

SWEEPING PLAZA DECK JOINTS UNDER THE RUG



The hidden pitfalls of "buried band-aid" joint sealing solutions



Before

This image shows leaking joints on a plaza deck, prior to treatment with EMSEAL's MIGUTAN joint sealing technology.



MIGUTAN Components

This photo shows the 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.

PLAZA DECK, OR WATERPROOFED SPLIT-SLAB, JOINT SEALING IS SERIOUS BUSINESS. Usually over occupied space, plaza decks are actually heavy duty roofs. Until the emergence of a watertight, purpose-designed system about 20 years ago, designers were left with the ineffective option of a buried looped membrane, "band-aid" approach to addressing these critical joints.

Buried-membrane options offered today are nothing more than a throwback to band-aid solutions for plaza and roof deck joint sealing. These out-dated solutions in no way respect an owner's desire for durability nor do they honor the reputation of designers who research, engineer, detail and specify solutions in the long-term interest of building owners.

Purpose-designed, watertight, plaza, roof deck, and roadway joint systems do exist. Specifically engineered to address the shortcomings of buried, sheet-membrane joint treatments that pre-date it by decades these systems are all descendant of a product called MIGUTAN by EMSEAL.

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 result in exorbitant costs of inspection, investigation, repair and replacement of buried systems. These direct costs are compounded by the costs of dis-



During

This photo documents the project in process. The joints are being completely integrated into the deck waterproofing membrane with MIGUTAN, a watertight, plaza, roof deck, and roadway joint system specifically engineered to address the shortcomings of buried, sheet-membrane joint treatments that pre-date it by decades.



After

This photo shows the finished product. The finished planters and roadway surface sit safely over a watertight plaza deck.

ruption of operations or lost lease revenue in the affected facility.

The list of criteria on which band-aids (buried-EPDM-membrane type products) do not match the MIGUTAN specification for plaza deck sealing is lengthy. Fundamentally, however, the buried membrane approach does not meet split-slab design philosophy in the following ways:

1. Principle of Operation
2. Composition
3. Track Record

DESIGN PHILOSOPHY AND PRINCIPLE OF OPERATION:

Buried Band-Aid Approach vs. Static Membrane Integration with Positively-Anchored, Purpose-Designed, Repair-Accessible, Movement Gland

Plaza and roof deck waterproofing involves a waterproofing membrane applied to a structural deck. These components are covered with some sort of topping. 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 plaza or roof 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.

MIGUTAN 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.

Buried Membrane Design Philosophy—The design philosophy that characterizes the “buried, band-aid” approach involves placing a strip of reinforced membrane over joints and adhering it to the 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 roof and plaza decks is over occupied, often sensitive interior space, the disruption to tenant operations of this type of remediation is work usually renders the space below unusable for the duration of the repair or replacement.

COMPOSITION

MIGUTAN 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 thermo-plastic, 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.

"Buried Band-Aid" Composition—In total contrast, the "buried, band-aid" is usually a simple piece of EPDM, thermoset rubber. It contains none of the evolved mounting components of the MIGUTAN system 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 use of wood blocking to build up the system where elevation is necessary is inappropriate in several respects. Wood blocking which eventually decays, and even if treated, cannot be considered a lasting construction method for this purpose. It is a validation of the need for a system that stands proud of the deck in certain application areas. In fact, the MIGUTAN mounting rail legs form an integral part of multi-layer deck composition ensuring that water is kept away from structural joint-gaps. Given this, wood blocking is a far cry from having non-corrosive metal supports

specifically designed for this purpose.

In contrast to thermoplastic rubber, thermoset rubber is an earlier generation of material that has been nearly totally replaced in most industrial sectors including automotive and construction, by better-performing thermoplastic alternatives. EPDM's limitations in respect to flex-fatigue resistance, abrasion resistance, and chemical resistance have been understood for years. The use of EPDM lying flat on a roof as roofing material requires vastly different physical characteristics when offered for use in a dynamic structural expansion joint application.

The addition, by some manufacturers, of a fleece to the EPDM is further recognition of the EPDM's fundamental shortcoming in respect to long-term bondability to other materials. This degradation of bond is caused by the migration of plasticizer oils to the surface of EPDM. While the fleece may provide a surface to which the membrane waterproofing can bite, it also has the effect of restricting elongation thereby increasing tensile stress at the bond line.

The need to have factory representatives execute all field splices using specialized equipment is a warning flag. It is the fundamental nature of thermoset rubber that it cannot be reliably joined except through vulcanization. Vulcanization a process normally confined to manufacturing facilities to achieve a finished state of certain rubber compounds using specialized equipment.

The term, "thermoset" refers to the final application of heat to a rubber compound to achieve its final, finished, unalterable, solid state. It is precisely this characteristic that led to the evolution in rubber technology of thermoplastic materials. Unlike thermoset rubber, thermoplastic materials can be, through the application of heat, softened, joined, and added to, to achieve desired shapes and joins. The resulting joins are as strong as the original material particularly when reinforced as part of the welding process.

The assertion by some that buried membranes facilitate deck drainage across the joint should be considered in light of the following: 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.

While it is true that the MIGUTAN, by design, typically stands proud of the structural slab, only in extremely rare retrofit occasions might this pose an obstruction to drainage. This instance is where a joint has been located mid-span in a ramp where due to other constraints no option existed to locate it at the preferable location at the top of the ramp and details are available for addressing this condition.

TRACK RECORD

EMSEAL's MIGUTAN has an unrivaled track record in over 20 years of waterproofing plaza and split-slab deck, stadium concourse, garden roof, and roadway expansion joints. Specialty waterproofing contractors, under guidance of qualified field technicians have installed thousands of feet of the system for satisfied owners. These installations have been integrated primarily with hot-rubberized asphalt waterproofing membranes and are fully warranted. The reputation for properly engineering these systems for watertightness, combined with the workmanship of trained contractors, and backed by manufacturer and installer commitment to addressing problems should they arise, are the cornerstones of the product's success.

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 plaza-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.

CONCLUSION

For many years MIGUTAN has set the bar for plaza



and roof deck joint sealing. Owners, designers, estimators, project managers and installers nationwide have demonstrated the philosophical, technical, and craftsmanship commitment to installing this superior system thereby addressing deficiencies that typically make expansion joint leakage one of the major headaches an owner lives with during the life of their structure.

To avoid specifying "buried band-aid" materials based on the very technology that MIGUTAN was engineered to replace seems common sense and should prevent deficiencies in philosophy, principle of operation, composition and track record from being "swept under the rug".

John Ruskin, a nineteenth-century commentator on architecture among other things warned: "It is unwise to pay too much, but it's worse to pay too little. When you pay too much you lose a little money—that is all. When you pay too little you sometimes lose everything, because the thing you bought was incapable of doing the things it was bought to do. The common law of business balance prohibits paying a little and getting a lot. It can't be done. If you deal with the lowest bidder, it is well to add something for the risk you run, and if you do that you will have enough to pay for something better." ■