

# TRANSCRIPT (5/2021)

## Basement Waterproofing Systems

### Partnership with Fine Homebuilding and DRYLOK ®

UGL DRYLOK ® partners with Fine Homebuilding to discuss basement waterproofing systems.

Basements are a huge concern for builders, homeowners, and remodelers in the industry. Often the solutions are complex and expensive as we all agree it's easier to get it right first, but there's some controversy on what that exactly means; thank you all for being here, and we're going to talk about all these things in just a little bit.

Mike- "I can talk about my basement. I have a walkout basement to my backyard, so the back of my basement is at grade level, and in March of 2010, we got a tremendous amount of rain. The stream and the swamp, which are about 400 yards behind my house, filled up. So the water came in the door and filled my basement up about 1 foot of water. It was at that point when there's nothing you can do about it."

#### **Did your heating system get submerged?**

Mike- "One of the things that I learned many, many, many years ago when I was young builder was all of the mechanical equipment that you put in a basement always raise them a foot or two off the floor. I put down concrete blocks, and I have a boiler and other tanks on top of those blocks to get at least one foot of water before any of the equipment gets damaged. All of my outlets in my basement are at chest level rather than down at ankle level. I can have up to 3-feet of water in my basement, and none of the wirings will be damaged and have to get ripped out. Anybody who's had this problem understands that when the electrical equipment gets wet, you can't just turn it back on; you have to rip it out because the water will get in the jacket and not drive out."

#### **Introductions:**

Lance Lang - "I have been with United Gilsonite Laboratories(UGL) for 12 years. We are the makers of DRYLOK brand products and the ZAR brand products. Tonight is strictly a basement discussion and will answer any questions you may have!"

Mike - "I'm a contractor, remodeler, and occasional single-family home builder in Rhode Island. I write articles for Fine Homebuilding for the last 25 years and do many of these webinars."

Travis - "I run a small residential remodeling and building company with my friend Joe Cook, and I do a weekly show with GBA."

#### **Sponsorship**

"I want to Thank UGL, the maker of DRYLOK products, for the sponsorship tonight and for bringing this vital information to you all. UGL has been advising customers on the prep and application of DRY-LOK Masonry Sealers for over 20 years!

Lance has been doing this for 12 years.

## **Lance, what do folks get wrong the most in regards to waterproofers?**

Lance- “Number one is they don’t pay attention to gutters, grade, and proper drainage. Those are the questions we ask first when a customer calls in with a water problem. When a home has a current issue with water and infiltration, and we find out that they have serious leaks, it is generally a drainage issue.”

Patrick- “Lance segued perfectly into the first part of our conversation,

**“ It’s easy to get the details for a dry basement right from the start, it is way more difficult to fix things that are a problem later.”**

I think we’d all agree that a key line of defense concerning keeping a basement dry is **footing drains, Connelly basement walls, and either stack masonry units or poured concrete on a wider footing.**

The first thing that I would like to talk about is the footing drain pipe. There’s a lot of debate about where that goes.

## **Where should you put that footing drain?**

Mike - “I’ve done it both ways. I prefer to put them inside of the foundation. I insert them inside the foundation walls underneath the concrete slab because I put down roughly a 4-6 inch deep, maybe even 8-inch deep layer of crushed stone, so I already have a connection between the outside of the foundation and the underside of the foundation wall. I put the pipes on the inside because they also work as a soil Gas depressurization system otherwise, known as a radon mitigation system. So I can run a passive line up through the walls inside the house, and it’ll do double duty with the drain pipes. One pipe goes out to daylight or into a sump to drain any water collected by that drain pipe under the slab. The other pipe will rise to the attic out through the roof and depressurize under the slab. The benefits are primarily the radon, but any soil moisture gets evacuated out that way, and the soil moisture migrates through the slab.

Travis- “Well, we always do the outside; the inside is actually in our market considered an upgrade. So the exterior drain tile around the perimeter of the footing is what I thought we were going to be discussing whether you set it on top of the footing at the base of the wall or set it down adjacent to the footing.

## **There’s some debate on whether you put the pipe at the bottom of the footing or the top.**

Travis -”We now put the corrugated plastic pipe down at the side of the footing. So when you excavate for your basement foundation, you end up with the bottom of footing on your top-grade of soil. By placing the footing drain at that location, you are at the lowest point theoretically that water would affect your assembly. Picking up the water at that location and draining it into a sump pump to discharge it and evacuate it away from your home, the common understanding is that is the place that you want to collect your water. Before this conversation, I was putting the pipe on top of the footing at the base of the foundation. Your interior basement slab sits on top of the footings. I thought by capturing the water in transition between the top of the footing and the base of the stem wall, I was capturing any water that could be sheeting the face of the foundation wall. I thought I was catching it at the point where it was most likely to flow in rapidly and evacuating it below the slab’s level. I still believe there is some merit to both systems; however, if you adequately detail that area with crushed stone in the sock to keep the cross-stone from being clogged with the sediment, I agree with Jake that I go ahead and evacuate it.”

## **Shouldn’t we be intercepting water that’s on the outside of the foundation before it gets under the slab?**

Mike- “So your presumption there is that the water is coming from outside of the foundation. In my area, most water is not coming from the outside of the foundation; it’s coming from rising groundwater. There are other water management details, such as underground gutter or diverter at grade level. In the

houses that I build or remodel, these houses are very close to the water table. It doesn't matter whether I catch it on the outside of the footing or the inside.

**Do you think if you had a steep slope dumping at the back of your house would it be wise to put it on the outside?**

Mike- "Yes, in that case, I would probably do two."

The 8 inches of crushed stone is under the footing. You don't need to add a pipe to link the outside pipe to the inside pipe. You already have a gravel bed there that allows the interior pipe to communicate with the other side of the wall.

Weak links in the assembly of the foundation wall sitting on top of a footing. What can we do about that joint? I've heard problems with a condition called "Rising Damp" where soil moisture moves through the flooring into the concrete.

**We need something to stop this water movement on a molecular level; how do we do that?**

Mike- "So you're talking about the capillary action of water that's being drawn through the footing. Then sitting in water and being drawn further up into either a concrete block or a concrete foundation. Or, if you have a block wall, it often is constantly venting out the top of the wall from the cavities, capillary breaks."

So I saw on GBA folks paint a coating on a footing. Does anyone do that in the real world?

Travis - "I've never witnessed one in my entire career on any home."

Have you heard of this, Lance?

Lance "Yes, we did it on a project in St. Louis where we used our DRYLOK Waterproofing on the top of the block wall as a capillary break between the first plate."

Mike-"You used it at the top of the foundation. So if we pour a separate footing, say 18 inches wide footing by 8 inches or 10 inches tall, and then we put our foundation wall on top of the footing. Could you still use your product on top of that to form a Capillary Break?"

Lance - "Yes, absolutely, the only thing is you need to wait 28 to 30 days for the concrete to cure before you apply our product. We recommend two coats, but, yes, it works. On this project over in St. Louis, the 10,000 square foot house took about 5 gallons to paint all of the caps of the foundation walls."

Travis- "I'm saying you typically don't see it done. You're stopping water from rising down from inhibiting the basement masonry walls. The location on top of the footing is where I've never seen it done. We always use a Capillary break at the top of the wall. Usually, then it's called a sill gasket at that location. So I would agree with you, Lance. It is a necessary detail at that location where you're connecting wood to masonry. The bottom-of-wall location is very inconvenient to do.

Patrick-" Yeah, as you said, you have to wait 28 days before you can pour your foundation walls. Forget about it, right?"

Mike- "I've used a WRB, a product you trowel or paint on. We wait like maybe two days to cure to put the foundation wall on. It only takes maybe three or four hours to harden up, and then we set our blocks and forms, and we'll go up from there. It's remarkable the reduction of efflorescence that we notice on the concrete wall inside even though we do waterproof the outside. If we don't put the capillary break on top of the footing, I've

noticed on the last couple of projects that we don't have that same efflorescence occurring, and we put a moisture meter on it. It's showing much lower moisture at that point.

Plastic works we've also used six mils Polly and put that down on top of the footing. The liquid is a lot more convenient because if we have our rebar sticking up, it's just a pain to get the plastic over it, where if it's painted, it only takes like an hour to do like 200 feet of a footing with a roll."

Patrick-"Where to put the footing drain so in section R405.1 of the 2018 IRC says - "drainage tiles, gravel, crushed stone drains, perforated pipe or other approved systems and material be installed at or below the top of the footing or below the bottom of the slab." So there's no definitive answer all of these systems are allowed. I think it depends on your situation, for which is the best."

"Many basement walls are not required, at least by the current IRC standards, to have waterproofing. Waterproofing is only necessary for areas where a high water table or other severe soil-water conditions are known to exist. So you don't even have to do this, but I think you'd all agree that this is important. The waterproof material accepted by the IRC include; two-ply hot-mop felt, 55-pound roll roofing, six mill polyvinylchloride, six mill polyethylene, 40 mill polymer modified asphalt, and 60 mils flexible Palmer consummate. "

### **What do you prefer to use on the exterior of your foundation wall to keep soil-born moisture from migrating into the concrete?**

Travis-"My favorite product is the diplomats that we've used on the exterior most common in my market is just a basic road tar on the exterior called damp proofing that's what I would say 90% of the houses I've ever built have had on it. I think we did 80 to 120 homes with them in my career with none of the efflorescent condition, and Mike was talking about and no Capillary Break. It's possible that we just got fortunate. However, we employed the interior drain tile on any of those builds in high water table areas, so we were mitigating a problem in another way. The guardian product, I think, is the name that we often use on the exterior. It's a higher solids version and supposed to have some elastomeric properties. That's what I have on the exterior of a large number of my builds."

Mike- "Far as waterproofing, I've used both liquid apply foundation coatings, and I've used diplomat, but I use that as sort of a cover sheet over the primary waterproofing. It's probably overkilling, but most of the places where I work are high water tables, and the soils aren't well-drained except when we backfill with clean gravel. Still, the native soil's aren't excellent, so it's money well spent if there's ever the potential for future use of a basement. Everything we're talking about here comes down to if you want to use the basement or the crawl-space. Either for dry storage or to finish the space. It is underground, so if you don't do everything you can to block the moisture, you won't have usable space."

Patrick-"I would add that even if you don't want use your basement for anything, if it's contributing a moisture load to your house that is a problem.

Mike-"True good point."

Travis-" There are especially mold risks, allergens, and all those things that come with moisture. It is best practices and cheap insurance when you look at what it cost to solve it later. "

Patrick-"That's a key point, Travis. I think it is much less expensive to do this correctly than try and go back and fix it. Lance mentioned right away in our webinar tonight that you know roof overhang's, gutters that work, good grading, drainage, site drainage that works, inground gutters."

## **Have you guys seen problems that are easily remedied by just fixing some minor things?**

Travis - "I would say 90% of the basement projects that we get called into here in Kansas City we solve with exterior gutters and grading. Clean gutters and 6 inches of positive grading for the first 10 feet away from the foundation solves 80%, and the last 10% is a problematic site. The neighbor has installed their sump pump discharge to your property directly above grade. Anything that you could do to keep that drainage from running into your property is the first line of defense. Good drainage is almost always the easiest, but that the underground gutter Mike was talking about earlier is an excellent solution to help route the water; away from the foundation."

## **Mike, what do you use for the underground gutter?**

Mike-"I use EPDM, which is probably way overkill. I salvage whenever we do a re-roof instead of throwing that away I'll recover it, and it works great. "

Patrick-"Guys, don't forget to address different strategies for mitigating foundation issues and water problems on older existing homes with masonry foundations."

Patrick--"Yeah, I guess that's a big problem, right? I've never lived anywhere. I didn't have water come in the basement at least once. The two places water was coming through the door from and rising groundwater came up through the cracks between the slab on the foundation wall. What do we do about these things? It was funny. I got up a little late and stepped in like, you know, a quarter of an inch of water which is a very alarming occurrence; if you never had that happen, you can imagine it's a nightmare. In each of the cases, it is going to be a different solution.

Mike-" I've never found any sealant that will block that rising groundwater. After all, there's so much pressure there. "

Lance -"As long as that area doesn't exceed four psi, we have transparent waterproofer and uses on verticle or horizontal surfaces—making it perfect for the floor for the slab. We also recommend using our fast plug hydraulic cement for that where the slab meets the wall. So you have to grind that out about a quarter-inch, then fill that with the hydraulic cement that comes in powder form and mix it with water, and you have to work fast because it sets in quickly. Our DRYLOK Floor and Wall clear withstand four psi. What we found was the concrete slab with a weak point would crack over four psi. In these cases, the hydraulic cement along the edge works and using the clear on the floor."

Mike-"How would we measure if we have a four psi, in other words, if I have water coming in my basement and I know that if it's less than four psi-like to say that these products would work, but I can't say if I have more or less than four psi so is there a quick and easy way of determining?"

Lance-" honestly, Mike, I don't know. I've not seen where there's a situation where the DRYLOK Floor and Wall doesn't work. I've not witnessed anything above that four psi. From what I understand from what the labs tell us, the slab itself the pressure of the weak point of the slab there will be a weak point found, and it will crack up somewhere north of 4 psi. We don't want to seal a slab if it was to stand higher than that four psi and then have it crack.

## **How do I stop the efflorescence?**

Travis- " I know you can clean it off, and then you can seal it. I became familiar with the DRYOK brand. So first, you dry it; we use indoor dehumidifiers and fans to lower that ambient humidity to where there was actual moisture in the wall. We frequently dealt with more mold issues than efflorescence, so we were doing a mixture to clean everything off. So everything is scrubbed clean and ready to accept paint, and then we will dry the area over a couple of days, and then we would roll on the DRYLOK. I'm coming to you live from my basement!

With CMU wall foundation and I did this same process here because we have three leaky corners. Then I followed up by laying up sheets of foam on the walls and then building it up as well on the floor and then doing a floating floor above that in the base already had a drain so any water to getting in I don't know about it because it's traveling underneath. I have DRYLOK in my laundry room and my shop, which I put up 15 years ago, holding all of my front drainages at bay. I have a mold allergy, so this would not be an excellent place to hang out if it wasn't working as planned. That's been our solution after having success in my home. I felt confident doing it in other folks' basements. It's efficient rolling out gallons of DRYLOK. You can move forward with your project the next day. Other alternatives that are a means to mitigate that risk versus loading up your paint tray and going to town after one day of prep and framing on day three your off races it's an effective solution."

Patrick-" Mike, Travis, and Lance, one of the things that happen in basements is you get shrinkage cracks in foundation walls or concrete slabs on the floor."

**Are there any reliable solutions to prevent water from coming in those cracks when we have high water table events or groundwater movement?**

Travis-"We've always had to do an epoxy injection if we have cracks that are letting water in vertically."

Lance-" The fast plug or the hydraulic cement works well with water coming in and stopping it."

Patrick-" I've heard of that. What is hydraulic cement? Chemically what is going on there?"

Lance-"I can tell you this when you mix a little bit of water with this powder, it heats up, and you don't want to be holding it. I work with many younger crowds demonstrating this, and I'll mix up a little bit in a cup, and I'll dump it out on the table on a paper towel, and within about three minutes, it's rock hard. So I'll reach down and grab it and toss it to somebody in the front row, and they're always surprised. It heats up and expands and becomes part of that substrate, and it stops the water!"

Mike-"Yeah, it does expand it out. I've used it to fill the joint between soil pipes to go out through the concrete wall. I will hollow that out and inject the hydraulic cement in there, and then we'll know hold back till it cures. I've done them in many houses where the leak was persistent year after year and only after we chiseled out a keyway inside the foundation or in the concrete wall of the block, and they filled it, and then it just stopped!"

**If you have a situation with an impossible drainage site, are there things you can do with coatings or french drains to deal with these problems?**

Travis-" You create a new lower place that is below your natural foundation."

Lance- " I agree; if you can redirect the water on the exterior, your 90% there."

**The Covid outbreak has many folks are using their basement for school for the kids. Travis was saying that that the basement is your office. What advice do all you folks have for people trying to make their basement space a more functional, dryer, and healthier space?**

Travis-"We have two different approaches. If you have a basement that already has moisture issues, That's one set of solutions. If this is a starting point and you need that found space to make your home office or home gym or even an entertaining space to get away. The starting point is always the same, clean and dry. First, get your stuff out of there to see what they're working with; once you have it truly clean. We always plan for the worst, and even if it's never been wet, the least we could do is paint on a DRYLOK coating to solve any moisture that would get in the wall system. Then plan for a floating floor because none of the slabs in my area have insulation underneath. Having insulation is a luxury to make that basement a comfortable space. We will insulate the slab then install the floating floor. Above that, the framed walls within that area, and your essentially ready to start to make it a comfortable finish space."

Lance-”Let me say that when someone contacts me and says that they have a wet basement or a damp basement and I need to find out how damp. So you know, putting a four mill plastic in areas of concern, taping those down, or using a rubber mat to find out just how much moisture comes through that surface is number one. If we find out that there’s not much moisture there on the surface, we know we know how to handle that, but if it’s severe, we have to refer them to guys like Travis or Mike to do other things. 90% of the time waterproofing the walls waterproofing the floor, repairing cracks it works. Our product is tintable and has different colors other than white or gray. We can make a light to medium shade; it’s versatile.

Patrick-” You know, instead of your office being bare concrete now and can look like painted walls.”

Lance-” Yeah, and not a lot of people know that we can make several colors.”

### **What can you do with the pre-existing 1900s home brick over Fieldstone?**

Mike-” when I approach those old foundations that are brick or block or stone or a combination of those where there’s lime water or regular water. Getting a lot of moisture in, the concern with old Claybricks is we get a lot of those here, and if you start playing around with the inside and sealing them, we end up without that moisture transfer. We have had problems where we increase the spalling and breaking up and crumbling. So bite the bullet excavate on the outside, and then waterproof it from the outside.”

Travis-” There’s something to be said for working in sections and limiting that risk if you dig out the entire side of the house. Yeah, you’ve taken away all the support that the soil was offering that wall. If you isolate your excavation for a 6-foot area, you’re limiting that window header for the second-floor loaded roof. With a couple of two by 10s, you can dig out for gravel and backfill the problem. It’s nearly impossible to roll out drain tile in that space without creating other issues. So it makes it very slow and challenging, but it is safer.”

“There is a detail that Building science corporation did on several projects when they were trying to figure out old foundations. They found it by putting a membrane on the inside, which you usually wouldn’t want to put plastic inside the foundation before you finish it. Because it could cause all sorts of other problems, but they put a membrane on the inside and ran that down. They had a Channel cut where water can drain down below the slab. Then they put high-density spray foam over it, which capsulated the whole inside of the foundation. Then they built in from that face that way water could come through the foundation and all drain down below the slab manage there, and then the inside was completely impenetrable. It’s costly, but they found it effective on homes.”

### **Do you use DRYLOK on the wall’s interior if there is no vapor barrier on the outside?**

Lance- “Yes.”

Mike-” You know basements were not intended for living space. They were my grandparent’s stored crops like a root cellar. There are limits to dealing with some water problems.”

Travis-”I disagree. We finished a ton of basements. We started as cavemen; we’re OK to live underground; we have to do a few things to make it work. To manage the dampness, we try to use vapor tolerant material or completely solve for water with DRYLOK. But to be fair to Mike, your area has the Fieldstone and springs that I don’t have to deal with; we have many guestrooms in basements, frequent space in the basement. Probably not your master suite in the basement. My family watches Friday night movies down here in our basement; we love that.”

Patrick-” That’s cool to reserve the space for something special right as I can go there to do this thing with whether you’re working on your crafts, or you’re exercising, or you want some quiet kind of space, or you want to have a family movie night. it’s hard to argue the basement is not the perfect space for that in many cases.”

Lance-"We appreciate everyone attending and your interest in keeping a basement dry the guys that are on this webinar are very intelligent; they know what they're doing. I appreciate being part of it. I truly do."

Mike-"There are a lot of articles in Fine Home Building about managing water and basements about how to do footing drains and how to do inside of the wild side all sorts of stuff."

Travis-" If you want to learn more from people like Mike, you should come to Kansas City in September on the 20th - 29th for this year's building sites Impossium Mike can tell you everything you need to know about that, read fine home building, pay attention when people talk, and you'll do fine."

Patrick-" Thanks, everyone, keep your basement dry!"