

MAURER || MAG

MAURER GUIDED CROSS-TIE

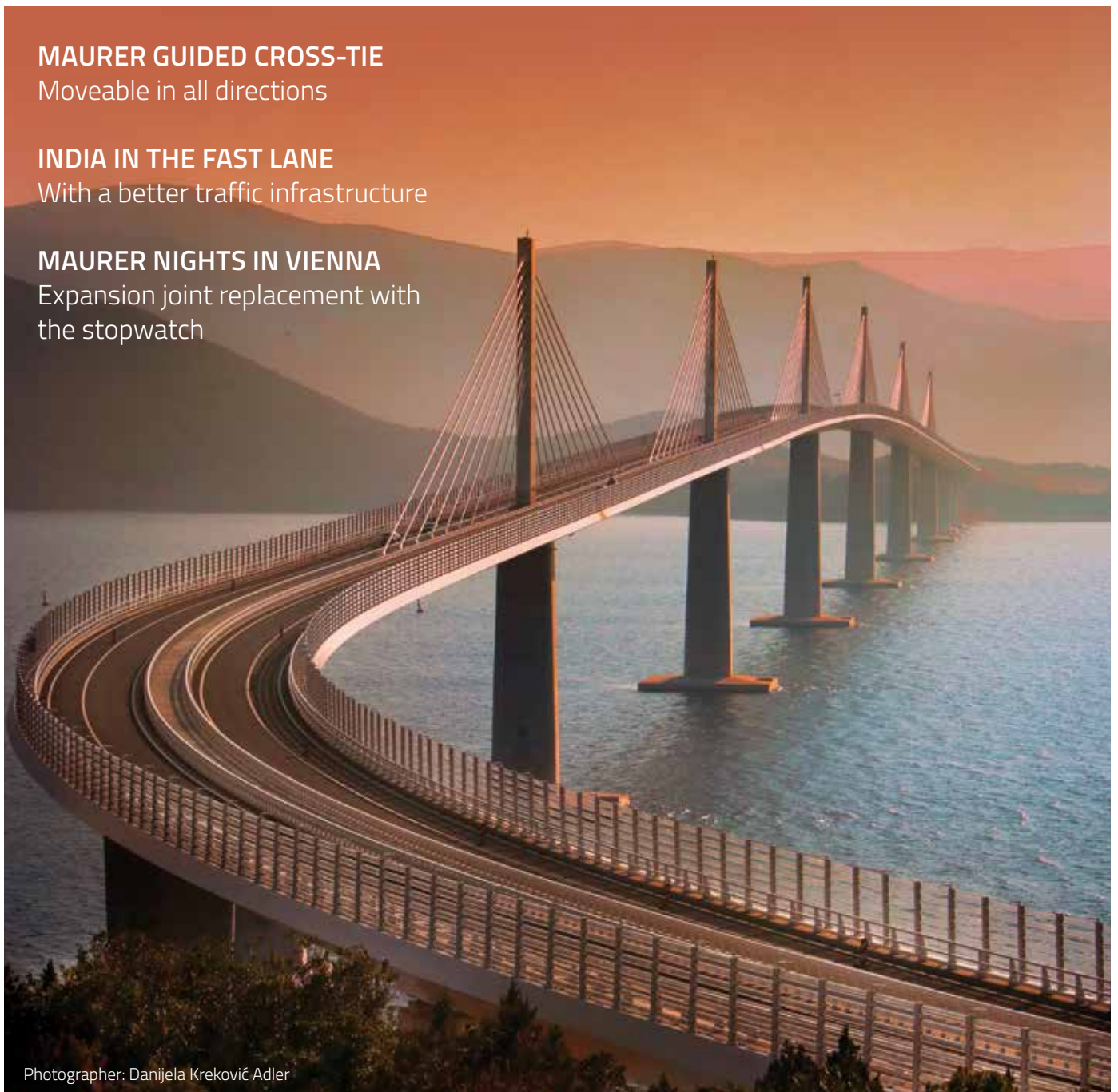
Moveable in all directions

INDIA IN THE FAST LANE

With a better traffic infrastructure

MAURER NIGHTS IN VIENNA

Expansion joint replacement with the stopwatch



Photographer: Danijela Kreković Adler

FROM THE PAST INTO THE FUTURE

The largest suspension bridge in the world, the 1915 Çanakkale Bridge. The first bridge equipped with the innovative MAURER MSM[®] Swivel Joist Expansion Joints.



Dear readers,

Our MAURER MAGazine has now been published for five years. Here, we report on new small and large stages of technological progress in our fields. That is continued in this issue.

In the light of ever new, terrible catastrophes and crises, we all have to pause time and again, reorientate, and then continue to make the world, in which more and more people are living closer together, a little bit better.

Together with you, our partners and clients, we have also made good progress in doing so in the more recent past. In this issue, we thus report from Mexico, from Canada, India and also a few other corners of the globe. Here, our work helps to protect buildings and traffic infrastructure from tectonic, climatic, and physical influences caused by us, and to realise modern future-oriented architectures and traffic routes.

That is what we show in this MAURER MAGazine. For us, crises are an initial for progress.

With kind regards from Munich,



Dr Christian Braun



Max Meincke



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To meet extraordinary demands, we are extremely inventive. MAURER designs highly innovative railway expansion joint and unique derailment protection for the "New Samuel de Champlain Bridge" in Montreal.



38 SPIKE FUN

A normal looping does not really set the hearts of hard-nosed roller coaster fans racing. But when the usual momentum suddenly gets a push or even slows down, and to top it all off, the seat is tilting, it is getting edgy.

// IMPRINT

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GOOD VIBES FOR 50 YEARS OF SERVICE LIFE // MAURER HAS BEEN DAMPING SPECTACULAR VIEWING PLATFORM SINCE 2011

Damping with a hint of adventure even for mountain tourists who are not so enthusiastic about vibrations.

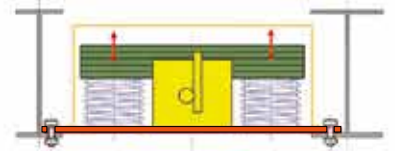
Munich, Garmisch-Partenkirchen. AlpsiX is a spectacular viewing platform 1,000 m above the Höllental and facing Germany's highest mountain, the Zugspitze: Two light steel walkways in an xshape jut out into the void. The AlpsiX walkways were opened in July 2010. However, the steel walkways vibrated so strongly when the visitors made specific movements that the operators – Bayerische Zugspitzbahn Bergbahn AG – decided to also make the AlpsiX accessible to mountain tourists who are less enthusiastic about vibrations. MAURER carried out the “damping with a hint of adventure.”

Damping, but not restraining

The order for MAURER was therefore: Reduce vibration, but do not eliminate it completely by using tuned mass dampers. In addition to heightened attractiveness for the visitors, the Zugspitzbahn also kept the service life in mind: the less vibration, the less material fatigue and thus longer maintenance intervals and service life.

The two approximately 17.50-m-long AlpsiX-arms lie one above the other and project symmetrically like an x above the abyss. Their load-bearing structure consists of two longitudinal I-beams with cross braces in each case. The mass dampers had to be installed at the cantilever as far forward as possible, where the vibrations are strongest. At the same time, the two mass dampers in each case should only detract from the airy look to a minor extent.

That is why each of the 340- mm-high components were installed under the grating between the longitudinal beams at the point of the steel beams. Each of the four approx. 300-kg-heavy mass dampers are in the shape of flat square boxes with 650 x 650 mm plan view. The vibrating absorber mass of 150 kg in each case is divided into several plates so that it can be fine-tuned later. The plate pack lies on four steel helical springs, which are fixed on a base plate. The base plate is fixed at the longitudinal beams.



The square flat boxes (orange) accommodate the vibrating absorber mass (green) with 150 kg in each case, which is divided into several plates. An additional hydraulic damping element (yellow) is integrated in the middle. The plate pack lies on the four springs (blue), which are fixed on the base plate (red). It is fixed to the structure with four bolts at the I-beams.

Springs plus Hydraulics

However, the counter vibration of the mass plates alone would not have sufficed to damp the structure. This is why MAURER integrated an additional hydraulic damping element that is connected with the mass and acts as an internal brake.

In summer 2011, the four mass dampers were installed from above by unscrewing the gratings and lifting the damper boxes into position and fixing them. Following commissioning, dimensions were checked and the absorber mass was finely tuned.



In an x-shape, the two viewing walkways jut out into the abyss. Mass dampers at the points of the steel walkways reduce excessively strong movements and hydraulic damping elements prevent the intentional build-up of vibrations.



September 2020: View across to the Pelješac Peninsula.

PELJEŠAC-BRIDGE CROATIA: // 19 MN HORIZONTAL FORCES REQUIRE VERTICALLY INSTALLED SPECIAL BRIDGE BEARINGS

Springs in the bearing core and special materials ensure long service life despite extreme loads through permanent contact of the sliding surfaces.

Munich, Pelješac. The Pelješac-Bridge situated on the picturesque coast of Croatia has been one of the most impressive cable-stayed bridges in Europe since 2022. The new bridge is well over 22 m wide and connects the Croatian mainland to the offshore peninsula Pelješac thus opening a complete Croatian overland route from the north to Dubrovnik.

The region is an earthquake zone; accordingly, the bearings have to accommodate large movements and high horizontal forces. Half of the bearings have been installed vertically because

of these forces. To this end, MAURER developed a special solution to ensure that no gap can open between the sliding surfaces. The wear is thus reduced and a service life of at least 50 years can be achieved.

Cable-stayed bridge with twelve pylons

The bridge has a total length of an impressive 2,404 m, divided into 13 different fields. The main bridge across the so-called Pelješac-Channel is a cable-stayed bridge with twelve pylons. The five central spans are 285 m in each case. The clearance amounts to 55 m.

16 spherical bearings installed vertically

In autumn 2020, MAURER installed 32 spherical bearings. From a technical perspective, the 16 bearings for guiding the bridge in the longitudinal direction were particularly demanding. They have to accommodate high horizontal forces of up to 19 MN in the transverse direction and be installed vertically. Here, it had to be ensured that the sliding surfaces remained in contact at all times so that no dust could infiltrate and impair the sliding properties. This also results in wear, which would reduce service life to only five to ten years instead of the required 50 years at least.

Additional 16 MSM® spherical bearings, two per pylon in each case, were installed to absorb the vertical forces of up to 33 MN. Moreover, all bearings have to accommodate large, fast movements of ± 1.3 m. This results in a bearing length of up to 3 m. The largest bearings are 1.2 m wide and approx. 330 mm high.

Corrosion protection important for bearings and expansion joints

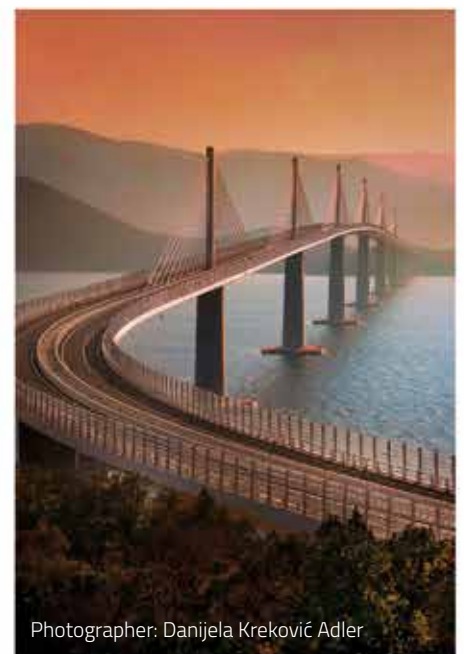
For reasons of corrosion protection (aggressive sea air), the steel parts of the spherical bearings are not only equipped with a corresponding C5-m coating, but also the important inner calotte hinge was completely manufactured from one material: MSA® – MAURER Sliding Alloy.

The required corrosion protection also influenced the expansion joint design. These flexible structural components compensate for temperature and earthquake movements of up to 1,400 mm of the bridge deck relative to the mainland at both ends of the bridge. The two 23.6-m-long expansion joints of type DS1400 with 14 profiles were manufactured by MAURER in hybrid design. Hybrid, since the upper part of the steel profiles is made of stainless steel, whereas the lower part is made of structural steel providing high protection against corrosion.

Construction work on Pelješac-Bridge had been completed by the end of 2022 and following that, the bridge was opened to traffic.



Attention reflection! The bearing (lower half) is reflected in the high-gloss sliding plate made of stainless steel (top). At the top and bottom, the clamps against uplift forces can therefore also be seen twice.



Photographer: Danijela Kreković Adler

THE MAXIMUM FOR
EARTHQUAKE-PROOF RAILWAY BRIDGES

// MAURER GUIDED CROSS-TIE

A world's first for a complex seismic protection system in Mexico

Construction site of the new intercity
line Toluca–Mexico City.





The railway line Toluca–Mexico City was scheduled to go into operation in early 2021. The new intercity line is 57.7 km long and connects Toluca with Mexico City. Around 230,000 to 300,000 passengers travel with it every day. The investment volume amounted to 2.5 billion US Dollars. [read more >](#)



Photo: Constructora De Proyectos Viales De Mexico S.A. De C.V. (CPVM)



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2



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- 1) The guided cross-ties in the production of MAURER in Munich
- 2) Installation of the guided cross-ties
- 3) Lifting the guided cross-ties into the bridge
- 4) In the testing laboratory in Augsburg
- 5) Working at a height of almost 70 metres

The unique feature of the successful realisation is the MAURER Seismic Protection for two long viaducts. To this end, guided cross-ties, the first entirely earthquake-proof railway bridge expansion joints worldwide, were installed at the ends of the individual bridge sections.

Together with a complex system of bearings, dampers and elastomeric spring isolators they ensure the stability, functionality and safety of the structure for various load cases: from braking and acceleration forces in normal operation to the maximum considered earthquake (MCE). To that end, the framework conditions posed one of the greatest challenges to MAURER and to Rainer Roos, Managing Director responsible for MAURER SPS GmbH & Co. KG. The two largest bridges, viaduct 2 (3,865 m long) and viaduct 4 (1,448 m), are located in the mountains. The region also has a high seismic risk. The distances between the piers are up to 64 m, and they are up to 65 m high. It is Mexico's first railway project with viaducts of such dimensions in a region with extremely high seismic accelerations of up to 0.77 g. The conventional strengthening with concrete and steel reinforcement in the structure was neither sufficiently safe nor cost-efficient in light of the seismic forces.

enable controlled movements and completely accommodate them, thus mitigating the seismic impacts, and fulfilling the requirement that trains can safely cross the viaducts even immediately after a strong earthquake.

the structure along with greatly reduced total construction costs.

The components used are certified and tested and have a long service life of at least 50 years.

The following elements intertwine at the two large viaducts:



- **The new earthquake-proof guided cross-tie:** This expansion joint installed at individual ends of the bridge sections facilitates non-destructive thermal and seismic movements in all directions.



- **Spherical bearings with the MSM® sliding material:** The bearings between bridge deck and piers accommodate 2,900 tonnes of superimposed loads and prevent lateral break-out of the deck in the event of a Design Basis Earthquake (DBE).



- **Horizontally positioned hydraulic dampers:** They block braking forces and limit the bridge displacement in the longitudinal direction in case of an MCE (Maximum Considered Earthquake).



- **Elastomeric spring isolators:** They optimally re-centre the bridge into a neutral position in all earthquake and service load cases.

»I grow with the challenge of finding solutions for problems that the market does not yet offer.«

Rainer Roos

A combination of different structural protection systems was implemented instead, which

Complexity as a challenge in itself

The maintenance-free protection system according to EN 15129 (antiseismic devices) substantially reduces the longitudinal forces acting in the bridge deck: by a factor of 3 to 4. This facilitates significantly smaller bearings and dampers.

Thereby, the slender piers requested by the architect could be implemented with relatively few foundation measures. The protection system guarantees high safety and functionality of

World premiere: earthquake-proof guided cross-tie

The paramount innovation was the guided cross-tie, that MAURER had developed over years. It was installed on the railway line Toluca–Mexico City for the first time worldwide. With the help of the guided cross-tie, the tracks bridge the gap between the individual viaduct sections in an absolutely earthquake-proof way. The decisive safety advantage of the guided cross-tie: The moveable bearings in the expansion joint facilitate "moving" or rotating of the cross-ties in or about the longitudinal,

transverse, and even the vertical axis. During train passages, there are no considerable elastic deformations inside the guided cross-tie. This enables high train speeds of up to 350 km/h. The full seismic movements are compensated within the expansion joint without damage and plastic deformations, which enables immediate crossing even after a strong earthquake.

At viaduct 2, for example, one guided cross-tie per direction of travel in each case was installed in five sections. Each section can therefore move individually thus drastically reducing the forces acting on the piers and the foundation. This leads to higher structural safety and enables a more economical construction method by up to 10 percent.

Currently, MAURER is the only manufacturer of railway expansion joints that can transfer and accommodate fast, pulse-like and large seismic movements to that extent without damaging the structure and the expansion joint itself.

142 spherical bearings for high compression in a small space

The viaducts have individual span widths of 55 m to 64 m, the piers are up to 65 m high and very

slender. Two spherical bearings per axis equipped with high-molecular polyethylene material are therefore planned as bridge bearings between bridge deck and pier to reduce the bearings by at least 40 percent compared to conventional teflon sliding bearings. In the event of an earthquake, the spherical bearings act as isolators and can move freely approx. ± 450 mm.

MAURER was able to fulfil these requirements with its MSM® sliding material, which is especially suited for railway applications and has been tested for 50,000 m slide path without wear.

Hydraulic dampers for the braking forces

In the middle of each bridge section, up to six hydraulic dampers lie on a pier. They block the pulse-like dynamic braking forces of the trains in the longitudinal direction of the bridge and prevent bridge deck displacements of more than the permitted 10 mm.

The damper system allows slow thermal bridge deck movements without significant resistance.

Elastomeric spring isolators tested in California

To re-centre the bridge sections

during and after an earthquake, 52 elastomeric spring isolators were installed in addition to the hydraulic dampers. They act as elastic fixed points and bring the bridge deck back to a centre position.

Due to the high requirements placed on the dampers and elastomeric spring isolators, they have been tested in two institutes: on the "shake table" of the University of California in San Diego and the earthquake simulator of the University of Messina.

Lateral concrete guides on each axis as safety barrier

Of the above-mentioned spherical bearings, one freely moveable and one laterally guided bearing lie on each axis. The guided bearing prevents a lateral break-away of the tracks in the DBE case.

At higher forces for MCE-load cases, the bearing guide gives way and the structural concrete enclosure on the piers acts as an additional safety system so that the bridge cannot collapse.

Production started at MAURER with the bearings for viaduct 2 in September 2016. The project had been completed with the installation of the guided cross-ties at viaduct 4 by the end of 2020.



MAURER guided cross-tie (CT)

// INTERVIEW

RAINER ROOS

Mr. Roos, as Managing Director of MAURER SPS GmbH you are responsible for worldwide sales. Sounds like a mammoth task?

Rainer Roos: "Yes. As MAURER SPS, we currently serve around 65 countries. All activities except sales region 1 (Germany, Switzerland, Austria, the Netherlands and Scandinavia) are under my responsibility"

You are an engineer with passion, is that right?

R. R.: "I have learnt my profession from scratch. I started with an apprenticeship as a toolmaker. This was followed by further education as a state-certified engineering technician, then studies as a mechanical engineer and finally management studies for Master of Business Administration with the area of studies »Sales and Marketing«."

Is it true that you have been working at MAURER for over 25 years? What was your career path at MAURER?

R. R.: "Yes, that's true. In October 1995, I decided to take up the position as a sales engineer with the aim of becoming »Sales Manager Europe« later on. So, I will soon have been at MAURER for 30 years."

We know that you have already collaborated on the expansion joints of the Viaduct of Millau.

R. R.: "The Grand Viaduc de Millau was a very special project for us at that time.

So-called balancells (special launching bearings) featuring an extremely low friction during the displacement process were used there. The first MSM® spherical bearings were also installed in the abutments there. One highlight in the more recent past is the 1915Çanakkale-Bridge." (see MAURER MAG 22)

»I love to initiate and accompany new developments.«

You are a recognised expert in the field of expansion joints. Where does your enthusiasm for it come from?

R. R.: "I love to initiate and accompany new developments – such as the guided cross-tie or the fusebox solution for earthquakes. I enjoy the challenge of finding solutions to problems that the market does not yet offer, and considering new or enhanced products to that end."

What has been your most interesting project so far?

R. R.: "Well, I can think of many: for instance, the first hydraulic seismic dampers of MAURER for the project Viaduct Ločica in Slovenia. Or large-scale bridge projects such as the Patullo Bridge in Vancouver, Canada, with very demanding expansion joint constructions and the Toluca high-speed train line in Mexico where the first guided cross-ties were used. In the field of structural isolation,



RAINER ROOS

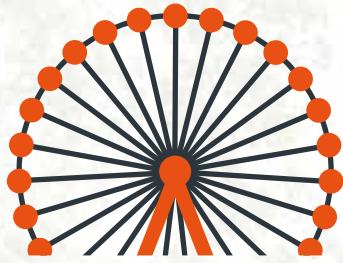
// MANAGING DIRECTOR OF MAURER SPS GMBH

- Born in Esslingen am Neckar
- Apprenticeship as a toolmaker
- Further education as a state-certified engineering technician
- 1995 Sales engineer at MAURER Söhne GmbH & Co. KG, development of sales Europe
- Studies in mechanical engineering
- 1998 Head of Marketing and Sales Bridge Accessories Europe, MENA, North and Central America
- 2004 Studies in Sales and Marketing, MBA San Diego
- 2017 Head of Marketing and Sales of the division Structural Protection Systems Africa, Asia, Europe and Oceania (all countries except DACH, the Netherlands and Scandinavia)
- 2020 Managing Director MAURER SPS GmbH, worldwide sales of MAURER SE (all countries except DACH, the Netherlands and Scandinavia)

I can think of the Sakarya Hospital Turkey with SIP®-D isolators, or projects in the field of nuclear plants or wind turbines."

Can you make time for hobbies, and if so, for which ones?

R. R.: "I like spending time in nature with our dog, am inspired by technical model construction and even though I am no longer an active player, I like watching volleyball as well as many other ball sports. I also like going to classical concerts."



umadum
The Munich Observation Wheel

Most beautiful views



27 CARS
WITH **422** SEATS

CULINARY RIDES LIKE **WEISSWURST-BREAKFAST** OR **CREATIVE DISH FOR LUNCH**



THEME CARS SUCH AS
CUDDLE, BEACH, MEETING

CAR

DURATION OF A RIDE
30 MINUTES



BREATHTAKING PANORAMIC VIEW OVER THE WHOLE CITY TO THE ALPS



ENTRY IN THE **GUINNESS BOOK OF RECORDS**

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78 m
TOTAL HEIGHT

OPERATION WITH **& ECO-POWER** ENERGY RECOVERY





WERKSVIERTEL-MITTE

nbat's

INDIA IN THE // FAST LANE

With new, better roads, tracks, traffic infrastructure – and MAURER Sanfield India

When it comes to the length of the road network, India has long occupied second place worldwide with over 6.2 million kilometres. This network – the associated infrastructure, the railway network, airports, and harbours – everything is now being pursued on a large scale and realised in a comprehensive project. With around 1.4 trillion Dollars for investments in infrastructure in 2025

alone, the Indian government is greatly expanding the infrastructure. In 2022 alone, some 25,000 km of new roads were added. The national motorway network is being expanded by 2,000 km. They supplement the National Highways (NH), which make up only two percent of the total road network, but handle over 40 percent of all traffic.

read more >





The Mumbai Trans Harbour Link (MTHL, also known as Sewri Nhava Sheva Harbour Link) will be 21.8 km long, and connects the city of Mumbai with Navi Mumbai.



Panipat Bridge



Kali River Bridge

A current example is the Mumbai Trans Harbour Link (MTHL, also known as Sewri Nhava Sheva Harbour Link). It will be 21.8 km long, and connects the city of Mumbai with Navi Mumbai.

India's longest sea bridge is designed to accommodate 70,000 vehicles per day on six lanes from the end of 2023, and reduce travel time from two hours to 20 minutes. This reduces traffic jams and enables further development of the harbour region.

Spans of up to 180 metres make India's longest sea bridge from the city of Mumbai to the harbour a challenge. The bridge is made of steel. This would lead to vertical vibrations of up to 300 mm with side wind. MAURER damped critical areas with special dampers: The dampers, each with a mass of up

to 4,800 kg, reduce vibrations by a factor of 15.

Additionally, vertical guides and hydraulic dampers control the large vibrating damper masses. The system is designed for a service life of 50 years.

»The vibration dampers posed the real challenge.«

The overall project consists of four construction packages. MAURER supplied a total of 1,100 elastomeric bearings, 461 spherical bearings, 160 pot bearings, 880 m expansion joints and 40 vibration dampers for it. "The vibration dampers posed the real challenge," project manager Dipl.-Ing. Peter Huber



Atal Setu, Goa

from MAURER reports. "That is why we developed them in coordination with JFE Engineering Corporation, the contracting engineering firm, for the situation on site, calculated them and are fine-tuning them following installation."

We at MAURER also have big plans for Bhopal, Bagroda. The team is continually growing. With employees of MAURER Sanfield India Ltd., we are steadily expanding and optimising our range of services on site. To that end, Bhopal is ideal for us: centrally situated in the heart of India, Bhopal is the centre of a growth region with a large catchment area of skilled employees.

Numerous large and small companies are resident in Bhopal. With an urban population of roughly two million people and a stable political environ-

ment, the city is a hotspot for trade and industry and offers a wide range of local investment opportunities.

Together with a whole number of other sub-centres, the region thus largely contributes to India's national growth targets.

According to S&P Global and Morgan Stanley, India will overtake Japan and Germany in the years to come, and become the third largest economy in the world.

If the prediction of S&P comes true, according to which the annual nominal growth of India's gross domestic product will average 6.3% by 2030, India will have long been in the fast lane. We at MAURER are contributing to it.



Mumbai Monorail



Yamuna-Expressway



ROB Habibganj, Bhopal



NEW PRODUCTION SITE IN BAGRODA

// MAURER SANFIELD

With MAURER Sanfield India in Bhopal and six other subsidiaries, we are represented across the country.



Impressions of construction works in India



In Bagroda, a suburb of Bhopal, we build further storage and production halls.

Coordinated with the management of MAURER Sanfield India Ltd. and in close collaboration with MAURER SE in Munich, numerous projects have already been realised or are about to be handed over to the client.



INDIA LTD.

1.4 LAKH KM TOTAL LENGTH NATIONAL HIGHWAYS

37 KM HIGHWAY PER DAY

SHARE IN GDP FOR LOGISTICS & TRANSPORT

15%

1.9 LAKH CR BUDGET 2022-23 FOR ROADS & HIGHWAYS



1 LAKH IS 100,000. Development of India's road transport market Source: <https://www.investindia.gov.in/> (official website of the government of India)



A delegation of MAURER Munich with management and part of the staff of MAURER Sanfield India at the production site in Bhopal.

DO SMART THINGS AND // TALK ABOUT THEM

Judith Klein makes sure that we all get along better and are better understood.

Ms Klein: You have been publishing this magazine for five years?

Judith Klein: "It is not only me. First of all, I want to say a big thank you to all colleagues of the divisions. And also, to our management, of course, which supports the project and gives us free rein. If you want something to be really good, you need a team. We publish this magazine together with our Munich agency 3 hoch K. The team includes Nadine Wagner for layout and graphics, Georg Krause for text production, and Mi Kube for image creation and editing."

How long have you been working for MAURER?

J. K.: "I started at MAURER in 2009 and "created" the Marketing and Communications division in the company. In our

field, it is often still common for medium-sized companies to manage communications and advertising as a sideline."

What happens in the marketing and communications division at MAURER?

J. K.: "The department focuses on the areas of print, press advertising, online marketing, events and meetings, internal and external communication, press work, social media. Classic marketing tasks (customer, market, competitive analyses) are outsourced if necessary."

What does a typical working day look like for you?

J. K.: "Whether ad placement, creation of press releases, participation in conferences, the magazine, each measure has to be planned and conceptually prepared.

The first drafts are followed by fine-tuning and respective release in close cooperation with the management. The workdays vary greatly. It always starts with a daily briefing with the management and then priority is given to the daily tasks: from photo sessions to text releases and meetings with agencies. As varied as the work is – as with everything there are many routine tasks, research, concept development, price comparisons and planning that form part of the order."

How big is your division?

J. K.: (Laughs) ... "You are talking to the entire Marketing and Communications department of MAURER. I cannot handle all tasks arising in this division by myself. Together with two strong agencies by my side, and a few very professional external people, we are able to achieve a lot."



What fascinates you in your job and with MAURER?

J. K.: "It has always been the communication issue, since I can establish contact with those around me through language. I can make a big difference at MAURER. There is not much routine and new concepts need to be continually developed with low budgets or "our own resources".

It requires much more attention and creativeness to achieve a lot with little funds."

What are the greatest challenges in your daily work routine?

J. K.: "We must try to continually and swiftly adapt to new circumstances in the world. The integration of our production sites is thereby important, as well as close communication with the local teams."

What has been your most interesting project so far?

J. K.: "There are a few:

A new web presence, the uniform trade fair presentation, a new design of advertisements and brochures.

The overall organisation and presentation of the 140-year celebration of MAURER SE was certainly outstanding. One of my personal highlights is and will continue to be the Munich observation wheel Umadam."

What are the strengths of MAURER from your point of view?

J. K.: "The sky is the limit", which is supposed to mean: We at MAURER make the impossible possible, whether in construction, development, sales, processing, shipping or on the building site. Colleagues whose innovative strength and problem-solving approaches amaze me time and again."

»We must try to continually and swiftly adapt to new circumstances in the world.«

Can you make time for hobbies, and if so, for which ones?

J. K.: "I like spending time with my husband, am active in sports in the mountains and on the sea, love Scandinavian thrillers, never stop improving my knowledge and am engaged in personal development/coaching."

How do you deal with the stress level in your job, do you perhaps have a secret recipe?

J. K.: "Perhaps it is a recipe not to see work per se as a curse, but as a blessing and enjoy it."



JUDITH KLEIN
// HEAD OF MARKETING
AND COMMUNICATION

- Saarlander, rooted in Bavaria, married
- Communication studies, Kommunikationsakademie Hamburg
- Certified Business Coach, IHK Akademie Westerham
- 1993 to 2004 European Marketing Communications Manager, Crown Gabelstapler GmbH, Munich
- 2004 to 2008 Head of Marketing, Garmin International, Gräfelfing
- 2008 Head of Marketing, EUROKONGRESS GmbH, Munich
- Since 2009 Head of Marketing and Communication, MAURER SE, Munich



Mi Kube and Georg Krause of 3 hoch K advertising agency.



Lifting into position of the second centre beam pair in front of the “wall” of the opened MMBS elements.

MAURER NIGHTS IN VIENNA // ONLY QUARTER OF AN HOUR

Prater Bridge in Vienna: Replacement of all moveable expansion joint parts without full closure

If it has to be quick, you need a lot of time in advance – and good nerves. Hardly anybody knows this better than Dr Saeed Karimi, our Head of Subsidiary MAURER Austria in Vienna. Prater Bridge as a section of Vienna's Südosttangente (A23) with an average of 220,000 vehicles per day, is the busiest motorway bridge in Austria. On the four-lane bridge, the expansion joints (MAURER DS420) had to be replaced in parts. According to Dr Saeed Karimi, the challenge was: "Even at night, a full closure had not been authorised."

The motorway police stopped traffic only three times for not more than 15 minutes per lane to enable lifting the new expansion joint centre beams into position. For Dr Saeed Karimi – very clearly – a case for the modular bridging system MMBS (MAURER Modular Bridging System).

A case for MMBS

Beforehand, the system, the stepwise installation and dismantling as well as the lifting up and folding down of the MMBS elements had been tested on a trial field by the client ASFINAG (Autobahn- und Schnellstraßenfinanzierung AG), the local construction supervision and the executing construction company. Crossings with up to 80 km/h as well as braking and starting should be reliably guaranteed – the final rehearsal for Dr Karimi and his team. [read more>](#)



Scrutinising eyes during a function test of an MMBS element.

Six lying and one lifted up MMBS element during test.



What does not exist must be invented

Since the steel structure of the bridge had a very low height of the road surface of approx. 60 mm, a large fly-over solution was impossible: The elements could not be anchored in the area of the Prater Bridge. To enable frictional anchorage of the MMBS elements on the steel structure side of the bridge, a special solution had to be developed.

Vienna calling – Munich answering

A case in which the close cooperation with MAURER SE in Munich and their active support proved their worth, which Dr Karimi also takes for granted:

“Finally, we all are a powerful unit at the MAURER group.”

An MMBS element mainly consists of three steel plates. The two ramp elements and the centre plate are connected to each other via hinges.

During work in the construction area, the centre plate is lifted up with a loading crane, the ramp element on the drive-off side is folded down and both are vertically fixed.

The elements weighing approx. 3 tonnes are positioned side by side above the work area and fixed, and can then even be driven over by heavy traffic. For the four lanes (14 m) on Prater Bridge, eleven MMBS elements were used. They were positioned and anchored in only one night.

In 15 minutes: loosen, lift up, fix, lift into position, move, loosen, fold down, fix.

The construction site was set up in early September 2019, the dismantling of expansion joints started in mid-September. The entire inner parts of the old expansion joint were removed bit by bit at night: six centre beams of approx. 15 m length and all associated parts such as support

bars, bearings, sealing elements and spring packages.

Only the edge constructions, which were firmly connected to the structure, were preserved. During these works, the bridge could still be used on at least one lane even from midnight to 5 a.m.

It works perfectly at night

The six new centre beams had been lifted into position on the night of 25 to 26 September. This was carried out in packages of two, more than that was impossible for load reasons.

This night from 10 p.m. to 5 a.m. was a technical and logistical masterstroke and had been planned and coordinated in detail with all those involved beforehand.

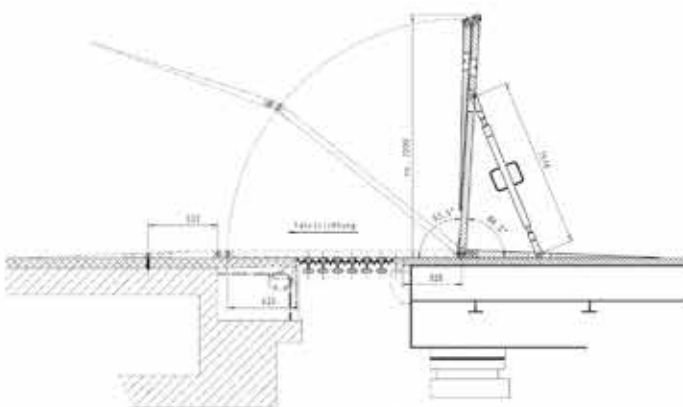
Replacement of expansion joints in only 45 minutes

In fact, traffic was stopped only three times for 15 minutes in each case, as stipulated. During these short time slots, the MMBS were loosened, lifted up and fixed, a centre beam pair was lifted into position and the MMBS loosened again, folded down and fixed.

More successful together

A partial replacement of the expansion joint through MAURER took around five weeks, the entire construction site was two and a half months.

A key success factor for this demanding rehabilitation project was the constructive cooperation within the MAURER group, as well as with the client (ASFINAG), the construction supervision (Pöyry) and the construction company (SSB – Sanierung Straße Brücke Bau GmbH).



MMBS, work position and lifting process

// INTERVIEW

DR SAEED KARIMI

A colleague describes Dr Saeed Karimi as a die-hard engineer who implements his projects with passion, openness and high standards of honest and fair cooperation.

For how long have you been working for MAURER Austria?

Dr Saeed Karimi: "Since September 2012."

Before MAURER, you worked at ÖBB as Head of Systems Engineering. What were the reasons for your move to MAURER?

S.K.: "Before my period of service at ÖBB (Austrian Federal Railways), I worked as a structural designer and project manager in the private sector. Following six years of service at ÖBB, I had the chance to apply myself to new tasks in the private sector again. At this point, I decided in favour of the company MAURER."

Have you already studied in Vienna and lost your heart to this exceptional global city?

S.K.: "Yes, I found my new home in this great city. However, my memories and experiences from my youth in my home country Iran were formative..."

You are Head of Subsidiary of MAURER Austria, what is part of your remit?

S.K.: "The quotation processing, acquisition, order processing and installation are almost entirely provided by MAURER Austria. Likewise, the intensive technical consulting relevant

to the execution is carried out by MAURER Austria. We coordinate the engineering and manufacture of the expansion joints with MAURER SE in Munich and Bernsdorf, the elastomeric bearings with MAURER Torbali."

How big is your subsidiary in Vienna?

S.K.: "We are a small but efficient team. MAURER Austria has five operational employees and two managers."

»We are a small but efficient team.«

What are the greatest challenges in your daily work routine?

S.K.: "The scarcely predictable or unpredictable daily work routine and my constant presence. Making the client understand my principle: The price of a product/service is what you pay. That value of that is what you get."

Can you make time for hobbies, and if so, for which ones?

S.K.: "Everything with the family: bike trips, hiking. And tending to our fruit trees. We have quite a few of them in the garden."



DR SAEED KARIMI

// HEAD OF SUBSIDIARY MAURER AUSTRIA, VIENNA

- Born in Iran/Isfahan
- 1991 Entry to Austria
- 1992 to 1994 Computer science studies at the Technical University of Vienna
- 1994 to 2001 Civil engineering, structural engineering studies at the Technical University of Vienna
- 1998 to 2006 Structural design, design and construction; project management/planning activity in engineering firms
- 2002 Structural design, design and construction; project management/planning activity abroad, THSR Taiwan High Speed Railway Project
- 2007 to 2012 Project management, head of systems engineering region east 1/Österreichisch Bundesbahnen ÖBB
- 2007 Railway and structural course/ Österreichische Bundesbahnen ÖBB
- 2008 Acquisition of the authorisation "Consulting engineer for building and civil engineering"
- 2011 Management development programme at ÖBB-Infra: Academy "Basic Certification Program for Top-Managers"
- 2012 Head of Subsidiary MAURER Austria
- 2020 Completion of doctoral programme at the University of Natural Resources and Life Sciences in Vienna, Institute of Structural Engineering

THE TIE WAS // HIS DESTINY

When, over 30 years ago, Zvonko Balabanic had the choice between MAURER and a banking career, the decision was easy for him – against the tie.

MAURER SÖHNE



Jozo Balabanic
at his
workplace
at former
Maurer Söhne
in 1972

At times, it is rather the trivial things that determine the direction of our careers, our lives. And that is exactly how it was with our head of purchasing in 1992. Zvonko Balabanic should actually have started an apprenticeship as a banker. He had already passed the recruitment test. But the idea of him sitting in a bank branch with a tie around his neck every day did not please him at all.

MAURER – like father, like son

So, it was fortunate that his father had been working as a fitter at MAURER for years and showed his son a way out: an apprenticeship as Industrial Management Assistant at Maurer Söhne GmbH & Co KG. The start of a career – as it were to turn out years later – that is also unique at MAURER. Following his apprenticeship and the first years in several commercial departments, Zvonko Balabanic finally moved to the purchasing department. And here, new challenges and opportunities awaited him time after time until he eventually became head of purchasing department in 2012.

The head of purchasing with his father, Jozo Balabanic, in front of the listed hall 1 at Frankfurter Ring.

This team is 100 percent reliable

He and his team, consisting of Ms Langner, Mr Coric and Mr Haller, look after the procurement of all goods with related documents, deadline monitoring, the search for new suppliers, they negotiate the prices and framework conditions.

"In my team", he says, "we work perfectly together. Everyone is completely well-versed in their field. Everyone is 100 percent reliable." And if there is no other way, then one or two days are spent in the home office even on holiday. Now one should think that he is sufficiently stretched with that. In 2019, MAURER decided to take over the majority of a manufacturing partner in Draganic, Croatia. The Managing Director for MAURER Croatia was searched for, and with Zvonko Balabanic he was immediately found.

There is still more possible

His normal workday has followed a tight schedule since then: "I always start quite early, shortly before 6 a.m.," says Balabanic. In the day-to-day business, all emails are processed at first, then the upcoming requirements in the work flow are ordered, due dates are checked and in-

voice verification (three to five espressi in between) is carried out. Once this has also been achieved, the various purchasing projects are addressed, the search for new suppliers, optimising the delivery terms.

How he manages it all? "I have already been crowned king of text messages, thanks to WhatsApp. We can only accomplish this because we all want the same: joint success", Balabanic emphasises.

Obviously, that also works because his team and he get along very well with the other colleagues at MAURER. For him, the people at MAURER are like a family. And in a certain sense, this also corresponds to the facts.

After all, it is not just the case that his father had been at MAURER for over 40 years and virtually passed on his enthusiasm for MAURER to him. Balabanic senior has also provided other family members with a mission in life at MAURER: "My father had guided his brother and cousin to MAURER. I am currently the last Balabanic. But that may still change", says Balabanic. At least the Balabanic family has already over 100 years of service at MAURER!



ZVONKO BALABANIC // HEAD OF PURCHASING MAURER SE

- **Place of birth:** Munich
- **Education:** Industrial Management Assistant at MAURER
- **Work experience:** MAURER Purchasing, MAURER Data Processing
- **Position:** Head of Purchasing MAURER SE
Managing Director MAURER Croatia
- **Hobbies:** Summer, sun, outdoor pool. And football youth coach at TSV Waldtrudering for four years. And yes, if the time is right, just doing nothing with a beer.
- **Motto:** Nothing is so good that it cannot be improved!



The powerful purchasing team



EUROPE IS GROWING TOGETHER – SO DO WE

// MAURER CROATIA

For our production in Croatia, we collaborate with partners from Austria, Italy, Slovenia and Poland.

Since 2019, MAURER has been active in the Balkans with its own production site. Well over three years ago, we took over the majority of our cooperation partner Metal Union d.o.o., and with Zvonko Balabanic, we were able to find the ideal person as managing director who directly links MAURER Croatia to our headquarters in Munich.

He is actively supported of Dragan Papic, the second managing director and Toma Papic, the workshop manager on site.

Our steel suppliers are certified according to EU standard and supply us from factories in Austria, Italy, Slovenia and Poland.

The product and service programme of MAURER Croatia:

- XW Expansion joints
- steel structures
- halls
- fences made of stainless steel
- Canopies and metal fences
- construction consulting
- metal accessories
- roofing
- cladding of structures

MAURER Croatia provides solutions for hall construction optimally customised to the client's needs – from pure frame to turnkey construction.

Our service includes the entire elaboration from design drafts to design drawings. We also advise on the protection of construction surfaces, roofings and facades.

CONTACT

MAURER Croatia
METAL UNION d.o.o.

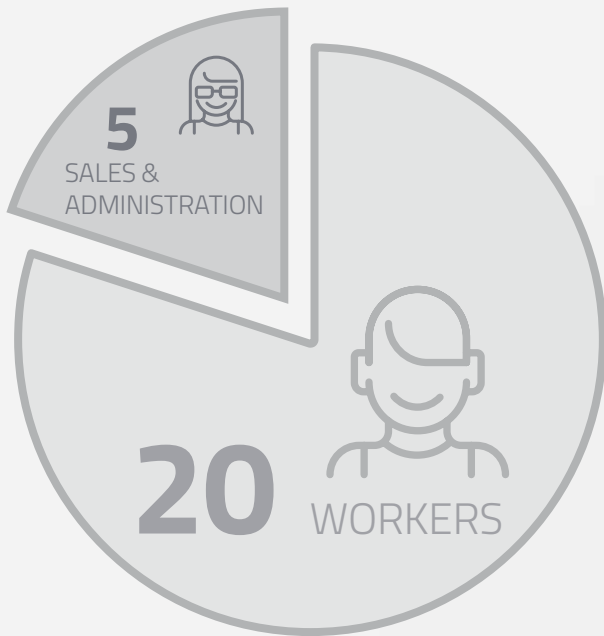
Lug 55/b
47201 Draganić

OIB: 16217801597
Mob: +385-91-622-2220

kristijan.metalunion1@gmail.com



approx. **600 km**
**DISTANCE DRAGANIC NEAR
 KARLOVAC TO MUNICH**



25 EMPLOYEES



From left to right: Miroslav Omelić – welding supervisor; Papić Toma – head of workshop; Zvonko Balabanic, Papić Dragan – managing directors; Krstačić Kristijan – commercial department

**LOOK WHAT COMES IN FROM
 OUTSIDE**

MAURER SE employs around 800 people from Munich and Upper Bavaria from 30 countries worldwide. That is how we see it. Because our development into one of the leading international technology companies in our field has a lot to do with new ideas and different thinking by our staff and colleagues from all corners of the world. And that makes us a typical German company again.

The success story of the Federal Republic of Germany is also a story of immigration. Since the end of the Second World War, Munich has continued to grow. While from the late 1940s to the 1960s it was the many homeless and displaced people from the former Eastern territories who moved to Bavaria and Munich, the German “economic miracle” called for more labour following this momentum. In the phase of foreign worker recruitment, young men came first, soon also women and families came to Germany – initially only to earn money. Many of them became Germans and stayed.

Only during the oil crisis in the early 1970s did a ban on recruitment come into force. But on the other hand, the Iron Curtain between East and West at that time opened up a bit. From the former Yugoslavia, young people were able to travel to the capitalist West and work there. During this phase, Zvonko Balabanic’s father and family also came to Germany and found their new home here.

When you look at the figures alone in a 50- year comparison, you can see how cosmopolitan Munich has become.

**Inhabitant Development and Proportion
 of Germans to Foreigners**

Munich 1971 (rounded figures)

1.3 million inhabitants
 196,000 foreigners
 Share of approx. 15 percent

Munich 2021 (rounded figures)

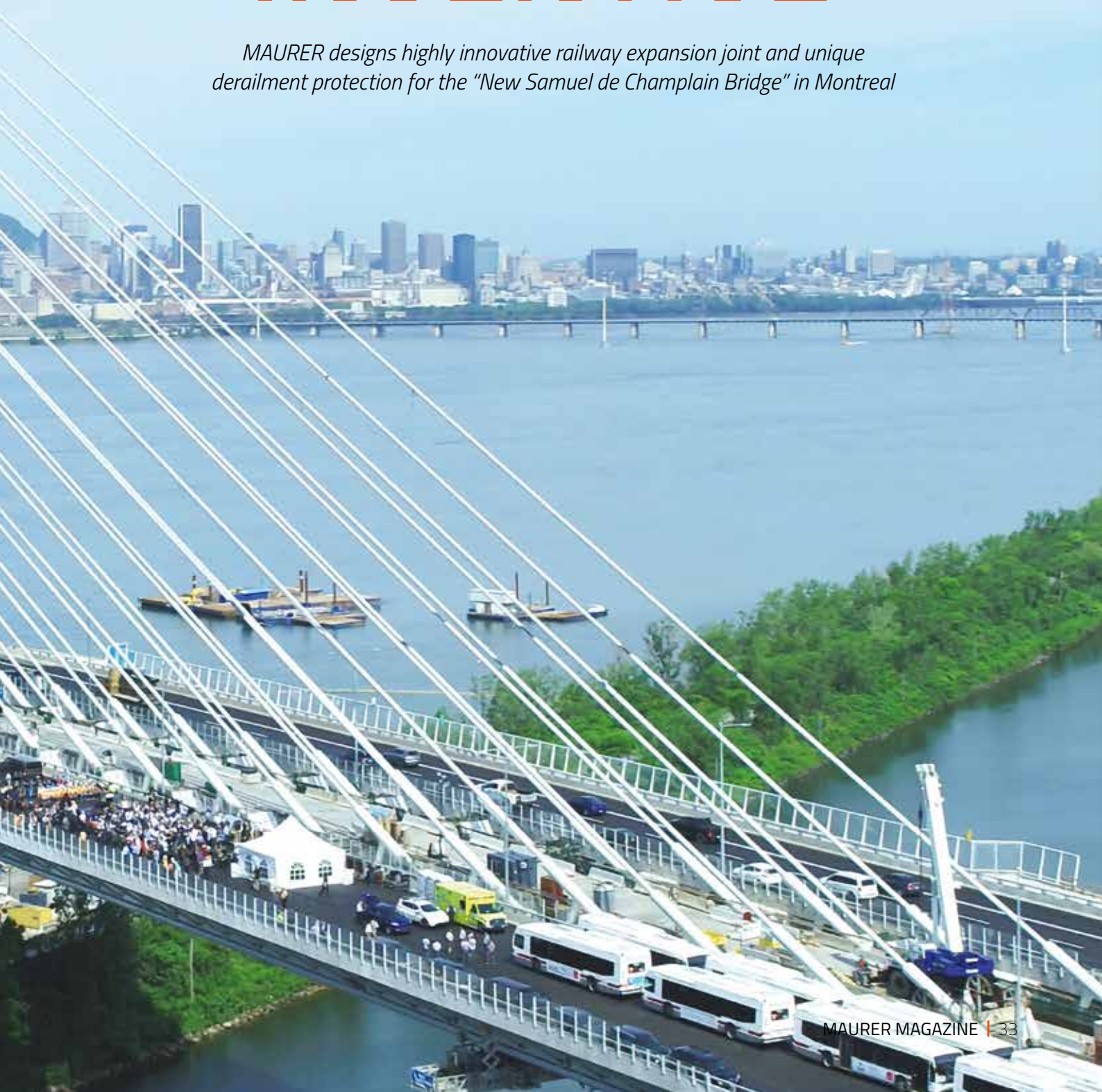
1.55 million inhabitants
 450,000 foreigners
 Share of approx. 29 percent



FOR EXTRAORDINARY
REQUIREMENTS WE BECOME

// EXTREMELY INVENTIVE

*MAURER designs highly innovative railway expansion joint and unique
derailment protection for the "New Samuel de Champlain Bridge" in Montreal*



When Deniz Kerner, our Sales Director for North America, took on the coordination of this project, she knew that this would be the ideal job for her. "I like taking responsibility and making decisions together with my team", Kerner explains. And there was no lack of them – in Munich with the developers and in Montreal with all partners involved and the MAURER team on site.

But for a start, a few facts on the "New Samuel de Champlain Bridge" across the Saint Lawrence River: It is 3.4 kilometres long, replaces the original Champlain Bridge built in 1962, and is already considered to be an icon. With its white colour, the 170-metre-high pair of pylons and the asymmetric cable stays in a harp arrangement, it is a landmark for Montreal. The main span is 240 m long, and its width of 60 m makes it the widest cable-stayed bridge in the world. Each year, up to 60 million vehicles cross the Saint Lawrence River at this point.



To facilitate the fast and precise positioning of the guided cross-ties, six mounting feet per expansion joint are measured and fixed in the structure prior to installation. This procedure saves operating time of heavy lifting devices.



The 16 guided cross-ties were installed between November 2020 and April 2021.

Road traffic has been flowing on the two outer bridge decks with four lanes in each case since 2019. On the central bridge deck passing through the pair of pylons, the new automated light rail system Réseau Express Métropolitain (REM) has been in operation since autumn 2022.

Large movements plus rotations

"The expansion joints at the central bridge deck posed a particular challenge", states Ms Kerner. The slender design of the central bridge deck results in relatively large longitudinal movements when trains are crossing, braking and accelerating. In addition, there are strong winds, severe winters and possible earthquakes.

However, there was another range of further requirements on the expansion joint:

- Completely watertight over the entire width of the bridge deck (even in combination with the sliding plate expansion joint, named SP expansion joint) thanks to patented sealing element
- Inspectable from below without traffic disruption

- Suitable for the installation space of the slab track
- Perfectly uniform opening and closing behaviour of the gaps
- Temperature range from -35 bis +40° C

Expansion joints for railway bridges

MAURER guided cross-ties are expansion joints for railway bridges. In Montreal, they bridge the structural gap in front of and behind the main spans at the pair of pylons.

The guided cross-tie is based on the principle of the swivel joint expansion joint used in road construction. It is simply much more stable, since high axle loads act on the expansion joint during each train passage. The guided cross-tie accommodates these rapid vertical impulses during the passage without fatigue. Horizontal expansions are evenly distributed on the distances between the sleepers through a geometrically guided control.

In addition, the moveable bearings in the expansion joint facilitate "moving" or rotating of the sleepers in or about the longitudinal, transverse, and even the vertical axis. Even seismic movements are compensated without damage within the expansion joint so that trains can pass again even directly after a strong earthquake.

Individually customised

The special challenge in Canada was that the calculated movements were larger than required according to German regulations. Moreover, it was necessary to run the usual derailment protection on railway bridges across the expansion joints.

These systems primarily serve to protect the bridge in case individual train axles will derail, which is actually quite common in railway traffic. MAURER therefore developed a derailment protection system for the guided cross-tie for the first time.

lated sliding displacements without wear and withstand 7.5 times the displacement velocity.

»MAURER
Guided Cross-Ties
achieve twice as much:
at least 60 years«

Deniz Kerner

The New Champlain Bridge is supposed to have a service life of 125 years, at least 30 years had been required for the guided cross-tie.

“MAURER guided cross-ties achieve twice as much: at least 60 years”, says Deniz Kerner. A total of 16 guided cross-ties with derailment protection were manufactured in Munich for Montreal, four pieces of those as large variant “CT4” with a movement of up to 1,030 mm.

The railway bridge was opened in autumn 2022. Client and operator is Signature on the Saint Lawrence Group G.P (SSLG). The bridge was designed by T.Y.Lin International and constructed by SSLC (Signature on the Saint Lawrence Construction GC).

High-performance sliding material MSM®

Small, laterally guided MSM® sliding bearings ensure low-wear, almost frictionless and controlled sliding of the sleepers. MSM® stands for “MAURER Sliding Material” and was developed and patented by MAURER. Compared to conventional Teflon (PTFE), it can accommodate twice as much compression, achieve five times the accumu-

The guided cross-ties are supplied with a specially developed transport frame. Within the frame, the sleepers can be displaced in the longitudinal direction. This enables adjustments to the respective state of displacement of the bridge during installation.



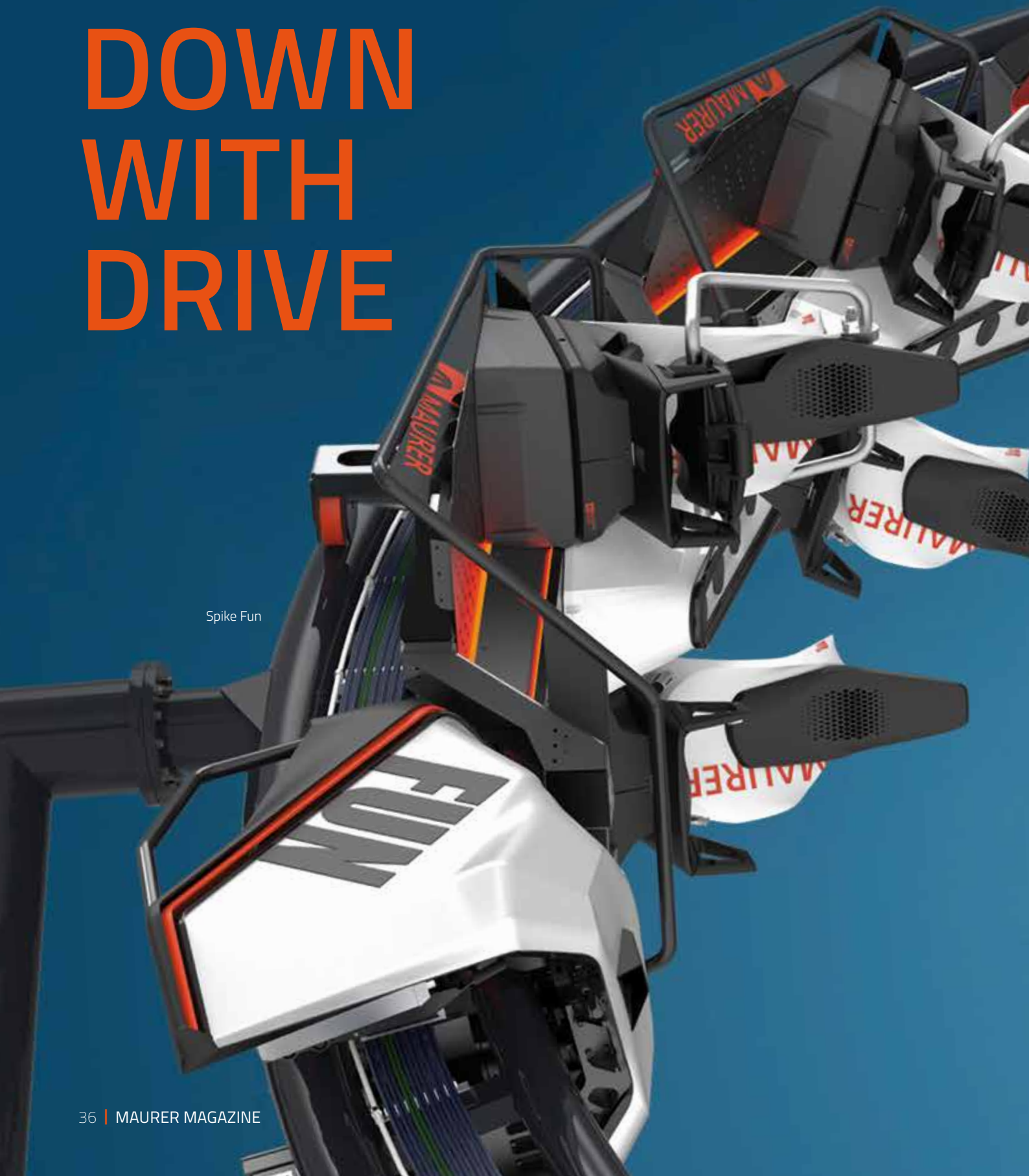
DENIZ KERNER // SALES DIRECTOR NORTH AMERICA

- **Place of birth:** Izmir, Turkey
- **Education:** Constructional and environmental engineering studies in Izmir (DEU) and at the Technical University of Vienna, field of study hydraulics, water supply and treatment, MBA in Munich (MBS), Singapore (SMU) and Italy (Boconni).
- **Work Experience:**
2009 MAURER Torbali, Turkey,
since 2009 MAURER Munich
- **Position:**
 - Sales engineer in Russia, Israel, Europe
 - Technical Sales Manager United Arab Emirates, Qatar
 - Sales Director North America
- **Hobbies:** The sea, sailing and swimming, and I always like to visit new cities and cultures.
- **Motto:** Happiness is solving problems. And I love solving problems.



SPIKE FUN // UPSIDE DOWN WITH DRIVE

Spike Fun





For its 30th anniversary, Maurer Rides presents two world 's firsts.

A normal looping does not really set the hearts of hard-nosed roller coaster fans racing. But when the usual momentum suddenly gets a push or even slows down, and to top it all off, the seat is tilting, there is danger ahead. No, not really! Needless to say, the new Spike Fun is also absolutely safe like all roller coasters from Maurer Rides. But it feels radically different.

After 30 years, many companies are getting on in years, but Maurer Rides has the passion for the new in its blood. Roller coaster, yes please, but always with a new perspective. Our technical know-how is the basis, our ultimate goal is the passengers' excitement – which is guaranteed.

Thrust in the upside-down element

Upside-down with drive – with this world's first, entirely new, energised (!) elements can be developed. The unique Omega element, for example, proves that. This iconic element is spectacular to watch and has an attractive arrangement regarding dynamics so that the passengers lose orientation and then enjoy the view unexpectedly high up before the ride vertically spirals downwards at the end.

Tilting in the Spike Tilt Seat

Innovation package number two is the Spike Tilt Seat. With a joystick, the passenger can tilt their seat during the ride.

Depending on the ride manoeuvre, this results in ever-more extreme seating positions and generates an entirely new roller coaster feeling. Whether during take-off, camelback, loop, wheelie or jump – when the seat tilts, and surprisingly dynamically, it always feels different depending on the timing.

The seat inclination is up to 45°. Besides the interactive and self-determined control by the passenger, the seat of course can be pre-programmed automatically tilted into various positions during the ride.

read more >



Powered coaster in train layout with Spike drive technology

The new Spike Fun complements the possibilities and strengths of the Spike Racing Coaster, and is ready for a high transport capacity. Several rickshaws for two passengers sitting side by side can be coupled to a train for up to eight persons.

This requires enormous power which is provided by the Spike drive, now well-known in the field. Its powerful electric engine pushes with the enormous torque of 1,050 Nm. The drive enables a completely free speed control and that means: at any point of the ride, everything is possible and can happen.

A drive unit with two engines and thus double power is optional. This facilitates....

- ... even greater accelerations, multiple launch up to 1 g. The thrill factor can thus be flexibly adapted to the requirements of the parks.
- ... greater capacity through a train with more seats at equally high acceleration.

With the modular rickshaw principle, the optimal mixture of capacity and acceleration is determined for every layout.

The electric drives thereby operate with high efficiency completely energy efficient and automatically recuperate the energy during braking. The energy requirement is thus only a fraction of conventional launch coasters.

One seat – three options

The choice of seats is also flexible for the operator. If the passengers need a maximum sense of safety during inversions, classical seats with lap bars that can be swivelled down over the head are recommended. The minimalistic belt variant tends to attract an audience into thrills and maximum freedom.

Seat option number three addresses three family layouts. Seats without headrests appear less brute and emphasise themes such as with Minetrains or character designs.

All restraint systems secure the passengers extremely comfortably and provide perfect lateral support with



SPIKE® TILT SEAT
New riding experiences interactively or automatically controlled



OmegaCoaster



SF MineTrain

maximum freedom. The lap bar as well as the belt restraint are class five according to EN/ASTM and therefore fulfil the highest safety standard for roller coasters.

Limitless multimedia

Spike fun has also no limits from a multimedia point of view and is up to date: powerful audio system,

information display, video system, light – and all that can be combined with numerous additional features. The fully integrated multimedia packages leave nothing to be desired.

Conclusion: Whether as a family coaster in classical Minetrain layout or as classical chase between cat and mouse, as

thrill coaster with extraordinary inversions, Dark Ride or Vertical Ride – the Spike Fun coaster plays to its strengths everywhere and opens up new driving experience dimensions. Parks that want to offer something new are at the right place here.



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German Engineering since 1876

