



Next-generation flexible plug expansion joints

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Abstract

A much-improved type of flexible plug expansion joint has been developed, with a polyurethane surface, which offers a number of substantial advantages over the traditional bituminous type. The *Polyflex® Advanced PU* expansion joint offers all the benefits of the asphaltic plug joint, including smooth, safe, low-noise surface, great adaptability and easy installation. However, it overcomes numerous disadvantages and challenges that have always plagued asphaltic plug joints. It offers greatly improved strength, elasticity and durability, resulting in much less maintenance and far more reliable watertightness. The joint's material offers consistent behaviour at both high and low temperatures, and excellent resistance against rutting. And installation is also far easier and less prone to error, with the two-component compound being mixed at ambient temperatures. For these reasons and others, this joint should be considered for use in bridge construction and, in particular, in bridge maintenance – as demonstrated by successful experience around the world in very varying climates and environments. This paper covers the extensive testing conducted at several independent testing institutes and the significant features and benefits of the system, and presents sample installations.

Keywords: expansion joint, flexible plug joint, new material, European Approval, life cycle cost

1 Introduction

Flexible plug expansion joints, which create a completely closed, absolutely flat driving surface right across a structure's movement gap, offer a number of benefits over other small-movement expansion joint types. The continuous, flexible surface results in unsurpassed driver comfort and extremely low noise under traffic, while also eliminating discomfort and safety risks for pedestrians and cyclists. Furthermore, the way the joints are constructed, by pouring freshly mixed material in situ, facilitates transport and handling and makes expansion joints installable in sections, lane by lane, with any desired shape or longitudinal profile (e.g. with intersections or upturns).

However, flexible plug expansion joints made from traditional bituminous materials have long been plagued with durability problems, not performing as well, long term, as joints manufactured primarily from steel. Continuous dynamic loading and braking/acceleration forces from vehicle wheels, year after year, cause stresses in the material, resulting in cracking, loss of watertightness and general deterioration – impacts that would only be exacerbated by improper preparation on site and incorrect temperature during installation.

To overcome these shortcomings while retaining the aforementioned benefits, the design of the flexible plug expansion joint has been optimized, utilizing superior (non-bituminous) materials and