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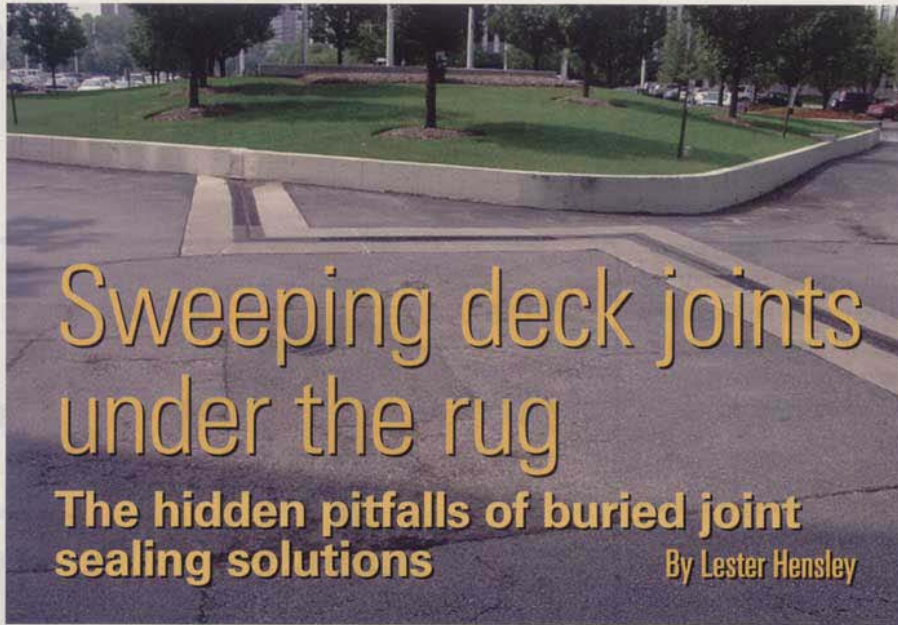


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Sweeping deck joints under the rug

The hidden pitfalls of buried joint sealing solutions

By Lester Hensley

Deck expansion joint sealing is critical to parking structure performance and longevity. Even more critical than watertightness of joints is parking deck design that incorporates a structural slab waterproofing membrane under a wear-course or topping slab. Until the emergence of a watertight, purpose-designed system, designers were left with the ineffective option of a buried looped membrane “band-aid” approach to address these critical joints.

For years, attempts have been made to seal expansion joints in asphalt-topped parking decks, without tying the joint into the waterproofing on the structural slab. Over time, failure usually occurs at the transition between the joint and the membrane.

Purpose-designed, watertight parking, plaza, garden-roof, and roadway joint systems do exist. Migutan by EMSEAL is specifically engineered to address the shortcomings of buried, sheet-membrane joint treatments.

Specification of the Migutan system results in attention to detail and quality assurance appropriate to the objective of achieving watertightness in this critical application. It is precisely this lack of attention on many projects that causes joints to leak prematurely and results in exorbitant costs of inspection, investigation, repair, and replacement of buried systems. These direct costs are compounded by the costs of disruption

of operations or lost lease revenue in the affected facility.

How it works

Split-slab parking or plaza deck waterproofing involves a waterproofing membrane applied to a structural deck. The membrane and its related components are covered with some sort of topping or wear-course such as asphalt, lightweight concrete, or pavers. The topping is porous by design and allows water to reach the membrane on the structural slab where it is managed to drains. When expansion joints are necessary through parking decks, they must be waterproofed using a method and material that accommodates movement while reducing or eliminating the stresses that will cause a buried membrane to fail.

Design philosophy — The Migutan design philosophy recognizes the need for the joint system to have a static integration with the deck waterproofing membrane. In addition, the specified design recognizes the need to have a purpose-designed, heavy-duty gland to accommodate movement at the joint that is integrated with the deck-waterproofing tie-in but that is accessible for repair, if necessary, without disruption of the topping system.

The design philosophy that characterizes the buried, band-aid approach involves placing a strip of reinforced membrane over joints and adhering it to

Joints on a plaza parking deck above occupied space and additional parking included a “bolt-down” system with concrete curbs that cracked perpendicular to the joint system, resulting in bypass leakage.

the parking deck or to the waterproofing deck membrane. The problem with this approach is that the accumulation of water combined with freeze/thaw cycles, as well as flex fatigue from movement, compounded by abrasion between topping and buried components, results in the inevitable rupture of the buried band-aid, usually at its interface with the abrupt concrete joint edge.

These conditions, when combined with joinery required to handle changes in plane and direction, exacerbate the tendency to failure. Remediation of failures of these buried systems involves nothing short of the removal of the entire surrounding topping system and all adjacent landscaping to expose the membrane. Because the location of parking decks is over occupied, often sensitive interior space, the disruption to tenant operations for this type of remediation work usually renders the space below unusable for the duration of the repair or replacement.

Composition — The Migutan system is a combination of corrosion-free, aluminum and stainless steel mounting rail components that are mechanically secured to the structural slab to provide a positive anchoring of the waterproofing components. The metal mounting components ensure that tension, compression, torsional, and other forces that result from joint movement are isolated from the critical connection of the deck waterproofing membrane to the side flashing sheets of the joint system.

The waterproofing components are all state-of-the-art thermoplastic, rubber materials. These materials can be heat-welded in the factory to produce transitions for addressing changes in plane and direction. In addition, these materials can be welded in the field using simple hot-iron tools for attaching transitions to straight runs and to address field conditions as they arise.

In total contrast, the buried band-aid



Migutan system components — retainer legs installed onto structural slab, side flashing sheets and movement gland — before installation of stainless steel retaining caps and before integration into the deck waterproofing membrane.



Mounting rails are lowered into position onto an epoxy leveling bed.



The finished product shows that planters and the roadway surface sit safely over a water-tight plaza deck.

is usually a simple piece of thermoset rubber. It contains no mounting components and does not provide for positive mechanical anchoring of the system. There is no barrier between the sheet and the deck membrane for separation, from the point of adhesion, of tensile stresses caused by joint movement.

The practice of designing wood blocking to elevate the joint system in plaza and roof decks, or similarly the use of concrete curbs in parking decks, is validation of the need for a system that stands above the structural slab. Even pressure or chemically treated wood blocking decays eventually and concrete curbs crack perpendicular to the expansion joint, allowing water to pass. Achieving the design intent of these methods, the Migutan mounting rail legs form an integral part of a multi-layer deck composition, ensuring that the joint is elevated, integrated into the waterproofing membrane, and that water is kept away from structural joint-gaps.

The assertion by some that buried membranes facilitate deck drainage across the joint should be considered because incorporating a structural expansion joint into a drainage plane, while sometimes unavoidable, is generally considered a waterproofing-design compromise. This condition can usually be addressed through attention to drain location.

Using a joint-system designed to integrate into the waterproofing membrane on the structural slab, long-term watertightness is assured. An example of this type of system can be seen at the City of Toronto's CarPark 11

(see photos above and on the previous page). Benefits include the elimination of concrete curbs that are subject to cracking, and the ability to repair or replace sections of the thermoplastic sealing gland, if needed.

Conclusion

Band-aid joint treatments were historically the only choice available to designers, and therefore were widely specified in years past. The existence of a place in the market for a purpose-designed parking-deck joint system like

Migutan is the direct consequence of owners' having to spend a fortune replacing failed, buried, band-aid, and looped membrane materials. ■

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