

## Sustainability in action – Expansion joint renewal with focus on retention and re-use

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## Abstract

A bridge's expansion joints will almost certainly have to be replaced several times during the course of the bridge's life, often causing great disruption to traffic and significant expense to the owner – impacts which should, of course, be minimised. The choice of expansion joint selected to replace an old joint strongly influences the expense and disruption caused by replacement works, not only for the current replacement project but also for the next one in the future. Therefore, the way in which joint replacement works are to be carried out, and in particular the type of joint to be used, warrants careful consideration by the responsible engineers. This paper presents a range of solutions, covering single gap joints, sliding finger joints and modular joints, which minimise the amount of an existing structure that requires to be broken out when replacing an expansion joint.

Keywords: expansion joint; renewal; replacement; minimal impact on structure; traffic disruption.

## **1** Introduction

Expansion joint renewal is a source of considerable expense to bridge owners and can cause enormous disruption to traffic - both impacts which should be minimised during the life of any structure. The best way to do this is to use only high-quality, properly designed expansion joints, and ideally ones which have proven their performance on many structures for many years. This will ensure that maintenance and repair efforts will be minimised during the life of the joint, and that the frequency of replacement projects can be reduced thanks to a longer service life. But where significant movements must be accommodated, even the best, most perfectly designed and detailed joint is likely to require replacement several times during the life of the main structure. This is because the joint is far lighter and less robust than the bridge as a whole, yet subjected to fatigue loading with the passing of every vehicle.

When the time comes to replace an expansion joint, a solution is required which not only minimises disruption to traffic and total effort and expense, but also fulfils any other relevant objectives. For instance, it is generally desirable to minimise the amount of deck structure which must be broken out, in order to avoid unnecessary weakening of an otherwise sound structure and to minimise noise and dust pollution during the work (as well, of course, as contributing to reduced effort, expense and traffic disruption). And the opportunity should always be taken to consider ways of improving the performance or