

Special Bearings and Noise Reduction for Leverkusen

MAURER equips Rhine bridge to be future-proof.

Leverkusen. Special restraints for the bearings and noise reduction on the expansion joints – MAURER supplied high-quality special elements for the first new section of the bridge over the Rhine in Leverkusen.

The previous Leverkusen Rhine bridge on the A1 motorway had been in operation since 1965, and due to cracks in the steel loadbearing structure, could only be used by vehicles of up to 3.5 tonnes at a maximum of 60 km/h since 2014. This caused major traffic problems in the region, as delivery traffic had to use other bridges.

Since February 2024, the problem has been partially alleviated. The first cable-stayed bridge – of two directional lanes – of the replacement construction was inaugurated and now carries the entire traffic of 150,000 vehicles per day. The bridge is a total of 1,068.5 m long (main bridge 690 m) and has two distinctive A-shaped pylons. The width of over 33 m is currently used for three narrowed lanes in each direction towards Koblenz and towards Dortmund. In future, it is designed for four lanes, two access and exit ramps plus hard shoulder and a 3.25-metre-wide cycle path.

The old bridge with the reddish stays is currently being dismantled. From 2025, the second parallel section of the bridge is planned to be built and inauguration is scheduled for 2027.

Bridge bearing system with special functions

Both of the new, separated bridge structures consist of a main span and an approach bridge on the left bank of the Rhine. The main span with a steel superstructure as well as the approach bridge in a concrete box girder variant are supported by modern bridge bearings with special functions.

MAURER supplied and supplies 44 MSM® spherical bearings for each of the two bridges.



The first new Rhine bridge in Leverkusen.

Photo: MAURER



Installation of the bearings on the first new section of the Leverkusen Bridge.

Photo: MAURER



Installed bearing. During the construction phase in the launching process, temporary restraints had enabled the bearings to partly assume changing functions in the progress of construction work.

Photo: MAURER

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Spherical bearings are sliding bearings that can accommodate arbitrary rotations in all directions without noticeable resistance and transfer them to the substructure with virtually no restraint. The main span as a cable-stayed bridge transfers an enormous superimposed load of approximately 100,000 kN to the MSM® spherical bearings below the pylon. The patented MSM® – MAURER Sliding Material – proves its worth here. In contrast to alternatives such as PTFE, it is PFAS-free. Additionally, MSM® has a much longer service life (more than 50 years) and twice the compressive strength. The bearings can therefore be built smaller.

A special construction method enables part of the bridge bearings to be temporarily restrained in the horizontal direction and monitored and gradually released and loosened as required. This increases work safety during the construction process and protects the adjacent components against uncontrolled impact load. The approach bridges used these temporary restraints to implement a shifting fixed point for the construction of the bridge; the main spans activated the restraints when bearings needed to be replaced. MAURER Project Manager, Dirk Wilming, explains: "Such smart bearing systems are exemplary and make life easier on site."

Low-noise expansion joints

The three expansion joints also supplied by MAURER are exceptional due to their length alone. The largest, an XLS 800, is 36.3 m long and has 7 profiles as well as 2 edge profiles. It is installed in axis 10 at the beginning of the main span. The other two expansion joints bridge the end of the main span and the end of the approach bridge.

The expansion joints compensate for the longitudinal movements of the bridge. Regarding design, these are so-called swivel joist expansion joints. Their special feature is that they allow movement in all directions: Displacements transverse, longitudinal and vertical to the direction of traffic as well as any kind of rotations.

All three expansion joints are noise reduced. Specially profiled rhombs welded on top reduce the noise level by 30 to 50 percent. Welded on top, as this lasts significantly longer than screwed elements, which can loosen due to the continual crossings.

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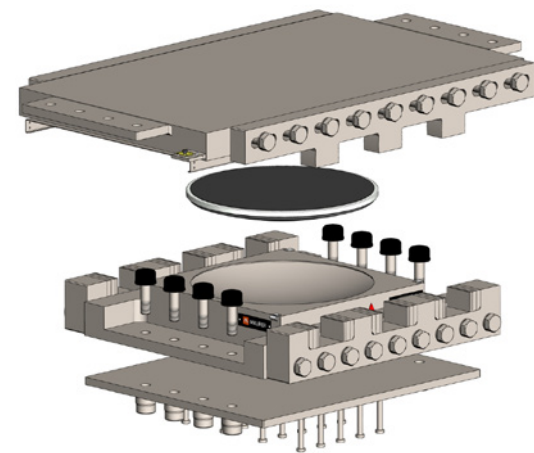
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Exploded view of the special bridge bearing with temporary restraints.

Graphic: MAURER



On the left: Ready-for-delivery expansion joint with 4 profiles at MAURER in Munich.

On the right: Installed expansion joint on the new bridge, which will have six lanes up to completion of the second section of the bridge.

Photo: MAURER

Quick facts about MAURER SE

MAURER SE is a leading specialist in mechanical engineering and steel construction with over 1,500 employees worldwide. The company is a market leader in the fields of structural protection systems (bridge bearings, expansion joints, seismic devices, vibration absorbers, and monitoring systems). It also develops and manufactures vibration isolation for buildings and machinery, roller coasters, Ferris wheels and special structures in steel construction.

MAURER is involved in many spectacular large-scale projects, such as the world's largest bridge bearings in Wazirabad, earthquake-resistant expansion joints on the world's longest suspension bridge (1915Çanakkale), tuned mass dampers in the Baku and Socar Tower or the unique guided cross-ties with derailment protection on the Champlain railway bridge in Montreal. Complete building isolation ranges from the Acropolis Museum in Athens to the new major airport in Mexico. Spectacular amusement rides include the Munich Ferris wheel Umadum, BOLT® as the first roller coaster on a cruise ship or the world's first duelling roller coaster at Mirabilandia Park in Ravenna.

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