

# MAURER Structural Protection Systems

Forces in motion



Abandoibarra bridge Bilbao

# Experience in innovation

The MAURER Group is a steel construction company and has been family-owned since it was formed back in 1876. The MAURER Group is currently one of the global technological leaders in steel and plant construction in various specialist fields. We offer products and solutions which are particularly notable for their durability, quality and dependability.



## Four areas of application for a customised structural protection system



EXPANSION JOINTS



STRUCTURAL BEARINGS



TUNED MASS DAMPERS



SEISMIC DEVICES

An important part of our activities is monitoring climatic, seismic and traffic-based forces and movements which have an impact on buildings, bridges and complex dynamic structures. These effects can be controlled through the selective use of our expansion joints, structural bearings, vibration dampers and seismic devices to protect the structures from damage.

We also offer the following services:

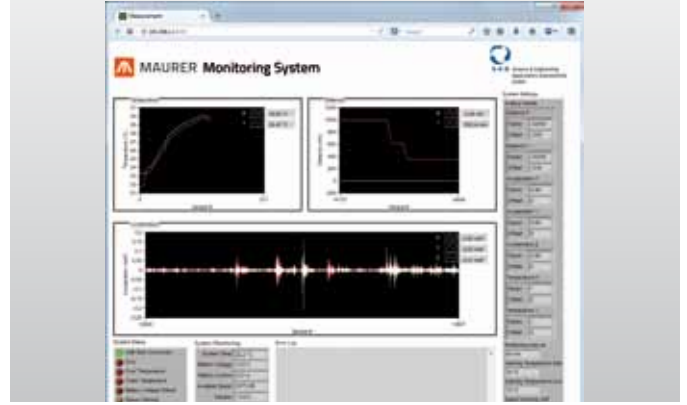
- Construction services
- Installation supervision
- Inspection
- Maintenance
- Refurbishments
  
- Static & dynamic analyses
- Component testing
- Design planning
- Monitoring
  
- Research and development
- Training courses

# MAURER Services



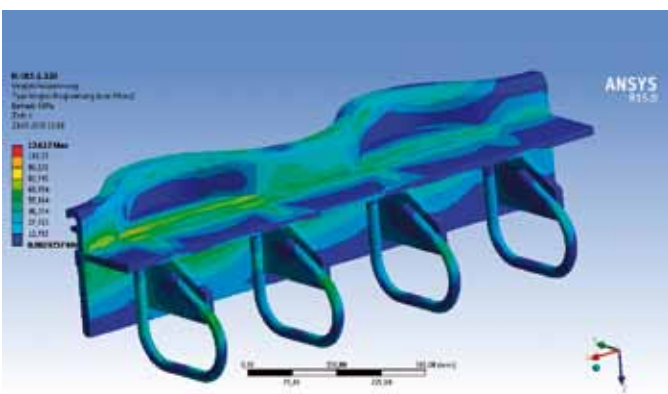
## >> INSTALLATION

Our specialists are ready to advise and assist customers in every project phase. We professionally install our systems in new buildings and existing structures. This becomes especially clear when it comes to replacing and refurbishing these systems. We have therefore developed a modular expansion joint structure with the MMBS which also enables road use while the replacement expansion joint structures are being installed and modified.



## >> MONITORING

A MAURER monitoring system can be used to permanently record and monitor all forces, movements, accelerations and temperatures which have an impact on a building and its structural protection system. This data provides the basis for documenting loads, carrying out inspections and further enhancing the protection system. A MAURER monitoring system like the one installed in the SOCAR Tower in Baku can be used in the pendulum to damp wind-induced vibrations. The soil accelerations and the distance which the mass of the pendulum swings are measured on the top floor of the SOCAR Tower. The temperature of the hydraulic dampers is also recorded.



## >> CONSULTING

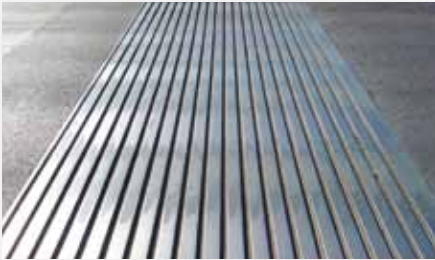
The exceptional strength of our team is its comprehensive technical expertise and its extensive experience. Our engineers have proven that we understand the causes of complex situations and develop the best possible solutions for projects subject to extreme conditions and extraordinary requirements in all regions throughout the world.



## >> INSPECTION

Regularly inspecting our products located in the structure increases the service life and safety for the user. This is because any damage can usually be detected at an early stage. It is therefore possible to identify whether there is any need for refurbishment in good time and repairs can be carried out at a low cost.

# MAURER Expansion joints



MAURER swivel joist expansion joint with 20 profiles

Temperature fluctuations and traffic volumes change the length of larger bridges by a matter of metres. An expansion joint which can move freely and safely transfer the traffic loads is therefore integrated at the end of the bridge.



Russky Island Bridge, Vladivostok, Russia

## >> GIRDER GRID EXPANSION JOINTS 🚗

For use in bridges with a guided bearing.

- Maximum torsional rigidity of the centre beam
- Long service life and efficient control
- Economical for minor to moderate movements

## >> SWIVEL JOIST EXPANSION JOINTS 🚗

For use in bridges with complex movement requirements and earthquakes.

- No control springs, can move in all directions (360 degrees of freedom)
- Any size can technically be chosen
- Provides a simple steel connection to the structure

## >> XL EXPANSION JOINTS 🚗

Low-noise modular expansion joint for road bridges.

- Easy to ride, perfect riding comfort
- Lowest noise emission
- Can be combined with lower noise protection

## >> SINGLE-PROFILE JOINTS 🚗 🚂

For movement of up to 100 mm.

- Simple
- Compact
- Extremely long-lasting

## >> XW1 EXPANSION JOINTS 🚗

Low-noise single-profile expansion joints.

- Compact
- Architecturally sophisticated

## >> BETOFLEX® EXPANSION JOINTS 🚗

For use where the available space is limited.

- Construction height = Asphalt height
- Tight connection to the structure
- Quick setup

## >> MATT EXPANSION JOINTS 🚂

Meet the specific requirements of railway bridges with minor to moderate movements.

- Deutsche Bahn approval for movement of up to 260 mm
- Service life corresponds to the bridge structure



Guard rail of a low-noise expansion joint

## >> GUIDED CROSS TIE EXPANSION JOINTS 🚂

Meet the specific requirements of railway bridges with significant movements.

- Controlled sleeper spacing
- Maximum torsional rigidity of the centre beam
- Installation in extreme curves and longitudinal gradients

## >> BUILDING EXPANSION JOINTS 🏠

Meet building-related architectural requirements.

- Available for all load categories
- Flexibility through the variety of types
- Also suitable for earthquakes

## >> GENERAL BENEFITS

- Low maintenance
- CE marking
- External monitoring
- Service life exceeding 50 years
- National and international approvals
- Dynamic screw-free connections
- Waterproof
- Snow-plough blade safe

# MAURER Structural bearings



Spherical bearing made from MAURER sliding alloy MSA®

Movements and significant forces – Bridges and high-rise structures sometimes lead an eventful life. MAURER structural bearings used worldwide ensure that this strain does not have a long term impact on the structure for as long as possible.



Allianz Arena, Munich/Germany

## >> MSM® SPHERICAL BEARINGS 🚗 🏠 🏗️

Ideal solution in terms of sliding properties, bearing surface and service life.

- Aging-resistant thanks to the use of MSM®, MSA® and steel
- Significant rotations and extreme vertical and horizontal loads
- Smallest possible surface for the ground area
- For use in temperature range from -50°C to +70°C
- Available in accordance with EN 1337-7, ETA 06/0131 and AASHTO
- Service life exceeding 50 years

## >> POT BEARINGS 🚗 🏠

Cost-effective solution for moderate loads with PTFE.

- Use of highest quality sealing rings according to EN
- Service life of 10-25 years
- For use in temperature range from -35°C to +48°C
- Available in accordance with EN 1337-5 and AASHTO

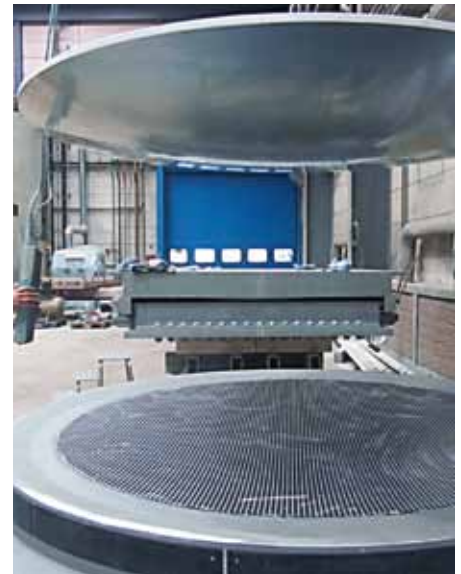
## >> ELASTOMERIC BEARINGS 🚗 🏠 🏗️

Cost effective solution for minor loads, movements and rotations.

- CR and NR design, round and square layouts
- Special forms and varied shear moduli available on demand
- Service life of 10-25 years
- For use in temperature range from -40°C to +50°C
- Available in accordance with EN 1337-3 and AASHTO

## >> SPECIAL BEARINGS 🚗 🏠 🏗️

- Tension-compression spherical bearings
- Spherical segment bearings
- Rocker bearing
- Build-up welding roller bearings
- Horizontal force bearings



MAURER MSM® spherical bearings for 220,000 kN load



Berlin Hauptbahnhof (Main Station), Germany

## >> GENERAL BENEFITS

- Low maintenance
- CE marking
- External monitoring
- National and international approvals

# MAURER Tuned mass dampers



Cable dampers in production

Tuned mass dampers protect structures against harmful vibrations, regardless of whether they are caused by people, traffic, machines, wind or earthquakes.



Donau City Tower, Vienna/Austria

## >> TUNED MASS DAMPERS (TMD)



A major factor in the ease of use and service life of the structure.

- Already active for very minor structural movements
- Adapted precisely to the structure thanks to narrow manufacturing tolerances
- Damping of vertical, horizontal and rotational vibrations
- Also available as a semi-active design to ensure maximum efficiency

## >> CABLE DAMPERS

Damped cable vibrations on braced supporting structures which are induced by traffic, wind or rain.

- Very sensitive due to low compressibility
- High efficiency with very low connection height to the structure, in order to meet architectural requirements
- Also available as a semi-active design to ensure maximum efficiency



MAURER mass dampers produced in Munich



MAURER double pendulum dampers, Baku/Azerbaijan



MAURER cable dampers, Sutong Bridge, China

## >> GENERAL BENEFITS

- Low maintenance
- CE marking
- External monitoring
- Service life exceeding 50 years
- National and international approvals

# MAURER Seismic devices



MAURER steel hysteresis dampers (MSHD)

Seismic devices from MAURER – This is a variety of in-house technological and structural design developments which offer effective protection through isolation and/or dissipation with an interaction of structural forces and movements.



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Djamaâ El Djazir Mosque, Algiers/Algeria

## >> SHOCK TRANSMISSION UNITS

Lock at high speeds and allow slow movements with low resistance.

- Structural protection through overload safety device
- Very short reaction time

## >> STEEL HYSTERESIS DAMPERS WITH RECENTRING

Viscous-free, recentering dampers for minor service movements.

- Highly-efficient energy dissipation
- Temperature-independent
- Aging-resistant



MAURER isolator at Bilkent Secondary School, Turkey

## >> HYDRAULIC DAMPERS

Offer very efficient energy dissipation with a variety of characteristic curves.

- Cost reduction resulting from an enhanced structure
- Leak-free thanks to very low pressure during the operating period and triple sealing
- Damping exponent  $\alpha$  available from 0.04
- Very short reaction time due to low compressibility
- Temperature-independent

## >> LEAD RUBBER BEARINGS

Combine structure isolation and recentering with energy dissipation.

- Suitable for minor to moderate loads
- Variety of shear modulus available on demand. Standard  $G = 0.9 \text{ MPa}$
- High recentering capacity
- CR and NR design



MAURER hydraulic dampers produced in Munich

## >> SLIDING PENDULUM BEARINGS




Optionally combine structure isolation and recentering with energy dissipation.

- Suitable for very high vertical loads
- Aging-resistant thanks to the use of MSM®, MSA® and steel
- For use in temperature range from  $-50^\circ\text{C}$  to  $+70^\circ\text{C}$
- Low-friction floating support with lubricated design

## >> GENERAL BENEFITS

- Low maintenance
- CE marking
- External monitoring
- Service life of 50 years

## >> LEGEND

-  Road bridges
-  Railway bridges
-  Building construction

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German Engineering since 1876

