daniel Alonso. The nacelle, made in Tauste (Zaragoza), measures over 12.5 metres long and is 4 metres tall and wide. It alone weighs 72 tonnes. Once the nacelle was hoisted onto the tower, work began to assemble the three blades, each of which measures 62.5 metres long and weighs 15 tonnes.

Gurit congratulates Gamesa on the successful completion, installation and commissioning of its first 5 MW offshore turbine.





Ryan Muller (left) and Ian Cowley study aspects of premium cars and discuss the use of composite car body panels.

Alex Beim (left) and Peter Jennings (right) are particularly interested in certain car body details.



Sauntering through a pedigree car park

The Goodwood Festival of Speed in the UK brings together an impossibly heady mix of cars, stars and motor sport 'royalty' to create the largest car culture event in the world. SHAPE joined some Gurit (Automotive) specialists on their stroll through the supercar paddock.

Goodwood is for many a car enthusiast an unparalleled chance to see – and often even drive – some of the latest supercar models. A dedicated vehicle evaluation route within the grounds of the Goodwood Estate includes the revered Goodwood Hillclimb. At the same time, Goodwood gives car manufacturers and even private car

owners the opportunity to showcase their gems in a stunning setting and a relaxed «garden party» environment: Visitors to this year's Festival of Speed were greeted by a strikingly arranged Supercar Forward Parking. With around 200 spaces allocated, it allowed owners of exotic machinery to become part of the Festival. Car makers exhibited their latest offspring at the Supercar Paddock. Cars making their world dynamic debuts at Goodwood this year were McLaren P1, Vencer Sarthe, Alfa Romeo 4C, VUHL 05, SIN R1 and Skoda Octavia vRS, with the first UK sightings of the Ferrari SP12 EC, Rolls-Royce Wraith, Peugeot Onyx, Bertone Aston Martin Jet 2+2, Renault Twin'Run, Maserati Ghibli, Nissan 370Z Nismo, Porsche 918, and many others.

A yearly sight: Gurit parts

«I believe ever since Aston Martin first showcased its DBS here in 2007, some car body parts manufactured by Gurit were always on display here», says Martin Starkey, Managing Director of Gurit (Automotive) as we entered the paddock. Let's have a look around.

When Gurit started producing class A carbon fibre car body parts, it was first the premium supercar manufacturers who opted for ultra-lightweight panels. SHAPE readers will remember how the story began in cooperation with Aston Martin. Over the years, especially continental European supercar manufacturers discovered the versatility, additional design freedom and the substantial weight savings that can all be achieved with carbon fibre car body panels and followed suit.



Goodwood is a great place to meet automotive experts: Greg Aratoon (left) and a professional car enthusiast in discussion.

Greg Aratoon, Gurit (Automotive) Account Engineering Manager added: «First, we started off in an all hand layup process. So the number of parts that could be produced from one tool was obviously limited. Yet, our ability to supply body parts with impeccable surfaces which were ready to be mounted on the finished car increasingly caught the interest of additional car makers and convinced existing ones to assign Gurit with larger production runs».

Towards the end of the first decade in the new millennium, Gurit had firmly established itself as a tier one supplier for the premium segment of the automotive industry. «Look here», added Ian Cowley, Gurit (Automotive) Programme Engineering Manager, pointing at another car in the paddock, «you won't see a difference between metal and carbon car body panels. You can't tell them apart. The production of fully painted and finished car body panels is still a key

specialty of Gurit.» «But not the end of the story», interrupted Peter Jennings, Gurit (Automotive) Development Lead Engineer. «Our goal was to develop new materials and manufacturing processes to offer super lightweight designs in much higher production run numbers. This is synonymous to moving from exclusive supercars into the realm of premium cars which are manufactured in larger series.»

Up to 30 000 composite car parts per year from one tool

Gurit's traditional target market has been the super sports and luxury car sector with production runs of 500 to 2500 vehicles per year, using the Car Body Sheet 96 (CBS 96) material, in a hand layup, out-of-autoclave technology.

Based on the accumulated know-how and experience, Gurit developed a next generation of CBS resin and materials branded as CBS 200. CBS 200 has been developed to be processed through

an OEM's high paint bake line and can even go through the E-Coat/KTL line. «The first CBS 200 composite panels we have sent down our customers' E-Coat/KTL line have proved to be a great success and the results are very exciting», said Peter Jennings.

Over the last year, Gurit (Automotive) has developed a new press forming manufacturing process. This significantly reduced the lead time to 8 minutes per panel. Together with the new CBS 200 material technology has allowed Gurit to expand its customer database.

«We are currently starting the production of a first larger volume CBS 200 parts production using the newly developed, automated press process. We have successfully brought the manufacturing time down to 8 minutes per piece. At this speed and with this technology, we are targeting the Premium car sector. Up to 30 000 parts from one single tool are now feasible per year», Greg Aratoon added.

«This is quite a game changer in the manufacture of composite car parts and its my belief that we'll see this first press formed part here at Goodwood in 2014», Martin Starkey summarised when we arrived at the far end of the Supercar paddock.

With the prospect of higher series volumes, faster production cycles, more complex car body designs, and with more and more automotive engineers discovering the beauty and versatility of composites, the Goodwood supercar paddock will certainly have to be expanded in the years to come.

Cut and kitted closer to our customers

Gurit not only provides accurately shaped and knife-cut structural core materials from its own kitting facilities in Canada and China but also cooperates with a growing range of independent sub-contractors for the non-wind energy related markets. In the wind energy market, we have a long-standing tradition to work with Mau&Mittelmann in Europe and with Corekits in America, and we supply core materials to other kitters on customer request.

«We have been working with independent kitting specialists for years,» says Mathieu Cariou, Business Development Manager Core/Kitting at Gurit (UK). Gurit's network of independent kitters, however, has seen some important additions over the past few months. At last year's METS in Amsterdam, Gurit and InCom signed an agreement for InCom to provide warehousing, core processing and kitting services from their Spanish and British sites on behalf of Gurit, mainly for the European marine market. Since the beginning of this year, Corecell™ M-Foam, PVCCell™

and G-PET™ are now stocked at InCom in Europe.

Moving closer to customers in Europe ...

All these core materials are processed onsite at InCom, according to Gurit's specifications. All Gurit's standard marine core finishes and thicknesses are available now. «Having this capability closer to our EMEA customers and distributor network allows us to shorten lead-times considerably. This co-operation also allows us to offer the additional service of local kitting and B³ SmartPac™ manufacture,» Mathieu added. Customers are now also able to place smaller orders. Previously, the minimum order size out of the Chinese or Canadian works had been a full container to cover freight costs.

... and in America

In order to move closer to boat building customers in America, Gurit has recently entered into a

partnership with composite kit manufacturer Mahogany Company of Mays Landing (New Jersey) for the fabrication of Gurit's B³ SmartPac™ solution.

«Our agreement with Mahogany will bring together Gurit's vast materials and design capabilities with the wealth of kitting experience of Mahogany, which will benefit our American customers in terms of service and product offering,» says Lance Hill, Gurit's Regional Sales Director, Americas.

Large volumes and special needs from strong home bases

Gurit (Americas) remains the leading production and kitting site for Gurit's Corecell™ structural foam. Kits requiring bespoke densities or non-standard cuts or finishes are thus manufactured in Magog, Canada, along with the high volume wind energy core kits for the local market. Gurit (Tianjin) in China is ideally located to respond to the regional requirements and needs of the Chinese and Asian wind energy, industrial and marine sectors. Gurit (New Zealand), the first site to produce B³ SmartPac™ solutions, is still leading the way here and continues to deliver high quality glass and core SmartPacs to regional customers.

To discuss your specific kitting needs, please contact Gurit at www.gurit.com/contact-form.aspx



Complex shapes produced by specialists according to customer specifications.



DSS patented system utilises retractable foils to reduce heel angles when desired and provides progressive dynamic lift, complementing the traditional fixed keel. This revolutionary system heightens comfort, reduces displacement, and has proved to increase velocity made good.

Designed to outperform any comparable superyacht

The Dynamic Stability Systems (DSS) technology has been around for some years. It now leaps forth into the true superyacht realm. Infiniti Yachts and Danish Yachts have launched Infiniti 100S, a 100 foot DSS boat designed to outperform any comparable superyacht. Gurit are the structural engineers to this performance cruising yacht.

Designed to encapsulate performance and style and at the same time deliver a new and fresh approach, the Infiniti 100S from Danish Yachts is setting new standards in the industry. They deliver a significant increase in performance and comfort, by using the patented technology of Dynamic Stability Systems (DSS). On April 30, 2013, Infiniti Yachts and Danish Yachts announced they will be building the first 100S on the terrace of the Real Club Nautico de Palma overlooking the two Infiniti 36GTs that raced in the Palma Vela event.

No simple goal: Delivering the future of sailing NOW!

The aim was no simple goal: the creation and construction of a revolutionary breed of yacht that re-

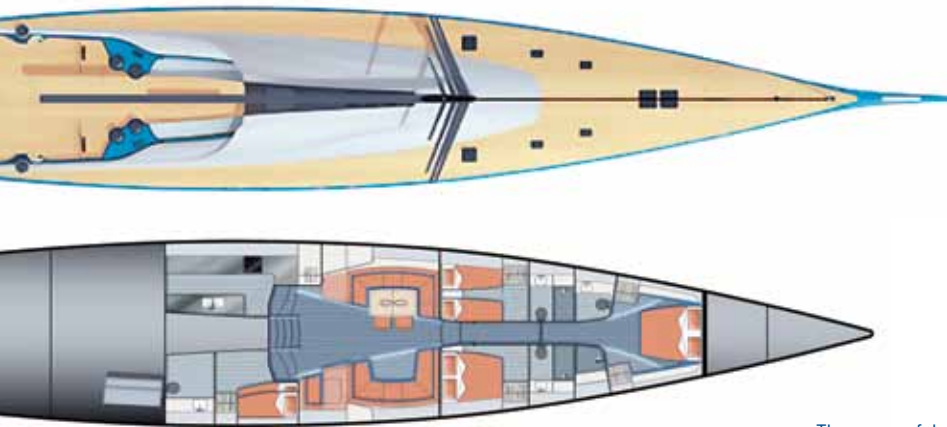
defines performance sailing in every respect. The Infiniti 100S is designed to deliver the future of sailing NOW!

Infiniti Yachts are a new benchmark in superyachts; exclusive, visually stunning creations utterly bespoke in every respect. Each Infiniti Yacht has the revolutionary Dynamic Stability Systems (DSS) at the core of its design, as its nautical DNA. The DSS patented system uses retractable foils to reduce heel angles and provide progressive dynamic lift, complementing a fixed keel. Faster, smoother, and safer than any other method of achieving speed in a monohull yacht, making for a yacht that is lighter, more versatile and with exceptional balance and precision.

Extensive R&D, state-of-the-art design work and days of tank testing

Ten years of research, structural engineering and materials and process development provide the revolution that drives the performance of the Infiniti 100S. At the heart of each Infiniti design is a very high level of state-of-the-art naval architecture combined with DSS as its core DNA.

Welbourn Design has worked closely with Gurit, the structural engineers, and Design Unlimited, the interior designers. Working from the naval architect's brief, Gurit is developing a structure that both meets the requirements regarding weight, yet allows for a



The purposeful, curvaceous lines that resonate on the exterior of the yacht are carried through into the interior.

stylish interior. Key areas included the engineering and manufacturing processes to ensure the production to be cost effective, at the same time meeting the weight targets. Alex Shimell, Marine Consultancy Director at Gurit said: «The structure is based on a relatively thick foam sandwich shell, aimed to reduce the interior structure in order to increase room for the «built-in» noise insulation. At the same time, this expedites build times. Gurit will work closely with Danish Yachts to develop the build concept and construction details to enable them to achieve the structural weight targets whilst maintaining control of the build hours. During this process we will also work closely with Design Unlimited and Hugh Welbourn to incorporate the looks and design features that have been designed in the Infiniti 100S.»

As the inventor of DSS, Welbourn Design has overseen Infiniti's intensive programme of tank testing and on-the-water evaluation, which gives the Infiniti 100S its superior performance. Velocity Prediction Programs (VPPs) were developed, necessary for the sail designers to be able to correlate the on-the-water test results with those derived from tank and CFD analysis and double check that the trim and behavioral characteristics of the model were in line with how the yacht was expected to behave.

While retaining the modern, hi-tech feel, Design Unlimited has adapted the exterior themes to create a



calm and welcoming environment within, that is ideal for relaxation and socialising. The taut and sweeping forms introduced in the coach-roof and cockpit draw the eye in one continuous flow through the saloon forwards to the guest accommodation and ultimately to the master suite. The interior provides for six guests in three en-suite cabins and due to its unique design, provides an excellent connection between the interior and the cockpit.

The ultimate fusion of performance and comfort

Because Infiniti Yachts are designed around Dynamic Stability Systems (DSS) they are significantly more comfortable than conventional yachts. Yachting World editor David Glenn wrote that DSS «not only worked but was simple to use... it reduces pitching and dampens the motions usually suffered by a yacht». Increasing

DYNAMIC STABILITY SYSTEMS

10 years

of R&D went into DSS. The technology uses a retractable foil that deploys to leeward to complement the fixed keel of the yacht. The DSS foil creates Righting Moment or stability. This can be thought of as power. The DSS foil also reduces drag, by lifting the boat out of the water. The DSS foil also reduces pitching which causes sea-sickness and reduces heeling, making the yacht smoother to sail, more comfortable and faster.

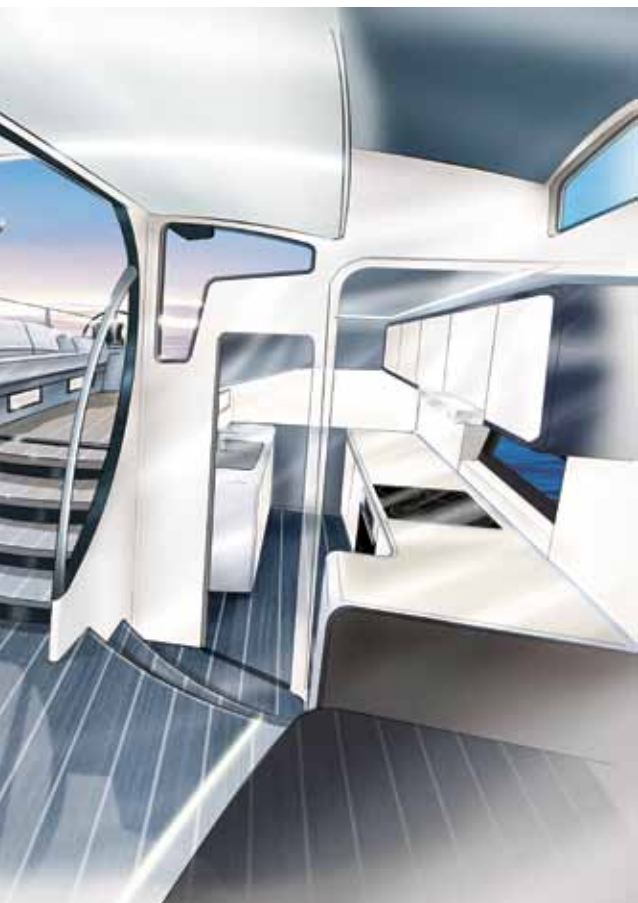
ing the enjoyment and comfort of all on board is a core value of Infiniti Yachts.

DSS heightens comfort for sailors, reduces displacement, and has proved to increase velocity made good (VMG) while providing stability to the yacht and reducing weight. When the breeze is light or the yacht is maneuvering the foil may be centered within the yacht without impinging upon the interior. Even when not using the DSS foil the yacht has plenty of stability from its keel to sail safely, meaning that in the unlikely event of a problem the ability to navigate safely is not compromised.

The Infiniti 100S design is ideally suited for the Mediterranean and can cruise comfortably at speeds over 20 knots, providing a genuine fusion of performance and comfort. The yacht is designed to perform in both light and heavy winds ensuring comfort and performance in all conditions.

The cockpit is deep, secure and comfortable and designed to ensure that it's both safe and dry when sailing, and at the same time intimate and relaxing at anchor. The twin helm stations are fitted with foil and mainsheet controls. The cockpit and saloon interface is unique, providing a seamless indoor/outdoor flow. This allows substantial natural light into the saloon area and at the same time gives added protection when passing from the cabin into the sheltered cockpit.

The interior is modern and open, yet with a Scandinavian stylish feel. Owner and guests share three en-suite cabins forward of the main saloon. The crew is accommodated aft of the companionway.



Materials for mankind's future space exploration

Gurit's SE 70 prepreg reaches new heights! A hot melt, low temperature cure epoxy prepreg achieved a number of «firsts» as part of a NASA research project undertaken by the University of Sydney.

Future space exploration will require large, lightweight structures for use as habitats, greenhouses, space bases and so on. They are likely to require preparation, in terrestrial conditions, of a prepreg, which can then be shipped uncured in a container into orbit and used for structural applications in space construction projects.

Dr Alexey Kondyurin, a Senior Research Fellow at the University of Sydney, Australia, led a team to investigate the effect of the stratospheric conditions on the polymerization process in the polymer matrix of a composite material, with Gurit providing its SE 70 carbon epoxy prepreg to the project.

Testing prepreg reaches altitude of 40 km

Uncured samples of SE 70, along with one cured control sample, were stapled to a sleeve attached to an aluminum base, together making up the flight cassette. Once weather conditions were suitable, the 1 kg cassette was



Inflating the balloon that took Gurit SE 70 prepregs to new heights.

fixed to the outside of the balloon's cabin, a telemetry unit, and the balloon was launched from Alice Springs Seven Mile Airport in Australia on April 16, 2010. Over the next three days the balloon and its



These test samples were sent up into the stratosphere.

payload, including the uncured SE 70 prepreg, was exposed in the stratosphere, and reached a maximum altitude of 40 km. Temperature variations from -76°C to 32.5°C and pressure up to 2.1 torr were recorded during the flight. After three days, the payload was separated from the balloon, and over 3 hours it descended by parachute to land nearly 1000 km from the launch site.

Prepregs are curable on-site in space

Some of the flight cassette samples of SE 70 prepreg, as well as those from the ground control cassette and the refrigerator control cassette, were analysed, with particular attention paid to the curing

reaction and the degree of cross-linking. The results show there was no significant difference between the glass transition temperatures (T_g) of the flight, ground control and refrigerated samples. This demonstrates that uncured samples of SE 70 prepreg can be delivered and stored in the stratosphere with no negative impact on its curing capability.

The full NASA report on this part of the project was published

in May this year. A subsequent project saw the remaining samples of Gurit's SE 70 prepreg cured at an altitude of 26 km during a stratospheric flight in November 2012, resulting in it being the first prepreg in the world to be fully cured in the stratosphere. Analysis of the samples is ongoing.

Both projects demonstrate that uncured prepreg can be prepared in terrestrial conditions and transported into space, for on-site cur-

ing, paving the way for further research into the exciting future of space construction. Gurit is delighted to have been a part of this groundbreaking project.

For more information, see Dr Alexey Kondyurin's blog at: <http://largeconstructioninspace.blogspot.com.au>

BEING GURIT

Build a boat in one morning

During the New Zealand summer – that is in February – NZ Marine Industry Association held its annual Marine Trades Challenge, a boatbuilding competition for industry apprentices and high schools. Gurit has been a longstanding supporter of the event, which always encourages a good crowd of visitors. «Special about this year's Marine Trades Challenge was that Gurit supported two all-girls entries from Tamatea High School in Napier, NZ», says Sian Stimson, marketing communications manager for Gurit (Asia Pacific).

As an Industry Supporter of NZ Marine, Gurit staff members are familiar faces at various industry networking events and conferences, including the annual Graduation Dinner for the marine industry apprentices, and the Auckland On Water Boat Show. At the Marine Trades Challenge, Gurit treats visitors and the competing apprentices and students to a Kiwi BBQ whilst they watch the action or take a short break from boatbuilding. It's quite hard to make the teams leave their yards for even a second, as they have just one morning to build their boat at Westhaven Marina in Auckland. They are given most of the construction materials and tools, and have specific criteria to meet, but otherwise have a freehand in the design and build process.

The teams' efforts are judged on both their ability to finish building within the timeframe, and also on the presentation of the boat. In the afternoon, the boats are truly tested as the teams race each other in a series of 'round the buoys' races.

Gurit congratulates Tamatea High School team for winning the High School Challenge, and Alloy Yachts for being the overall winner of the event.



Tamatea High School girls team as they near completion of their monohull.



Tamatea High School, supported by Gurit, collect the high schools' trophy.



Peter Busfield, Executive Director of NZ Marine, grabs some lunch at the Gurit BBQ.

Continuous improvement made visible

Gurit (UK) has launched in June a reinvigorated 5S programme throughout its factory environment to improve standards, efficiency and the working environment for all staff. 5S stands for the following principles:

SORT – No unneeded items, less clutter, improved health & safety standards (e.g. less trip hazards), raised morale, more respect for your machine area.

SET IN ORDER – The locating of necessary items so that they are easy to use; label them so that anyone can find them and put them away; aim to eliminate unnecessary motion and provide operators with an ergonomic process environment

SHINE – To keep everything in top condition so when something is needed, it is ready to be used; to ensure the working environment is clean, maintained to a high standard aiding work place safety and efficiency

STANDARDISE – To ensure standards are reached, maintained and remain implemented.



SUSTAIN – The on-going commitment which holds the first 4 principals of 5S together.

5S Audits are conducted at each end of shift, for each respective machine or area in an effort to drive continuous improvement. The audit scores are added daily to a database and updated score cards show in real time how each of the 16 teams is performing. The early response from the production teams has been enthusiastic and yielded notable improvements in all areas. 5S ensures, positive results are seen by each individual as it is them who are making the positive changes to their own areas and work environments helping to improve morale, raise health & safety standards and drive efficiency.

Gurit awarded Preferred Supplier of Choice status with ABA



The American Boat builders Association (ABA) has selected Gurit as «Preferred Supplier of Choice» for the supply of G-PET™, PVCell™, and Corecell™ SAN structural foam cores. ABA member companies have approximately 5,000 employees in the United States, with 15 facilities in 9 states. ABA companies produce more than 15% of all the boats above 16 foot built in America. With Chaparral Boats, Cobalt Boats, Correct Craft, Godfrey Marine, Grady-White Boats, Monterey Boats, Regal Marine Industries, Rinker Boat Company, Tiara, Pursuit, Stingray Boats, Thunderbird Products as members, ABA is one of the leading U.S. buying groups for independent boat builders. «ABA is pleased to reach an agreement with Gurit (USA) as the Preferred Supplier of Choice for this wide range of core materials. We've chosen Gurit (USA) because

they offer high quality products, excellent technical support, and valuable engineering resources. We look forward to enhancing our relationship with Gurit in the future.» says Jay Patton, President, ABA.

Structural core materials are a key materials category in boat building. Cores in a sandwich construction are specified by boat designers and naval architects to increase stiffness and reduce the weight of a composite structure. «Gurit has a comprehensive range of core materials to fit any specification or manufacturing process. Our materials can be offered in sheet form and with a variety of cut patterns and finishes. We welcome this agreement with ABA to offer them tailored products to fit their members' needs and processing choices,» says Lance Hill, Regional Sales Director Americas Gurit Composite Materials.

G-PET™ core materials range now includes fire retardant version

G-PET™ 75FR and G-PET™ 100FR have been developed in order to meet the growing need for structural core materials with good fire, smoke and toxicity (FST) properties used in marine, civil engineering and transportation markets. The newly added G-PET™ FR range offers a much lower cost FST material compared with existing competing high-cost / high-performance materials such as PMI, PEI, PES foams, addressing lower requirements and needs.

Starting with G-PET™, the basis of Gurit's extruded structural PET core, flame retardant additives are added to improve FST properties. The manufacturing process remains the same as for G-PET™, with slight variations in process settings. The material is available in all standard knife-cut finishes as well as featuring the new G-PET™LITE surface heat treatment technology

which is being used for the roof panels of the Medinah Station of the Haramain High Speed Railway in Saudi Arabia.

Following the launch, the technical team at Gurit has now completed and achieved important fire certifications which include DIN 5510-2, ASTM E1354, ASTM E662, BSS 7239 and FAR 25.853.



Fire retardant versions have been added to the existing G-PET™ family of core materials.

CORPORATE NEWS

Benefits from weekly meetings

Gurit Americas – the former Gurit (Canada) – benefits in multiple ways from the work of its continuous improvement steering team. Since Autumn 2012, this group meets on a weekly basis to follow up on running projects, provide support for the workers involved and to help overcome any obstacles. Recently, the team was honoured for the successful completion of three projects.



A first project in Corecell™ production investigated ways of improving the ergonomics of one specific worksite while increasing the product quality as well as the speed and

output of its sanding process: Adding a cleverly positioned handle to the tool, installing a more powerful sander and by changing the way necessary equipment and tools needed for the job were placed nearby, one worker instead of the former two is now operating the whole process.



The target of the second project was to speed up change-over time at a specific machine: In the context of a single minute exchange of die (SMED) project, the project team defined a new standard procedure, made certain modifications to the machine to support this process. The outcome was again stunning: Not only was the change-over time greatly reduced, the team also found out that with the newly defined standard process, the operator could actually operate two machines at a time.



A third project analysed the way a certain job was done. The team came to realise that with a couple of changes the machine could be started up in a much quicker fashion. The time to stock this specific work station with material was also greatly reduced. Together these two measures led to a valuable increase of productivity.

Gurit Agenda 2013

Gurit will showcase its wide range of material packages, solutions and technologies at a trade show near you.

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

- **Automotive Composites Conference & Exhibition, Michigan/USA**
11–13 September 2013, Focus: Automotive; Gurit is a session sponsor and will give a presentation
- **China Composites EXPO, Beijing/China**
11–13 September 2013, Focus: All markets
- **Composites Europe, Stuttgart/Germany**
17–19 September 2013, Focus: All markets
- **Auckland On Water Boat Show; Auckland/New Zealand**
26–29 September 2013, Focus: Marine
- **Composites Association of New Zealand – Conference & Trade Show, Auckland/New Zealand**
11–12 October 2013, Focus: All markets, Engineering
- **Busworld Kortrijk, Kortrijk/Belgium**
18–23 October 2013, Focus: Transportation, Engineering
- **Indian Composites Show 2013; New Delhi/India**
24–26 October 2013, Focus: All Industries; Engineered Structures
- **Composites Engineering Show, Birmingham/Great Britain**
12–13 November 2013, Focus: All industries, Engineering
- **Railway & Mass Transit Interiors EXPO, Cologne/Germany**
12–24 November 2013, Focus: Transportation
- **METS 2013; Amsterdam/The Netherlands**
19–21 November 2013, Focus: Marine
- **Tidal Energy Summit, London/Great Britain**
25–27 November 2013, Focus: Tidal Energy; Engineering
- **Performance Racing 2013, Indianapolis/USA**
12–13 December 2013, Focus: Automotive

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