

# AMBITIONS

A dive into Sika's world



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A journey to Vienna

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## HOW TO REFOREST CORALS WITH BYPRODUCTS?

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Elbphilharmonie: 200,000 t of weight,  
1,100 window units and a 70 m high glass assembly

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AMBITIONS ISSUE #29

BUILDING TRUST



# MAINTENANCE



ASTRID SCHNEIDER  
Marketing & Communications  
Manager, Sika Services

Maintenance – maintaining nature, life and ecosystems – is one of the mega-topics of our time. Too many of us often waste what we have and throw away what we over-produce, and often there are too few who take care to maintain what we already have or what we once had. Living sustainably can be a question of money, and yet there are places in the world that are more sustainable than you would think: Did you know, for instance, that Ruanda doesn't hand out plastic bags for free in supermarkets? Neither does Botswana. We all know that plastic ends up in the oceans and in fishes, birds and other animals which – fatally – mistake it for their food. To save fishes and their natural surroundings, Sika Thailand took on a big challenge (p.56). Healthy coral reefs are plainly a sign of healthy oceans and hence of a healthy planet. But corals have been seriously reduced in recent years: Extensive fishing and other forms of human encroachment have resulted in coral bleaching. Using cement and sand waste, Sika Thailand is producing cement cubes in which it is planting coral fragments. The cubes are then placed on the seabed by divers to reafforest the coral reef.

At the same time, Sika Chile is maintaining good and healthy relations with its neighbors (p.62): It is supporting the children at a nearby school by activating public green areas and developing other cooperation initiatives with the school – such as guided tours of the laboratories.

Last but not least, this edition reports on the maintenance of reliable infrastructure for China's growing population (p.15) and on the maintenance of art – and specifically an unforgettable piece of architecture, the Elbphilharmonie concert hall complex (p.5).

Yours sincerely,

ASTRID SCHNEIDER

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# CONTRIBUTORS



FELIPE CARRION  
Head of Marketing, Sika Chile

The most comforting part of our work is, when customers tell us how good the experience was with our products. Expanding these experiences, is the main incentive for our Marketing Team in Chile.



PAWARIN CHOTI  
EHS Manager, Sika Thailand

We are always aware that the results of our production process must have minimal impact on the environment, especially the problem of waste such as cement cubes. So we took them to build new homes for corals to conserve the sea.



DONG CHAO  
Key Account Manager Concrete,  
Sika China

Our team is guided by Sika's values and principles. We are so glad Sika China contributes to the first high-speed railway in China.



DANIELA PURKART,  
Marketing and Communications,  
Sika Austria

The atmosphere at Sika Austria is friendly and personal. We are constantly being challenged and learn something new every day. That's the way we get the most out of our work.

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Sika adhesives and sealants were used in the manufacture of the one-off window units for the imposing glass facade.

SMART

# ARRANGEMENT FOR A SYNTHESIS OF THE ARTS – ELBPHILHARMONIE CONCERT HALL IN HAMBURG

Though a controversial talking point during construction, it has become a magnificent new landmark for the Hanseatic city since completion – the Elbphilharmonie concert hall is an architectural and cultural beacon that shines far beyond Hamburg's city limits.

TEXT: CHRISTIAN DIEFENBACHER, ASTRID SCHNEIDER  
PHOTO: SIKa GERMANY

> The site in Hamburg's redeveloped harbor area is steeped in history: as of 1875, it housed what was then the city's largest warehouse, complete with neogothic bell tower. After this building had been destroyed during the Second World War, a new warehouse, the "Kaispeicher A", was built on the same spot. The plain brick building was used to store tobacco, cocoa and tea. As containers came to be increasingly used for sea freight shipments, both the warehouse and the old general cargo dock became obsolete. As a result, from the 1990s until now, the

warehouse largely stood vacant. After a string of redevelopment proposals had come to nothing, the charming brick building was finally enlisted to serve as a massive podium for the Elbphilharmonie concert hall.

The spectacular design for the "Hamburg Philharmonic" was crafted by Swiss architects Jacques Herzog and Pierre de Meuron. The visionary idea of a wavy outline sitting atop the quayside warehouse quickly sparked enthusiasm. The boldly curvilinear roof, as the

Elbphilharmonie's signature feature, has now added an enchanting and unmistakable silhouette to Hamburg's harbor skyline. The foundation-stone-laying ceremony in April 2007 marked the start of an elaborate work program that lasted almost ten years. An important contribution to the success of Hamburg's new showpiece building was made by the many construction chemical products and system solutions of Sika Germany that were specified by construction group HOCHTIEF.

## START ON SITE: STRIP-OUT AND REFURBISHMENT OF EXISTING WAREHOUSE

The first step involved stripping back the existing warehouse to its historic landmark brick facade. To carry the total weight of the Elbphilharmonie – running to some 200,000 t – the warehouse foundations needed strengthening through the addition of 650 to the existing 1,000-plus reinforced-concrete

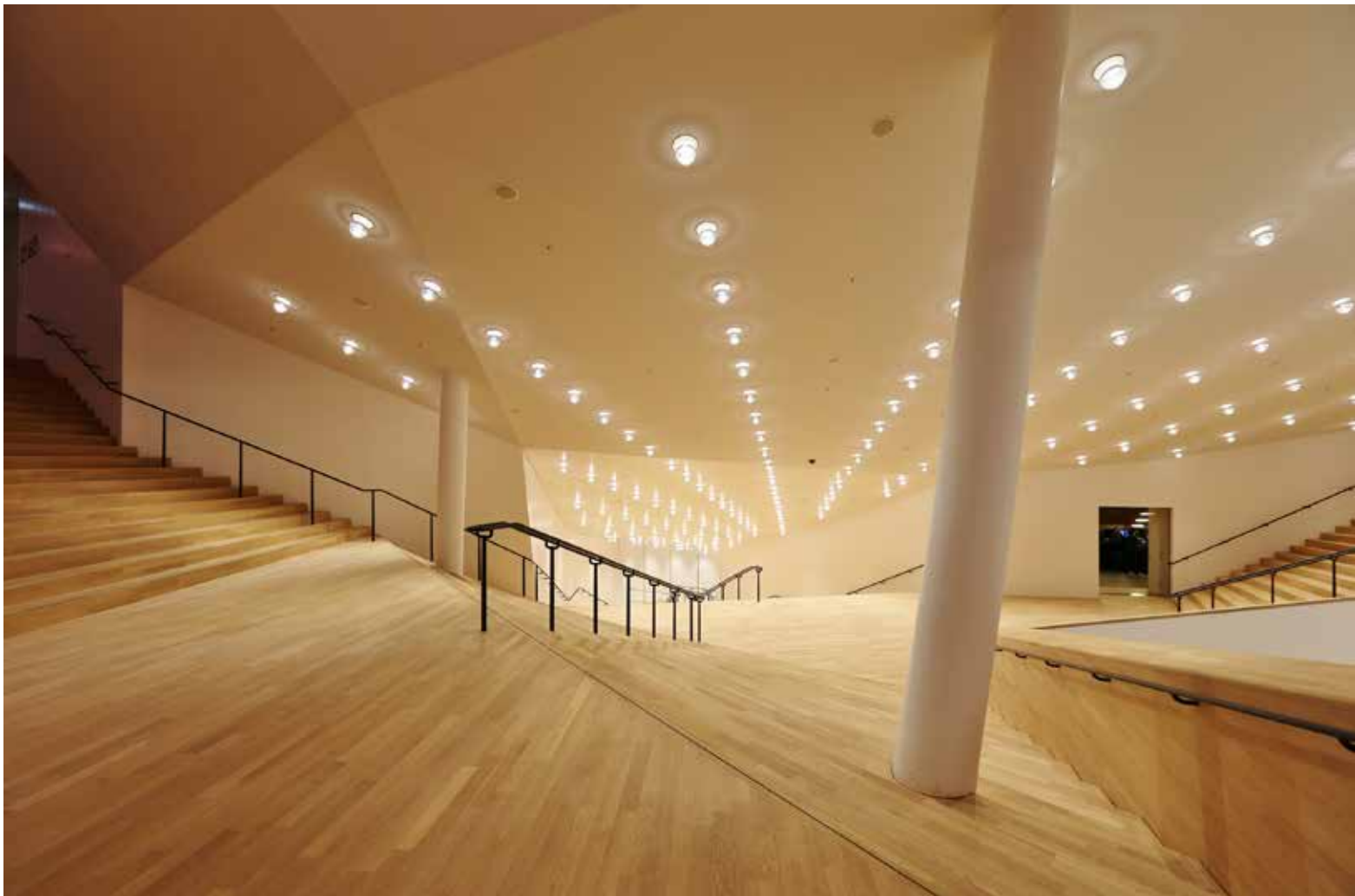
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From foundation to roof: Numerous products and system solutions were supplied by various Sika business units for Hamburg's new landmark building.







**Photo to the left:**

Sika's anti-corrosion solutions provided the loading hatches of the former Kaispeicher warehouse and the stair balustrades with a hardwearing protective finish.

freestanding columns, these are made from C80/95-grade high-strength concrete. To optimize concrete strength and durability, Sika supplied a total of 40 t of the ultra-fine pozzolanic concrete additive Sika® Silicoll SL.

The most stringent (class 4) requirements were placed on the fair-faced concrete in the stairwells and elevator shafts. The universal Sika® Viscocrete® ready-mix concrete superplasticizer was specified for many of the complex concreting operations. Used for over 63,000 m³ of material, it improved flow properties and lengthened workability, even at higher concrete temperatures, while also increasing concrete strength.

**SIKA CORROSION PROTECTION: ROBUST STEEL PROTECTION FOR STAIRWAYS AND LOADING HATCHES**

Curved sculptural stairways opening off the Plaza lead to the centerpiece of the Elbphilharmonie: one of the acoustically best concert auditoria in the world. Required to offer long-term abrasion and impact resistance, the steel stair balustrades were provided with a robust anti-corrosive finish using the SikaCor® EG system. The combination of two-pack priming and intermediate coats based on epoxy resin/micaceous iron oxide and polyurethane top coat ensures high chalking resistance and color retention. In the event – given that the coating initially applied to the balustrade had corroded within a short space of time – Sika turned up right on time with the ideal solution.



Sika sealants were also specified for the floor joints.

piles. The warehouse levels now accommodate the parking areas and several restaurants as well as rehearsal and storage spaces for the concert hall. Forming the interface between restored warehouse and new-build component is the approx. 3,100 m² plaza, which offers a stunning 360° panorama. This public viewing deck is accessed via an extraordinary, 82-m-long escalator, which leads from the eastern entrance portal through the entire building to the western front,

where it reaches a height of 37 m. The journey through the white, illuminated tunnel vault is, in itself, a remarkable experience.

**SIKA CONCRETE TECHNOLOGIES: ADMIXTURES FOR CHALLENGING CONCRETE STRUCTURES**

The spacious Plaza foyer is dominated by large ceiling vaults and inclined concrete columns. Due to the magnitude of the loads permanently supported by the

**SIKA CONSTRUCTION BONDING AND SEALING: SCINTILLATING PLAY OF LIGHT ON GLASS FACADE**

The over 70-m-high glass assembly fronting the Elbphilharmonie is reminiscent of a giant, shimmering, blue crystal. Sporting 1,100 window units, the glass facade covers a total area of around 20,500 m². The elaborately curved, one-off windows are fitted with special reflectors that deliver an ever-changing choreography of mirrored sunlight, sky >



Sika supplied 40 t of concrete admixtures to increase the strength and durability of the concrete.





**Photo to the left:**  
Apart from the Sarnafil TS 77-20 FPO polymeric membrane, the building also incorporated other products from the Sika Sarnafil system range.

**Photo to the right:**

The Elbphilharmonie's spectacular roof construction required an absolutely trouble-free and, above all, durable waterproofing solution. The project team opted to use a Sika system solution.



hues and harbor lights. The reflective function also prevents the incident solar radiation from heating up the building. Some of the windows between the twelfth and seventeenth stories feature large recesses shaped like gigantic tuning forks.

The adhesives and sealants used for the glazing are exposed to the typically harsh Hamburg climate of alternating sunshine, rain, storms and gale-force winds. The project team thus opted for the use of Sikasil® SG-500 two-part structural silicone adhesive and Sikasil® IG-25 HM Plus two-part silicone sealant for fabrication of the individual glass units. In addition to the adhesives and sealants for the glass facade, Sika also supplied sealant solutions for the floor joints in the break rooms and stairwells.

**SIKA ROOF WATERPROOFING: 800 T OF ELEGANCE**

Structurally, the Elbphilharmonie's column-free Grand Hall takes the form of an intricate steel frame with steel nodes. This construction, comprising a star-shaped arrangement of 11 steel truss units, each up to 25 m wide and weighing up to 40 t, is concealed by the

curved lines and pointed tips of the roof. The 6,200 m<sup>2</sup> roof area is made up of eight concave surfaces resting on approx. 1,000 individually bent steel beams. These create the wavy geometry and lend the roof silhouette its sweeping elegance. The lowest point in the roofscape is 74 m and the highest point some 110 m above ground level. Trapezoidal steel sheeting, installed at inclinations of up to 55°, spans between the steel beams.

To ensure absolutely trouble-free and, above all, durable performance, the waterproofing solution for the imposing roof assembly was required to meet the most stringent demands. The waves and tips of the roof and the "paillette" covering installed as the final step posed an awkward challenge that was successfully mastered through the use of Sika Germany's system solutions. The steeply sloping trapezoidal steel sheeting was covered with Sarnavap® 5000 E self-adhesive vapor barriers. These, in turn, were overlaid by double-layer mineral-fiber insulation with a total thickness of 190 mm. Due to the, in places, extremely steep roof inclination, the design team opted to use the 2 mm thick Sarnafil®

>





#### SIGNBOARD:

Project:	Elbphilharmonie concert hall, Hamburg
Architects:	Herzog & de Meuron, Basel
Client:	Elbphilharmonie Hamburg Bau GmbH & Co. KG, represented by ReGe Hamburg Projekt-Realisierungsgesellschaft mbH
Lead designer:	Design consortium comprising Herzog / de Meuron, Höhler + Partner Architekten Ingenieure and Hochtief Solutions AG
Construction:	Hochtief Solutions AG, special-purpose company ADAMANTA Grundstücks-Vermietungsgesellschaft mbH & Co., Objekt Elbphilharmonie KG, a company of Commerz Real AG



- > TS 77-20 E multi-layer polymeric membrane, based on flexible polyolefin. This is particularly suitable for mechanically fastened roofs with pitches exceeding 20° while offering enhanced fire protection. The individual membrane sheets were mechanically spot-fixed at the overlaps using the Sika® Sarnafast system, purpose-developed for fastening to trapezoidal steel profiles. Special washers were used in conjunction with the Sarnafast SF 4.8 self-drilling, hardened carbon steel fasteners.

This roof assembly then served as the base for tubular supports to carry the 5,800 white-coated, round, perforated aluminum-sheet "paillettes". Up to 110 cm in diameter, these fulfil a purely

aesthetic purpose. During installation of the roof membrane, provision thus had to be made for several thousand penetrations. The resulting junctions were formed with Sarnafil® T galvanized-steel flashings. The upper faces of these units are laminated with Sarnafil® TG 66-18 FPO membranes, thereby allowing homogeneous welding with the TS 77-20 E roof membrane.

With the underlying roof membrane no longer accessible after fixing and sealing of the paillettes, it was essential for the installed materials to guarantee absolute watertightness and durability. Hence the need for wide-ranging tests, which included a leakage test and a fire test specifically for the action of fireworks, a vacuum box test and manual wind suction resistance certification for 600 kg/m<sup>2</sup>.

In selecting materials, due allowance was also made for specific site factors. These included the emissions from cruise ships in the harbor and the fluctuating weather conditions. Continuous seam inspections were required and even the welding equipment needed optimizing for use with the existing roof inclinations. The total length of the weld seams

incorporated on the Elbphilharmonie roof runs to 15 km.

On this prestigious project, the in-depth technical expertise offered by Sika Germany, as a single-source provider of products and systems solutions in many fields of construction, was complemented by comprehensive consultancy services. The Elbphilharmonie is, after all, no ordinary building, but a Gesamtkunstwerk – a total work of art – that poses exceptional architectural, design and construction challenges. Both the client and construction teams were duly impressed by the convincing solutions delivered by Sika, as construction chemicals specialist, for all required applications. <





Construction proved difficult due to the station's proximity to the sea, where saline-alkali soil had been formed by sediments accumulated over thousands of years.

## ADMIXTURES

# A SILVER-WHITE SHELL HOUSES THE WORLD'S BIGGEST UNDERGROUND STATION

The Bohai Sea is the innermost gulf of the Yellow Sea and Korea Bay on the coast of North and Northeastern China. Covering approximately 78,000 km<sup>2</sup>, its proximity to Beijing, the capital of China, makes it one of the busiest seaways in the world. On the shores of the Bohai, between rows of packed buildings, a huge and eye-catching silver-white shell can now be seen glittering under the sun. It houses the biggest and deepest underground station in the world – Yujiapu Railway Station.

TEXT: CARINA LIU  
PHOTO: ZHOU RUOGU

> The station has been built as part of the drive to greatly shorten the travel time between Tianjin and Beijing and thus improve regional economic integration. It is the terminus of an extension to the Beijing-Tianjin rail line, China's first high-speed intercity route. Occupying 93,000 m<sup>2</sup> of land, it comprises a built area of more than 270,000 m<sup>2</sup> and provides a link to the Beijing-Tianjing-Binhai New District. The travel times from Beijing South Station to Tianjin Station, and then on to Yujiapu Station, have been shortened to 60 and 21 minutes respectively. The unique form and appearance of Yujiapu Railway Station is impressive, and reflects the area's marine culture.

From the northwest, the station looks like a shell while from the southeast it resembles a blue whale under a transparent dome. This huge "shell" is 143.9 m long from south to north and 80.9 m wide from east to west. The highest point is 25.8 m above ground. It weighs about

4,200 t, which is equal to about half the weight of the Eiffel Tower's metallic structure. It is supported primarily by 36 direct spiral and 36 reverse spiral steel box girders that are interlaced and connected without any central support. Its weight is borne by the steel structure and 36 foundation elements around it. Such craftsmanship is almost unprecedented in the international arena.

The steel structure is covered with 700 ETFE (ethylene tetrafluoroethylene) films of various sizes. Once inflated, each of them can support the weight of a car. Covered with transparent film, it constitutes a transparent, spacious, bright, and innovative architectural space characterized by unity of construction and beauty.

The construction and design of Yujiapu Railway Station are a departure from those employed in high-speed railway stations in the past. In addition to the exposed dome, more than 90% of the

station's main structure is buried underground. Its entrance resembles the glass pyramid of the Musée du Louvre, which was designed by the renowned Chinese architect I.M. Pei. The entrance to the station is also located above ground but extends below the surface. The standards of design applied to the interior are equally high. Construction proved difficult due to the station's proximity to the sea, where saline-alkali soil had been formed by sediments accumulated over thousands of years.

The permeability of the terrain also made construction work highly challenging. The foundation pit of Yujiapu Station is extremely large, with a total area of 130,000 m<sup>2</sup>, and is also very deep (31 m below the surface at the deepest point). Its irregular shape and uneven depth gave rise to extremely demanding safety requirements. The diaphragm wall is much deeper than that of regular >



Finally now travel times from Beijing South Station to Tianjin Station, and then on to Yujiapu Station, have been shortened to 60 and 21 minutes respectively.



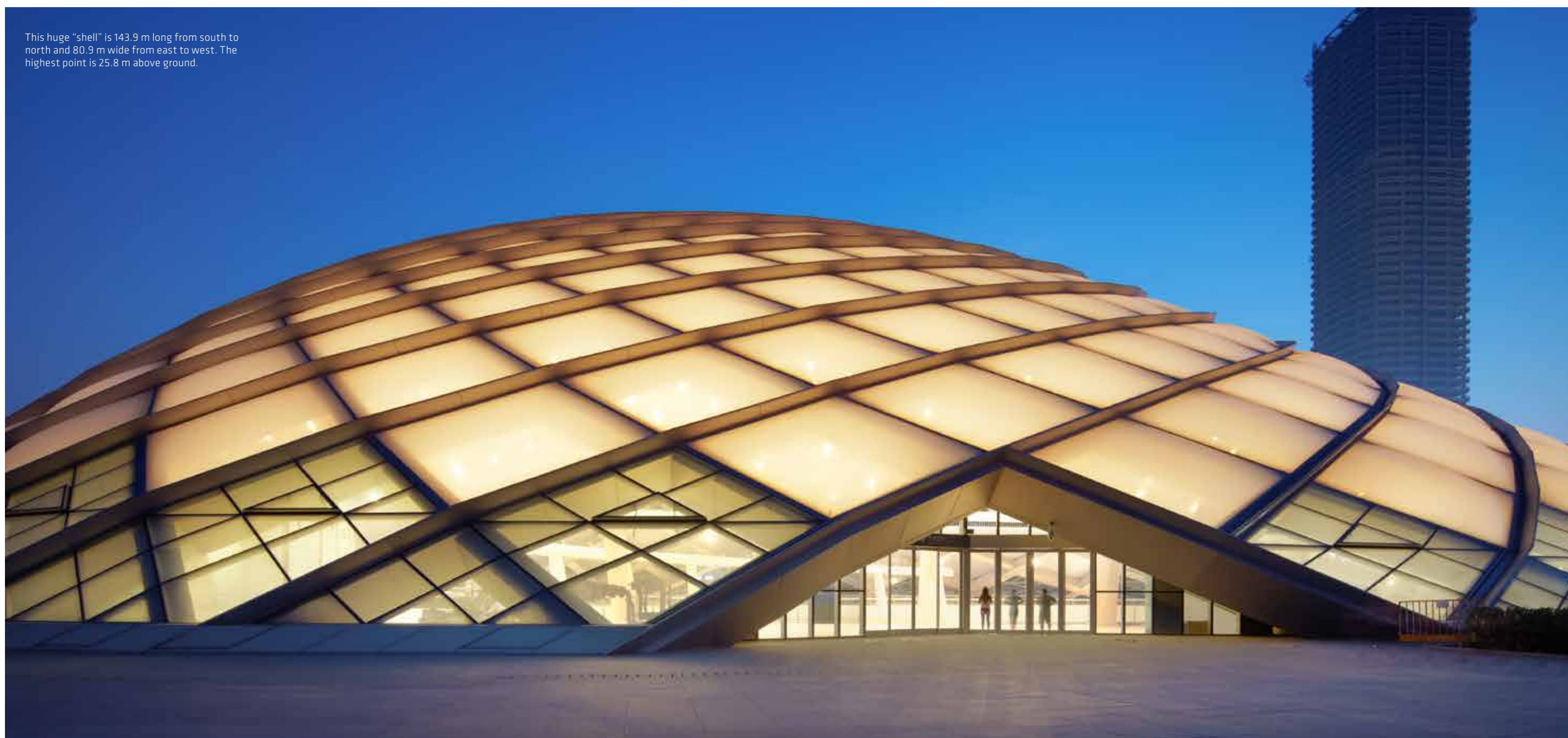


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IN ADDITION TO THE EXPOSED DOME,  
MORE THAN 90% OF THE STATION'S MAIN  
STRUCTURE IS BURIED UNDERGROUND

This huge "shell" is 143.9 m long from south to north and 80.9 m wide from east to west. The highest point is 25.8 m above ground.



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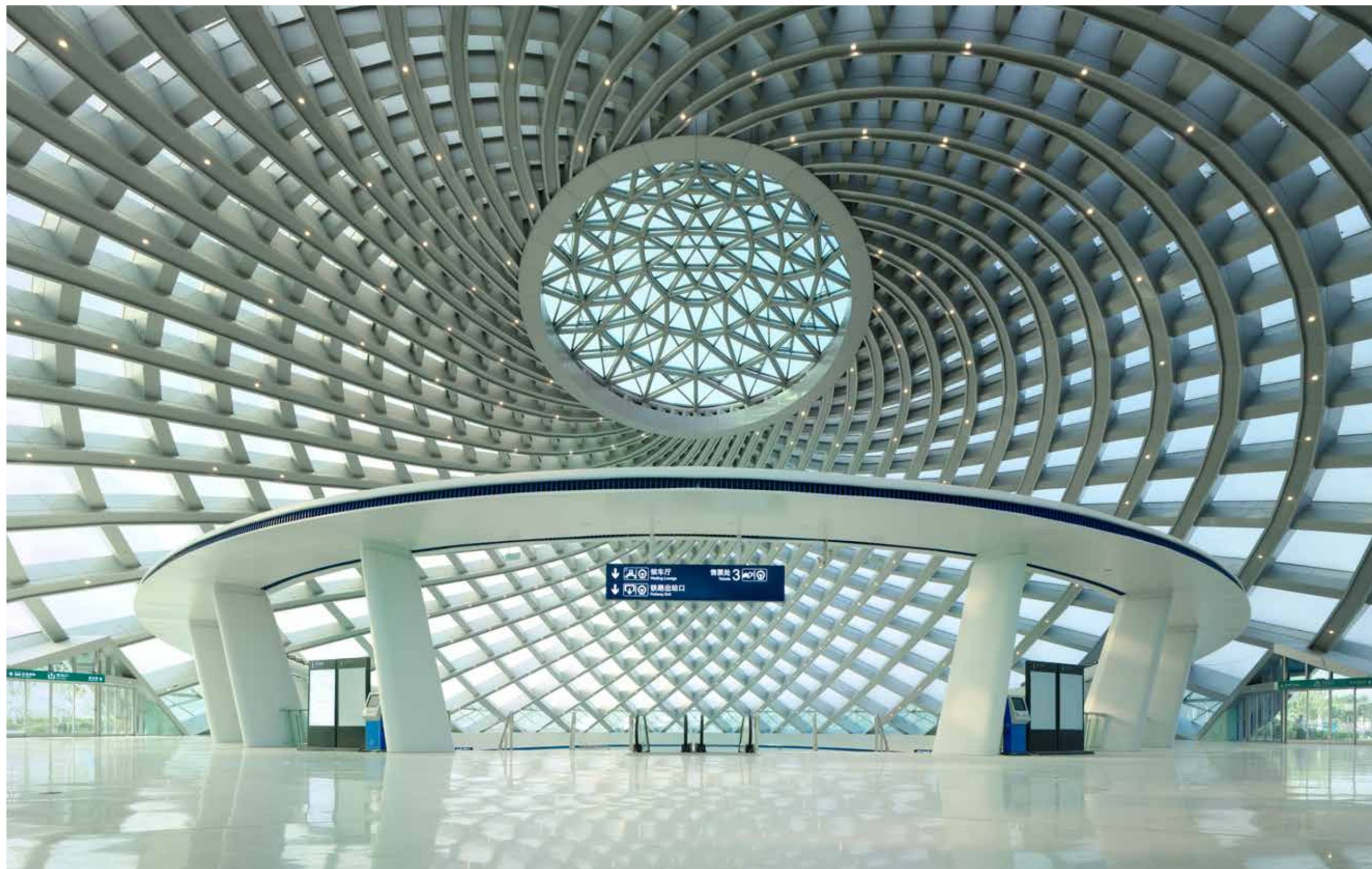
> buildings, extending as far as 65 m underground. This is almost equal to the depth required by a building 300 m tall. The construction specifications for the concrete were also very demanding: it had to have very good workability and performance: The 2 h slump loss had to be smaller than 2 cm, with the concrete strength at C30-C80.

For this the high performance PCE admixture Sika® ViscoCrete® 3301C and the retarding agent Sika® Retardol® were used. During their actual application, these products can be adjusted according to requirements and variations in materials. To ensure top quality, moreover, their formulation can be adjusted over time. The concrete produced completely satisfied the design specifications. Completion of the station has created a worthy terminus for the Beijing – Tianjin intercity rail route.

This is the first high-speed rail project realized in China with Sika as a participant as well as a witness. Great contributions were made by both Sika products and by Sika personnel from the beginning to the end of the project – right from the construction of Beijing South Station to the construction of the Beijing – Tianjin intercity rail route and then to the building of Yujiapu station. <

**Photo to the right:**

The “shell” weighs about 4,200 t, which is equal to about half the weight of the Eiffel Tower’s metallic structure.



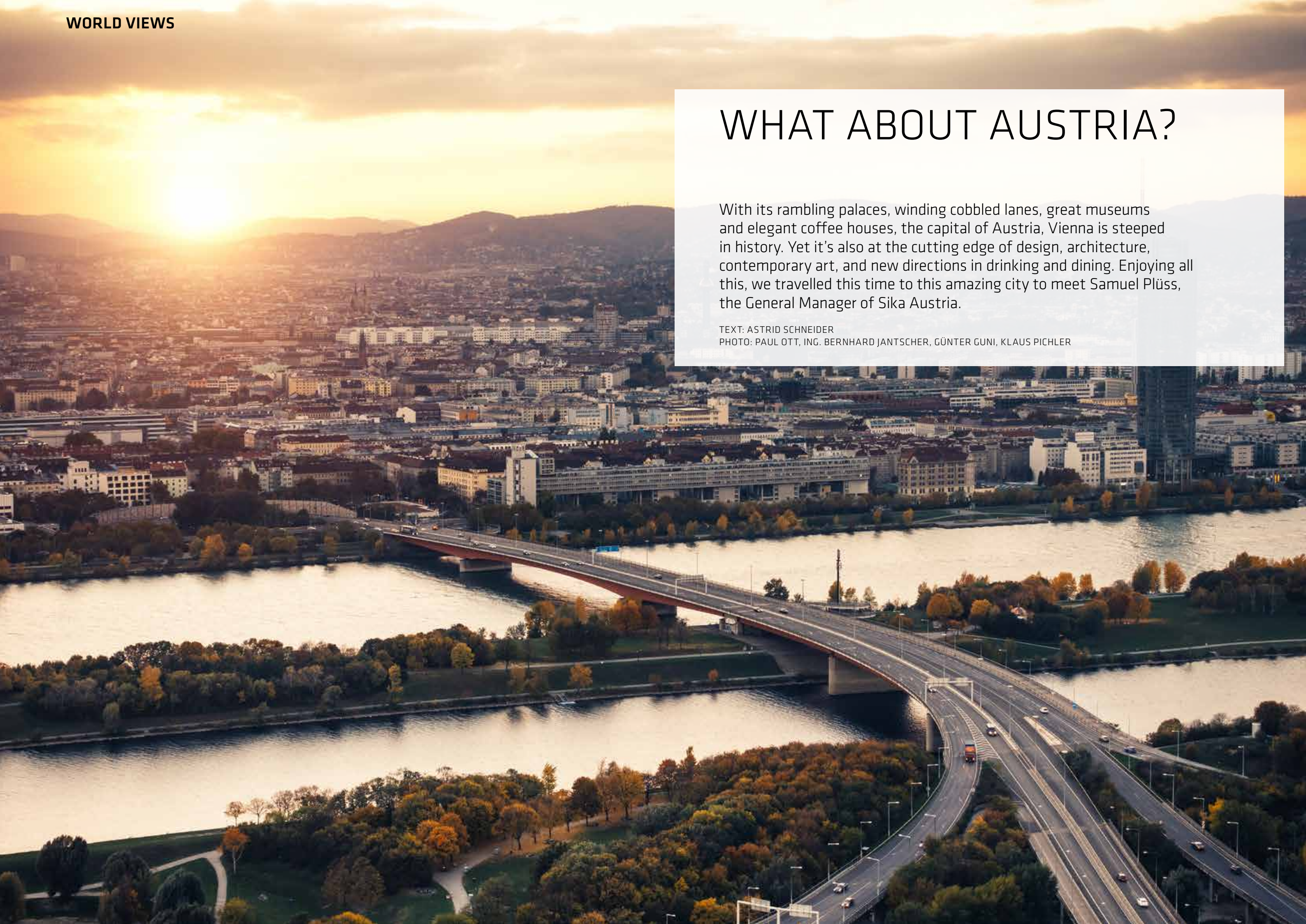


# WHAT ABOUT AUSTRIA?

With its rambling palaces, winding cobbled lanes, great museums and elegant coffee houses, the capital of Austria, Vienna is steeped in history. Yet it's also at the cutting edge of design, architecture, contemporary art, and new directions in drinking and dining. Enjoying all this, we travelled this time to this amazing city to meet Samuel Plüss, the General Manager of Sika Austria.

TEXT: ASTRID SCHNEIDER

PHOTO: PAUL OTT, ING. BERNHARD JANTSCHER, GÜNTER GUNI, KLAUS PICHLER





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

I try to set clear targets, to empower, to coach, to lead by example, to maintain regular communication, and to understand the motivation and individual situation of each team member. Finding the right balance between distance and proximity to teams is important. However, rapid mobilization, keeping control over developments and optimizing performance are just as crucial. At the same time, I'm straightforward, sincere and open, and I like to give employees recognition for a job well done. Enjoying the job and having 'fun' with the team members are essential for everyone's motivation.

**What is the first thing that comes to mind about working at Sika Austria?**

I have had the chance to work in various countries and experience different cultures. To be an expat in Austria is definitely one of the best options.

For me, the most exciting things about Austria are the perfectly functioning infrastructure, Austrian friendliness and hospitality, the skilled and committed workforce, the professional business conduct and the high level of personal security. My colleagues are very hard-working and the public administration is still very efficient. It's a beautiful country with lots of variety and a real feel-good factor. The best place to live and work is probably Vienna.

But I still don't understand why so many Austrians are resistant to change, new technologies and creative ideas and unwilling to adapt to the rapidly changing environment.

Typical of Austria are the many and often long titles sported mainly by people in public and government positions as well as the relatively complex and bureaucratic government organizations.

**After four years of disappointing economic growth, business activity picked up in 2016. It was bolstered by a fiscal**

**reform that boosted household disposable income, catch-up investment and solid job creation. These factors will continue to fuel growth in 2017. What is your view on this?**

I agree: in the first quarter of 2017, Austria's economy recorded the stron-

> **Samuel Plüss,**  
General Manager of Sika Austria



The coating and the roof insulation of this four-storey carpark in Baden near Vienna was done by Sika Austria.



> gest growth in six years, driven by higher private consumption and investment. Forecasts estimate economic growth for this year at 1.8%, with 1.5% predicted for 2018. The momentum comes from the robust domestic demand and a slight upturn in exports.

Since last fall, however, raw material prices have risen sharply in Austria too and this has necessitated price adjustments for the relevant products. And, naturally enough, we have to convince our customers that this is justified. Nevertheless, I am still very positive about the future.

**And the construction market? How exactly does Austria profit from Sika?**

There is a high demand for additional living space in Austria – especially in the urban centers and surrounding conurbations, but also in some rural areas. The

>

## THE BRENNER BASE TUNNEL IS SET TO BECOME THE WORLD'S LONGEST RAIL TUNNEL SYSTEM



In the expansion of the tunnel Klaus in Upper Austria, 120,000 m<sup>2</sup> of the Sikaplan® waterproofing system was used against leakage and seepage water.



> public sector is investing in infrastructure expansion, particularly in the transport, energy and communications sectors. For example, the Brenner Base Tunnel, running from Innsbruck into Italy, is set to become the world's longest rail tunnel system. With our products and systems, we are ideally positioned. Our professional distribution network and highly efficient logistics enable us to meet the constantly changing requirements of our customers.

Sika Austria was established as early as 1939 and boasts a long track record of expertise in the construction industry.

This know-how was further expanded at the start of this year through the acquisition of bituminous waterproofing system manufacturer Bitbau Dörr. Sika is now able to offer its customers an even wider selection of high-grade, durable waterproofing systems.

Today, Sika Austria can also cater for the rapidly growing interest in sustainable construction and thereby make its own contribution to climate protection.

**What infrastructure do you think is needed to simplify everyday life and trade in Austria in future?**

Although Austria is a small country in terms of area, the journey from east to west is long and sometimes arduous. The country's high Alpine regions account for over 62% of its geographical area – hence the large number of tunnels and bridges needed for road and rail traffic. Despite the constant expansion of the country's

rail infrastructure in recent years, particularly in the mountainous western regions, much remains to be done. My personal wish would be a high-speed train link between Vienna and Bregenz to simplify travel within the country.

>





First six-storey wooden construction passive houses in Graz, Styria. The green flat roofs of 2,400 m<sup>2</sup> were sealed with Sarnafil® sealing membranes.





> **What are Sika Austria's long- and short-term goals?**

Our main goal is to achieve profitable growth in all target markets and to become a preferred workplace for employees. We aim to be the leading supplier for the Austrian construction chemicals markets and for the countries to which

In mature markets, growth can be accelerated by purposeful acquisitions – though also through product and service innovation, and a closer understanding of customer needs.

We are seeking to expand our presence in the distribution network, mainly via

**comes first. Do you see this as an accurate description of Austria?**

Definitely. There are boundless options in both summer and winter. You can go skiing or hiking in the mountains, go bathing in lakes, visit cultural monuments or attend events. That is why Austria is a tourist destination and hospitality a top

I can confirm that. Vienna is connected, offers an abundance of cultural activities and has fantastic facilities for all kind of sports. It is a safe place to be, is full of restaurants with delicious cuisine and has many other great places to enjoy unforgettable moments with friends and family. Whether you're into skiing or

wine-tasting or are just looking for some peace and quiet in a natural setting, then you will find numerous places around Vienna to explore and enjoy.

**What are your aspirations for the country in the future?**

I hope that Austria will continue to be

one of the world's safest countries with the highest quality of life. <



The team of Sika Austria.

we export our products and technologies. We can only achieve these goals by retaining and attracting skilled and highly motivated employees, who are guided by strong and customer-oriented leaders. That is why we are constantly improving working conditions for staff, e.g. by modernizing workplaces in offices, laboratories and elsewhere. Furthermore, training and continuing professional development are crucial for managers and the entire workforce.

the leading builders' merchants, to build better customer relations through added value, to develop new products, systems and integral solutions for our customers, and to strengthen our brand reputation.

**No country waltzes so effortlessly between the urban and the outdoors as Austria. One day you're cresting Alpine summits, the next you're swanning around imperial Vienna. It's a small but versatile country where hospitality**

priority. Of course, the country's centrality within Europe and easy accessibility are also important.

**What do you personally enjoy most about living in Austria?**

Vienna is a fantastic place to live. This year, for the eighth consecutive time, Vienna occupied top spot in the Mercer rankings – ahead of even Zurich, Munich and Auckland – as the city offering the highest quality of life worldwide.



The waterproofness of the pool and wellness area of a private house is ensured by an expertly prepared surface as well as a full-surface bonding with SikaBond®.



© Paul Ott





## A COMPLEX STRUCTURE BUILT DEEP INTO THE MOUNTAINSIDE

The town of Visp in southern Switzerland is located at a strategic pinch-point for traffic passing through the narrow Rhone valley. Here the A9 highway leads through densely built-up residential and commercial areas. To increase the inhabitants' quality of life, the only option for a highway bypass was to go underground. The main objective of the new highway is to enable a sustainable and future development, which links the whole Valais and brings real value to the population, industry and tourism.

TEXT: BENEDIKT LINDLAR, ASTRID SCHNEIDER  
PHOTO: RICARDO GOMEZ



The Visp tunnel is part of an almost entirely underground bypass scheme and marks the final phase in the construction of highway A9 through the Valais area.







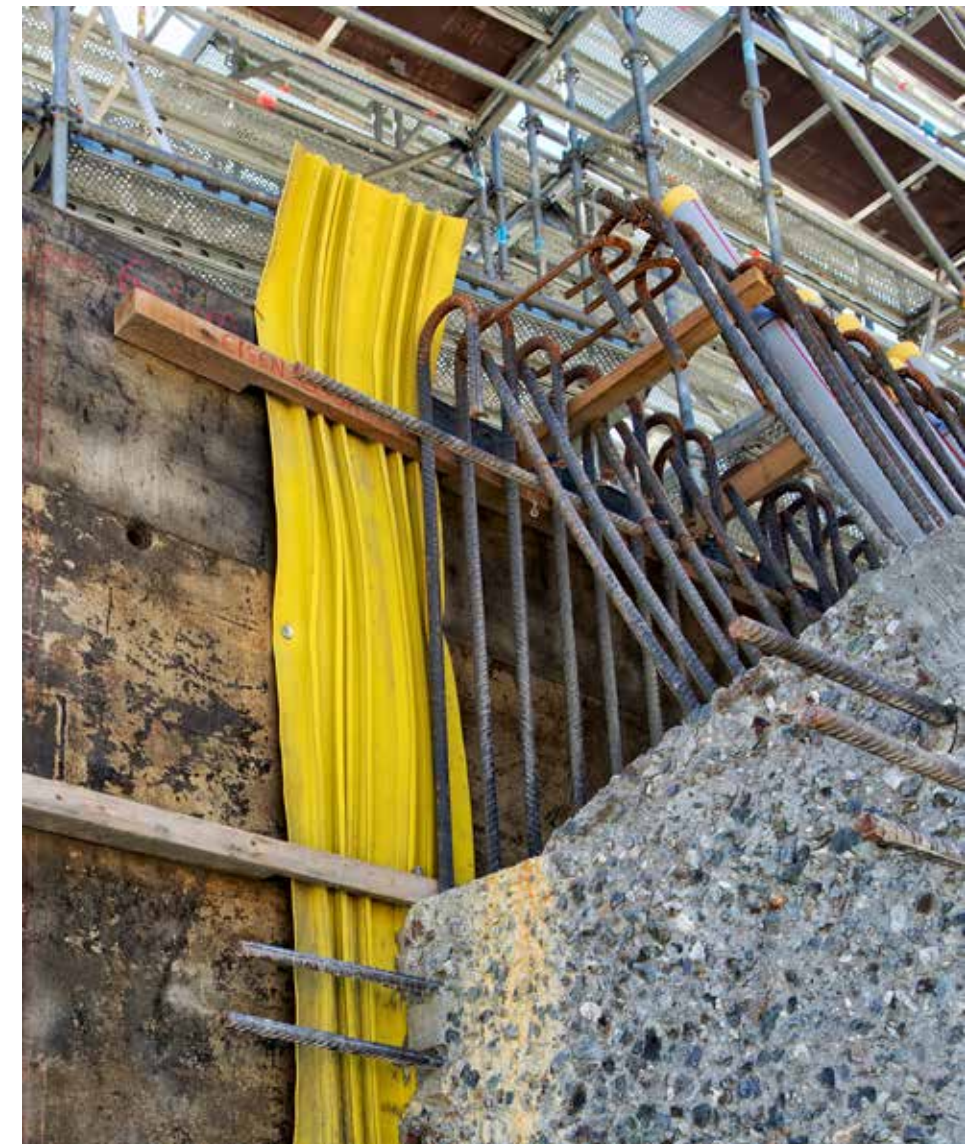
> The Visp tunnel is part of an almost entirely underground bypass scheme and marks the final phase in the construction of highway A9 through the Valais area. This new tunnel is a complex underground structure, consisting of the north and south directional road tubes plus an underground interchange connecting Valais to the Visp Valley.

The tunnel project started in 2014, and since then the northern tube (2645 m long) has been constructed following the completion of an exploratory tunnel in 2015. The southern tube mainly followed the existing smaller tunnel to the Visp valley, which was widened to a diameter of 10.80 m to make it suitable for use as a highway tunnel. Construction work

also included crossings and the highway intersection.

Since the project's start in 2014 more than 350,000 m<sup>3</sup> of rock have been excavated and, after crushing and grading, been used as fill material on several of

>



Since the project's start in 2014 more than 350,000 m<sup>3</sup> of rock have been excavated.



Sika's support comprised products for rock support plus various aspects of production and placing for about 185,000 m<sup>3</sup> of concrete and 150,000 m<sup>3</sup> of shotcrete.



> the A9 construction sites. Excavation of the Visp tunnel was completed in 2016, with the breakthrough of the north tube on August 22, 2016.

In close cooperation with the contractor, Sika was able to provide a comprehensive package of solutions throughout the entire project. This comprised products for

rock support plus various aspects of production and placing for about 185,000 m<sup>3</sup> of concrete and 150,000 m<sup>3</sup> of shotcrete, as well as 150,000 m<sup>2</sup> of membrane-based structural waterproofing systems for the tunnels.

Experience the project by flying with a drone:

<https://www.youtube.com/watch?v=aGIDLbA6s>



## FUN FOR ALL BENEATH THE DOME

For young and old alike, nothing beats the anticipation, excitement, butterflies, and exhilaration of a roller coaster ride. Since summer 2014, riding the roller coasters at Europa-Park, Germany's biggest theme park, has been more spectacular than ever. That's when the most elaborate indoor attraction in Europa-Park's history opened to the public. Right next to the Fairy Tale Forest, the park has built a theme ride based on the French children's film 'Arthur and the Invisibles.' Most of the movie takes place underground in the enchanted garden-like land of the tiny elfin Minimoys. The fascinating dark ride through this fantastic wonderland features numerous special effects.

TEXT: CHRISTIAN DIEFENBACHER, ASTRID SCHNEIDER  
PHOTO: SIKI GERMANY





A distinctive green roof, dome, and wall transform the structure into a verdant primeval forest idyll.



A steel framework serves as load-bearing structure for the hall and dome.

- > The building is unusual in architecture and design. The attraction is concealed beneath a 15-meter quarter-circular dome connected directly to the hall. The dome rises three meters above all the other buildings in the Minimoy world. The distinctive greenery covering the roof, dome, and walls near the entrance transforms the building into a verdant primeval forest idyll. Lavish plant cover, richly detailed decorations and a location directly on the Mühlbach stream next to a chestnut-lined path strengthen the

- 1/3 The synthetic roof membrane is ideal for architectural details like the domed roof.
- 2 The surfaces are sealed using a Sarnafil TS 77 FPO synthetic roof membrane from Sika Germany, delivered in a custom reseda green color.



## THIS MEMBRANE IS IDEAL FOR WATERPROOFING ROOFS WITH EXTENSIVE PLANT COVER IN COMBINATION WITH A MECHANICAL ATTACHMENT SYSTEM.

> fairy-tale ambiance. Green roller coaster tracks snake their way outdoors from the entry area, then reenter the microcosm on the other side of the building. The park planners developed the theme ride mainly for younger children and families. The passengers sit in cars, but with their legs dangling in the air in an “inverted coaster” configuration. For the entire ride, the cars are suspended from the rails rather than running on them as in a conventional coaster. This gives passengers a fantastic sensation of flying, carrying them to a height of nearly 15 meters at the highest point of the ride beneath the dome.

### A TIGHT SEAL FOR THE DISTINCTIVE ROOF DESIGN

Construction began with an enormous steel frame that serves as a supporting structure for the hall and the dome. Gradually the building took on its unusual shape. Box corrugated steel roofing panels were used over the entire newly-built hall. The 3,320 m<sup>2</sup> surface was first covered with a self-adhesive aluminum-laminated vapor control layer from Sika Germany. This was followed by a 160-mm layer of mineral fiber insulation. Sarnafil synthetic waterproofing sheeting, also from Sika, was chosen to seal the roof and dome. There were three distinct areas to be sealed: The 2,300 m<sup>2</sup> main roof was attached mechanically. To the north it adjoins a 320 m<sup>2</sup> sloping roof with a 30 degree incline. The third area consists of the dome, which rises three meters above the main roof, and the quarter circle that descends to the ground. These have a total area of 700 m<sup>2</sup>.

Since the sloping and dome roof areas were to be covered in vegetation, the waterproofing membrane had to exhibit a high degree of tear resistance. Sika's root and rhizome resistant Sarnafil TS 77 membrane is ideal for waterproofing roofs with extensive plant cover in combination with a mechanical attachment system. To ensure that the roof would blend seamlessly into the building's design, the client had one special requirement for the synthetic membrane: the waterproofing for the entire roof had to be reseda green. Sika Germany met this special color request. As a result, the building had a distinctive, otherworldly appearance even before planting.

### A SPECIAL CHALLENGE: THE DOME

The dome rises from the building, directly attached to the flat roof and the facade. In the shape of a quarter-circle it descends all the way to the ground. Beneath it is the entrance to the realm of Arthur and the Minimoys. The lower edge of the 700 m<sup>2</sup> dome surface, with a slope of nearly 90 degrees, presented a special challenge. Synthetic waterproofing membranes are particularly well-suited for architectural details like this.

### SUPPORT ON THE DOME

Sika Germany provided services such as engineering assistance for the dome and sloping roof construction and mechanical attachment as well as visits to the construction site by an application technician. The slope of the roof and the dome presented added safety challenges during construction. Safety nets suspended from tubular steel brackets

were installed around the building and additional scaffolding was erected.

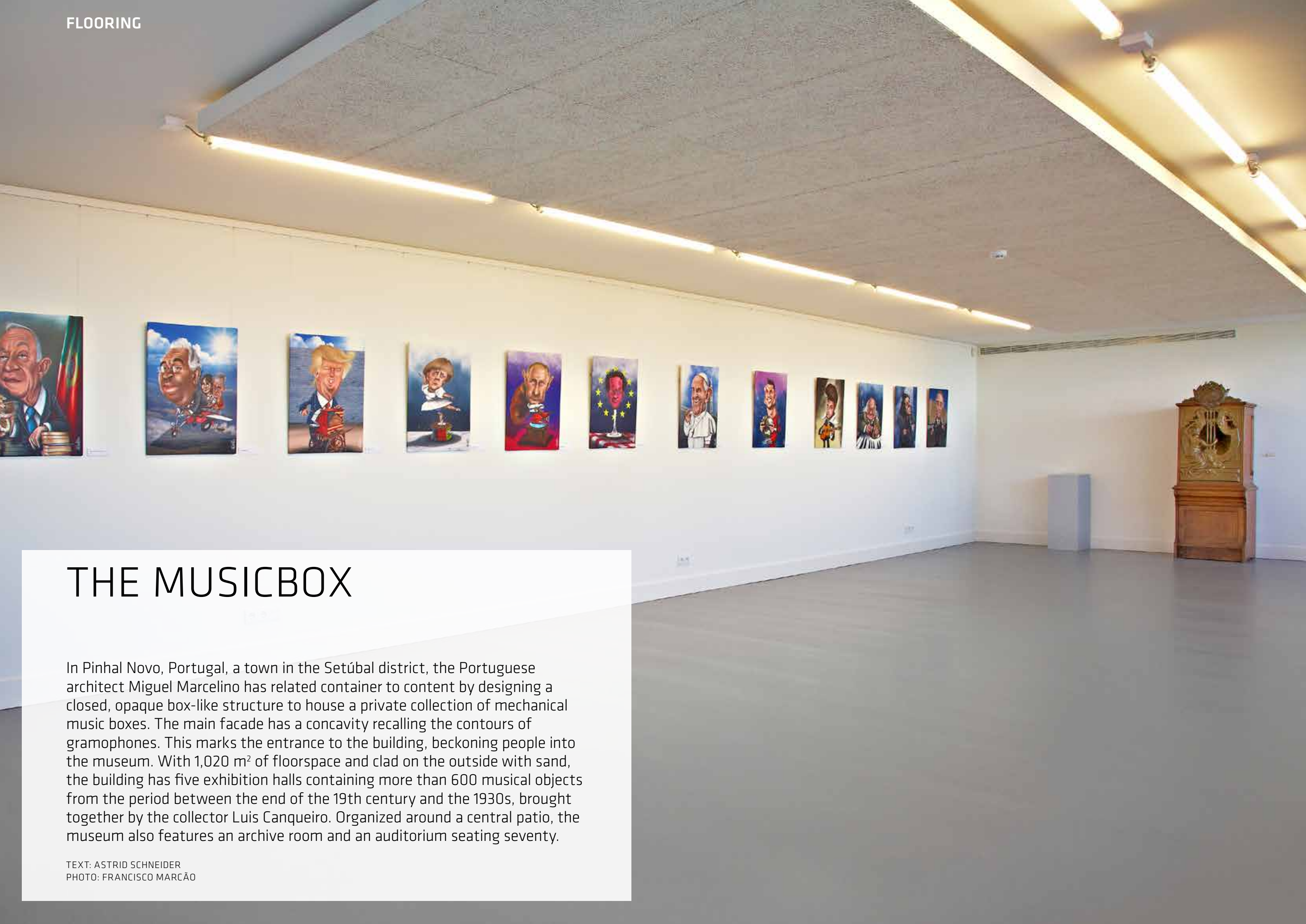
### ENCHANTED GREENERY

The roof, dome, and walls were subsequently planted using vegetation mats. A cherry picker and additional safety ropes were used to reach the steep roof surfaces. The work on the facade required special precautions. A steel structure at the peak of the dome was used to secure steel cables. Individual panels were pre-filled with substrate and mechanically attached to the steel cables together with the vegetation mats. This load transfer method made it possible to securely attach the extensive vegetation to the roof sections. The green roof is complemented by artificial flowers at the roller coaster entry and on the facade.

All this effort has paid off, and the new attraction has been a big hit with both children and adults. Visitor numbers since the ride opened in the summer of 2014 have been well above all expectations. <







# THE MUSICBOX

In Pinhal Novo, Portugal, a town in the Setúbal district, the Portuguese architect Miguel Marcelino has related container to content by designing a closed, opaque box-like structure to house a private collection of mechanical music boxes. The main facade has a concavity recalling the contours of gramophones. This marks the entrance to the building, beckoning people into the museum. With 1,020 m<sup>2</sup> of floorspace and clad on the outside with sand, the building has five exhibition halls containing more than 600 musical objects from the period between the end of the 19th century and the 1930s, brought together by the collector Luis Canqueiro. Organized around a central patio, the museum also features an archive room and an auditorium seating seventy.

TEXT: ASTRID SCHNEIDER  
PHOTO: FRANCISCO MARCÃO





The museum has five exhibition galleries featuring mechanical instruments arranged around a central area plus a documentary room.





> Though from the outside the box looks very elementary, this belies its interior: exploring long diagonal perspectives that open up as spaces are crossed; we see glimpses of galleries in a game of spatial seduction that maintains our curiosity from the beginning to the end of the visit. On one side of the building is an atrium which also functions as a vertical space with varying dimensions. The transition between each of these four spaces is achieved through four antechambers. This unique museum is wholly dedicated to the study, preservation, enhancement and dissemination of a collection that is particularly representative of mechani-

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- 1 The exterior design reflects the topic of the interior exhibitions: the musicbox
- 2 The interior design shows long diagonal perspectives that open up as spaces are crossed
- 2 This museum is wholly dedicated to the study, preservation and enhancement of mechanical music





> cal music. It has five exhibition galleries featuring mechanical instruments arranged around a central area, plus a documentary room and a multipurpose room used among other things for temporary exhibitions.

A special piece of architecture needs special building materials. In particular, there were specific requirements for the floor. Sika® ComfortFloor® was ultimately chosen, as this flooring combines aesthetics with very good acoustic qualities and durability. Furthermore, Sika Portugal provided technical support from specification through to implementation and installation by an Approved Applicator. José Mestre, Indopave Applicator, stated that “Sika® ComfortFloor® coating, SikaFloor®-330 and SikaFloor®-305 W was chosen because the space requires a continuous solid floor that is quiet, easy to clean and aesthetic.” Sika® ComfortFloor® solutions are also suitable for continuous flooring with matt and colored finish that can be applied over a wide range of thicknesses, including pre-fabricated rubber shockpad for acoustic excellence.

Architect Miguel Marcelino considers that the end result is a structure which

seems deceptively elemental from the outside but whose interior conveys quite a different impression, leading visitors on from one display area to the next. So we should give in to our curiosity and make a stop in Portugal to visit this stunning work of architecture – and be enchanted by the world of mechanical music. <

For more information about the project: <http://www.arquitecturaviva.com/en/Info/News/Details/9696>



4 Sika ComfortFloor® solutions are also suitable for continuous flooring with matt and colored finish

5 SikaFloor was chosen because the space requires a continuous solid floor that is quiet, easy to clean and aesthetic



# REFORESTATION OF CORAL REEFS WITH MORTAR BYPRODUCTS

Corals live in tropical waters throughout the world, generally close to the surface where the sun's rays can reach the algae. They form one of the world's most colorful and diverse ecosystems, and though they cover only about 1 percent of the ocean floor they have a huge effect on the health of the rest of the world, supporting about 25 percent of all marine creatures.

TEXT: ASTRID SCHNEIDER  
PHOTO: SIKA THAILAND



# THE PRODUCTION WASTE OF MORTAR, WHICH IS CEMENT AND SAND, HELPS TO BUILD NEW CORALS REEFS

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Reefs house hundreds and even thousands of species. The diversity is due to the fact that reefs are an important location for finding food, shelter, mates and places to reproduce. Reefs also act as nurseries for large fish species, keeping them safe until they are large enough to strike out into the deeper ocean.

Corals are not plants. They're actually animals and are relatives of jellyfish and anemones. Though "taking root" on the ocean floor, corals are sessile animals – unlike plants, they do not make their own food. While corals get most of their nutrients from the byproducts of algae photosynthesis, they also have barbed, venomous tentacles they can stick out, usually at night, to grab zooplankton and even small fish. At their base is a hard,

protective limestone skeleton called a calicle, which forms the structure of coral reefs.

Reefs develop when a polyp attaches itself to a rock on the sea floor and then divides into thousands of clones. The polyp calicles connect to one another, creating a colony that acts as a single organism. As colonies grow over hundreds and thousands of years, they join with other colonies and become reefs. Some of the coral reefs on the planet today began growing over 50 million years ago.

Healthy coral reefs mean healthy oceans, which means a healthy planet. But corals have been extremely reduced in the recent years due to coral bleaching from

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A collection of coral cubes shortly before thrown back to the sea.



Major production waste volumes of Sika Thailand's 80,000 t of mortar are cement and sand. And coral reforestation is what you can do with it.



- > extensive fishing and extermination by humans. Scientists estimate that human factors, such as pollution, global warming, and sedimentation, are threatening large swaths of the world's reefs. So it is a responsibility to preserve and restore corals.

Sika Thailand is setting a creative and impressive example to reuse waste materials from production and to provide added value to the Community/Society as part of its local "More Value Less Impact" Sustainability program. But how did they proceed?

First of all we must note that Sika Thailand produces about 80,000 tons of mortars, admixtures and resins per year. Major production waste volumes are cement and sand, which so far have been sent to landfill. Recently a cooperative venture has been set up with a local naval school to use these materials to repair buildings and roads and to recycle them into concrete cubes for coral reef reforestation. All this takes place at the island of Koh Samet on Sai Kaew Beach, Chonburi province. The island is controlled by the Royal Thai Navy base and is connected to the Gulf of Thailand, three hours to the south-east of Bangkok.

The coral branches to be planted are delivered by Thai Navy personnel, who patrol the sea regularly. When they find damaged corals which are still alive, they collect them for growing. The actual process starts by mixing cement powder residues from Sika Thailand's Chonburi factory with water to obtain a glue-like texture. This mass is then formed into a concrete cube with a hole in the middle of the top side.

When dry, a coral branch is put into this cement hole. The coral is then again attached to the cement hole by a Sika cement powder mix. It is important to pay attention and not touch the coral branching and staghorn during the whole process so that the parts can grow later on. It is then once again time to wait for the

attached cement to dry. Afterwards, the concrete cubes with the corals are moved to the navy boat. As corals can only survive out of seawater for 5 – 10 minutes (depending on the species), they must be moved to the sea immediately or else kept watered. Personnel with diving skills now drop the concrete cubes with corals to the seabed. Subsequently, it is a ques-



tion of monitoring the corals to see how fast they grow. After some months, sub-branches can be seen.

In 2016, Sika Thailand produced 840 concrete cubes with waste materials and planted corals. These provide a new habitat for marine life. But now there is an even more ambitious plan – to plant 2,000 corals in 2017.

See the whole process on video:

<https://youtu.be/AiUwMLvYUyc>

Visit Sika Thailand: <http://tha.sika.com/>



Participants diving and bringing the coral cubes down to the seabed.







The team of Sika Chile and the pupils making their space a better place.

## A GOOD NEIGHBOR

With the aim of empowering the relationship between Sika Chile and the neighboring community in San Joaquín – the area where Sika Chile is located – the latter has developed a series of activities to support the Fray Camilo Henríquez school.

TEXT: SANDRA ROMAN  
PHOTO: SIKA CHILE

> Besides Sika colleagues, professionals from the NGO “Mi Parque” have also taken part in the initiatives. Mi Parque works to improve life quality in underprivileged neighborhoods by designing, building and activating public green areas, working along with the local community.

With shovels, pots and plants, they all arrived at the school to work together with the students from primary school to enhance green areas and repair playing spaces in the school, thus also helping to improve the environment for learning.

“We want to become a good neighbor, involved in the problems and dreams of the

kids in our community and contributing to a better future for them”, said Rodrigo Sáez, HR Manager of Sika Chile at the launch of the all-day work activities.

Students and teachers worked together in a spirit of friendship and full of energy together with all the various collaborators to improve access to the pre-elementary school area – playground, bicycle parking area, trees, etc. – and hence make it generally more attractive. They also restored the vegetable patch, repairing planting pots and drawing a sowing/harvesting calendar on the wall.

Sáez recalled: “Some months ago the

School Director contacted me to ask for support from us in this initiative, and our answer was immediately affirmative. The students’ happiness was our best reward”.

“It was a nice coincidence that we were concerned about improving the school’s infrastructure while Sika also had the attitude to support us with it. The result is plain to see, and we are happy that our students now have a better place to study, have lunch or simply play”, says Director Lorena Manríquez.

The project involved materials, tree planting and the participation of 15 Sika



Enhancing green areas and repairing playing spaces in the school were parts of the activities



has been a very encouraging experience to see the children’s smiles, to answer their concerns about research topics and



employees in addition to a professional team supplied by “Mi Parque”, who guided the process and designed the improvements.

Apart from this project, Sika has developed other cooperation initiatives with the school, including a guided visit to our facilities for students from the 6th elementary grade so that they could get

to know industrial processes, and also a co-teaching class at our R+D Lab in which Sika R&D Manager Carolina Valdebenito carried out an interactive chemistry class to students from the 8th elementary grade.

“We want to be good neighbors in San Joaquín and this activity at the school is an important part of this challenge. It

to share all of this with teachers and parents. We are very grateful”, concludes Rodrigo Sáez. <

Get linked to Sika Chile:  
<https://chl.sika.com/>  
Get more information about the NGO “Mi Parque”:  
<http://www.miparque.cl/home-en-ingles/#ourwork>



