In 2007, Gurit has truly extended its global footprint: With production sites in Europe, North America and Asia, Gurit is now uniquely positioned on the global advanced composites market to readily supply customers with materials produced near them.

At Gurit (Canada) – the Group’s well established competence centre for structural foams – production of fibre-reinforced composites (prepregs) has now started. On August 22, the brand-new, purpose-built production site in China was officially inaugurated – featuring dancing lions and fireworks, of course. Gurit (Tianjin) is now supplying prepreg and structural foam materials to its growing Chinese and Asian customer base.

Gurit (UK) witnessed the roll-on of the automotive parts production in October. This new facility was built during the first half of the year and is now supplying fenders, bonnets and trunk lids for one of the most exclusive cars ever made – driven, tried and tested by Her Majesty’s agent 007, James Bond.

In 2007, Gurit grew rapidly to a global scale but experienced a commercial downturn, forcing the company to adjust its financial earnings outlook twice. To bring the company back to profitability, a new management team was put in place with Rudolf Hadorn at the helm. In this issue of shape, CEO Rudolf Hadorn looks at Gurit’s challenges and outlines what it will take to bring the company back to a sustainable earnings position.
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Corporate News

BOARD OF DIRECTORS APPOINTS NEW MANAGEMENT

Expanding the Group’s capacities on three continents at the same time proved to be a tremendous challenge which negatively impacted results for the first half of 2007. When it became apparent that the business expansion and the ongoing commercial difficulties would lead to an operational loss for the second half of the year, the Board of Directors decided that a new management team should bring Gurit forth. On its meeting of October 29, the Board appointed Rudolf Hadorn as new CEO of Gurit as of November 1, 2007. Rudolf Hadorn was CFO and later President and CEO of the Ascom Group from 2004 until February 15, 2007. Prior to that, Mr. Hadorn was CEO the German Krone GmbH and CFO of the Krone Group. After completing his MBA (University of St. Gallen, 1988) Mr. Hadorn worked for GM in Europe in a series of financial and executive functions.

In his first weeks as CEO, Rudolf Hadorn devoted all his time to rapidly understand and analyse the Group’s current challenges and define an action plan going forward. Read more in the interview with Rudolf Hadorn on page 6.

NEW CFO

On October 1, Markus Knuesli has officially assumed his new position as Chief Financial Officer of Gurit. He took over from Nikolaus Belz who will continue to support Markus Knuesli together with Peter Lieberherr, former Chief Financial Officer of Gurit-Heberlein, to ensure a smooth transition in Group finances.

Markus Knuesli, a Swiss and French citizen born in 1962, last served as Chief Financial Officer of the IT services company Unicible SA, Prilly. In 1997, Markus Knuesli joined Nextrom AG, Morges, as Group Controller and became the company’s Chief Financial Officer from 1999 until 2003. From 1993 to 1997, Markus Knuesli held various financial positions with Tetra Laval International, Pully. After completing his degree in economics at the HEC in Lausanne in 1988, he worked as an assistant in tax law at the University of Lausanne before joining Coopers & Lybrand, Geneva, as an auditor.

GURIT OPENS NEW SALES OFFICE IN INDIA

At the end of November, Gurit opened its Sales Office in Pune, India. With this move, Gurit provides a more personal and local service to its largest Indian customer, the wind energy specialist Suzlon, whose headquarters are also in Pune. The Gurit office is situated in the heart of the business district of Pune which in turn is the second largest city in the state of Maharashtra, India, located 175 km from Mumbai.
GURIT (CANADA) WINS AWARD FOR ENERGY RECOVERY

At the 18th edition of the Gala Energia in Montreal, Gurit (Canada) won a prestigious award honoring the company’s efforts in the field of energy recovery.

The Gala Energia is an official reception organized by the Association Québécoise pour la Maîtrise de l’Énergie. This body recognizes and honors excellence in the fields of energy effectiveness, energy conservation and healthy environment management within the business and public sector of Quebec.

The candidacy of Gurit (Canada) Inc. was prepared and deposited by the engineering and sustainable development specialists of Teknika-HBA in the category of «Industrials / Manufacturers Processes». The special focus was on an «Energy recovery project» which Gurit (Canada) had carried out in 2005 for its Corecell plant: In a major project costing some 780'000 Canadian dollars, Gurit achieved a 35% reduction of power consumption. The project paid itself back in 1.6 years through 22% lower electricity and 55% lower natural gas expenses.

INVESTOR VISIT GURIT (TIANJIN)

In late September, Bank Berenberg organised an investor trip to China. On their journey through China, the financial experts visited Gurit (Tianjin) to learn more about Gurit’s expansion plans and the trends in wind energy in China. Gurit teamed up with Gamesa, one of the leading players in wind turbine manufacturing worldwide, to give the guests as much of an insight as possible into this fascinating growth area. While Gurit explained the importance of having a truly global footprint in this worldwide market, Jesus Zaldua of Gamesa stressed the importance of a well-established supply chain in the high-tech wind energy sector. He said: «We don’t need suppliers, we need partners like Gurit.»

Christian Bisaillon (far left) and Michel Emond (second from right) receiving the award that was jointly awarded to Teknika-HBA and Gurit Canada.

Gurit explains the company’s growth strategy.
Interview with Rudolf Hadorn

Mr. Hadorn, you’ve been with Gurit for two months now. What have you experienced and discovered in your first weeks?

Hadorn: A lot of reason to be optimistic and a lot of work that needs to be done to benefit from the many opportunities that are out there for Gurit. Let me explain that somewhat more: Gurit is active in attractive and interesting growth markets which offer great potential if Gurit approaches these markets with entrepreneurial know-how and flawless business execution. We need to do better than in recent years.

Where do you see most need for improvements?

Gurit had embarked on an fast expansion strategy in 2007. This move ahead was certainly right, but done with – let’s say – not enough business process, organizational and execution strength needed for such a big challenge. Expanding the Group’s capabilities on three continents at the same time is not an easy task. Certain priorities and responsibilities were not clear and as a consequence some vital business aspects did not get the attention they needed. Now we need to correct this.

What exactly do you refer to?

We currently have three major areas of concern: First, we need to finalize the residual qualification work on the new production lines. Once this is achieved, we need to ramp-up the utilization of our installed capacities across the world fast to serve our customers – existing and new. Gurit has now got significant capacity available. Second: While management was busy with the expansion projects, Gurit has somewhat lost focus on the raw material prices on one hand and our own selling prices on the other hand. We were very busy explaining this situation to our key customers in open, but transparent discussions over the last weeks. Third: There is still a lot of room for improvement in our operations for stronger business support processes, lean manufacturing and more efficient logistics and materials management. Gurit’s business model needs re-inforcement in these areas to pursue a path of profitable growth in the future.

You said you were optimistic for the future. Why?

I trust that Gurit will be able to successfully accomplish the tasks I’ve just explained. We are well positioned in the markets we have chosen. We have strong and even leading positions in some of these markets, we are world-wide present to serve our customers from local production hubs and – last but not least – we have some interesting new product developments in store which will foster the technological leadership of Gurit.

So what are the top priorities for 2008?

It’s quite a list: We need to a) re-establish Gurit’s earnings position while pursuing further growth opportunities, b) manage our business in a decisive and fact driven leadership manner – Execution is key! c) strengthen our business model with clearer responsibilities, more efficient operations and more robust business processes, and last d) we need to leverage Gurit’s technical capabilities to strengthen, broaden and deepen our market offering for our global customers.
Putting Values into Action

A shared set of core values helps an organization to work together in order to meet the challenges of the future. Gurit has developed a set of new corporate values in a three-step process involving management and employees at each site.

Why does Gurit need Corporate Values?
Gurit operates in dynamic markets. This means that employees carry significant responsibility for understanding what is changing, and how they need to act so that the company can profit from new opportunities and avoid risks. Each of us is confronted with new questions and decisions in our everyday business life. A commonly accepted set of values are like a set of guidelines which helps us to make the right decisions on the spot rapidly. They align employee efforts and decision making processes with the success of Gurit as a whole.

How do you define Gurit’s corporate values?
Values4Success defined the following four values, or guiding principles:
• Customers – our priority
• Renewal through innovation
• Profit through empowerment
• Success through people
When we come to a point in our work where we have to make a quick decision, either independently, or as a group, we can check our options against the Values4Success framework and the four dimensions: Customers, Innovation, Profit and People.
Interview with Isabela Quinton

But these values can easily be in conflict with each other. What comes first for instance when I have work to do for a customer but also have to contribute to bring an innovation project forward?

This is exactly where the value process kicks in! An employee facing the situation you just described would first give their best to satisfy our customers’ ongoing needs. But, he or she would also understand that innovation is critical for Gurit’s success and would therefore make an extra effort to also contribute here. Perhaps this prioritization through the values allows other things to be de-prioritized. It is important that Gurit employees understand how values make a tangible difference in their priorities, and the way they do their job.

What happens if an employee chooses to prioritize the more interesting innovation job first?

That could also be a valid decision. Allocating more energy and more time to innovation is fine, as long as the employee knows that customers are our priority. At the end of the day, we innovate for the benefit of our customers.

Could you tell us about the Group-wide Values4Success project?

The Values4Success project started at the Annual Management Meeting in January 2007. Gurit, as we know it today, was launched in 2006, bringing different companies cultures and people together into what is referred to as «One Gurit». The integration process started of course with outlining the overall Group strategy. Within the context of the strategy process, we conducted the first Group-wide employee survey to identify the most urgent soft factor needs. We received very constructive and valuable feedback. Employees appreciated the fact that the Group cared about their views. We learned that the formation of the new «One Gurit» Group had reduced the sense of identification with the company for some of our employees. Also, there was an unmistakable request for better and more internal communication. Launching shape as a Group-wide corporate magazine was one of the more immediate results of the questionnaire. And the Values4Success project was defined as another, medium-term initiative from this effort.

«A set of values are like a set of guidelines.»

«Gurit Values come from our own experiences and real day to day situations as an organization. The values are grounded in what we do and provide a reference point when required - Simple, Useful and Effective.»
At the Annual Management Meeting in January 2007, the executives and managers initiated the Values4Success project in plenary and break-out sessions. This was an important catalyst for taking the value discussion out to all our sites.

During the summer we involved an additional 60 people from all locations and levels to participate at six international full-day workshops. The participants brought their individual points of view, which of course reflected their personal thinking, but also were viewed against their geographic and cultural backdrops. Based on the results of these employee workshops, the Group executive committee hammered out our corporate values and their exact wording as mentioned above. When you see these values, you might think they are quite obvious, or even generic. However, they are the result of a very systematic and thorough process. Even more important than the wording, is how Gurit employees adopt and internalize the values. The values need to be anchored within the organization, individuals and management.

How do you anchor values with Gurit employees?
This is happening right now in the third phase of the project. With the support of all management team members and the 60 people who participated in the workshops, we are now familiarizing the entire Group with our new values. A personal copy in booklet form will serve as an introduction to our values and as a quick reference for future use. Even more important however, are the lively discussions about our values which we will have at various Gurit sites around the world. Every Gurit employee will have a chance to participate in one of these workshop discussions. Gurit HR personnel will put the values in action. Among other things, we will discuss difficult «moments of truth». How should we decide when we are confronted with a difficult decision. Putting the values in action by discussing typical difficult situations we encounter every day, will give us a better internal map and help us to best align our actions with the overall goals of Gurit.

The Gurit Magazine 02_2008
STREET ACCESSORIES AND RACING MACHINES
DESIGN AND PRINTING AS DIFFERENTIATORS

«Printing is always an issue», says Reinke Blättler. Fibretec uses silk-screen printing for prints of up to three different colours. More complex designs are done on a sublimation printing machine which they run at 360 dpi. «Printing a series of 100 boards easily takes a whole day and night. And you are never quite sure what the pressed and cured end product eventually looks like.»

PURE DIGITAL PRINTING DELIVERS PURE COLOURS

At last spring’s ISPO trade show in Munich, Fibretec learnt about Gurit’s new digital printing technology, PURE. «The colours and the resolution PURE offers are just stunning.» Developed to reproduce designs in a photo-realistic quality for ski and snowboard top sheets, PURE is obviously also an enabling technology for state-of-the-art skateboards, where style and design matter. «When they don’t ride their boards, teenagers carry them around in-town like an accessory to their outfit, like exclusively branded street-ware, sun glasses or handbags.»

Gottfried Herbst of Gurit Ittigen sat down with Reinke Blättler and laid out the steps for a first production run of PURE printed bottom sheets. In-house design files with the artwork were exchanged, fed into the PURE equipment and before too long, Fibretec had built the first series of their exclusive race and downhill boards in shiny and sharp colours. shape wanted to know if this was a departure from the «do-everything-yourself» philosophy using sheets digitally printed by Gurit rather than printing them in-house. «Not at all, you see we rely on good suppliers: We don’t grow trees. Nor do we make the multi-layered wooded cores, prepregs or resins we use for our boards. But we want to control the building process by working with the best available material and techniques to produce the best product. Just look at this ocean-deep blue!»

WHIZZING BY AT 120 KM/H

The new Fibretec downhill race series not only features cutting-edge design technology but they also cut around corners like no others: At last year’s downhill world championship in Jungholz, Austria, the dare-devil skateboarders relying on the new Fibretec downhill boards did very well. You’ve got to trust your board, when you dash down a mountain at 120 km per hour!

“Our end customers are typically teenagers or fearless race fanatics» says Reinke Blättler of Fibretec, a Swiss producer of high-performance downhill and slalom skateboards, custom surf and snowboards.

“We believe in our hands-on approach in almost every production step: We design, construct, laminate, press and cure, shape, finish and mount our small series or custom-made skateboards.»
Gurit (Tianjin) Composite Material Co, Ltd. was officially inaugurated on August 22, 2007. Representatives of the local authorities, business partners, Group Management, the international Gurit Task force in charge of setting this green field investment up, the local Chinese Managers, and all of the staff participated in this remarkable day full of speeches, dancing lions, fireworks, cocktails and parties.

ON TIME AND ON BUDGET
There was good reason to have a party. This important green-field investment project was finished well within time schedule and budgets. In just seven months all the buildings, installations and most of the production equipment was set up, so that qualification work on the prepreg lines could start in early summer. The production of structural foam products had already started in April and was moved to the new facility as soon as possible. The Tianjin plant is Gurit’s new hub for prepreg and structural foam materials in China and Asia. When all the equipment is in full use, this facility will generate annual sales of about CHF 50 million. While the expansion and tailoring of structural foam products are already in full three-shift, seven days a week operation, the prepreg lines are currently producing the materials for qualifications by European customers and are expected to be in production soon.

In late September, there were about 140 people working at the new plant in Tianjin; management expects this number to increase to about 160 by spring when all production equipment is fully running. On the 10’000m² factory floor Gurit operates today two prepreg lines, seven foam expansion ovens, a full tailoring and kitting unit. And there is still room to grow in the future.

AN IDEAL LOCATION
General Manager Phil Harnett, who has lived in China for over 13 years, is proud of the new facility. «Tianjin has a long tradition in manufacturing in China. We have found very good staff here. The proximity to the capital city of Beijing where most of the important decision-makers in the rapidly growing wind energy market are located is another asset of this location.»

The area where Gurit (Tianjin) is located is called Tianjin Economic Development Area TEDA, a main hub for international industrial production in China. There are many existing and potential customers for high-end composite products, including wind energy, aerospace and transportation. «Setting up business in TEDA was excellently supported by the local authorities and TEDA», says Phil Harnett. «We were on a very tight schedule and everything was finished by late June.» Going through a fascinating series of photos documenting each and every day’s progress Phil recalls: «Even the lawn and landscaping plants arrived the day before we moved in.»
Standing in front or inside Gurit’s purpose-built production site in China, it is hard to believe that it took only seven months to build this state-of-the-art facility. This is just another example of how fast things move forward in China.

August 22, 2007: Doors open for the Opening Ceremony

A big day also for all the local staff.

Painting the lion’s eyes makes it open its eyes on a grand future.
Gurit had worked with the architects Consarc during the early phase of the project and were instrumental in converting the original steel design into the present, more organically looking composites canopy solution. Thomas Royle, Project Manager at Gurit, remembers this also entailed introducing the architects to the world of opportunity opened up by this new composite design: «In support of this process we also provided Consarc staff with technical training on composite theory, application and manufacturing processes.»

**COMPOSITES ARE IDEAL FOR ORGANIC SHAPES**

The canopy is a hybrid glass/carbon structure with an aerofoil section, consisting of an internal structural central spine and composite fairings. Running beneath the canopy is an integral lighting tray which also incorporates the tannoy speakers. The canopy is supported from two opposing elevator towers by stainless steel tie rods which link into fabricated steel elements mounted within the canopy. The pedestrian walkway, which links the two station platforms, is hung from these steel members.

Gurit’s structural engineers designed the composite canopy and engineered the interface between the organic composite structure and the integrated steel frames, working closely with the prime contractors design team Gifford, the architect and the manufacturer. The analysis was undertaken from first principles and also by FEA using MSC Patran/Nastran software utilising Gurit’s own materials design allowables.

«The America’s Cup is always a prime challenge for our composite specialists and one that we thoroughly enjoy. We have been working incredibly hard for the past two years to supply the teams with the best materials and engineering services available and we are delighted with the results. Gurit would like to congratulate all the teams that participated in the 32nd America’s Cup», said Graham Harvey, Head of Gurit’s Marine, Sport and Civil Engineering Business. With its SP-branded materials and technology, Gurit supported eight out of twelve America’s Cup syndicates in various capacities during their multi-year preparations and all the races of this campaign.

To best support and assist the teams’ efforts on the grounds in Valencia, Gurit offered its comprehensive range of SP-branded materials via distributor JEMG, part of the Gazechim Group. This readily accessible, stand-by support scheme proved to be an invaluable service for the inevitable repairs and modifications that occurred throughout the series of races where the limits of boat building and sailing were constantly being tested.

With the America’s Cup organizers promising stronger, lighter and faster boats for the 33rd race, the quest for yet again higher performing materials has already begun anew at Gurit.
Sailing is one the most fascinating sports in the world. Every boat is different, every race is new. Yet there are some constants in the equation of success. One such constant is the long-standing partnership between Hasso Plattner and Gurit’s marine experts and its SP product range.

congratulations on winning the Maxi Yacht Rolex Cup! What is your personal recollection of this regatta?
Hasso Plattner: It was very special to me to win that race again after 10 years! Success is a complex equation with many parameters: The boat, the technology, the crew and its teamwork, the kind of winds you have, the strategies you develop, tactical decision, luck, … you name them. Especially in the last race, we certainly had the right strategy to win the cup.

What about the other factors in your equation of success?
Sailing is a very competitive sport and materials certainly are an important factor. I am interested in new technologies, new designs, new materials. I enjoy working with boat-builders and material engineers who are never satisfied, who want to reach new horizons. Whatever the class of sailboat, dinghy or yacht, I am very keen to sail with latest available technology that the rules allow – canting keels or carbon parts for instance.

How does sailing carbon-based boats compare to pre-carbon boats?
Especially sailing a dinghy you notice the lightness of the boat, which planes earlier, is stiffer and more responsive. With yachts, it is a similar approach. Weight is crucial but needs to be carefully balanced with stiffness and strength. The feeling is different and you are chasing much smaller gains but everything counts towards making the boat, faster and more powerful. Sailing carbon based boats is sailing at the edge of the possible. At this level, you never know when you cross the fine line between make or break. But you know that with what you do, you bring technology – and sailing – forward.

Are you referring to any specific moments?
Well, YOU know as well. Your company was involved in engineering and building many of my boats. There will always be certain things that need to be re-thought, re-done, re-built. Not everything is right the first time. But that’s natural. With partners who are truly committed to success, you will always overcome minor setbacks.
SP products – a key to differentiation

Gurit is one of the most prominent material and technology providers in the high-performance boatbuilding markets. The world’s best boat designers trust and rely on Gurit’s SP branded product and technology offering. With a special product and technology package, Gurit is leveraging this expertise into the rapidly growing production boat market.

What are the most pressing needs of production boatbuilders today? «Boatbuilding is a very competitive business; differentiation in terms of design, quality, diversity of model range and manufacturing technology is the name of the game», says Jean Pierre Mouligne, marine sales manager for Gurit in North America. To meet market expectations, production boatbuilders nowadays introduce two to three new models each year. So the aim of most boatbuilders using glass fibre reinforced polyester or epoxy is twofold: They look at ways to improve the quality of their design and they need to bring these new designs to market as quickly and as efficiently as possible. «Over the past few years, we have developed a comprehensive product and technology offering for the production boat market covering the full production process from design and engineering to the actual boatbuilding process.»

FROM MODEL-MAKING AND PATTERN MATERIALS... Production boatbuilders look for ways to easily improve the accuracy and complexity of their designs. T-Paste 70-1 featured in the last issue of SHAPE is the ideal answer for this. Easy to apply and curing at room temperature in a day, this epoxy based tooling paste can then easily be machined by CNC tools. Production boatbuilders are rapidly adopting this new technology which not only results in higher accuracy of final parts but also drastically reduces the time to introduce new models.

...TO INNOVATIVE WAYS OF COMBINING MATERIALS A special backing laminate technology allows production boatbuilders to continue to use polyester gelcoats in combination with advanced SP epoxy products. The advantages are obvious: epoxy based hulls and decks are significantly stronger and lighter at the same time, feature an improved fatigue performance over standard polyester glass fibre reinforced laminate and provide a smoother surface finish as the lower shrinkage of epoxies results in less print of fabric on the surface. Also the production processes become leaner as less material is required to manufacture a boat using high performance epoxy materials which also do not suffer from osmotic degradation and add to the longevity of the boats. Special SPRINT prepreg materials curing at lower temperatures and Gurit’s «no-problem» core material Corecell (see article on page 20) again increase quality while reducing labour hours in the manufacturing process.

...TO RELIABLE BONDING SYSTEMS The new Spabond 540PB is specially designed for use in the production polyester boat market. It offers improved strength with very long working time over conventional adhesives. Spabond 540B is available in cartridges, pails and drums. When used in large volume, it can be applied using special mixing equipment.
PLUGGING THE GAP FOR MILLIONS

With its organically shaped bridge canopy, London’s new Langdon Park Station will be an architectural focal point and act as a catalyst for the development of this section of the London Docklands.

Langdon Park Station will plug one of the longest gaps on the London’s Docklands Light Railway (DLR) network, bringing it closer to thousands of homes and vastly improving access to jobs, education, leisure facilities and health services. Feasibility studies for a new station between the existing All Saints and Devon’s Road stations were jointly funded by Leaside Regeneration Ltd. and DLR as early as May 2000. The new station was intended to serve as an architectural focal point and act as a catalyst for regeneration of the area by stimulating new commercial and housing development and encouraging greater use of public transport. The DLR is the best link to nearby Canary Wharf and provides Londoners with direct interchange with over 100 bus routes, five mainline railways, eight Underground lines as well as coach, taxi and riverboat services. It currently serves 53 million passengers a year, a figure forecast to increase to 80 million by 2009.

TEAMING UP FOR A STRIKING RESULT

The engineering and construction services company Costain was tasked with the design and construction of the new station, and in January 2007, Gurit’s Engineering Group received an order from AM Structures of Sandown, Isle of Wight for the structural engineering of a 33m long futuristic pedestrian bridge canopy. AM Structures were chosen by Costain as preferred manufacturer for the canopy due to their previous architectural experience, their preference for Gurit materials and close proximity to Gurit’s engineering offices.
Markets: Transportation

A COMBINATION OF POWER, BEAUTY AND SOUL

Der Aston Martin DBS setzt auf modernste Technik; Gurit produziert Karosserieteile aus Karbonfaserverpregs.

Aston Martin 依靠最新的技术，同瑞特为它生产一些车厢零部件 碳纤维的预浸料。
The most potent production Aston Martin ever made, the DBS represents the synthesis of raw power, race-bred technology and design excellence.

The DBS was developed as the ultimate expression of Aston Martin’s engineering and technical ability. The need for high-performance stability, handling ability and low kerb weight defined the car’s form and construction. The DBS is the first production Aston Martin to make extensive use of ultra-light carbon-fibre body panels. Its high levels of performance and control are delivered by the combination of inherent light weight, near-perfect weight distribution, a supremely powerful and flexible hand-crafted V12 engine, and a performance-honed six-speed transmission, together with new carbon ceramic brakes and an adaptive damper controlled suspension system.

NO RESTRICTIONS ON FORM OR SHAPE
Carbon-fibre panels are used for the boot enclosure, boot lid, door opening surrounds, front wings and bonnet, giving a saving of some 30 kg over more conventional materials without any reduction in strength. «There are no restrictions on form or shape in using carbon-fibre,» says Marek Reichman, Aston Martin’s Design Director, «and the material allowed us to wrap bodywork around the 20» wheels and maintain the precise relationship between the wheel and the bodywork.» Each panel has been carefully sculpted to direct the airflow around the car, into the engine and to help cool the braking system; the DBS bodywork is a harmonious composition of flowing, muscular forms.

OPTIMAL WEIGHT DISTRIBUTION
The carbon-fibre elements are produced using advanced manufacturing techniques developed from the aerospace and motorsport industries. Last year, the industrialization of these techniques were proven in the much discussed ALBOS – affordable lightweight body structures – project (see SHAPE volume 1) where Gurit as well as Aston Martin participated. The new panel-making procedure which Gurit (UK) applies in its new automotive parts production plant at Newport on the Isle of Wight delivers an industry-best surface finish, thanks to a patented «Surface Veil» process. The application of a 200 micron layer of epoxy and glass to the panel delivers a class-A surface that is in line with Aston Martin’s tradition of high-quality finishes.

Using the latest technologies, weight is kept to a minimum, with the front mid-mounted engine and rear mid-mounted transaxle ensuring a near perfect weight distribution: 85% of the car’s weight is positioned within its wheelbase. The combination of modern materials and traditional skills is an essential element of the Aston Martin experience. In the DBS, the fusion of power, beauty and soul is without equal.
A composite material is created when two or more materials are combined to create a material that has properties of all its ingredients. Modern fabrication methods combine glass or carbon fibres with a thermoset epoxy resin matrix, creating structures of exceptional strength and lightness.

Single-skin laminates made from glass, aramid or carbon fibres are very strong, yet they can lack stiffness due to their relatively low thickness. A sandwich structure of two high-strength skins and a core material is thus the ideal combination.

A composite panel can use core to stiffen it by separating and structurally connecting two stiff skins. This works in exactly the same way as a steel girder as illustrated below and in a composite, the separating section in an I-beam is provided by a structural core material. Without going into too much detail, the skins hold forces in tension and compression, whilst the core material holds shear. By inserting a lightweight structural core material into a composite laminate, the stiffness you can achieve for a given weight increases dramatically. This technology is used extensively in boats and wind turbine blades and enables the incredible performance of today’s modern structures. When making a structure from metal, the material is simply being shaped. When manufacturing a composite structure, the material is created at the same time as the structure. It is therefore very important to get the material processing right, maximizing quality and minimizing cost and waste. The science of doing this effectively is Gurit’s business and one that continues to develop rapidly. The most common fabrication processes are hand lay-up, resin infusion and prepreg.

These methods all have their strengths and weaknesses and are all suitable for the inclusion of core material to increase the stiffness of the finished component. The type of core suitable and the way it is prepared before inclusion into the laminate vary and Gurit have a range of materials and product formats suitable for every application.

Unique CoreCell features include:

- Closed-cell structures that will not act as a sponge absorbing water or moisture as honeycombs or balsa wood
- The inherently stable SAN polymers are highly resistant to many chemicals such as fuel oil or hydraulic fluids
- The fine foam cells reduce the amount of resin intake – and thus additional weight
- Extreme consistency from block to block in terms of density
- Lower tendency to out-gas
Die Corecell-Strukturschaumprodukte sind die idealen Materialien für die Sandwichbauweise.

泡沫芯材产品是理想的夹层结构材料。

The material properties of a structural core contribute to the performance of the finished component. Strength in compression and shear are the critical structural factors. The density of the material for any given structural properties is also important because it affects the weight of the finished component. A core’s elongation properties affect the fatigue and impact performance of a laminate, with more elongation causing more toughness and a more reliable structure. The processing properties are equally important, as they influence the cost, ease of manufacture and the quality of laminate in the final structure. A core material which does not absorb too much excess resin, isn’t too fragile to handle and can be thermoformed easily will allow fabrication of low cost, low weight, structurally efficient components.

The structural core materials used in the manufacture of boats and wind turbine blades are commonly balsa wood, honeycomb, and lightweight stiff foams made from PVC. Gurit’s Corecell is the only styrene acrylonitrile (SAN) foam available and has unique material and processing characteristics.

The Corecell range has been developed specifically to address the key issues facing marine and wind energy composite component manufacturers around structural performance and processing. In particular, the ease of use, low parasitic resin uptake and high degree of toughness make Corecell a very sought after core material for the modern composite fabricator.

The use of core materials is most common in high performance laminates. The industrialization of the composites business, particularly over the last decade, has seen huge growth in the use of core in increasing large and high performing structures. The market for core material has grown dramatically with huge demand from wind turbine blade manufacturers in particular. Gurit has doubled its corecell foam manufacturing capacity twice to keep up with this demand. Product developments around the unique corecell chemistry continue and demand from both wind energy and marine applications continues to build, with Gurit well positioned to benefit from their continued growth in this exciting area.

ULTRA-TOUGH CORECELL A AND P FOAMS
for Marine applications

- Top resistance to shear cracking and fatigue
- Withstands very high impacts and slamming loads
- Easily thermo-formable

ULTRA-RIGID CORECELL T AND K FOAMS
for wind, transportation and industrial applications

- Increased rigidity
- Stable to over 100 C

HIGH-PRESSURE BUOYANCY CORECELL S
for deep-sea applications

- High hydrostatic crush strength and water resistance
- Ultra-fine cell size
ENSURING THE SMOOTH FLOW OF TRAFFIC

Gurit materials help open up new dimensions in road construction. Pultruded reinforcements are used to extend the life span of existing bridges be it in the context of enhancing their load bearing capacities or in repair work. In new road infrastructures, the same kind of reinforcement elements are used to allow for ever wider spans between bridge pillars. Also, architects are increasingly discovering the fantastic properties of composite materials which open up new design dimensions.

Wherever you are, road travel is becoming more intense all the time and no one likes being slowed down or even held up by lengthy road works. Road engineers and builders are thus looking for ways to make existing infrastructure cope with ever increasing traffic loads without disturbing the flow of traffic too much.

MEETING TOMORROW’S TRAFFIC CHALLENGES

Gurit carbon reinforcement elements constitute one of the most successful answers to this challenge. These reinforcements consist of countless unidirectional carbon fibres which are embedded in a specially formulated resin. In a pultrusion process, the fibres are combined with the resin in a specially formed tool that gives the final product a uniform profile. Such composite reinforcement elements are extremely light, very homogenous, highly resistant to fatigue and corrosion and capable to cope with extreme mechanical loads. They can simply be bonded onto concrete girders and longitu- dinal beams of bridges and make them cope with the increasing traffic loads for an additional 20 years or so. Using such carbon elements, many pre-stressed concrete bridges that normally would have been demolished and rebuilt to cope with tomorrow’s traffic were upgraded without disrupting the normal flow of cars and lorries above.

Major construction material companies offer proven strengthening systems, including the respective regional administrative approval and accepted design guidelines, using these reinforcement elements. For many years already, Gurit has been cooperating in this field with the Swiss building materials company Sika.

NEW MATERIALS ENHANCE DESIGN

Permanently loaded Gurit CFRP reinforcement profiles as part of pre-stressing systems are gaining credibility for substantial load increase. Currently new carbon pre-stressed bridges are projected and promise faster construction time, material savings and more elegant design. Other applications of carbon reinforcement elements include repair of industrial chimneys, roofs, floors, balconies, stairs and timber beams. In addition, they are also ideal materials facilitating constructions in seismic active areas or other challenging conditions such as marine environments.

Markets: Marine, Sports and Civil Engineering

Pultrudierte Carbonlamellen machen Brücken stärker und verlängern ihre Nutzungsdauer.

用于桥梁中的拉挤薄层，使桥梁更坚固并可以延长使用寿命。
Taking a clean-sheet design for airlines’ operational needs of tomorrow, Airbus developed the A380 as the most spacious and efficient airliner ever conceived. This 525-seat aircraft, featuring a broad array of Gurit composite materials, will deliver an unparalleled level of comfort while retaining all the benefits of commonality with Airbus’ other fly-by-wire aircraft families.

Airbus is the first jetliner manufacturer to be certified to international environmental standards ISO 14001, for full lifecycle coverage, including all products and manufacturing plants. The A380 has been a catalyst for innovative new technologies and a new way of “working together” across the industry. Airbus negotiates environmental requirements in contractual agreements with suppliers and actively spreads environmental best practices within the supply chain. Airbus’ design philosophy is based on the whole life cycle of an aircraft, from the initial concept to its end of life.

The A380 burns 17 per cent less fuel per seat than today’s largest aircraft. This is the most significant step forward in reducing aircraft fuel burn and resultant emissions in four decades. Low fuel burn means low CO₂ emissions. In fact the A380 produces only 75g of CO₂ per passenger and per km, almost half of the target set by the European Union for cars manufactured in 2008. With the A380, which offers more space per passenger in all classes, CO₂ footprint per passenger has never been so small.

This progress is possible thanks to advances on many fronts. The A380 has an efficient structure that incorporates more new material than any other jetliner, with composite and other lightweight materials accounting for more than 25 per cent of its structure. Gurit is proud to supply a broad array of ultra-light, stiff, strong and durable composite materials, mostly for the jetliner’s interiors.

Low-noise characteristics have been a major design driver for the A380. As a result the aircraft is significantly quieter than other large aircraft and offers substantial margins in relation to the latest noise limits. But the A380 is not only the quietest aircraft on the outside. The A380 cabin is the quietest cabin in the sky. Reducing cabin noise levels increases passenger comfort and well-being, and is an important factor in limiting the fatigue normally associated with long haul travel. The A380 flight deck is also the quietest in the skies, improving working conditions for the flight crew.

The combination of 21st Century aerodynamic standards and advanced digital design tools enable the A380 to offer unsurpassable performance standards. A highly efficient wing design allows the A380 to take-off and land in less distance than today’s largest aircraft. As a result the A380 uses existing runways while carrying 40 per cent more passengers per flight.

**GREENER, CLEANER, QUIETER, SMARTER**

**A380 IS READY FOR TAKE OFF!**
The prototyping facility allows Gurit to demonstrate its new materials on commercial projects and maximize the potential benefits for customers.

ATLANTIC 85 BOAT DEVELOPMENT USING ST70 SPRINT® AND POLYESTER GELCOAT

One of the first projects undertaken by the Prototyping Facility at Gurit was the redesign and build of an Atlantic 85 rescue craft for the RNLI (UK Royal Navy Lifeboat Institute). Gurit used the latest carbon epoxy technology and manufacturing techniques to convert the manufacturing method from more traditional wood and polyester. The result was a higher performance boat, 20% larger than the previous model, with a 25% reduction in structural weight, and for an equivalent manufacturing cost.

Following the success of the Atlantic 85 project, Gurit strived to improve the process even further. With the launch of the new low temperature curing SPRINT® ST70 in March 2007, the opportunity to reduce the build time and costs through the use of standard polyester gelcoats became viable. Previous RIBs (Rubber Inflatable Boats) in the Atlantic 85 series were manufactured with Gurit’s ST95 SPRINT® and CR3400, an epoxy in mould priming gelcoat. The first Atlantic 85 prototyping project had seen manufacturing times reduce from 13 weeks for traditional materials and construction techniques, to just over 4 weeks with the new technology. The hulls and deck had typically taken Gurit two weeks to manufacture to the point of painting, before being sent to the paint shop for a further two weeks for completion of the finishing process. Therefore, there was a strong desire to eliminate the painting process.

With the development of SPRINT® ST70 Gurit were able to use a standard in-mould polyester gelcoat combined with a vinylester tie coat, to eliminate the post painting operation. Polyester gelcoats provide a more durable and maintainable surface, which is particularly suitable for the function of this boat. This surfacing method had previously been unsuitable for SPRINT® or prepreg boats, due to the high cure temperatures required to cure the laminates. The ability to cure at 70°C reduces the differential shrinkage between the laminate, gelcoat, and tie coat, providing a robust high quality surfacing solution.

The first two days of an ST70 build are more intensive compared to a ST95 build, as the second gelcoat layer and the tiecoat plies add extra manufacturing steps. The ST70 deck and all internal components are made in precisely the same way as the previous ST95 boats, simply substituting ST70 materials for the ST95.
The additional manufacturing steps take approximately 6 hours longer to lay-up than the previous method, but the key benefit of using a polyester gelcoat is the removal of the painting process and the subsequent time and cost reductions in manufacture. The ST70 hull uses gelcoat and vinylester at a cost of less than £150, which compares favourably with the painting costs of over £3000 for a SPRINT® ST95 boat. Furthermore, a further 2 weeks were removed from the manufacturing schedule.

The prototyping facility was created to demonstrate that an integrated approach to engineering, materials selection, and manufacturing processes can produce market leading composite solutions. The development of the RNLI Atlantic 85 using the latest technology from Gurit has demonstrated that significant improvements in manufacturing costs and component performance can be achieved when using a holistic approach.

The addition of new materials to the development process has provided further gains in manufacturing and performance, including and not limited to, the following benefits:

- Decreased differential shrinkage when used with polyester gelcoat/vinylester tie coat method enabling the removal of external painting/coating process
- Lower energy requirements during the cure cycle and therefore lower specification oven/heating systems
- Lower specification tooling requirements – enabling SPRINT technology in some existing polyester tools
- Greater flexibility in the choice of core materials through lower temperature stability requirements

The RNLI are currently undertaking sea trials of the ST70 rib and they are optimistic that future Atlantic 85's will be built using this method.
Being Gurit

TWO KINDS OF KNOWLEDGE TRANSFER
James Taylor, a quality engineer normally working at Gurit (UK) on the Isle of Wight has been away from home for his 6th week, when we spoke to him in China. Providing training for the local team of quality technicians at Gurit (Tianjin), James also experiences a lot of new and fascinating aspects of what it means to be in China.

“My main task is to train the local quality technicians here at Gurit (Tianjin). More and more, I can step back from that role and be more of a bridge for communication between China and Europe.”

Asked how he communicates with the Chinese, James comments: «Our workers here are very skilled and well educated. Some do speak English; communication, however, is an issue. And this is not only true for words. I quickly found out, that we even count in different ways with fingers. My local colleagues here count to ten by different hand signs with one hand. I now know some basic sentences in Chinese, but to facilitate communication, I have made an incredible number of drawings to explain things.»

James is fascinated by all the new things he experiences and the speed of change he sees in Tianjin and in China. «I try to be open for all the new things: even if it is dried duck blood cubes for lunch at our canteen.» James is planning to stay in China now for a year and he

GURIT SUPPORTS FORMULA SAE TEAMS
Formula SAE is an international motor racing competition between universities. Just like Formula 1 cars, these racing cars also rely on the latest material technology and provide students an excellent opportunity to familiarize themselves with the unique properties of prepregs. Gurit currently supports Formula SAE teams both in North America and in Australia. Simon Grosser comments: “It is fascinating to see the enthusiasm of the students striving for maximum performance. It is an honour for Gurit to support racing teams from all over the world with our high-performance materials.” At the Formula SAE event in Romeo, Michigan, the University of Western Australia’s vehicle performed superbly and finished the event in second place overall behind the car from the University of Wisconsin, Madison, in a field of 130 international teams. The chassis, body and appendages of the University of Western Australia vehicle are all made of Gurit prepregs.

James trains the local production and quality technician colleagues.
Carter Zhang is production manager at Gurit (Tianjin). Composites were a new field for him. He enjoyed the hands-on knowledge transfer by visiting other Gurit sites in the UK and in Canada.

«I joined Gurit in March. Production was set to roll on in summer, so I needed to learn fast», says Carter Zhang who is in charge of production, maintenance and process and workshop planning at Gurit (Tianjin). The composites industry was new for him and the best and fastest way to learn as much as possible was a hands-on approach: Only a few days after starting his new job at Gurit, he went to Canada for a week to study the expansion and kitting processes for structural foam products. «Having a chance to meet my colleagues in Canada helped me a lot in understanding the production process I was to set up and structure back in Tianjin. It was a very fast way of learning and it is good to know the people I need to talk to doing my job back in China», says Carter who has learnt to speak English in China before, mostly working with ex-patriate colleagues in previous jobs. In May, Carter went together with other colleagues from Gurit (Tianjin) to the UK to learn more about the critical details in prepreg production. «We all got very good training from the colleagues in Newport, too.»

Besides the many hours he eagerly spent on the shop floor and in the quality labs, Carter could also fit in some sight-seeing. «My local colleagues did show me around. On my second visit to Canada in June, the snow had gone and we could go out on a boat. In the UK, we went to the local pub for a beer, of course, and I've spent a day in London. Now I know what people refer to as English weather.» What about western food? «Well, … it's good to try, but very different from Chinese food.»

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GURIT AGENDA 2008

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:

» ISPO, Munich, 27–30 January
» India Composites, Bombay, 7–9 February
» Aircraft Interiors, Hamburg, 1–3 April
» JEC, Paris, 1–3 April
» Wind Power Asia, Beijing, 24–26 June
» SPE Automotive, Detroit, September
» Monaco Yacht Show, Monaco, 24–27 September
» China Composites, Shanghai, 17–19 September
» IBEX, Miami, US, 6–8 October
» METS, Amsterdam, 18–20 November