

Wheel prints and axle geometries for static and fatigue load models of expansion joints for road bridges

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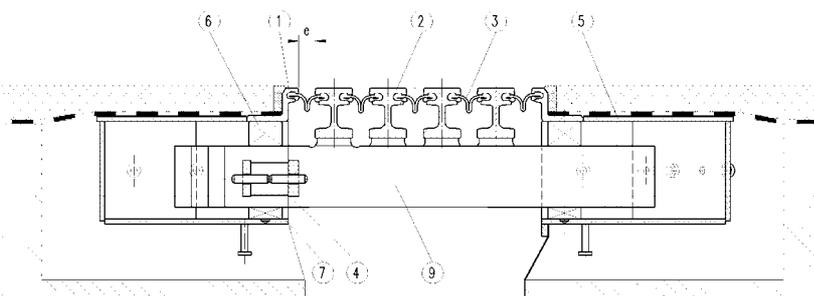
Summary

For the design and verification of expansion joints and details of bridge decks not only the axle and wheel loads, but also the wheel print and axle geometries are crucial. The exact contact stress distribution is normally of lesser importance. Modified axle geometries and wheel prints are proposed for the tandem systems of the static load models and the axle types of the fatigue load models FLM1, FLM2 and FLM4 of EN 1991-2. Examples of the required static strength and fatigue resistance of expansion joints with existing regulations, with EN 1991-2 and with the modified axle geometries are shown. Conclusions are drawn about the consequences of the current regulations and the proposal of the modified wheel print and axle geometries.

Keywords: Design codes, specifications, axle loads, wheel loads, wheel prints, static resistance, fatigue resistance, expansion joints.

1. Introduction

The design and verification of expansion joints is based on the axle and wheel loads, in conjunction with the relevant wheel print and axle geometries. The exact contact stress distribution is normally of lesser importance.



Nr	Part/Component
1	Edge beam
2	Centre beam
3	Seal element
4	Control element
5	Joist box
6	Prestress element
7	Bearing
9	Crossbeam

Fig. 1 Modular expansion joint “beam grid type”

This paper describes parameter studies carried out by an ad-hoc group for the draft European Approval Guideline ETAG 032 [1] for road traffic expansion joints. In addition to the authors, the following parties participated in this ad-hoc group: The Technical University of Munich, the expansion joint manufacturers “mageba” Switzerland and “RW-Sollinger Hütte” Germany.