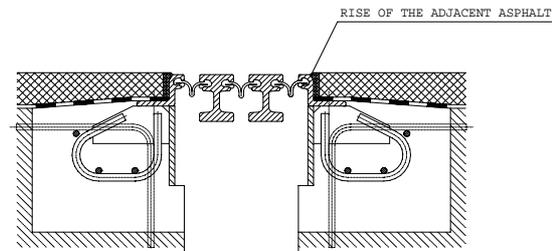




Noise Reduction at Expansion Joints by means of a smooth Connection to Asphalt



Expansion joints of whatever design type interrupt the asphalt layer. If this asphalt layer should not smoothly be connected to the edge of the expansion joint or in case of an abrupt change of the slope, the vehicle, i.e. the wheels, will be triggered to vibrate. Consequence thereof is an increased strain of the expansion joint, as well as an increased noise emission. Other noise reducing efforts can become ineffective, if the asphalt should not be connected smoothly. For this reason, the following measures have to be taken:

- a) a change of the slope has to be avoided at least 10m before and behind an expansion joint.
- b) the asphalt has to be connected smoothly to the expansion joint.

Referring to a)

According to the German Technical Standard named ZTV-Bel-B1/99, Section 5.5, the maximum discrepancy in

smoothness of the asphalt surface must not exceed 0.6cm, related to a length of 4m.

This specification of an asphalt layer however also holds valid over to the other side of the joint. As it is very often the case, the pavement of asphalt contractually ends at the edge of an expansion joint, and it is not considered which situation prevails at the opposite edge, because this is the contractual matter of another contractor. Seen from a contractor's point of view, expansion joints are thus considered as a kind of interface, which might result in intolerable noise emission when passing the joint.

Referring to b)

The lack of smoothness referred under a) concerns continuous changes of the surface. Sudden changes in the height of the road level of 0.6cm (or 1.0cm when paved by hand) will not be tolerated.



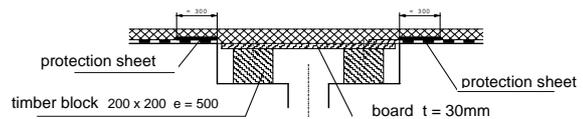
Noise reduction at expansion joints by means of a smooth connection to asphalt

In order to prevent the formation of grooves and to take care of possible dimensional tolerances (the latter due to request of the asphalt industry), the German Specification named ZTV-K 96, Section 9.3.1 stipulates that the upper edges of the edge beams must not protrude into the carriageway, but have to be placed in an area of about 3mm to 5mm below asphalt surface. However, 5mm difference between asphalt surface and upper edge of the edge beam lead to a considerable noise emission. In the area of overtaking lanes, for example at expressways, no big settlements occur, and among others particularly the hard radial tyres are a source of noise emission. On the one hand it is comprehensible that dimensional tolerances are to be maximised. On the other hand however, price should not be that serviceability (in respect to noise emission) is reduced.

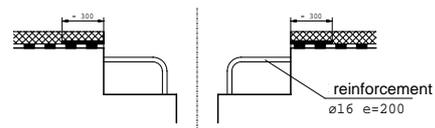
This product information serves to propose ways how asphalt can be smoothly connected to the expansion joint.

1. Installation of Expansion Joints after Asphaltting

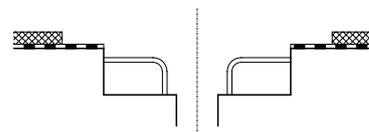
In Germany, usually the expansion joint is installed prior to paving the asphalt. In other countries, like for example in France, the asphalt is paved over the structural gap, in supporting the structural gap by suitable means. This way, optimal smoothness can be achieved. The area where the asphalt has to be removed again is then marked, and the waterproofing layer that lies underneath the asphalt is covered by means of protection sheet. The surface is then cut along that marking and removed, and the protection sheet as well as the auxiliary support of the asphalt layer is removed. After this, the usual installation of the expansion joint is carried out, enjoying the advantage of optimal levelling to the adjacent asphalt. See also the figures below.



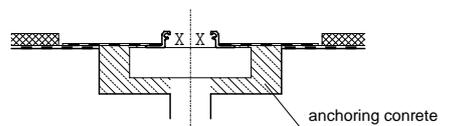
1. Continuous asphaltting with auxiliary support at the area of the block out (Proposal)



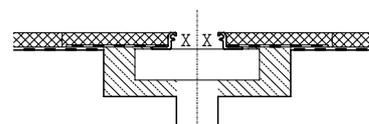
2. Cutting the asphalt



3. Removing the asphalt and the protection sheet



4. Installation of the expansion joint and application of the waterproofing



5. Asphaltting

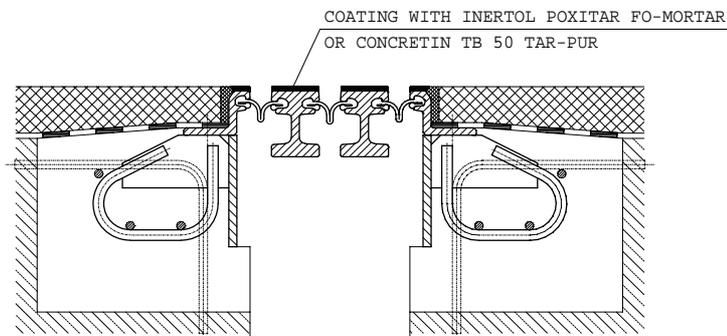


Noise reduction at expansion joints by means of a smooth connection to asphalt

2. Coating of the Steel Profiles

A subsequent coating of the steel profiles serves to avoid steps. This method is being used in parts of Austria and

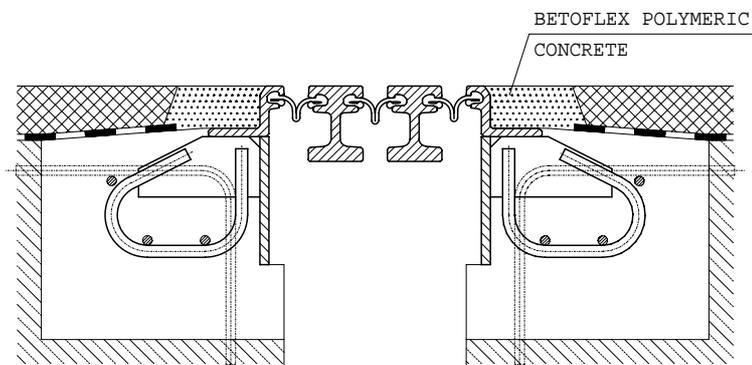
carried out by the local maintenance departments. This method is said to be effective.



3. Placing of Elastomeric Concrete

In connecting the edge beams to elastomeric concrete instead of asphalt, the formation of rail grooves can be avoided. This way, a planned rise of the adjacent asphalt can be avoided. Particularly suitable for this purpose is the MAURER Betoflex elastomeric concrete. This special concrete fulfils all requirements of an asphalt, transfers the traffic loads without permanent deformation and is watertight.,

By means of a skew connection of the asphalt, the rail grooves are continuously reduced, and a separation of the asphalt from the Betoflex beam is avoided. The pouring of the Betoflex elastomeric concrete is done after installation of the expansion joint, and is also possible at a later point in time.





Noise reduction at expansion joints by means of a smooth connection to asphalt

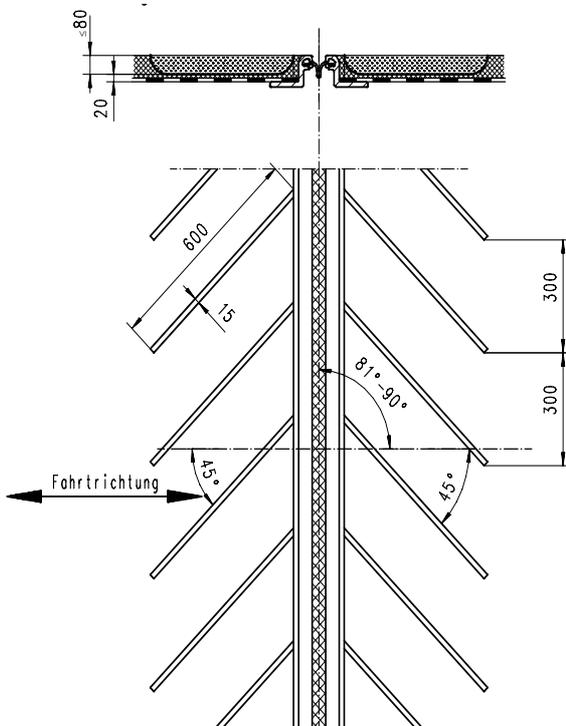
4. Connection to Supporting Ribs

Already many years ago, on an experimental base slots were cut into the asphalt next to the edge beams and being filled with a stiff aggregate. Objective was to prevent damages of the edge beams due to snow ploughs. This method is now being applied in parts of Austria (particularly Corynthia), with the particularity that the slots show a skew angle of 45°.

The effect of this method is similar to the one as described in Section 2, however with the advantage, that the existing waterproofing is not being contacted, and a continuous transition from an elastic asphalt layer to a stiff steel edge beam is achieved. Again, Betoflex can be employed as grouting compound.

section A - A

Joint direction between 81° - 90°



Joint direction between 45° - 80°

