



## Expansion Joints for Road Bridges – Requirements and Reality – Noise

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### Summary

Expansion joints are important parts of the traffic infrastructure to connect bridges and roads. There are different traditions to design expansion joints due to different types to design bridges like single span beams or continuous beams. There are some national rules, but no common European rules until now: An European Technical Approval Guideline for expansion joints is in preparation. The noise of expansion joints is a problem near settlements, some efforts were made to avoid it respectively to compensate it.

**Keywords:** Expansion joint, requirements, regulation, watertightness, guide drawing, noise.

### 1. Introduction

Expansion joints are needed to offer a continuous road surface to vehicles rolling over. They bridge the variable opening between bridge and road because of the length changes of the bridges. Length displacements appear because of climatic influences, mainly from temperature and from traffic influences. The loads on the expansion joint are passed on to the neighbored components of the bridge and the abutment.

Expansion joints are executed in different constructions which are in connection with the tradition of the bridge-building. Continuous beams are redundant, there are countries which support the decision either for continuous beams or for many single span beams behind each other; due to safety reasons in Germany the way of construction “continuous beam” is preferred. Continuous beams offer higher safety reserves than single span beams.

Expansion joints are interfaces which frequently cause problems like all interfaces. Watertight expansion joints which frequently showed disadvantages respectively noise were built in Germany after numerous damages by carbonisation of the concrete. It is here necessary to fulfil the various requirements with regard to safety, efficiency and durability and to find a sensible and comprehensible compromise.

### 2. Requirements in national and European sets of rules

#### 2.1 National sets of rules

##### 2.1.1 General

In Germany, requirements on expansion joints are given in the additional technical contract conditions and guidelines for structural buildings part 8 section 1 (ZTV-ING) [1]. As usual additional regulations, all suitable existing codes and other sets of rules are used as a product from the experiences with damages.

The ZTV-ING regulate requirements with regard to the material, the design and the further use. In chapter 8 section 1 constructions with one and with several stretching profiles are distinguished. Asphaltic plug expansion joints in asphalt are regulated in chapter 8 section 2.