

TL-0009 — Retrofit Waterproofing Technical Letter

Buildings with water leakage problems are expensive to repair. Properly done original waterproofing does have an initial cost, but retrofitting problems will cost significantly more. Excavating, removing pavers from plaza decks, pulling trees out of planters, cleaning and repairing concrete, will cost a building owner even before applying the new waterproofing system. This process can cost 5X or more, compared with the initial cost to waterproof a structure.

Defining the Problem

The first, and probably most critical step in retrofit waterproofing is to determine why the original system failed. Failure may lie in the material, the installation, the design of the system or components or in some related construction component.

A minimum of three steps should be taken to determine the cause of the failure.

1. Inspect the inside of the structure and pinpoint the exact location of interior leakage. On walls and floors this is a relatively easy task. On ceilings, the job will be more difficult. For example, stains on suspended ceilings will not always be directly under the leakage point. Water may be flowing along a beam or a construction joint for some distance before it drips off. Pinpointing the location of interior leakage does not guarantee that the entry point through the waterproofing system is directly above. If waterproofing is not fully adhered, water may penetrate the waterproofing and travel laterally under the waterproofing. Therefore, Step 2 is important in continuing the search for the cause of failure.
2. Study the original plans and specifications. Determine what type of waterproofing system was used in the original construction. Are there components which may be incompatible? Are there any questionable design details which may have interfered with good waterproofing practice? Could there be problems associated with expansion joints or the lack of expansion joints? Are drains properly located? A study of plans and specifications is unlikely to definitively answer the question of what caused the failure, but it may be valuable in establishing probable causes. It will also help guide the actions in the final and most revealing step.
3. Excavation and inspection must be done when possible in order to reliably understand the nature of the problem. Results from Steps 1 and 2 will help in developing a plan for excavation or removal of overburden and inspection. This is typically only an option for buried decks, planters, and open cut excavations where the foundation walls can easily be exposed. For applications that originally received a blind side waterproofing, material excavation is most likely not an option. Steps 1 and 2 can still be followed to uncover valuable information and help to create an appropriate remediation plan. Care should be taken to avoid damaging the waterproofing system during excavation or removal of overburden. Under the best of conditions, it may be difficult to be absolutely sure of the cause. If the point of water entry is not found, further excavating will be needed. Check the plans, and be sure that further excavation is in an upslope direction.

Realistically, the inspection may still not reveal an absolute cause for failure, however, it will establish some strong theories. Inspection will provide valuable information to aid in the retrofit waterproofing.

Existing Conditions

Inspection will be the opportunity for observing and recording current conditions. Some information to record will be:

1. What waterproofing system was used?
2. Is the waterproofing bonded to the substrate? Loose? Partially bonded?
3. How will the waterproofing system be removed? Spot repairs are risky and usually insufficient. Removal should always be recommended in order to provide a smooth suitable surface for the application of the BITUTHENE[®] Membrane. It is not necessary, even with coal tar based products, to remove every trace of the original waterproofing. Repairs to the original structure or substrate may be required.

Specifications

Only now can realistic specifications be written for the retrofit waterproofing. The key area of concern in writing a specification is to thoroughly address one issue – preparation.

Specify substrate repairs to assure that surfaces and detail areas are correct for the proper application of BITUTHENE[®] waterproofing membranes. Check concrete carefully to be sure it is sound and not delaminated or spalled from corrosion of reinforcing steel or from some other cause. Rough surfaces must be brought to a smooth condition. On horizontal surfaces, use BITUTHENE[®] DECK PREP[®] Surface Treatment for the best results. For vertical surfaces, use the appropriate BITUTHENE[®] primer and repair all surface imperfections. See BITUTHENE[®] Technical Letter “Inspection and Repair of Concrete” for specific surface repair information.

Expansion joints should be given special consideration. Joints should be redesigned, reworked, or repaired. While joints may appear to be in good condition, resealing may be required. Do not use polysulfide sealants in any areas in which BITUTHENE products will be in contact with the sealant.

Wet areas in the original structure, or areas in which substantial patching is required, will require time for drying and/or curing of repair materials.

The specification for BITUTHENE[®] membrane and its application may be the same as for new construction, providing all of the repair and preparation steps have been followed. However, the application problems on retrofit projects will nearly always be more complex than for new construction. Because of the cost and complexity of retrofit waterproofing, some architects and engineers specify BITUTHENE[®] Deck Prep and two plies of BITUTHENE[®] Membrane.

Compatibility of the BITUTHENE[®] membrane with existing waterproofing will also become an issue. Refer to BITUTHENE[®] Technical Letter #10 for “Chemical Compatibility of BITUTHENE[®] Membrane with Other Materials” and Technical Letter #31 “Compatibility of Other Primers and Surface Treatments with BITUTHENE[®] Membranes”

Execution

One final link is required to assure a watertight retrofit project. Close cooperation between the owner, the architect, the waterproofing manufacturer and the waterproofing contractor is absolutely essential. The work area will be messy. It will be confusing for the contractor, and it will be disruptive for the owner and occupants. Pre-construction conferences and job site reviews are even more important than for new construction.

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