

AMBITIONS

A dive into Sika's world



LIGHTWEIGHTING VEHICLES

More energy for less fuel

50

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Discover the other side of
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Security from salt water

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AMBITIONS ISSUE #27

BUILDING TRUST



PROGRESSION



ASTRID SCHNEIDER
Marketing & Product
Communications Manager
Sika Services

Progression is a term used in mathematics, music, astrology and semantics, but the element common to all of these fields is that the act of progressing symbolizes forward or onward movement. There is no taking a step back. Progression stands for a swing in forward-thinking development. Change is therefore part of the process. Whether in terms of the economy, technology or construction markets, progression is fast. Digitalization of working tools and processes plus new innovations in technical sectors is a driving development forward at a rapid pace. For instance, there are one billion registered passenger vehicles on the road today. As more vehicles are produced with a concomitant rise in energy consumption and CO2 emissions, consumers and government regulators alike are demanding greater fuel economy. But while a few grams of CO2 or a little material or energy saved by shaving several kilograms off one vehicle's weight may seem modest, the results are significant over the millions of new cars manufactured every year. Indeed, in automotive markets we are witnessing a long-coming trend in vehicle lightweighting (p. 50).

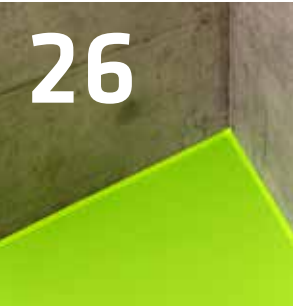
Building infrastructure also serves to develop a region. The terminal of the Port of Leixões in Portugal was built specifically for cruise ships conceived with the purpose of re-launching and boosting local tourism and developing the urban character of the location (p. 5).

When it comes to progress, energy is also a much discussed topic. The first wind farm in South Africa (p. 44) is now one of the largest in the whole country. Located 100 km northwest of Cape Town, it can produce enough power every year to cover the demand from around 200,000 South African homes.

Yours sincerely,

ASTRID SCHNEIDER

AMBITIONS #27 2017



CONTRIBUTORS



JULIE PIKE
Senior Marketing Specialist,
Sika New Zealand

Sika New Zealand has a great work environment. There is a lot of encouragement to try new ideas and a lot of trust to simply let you get on with doing your best.



DUNCAN ROBERTSON
Marketing & Communications
Manager, Sika New Zealand

Though far away from many Sika colleagues, me and Julie Pike have together developed marketing campaigns that have now been adapted for USA, Europe, Canada, Asia, Australia and South America.



DOBRIVOJE (BOBBY) JOVANOVIĆ
Global Product Marketing Manager,
Sika Automotive AG

I have been involved in numerous advanced mixed-material bonding projects using SikaPower adhesive. Vehicles lightweighting will be even more important in the future than it is now.



MARLENE MORIN
Marketing Manager Interior
Finishing, Sika USA

I've always been amazed by the involvement and commitment our partners put into their work. I think "With My Summer with Sika" is an excellent reflection of their passion.

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900,000 CERAMIC TILES FOR A NEW CRUISE TERMINAL

Ports have long played a vital role in the international transport system, but have become increasingly important since the second half of the twentieth century with the rapid globalization of the world economy and expansion of world trade.

TEXT: JESSICA AUDINO, ASTRID SCHNEIDER
PHOTO: FERNANDO GUERRA

Leixões is the second most important Portuguese national port in terms of container traffic and is going to play an important role under Europe's new commercial strategy.

> Nowadays ports are not just a transferring point between different modes of transport, but also logistics hubs and centers in global passenger or freight transport chains. High port and other transport costs can act as barriers to trade. If transport can be organized efficiently, that is all the better.

The terminal of the Port of Leixões, Portugal, inaugurated on July 23, 2015, is located in the Matosinhos municipality close to the city of Porto in the northern region of Portugal. This terminal was built specifically for cruise ships. Conceived with the purpose of re-launching and boosting local tourism and developing the urban character of the location, the new terminal building sits upon a 340 m long quay and includes a pedestrian access path for the general public and passengers. Leixões is the second most important national port in terms of container traffic and is going to play an important role under Europe's new commercial strategy as well. Three important connections depart from the main building, which has a floor area of around 1,500 m²: the new pier for cruise ships, the new nautical recreational port for vessels, and the new road system to access the city.

The main building hosts the passenger station building, a plaza, a gallery museum with laboratories to promote the University of Porto's Science and Technology Park of the Sea, an aquarium, an underground garage, meeting rooms, a restaurant and a large covered amphitheater with a captivating view of the ocean.

The urban plan extends over a public space of around 5 hectares with approximately 19,000 m² of construction area, including the port and the pier extension, with the building located at the end of the pier. The building was designed in the shape of a helical spiral moving from sea level in a continuous alternation of glazed and opaque surfaces to create a structure with 4 levels. The winding shapes of the

>

More than 4,000 t of steel were used, as well as 20,000 m3 of concrete, 6,700 m² of glass and 900,000 tiles in six different shapes.





Because of uneasy access on vertical surfaces, installers could cover only 5 m² per day per person.

- > new building attract visitors through a kind of centripetal force that drives them towards the great central hall, which is imbued with filtered light, on what feels like a voyage to the open sea.

The total cost of the project (studies began in 2003) was around 26 million euros, with an initial budget of 28.3 million euros. The project was funded by the EU with the aim of boosting the local economy, which is based on maritime traffic and tourism.

More than 4,000 t of steel were used to build the terminal, as well as 20,000 m³ of concrete, 6,700 m² of glass and 900,000 tiles in six different shapes. This project won the 2016 AZ Award (international architecture and design category) in Toronto. The book *Terminal de Cruzeiros de Leixões*, edited by the project architect Luis Pedro Silva, was published worldwide in March 2016.

The project manager for the main build-

ing of the New Cruise Terminal Port of Leixões wanted to install ceramic tiles of a different thickness and shape on the interior and exterior concrete walls, and flat tiles for the ceiling. The tiles needed to be fixed without sealant with a gap of 2 – 3 mm. Locational factors such as exposure to chloride attack from seawater, temperature variations and thermal expansion had to be incorporated into the design.

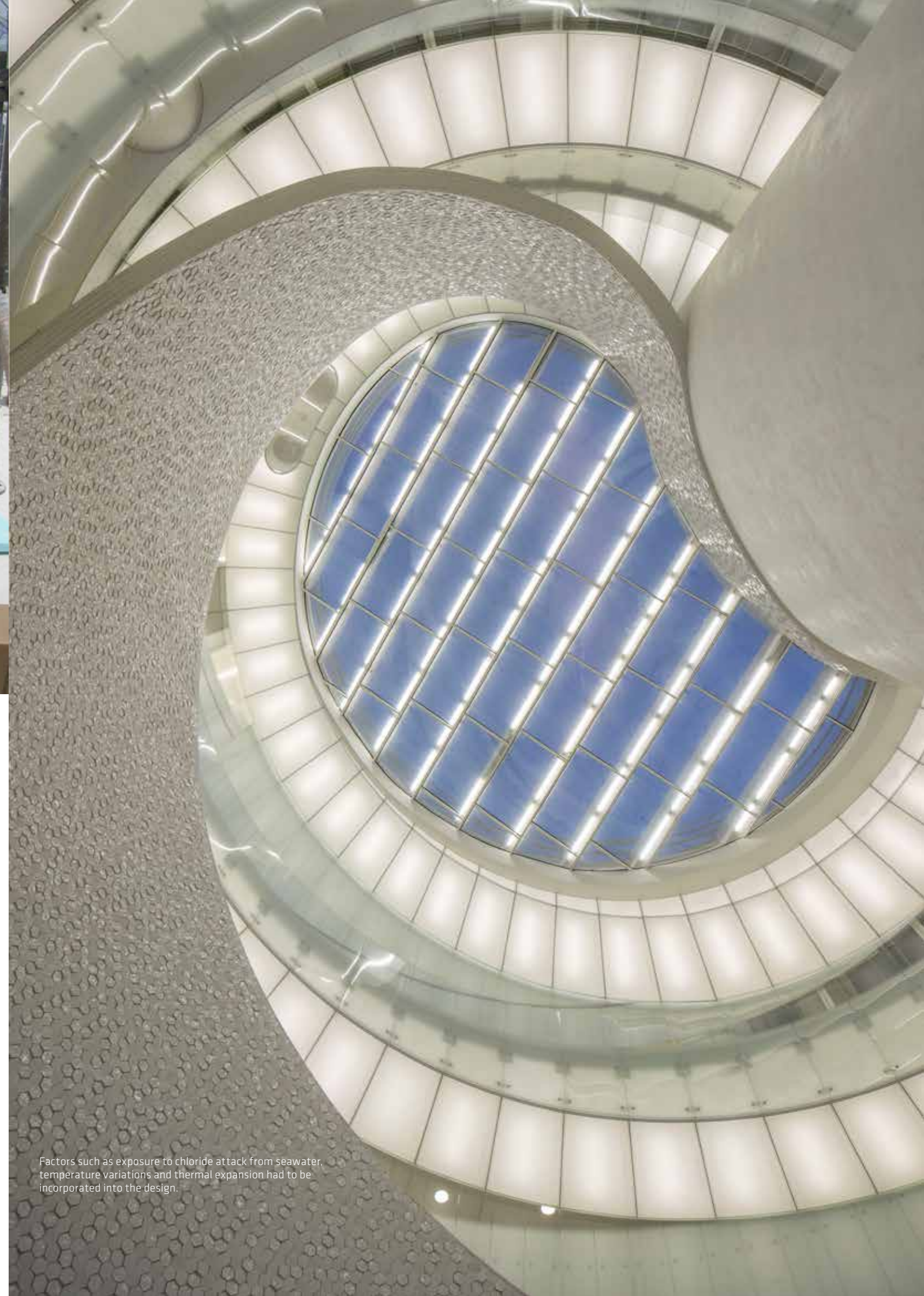
A solution permitting the installation of 900,000 ceramic tiles in six different shapes needed to be identified. Fixing posed considerable difficulties given the type of substrate and the uneasy access on vertical surfaces. This meant that installers could cover only 5 m² per day per person. The combination of challenges led to a series of cost management issues with keeping to the construction and maintenance budget.

Following an analysis of the substrate conditions (concrete curing, pull-off

tests, compressive strength), a method statement was defined. Primarily, it included water or sand blasting of the substrate to eliminate all dust and any traces of form release agents, as well as the mechanical removal of all protuberances and imperfections due to formwork in order to have a flawlessly smooth surface suitable for promoting complete adhesion of the tiles to the substrate, which was supposed to be perfectly dry.

Mainly hexagonal tiles of 15 cm diameter and of varying thickness and shape were used for the exterior and interior wall tiling. They were laid with no grout, minimizing the use of adhesive (which was employed as a leveling agent) and also maximizing the three-dimensional and light-dark effects. Adhesion of the Technokolla adhesive ALL-9000 to the cast-in-place concrete and tiles was excellent, due also to the fact that the glue has no vertical slippage.

>



Factors such as exposure to chloride attack from seawater, temperature variations and thermal expansion had to be incorporated into the design.



The project won the 2016 AZ Award in Toronto.

> As far as the adhesion of the tiles to the wall was concerned, the procedure was as follows:

- Very slight leveling with Technokol-la ALL-9000 by applying it with a minimal thickness in order to prevent blistering or imperfections on the surface of the adhesive.
- Installation of the tiles (after waiting at least 24 h) by spreading the adhesive first with a notched trowel (4 – 5 mm), then with a smooth trowel to ensure a continuous, even layer of adhesive (around 2 mm thickness) on the surface.
- Application of the adhesive also on the edges of the back of the tiles by using a small spatula.
- Then installation (with due pressure) of the tiles on the substrate previously leveled.
- The tiles were not fixed close to each other; a minimum gap between them (2/3 approx.) was ensured through the use of spacers.

- Any excess adhesive on the sides or surface of the tiles was removed with a cloth soaked in ethyl alcohol when the adhesive was still fresh.

As regards the procedure for bonding the ceiling, Sika recommended the same installation procedure described previously (without following point 3). In this case, the still fresh adhesive was able to bear the weight of the tiles since they were installed on a flat surface, unlike those installed on the walls. Rasolastik, a two-component cement-based waterproofing product, was used in the pedestrian access ramps leading from the building to the sea – the areas with the greatest exposure to chlorides.

The Port of Leixões, part of the Trans-European Core Transport Network, serves as the main sea gateway to Porto – a popular tourist destination – and to the country's northern region. However, the port's cruise facilities for both ships and passengers were too small to accom-

modate the average size of ships that are currently used in the cruise market. The "New Cruise Terminal for the Port of Leixões" project is positioning the region as a port of call for international cruise ships and luxury ocean liners, thus bolstering the local tourism industry. By investing in a completely new cruise terminal and all its facilities, the Port of Leixões now serves as a hub for Porto's diverse marine-based economy. <

For more information about the project, please visit:
<https://divisare.com/projects/308178-luis-pedro-silva-fernando-guerra-fg-sg-Leixoes-cruise-terminal-oporto>
<http://afasiaarchzine.com/2016/01/luis-pedro-silva-3/>

Astonishing design: cruise ship tourists have a closer look at the tiles.

Literature:

José Manuel das Neves,
 Terminal de Cruzeiros de Leixões Porto
 Cruise Terminal Leixões, Matosinhos Luís
 Pedro Silva, Uzina Books, 2016.

More about Sika Italy:
www.sika.it.com



WHAT ABOUT NEW ZEALAND?

New Zealand presents a mix of landscapes and unique cultures. There are just 4.6 million New Zealanders, scattered across 268 km²: bigger than the UK with one-fourteenth the population. Filling in the gaps are the sublime forests, mountains, lakes, beaches and fiords. New Zealand's 14 national parks showcase more than 30,000 km² of diverse, natural scenery ready to explore by foot, boat, car or air. We skip Middle-earth and fly directly to Auckland, where we meet Mike Edwards, the General Manager of Sika New Zealand.

TEXT: DUNCAN ROBERTSON, ASTRID SCHNEIDER
PHOTO: DUNCAN ROBERTSON, SIKA NEW ZEALAND, I-STOCK

> **What are your personal secrets for managing a team?**

Perhaps my only secret is to try not to have secrets with my team. It is important that our goals are agreed to, openly communicated and frequently referred to.

I believe that people will rise to a challenge and that they truly want our business to prosper. We have a strong team in NZ and I am very proud of how hard they work to exceed our customers' expectations. Every day I see examples of our team going the extra mile to help our customers succeed.

What is the first thing that comes to mind when you think of working in NZ?

That all my Sika friends from around the world would like to visit us. Whenever I'm at a corporate meeting, many people express a desire to come to NZ. The distance, of course, is an issue. Apart from our Australian cousins, we're at least 10 hours flying time from our next nearest neighbor.

In 2015 NZ was ranked by the World Bank as the easiest place in the world to start a business and the world's second easiest country to do business in generally. In addition in 2014 the country came in third in Forbes' 'Best Country for Business' report, just behind Den-

mark and Hong Kong. What is NZ's secret?

In general these surveys consider how government regulations enhance or constrain business activity. NZ is a very fair place to do business, with strong business regulations. Property rights are protected, services such as electricity and water are secure, contracts are enforced, etc.

We have very low levels of corruption in NZ. In Sika we commit worldwide to our Code of Conduct, and one of our main themes was how lucky we are to operate in a country with little corruption and therefore how extra vigilant we need to be against bribery or corruption.



The Fjordland National Park provides amazingly photogenic landscapes



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2



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- 1 Scenic vineyards.
- 2 Transparent waters of Haast River.
- 3 Big fishes for a small fisherman.

And the construction market? Where exactly does NZ profit from Sika?

Sika NZ is a very mature company operating in a very mature market. We have been in NZ for over 50 years and are the number one or number two suppliers in most of our markets. We are a very well

known, well trusted brand, with a reputation for quality products and excellent service.

NZ profits from our years of knowledge in this market, the expertise of our technical sales team, the wide product

range we offer and the global expertise we can draw on from our corporate support teams and our more than 95 sister companies.

>

IT IS PEOPLE THAT ENRICH OUR LIVES

Christchurch tragically had to go through various vast earthquakes in the last years. How Sika supports the rebuild which is highly ranked on estate agenda?

- > The Canterbury earthquakes in 2010 and 2011 devastated the Central Business District of Christchurch. Some 5 years later there are still vast areas of the CBD that are desolate.

Our team in Christchurch has done an incredible job supporting the Christchurch rebuild, while they and their families were still living through the earthquakes and the more than ten thousand aftershocks that followed.

Shortly after the main earthquakes our technical sales team was using its expertise in refurbishment to support the repair of earthquake damaged buildings. Gradually the rebuild has shifted from repair of damaged buildings to the construction of new buildings, and our focus has moved from refurbishment to basement-to-roof waterproofing, with our teams in Waterproofing, Sealing and Bonding and Roofing.

What are the immediate goals for Sika NZ?

Of course we have our financial goals, that's a given, but we also have many goals focused on continuous improvement of our business processes. In 2017 we will have a strong focus on training right across the business, from up skilling the technical knowledge of our Customer Service team to rolling out the Management Training Classic program to our middle Managers.

We will continue to focus on selling complete solutions rather than individual products.

The Australian writer Charles Rawlings-

Way every trip to NZ wrote: The rolling hills and hedgerows collude with the irreverent, easygoing locals to disarm, distract and delight. Māori culture is potent, the surf is world class, and the craft beer is awesome. He states, the country presents the best of old and new worlds with social and environmental sensibility: a template for a new world order, perhaps? Does this come close to what NZ is about?

I would like to think we can live up to such an evocative description.

Certainly the landscape is very varied. From my home in Auckland I could be, in an hour, surfing at a rugged west coast beach, lying on a lovely white sand beach on the east coast, enjoying a glass of award winning chardonnay at a local vineyard, or tramping along native forest trails.

"Kiwis" work hard, but also treasure their personal time, and we can pride ourselves on being good hosts to our many visitors.

What is it that you personally enjoy the most about life in NZ?

While we have many things to enjoy in NZ, in terms of our natural environment, our stable political situation, our relative prosperity, etc., it is people that enrich our lives. For me NZ means family, friends and the great team of people at Sika NZ.

What are your aspirations for your country looking forward?

We have so many things to be thankful for. In particular, NZ is well known and admired for its natural beauty, and future governments will be judged by how well they balance growth and development with the protection of these unique natural assets. Sustainability should be a key focus for all New Zealanders.



1



Mike Edwards,
General Manager of
Sika New Zealand

1 Skyline of Auckland.
2 Team of Sika New
Zealand.



2



Seventeen years after its completion, the pool was not in good shape. The substrate was crumbling, steel rusting, tiles surrounding the pool were lifting and the pool was leaking. Calcium carbonate had even leached down on to a resident's Ferrari parked two floors below. Time for action!

METROPOLIS SWIMMING POOL

The 40 story Metropolis occupies a prime site in the heart of Auckland's Central Business District. It is the tallest apartment building in New Zealand. One of its many luxury amenities is a 22 m heated swimming pool on the 8th floor.



Minimal disruption to the Metropolis's many permanent residents was essential. Dust, noise, water, fumes and foot traffic all had to be kept to an absolute minimum.

No product could be carried through the lobby or other guest areas. Every single

bag of Waterproofing and Adhesive (5 pallets of waterproofing, 10 pallets of Sika Screed Binder and 7 pallets of Sikaceram-255 LD) had to be carried to the pool area one at a time via external scaffolding.



The pool, spa, sauna and Jacuzzi were all repaired and retiled. So too were all the tiles surrounding these areas. Even the inside of the huge ballast tank had to be repaired then retiled.



The client's brief was for a smooth but slip resistant, hard wearing surface that would withstand all the heavy duty requirements of a vehicle workshop floor yet have the appearance and easy clean finish of a showroom floor.



New Zealand Specialised Coatings is New Zealand's largest Sika approved applicator and has a wealth of experience in applying specialised flooring systems. NZSC used Sikafloor-264 with Sikaglaz PU for this quality project.



All photos supplied by NZ Specialised Coatings & DigPro Photography

HAMILTON BMW WORKSHOP FLOOR

Combes Johnston BMW in Hamilton city is one of New Zealand's leading BMW dealerships. After 25 years in the same location, this year the entire dealership moved to new, purpose built "future retail" premises. A key feature of the new location is the new service and workshop facility, which naturally required a premium floor befitting the BMW brand.

The finished floor, together with the BMW Factory fittings, looks amazing and the feedback from the service technicians who work in this environment is that together Sika and NZSC delivered the ultimate flooring surface for their ultimate driving machines.



Photo by Waterview Connection

Strict performance criteria had to be met including specific Light Reflective Value (LRV) and fire performance standards. The coating also needed to be resistant to carbonation from car exhausts and robust enough to withstand both pressure washing as well as the emergency deluge sprinkler systems.

Delivery times played a major role in product selection – the Specialist Applicator needed a product that could be easily applied in rapid succession to keep to the strict schedules for completion.

SIKA WATERVIEW TUNNEL BLACK OUT

The \$NZ 1.4 billion Waterview Connection motorway project is one of the biggest transport infrastructure developments in New Zealand. Half of the new motorway is underground. Two 2.4 km tunnels will each carry three lanes of traffic. Sika NZ has had a very high involvement on this project. Each of the 10 tonne tunnel segments was made using Sika ViscoCrete admixture and there are 24,000 of them!



One of the final stages of the project has been to paint the ceilings of the tunnels black, an important safety requirement as it eliminates glare and helps focus drivers' eyes on the road. Sikagard-Wallcoat T was chosen to cover over 90,000 m² of tunnel walls.

SIKA HYBRID CATHODE PROTECTION

In 2016 Sika NZ was awarded the contract to provide a state of the art hybrid corrosion protection system on concrete support piles under major highway bridges in Auckland. The SH16 Whau River Bridge was the first bridge to have the Sika Hybrid Cathode Protection System installed. Some of the original piles had been installed over 40 years ago so some degradation had taken place.

Repairing marine structures is especially problematic when they have been made of reinforced concrete. Heavy wear and abrasion from wave action and inter-tidal challenges mean chloride-induced corrosion can advance very quickly.

Ease of installation in difficult to access areas is a big advantage of the Sika Hybrid Cathode Protection System.



The system combines elements of re-alkalisation, cathodic protection and galvanic protection which are applied as an overall "global" or targeted protection system for the concrete element or structure. Hybrid anodes are installed in drilled holes and connected via titanium wire.

FROM BASEMENT TO ROOF

Sika has a decentralized, flat organizational structure, which is designed to empower employees, promote collaborative working and encourage information exchange and innovation. “Customer first” is a cornerstone of the group values; Sika understands that it is its own people who provide the maximum benefit to its customers every day.

TEXT: MONIKA ZIGERLIG, ASTRID SCHNEIDER
PHOTO: RICARDO GOMEZ

> To support this, a working environment that includes all of the necessary equipment, services and connections is fundamental. Therefore the alignment of Sika's values with its organizational structure and processes that are designed for team working, together with a work environment created to enhance satisfaction, improve performance and increase competitiveness in this rapidly changing world.

The headquarters of Sika are located in the Altstetten District of Zurich. The complex includes production, research and development, a site services center and a multi-story car park, plus various buildings for sales and marketing departments with extensive training facilities. With the new building a key objective was to centralize the Construction Sales divisions of the organization, with other key departments, which had been locally separated before. The aim is to fully exploit the synergies of working together.

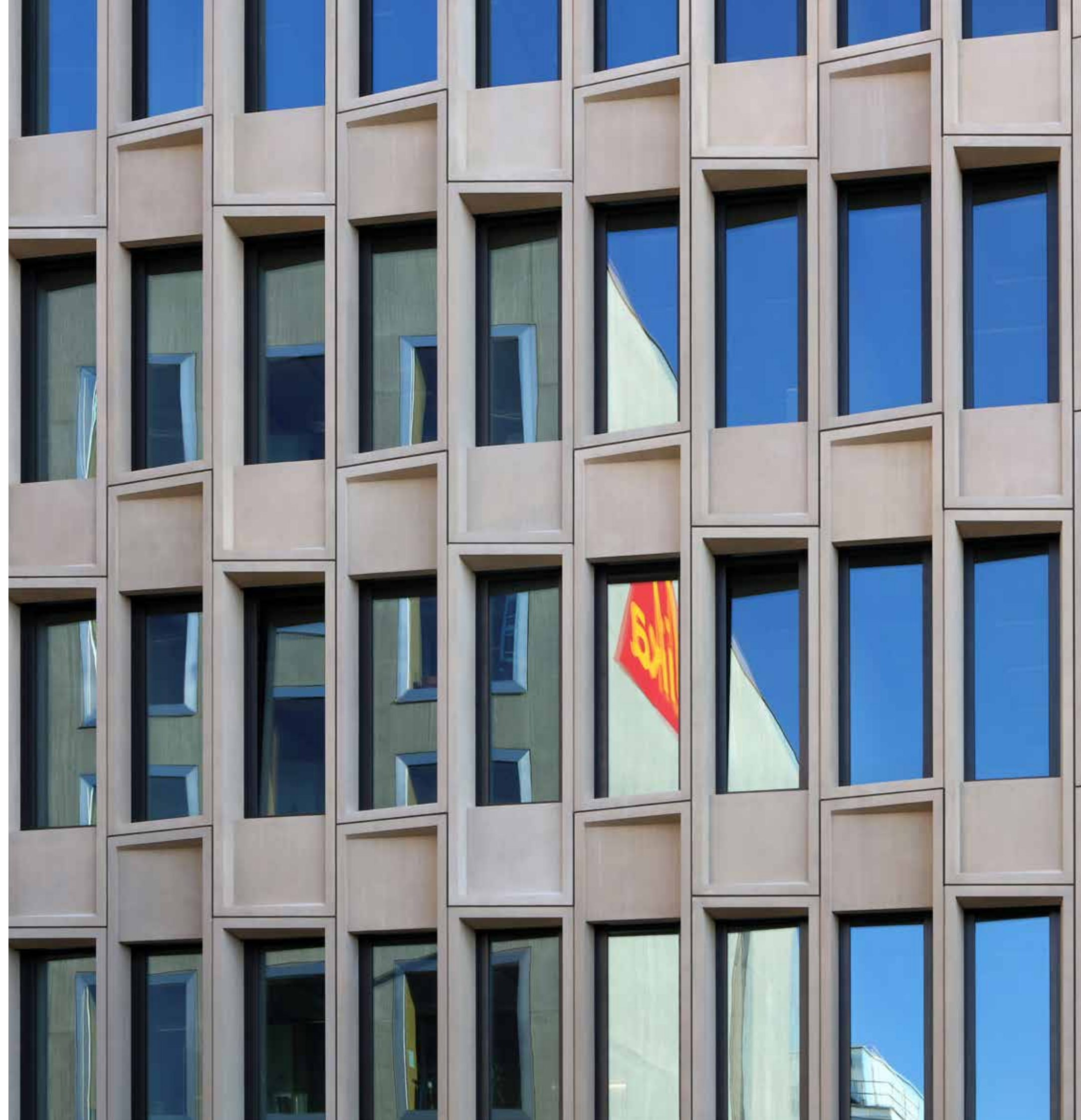
New workplace concepts were introduced to support this collaborative working and

information exchange, by facilitating contact between the members of different departments and working groups. The Limmat Building building is designed to accommodate up to 300 employees. There are also new laboratories and a product demonstration and application center, plus a restaurant for staff and visitors.

The building design is based on the flexible use of space for multiple functions, reflecting the Group's core competencies: sealing, bonding, damping, reinforcing and protecting; all this is materialized in this new building, following and communicating the business objectives throughout the physical space. The staff and visitors are at the center of the building's conception.

Bright, open and a pleasant working environment, with as much natural light as possible and supporting spaces for social contact are all provided. Technologies to support sustainability according to Minergie (Swiss) international stan-

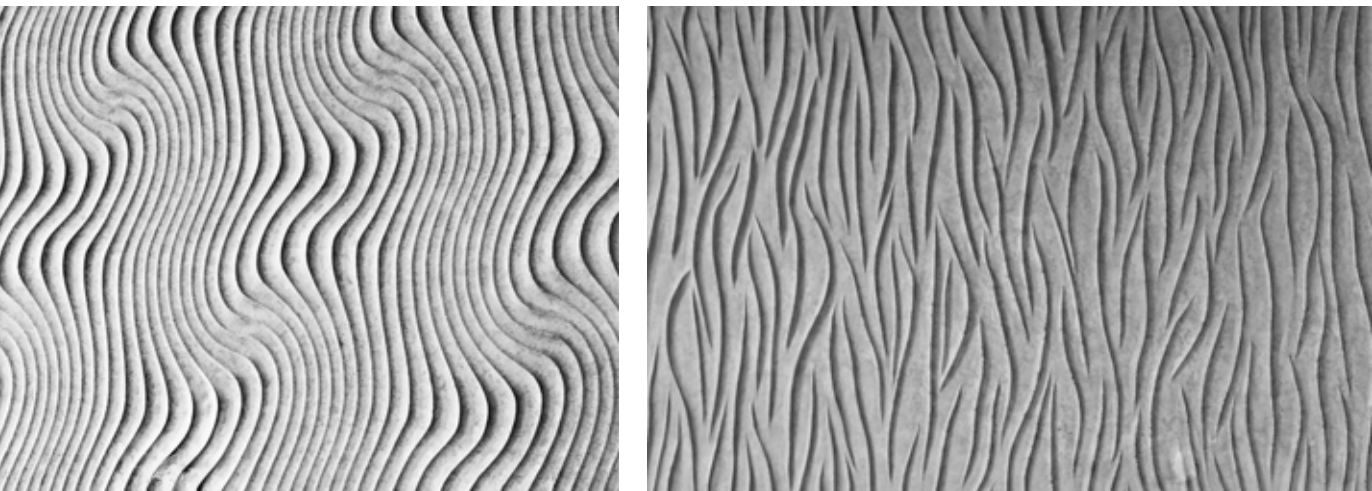
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To achieve a perfect seal at the junctions between facade and concrete units, the Sika Membran® waterproofing system was bonded around each unit. This system provides inter alia a reliable barrier against wind and moisture as well as prevents condensation.

CONCRETE ASSUMES A WIDE VARIETY OF GUISES: DISCREETLY TINTED OR BLACK-COLORED ON THE FACADE, IN A NATURAL GREY HUE IN THE CORRIDORS, STAIRWELLS AND OFFICE SPACES



dards, including for example the installation of PV Solar arrays, are also deployed extensively and integral to this building. The new working concepts applied in the Limmat have the layout of the workplace as a combi-office or cocoon office format. Enclosed workplaces are located at the front of the building for individuals on concentrated work, with open plan offices and meeting rooms for team and project work. Training and teaching areas are included to create a comfortable and attractive environment. Overall the design supports focus, collaborative working, interaction and knowledge transfer.

Sika solutions feature throughout the building: from the tanking membrane to the concrete facade, from floor coverings and bonded windows to the roof membrane. In all, over 60 Sika products and systems from all business areas contributed to the success of the Limmat Building project. Concrete assumes a wide variety of guises: discreetly tinted or black-colored on the facade, in a natural grey hue in the corridors, stairwells and office spaces. The "creative" wall finishes in the coffee break rooms, which recall blades of grass swaying in the wind or waves rippling onto a beach, add a universal quality to the spatial experience. Nor is there any lack of vibrant color in the building: the flooring in the coffee

>



The "creative" wall finishes in the coffee break rooms, add a universal quality to the spatial experience.



There isn't any lack of vibrant color in the building; the flooring in the coffee lounges, for example, shine in a refreshing green.



1



3

- 1** The restaurant is designed for 150 seats. In good weather the large windows open to the roof terrace.
- 2** Wood floor bonding in the restaurant area.
- 3** For most of the floors Sika ComfortFloor® was used, some areas with optional color flakes.



2





The sloped metal roof is waterproofed by Sarnafil® TG66-15 membrane system including 2 layers of mineral wool thermal insulation.

> lounges, for example, shine in a refreshing green.

Given that the Limmat Building also includes high-grade laboratory, training and presentation facilities at basement level, absolute watertightness was essential. The concrete fabric was waterproofed with the SikaProof® A fresh-concrete-embedded membrane, which offers proven resistance to lateral water underflow. The membrane was installed in conjunction with various Sika system solutions for joint sealing, pipe penetrations and other details. Precast color concrete units enter into a harmonious symbiosis with the idiosyncratic glass facade. To achieve a perfect

seal at the junctions between facade and concrete units, the Sika Membran® waterproofing system was bonded around each unit. This system provides a reliable barrier against wind and moisture, prevents condensation, serves to mitigate thermal bridging and heat losses, and thus helps to maintain comfortable indoor environmental conditions throughout the year.

The Limmat Building is topped by a steel roof structure. To guard against damage from long-term environmental action, the steelwork was finished with a gray (RAL 7046) SikaCor® corrosion protection coating. A Sarnafil® membrane was installed on the flat roof area, which

serves as the staff restaurant terrace, to protect the rooms below. The waterproof membrane was mechanically fixed and ballasted by a gravel layer to prevent wind uplift and reduce weather exposure. The pitched metal roof was waterproofed with a Sarnafil® TG membrane and also incorporates two layers of thermal insulation. The photovoltaic panels are able to generate an impressive 110,000 KWh of electricity.

As of spring, the fifth-floor restaurant with its huge outdoor terrace will allow employees to eat lunch while enjoying magnificent views of the river and vineyards opposite – a truly relaxing highlight to the working day. <



The building seen from the air.

Photo to the right:
The showroom serves for events and trainings.



EFFICIENCY AND SUSTAINABILITY IN GYPSUM BOARD PRODUCTION

Gypsum is versatile and widespread. It is used as set-regulator for cement, as fertilizer, blackboard chalk, for brewing, baking, tofu manufacture and much more.

TEXT: MARKUS MUELLER
PHOTOS: SIKA SERVICES AG



THIS IS A NEW STANDARD IN RETARDING EFFICIENCY, PROVIDING THE GYPSUM INDUSTRY WITH THE BEST-PERFORMING GYPSUM RETARDER AVAILABLE ON THE MARKET

ing gypsum binder reaction but must be evaporated from the boards.

The board drying process requires a lot of energy, making it the main cost driver of wallboard production. Reducing the water demand with innovative additive

technologies such as Sika® ViscoCrete® helps to cut energy costs. It also reduces the carbon footprint over the entire service life of gypsum boards. The Sika® ViscoCrete® product family includes extremely efficient liquefiers tailored for gypsum applications.

>

> A massive fine-grained white or lightly tinted grade of gypsum, called alabaster, has been used for sculpture by many cultures, including Ancient Egypt for the construction of the pyramids, Mesopotamia, Ancient Rome and the Byzantine Empire. Nottingham carvers in Medieval England also worked with alabaster. Over the past 3,500 years, it has become one of the most important mineral used in the production of construction materials. Today, the majority of gypsum binder, so-called calcined gypsum, is used for the manufacture of gypsum boards. Also known as plasterboards or drywall, they are lightweight building elements primarily used as an interior surfacing for building walls and ceilings. Gypsum board walls and ceilings have a number of outstanding advantages: they are fire-resistant, sound-attenuating, durable, economical and versatile.

Besides standard plasterboards, water-resistant (impregnated) and fireproof boards (fiber-reinforced) are available. Furthermore, special boards such as acoustic, thermal and radiation protection panels are also commercially ob-

tainable. More than 12 billion square meters of wallboard are produced in over 400 plants globally every year. This is more than the surface of the European continent!

Gypsum boards consist of a thin core of gypsum between two cardboard sheets. Their manufacturing process was patented more than 120 years ago, in 1894 by Augustine Sackett. Today, it is a highly automated continuous process. The gypsum core is made of gypsum binder, water, various performance additives and prefabricated foam. Lightweight boards can consist 50 % or more of air.

All ingredients are mixed for just a few seconds to form a slurry, which is then poured onto a cardboard sheet, homogeneously distributed and covered with a second cardboard layer. On a long setting-line the gypsum binder chemically reacts with water. The formed crystalline structure sets and hardens and gives gypsum boards a certain strength and provides adhesion to the cardboard sheets. After the setting process, boards are cut from the continuous line to the

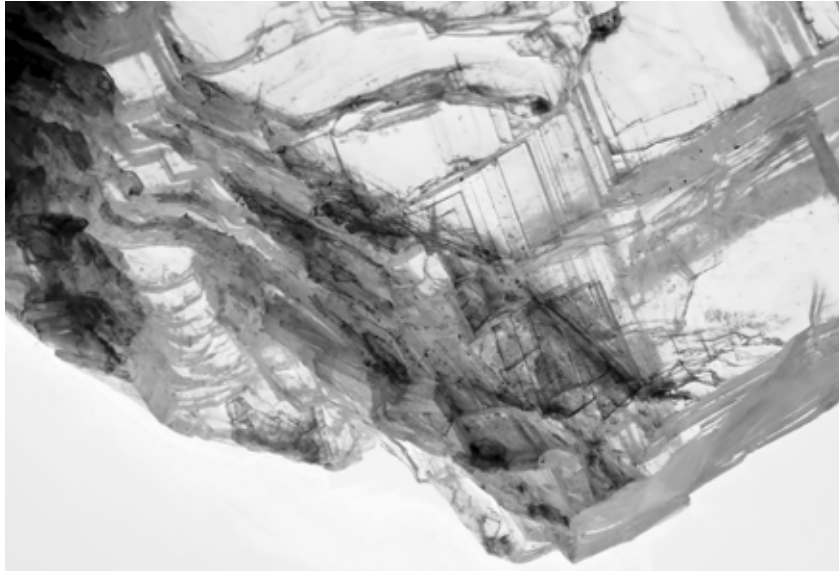
appropriate length and transferred into the dryer. There, excess water is dried out of the boards, resulting in the finished product less than one hour after mixing the raw materials.

Quick setting and hardening is of crucial importance to be able to run the gypsum board production at high speed for maximum capacity utilization. Efficient gypsum board production requires a combination of suitable retarding and accelerating additives to achieve the ideal setting curve. This so-called snap set follows the same principle as pushing gas and brake pedals during a car race. With Sika® Retardan®-200 L, Sika sets a new standard in retarding efficiency, providing the gypsum industry with the best-performing gypsum retarder available on the market.

Saving energy, reducing CO₂ emissions and achieving a sustainable bottom line in terms of production are ever-present topics that are also gaining importance in the gypsum industry. In wallboard production today, approx. 70% of the water added in the mixer is not consumed dur-



More than 12 billion m² of wallboard are produced in over 400 plants globally every year. Here we can see some of them.



Chemically known as “calcium sulfate dihydrate,” gypsum contains calcium, sulfur bound to oxygen, and water. Gypsum is an abundant mineral with often beautiful crystalline appearance.



The board drying process requires a lot of energy, making it the main cost driver of wallboard production. Reducing the water demand with Sika® ViscoCrete® helps to cut energy costs.



Saving energy, reducing CO₂ emissions and achieving a sustainable bottom line in terms of production are ever-present topics that are also gaining importance in the gypsum industry.

SECURING GIANT WIND FARM TOWERS

The South African Cape is famous for its 18 official wine routes and two brandy routes, which are amongst the most scenic in the world, featuring many historic wine estates that date back centuries. You can take your time exploring this magnificent part of South Africa's Western Cape Province and enjoy sampling its splendid wines and brandies. But in terms of a sustainable future, the area has much more to offer. And yes, this can be celebrated.

TEXT: BRONWYN LITTLE, ASTRID SCHNEIDER
PHOTO: ACQUES REINECKE, SIKA SOUTH AFRICA



> Although still dependent on fossil fuels, South Africa has been unobtrusively creating one of the world's most progressive alternative energy plans, quietly building up wind power capacity. Installed by Spanish company Acciona, Gouda was the first wind farm in South Africa and is now one of the largest in the whole country. It started feeding the grid in 2015 and has 463 MW unit capacity turbines mounted on concrete towers with a hub height of 100 m. Located in Drakenstein, 100 km northwest of Cape Town, the wind park can produce enough power every year to cover the demand from around 200,000 South African homes. This corresponds to an estimated annual production of 423 GWh. What is more, 406,000 t of CO₂ emissions from coal-fired power stations are avoided each year.

The wind farm was the first to use locally produced concrete instead of the usual imported steel towers. Vast quantities of Sika products were supplied for construction of these 100 m tall towers. Jacques Reinecke, Head of Renewable Energy at Sika South Africa, spearheaded the specification and installation and provided on-site training.

The Sika products used in large quantities for the construction of the towers included Sikadur-31 CF (1 t per tower), Sealing



- 1 The entire project was instrumental in creating an average of 400 jobs, with hikes of up to 800 employees during the construction phase.
- 2 Each column consists of four precast segments that were sealed and grouted together on site.
- 3 Due to their extreme height, each tower is comprised of four precast concrete columns of 20 m in height, joined on site, one on top of the other.

THE GOUDA WIND PARK CAN PRODUCE ENOUGH POWER EVERY YEAR TO COVER THE DEMAND FROM AROUND 200,000 SOUTH AFRICAN HOMES



Horizontal joints on the tower segments were sealed with Sika EVA Backing Strip. This semi-rigid, closed cell cross-linked construction foam is designed as a tough, flexible and resilient back-up support material for surface seals in load-bearing joints. It can also be used as a bedding seal under precast concrete panels and to prevent loss of grout when joining precast concrete components.

Once joined together, the vertical and horizontal joints of the precast segments were sealed with Sikadur-31 CF and Sikadur-31 DW. Both products are moisture-tolerant, thixotropic, structural two-part adhesives and repair mortars based on a combination of epoxy resins and special fillers. They provide high initial and ultimate mechanical strength and are impermeable to liquids and water vapor. Sealing Backing Cord was placed into the expansion joints to regulate the depth of seal and to provide a solid backing onto which the sealants were placed.

tions. The entire project was instrumental in creating an average of 400 jobs, with hikes of up to 800 employees during the construction phase.

One of the client's primary requirements was a high content of local products. 100% of all Sika products used in the Gouda Wind Farm project were locally produced. Tried and tested for their reliability and endurance, the products employed in this project add to the sustainability value of Gouda Wind Farm.

All PPE requirements were adhered to on site on a daily basis and each employee underwent induction before commencing work. Acciona has a well-established and certified corporate Integrated Management System (IMS) incorporating quality (ISO 9001), environment (ISO 14001) and health & safety (OHSAS 18001). As a final accolade, the Gouda Wind Farm project won the coveted Fulton Award for Innovation in Concrete. Since the emphasis for this huge project was to use local content and local labor, it surpassed all expectations, proving local really is best. South Africa is meeting the ambitious target of 10,000 GWh of renewable energy under its Integrated Resource Plan, an energy blueprint for the period from 2010 to 2030. The country's wind power is now about 40% cheaper than new coal power produced by the national utility. The successful growth in procured capacity from 10 MW to 3.3 GW in just four years was not driven solely by the imperative

- > Backing Cord (22 km) and SikaGrout-295 ZA (30 t per tower). Each column consists of four precast segments that were sealed and grouted together on site. Due to their extreme height, each tower is comprised of four precast concrete columns of 20 m in height, joined on site, one on top of the other. A final segment carrying the nacelle brings the 46 towers to a height of 100 m each.

Using local Sika-trained labor, DD Materials completed the grouting of all vertical cavities applying SikaGrout-295 ZA (a one-component, ultra-high-strength, cement-based grout specifically designed for use in the renewable energy field) under metal bases, between concrete segments and to fill cracks, gaps and large voids. The product was sent for fatigue testing and is now certified for durability. The workers were also trained in concrete repair, waterproofing and epoxy applica-

to address climate change. The rapid uptake and scaling up of the government's renewables ambitions were due to the simple fact that wind has become a no-brainer. A wind power farm can be set up four times faster than a new coal plant and conceivably six times faster than a nuclear station. It is far cheaper and infinitely safer than both. It is modular and can better use existing grid capacity. Moreover, it is all realized with private money and does not require the government to lay out billions for a new build

program. The wind industry has matured and reached a stage where its business case speaks for itself. Wind power has come of age.

For more information about energy practitioner Brenda Martin in CEO Blog, published by the South African Wind Energy Association, visit: <http://www.sawea.org.za/index.php/ceo-blog/328-wind-power-and-the-imperative-to-address-climate-change>

Watch the Gouda Wind Park: <https://youtu.be/G2wnoMwgYp8>

Experience Sika South Africa: <http://zaf.sika.com/>



NEW LIGHTWEIGHTING VEHICLE ARCHITECTURES

One billion! That is the number of registered passenger vehicles on the road today, and the number is growing every year. As more vehicles are produced and we face a scarcity of resources, rising energy consumption and increasing CO₂ emissions, consumers and government regulators alike are demanding greater fuel economy.

TEXT: DENIS SOUVAY, DR. NICOLAS MOREL, DOBRIVOJE JOVANOVIĆ, ASTRID SCHNEIDER
PHOTO: SIKA AG, I-STOCK





New ideas, technologies and production methods are needed to develop lighter and more efficient vehicles for the future.

> Different measurement cycles are used to approximate the actual performance of the vehicle. The energy in fuel is required to overcome various losses (wind resistance, tire drag, etc.) encountered in propelling the vehicle, and in providing power to vehicle systems such as ignition or air conditioning. Various measures can be taken to reduce losses at each of the conversions between chemical energy in fuel and kinetic energy of the vehicle. Driver behavior can affect fuel economy; maneuvers such as sudden acceleration and heavy braking waste energy. But what about the car itself? Beyond motor technology, the weight is what matters.

Indeed, while a few grams of CO₂ or a little material or energy saved by shaving several kilograms off one vehicle's weight may seem modest, the results are significant over the millions of new cars manufactured every year. New ideas, technologies and production methods are needed to develop lighter and more efficient vehicles for the future. To achieve the goal of lightweighting, automakers have adopted different strategies, such as the use of non-traditional materials including high-strength steel, aluminum, magnesium and carbon-fiber-reinforced plastics.

Another strategy is to adopt lighter-gauge metal or even eliminate sheet metal. But this creates unique challenges in assembly processes and introduces unwanted effects on durability, vehicle dynamics and crash performance. To further advance lightweighting, automotive OEMs have developed new vehicle architectures with radical manufacturing techniques using non-traditional materials. Even long-established assembly

processes have been rethought. Body-in-white (BIW) assembly is done not only in the conventional body shop, but can increasingly take place in a non-traditional, cold body shop.

Most modern BIW comprises full steel, full aluminum and, most recently, full CFRP (carbon-fiber-reinforced polymer) bodies. However, in the future, more and more bodies will be designed with a



mixture of dissimilar material, taking advantage of their unique properties at the right place in the BIW. Automakers call it "The right material at the right place." The result is an irreversible trend toward building bodies using mixed materials.

Given these strategies developed by the automakers, advanced bonding and reinforcing technologies have emerged as the key enablers in making vehicle lightweighting possible, while still maintaining strength and keeping occupants safe. Sika has been working with automakers to develop a full range of joining technology solutions to efficiently support the migration to new vehicle lightweighting architectures.

While sustainable vehicle design has become a major trend in car production, so has sustainable performance realization. Performance expectations, economic, legislative and environmental targets are influencing automotive OEMs' thinking and driving the need for durable body shop adhesives that improve stiffness, crash durability and fatigue performance, as well as contribute to weight-reduction strategies. These include incorporating mixed-material joining.

Sika provides a broad range of innovative solutions for crash-durable, semi-crash, structural, hem-flange, anti-flutter, mastic and sealing applications to match challenging design requirements. Our body shop adhesives have been used in 25 million cars and trucks, reducing weight without reducing safety. Crash-durable bonding is now the most important joining process in the body shop because it directly influences the car body structure sections during a crash.

SikaPower® crash-durable adhesives contribute to a significant increase in energy absorption during collisions, which makes them an ideal solution in comparison to traditional metal-joining techniques. Superior impact peel values leading to a reduction of car body intrusion space make SikaPower® products an increasingly effective bonding solution for high-performance vehicles. Lab tests on crash beams confirm intrusion reduction of 20 percent using these adhesives.

By employing non-traditional material in the BIW structure such as aluminum, which has a lower density than steel, significant weight reduction is achieved. One of the first vehicles to adapt a near

all-aluminum construction was the Jaguar Land Rover Range Rover Sport, the first practical high-volume, all-aluminum platform. By using aluminum instead of steel, the Range Rover Sport saved more than 350 kilograms versus the previous version. Note, however, that innovation does not come without challenges—aluminum is not a metal that can be easily welded. To solve the joining problem, Sika worked with Jaguar Land Rover and developed a specific type of SikaPower crash-durable adhesive to assemble this aluminum body. The finished vehicle meets a strict set of crash performance standards set by the OEM.

For multi-material, lightweight car body construction, suitable joining technologies are needed. Recently, Sika created a family of novel bonding solutions optimized for these specific applications. Depending on the construction, substrates used, performance criteria required and production process, the best approach to the design can be evaluated and implemented. For instance, for a new application in the body shop, a hot curing, one-component adhesive technology was developed.

>



Sika has been working with automakers to develop a full range of joining technology solutions to efficiently support the migration to new vehicle lightweighting architectures.

> SikaPower Mixed Bonding Excellence (MBX) technology made the mixed-material joining of steel to aluminum, steel to CFRP and aluminum to CFRP possible. The adhesive provides galvanic separation that improves protection against corrosion and increases vehicle durability. It also addresses a major issue of delta-alpha-mismatched expansion and contraction properties of dissimilar materials. In joining mixed material in a traditional body shop, as the temperature of materials is elevated and then cooled during the typical assembly process, high residual stress can build up in the interfacing layer of adhesive between substrates of dissimilar materials. This is due to differences in material coefficients. Conventional body shop adhesives are not designed to relieve this stress, which can lead to adhesive failure, substrate failure or even substrate deformation. SikaPower crash-resistant adhesive absorbs the stress to prevent possible failure.

It was developed for the next generation of vehicles such as the BMW 7 Series Sedan, which employs a mixture of aluminum, steel and CFRP to reduce weight while at the same time increase vehicle

stability. The total body-in-white weight reduction is 50 kilograms when compared to the previous generation. Innovative adhesive technology was needed to strategically bond the CFRP to steel and aluminum to steel. The SikaPower MBX products have the optimal balance of modulus, elongation and strength to ensure the necessary adhesion performance, while preventing any failure from residual tension during the entire vehicle service life.

The trend toward lightweight structures in car body construction also opens up a new broad application in the field of elastic adhesives. The mixed assembly of lightweight and composite materials such as aluminum, polycarbonates and CFRP can pose a technical problem if the conventional BIW technologies of welding and structural bonding are used. To meet this new demand from the market, Sika came up with an ultra-high modulus (UHM), one-component elastic polyurethane adhesive to assist customers in improving body design and further reduce body weight.

By being involved early in development, Sika is helping engineers achieve ad-

ditional weight reductions through the design and implementation of reinforcement solutions. As weight is removed, its reinforcement products can readily provide the same or better performance than traditional designs. SikaReinforcer® is a range of highly engineered reinforcement solutions based on highly engineered and molded carriers, SikaStructure®, bonded in the vehicle body with structural foam. A high-end performance variation of the system includes structural adhesive applied to the carrier, known as Sika High Strength Bonding (HSB).

SikaReinforcer can be used in place of steel reinforcement, which means lower weight without degrading performance. It will achieve both safety (as a strategically placed reinforcement) and environmental regulation objectives (through the weight reduction thus achieved). Automakers are largely using hot-stamping steel technologies. Thanks to its unique combination of very good hot-forming and very high tensile-strength properties, steel is optimized to reduce BIW mass.

Lightweighting techniques also take advantage of the new grades of steel

OUR BODY SHOP ADHESIVES HAVE BEEN USED IN 25 MILLION CARS AND TRUCKS, REDUCING WEIGHT WITHOUT REDUCING SAFETY

coming online. These grades offer high crash performance, but with the desire to further lightweight the BIW, metal thicknesses are gradually reduced. By doing this, the global noise, vibration and harshness (NVH) performance of the body is reduced. Compensation is then necessary by utilizing local reinforcements. SikaReinforcer is easily placed at the strategic body nodes to achieve the goal. The most recent industry-leading example is the implementation of 16 parts in the steel body of the Mercedes

S-Class, saving more than 10 kilograms per body.

It is clear that the push for lighter automobiles will become more intense, and the technologies for lightweighting will need to advance. As automakers are proliferating different types of vehicle architectures using traditional and non-traditional materials, as well as light-gauging existing body constructions, the role played by bonding and reinforcing technologies will become paramount.

However, advanced technology alone is not enough. Early involvement at the development stage with automakers is key to creating additional weight reductions through the design and integration of lightweighting solutions. <

For more information on how bonding and reinforcing technologies can enable vehicle light weighting visit www.sikaautomotive.com/lightweighting



The trend toward lightweight structures in car body construction also opens up a new broad application in the field of elastic adhesives.

YES, YOUTH CAN – GIVE BACK DAY

Sika USA and its partners recently helped the YOUth CAN headquarters to become a better place. YOUth CAN's mission is to intervene in the lives of disadvantaged youth in the community by enriching their academic, cultural and social development through academic assistance, computer technology, art and music programs.

TEXT: GREGG LAVOIE, KLAUS STRIXNER, ASTRID SCHNEIDER
PHOTO: SIKA USA





Volunteers of Sika USA with their partners of YOUth CAN.

> 50 volunteers recently answered Sika's call to devote one day to improving the quality of a community center building in Chicago. The volunteers spent that day replacing failing ceiling tiles, installing new carpet, cleaning the building's storage areas, installing shelves, as well as painting and repairing the fence. It was a fantastic event for both the local Sika team as well as our partners.

tions, have been unable to adequately maintain their homes. After 24 years, the organization has repaired over 1,500 homes and 200 non-profit facilities in partnership with communities, corporations, trade unions and civic groups.

Each year, on National Rebuilding Day, approximately 3,500 volunteers from across the Chicago area come together



Sika also donated products and materials to replace the 30-year old multi-layered asphalt roof with a new EnergySmart Sikaplan system so roof leaks will no longer be a daily occurrence in the building. Sika is also gifting products and materials to add a new epoxy floor in their design room, lay a wooden floor in the computer room, and provide sealant to fix the gaps in the exterior windows and masonry.

Sika has formed a strong partnership with Rebuilding Together Metro Chicago, an organization that was established in 1991 to improve the declining housing stock and neighborhoods in Chicago and Cook County. Rebuilding Together Metro Chicago serves existing home owners who, due to financial or physical limita-



to complete home repair projects. Skilled members can donate their time and expertise to help make necessary electrical, plumbing, carpentry and other crucial repairs in the sponsored homes. The volunteers provide repairs geared toward making a sponsored home warm, safe and dry. The renovations completed

benefit families, seniors, veterans, and people with disabilities whose limited income has made it difficult to manage the upkeep of their homes. Emphasis is placed on repairs that make homes safer, healthier, and more accessible for their owners, as well as renovations and upgrades that will leave the home a brighter, more pleasant place to live.

But what is the concept behind Give Back Days? Give Back Days are hands-on, volunteer-driven days of service. Each project is tailored to the sponsoring group's size, skill level and budget. Typical projects include decorating, landscaping, organizing and cleaning, plus painting murals, furniture and playground assembly, along with other minor repairs. To date, Give Back Day sponsors and volunteers have worked to improve over 200 community facilities in the Chicago area. All work is completed in one day, allowing volunteers to see their immediate impact. It's an outstanding opportunity for colleagues to work together outside of the office and make a real difference.

Team-building is an exciting by-product of a Give Back Day. YOUth CAN's mission is to intervene in the lives of disadvan-

tagged youth in the community by enriching their academic, cultural and social development through academic assistance, computer technology, art and music programs. YOUth CAN strengthens the self-preservation capabilities of community youth by giving them the social development skills, educational support and cultural tools necessary for success. <

Watch the film:
<https://youtu.be/2b5N57QVJHQ>
For more information about the Youth

Civil Activism Network visit:
<http://www.youthcan.net/>

Rebuilding Together Metro Chicago improves the homes and neighborhoods of elderly, disabled and low-income residents: <http://www.rebuildingtogether-chi.com/>

To go to Sika USA:
<http://usa.sika.com/>



A ROAD TRIP: DISCOVERING AMERICAN CONSTRUCTION MARKETS

Last summer in the USA, Sika launched an amazing adventure: over a period of 2 months, Eric and Matt traveled the country to meet and talk with our partners and discover how passionate they are.

TEXT: MARLENE MORIN
FOTO: SIKI USA



Eric and Matt have traveled for 2 months through the US meeting 700 partners.



Visiting 100 construction sites brought them many insights of challenges of the market.

> 100 construction sites and more than 700 encounters later, My Summer with Sika documents in pictures all the challenges that construction and industry markets are dealing with every single day.

From concrete restoration to bridge construction, from tunnel waterproofing to high-rise blocks, from green roofs to windshields, our two guys experienced how Sika can support, help and advice dedicated teams to design and create what they have in mind and reach their goals.

Matt and Eric also met up with partners committed to their local community and got involved with numerous projects. Along the road, what struck them most was the warm and friendly welcome they received from everyone. And this is what the entire adventure was all about: a journey of passion and discovery.



As pictures are worth a thousand words, watch the video of My Summer With Sika at <https://youtu.be/LV5Ywm03pxA>, discover our partners at www.mysummer-withsika.com and enjoy sharing in some impressions of their venture! <



From concrete restoration to bridge construction, from tunnel waterproofing to high-rise blocks, from green roofs to windshields: it was a diverse experience.

