



## Bridge Deck Waterproofing on Concrete

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### Abstract

Bridges are critical elements for infrastructure projects. Bitumen based state of the art systems cannot fulfil the increasing requirements for modern bridges when it comes to minimum service life and resistance to severe stresses, so developing new resin based systems which can provide a longer service life, shorter down times in case of maintenance works and reduced repair costs are the main target for system manufacturers.

New spray-applied solutions offer rapid application and curing, and form a tough, elastic and seamless waterproofing layer. The key element is the increased tensile bond ( $> 0.4 \text{ N/mm}^2$ ) and shear strength to the asphalt overlay, which is substantially higher compared with traditional bitumen tack coats.

The worldwide recognised standards for liquid applied waterproofing systems on concrete bridge decks are BBA/HAPAS and ETAG 033.

**Keywords:** bridge deck waterproofing, liquid applied, asphalt bond, pellet, BBA, ETAG033

### 1 Introduction

The waterproofing of bridge decks is recognized as a vital and necessary element to improve the durability and extend the service life of bridge structures. It represents the first line of defence against the ingress of water, chlorides (from the atmosphere or road de-icing salts) and other aggressive chemicals into the bridge deck. Concrete bridge deck deterioration is one of the most extensive bridge maintenance problems affecting the service life of bridges, causing severe damage and even destroying the structure, through steel reinforcement corrosion or erosion and corrosion of the cement matrix of the concrete. Therefore it is paramount to the durability of the bridge that this key element is protected.

In the past, several different material systems and approaches have been developed and applied as deck waterproofing systems. Starting with bitumen or tar, later different bituminous sheets and polymer modified membrane systems, waterproof concrete, and finally now with liquid, spray applied membranes which are fully bonded to the substrate [1].

All of these systems have their own strengths and weaknesses. Worldwide many different waterproofing systems are installed, dependent on the country, its standards/regulations, plus the climatic conditions. But bridge deck waterproofing is actually one of the most heavily regulated types of applications in civil engineering with stringent testing to prove suitability for use in these tough conditions.