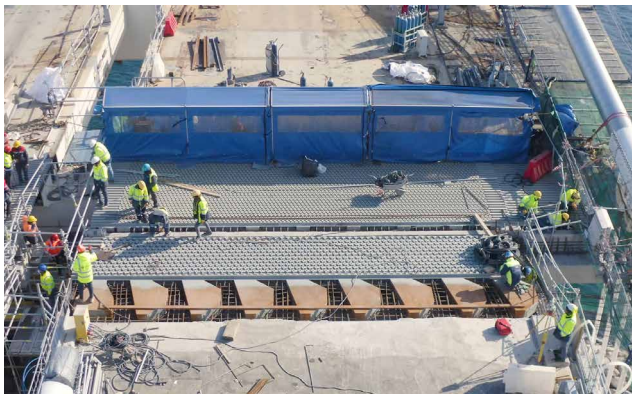
MAURER

MAURER
Expansion Joints - Roadway



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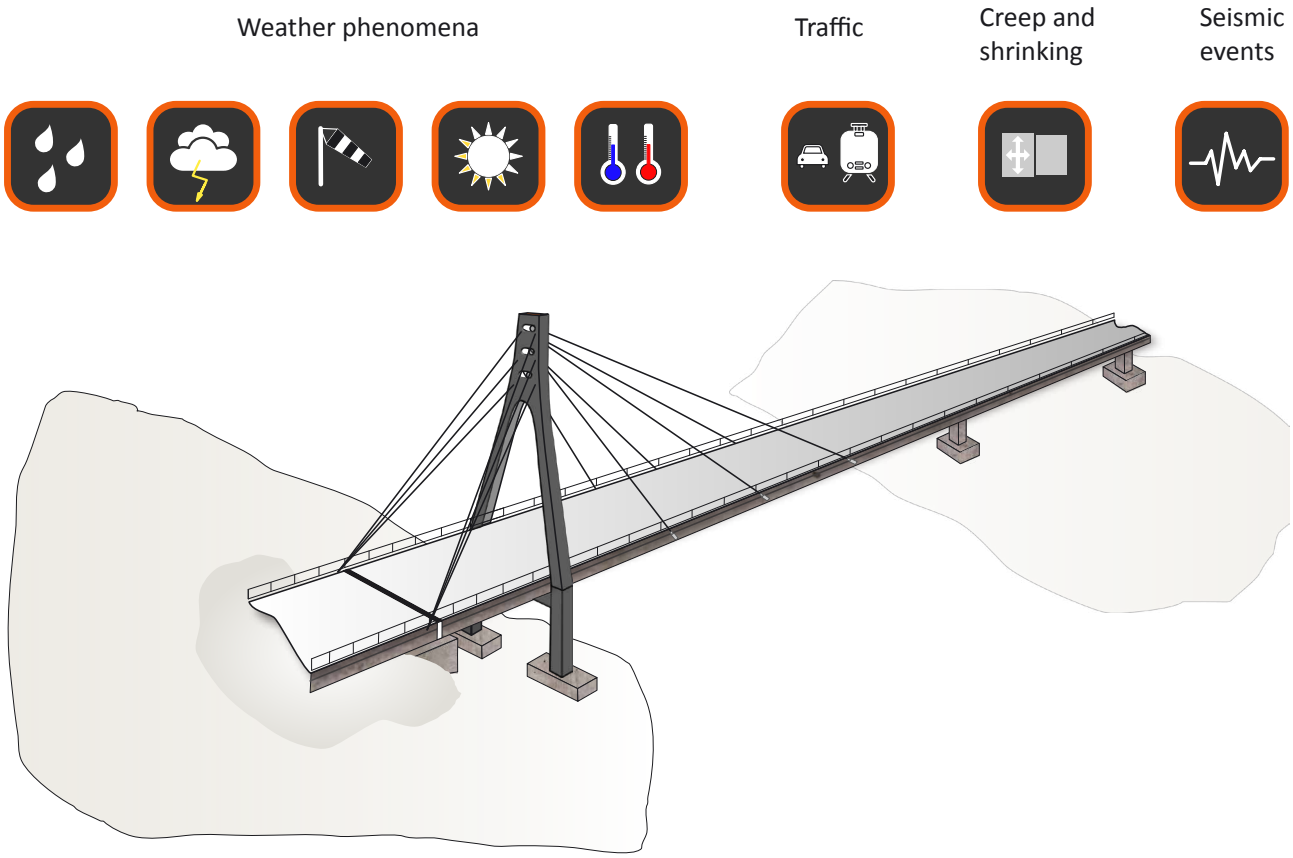
Expansion joints for road bridges ensure crossing over all sizes of structural gaps and that possible movements due to creep and shrinkage, temperature differences, traffic loads, slope shear, seismic events, etc. are accommodated. They are mainly used in steel, reinforced concrete and prestressed concrete bridges, as well asin composite structures.



>> Characteristics

- Optimum adaptation to the geometry of the structure
- Fatigue resistant connections
- Low life cycle costs
- Service life > 50 years
- Optional noise reduction

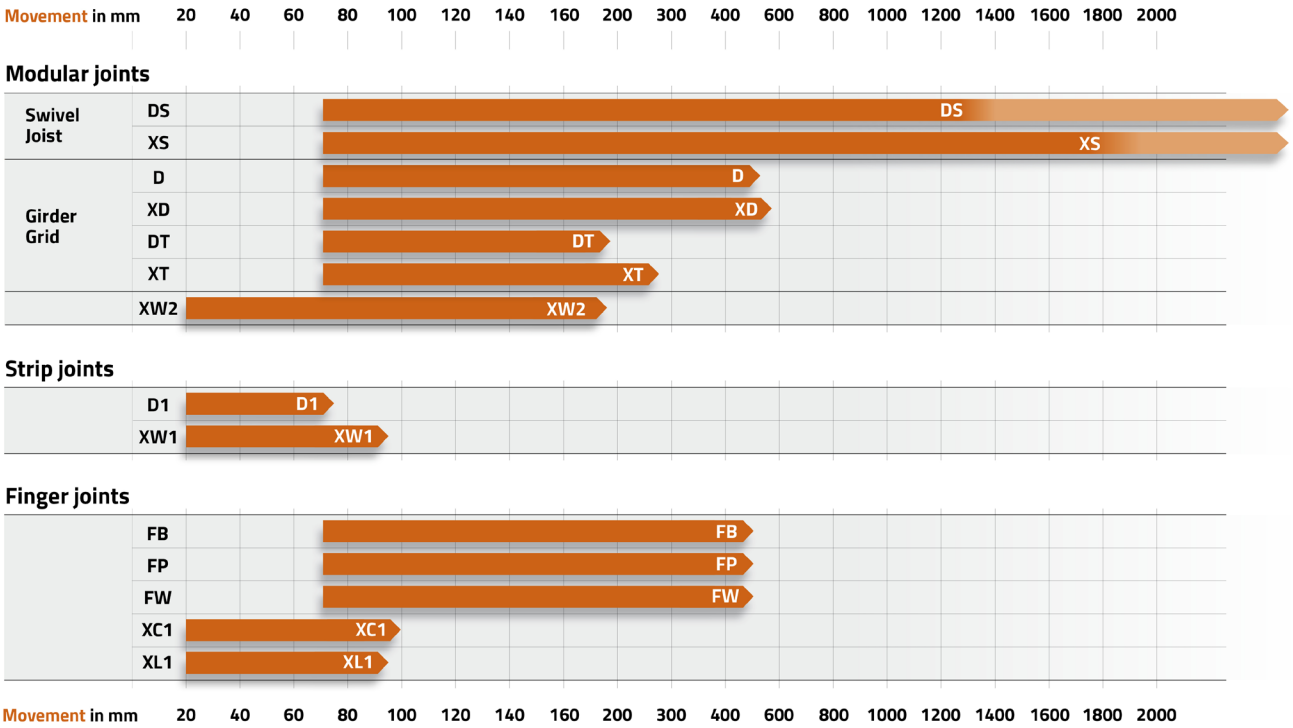
Overview and movements

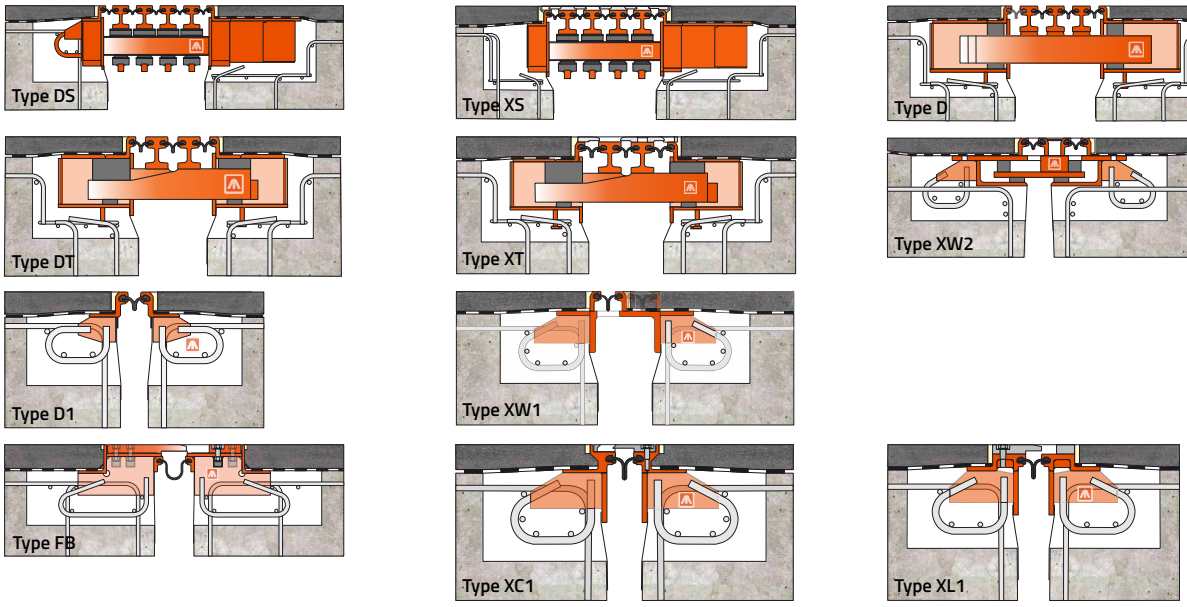
All available MAURER expansion joints can fulfil national, European and/or international requirements. MAURER distinguishes between the following groups of expansion joints.

- Modular joints
- Strip joints
- Finger joints

Depending on the type of expansion joint, transverse, vertical and rotational movements of the main structure can be accommodated. The longitudinal movements of MAURER expansion joints are shown here as an example.

MAURER Expansion Joints – Longitudinal movements





Modular Joints

Modular joints are used when the movements to be accommodated exceed 65 mm (without noise reduction) or 95 mm (with noise reduction) and thus exceed the capacity of single seal joints. The highly flexible expansion joint systems allow the movement capacity to be adapted to the structural requirements by changing the number of sealing profiles used.

- Load transfer into the structure via damping, reinforced elastomeric bearings
- Prestressed spring elements prevent individual components from lifting off each other
- Replaceable elastomer components have a minimum service life of 25 years
- Supplied ready for installation, no on-site assembly required
- Movement capacity up to 1900 mm according to standard tests or unlimited according to individual cases

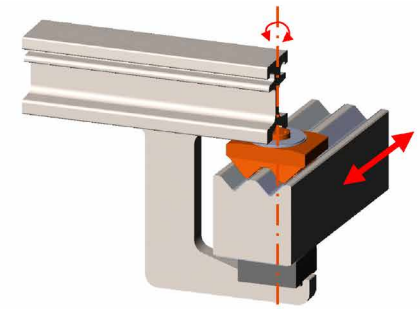
The expansion joints can be designed with or without noise reduction in the carriageway area. In addition to the lower noise emission of the XT/XD or XS versions, these have the advantage that the permissible individual gap width is 30 mm greater, so that the number of sealing profiles and centre beams can be reduced accordingly.

Features	Swivel Joist Expansion Joints		Girder grid				XW2
	DS	XS	DT	XT	D	XD	
Noise reduced	+	++++	+	++++	+	++++	++++
Watertightness	✓	✓	✓	✓	✓	✓	✓
Three-dimensional movement	++++	+++	+++	++	+	+	++
Service life	> 50	> 50	50	50	50	50	50

++++ very good +++ good ++ limited + very limited

MAURER MSM® Swivel Joist Expansion Joints

The use of durable components such as MSM® as the sliding material, and the backlash-free guidance of the centre beams on the support bars, ensures that these expansion joints have lowwear, constraint-free control of the joint gaps. With six degrees of freedom of movement and a torsionally soft sliding bearing, the expansion joints can be optimally adapted to the requirements of the project.



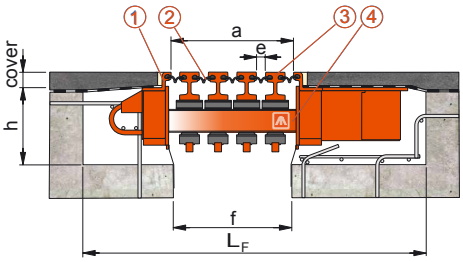
MAURER Type DS/XS

- Movement capacity up to 1,900 mm according to standard or unlimited according to individual test
- Prestressed, backlash-free and torsionally rigid mounting of centre beams to support bar
- Fatigue resistant design due to elimination of bolted connections
- Wear-free sliding bearings with proven low-friction MSM® sliding material
- Very high return on investment due to low life cycle costs
- Free distribution of support bar movements to both joint edges possible

MAURER MSM® Swivel Joist Expansion Joint DS

The use of durable components such as MSM® as the sliding material, and the backlash-free guidance of the centre beams on the support bars, ensures that these expansion joints have lowwear, constraint-free control of the joint gaps. With six degrees of freedom of movement and a torsionally soft sliding bearing, the expansion joints can be optimally adapted to the requirements of the project.

Displacement of One-sided expansion joint



1 Edge profile
2 Sealing element
3 Centre beam
4 Support bar

Type	a	h_f	f	L_f	Type	a	h_f	f	L_f
DS2	150	340	115	995	**DS11**	1230	420	1140	2430
DS3	270	350	240	1165	**DS12**	1350	430	1255	2590
DS4	390	360	335	1290	**DS13**	1470	430	1255	2750
DS5	510	370	450	1450	**DS14**	1590	440	1485	2910
DS6	630	380	565	1610	**DS15**	1710	450	1600	3080
DS7	750	390	680	1780	**DS16**	1830	460	1715	3240
DS8	870	400	795	1940	**DS17**	1950	470	1830	3400
DS9	990	410	915	2100	**DS18**	2070	480	1945	3560
DS10	1110	420	1025	2260	**DS19**	2190	490	2060	3730
					DS20	2310	500	2175	3890

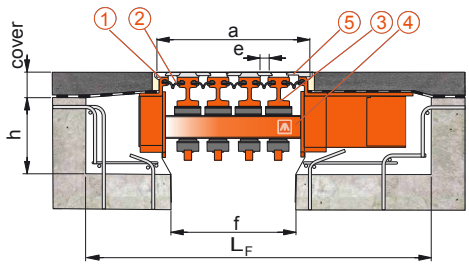
The preliminary assumed adjustment dimension e is 30 mm.
All dimensions in mm.

Further dimensions for double-sided expansion and single-sided expansion versions with steel connection can be found in the "MSM® Swivel Joist Expansion Joints" specification booklet.

MAURER MSM® Swivel Joist Expansion Joints XS

As an option, the MSM® swivel joist expansion joint can be fitted with rhombic elements. As a result, the impact edges at the individual gaps transverse to the direction of travel are eliminated and the impulsive sound emission is reduced.

Displacement of One-sided expansion joint



1 Edge profile
2 Sealing element
3 Centre beam
4 Support bar
5 Rhombic element

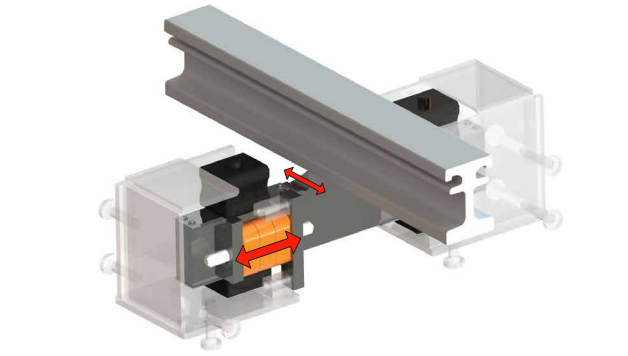
Type	a	h_f	f	L_f	Type	a	h_f	f	L_f
XS2	190	340	160	1095	**XS11**	1450	430	1360	2930
XS3	330	360	295	1305	**XS12**	1590	430	1360	3140
XS4	470	370	415	1480	**XS13**	1730	440	1630	3350
XS5	610	380	550	1690	**XS14**	1870	450	1765	3560
XS6	750	390	685	1900	**XS15**	2010	460	1900	3770
XS7	890	400	820	2110	**XS16**	2150	470	2035	3980
XS8	1030	410	955	2330	**XS17**	2290	490	2170	4200
XS9	1170	410	1095	2500	**XS18**	2430	510	2305	4410
XS10	1310	420	1225	2710	**XS19**	2570	520	2440	4620
					XS20	2710	540	2575	4830

The preliminary assumed adjustment dimension e is 50 mm.
All dimensions in mm.

Further dimensions for double-sided expansion and single-sided expansion versions with steel connection can be found in the "MSM® Swivel Joist Expansion Joints" specification booklet.

MAURER Girder Grid

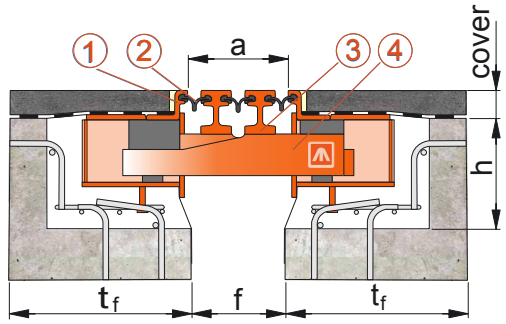
These expansion joints, in combination with a guided bridge bearing, allow large movements in the defined direction of movement.



- Standard tested, economical system with up to 8 sealing profiles without noise reduction and up to 6 sealing profiles with noise reduction
- Attaches to a steel superstructure directly to the end plate of the superstructure using a welded bracket connection
- Watertight construction
- For bridges without a guided bearing under the expansion joint, DT2 and DT3 can be used due to their transverse movement capacity of up to 50 mm

Girder Grid DT and XT

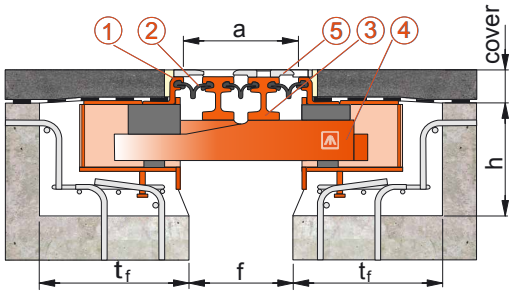
DT and XT expansion joints are available with two or three sealing profiles. The centre beams are controlled by compression-shear springs. They can accommodate planned movements that deviate from the main direction of movement, eliminating the need for combination with a guided bridge bearing.



Type	a	h	f	t_f
DT2	150	300	175	350
DT3	270	330	360	430

(1) Edge profile
(2) Sealing element
(3) Centre beam
(4) Support bar

The preliminary assumed adjustment dimension e is 30 mm.
All dimensions in mm.



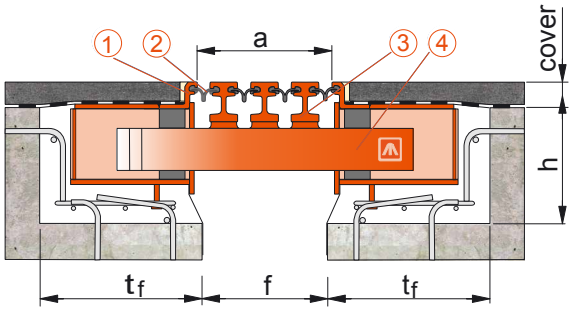
Type	a	h	f	t_f
XT2	190	350	180	400
XT3	330	370	315	500

(1) Edge profile
(2) Sealing element
(3) Centre beam
(4) Support bar
(5) Rhombic element

The preliminary assumed adjustment dimension e is 50 mm.
All dimensions in mm.

Girder Grid D and XD

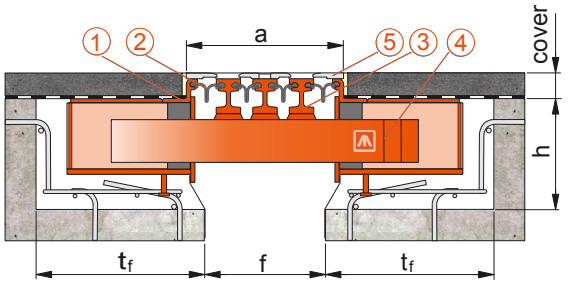
The individual center beams are controlled by polyurethane control springs connected in series, which develop an increasing restoring force as the individual gap width increases (inverse control). This ensures an even distribution of the total movement over the individual sealing profiles.



The preliminary assumed adjustment dimension e is 30 mm.
All dimensions in mm.

Type	a	h	f	t_f
D2	150	340	175	335
D3	270	350	280	430
D4	390	370	395	520
D5	510	390	510	650
D6	630	410	625	750
D7	750	430	740	800
D8	870	430	855	890

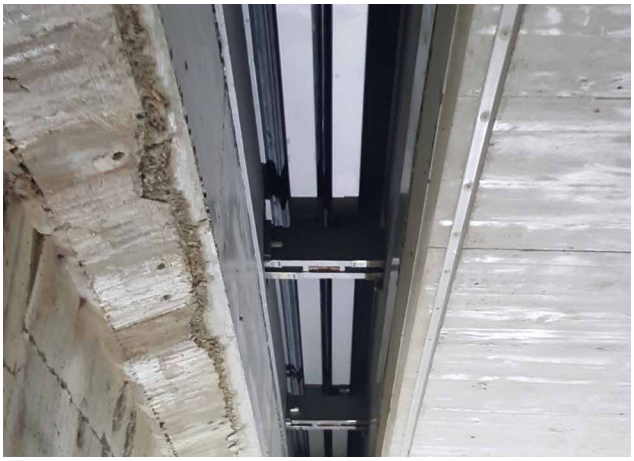
1 Edge profile
2 Sealing element
3 Centre beam
4 Support bar



The preliminary assumed adjustment dimension e is 50 mm.
All dimensions in mm.

Type	a	h	f	t_f
XD2	320	350	180	400
XD3	460	370	315	500
XD4	600	390	450	600
XD5	740	410	585	700
XD6	880	430	800	720

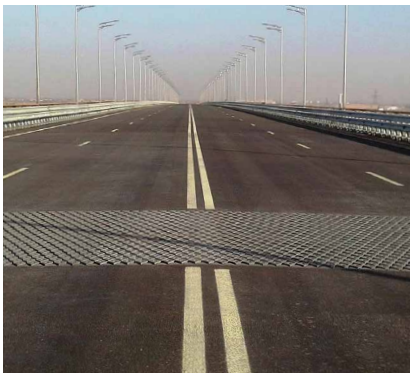
1 Edge profile
2 Sealing element
3 Centre beam
4 Support bar
5 Rhombic element



Noise reduction on expansion joints

The expansion joints can be designed with or without noise reduction in the carriageway area. In addition to reduced noise emissions, these have the advantage of increasing the allowable gap width by 30 mm, reducing the number of sealing profiles and centre beams required. The rhombic elements break up the impact edges at the individual gaps, which are transverse to the direction of travel, significantly reducing impulsive noise emissions.

Rhombic elements at centre beams



Noise reduction at swivel joist expansion joint

Features expansion joints with rhombic elements

- 50-60 % noise reduction compared to modular conventional expansion joints
- Fatigue resistant
- Anti-skrid surface
- Rhombic elements factory welded to the centre beams

Noise protection system below expansion joints

Particularly in the case of truck crossings, the sound waves radiated downwards are amplified by resonance in the abutment area and escape again through the gap between the deck and the abutment. The encapsulation of the underside of the expansion joint serves to absorb and reflect sound. This reduces low frequency noise, which can otherwise propagate very far.

Features noise protection system MAURER GU

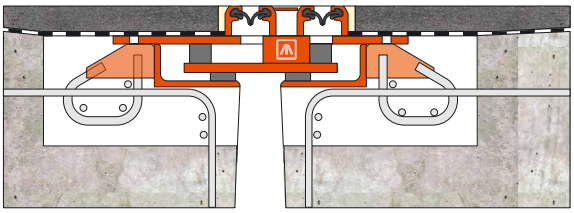
- Noise encapsulation of the underside of expansion joint
- Sound absorption and reflection due to material combination of insulation material / VA sheet metal
- Noise level reduction > 15 dB
- Can be operated by one person for inspection and cleaning

Noise reduction (closed)

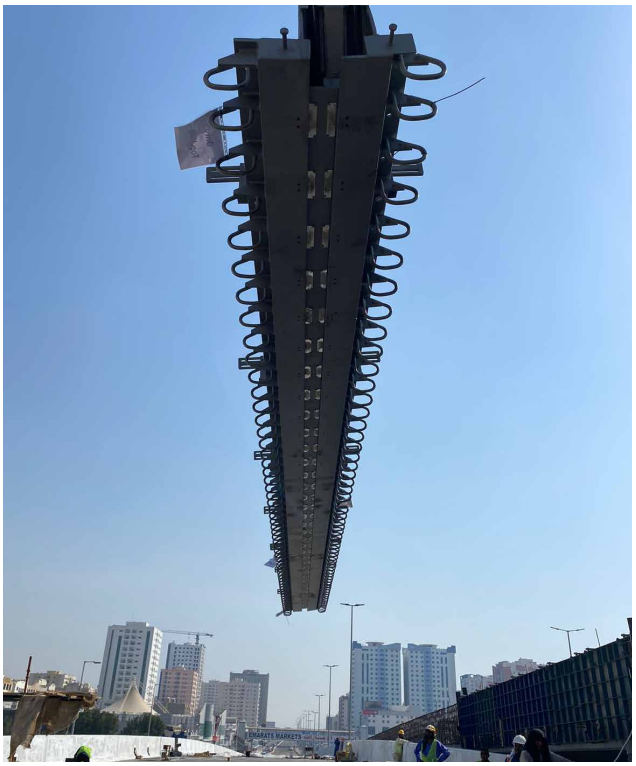
Noise reduction (open)

MAURER XW2

The expansion joint XW2 was developed on the basis of the wave-shaped XW1 expansion joint. In addition to the wave-shaped edge profiles, the centre beam of the XW2 is also wave-shaped. This means that additional noise protection elements are no longer required. The self-cleaning effect of the uncovered movement gap significantly reduces maintenance costs.



Properties	Edge profile and centre beam waves No additional noise reduction elements
Noise reduction	++++
Cleaning comfort	++++
Installation height	++++
Service life	++++



Strip Joints

MAURER strip joints are available in various designs. All versions distinguish between the two main functions of "fixed anchorage" and "watertight connection". This allows the best possible adaptation of the two components, the sealing profile and the edge construction, for the connection to the carriageway.

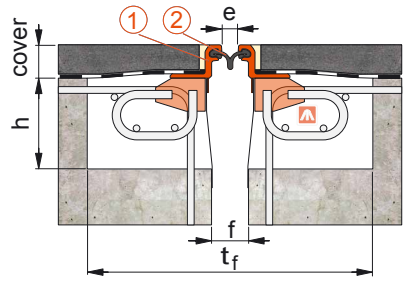
Type D1, assembly

MAURER Type D1

- Movement capacity up to 100 mm
- Accessibility from below (maintenance passage) not necessary
- Design with MAURER Betoflex® anchoring possible

Strip joints without noise reduction

Compared to MAURER Standard type D1, these two variants can be realized very flat.

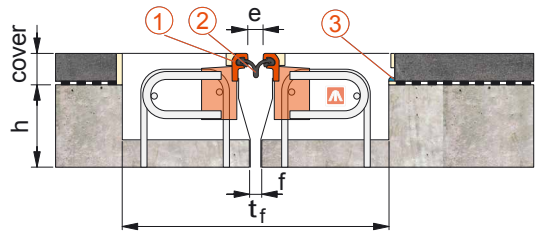


D1 with asphalt reinforced stiffer rips

Type	a	h	f	t_f
D1	80	220	100	700

(1) Edge profile (3) Sealing element

All dimensions in mm.



D1 with top of concrete plus drainage and sealing connection

Type	a	h	f	t_f
D1	100	140	70	690

(1) Edge profile (3) Drainage
(2) Sealing element

All dimensions in mm.

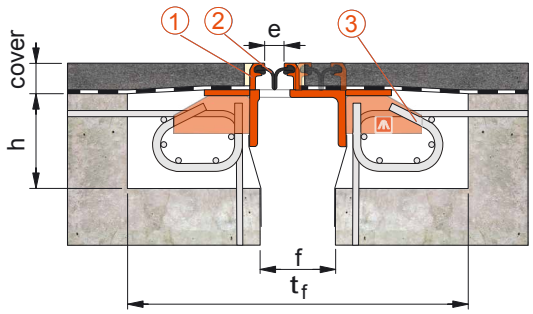
Strip joints with noise reduction

With the XW1 expansion joint, the structural concrete is bonded directly to the monolithic corrugated edge panel. This eliminates the usual straight 'impact edge' at the front and back of the edge profile and provides optimum noise protection. Installation at an angle to the carriageway further enhances noise reduction. The XL1 finger joint is also listed with reduced noise emission.

MAURER Type XW1

- Movement capacity up to 100 mm
- According to ETA 13/0232 "Noising expansion joint „MAURER XW1 Expansion Joint"
- Maintenance-free
- Maintenance passage not necessary

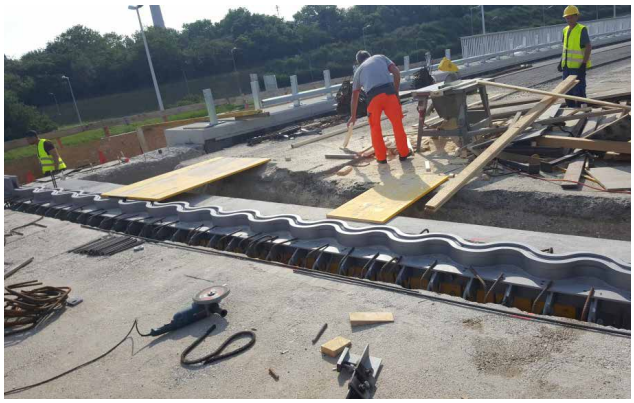
View of a XW1

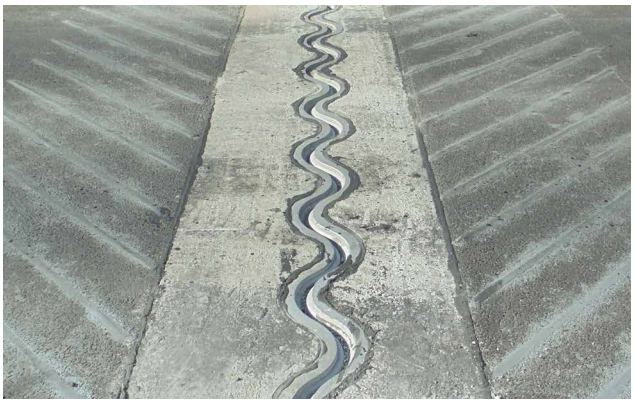


Type	a	h	f	t_f
XW1	50	280	60-120	350

(1) Edge profile
(2) Sealing element
(3) Reinforcement

All dimensions in mm.





Finger joints

The water-permeable expansion joints can be manufactured with bolted or welded finger plates. The deep drainage channel required for finger joints must be regularly cleaned of debris. Compared to standard expansion joints, a noise reduction of up to 50 % is possible.

Type D1, assembly

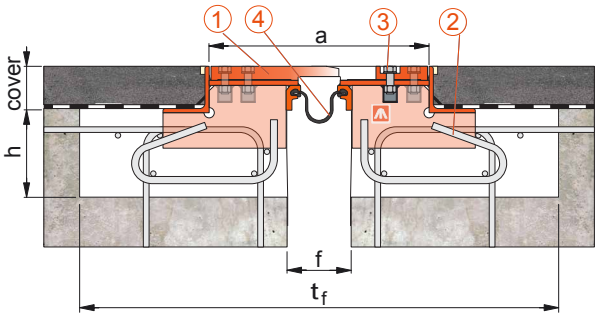
MAURER type FB (bolted), FW (welded) and FP (prestressed)

- Movement capacities type FP and FB: 500 mm, type FW is determined project-related (check in ndividual cases)
- Water-permeable
- Additional drainage channel with a connection to the bridge drainage system necessary

Bolted and welded finger joints

Bolted finger joint (FB)

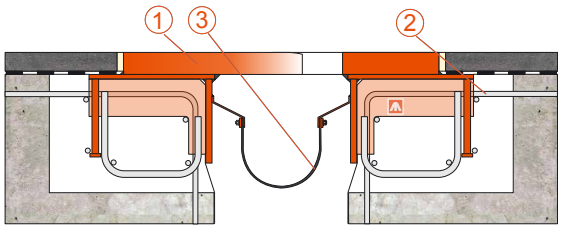
Welded finger joint (FW)



1 Finger plate
2 Reinforcement
3 Bolting
4 Sealing element

All dimensions in mm.

Type	a	h	f	t_f
FB100	534	250	100	420
FB140	594	250	150	420
FB200	809	270	180	535
FB260	879	300	200	550
FB320	924	320	190	685
FB380	1014	320	220	705
FB440	1104	330	250	745
FB500	1234	330	300	760

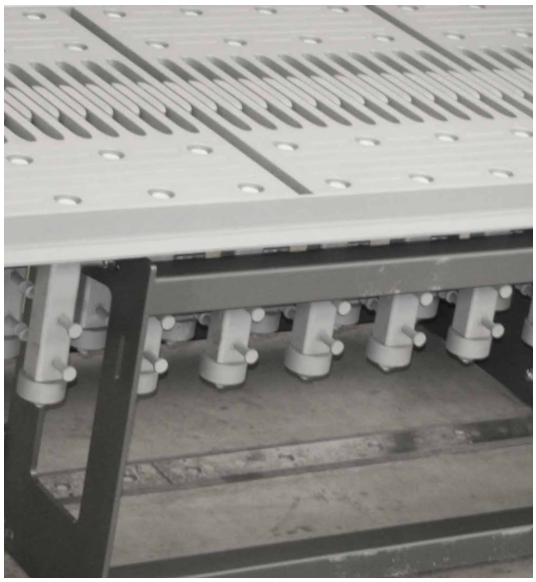


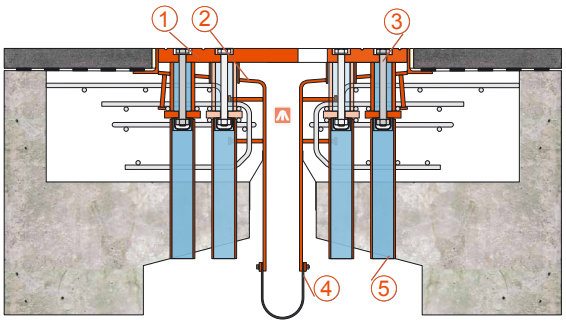
1 Finger plate
2 Reinforcement
3 Sealing element

All dimensions in mm.

Prestressed finger joint

The FP prestressed finger joint is a bolted system where the through-bolted joints are accessible from below. Prestressing against thick-walled steel sleeves prevents the reduction of prestressing forces due to creep and shrinkage of the concrete.





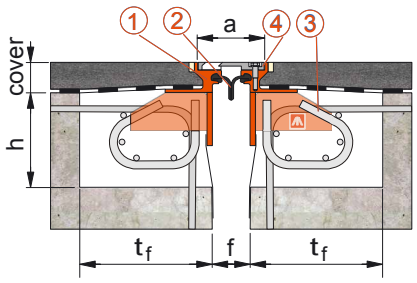
1. Finger plate
2. Sub structure
3. Bolting
4. Drainage channel
5. Access for the anchor bolts from below

Finger strip joints

The XC1 and XL1 are finger strip joints with bolted edge plates. The continuous surface makes it possible to increase the permissible gap widths without compromising driving comfort and traffic safety. Traffic safety is improved, especially for cyclists and pedestrians. Both versions reduce noise pollution and prevent damage from snow ploughs.

MAURER Type XC1

- Movement capacity 110 mm
- Approved with ETA-20/0028 „MAURER XC1 Expansion Joint“
- Standard impact protection
- Standard covering connection height of 70 mm or 100 mm
- Watertight
- CE-marking



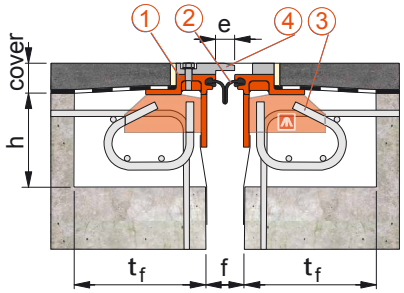
Type	a	h	f	t_f
XC1	200	190	100	300

1. Edge profile
2. Sealing element
3. Reinforcement
4. Bolted M-plate

All dimensions in mm.

MAURER Type XL1

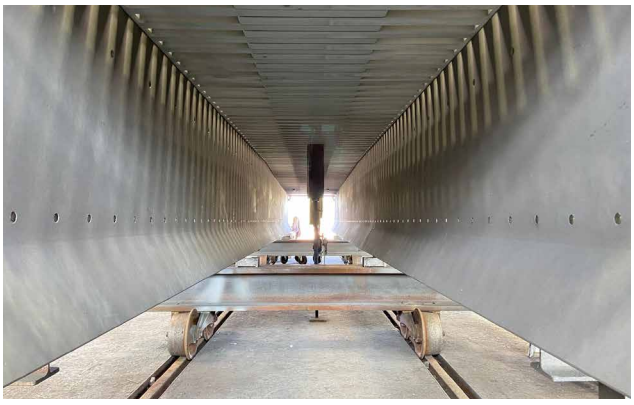
- Movement capacity 110 mm
- Approved with German specification
- Standard impact protection
- Watertight



Type	a	h	f	t_f
XL1	50	250	100-150	350

(1) Edge profile
(2) Sealing element
(3) Reinforcement
(4) Bolted XL1-edge plate

All dimensions in mm.



MSM® Swivel Joist Expansion Joints with seismic protection

Seismic expansion joints are able to transfer actions occurring in the extraordinary load case (ULS / GZT), which significantly exceed the service load case (SLS / GZG). In principle, any expansion joint can be designed for full seismic movement, but this is usually more expensive than working with a MAURER Fuse Box System. The concept is to protect the structure from uncontrollable damage once the movement capacity of the expansion joint is exceeded.

Osman-Gazi-bridge, Turkey

Yavuz-Sultan-Selim-bridge, Turkey

Available Seismic Expansion Joint types with and without Fuse Box Systems

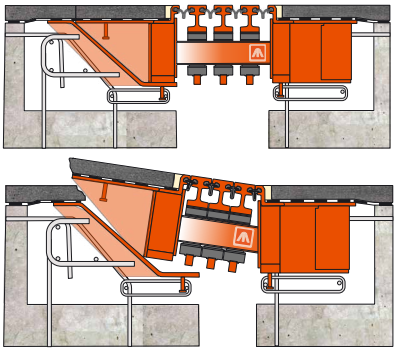
Characteristics	MSM® Swivel Joist Expansion Joint without Fuse Box	MSM® Swivel Joist Expansion Joint with Fuse Box			Girder Grid with Fuse Beam Type IV
		Type I	Type II	Type III	
Traffic safety during seismic event	++++	++	+++	+++	++++
Condition after DBE	++++	+++	++++	++++	++++
Condition after MCE	++++	++	+++	+++	++++
Passing over of rescue service after seismic event DBE, MCE	++++	++	+++	+++	++++

++++ very good +++ good ++ limited + very limited

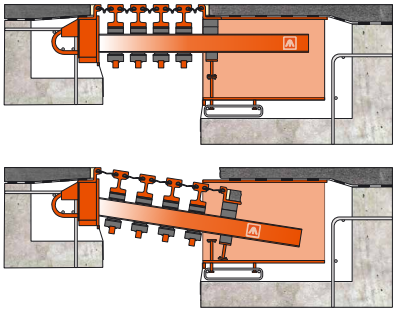
Fuse Box System for modular joints

Longitudinal Fuse Bos System

For the design of the longitudinal Fuse Box System, it is important to know the maximum opening and closing movements of the expansion joint. For the large seismic joint opening movements, the gaps between center beam may open more than 150 mm. For large movements resulting in the joint fully closing and contact of all center beam, the longitudinal Fuse Box System will be released to prevent the expansion joint from being crushed between the bridge deck and abutment or transition pier.

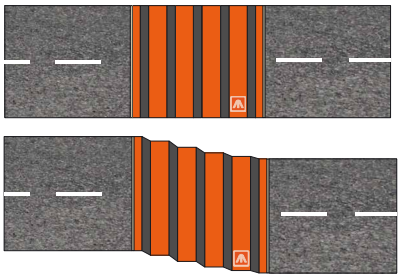


Type I:
During large closing movements, one expansion joint side is pushed upwards via an inclined steel box. The safety mechanism is activated by intentional failure of welded joints at specific points.



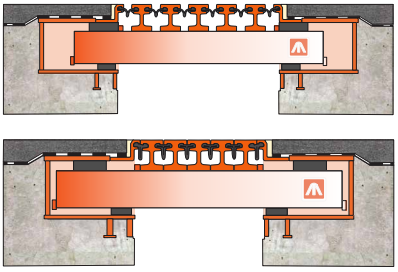
Type II:
On one side, the expansion joint drops into a prepared space of the Fuse Box. There it can perform movements exceeding the maximum closing movement. The safety mechanism is activated by intentionally failing bolted connections near the carriageway surface and at the bottom of the joint where it connects to the structure. This fuse type reduces damage to the top of the roadway and allows for the better passing ability in the released position. Normal movement capacity is guaranteed during aftershocks.

Lateral Fuse Box System



Type III:
As soon as the bridge movements in the transverse direction exceed the movement capacities of the joint, the failure of a notched steel pin activates a sliding guide system. This allows the complete joint to move laterally in a sliding movement without damaging structural elements of the joint.

Fuse Beam for modular joints



Type IV:
In the event of extraordinary closing movements, predetermined breaking points or defined weld seams of the "fixed" centre beams break. This means that the centre beams can absorb further movements on the support bar. The expansion joint can be driven over.

Fast and simple of the expansion joint and adjacent bridge deck. i.e. small welds, bolted connections and asphalt repair work, is possible.

Expansion joint with Fuse Box

Expansion joint with Fuse Box

Transition bars / support ribs

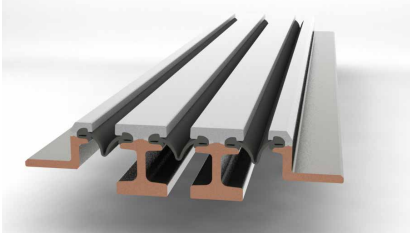
In order to minimize noise at expansion joints, the road surface must be connected to the expansion joint at the same level, as required by ZTV-ING 8-1. A polymer concrete beam, e.g. Betoflex®, can be installed to stabilize the transition area and to prevent tracking in the immediate expansion joint area. Alternatively, the asphalt can be stabilized by inclined support ribs, also made of polymer concrete, in front of and behind the expansion joint.

adjacent transition bar at XD6 using Betoflex®

D1 with stabilizing support ribs of Betoflex®

Edge- and centre beam as hybrid profiles

In the case of the approved MAURER hybrid profiles, the profile heads, including the retaining claw, are made of stainless steel (1.4571). Thus, on the one hand, the entire upper part of the joint, which is in contact with the environment, is protected against corrosion processes. On the other hand, the clamping nose, which is essential for holding the sealing profiles watertight, is also corrosion-free! The profile sections below the sealing profile level are made of structural steel so that the necessary welding work can be carried out without affecting the service life.



Hybrid profile edge and centre beam

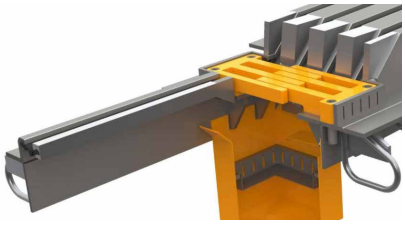
Curved low point

Curved low point and rinsing opening

The change in slope can be achieved by using bent profiles. The discontinuities caused by a weld in the area of the contact surfaces of the sealing profile in the claw area are eliminated. In the case of low-noise joints, the low point area should be designed without rhombic elements to facilitate maintenance ("flushing opening").

Flushing opening

In the low point area of the expansion joint, the water is quickly and effectively drained away and fed into the general bridge drainage system. Standing water can be avoided and traffic safety is increased.



Hybrid profile edge and centre beam

MAURER Edge profile protection cap

The MAURER edge profile protection can be used to prevent damage to the corrosion protection during construction and as a formwork aid in the cap area. The protective profile is clamped onto the edge profiles raised in the cap area after the expansion joint has been installed in the steel structure. At the same time, the required 10x20 mm gap required between the edge profile and the adjacent cap concrete is kept free. After concreting and removal of the edge profile protection, it can be poured without further cutting.

Protection profile with required grouting joint

Clamped edge profile protection

MAURER Betoflex®

MAURER Betoflex® is a high quality, cold workable polymer concrete for anchoring expansion joints. Especially for renovation and replacement of expansion joints, anchoring with Betoflex® can shorten the construction time – it is sufficient to produce a recess depth according to the pavement structure.

XC1 with Betoflex®

MAURER Type
D1-B, XC1-B, K30-B, K50-B

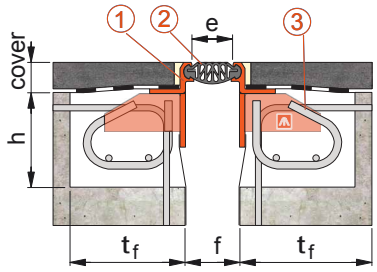
- Excellent adhesion
- Low recess depth
- No need for additional reinforcement or bond anchors
- Avoidance of cracks in the edge beam
- Non-slip and noise-absorbing coating
- Low height installation tolerances
- Watertight connection to expansion joints and bridge waterproofing
- Resistant to chemically aggressive substances, de-icing salt solutions, fuels (e.g. petrol), oils and acids

Joints with closed surfaces - Footway and Pedestrian bridges

These consist of a substructure in accordance with the single-profile expansion joint type D1 and a mat-shaped sealing profile with the same surface. This makes this system well suited for walkway and cycle path bridges or areas with mixed traffic (e.g. parking decks).

MAURER Type E1 / E2

- Vulcanized molded parts
- Several profiles can be connected in series
- Watertight, de-icing salt, oil and petrol resistant constructions

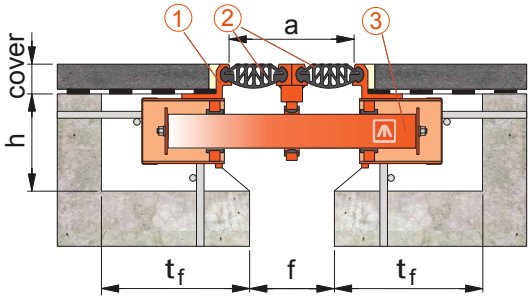


Type	a	h	f	t_f
E1-80	100	240	100	300
E1-100	130	240	150	300

(1) Edge profile (3) Reinforcement
(2) Elastomeric profile

All dimensions in mm.

Movement capacity E1: 80 – 100 mm
Movement capacity E3: 240 – 300 mm



Type	a	h	f	t_f
E2-160	265	240	180	300
E2-200	325	240	270	300

(1) Edge profile (3) Reinforcement
(2) Sealing element

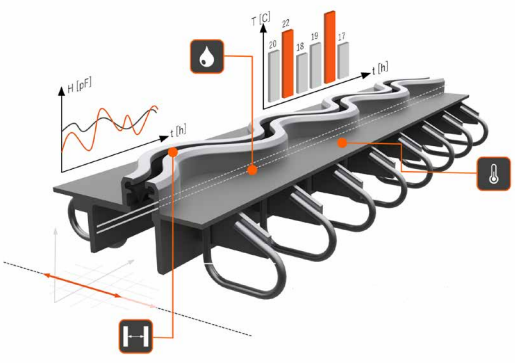
All dimensions in mm.

Movement capacity E2: 160 – 200 mm
Movement capacity E4: 400 mm

MAURER JointSense Monitoring System

This is a self-sufficient multi-sensor system for monitoring expansion joints using moisture, movement and temperature sensors.

- Leaks are detected
- Can be integrated, retrofitted and replaced
- Reduction of expansion joint life cycle costs
- Remote monitoring
- Simple installation, no external power supply required
- Self-sufficient power supply



Reconstruction with strip joints Type D1-R and Type XC1-R

These two types are particularly suitable for reconstruction projects. They are characterised by their low installation height and easy to handle. The joints are based on the Dutch standard RTD1007-2.

Type D1-R

- Movement capacity up to 80 mm
- Gap width 5 to 70 mm
- Height 70 mm (90 mm inclusive concrete cover)
- Based on Netherland Standard „RTD1007-2"
- Construction is anchored with bonded plug-in reinforcement (20 pcs. Ø12 j/M) and concreted in with steel fiber concrete

Preparation

Installation

Anchorage with steel fiber concrete

Sidewalk – roadway area

Type XC1-R

- Movement capacity 100 mm
- Height 90 mm (min. 110 mm inclusive concrete cover)
- Based on Netherland standard „RTD1007-2 and RTD1007-3" Construction is anchored with bonded plug-in reinforcement (20 pcs. Ø16 j/M) and concreted in with steel fiber concrete

Preparation

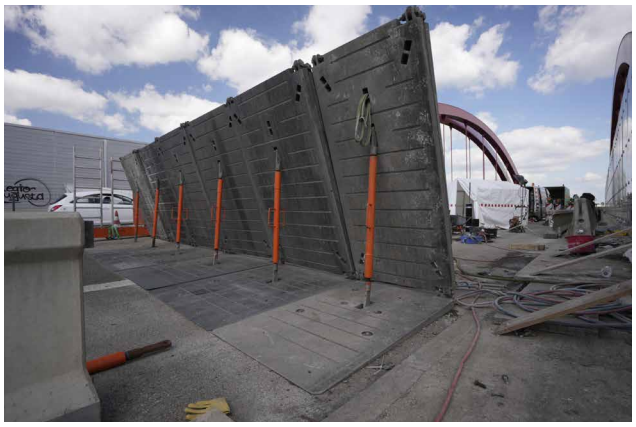
Installation

Anchorage with steel fiber concrete

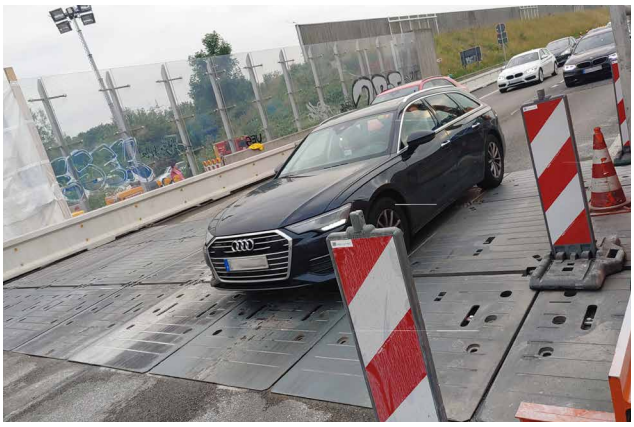
Roadway

MAURER Modular Bridge System (MMBS)

MMBS is a flexible, temporary bridging system for maintaining traffic during rehabilitation works. Individual sections can be closed or opened in sections, allowing optimum traffic management to be planned for different periods. This also helps to avoid oncoming traffic. Replacement or repair of transition structures can be carried out almost unnoticed. Movements due to temperature or traffic loads can be accommodated.



MMBS, open



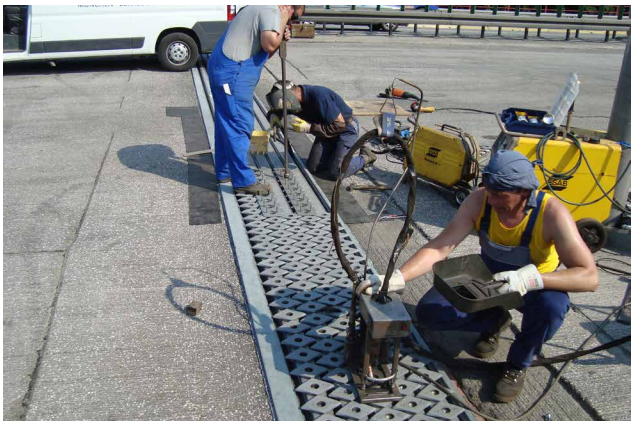
MMBS, closed for traffic

Retrofitting

Retrofitting noise reduction on the top surface

Existing expansion joints with a remaining life expectancy that makes retrofitting economically viable can be retrofitted with the rhombic elements on the expansion joint surface if required. Combined with the required 20mm rise in the road surface (small ramp), noise emissions can be significantly reduced.

Tacking of the rhomic elements



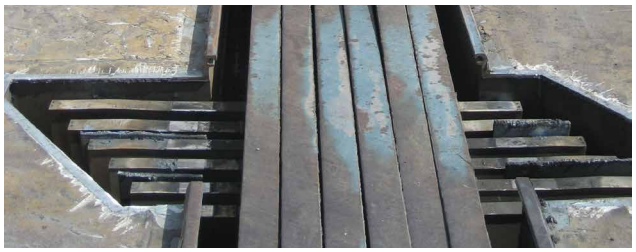
Welding of the rhomic elements with robot

Reconstruction

In order to minimize disruption to existing structures, repair methods have been developed that leave the anchors in place and continue to be used. All measures can be carried out in stages. For this application the MAURER Modular Bridge System (MMBS) can be used.

Reconstruction - e.g. "box in box" system (for girder grid expansion joints)

As the amount of irreversible movement decreases over the life of the bridge, new, smaller expansion joints can be installed in the existing boxes in prestressed, reinforced concrete and composite bridges after the "inner life" of the existing joint has been removed. No demolition work is required in the area of the highly reinforced end cross girders.



Removable of the movable components

Preparation of the remaining components

Lifting the new expansion joint into existing boxes

Restoration of sealing / surfacing

Reconstruction - e.g. replacement of moving parts (MSM® expansion joints) and retrofitting of rhombic elements

The modular design of the Swivel Joist Expansion Joints allows both individual and all dynamically loaded components to be replaced on site. It is possible to equip the expansion joint with a noise reduction system as part of the refurbishment.

New support bars, refurbished edge structure

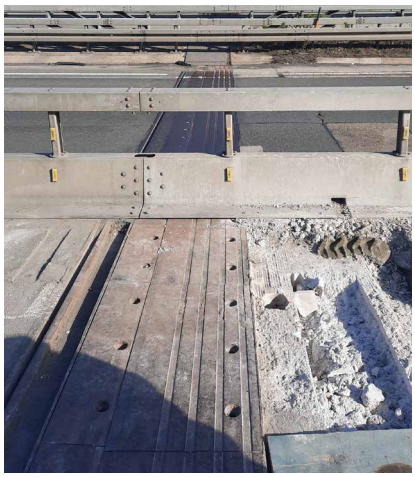
Installation of new centre beams with rhombic elements

Expansion joint replacement in one weekend

The traffic disruption caused by the replacement of expansion joints can be significantly reduced thanks to a new method. Instead of several weeks, the affected structure only needs to be closed for a weekend.

Conventional replacement involves the following operations
- Expose the expansion joint to be replaced (e.g. by ultra-high pressure water jetting)
- Fix the new expansion joint in the recesses created
- Completion of the reinforcement
- Shuttering and concreting of the anchorage areas, including drying time.

This time-optimized method significantly speeds up both the removal of the existing joint and the installation of the new expansion joint. The traffic loads will be transferred via a steel construction which is supported in the abutment. Additional reinforced concrete girders are not necessary.



Expansion joint to be replaced

Lifting the new construction

Aligning

50 hours after the start of the construction site

Quality and Specifications

Excerpts from the test programs

- Load capacity and relaxation of bearings and springs
- Fatigue resistance and wear of bearings and springs
- Fatigue strength of metallic components
- Water tightness
- Movement capacities

Fatigue test MSM® Swivel Joist Expansion Joint

Roll over test MSM® Swivel Joist Expansion Joint

Implemented management and third-party monitoring systems as well as welding and product certificates

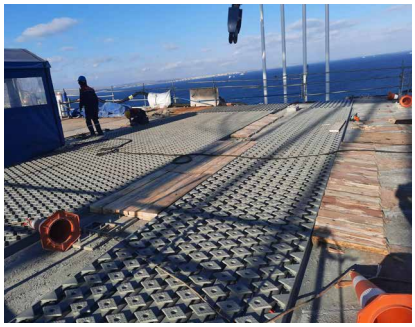
- DIN EN ISO 9001 „Quality management systems"
- DIN EN ISO 14001 „Environment management systems"
- DIN ISO 45001 „Occupational health and safety management systems"
- DIN EN 1090-1 „Execution of steel structure and aluminium structures EXC 4"
- DIN EN 1090-2 „Welding of steel structure EXC 4"
- MPA Stuttgart „Supervision confirmation bearings in construction, expansion joints and seismic devices"
- ISO 3834 „Quality requirements for fusion welding of metallic materials"
- 0754-CPR-19-0279 „Certificate of constancy performance MAURER XW1 Expansion Joint, ETA-13/0232"
- 0754-CPR-19-0280 „Certificate of constancy performance MAURER Expansion Joint XC1, ETA-20/0028"

References

>> 1915 Çanakkale bridge over the Dardanellen in Türkiye

The longest suspension bridge in the world has a centre span of 2023 m. Four of the innovative MAURER MSM® Swivel Joist Expansion Joints XS28 (movement until 2800 mm) with noise reduction were installed at the ends of the bridge. The expansion joints can accommodate three-dimensional movements and have been proven to be earthquake resistant.





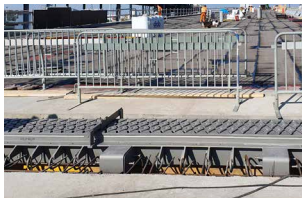
>> Chain bridge in Budapest

The Chain Bridge over the Danube in Budapest is a national landmark; it is almost 15 metres wide and 380 metres long. MSM® Spherical bearings and expansion joints were replaced as part of the refurbishment. Four MAURER DT2 expansion joints and two D1 single joints with the hybrid profile were used, which ensure improved corrosion protection.



>> Lifting bridge Hisingsbron in Gothenborg

The Hisingsbron Bridge is located on the west coast of Sweden in Gothenburg. The main bridge a lifting bridge up to a height of 28 metres. MAURER spans the gaps with 10 expansion joints between the bridge and ramp sections with expansion joints from XL1 to XL4. The challenges were noise reduction and watertightness at the transition from the tram rails to the girder profiles.

>> Farrell Creek bridge in Canada

The Farrell Creek Bridge is one of 5 bridges on Highway 29 in Canada. A new Site C reservoir was built in the area of Highway 29 for power generation, which meant that the highway had to be re-routed. The bridges additionally had to be designed for Tsunami waves. Two MAURER finger joints F500 and F600 are particularly characterized by the transverse movements and the water flow below the expansion joint.

>> Hutong bridge in Shanghai

The Hutong Yangtze River Bridge is a combined road-railway bridge. There are 4 railway tracks on the lower deck, designed for speeds of up to 250 km/h. Road traffic is on the upper deck with three lanes in each direction. One MAURER Swivel Joist Expansion Joint type DS18 with a length of 36.2 metres was installed at each abutment of the bridge.