Waterproofing Tragedies

by **Dave Gobis**

Looking back in my files for 2009, I found four articles on waterproofing for BNP publications in the past 12 months. It seems every year for the last twelve years I have been writing there are two or more on the editorial calendar. The circulation numbers of BNP flooring publications would indicate that nearly every tile installer in the U.S.A. would be a reader. Sadly, I know this is not true because nobody could read that many articles and still manage to make a mess out of one of the most critical applications in tile work, waterproofing. In the past year with this slow economy I have been involved in projects of no less than 3,000 showers and a third as many balconies, decks, and patios plus a handful of restaurants on suspended slabs. It's been a great year for me in the inspection and consulting business. But, unfortunately, unsuspecting real estate owners ranging anywhere from a disabled retired couple on only social security to a multi-billion-dollar developer have lost millions of dollars in replacement and repair of tile work in their water-damaged structures. One major hotel chain is seriously considering eliminating tile showers altogether because regardless of where they build, they can't find anyone who can construct tile showers without having to repair them in a year or two. Along the way many contractors found out there is a difference between completed operations and liability insurance. Some, not having the resources to repair things, are no longer with us. So, this month instead of explaining how you do it, I thought I would share some of the waterproofing shortcomings that have cost so many so much when they chose not to do it the right way.

Weep holes! Not a single one of the showers I have seen in the last year using conventional (mortar) shower construction provided for mortar bed drainage by keeping the weep holes open. Time and time again, we try to impress upon everyone the importance of not plugging the weep holes with mortar. These holes MUST be kept open to allow for subsurface drainage of the mortar bed. Plugged weep holes will cause water

Some jobs leave me at a loss for words. This one-year-old project has waterproofed drywall; however, the joints were not taped and left open. The tile was then spot mounted to the wall and collected water through the grout, which was promptly dispatched to the kitchen ceiling below.

About the Author

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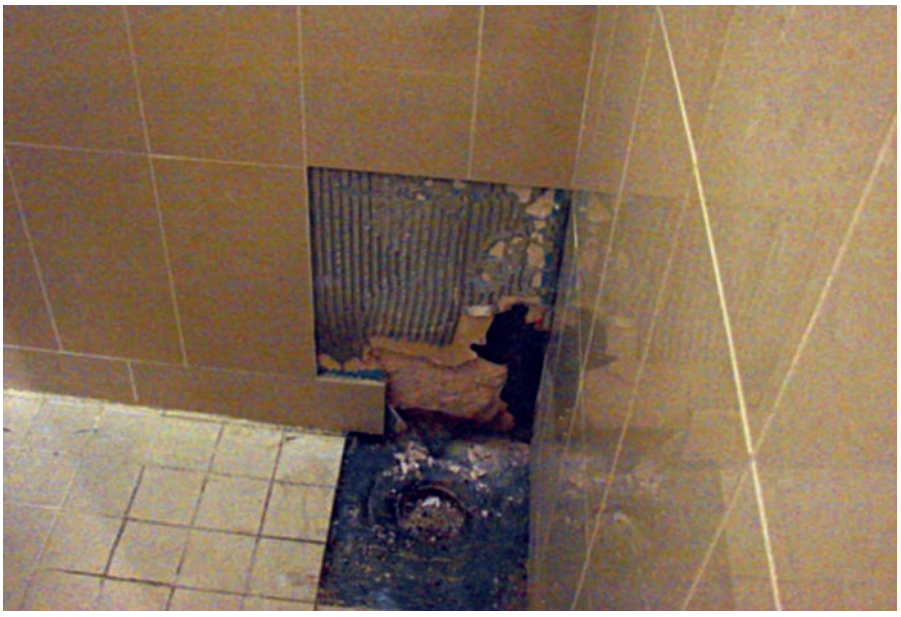
Top Left: This one-and-a-half-year-old shower had a glass mat backerboard nailed to the top and back of the concrete curb through the shower pan liner. The original complaint was that the tile fell off the inside of the curb. Further investigation revealed additional leaks at the pan liner corners. which had been cut and not seamed properly.

Bottom Left: After removing the tile around the drain, we discussed that a paper backed tile should never be used in a wet area. During the 15 minutes of conversation, water filled the area of tile removal. Further demolition revealed that the weep holes were not only filled but caulked shut when the shower liner was installed.

to collect in the mortar initially leading to efflorescence and later mortar degradation by bacterial attack. Some years back I took out a 7-year-old mortar floor in gang shower with a coal shovel, literally. Bacteria that became trapped in the mortar gradually turned the mortar floor into a large mass of mold. Mortar shower floors typically stay wet once they get wet. Using epoxy grout and sealers on the tile and/or grout are not going to change that. The new water will constantly replace the old water, unless the weep holes are plugged. In that case the shower floor functions as a septic tank, not a very sanitary place to be when the goal is cleaning your body. Proper pitch of the subsurface waterproofing and open weep holes are also very important when a mortar bed is used in a deck or balcony application. All too often we see surface drains with no provision made for subsurface drainage, causing efflorescence and mortar degradation.

Proper pitch of subsurface waterproofing seems a foreign concept. Whether a floor deck or a shower, the surface *under* the waterproofing must pitch towards the subdrain when using a mortar system. Industry standards call for a ¼" per foot pitch, which is fairly equal to the 2% slope required under plumbing code for pre-slope under the waterproofing. Achieving that much pitch can cause problems at times when you are dealing with large areas. The 2% slope recommendation was formulated years ago when large showers and huge tile decks were not a consideration; they were few and far between. None the less, I think the recommendation is still quite valid. The goal should always be to shed both the surface water and rid the installation system of water it may retain as rapidly as possible. In exterior applications, the further North you are, the greater the need to keep the system as dry as possible with as much pitch as tolerable to avoid freeze-thaw damage. Mortar installations can be used in freeze-thaw applications when the proper precautions are taken. There are plenty of exterior tile installations here in the Milwaukee area that are over 100 years old. Where freeze thaw is not a concern, subsurface drainage will minimize the efflorescence. Keeping the weep holes open to drain water is always a need. Making sure the entire floor drains by properly pitching the substrate prior to waterproofing makes much more sense than leaving the ½" to ¾" of water that will otherwise lie stagnant on the flat floor if you don't. While not required under industry recommendations and an unknown term to many, a drainage mat on top of properly pitched waterproofing with open weep holes at the drain will prolong the life of the floor assembly by providing rapid drainage of a mortar bed. With use of a drainage mat, water must only travel the depth of the mortar bed rather than the length of the floor to reach the subdrain assembly.

Shower curb problems seem simply endless. Twice this year I have been on hotel projects where a gypsum board product was nailed through the waterproofing on the top and inside the curb. It's bad enough that anything would get nailed into the top or back of the curb, but a gypsum panel? If you nail through the top or the back of the curb, the waterproofing is compromised. Nothing will fix it except more waterproofing over the top of the backer board curb. That would require some tile setter field engineered hybrid system where not only the backer



This was one of many showers which had a glass mat backerboard placed in the bottom of the mortar. The wall was saturated approximately 24" up the wall. As it was in front of the shower pan, water was being retained and strange growths were appearing in the grout joints.

board on all three sides of the curb was waterproofed, but also seamed into the shower pan liner to avoid water wicking up behind the waterproofing on the curb. That rules out most liquid products, and all but a few sheet products. I am aware that waterproofing backerboard curbs is a common practice, but I could not find a single manufacturer who would endorse or warrant such an application with any product. I have also recently been on jobs where thinset was used over metal lath nailed into the curb that failed within a year. Shower curbs are time consuming projects unless you chose to avail yourself of some of the more modern materials available for those who do not have the skills (though they may think otherwise) to build mortar curbs. One project I reviewed used treated lumber for curbs and framing as a "solution" to water damage. Treated lumber warps as it dries out and on this particular project which used a liquid waterproofing product, the warpage actually caused the failure of an otherwise viable system.

Last on my list due to the limitations of space is the abuse of liquid or trowel applied waterproofing systems. Liquid and trowel applied systems can provide effective code compliant waterproofing when properly applied. However, they do have their limitations. First and foremost, they are NOT all the same and do require specific application procedures for each individual product. My most recent project was a gang shower in an athletic facility in which the tile installer rolled on one generous coat of the product. He had been told by his distributor it was equal to a similar product costing twice as much. Well, it was equal to the other product in performance. But, it required three coats and full field application of a reinforcing fabric to be equal. With three coats and fabric, the per square foot cost was actually greater than the "similar but equal" product which required one coat. Water started passing through the masonry wall into the locker rooms after only two months of service. I'm not sure what product he will use in his replacement of 4,600-square-feet-worth of backerboard, tile, and waterproofing.

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As things remain ultra competitive and profits still being very elusive, we all look for the most cost effective way of accomplishing a given task. It seems the only way you can get a job the past few years is to bid it breakeven at best. That's not all bad; we older guys have been here before, and it will pass. However, breakeven is one thing, doing something questionable or unlikely to succeed is another. From my perspective I see two things in the current market. One is many otherwise good installers taking way too many risks to land one of the few elusive jobs available. The other is floor covering guys and remodelers who don't have a clue about the true requirements of waterproofing taking jobs they are not qualified to do. To my brother installers I say work smart and hang on; better days are coming. To those who fall victim to the unqualified and unscrupulous, I am ready and available for work throughout the United States. **FCI**