
MAURER || MAG

**INNOVATIVE MSM®
SWIVEL JOIST**

Expansion Joint Installation
of the world's largest
suspension bridge

**FROM MUNICH FREIMANN
TO THE REST OF THE WORLD**

Smallest spare parts to XXL
expansion joints

**EXPRESS REPLACEMENT
OF EXPANSION JOINTS**

Within three days instead
of three weeks



THE BEAUTY FROM THE JUNGLE

Seismic Retrofitting of Viaduct Piers of the
"Yarumo Blanco", Colombia.



Dear readers,

You are holding the fourth issue of the MAURER MAGazine in your hands, and we are glad that we can share good news and articles with you despite the challenges of the time. For MAURER, 2021 was a special year. As already announced in the last MAGazine, we were able to complete the development of an outstanding innovation: our new MSM® Swivel Joist Expansion Joint. We installed it for the first time in a no less spectacular structure, the 1915Çanakkale Bridge in Turkey, currently the world's largest suspension bridge.

There is hardly any routine for our shipping department either. Virtually every order is different and presents the team with challenges. From Frankfurter Ring into the world, this applies to one package of bolts up to expansion joints weighing 60 tonnes. You will gain interesting insights into day-to-day work of this important department on pages 22 to 25.

Another technical innovation was an operation at the Augsburg motorway junction in southern Germany. Until now, the replacement of an expansion joint led to at least three weeks of closures, lots of resentment among drivers, and high costs for motorway operators. Our colleagues at MAURER tackled it on one weekend. We have already patented this process, the related necessary methods and products. Which, of course, meets our aspiration to make the impossible possible.

With kind regards from Munich,



Dr. Christian Braun



Max Meincke



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MAURER's MarCom team regularly issues press releases on interesting projects or new products in cooperation with in-house product experts.

10 A CATAMARAN FOR THE WORLD'S LONGEST SUSPENSION BRIDGE

Since March, the world's longest suspension bridge with a main span of over two kilometres has been in operation in Turkey. At the structural gaps, MAURER installed innovative MSM® Swivel Joist Expansion Joints allowing movement of 2,800 mm. Thanks to their special support, they guarantee an accumulated slide path of 50 km.



22 EXCEPTIONS ARE OUR RULE

These days when it comes to shipping and delivery, we all think about a courier standing in front of the door with a more or less large package. For Regina Murhauser and her team, apparently there are moments when they too wish they could send our clients a tracking number and the friendly neighbour who receives the shipment takes care of the rest.

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Raul Arranz Diez // Regional Sales Director: The interesting thing is that we can see the outcome.
Christian Steinhilber // Shift leader: I always wanted to work with steel.

MAURER || TOPICS



16 **ONLY 57 HOURS**

Sounds like an action movie and was indeed a perfectly timed interaction: the complete replacement of expansion joints on a three-lane motorway bridge in less than two and a half days. Normally, it would have required closing the A8 at the Augsburg junction for three weeks. But then, what is normal for us?



30 **SPA & SURF HOTEL ON 410 DOUBLE SLIDING ISOLATION PENDULUMS**

The Secrets & Dreams Bahia Mita Hotel in Puerto Vallarta is currently the largest building in Latin America to stand entirely on seismic isolators.



38 **NOW YOU SEE ME**

Maurer Rides Spinning Coaster 3000: the world's fastest single-car Spinning Coaster is opened in the Lionsgate Zone of Motiongate™ Dubai as part of the Dubai Parks and Resorts expansion.

//IMPRINT

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RESPONSIBLE FOR THE CONTENT

MAURER SE
Judith Klein

DESIGN

3 hoch K Werbeagentur AG
Brecherspitzstr. 8
81541 Munich

EDITORIAL ASSISTANCE

Georg Krause

PHOTOS

MAURER SE
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The horseshoe-shaped Yarumo Blanco Viaduct in Colombia significantly reduces travel time from Bogota to the Pacific. In front on the right at the bottom of the short pier, you can see the concrete cube under which the retrofitted isolators are located.

SEISMIC RETROFITTING // OF VIADUCT PIERS

Horseshoe shape of the Yarumo Blanco Viaduct poses a challenge to engineers.

Colombia. Rugged mountains, high seismic risk and a half-finished viaduct shaped like a horseshoe – that was the situation in the Colombian Andes.

After construction had been stopped for years, the problem was solved with a technical masterstroke: The endangered viaduct piers were retrofitted with seismic isolation using sliding isolation pendulums. The isolators have a very high coefficient of friction of 7%, which could only be achieved with MAURER-Isolators.

There were already plans to cross the Andes in 1902. The large-scale project started in 2010; the most important and at the same time most complex viaduct was “Yarumo Blanco.” As of 2015, construction stalled for years. There were political reasons for this. But when the construction project started again, it was discovered that the half-finished viaduct did not comply with the seismic codes that had been established in the meantime.

Short piers with seismic risk

The approximately 640 m long viaduct stands in a rugged mountain jungle and winds in the shape of a horseshoe around a rock with a 5% slope. Both the complex geometry and the high seismicity in the region required subsequent improvement of the viaduct. Crucial point was the height difference of the ten viaduct piers, ranging from 20 to 50 m.

Double sliding isolation pendulums isolate, dissipate, centre and transmit

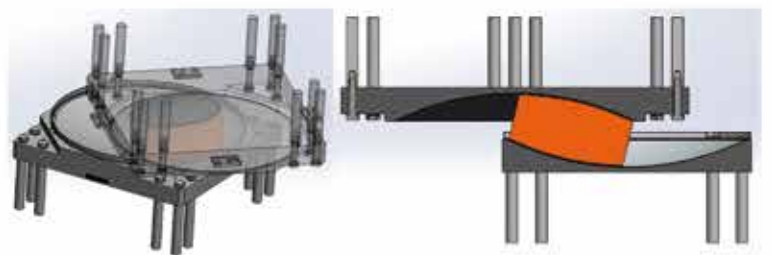
To prevent damage, so-called SIP®-D-Bearings from MAURER were used. SIP® stands for Sliding Isolation Pendulum (Gleitpendellager). “D” (Double) indicates that the isolators have two concave surfaces.

The horizontal displacement is thus equally distributed over two surfaces. Therefore, they can be built smaller and lighter. This saves space, time and costs.

Retrofit installation

The subsequent installation of the isolators required decoupling of the bridge deck and piers, which could only be realised at the bottom of the piers due to the construction. Therefore, a spectacular installation took place in summer 2021: with sawing through, lifting, inserting the isolators and lowering.

The viaduct was opened by President Iván Duque Márquez on 24 November 2021.



View of a SIP®-D-Bearing – highlighted in orange is the sliding lens through which the horizontal displacement is equally distributed over both concave sliding surfaces.

FOR THE FIRST TIME, HOSPITAL IN CHILE ISOLATED // WITH MSM® SIP BEARINGS

Double Sliding Isolation Pendulums protect the Hospital Alto Hospicio against earthquake-induced damage.

Alto Hospicio, Chile. For the first time, a hospital in Chile was isolated with Double Sliding Isolation Pendulums. The innovative building design results from an intense cooperation between structural planner, construction company and MAURER. The isolators significantly save costs, and the building can still be used in its entirety even following an earthquake.

The clinic centre in Alto Hospicio in the north of Chile has a total area of nearly 50,000 m², distributed over three buildings with three floors and a basement in each case.

Hospital with seismic risk

Alto Hospicio is located in an earthquake zone of medium intensity with up to 0.5 g ground acceleration. That is why the clinic centre was entirely seismically isolated. It was the first time that sliding isolation pendulums rather than elastomeric bearings were installed to that end in Chile. The task of the bearings is to isolate buildings from the ground in the event of an earthquake.

The clinic centre was built between 2018 and 2021. It is scheduled to open by summer 2022. The client is the Consorcio Alto Hospicio S.A – SACYR Chile, the hospital operator is the Servicio de Salud Iquique.



The clinic centre in Alto Hospicio in May 2021. The building structure is in place – entirely seismically isolated.



Pumarejo cable-stayed bridge near Barranquilla, the longest road bridge in Colombia.

COLOSSUS OF THE CARIBBEAN // WITH CHALLENGING LOAD CYCLES

MAURER supplies all bridge bearings for the Pumarejo cable-stayed bridge in Colombia.

Munich, Barranquilla. The Pumarejo cable-stayed bridge near Barranquilla is the longest road bridge in Colombia. The challenges are strong vertical and horizontal bridge deck movements under the effects of wind and earthquakes.

MAURER developed and supplied all bearings needed here, and the bearings for the approach bridges in close coordination with the client.

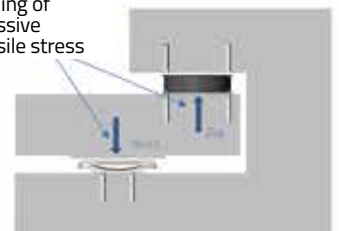
The “Puente Alberto Pumarejo” is also called “El coloso del caribe”, Colossus of the Caribbean. At 38.10 m, it is South America’s widest bridge, and with 3.2 km one of the longest road bridges in Colombia. The six-lane bridge with bicycle and pedestrian paths crosses the Río Magdalena near the city of Barranquilla and connects the city with the north-eastern Caribbean coast. The new bridge is not only important for road traffic, but also for navigation. The vertical clearance of the new cable-stayed bridge is 45 m, the main span is 380 m.

Alternating compression and tensile forces

Challenging wind and seismic load cases require sophisticated measures in the load-bearing structure. Therefore, a total of ten bridge bearings were installed. The largest of these bridge bearings are used to transmit compression forces of up to 45,000 kN. However, vertical load acting downwards was not the only challenge; earthquakes can also cause tensile forces of up to 15,000 kN.

The planners solved this by positioning two bearings one on top of the other (see picture), with two pairs of bearings per pylon.

Decoupling of compressive and tensile stress



Bearing arrangement at the pylons.

LIFT BRIDGE IS // LIFTED FROM ITS BEARINGS

MAURER equips both the Old Kattwyk Bridge and the New Kattwyk Railway Bridge in Hamburg.

Hamburg. The striking Kattwyk Bridge in the Port of Hamburg now has a sister with the same name. A special feature of the new and at the same time largest lift bridge in Germany is that the lift span is raised out of the bearings.

MAURER supplied the bearings and expansion joints for the new railway bridge and also replaced the bearings and expansion joints of the rehabilitated "old" Kattwyk Bridge.

Both Kattwyk bridges in the Port of Hamburg are steel framework bridges and Hamburg landmarks. The older bridge was the largest lift bridge in the world when it was built in 1973. 58 metres north, its 287-metre-long sister bridge has now been built, the largest lift bridge in Germany. The "New Kattwyk Railway Bridge" has a lifting height of 45.7 m and a drive-through width of 108 m.

When a ship passes through, the bridges are being closed to road and railway traffic, for a total of up to three hours a day. Until the new bridge was built, road traffic also had to be stopped every time a train crossed, for up to seven hours each day. The New Kattwyk Railway Bridge now carries railway traffic, while the old bridge is only used by road traffic. The sister bridges each consist of three bridge sections: fixed bridges on the bank sides and lift bridges in the middle in each case.

Bearings of the new bridge: restraining and coupling up

The special challenge posed by the new lift bridge was that the bearings separate during lifting and the upper part of the bearing is raised too. It also has a hori-



View from below of the opened new railway lift bridge; on the left, the support surface for the multi-directionally movable elastomeric bearing, on the right, the upper part for coupling up with the shear key with transverse strength.

zontal bearing clearance of a few millimetres and can change due to temperature. That is why it must be "coupled up" when lowered so that it is precisely positioned on the bearings.

MAURER solved this problem with special bearings that guide, restrain and couple up.

Six elastomeric bearings were installed, four of which can move on all sides. Two are equipped with horizontal restraints, which restrain the lift bridge in the longitudinal direction.

In addition to the horizontal load transmission, these two bearings also carry out a coupling function so that the bridge slides in the exact longitudinal position when lowered.

MAURER also supplied the expansion joints for the new bridge, DB-regulated elastomeric mats.

Since 2017, the old Kattwyk Bridge is rehabilitated and converted into a road bridge. Both Kattwyk Bridges have bicycle and pedestrian paths, which offer a great view over the Süderelbe River and the port. The new bridge was built by SEH Engineering GmbH.



The Kattwyk Bridges in the Port of Hamburg: in the front, the new one for railway traffic, in the back, the one built in 1973, which now only carries road traffic.



On the left: Halfway River Bridge under construction, May 2021. The tapered piers indicate the future water surface of the reservoir. On the right: Installed bearing with steel girder laid on top.

SPECIAL BEARINGS FOR THE // **HALFWAY RIVER BRIDGE IN CANADA**

Fixed spherical bearings can move in the longitudinal direction during the construction phase.

Fort St. John, Canada. Spherical bearings are not very widespread in Canada. However, high superimposed loads, a large temperature difference, and unusual challenges during the construction phase led to MAURER developing modified MSM® spherical bearings for the one-kilometre-long Halfway River Bridge. Special feature is that the fixed bearings had to remain movable in the longitudinal direction of the bridge during installation.

The Halfway River is a tributary of the Peace River in the north-east of the Canadian province of British Columbia. Highway 29 winds partly along the river as a busy interstate road. About 45 kilometres north of Fort St. John, the highway crosses the river on a 40-metre-long bridge. Yet, both the Peace River and with it the Halfway River will be an 83-kilometre-long reservoir in future; at the bridge, the water level will rise by 30 to 40 metres. The 3.7-kilometre-long road section will thus be raised, and approximately 200 metres north of the existing bridge, the new one-kilometre-long Halfway River Bridge will be built, which is one of the largest bridge structures in Canada.

Restrain and enable movements at the same time

The new bridge has twelve piers, whereas the challenge lies with the middle six piers with three bearings each. These bearings are fixed bearings that should only allow rotations. The load is transferred via the 50-metre-high piers, in other words: When the bridge moves in the longitudinal direction, for example due to significant temperature fluctuations (ranging from -42 to $+40^{\circ}\text{C}$), then it is not the sliding bearings that are displaced, but the piers that bend by a few centimetres. They were therefore designed to be relatively slender, with a diameter of only five metres.

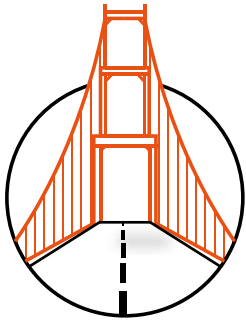
How can they be fixed?

How can the steel girders be connected to the fixed bearings? Since daily temperature fluctuations of 20°C and more are normal, the steel girders continually change their length accordingly. When and how are these girders connected to the bearings? As a solution, MAURER developed an additional sliding surface under the bearings. There are restraining plates for them at all sides, but initially only the outer ones were installed to prevent transverse

movements. In the longitudinal direction, the girders can move together with the spherical bearing during the construction phase. At the end, the restraining plates at the front side are also screwed in tight.

Since the bridge will be located in a reservoir in future, the long service life was also important: MSM® has virtually no wear and will therefore not need to be exchanged. Construction for the Halfway River Bridge started in March 2020 with final acceptance of the bridge bearings in May 2021. Completion of the total 3.7-kilometre-long highway section including the bridge is scheduled for autumn 2022.

It was important for the Eiffage-Infracon Halfway River Joint Venture to have fast and competent technical support throughout the entire bridge bearing project. "It was our first major project with spherical bearings in Canada, which was also not covered by the standard – making constructive cooperation absolutely essential," emphasises Christian Guckel, P. Eng. PhD, COO of MAURER Canada.



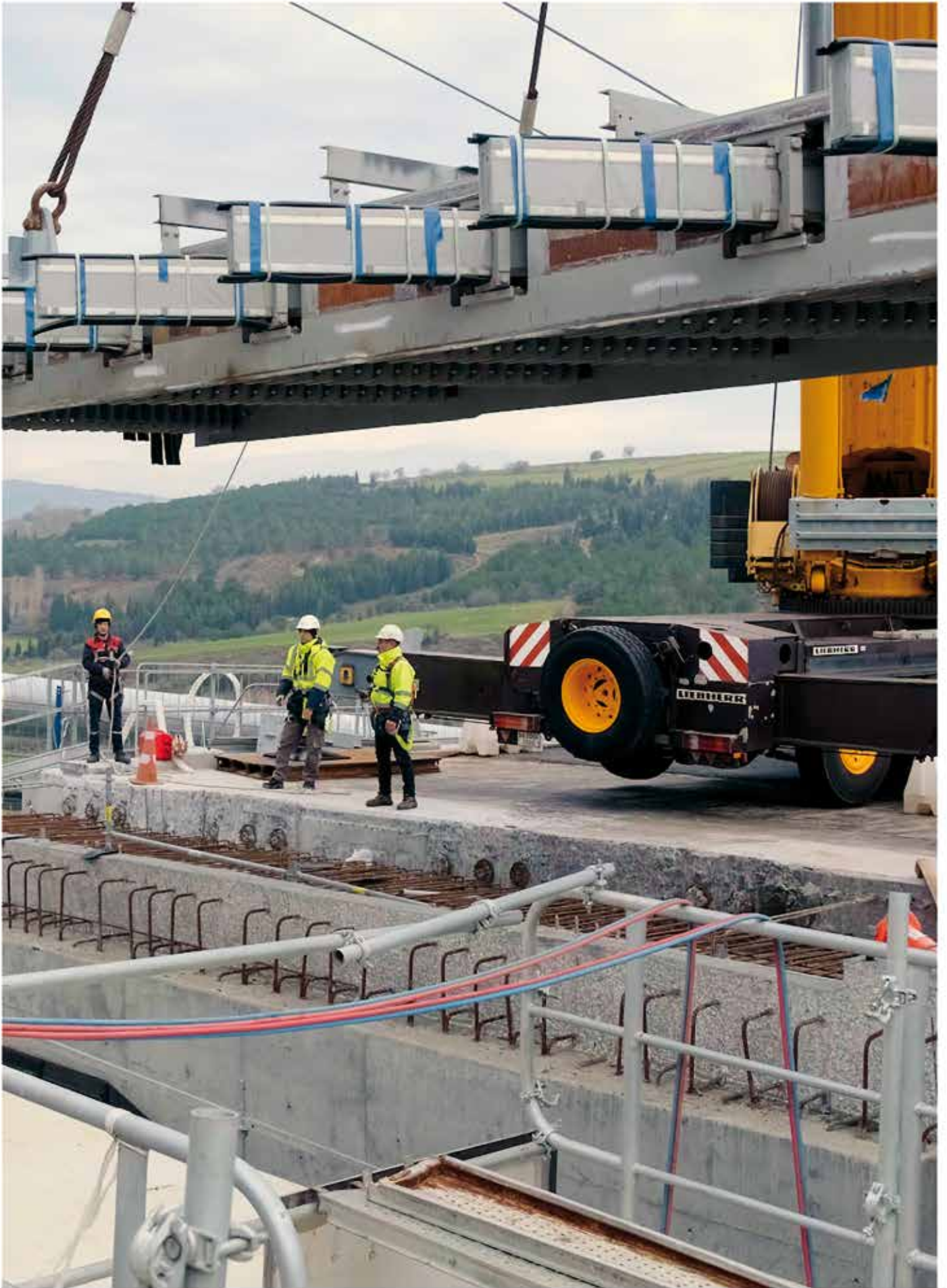
A CATAMARAN
// **FOR THE WORLD'S
LONGEST
SUSPENSION BRIDGE**

*Newly developed MSM® Swivel
Joist Expansion Joint for the
1915Çanakkale Bridge
over the Dardanelles Strait.*

Since March this year, the world's longest suspension bridge with a main span of over two kilometres has been in operation in Turkey. At the structural gaps, MAURER installed innovative MSM® Swivel Joist Expansion Joints allowing movement of 2,800 mm. Thanks to their special support, they guarantee an accumulated slide path of 50 km.







Bridges connect

A structure like the 1915Çanakkale does far more. It transcends space and time. Turkey associates the number 1915 with an important victory in the Gallipoli campaign of the First World War. 18 March is celebrated as an anniversary while it is also an important day on two occasions during construction of the 1915Çanakkale. For its laying of the foundation stone in 2017 and its opening in 2022.

Four kilometres, which save time and costs

The bridge over the Dardanelles Strait near Çanakkale (officially named "1915Çanakkale Köprüsü") has a main span of 2,023 m and a total length of 4,608 m. It is 36 m wide and forms part of the three-lane motorway section from Malkara to Çanakkale. It is intended to relieve the burden on the holiday region and save time and costs for transit traffic between the European and Asian parts of Turkey. Because until the bridge was built, anyone who wanted to cross the Dardanelles Strait had to use ferries which cost a lot of time and logistical effort.

The expansion joints of the huge bridge and of all approach viaducts were delivered and installed by MAURER in September 2021. The four largest expansion joints on the main bridge accommodate longitudinal bridge movements of up to 2,800 mm and ensure that the bridge can be safely accessed in any state of expansion. Four 16.1-metre-wide XS 2800 expansion joints were installed in each case.

Movable in all dimensions

Regarding design, these are so-called swivel joint expansion joints. Their special feature is that they allow movement in all directions: transverse, longitudinal and vertical to the direction of traffic as well as any kind of rotations. This is important, because the 1915Çanakkale, as a suspension bridge, is much less stiff due to its design, while also being located in an earthquake region.

On top of the swivel joints lie the parallel profiles, which are also called intermediate beams (centre beams). They are at a slight angle to the direction of traffic (except for the joists on the edges) thus ensuring that the opening and closing bridge movements are evenly distributed over the spacings between the profiles.

Innovative support

The swivel joint expansion joints at the ends of the bridge of the 1915Çanakkale have been technically optimised regarding several details.

The support is entirely new: Rather than in simple elastomeric bearings, the profiles run in MSM® bearings with a double prism shape. The so-called catamaran support was developed by MAURER in 2020 and is patent pending.

The new support enhances the performance of the entire expansion joint. Due to MSM® and the special bearing shape, the profiles slide faster and more precisely over the joists. This prevents restraints and increases service life.

► MSM® CAT – THE CATAMARAN GUIDE WITH MSM®

The prism guide, also called "CAT" guide due to its visual and functional resemblance of a catamaran, facilitates play-free and thus wear-free control of the expansion joint.

The kinematic control principle leads to gap widths being evenly distributed between the centre beams depending on the bridge movements.



CHARACTERISTICS

- guided pivoting hinges, which are elastic in shear
- each centre beam is controlled independently
- superstructure movements displace the support bars on top of the swivelling bearings
- The special geometry and the prestressed sliding spring prevent the sliding bearings from being lifted off

MSM® – THE SPECIAL SLIDING MATERIAL

- patented high-performance sliding material for structural bearings acc. to EAD 050004-01-0301
- multiple service life and double compression compared to PTFE
- without environmentally harmful components such as fluorine or chlorine
- resistant against chemical contamination and ageing

High forces in the guide bars

Very high forces act in expansion joints. The 1915Çanakkale Bridge, for example, was designed for heavy traffic. However, the challenge is not the vertical, but rather the horizontal forces acting on the lateral guide bars of the sliding bearing. These bars ensure that the intermediate beams remain "on track", in other words: exactly parallel at all times (transversely to the direction of traffic) and with equal distances between them.

Given that the bridge can move by one metre within seconds, the relatively small guide bars are subject to extremely high compressions. These forces not only result from the control force of the expansion joint, but also from

braking or acceleration forces of vehicles.

In extreme cases, the guide "gets jammed" – which can be compared to a simple drawer that is tilted when pulled open. Such restraints lead to wear in the guide bearing.

MSM® guarantees 50 km accumulated sliding displacement

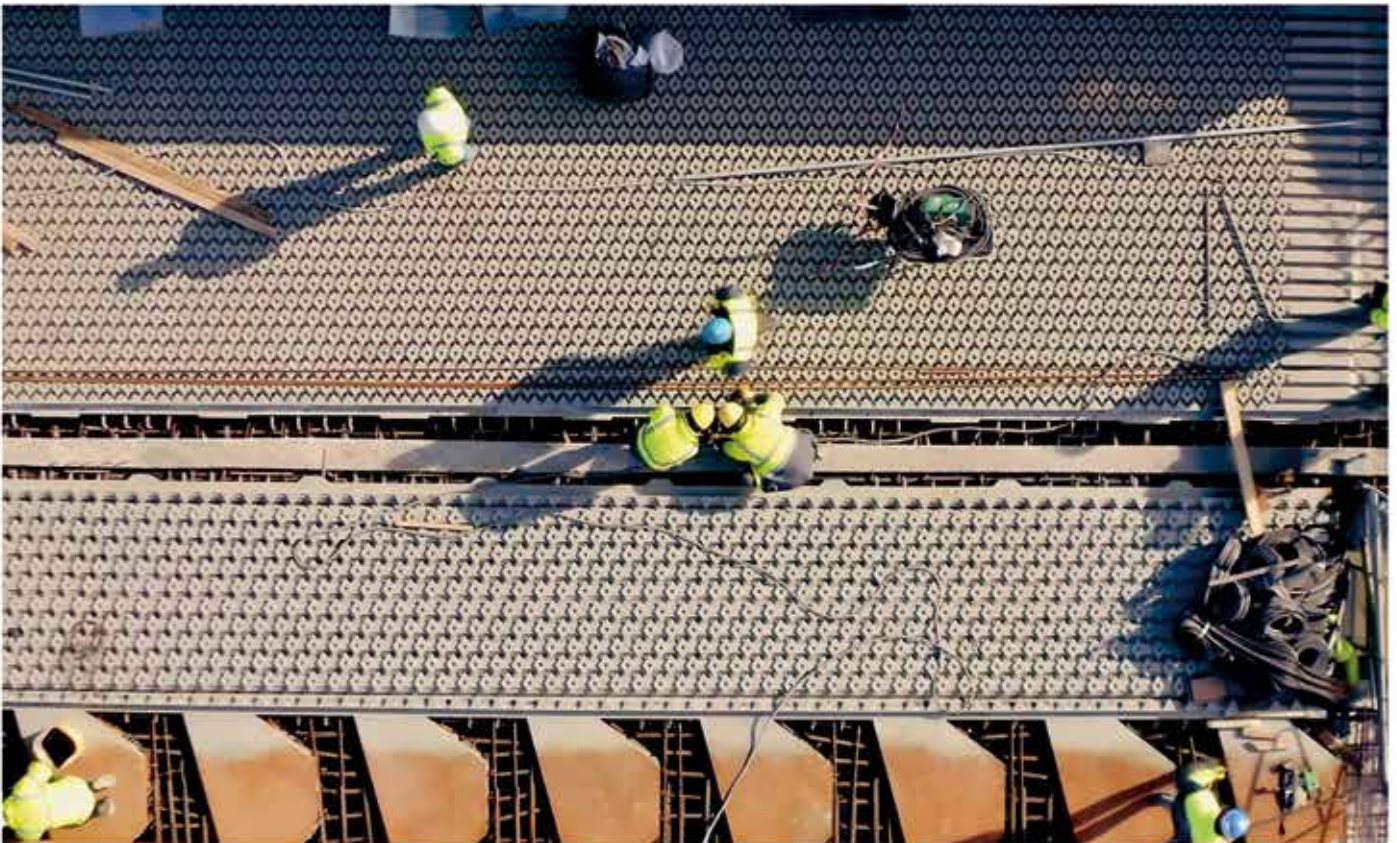
MSM® (MAURER Sliding Material) with grease pockets is a high-performance sliding material that MAURER has been using in bridge bearings for 20 years. It accommodates much higher compressions than the composite material used in swivel joist expansion joints and is approved for an accumulated sliding displacement of at least

50 km. However: The advantages of MSM® can only be harnessed, if the sliding surfaces are in constant contact with each other. But this has not been the case with the swivel joists so far, since the sliding elements were sometimes in contact with the left and sometimes with the right side of the lateral guides. This resulted in a so-called gaping joint.

Therefore, MAURER developed a new bearing in a double prism shape, technical term "prism guide".

The decisive difference can be imagined by visualising a catamaran: Like on two "skids", the profiles lightly and precisely slide over the joists in a tilt-proof way, thus resulting in a very stable guide.





Significant noise reduction

All expansion joints of 1915-Çanakkale including the approach viaducts, are equipped with noise protection in the form of welded rhomboid plates. Welded rhomboid plates significantly reduce noise by up to 60% while increasing riding comfort at the same time. It is essential that MAURER avoids bolted solutions in the dynamic area, such as in traffic: The bolts may loosen under the dynamic load and no longer be tightened. On the other hand, the applied welded connection is long-lasting and guarantees a durable connection.

Five weeks for MAURER

Start of construction of the 1915-Çanakkale Bridge was in 2017, MAURER installed the MSM® Expansion Joints within only five weeks in 2021. In addition to the four large expansion joints, each weighing around 65 tonnes, MAURER also delivered the expansion joints for all approach viaducts. They are all designed to withstand earthquakes. The bridge was handed over on 26 February 2022 and officially opened on 18 March 2022.





ONLY 57 HOURS

Sounds like an action movie and was indeed a perfectly timed interaction: the full replacement of expansion joints on a three-lane motorway bridge in less than two and a half days.



The 16-metre-long and twelve-tonne-heavy expansion joint when lifted into position. Behind it, the bridging system MMBS lifted up in full width.



The Lechbrücke near Gersthofen west of Augsburg during the construction site for the replacement of expansion joints. The entire replacement took only one weekend, with only five and a half hours of full closure.



The new expansion joint under traffic.



Normally, three weeks of full closure would have been needed to install the new, modified swivel joint expansion joint on motorway A8 at the Augsburg motorway junction. But then, what is normal for us?

The federal motorway A8 between Munich and Stuttgart is a European Magistrale while also being regionally busy because it crosses the Lech River between the junctions Augsburg East and West. It was clear that every closed lane costs the private motorway operators, autobahn-plus A8 GmbH, a lot of revenue per hour. So, if you want to limit operations for the shortest possible period of time, only one thing helps: Work must rather be done in our production plant and less on the construction site.

More MAURER - less time lost

Since with the conventional replacement of expansion joints, the preparations and follow-up work are really time-consuming. It starts with dismantling the existing expansion joint, which is integrated into the bridge structure; after that, the reinforcement must be completed in a time-consuming way, followed by detailed shuttering work, and finally the setting of the concrete. To minimise this work, we have modified our MAURER Swivel Joist Expansion Joint. Our expansion joints allow movement in all directions: transverse and longitudinal to the direction of traffic as well as vertical. The parallel swivel joists that lend their name to the expansion joint support the profiles above. They are at a slight angle to the direction of traffic thus ensuring

that the tensile and shear movements of the bridge are evenly distributed over the distances between the intermediate beams.

Normally, these expansion joints have anchor loops on both sides, which are connected to the reinforcement of the bridge and concreted afterwards. The new expansion joint looks completely different because it is connected differently. Instead of anchor loops, it is bedded in mortar on one side with a steel plate and fixed. On the other side, it is welded to the existing expansion joint.

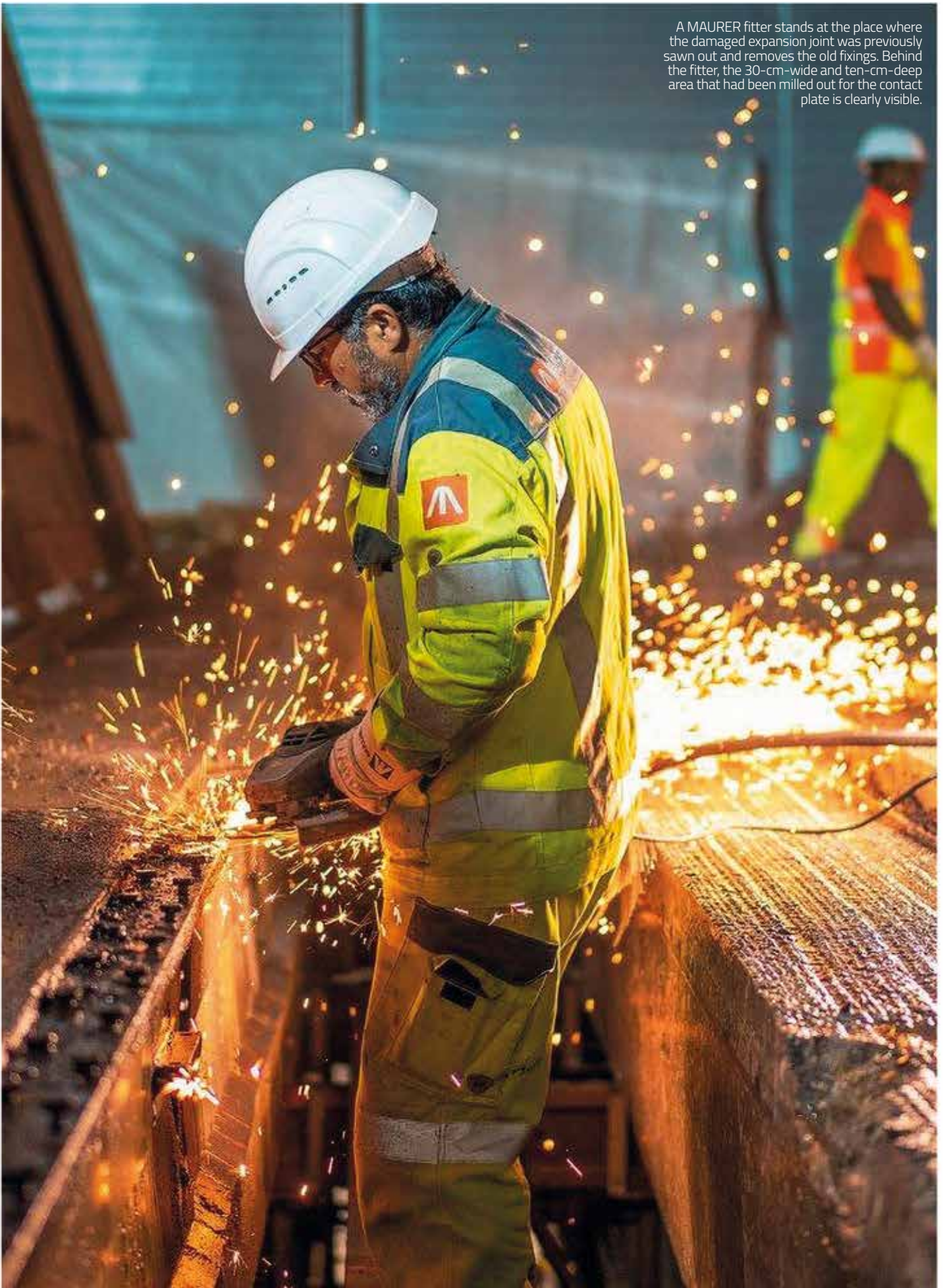
For Josef Reger, Head of Assembly Munich at MAURER, it is thus absolutely clear: "With this new principle, we can replace almost any expansion joint, no matter what we find."

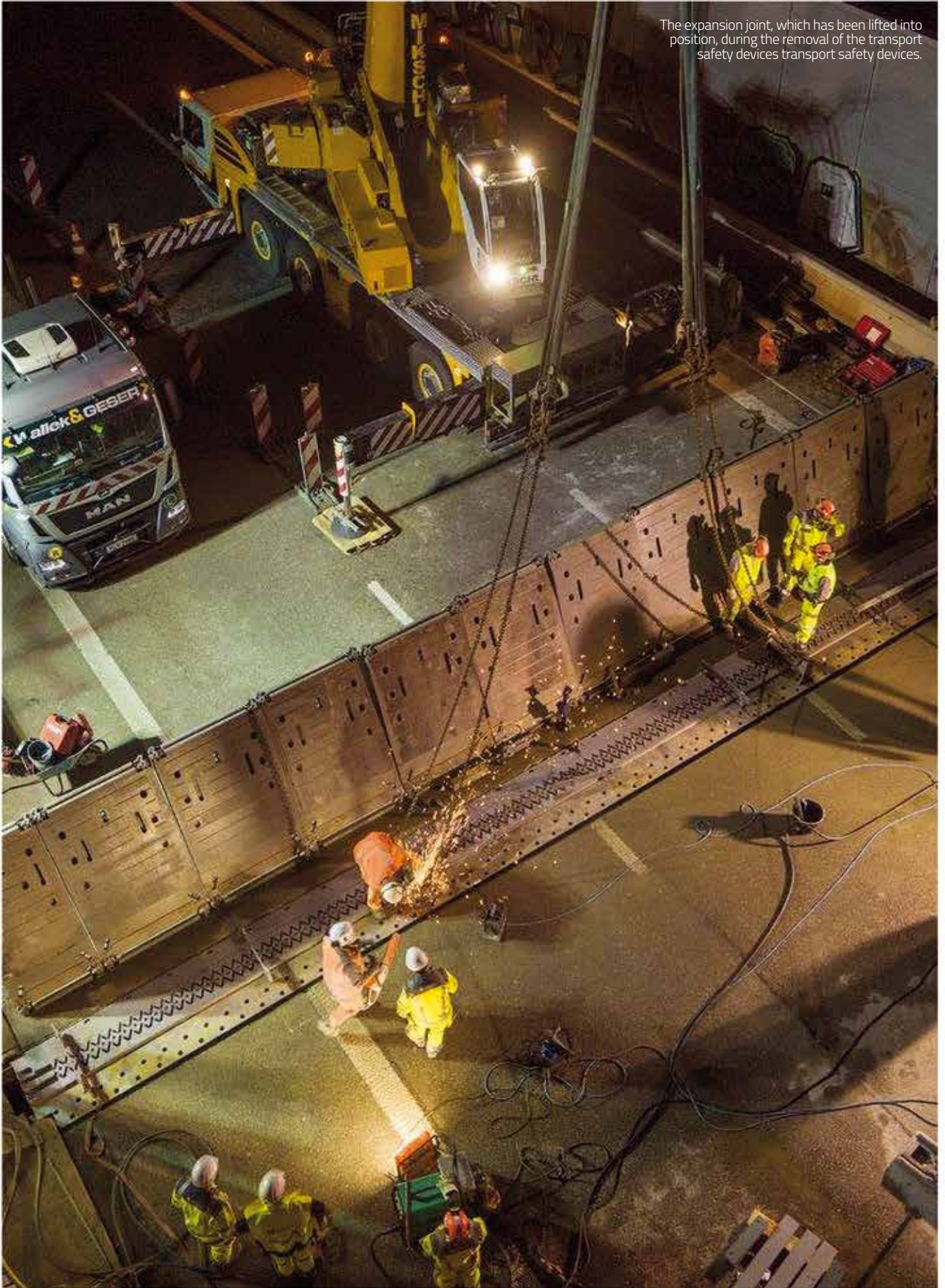
57 hours for dismantling and installation

The replacement of the expansion joints started on Friday at 8:00 p.m.. Materials and containers had been delivered on site beforehand, and preparatory works in the abutment have been completed. The dismantling of the existing expansion joint took place step by step so that traffic could always flow on at least one lane during this stage. The gradually exposed gap was bridged with the MMBS system.

MMBS (MAURER Modular Bridging System) is a modular bridging system. Each module principally consists of three steel plates connected to each other with hinges. During work on the expansion joint, the

A MAURER fitter stands at the place where the damaged expansion joint was previously sawn out and removes the old fixings. Behind the fitter, the 30-cm-wide and ten-cm-deep area that had been milled out for the contact plate is clearly visible.





The expansion joint, which has been lifted into position, during the removal of the transport safety devices transport safety devices.

centre plate is lifted up, the ramp element on the drive-off side folds downwards and both are fixed vertically. The elements that weighed roughly three tonnes were placed next to each other across the structural gap and fixed without exposing the structure to considerable stresses. For the Lechbrücke (16 m carriageway width), eleven MMBS elements were used.

Create space for the new expansion joint

Exposing the structure to stress was only necessary towards the bridge side. Part of the bridge that is just as wide as the recess of the existing expansion joint was cut out of the superstructure concrete with a wire saw, and lifted off in three parts with a mobile crane to provide space for the new expansion joint. For the contact plate, a 30-cm-wide and ten-cm-deep strip was milled out of the asphalt and superstructure concrete in full width above the superstructure reinforcement.

On Saturday night, punctually at 11:30 p.m., the full closure started and all MMBS elements were lifted up. The last loose parts of the existing expansion joint were dismantled, whereas all components firmly fixed in the concrete remained on the abutment side.

Thereafter, approximately 2.5-m-high steel supports were lifted into position. The five supports stand on the abutment and transfer vertical loads. On Sunday morning, at 1:30 a.m., lifting the 16-m-long and twelve-tonne-heavy expansion joint into position began. Working fast was then necessary for the mortar bed at the contact surface of the new expansion

joint, since an extremely fast hardening concrete was used here. The expansion joint was then lifted into its exact height and position and welded afterwards. After one hour, the concrete had hardened to such an extent that the contact plate on the bridge side could be anchored into the bridge with special dowels. The dowels are designed to accommodate dynamic loads.

Towards the abutment side, the new expansion joint was welded to the existing edge profile. The full closure could be lifted on schedule at 5:00 a.m. on Sunday morning. "Further welding and dowelling of the expansion joint, waterproofing and placing of the mastic asphalt on the superstructure side and various works, such as the installation of the supports in the abutment, followed as planned. The new expansion joint type XLS 200 Hybrid has been under traffic since 5:00 a.m. on Monday, 19 July," reports Robert Beyrle, site manager at MAURER.

The new expansion joint has additional special features. It was manufactured in hybrid design, in other words: Components susceptible to corrosion are made of stainless steel in the critical area. Additionally, the expansion joint is noise-reduced. Unlike the damaged predecessor expansion joint, however, the noise-reducing rhomboid plates are not bolted, but welded, which has been proved to provide a very long service-life.

Direct client was autobahnplus A8 GmbH. Together with proven partners from the construction industry, MAURER realised the measure including all related trades.



57 HOURS
IN 2 MINUTES

**Pure action, hard
as steel and cast
in concrete:**

the trailer for the complete replacement of the expansion joints now on YouTube on the MAURER SE Channel under www.youtube.com/watch?v=YpCrgj4TUc0





EXCEPTIONS ARE // OUR RULE

These days when it comes to shipping and delivery, we all think about a courier standing in front of the door with a more or less large package. For Regina Murhauser and her team, apparently there are moments when they too wish they could send our clients a tracking number and the friendly neighbour who receives the shipment takes care of the rest.

What is normal with us? Each structure is special, has particular requirements due to its function, the infrastructure, various loads and the architecture. Our colleagues always find a solution and make sure that everything works from conception to production and the installation on site.

As an outsider, we sometimes overlook how many processes are crucial for success. Shipping is such an example.

The department FV/Shipping organises national and international transports with various transport carriers. Smallest spare parts and standard products are shipped just like XXL special designs. All this often happens in close cooperation and permanent consultation with the "counterparts" at the customers and clients.

[read more >](#)





Collection of the expansion joint and loading on the heavy goods vehicle on the premises of MAURER at Frankfurter Ring.



Here in Munich, Regina Murhauser and currently six employees take care of this. Deadlines and time pressure pose a continual challenge. The department ZB/ Person in charge of customs matters is affiliated with the Shipping Department/ Department FV in Munich. And that is, for now, the setting, in which real Herculean tasks are mastered. If you ask Regina Murhauser which transport has been particularly exciting in the recent past, she answers: "Very clearly, one of the two special transports to Croatia, via the Neum Corridor, to the Pelješac peninsula."

but also a philosophical and interpersonal one. Regarding Pelješac Bridge, it is also highly political.

The break-up of Yugoslavia around twenty years ago resulted, among other things, in Bosnia and Herzegovina being granted direct access to the sea. However, between the Adriatic Sea and Bosnia lies a narrow strip of land that belongs to Croatia. An agreement was reached on a land corridor of a few kilometres wide, which was granted to Bosnia.

But due to this corridor, Dubrovnik and the surrounding region are cut off from Croatia. This does not currently pose a problem to collaborating neighbours. However, since Croatia has become a member of the EU, the situation has changed for transit traffic. Free movement of goods, freedom of movement, EU-wide regulations and benefits apply only to EU member states.

So a bridge was planned just before the corridor connecting the Croatian mainland to the Croatian Pelješac peninsula, from which a motorway leads to Dubrovnik. The region is exposed to seismic risk. And that is right, MAURER as an expert in seismic protection systems, ensures the security and longevity of the structure.

»Large orders worldwide are great, but how do the components weighing tonnes get from the Frankfurter Ring all over the world?«

Inevitably, customs procedures that vary from country to country must be specifically coordinated for our special transports too, and legally compliant export and import customs documents must be prepared that can also withstand subsequent official reviews during transport and on site.

Bridges are meant to overcome obstacles and to connect what is separated. This not only sounds like a technical challenge,



The convoy with the MSM® Swivel Joist Expansion Joints on its way to the construction site in Turkey when stopping off in Bulgaria.

Delivery of a swivel joint expansion joint at Munich Airport for loading onto an Antonov cargo aircraft.



Transporting our protection systems, however, became one of the most delicate tasks in recent years. 32 spherical bearings and two swivel joint expansion joints had to be transported overland through four countries.

This starts with recording and evaluating facts, prioritising processes, and taking all necessary actions. Discussions and team meetings are needed for determining, for example, the distribution of loads which maintains the balance. Then, finally, organisation of suitable heavy goods and escort vehicles that were supported by the national police. It is necessary to consistently check the loading/delivery dates. Regarding the Pelješac Bridge, the coordination of customs for the different

transit countries was particularly exciting. Regina Murhauser describes the strengths which matter for the team around her

»Our own mission is: the right goods at the right time in the right place... and, of course, at the "right" price!«

as follows: "With professional flexibility and the necessary hands-on mentality, we must deliver and hand over the

right goods together with the related and, above all, correct documents, at the right time in the right place within the right budget while also considering and complying with the relevant legal requirements.

This makes a complete overview necessary - usually in a very short time - to gather all information needed as a basis for fulfilling the task and having it ready on time."

When the Pelješac-Bridge will be opened as scheduled in autumn 2022, that is also because Regina Murhauser and her team have cleared away all obstacles on the route from Munich to Croatia.



Special transport/Convoy of swivel joint expansion joints in the USA.

Ms Murhauser, how long have you been working with MAURER?

Regina Murhauser: "For proud 22 years."

What fascinates you in your job and with MAURER?

R. M.: "It is new almost every day. Time and again, you face unexpected challenges and have the opportunity to prove yourself; all this coupled with an "interesting" mixture of people and things."

How is the cooperation with the individual departments?

R. M.: "Good. Nothing else would work because we constantly depend on information, in the process chain, from most departments of MAURER SE and MAURER SPS GmbH to fulfil our tasks."

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

R. M.: "For me, there are many. To name two or three ad hoc: a constant will to develop further and, above all, our proficiency. The flat hierarchies with fast decision-making processes are essential for us."

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

R. M.: "Pottering around in our small, but beautiful garden. I love to tend plants."

As a true native of Munich, I also love to go hiking in our wonderful mountains; in winter snowshoeing and also crosscountry skiing from time to time... and spending as much time as possible with the family."



REGINA MURHAUSER // HEAD OF SHIPPING DEPARTMENT

- born on 14.03.1967
- apprenticeship as a forwarding agent at Kuehne & Nagel
- with MAURER for 22 years
- hobbies: Garden, nature, hiking



RAUL ARRANZ DIEZ

// REGIONAL SALES DIRECTOR



At home in half of the world.

Arranz Diez is not only our man in Bilbao – he also works across all cultural borders throughout Central and South America, as far as Australia and New Zealand.

How long have you been with MAURER? What did you do prior to joining MAURER?

Raul Arranz Diez: "I have been with MAURER since the end of 2015. Prior to that, I worked in the Middle East for the MAURER representation in the region for five years."

Could you please give a short description of your job?

R. A. D.: "I am Regional Sales Director for Latin America and recently also for Oceania. Both are quite far from one another, which poses a challenge to manage the time zones. My task is to select the best projects for MAURER and to coordinate with our team in Munich and the local representatives."

What inspires you in your job and with MAURER?

R. A. D.: "The interesting thing is that we can see the outcome, often in the form of impressive and important structures. Knowing that you have contributed a crucial part is really very motivating and makes it easy for

me to explain how important our work is to my family and friends."

What are the biggest challenges?

R. A. D.: "The distance and coordination of the extremely distinct cultures in the countries of Latin America, of those in Oceania and of my colleagues in Munich. The approaches to one and the same issue are quite different depending on who is carrying out the project, and in most cases, we are right in the middle of it."

»The interesting thing is that we can see the outcome,«

What about the cooperation and communication with MAURER in Germany?

R. A. D.: "For my part, it is pretty good. I am lucky with my colleagues, especially those who are close to my daily work. When I started at MAURER, only one or two people could speak Spanish; now we have several nationalities (Venezuelans, Colombians, Mexicans, Spaniards...) in different depart-

ments and that is a good step."

What are the main differences in your markets compared to the German market in terms of corporate culture and work methods?

R. A. D.: "The technical specifications. Many Latin American countries already have their own standards (equivalent to EN1337 or EN 15129). Nevertheless, it is still necessary to make different adaptations for the same seismic isolator depending on whether the project is implemented in Chile, Peru or Mexico. Apart from that, planning and coordination are quite difficult, since, for example, urgency can change within one week for unforeseen reasons."

Do you have any hobbies, and if so, can you make time for them?

R. A. D.: "My biggest hobby is my four-year-old child, who spends all day asking and exploring new things. When it is convenient, I like to try my hand at endurance sports like road cycling, swimming and running."



CHRISTIAN STEINHILBER

// SHIFT LEADER

What has been the most exciting order until now, where you have been involved?

C. S.: "The most exciting one? Difficult to say. As before, it is the particularly large expansion joints for Turkey and China. These are always real challenges. Special expansion joints for the Galecopperbrug Utrecht can also turn out tricky."

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

C. S.: "Carrying out tasks at short notice which seemed difficult at first, while still interacting in a good and collegial manner."

»I always
wanted to work
with steel.«

What could MAURER improve?

C. S.: "Well, that is complaining at a high level. It would be great if all branches and our main production plant coordinated their procedures to an even better extent."

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

C. S.: "My hobby is collecting watches. And: I have made up my mind to cycle more often again."

How big is the department where you work as a shift leader?

C. S.: "It varies: depending on the number of apprentices and temporary workers there are between 17 and 20 employees. That is quite a lot."

What fascinates you in your job and with MAURER?

C. S.: "I always wanted to work with steel. Well, and with MAURER I can do that. I also like the product range and, of course, the good cooperation with the colleagues, the work atmosphere here in the company."

What are the biggest challenges in your daily work routine?

C. S.: "Doing a good job in the face of high workload and tight deadlines demands the whole man. And treating and coordinating the employees fairly and professionally regardless of all stress."

How is the cooperation with the individual departments?

C. S.: "Oh, that actually works out quite well. You discuss things in small groups and are on the phone a lot. That will be fine then."

Steelbuddy. *Because he loves steel, Christian Steinhilber is one of our "most loyal" colleagues*

Mr Steinhilber, how long have you been working with MAURER?

Christian Steinhilber: "For a while now, since 1981, so, for over 40 years."

Respect. We have heard that expansion joints are "close to your heart", how did that come to be?

C. S.: "It was almost love at first sight (laughs). When I came to production after the first year of apprenticeship, my first workplace was the manufacture of expansion joints in hall three, and I liked it there right from the start. From then on, it was all clear."

Could you please describe what you do? What does a typical workday look like for you?

C. S.: "My day starts with looking at the current status at the end of a night shift; after that, I plan my day shift, take care of the materials, print picking lists, get the goods from the warehouse, resolve technical issues with the design office and coordinate deadlines with the planner."

SPA & SURF // ON 410 DOUBLE SLIDING ISOLATION

COMPLETELY DETACHED FROM
THE EARTH ON MEXICO'S PACIFIC COAST.



Puerto Vallarta. The Secrets & Dreams Bahia Mita Hotel is currently the largest building in Latin America to stand entirely on seismic isolators. 410 isolators can accommodate horizontal displacements of up to ± 500 mm. An early involvement of our earthquake experts in the structural planning not only protects the structure against earthquake-induced damage, but also reduced construction and operation costs. [read more >](#)

The Secrets & Dreams Bahia Mita hotel complex in Mexico was built step by step into the rising terrain and stands entirely on seismic isolators.





Construction site with foundations: seismic isolators are already positioned in the front and in the middle of the picture.

The luxury hotel Secrets & Dreams Bahia Mita is located between the picturesque headland of Punta Mita and the seaside resort of Puerto Vallarta in the Banderas Bay on the Pacific coast. The huge complex consists of two hotels: "Secrets" for adults and "Dreams" for families. It also houses a shopping centre.

"The greatest challenge at the start of planning was to define the position of the seismic isolators and distribute the structural heights and loads in a roughly equal way," as Dr Luís Pinto Carvalho, Country Manager for MAURER SPS GmbH, describes the project.

"This is often neglected. But regarding this project, cooperation with the engineer-

ing firm was good, and we were able to develop an optimal solution together." Only the large pools are excluded: they stand directly in the earth and move with the earthquake.

Seismic isolation in four sections

The starting point was that the dream hotel was built step by step into the rising terrain. Accordingly, it was difficult to distribute loads over the isolators. To that end, the complex was divided into four sections, which are separated from each other by expansion joints and can thus move separately in the event of an earthquake.

SIP®-D: Double Sliding Isolation Pendulums

The main task in the event of an earthquake is carried out by the bearings. SIP® D-bearings were installed. (SIP® stands for Sliding Isolation Pendulum).

D (Double) indicates that the bearings beneath the hotel have two concave surfaces instead of one. They are necessary since the earthquakes at the hotel location are characterised by large horizontal displacements of ± 400 mm. The bearings would thus have to become very large in order to accommodate this.

But with the Double-Bearings, the displacement is distributed equally over both concave surfaces. Therefore, D-Bearings can be built smaller and lighter, which

► ISOLATING, DISSIPATING, CENTRING, TRANSMITTING

In principal, SIP®-Bearings have four functions:

- They **isolate the building** from its foundations.
- They **dissipate** the seismic **energy** through friction.
- They **re-centre the building** in its initial position following an earthquake.
- They **transmit vertical loads**.

reduces dimensions, saves space, time and costs.

A total of 410 SIP®-D-Bearings with maximum vertical loads of 4,900 kN up to 14,100 kN were installed, which can accommodate maximum seismic displacements of up to ± 500 mm.

Sophisticated positioning of the bearings

The distribution of the bearings is particularly sophisticated. The load-bearing structure of the hotel mainly consists of a concrete scaffold, stiffening walls provide stability. However, these walls tend to "tilt" or rotate due to the horizontal forces in the event of an earthquake. "This lever effect could cause tensile forces, which means lifting forces in the



Installed SIP®-D-Bearing with protection against concrete.

isolators,” Dr Pinto describes. We solve this by distributing and positioning the bearings. Directly under the stiffening walls are the largest bearings and prevent a lift-off and they also accommodate the largest forces.”

Quality is key

The client AMR Collections, an international hotel operator owning many luxury hotels, placed great value on the building’s quality and safety. “It was not only about the primary structure, but also the secondary structure, such as lamps or suspended ceilings. AMR wanted operation to continue without interruption even after a stronger earthquake – without closure and several months of repair work.”

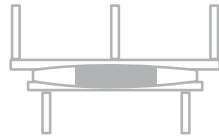
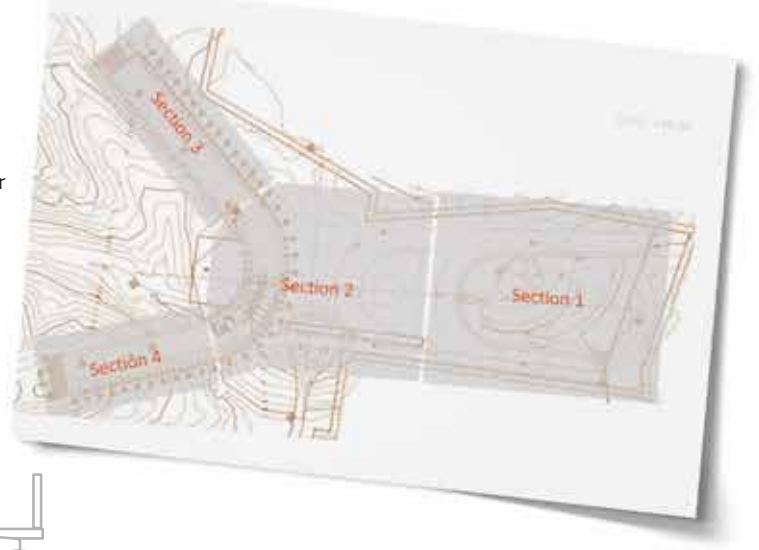
Quality assurance thus played a decisive role in the tender – and this is where MAURER was able to score points. The production in Munich was inspected by AMR representatives on site. Tests were also required and carried out by EUCENTRE in Pavia/Italy. Each of the three bearing types passed two prototype tests and 21 randomly selected production tests.

In the last quarter of 2019, 33 containers went to Mexico. The number of containers was determined by the weight: Each isolator weighs approximately 800 kg.

Lifelong due to MSM®

A central requirement of the client was also that the isolators should have the

Division scheme of the structure into four sections.



410 x
SIP®-D-BEARINGS

50 YEARS
SERVICE LIFE

15%
COST SAVING

33 CONTAINERS

longest possible service life. “We were able to ensure this by using our patented sliding material MSM®.” Of the advantages provided by MSM® (MAURER Sliding Material) compared to conventional Teflon (PTFE), the main decisive factor was the twice as high load capacity. It reduces the cross section of the bearing. Furthermore, MSM® can accommodate at least five-fold accumulated sliding displacements,

a seven-and-a-half-fold displacement velocity and high temperature fluctuations. The approval indicates a service life of 50 years. However, since the limit loads are rarely exhausted, the bearings achieve the required service life of the structure.

15% costs saved on the load-bearing structure alone

Finally, using SIP®-D-Bearings with MSM® in the sliding surfaces also reduced building costs because the load-bearing structure could be built with leaner supports and beams could be refrained from. The latter reduced the height of the building which meant less facade and less space – and thus less cooling during operation. “In the area of the load-bearing structure alone, 15% costs were saved – while also increasing safety,” Dr Pinto reports.

Timing

Start of construction of the hotel complex was in 2019, the first guests arrived in August 2021. The SIP®-D-Bearings were installed between October 2019 and February 2020.



SIP®-D-Bearings during installation.



DECOUPLING AND DAMPING // THERE IS NOTHING BETTER

Mr Patino, you come from a country with high seismic activity. Have you ever experienced an earthquake?

Sebastian Patino: "Yes, in my home country Colombia on the Pacific coast, earthquakes occur frequently. When I was barely nine years old, a strong earthquake shook the country and largely destroyed the city of Armenia. I remember how we all fled the house, and lay down flat on an opposite meadow. Everything moved and the ground cracked."

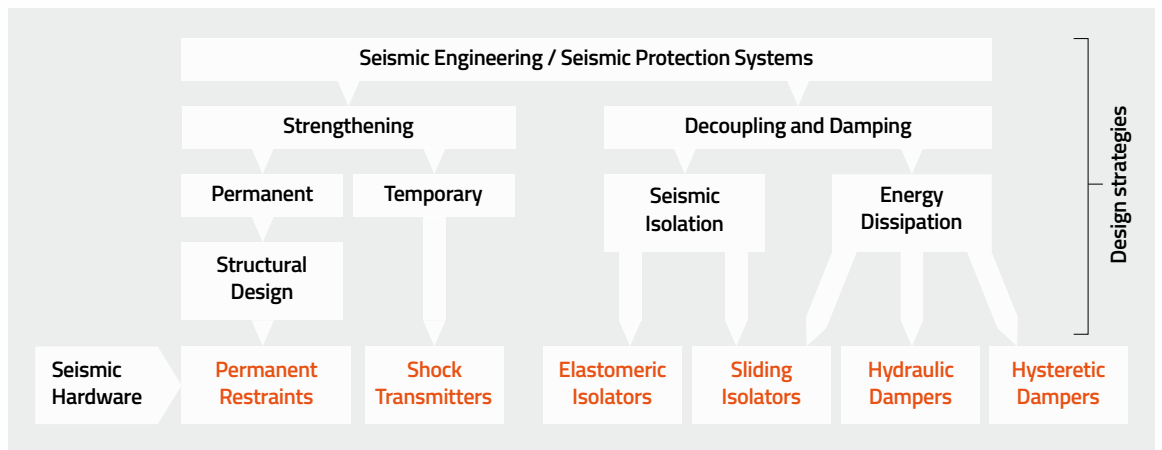
Did you decide that day that you wanted to deal with this topic professionally?

S. P.: "Not at first. But this experience was always present until my studies. Professionally, this event has long been a motivation for me to advance our technology. I have experienced the huge social and economic impacts that an earthquake can have on us humans. Now as a civil engineer, it is fascinating to understand how earthquakes occur and how they affect structures, but mainly, how

we can best protect ourselves against them."

How did you join MAURER and how were you able to professionally develop there?

S. P.: "I was in the final phase of my studies and really wanted to write my master thesis in the area of seismic protection systems. Rather earlier than later, you come across MAURER and then I have applied there. I started in the design office as a Project Engineer and was responsible for





SEBASTIAN PATINO // CONSULTANT FOR SEISMIC PROTECTION SYSTEMS

the dimensioning and design of structural bearings and isolators.

There is constant technical exchange between civil and mechanical engineers in the department.

I am currently working in technical sales and advise planning firms alongside construction companies on seismic protection systems in Central and South America. I am also responsible for the preparation of technical offers and support the area sales."

What was the implementation of the Punta Mita Hotel project like, and what were the specific tasks?

S. P.: "The Secrets & Dreams Bahia Mita Hotel is located in an area with high seismic activity. In consultation with the client and planner and in cooperation with our colleagues at MAURER Mexico, we planned a seismic protection system with our sliding isolation pendulums, thus ensuring that the structure remains functional following an earthquake."

Why did you choose this solution and how does it function?

S. P.: "There are principally two strategies for the safe design of structures in seismic areas: "Strengthening" and "Decoupling and Damping". With "Strengthening", the structure is connected to the foundation so that the energy released in an earthquake is transmitted into the structure in

its entirety. This leads to very stiff structures.

The dissipation of energy takes place in the structure itself so that damage like cracks and plastic deformations is practically inevitable. A structure that is not isolated in this way is like a car without dampers.

With "Decoupling and Damping", the structure is isolated from the foundation so that only a small fraction of the seismic energy reaches the structure.

The remaining energy is converted into heat through the friction of our isolators. In the end, our isolators are energy converters.

The advantage is that the structure and its interior are scarcely affected by the earthquake."

Have the products already been used in other buildings and is there experience?

S. P.: "Yes, with an upward trend. The high number comes primarily from structures that need to remain functional during and following an earthquake, such as hospitals, airports, railway stations, supply infrastructures. Fortunately, the private sector, too, has recognised the major advantages of "Decoupling and Damping" and makes use of it. There is no more sensible strategy for structures in seismic areas than to equip them with seismic protection systems."

-
- 29.03.1990** born in Cali, Colombia
 - 2013** for exchange studies to Darmstadt, Germany
 - 2013-2016** double degree in civil engineering at both TU Darmstadt, Germany and „Escuela Colombiana de Ingenieria Julio Garavito“ – Bogotá, Colombia; Ing. B. Sc.
 - 2016-2018** project engineer for structural planning in Frankfurt/Main, Germany
 - 2018** development department at MAURER for research projects in the course of the master thesis
 - 2020** degree as structural designer M. Sc.
 - 2019 – 2021** project engineer in the design office for bearings and isolators
 - SINCE 2021** consultant for seismic protection systems region LATAM
-



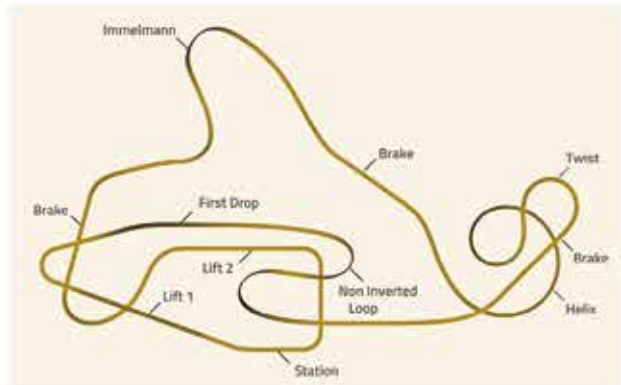
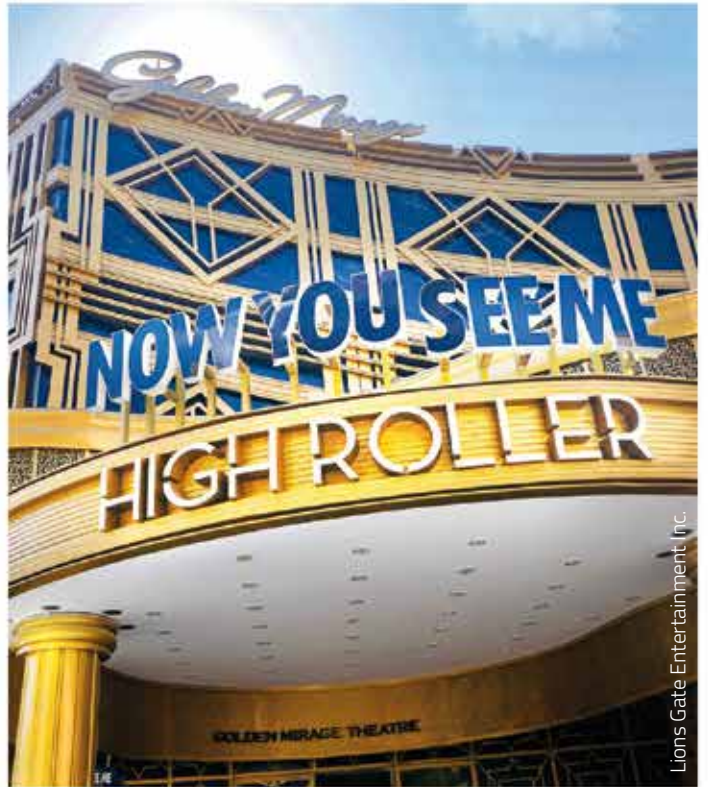
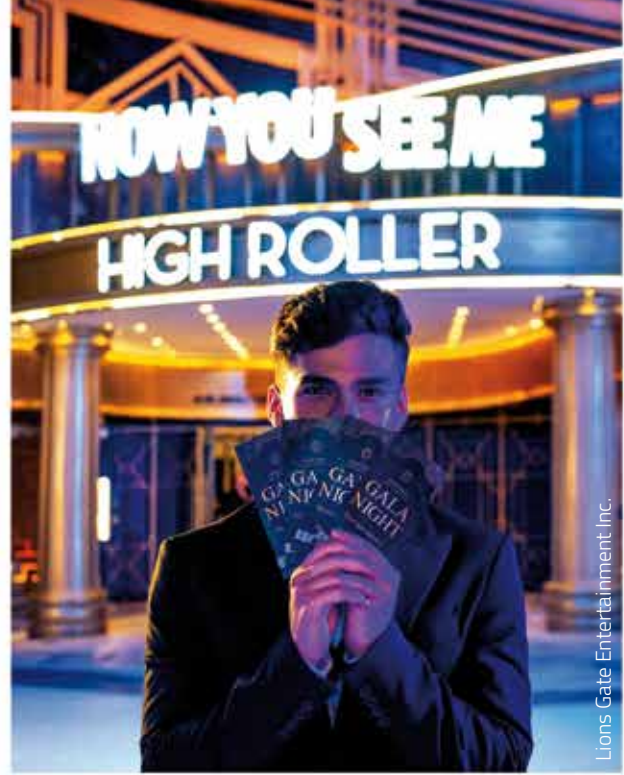
NOW YOU SEE ME // SCREAM

Lions Gate Entertainment Inc.



PASSION FOR THE NEW

Maurer Rides Spinning Coaster 3000. The world's fastest single-car Spinning Coaster is opened in the Lionsgate Zone at Motiongate™ Dubai as part of the Dubai Parks and Resorts expansion. [read more >](#)



Based on the stunning thriller “Now You See Me”, the guests experience the masterly misdirection of the film through several optical illusions and a fascinating story. The passengers of the Maurer Rides roller coaster reach speeds of up to 70 km/h while they try to evade security and reveal the intrigues of a criminal mastermind during an intense coaster action.

The four-seater pulls upwards quickly and out into the open, into a right-hand bend, with spinning effect and panoramic view: it’s a steep and rapid descent, with top speeds of up to 70 km/h, spinning, looking all around while searching, up there perhaps? Then steeply upwards again into the loop – BUT always keep your head up.

Looking around and searching again and quickly downwards again, spinning, looking, staying cool in

the horizontal eight, further on in a helix – scanning everything on the wild chase. Steep Immelmann turn (80° banking) and twisted through s-bends.

The experience is based on lots of sophisticated technology. The high speeds combined with spinning effects and a winding course only work on perfect tracks. That is the strength of Maurer Rides: to master everything equally from the wacky idea to the perfect manufacture and reliable installation.

Looping principle turned upside down

Highlight literally is the new NIL, “Non-Inverted Loop” which went into operation in Dubai for the first time worldwide. It turns the looping principle upside down: soaring up to the top while still keeping an overview. Precisely

► TECHNICAL INFO	
Type of coaster:	SPINNING COASTER 3000
Track length:	519 m (1703 ft)
Base area:	95 m x 58 m (312 ft x 190 ft)
Height:	17.4 m (57 ft)
Max. speed:	70 km/h (43.5 mph)
Type of vehicle:	Four-seater spinning cars
Number of vehicles:	6
Ride time:	103 sec.
Capacity:	680 pph

► FEATURES	
▪	First spinning coaster with Non-Inverted Loop
▪	Fastest spinning coaster using single cars
▪	Free spinning



designed track turns enable the innovation. To create the perfect illusion of the film, Maurer Rides cooperated with the design studios FORREC and DEC.

Denis Pascal, General Manager of Motiongate Dubai in Dubai Parks and Resorts, is enthused: “The record-breaking roller coaster immerses the visitor entirely: in the story, the coaster – a thrilling roller coaster experience of a special kind.” And he further emphasises, the “Now You See Me: High Roller” was imaginative, thrilling, extravagant and would give young people and adults the feeling of experiencing the film, and time and again, if they like.

**MAURER SE**

Frankfurter Ring 193
80807 Munich
Germany

P.O. Box 440145
80750 Munich
Germany

Phone +49 89 323 94-0

Fax +49 89 323 94-306

info@maurer.eu

www.maurer.eu

German Engineering since 1876

