**EP 39: Building Performance Failures**

**Where do things go Wrong with Stucco, Brick and Masonry**

***CURTIS:*** Today, I want to welcome back Rhonda Lynn Riley with exterior inspections. Rhonda Lynn is one of the foremost experts in the Houston market, the Texas market, probably even the US on all kinds of things, masonry claddings, waterproofing, wall assemblies, building envelope. I like to say everything that's associated with keeping water out of your house. So her company does those inspections for us. She teaches classes on this stuff. She does expert witness work. She's really the first call person for all those types of things in this market. So Rhonda Lynn, welcome back.

***RHONDALYN:***  Thank you for having me again. I appreciate the invitation and I look forward to today.

***CURTIS:*** Yeah, always great to see you. Last time you were here in our season two, we talked about third party inspections, which is a service that you guys provide and kind of the importance of third party inspections and what those inspections typically cost. And we dipped into kind of what you do a little bit, but we're kind of really focused on cost and why you should do these inspections last time. Today I wanted to cover where things go wrong with stucco, masonry, and any exterior wall cladding. And in my last episode with Toner last week, we talked about the building envelope and kind of that complete wall assembly and where things go wrong with the building envelope. So I'm sure there's going to be a lot of overlap with that conversation. I wanted to focus mostly on kind of the outer layer of that building envelope. And I wanted to start by saying, you know, with interior work, if something's not done correctly or if something goes wrong, you're not typically going to have major problems. So if the drywall is not installed quite right or some trim is not installed properly, it's really more of a cosmetic thing. So the detailing is not as important except for the visual. But that's what people focus on because they focus on what they can see and that's what's important to them seemingly. But with exterior work, if that detailing is not done right, that's really what's going to cause them more long-term problems and heartaches. So that's really structure-wise the most important piece, right, is keeping the water out. There's a building science saying that I know that you've heard before and it's if it can't dry it will die. Yes, absolutely. So you and your team do this every day. What mistakes do you most often see made? Or maybe we should even back up from that and kind of start with the basics and kind of talk about what are the different types of exterior claddings and kind of what are some problems that you see with those different types kind of define things for us a little bit.

***RHONDALYN:*** So let's start from the outside and work our way in. And to your point about the interior, if it's not installed quite properly, right, is most people are concerned about the aesthetics of it. And that's really the interior is there to look pretty. I always ask people to think about the exterior cladding is the thing that protects the pretty stuff inside, right? The exterior cladding, whether it be brick or stone or stucco or cement board or wood or whatever, right? The interior cladding, that's the thing that protects the structure first line of defense against weather, right? So if you don't spend the time outside taking care of the house, then the interior stuff is going to suffer the consequence. So I always tell people think of it in terms of this, if you hire a housekeeper to come in and scrub your toilets twice a week or once a week, right? But you won't and you spend six or $8,000 a year on the interior maintenance, but so many people won't spend six or $8,000 a year on the exterior of the home. They'll spend nothing. Exactly. And that's going to be the one thing that probably every homeowner can do that's going to provide them with the most return for their dollar. So that said, let me just talk about maintenance as a starting point for us to work our way in. So when we say maintenance for a homeowner, we're talking about that we want people to go outside or have someone inspect their house, whether it's me or somebody else, my company or somebody else, and make sure that the caulking around windows and doors is intact and is functioning, that we don't have big cracks or gaps or other damage to the exterior of the house. Number one, right? So make sure things are caulked and stay caulked. Secondly, make sure that if you have a lawn irrigation system, that somebody checks, turns that on and makes sure that you're not spraying the house for 30 minutes at a time, three times a week or more during the summertime, right? Watering the house is not going to grow more house. Watering the grass or the shrubs will grow more shrubs. So things that would keep the weather or water away from the structure is what we need the homeowner to do. Yeah. While that is considered secondary to protecting the structure, it's primary first line of defense.

***CURTIS:***  As far as outside of maintenance, going back to the builder, to the construction side, so what types of things are typically done improperly or dismissed during construction that are going to cause problems?

***RHONDALYN:*** Then I have to take it all the way past the cladding to the structure itself, right? So from the studs, we're normally going to have some sort of plywood or OSB sheathing and over that we're going to have weatherproofing or a weather resistant barrier. So that weather resistant barrier can be a sheet product like a Tyvek or a Zipboard or some sort of weatherproofing or water resistant barrier. The water resistant barrier in and of itself will protect the structure so long as it is intact and the flashings are tied in correctly. When I say flashing, we're not talking about running across the sports field, but rather flashings are things that are intended to direct and divert water out and away from the house. Flashings could be metal, they could be a liquid applied or they could even be some sort of sticky backed self-healing, self-adhering membrane. So we want that sheet product or that weather resistant barrier tied in with flashings to things like openings, doors and windows need to be flashed. I can tell you that probably the most common place that we find water intrusion is around windows because the maintenance part fails. So the caulking fails, the homeowner doesn't repair or replace the caulking, water gets behind the cladding, then the flashing at the window is not done properly or there's a breach in the weather resistant barrier, the Tyvek or whatever the product is. Once the water gets behind that weather resistant barrier, then it's just going to affect the wood. Both scenes, situations where there's just a lot of rot and even structurally compromised structures because the water has been either a little bit over a long period of time or a lot over a very short period of time.

***CURTIS:***  Flashing is typically installed anytime there's an interruption in the sheathing or a change in plane or an intersection of different materials that happens. We see all the time that flashing just gets left off of certain areas, like builders will just miss it or rather their subcontractors will miss it. In my experience, the exterior work is one of the trades that builders will not watch, will watch the least. Sometimes that's because it's up in the air, it's off the ground, it's hard to see and they're not taking the time to get on a ladder, get on the scaffolding and go up there and look at it to make sure it's there. They're kind of trusting their sub to make sure it's done the right way. And so you'll see head flashing missing over a window, you'll see kick out flashing missing at a roof, parapet caps and things like that done improperly because the builder is trusting their sub to have done it the right way and he's not getting out there and verifying it, right?

***RHONDALYN:***  Right. So what I would say is where we have roofs intersecting with walls, the weather resistant barrier has to be installed in what we call shingle fashion or top over bottom, right? So that it sheds water out and away, out and away, out and away from the house. And so roof to wall intersections is a big point of entry for water intrusion and you're right, any place that we have a penetration. So we've talked about windows and doors, but literally ductwork is a huge point of origin for water intrusion that people don't quite really think about. So here we're talking about bathroom exhaust fans, dryer duct, range hoods, where perhaps the mechanical contractor comes in and punches those holes and they don't ever get flashed or the integrity of the weather resistant barrier doesn't get restored. And that is particularly the case in cement board siding because generally the same contractor that's putting up that weather resistant barrier is also putting up the siding. And to a large extent, they go up simultaneously, right? One after the other. And many times it's before the electrician gets there, it's before the mechanical contractor gets there, it's before the plumber gets there. So now you have these subcontractors punching holes in exterior walls with no way to restore the integrity of the weather resistant barrier.

***CURTIS:*** Yeah. That guy's not going to come back. He should, but the cornice crew that installed the WRB and the siding is probably not going to come back after all the mechanicals. The next guy in there is the painter. So he's just going to caulk around it and paint it and call it a day, right?

***RHONDALYN:***  Right. And once the siding is installed, you don't have access to the weather resistant barrier anymore.

***CURTIS:***  Yeah. So a better way to do it would be to get the house dried in first, no siding, no exterior finish, do all your mechanical rough ends, then come back and seal your penetrations and then put your claddings on, right?

***RHONDALYN:***  That's true. Yeah, that's exactly right. That is the way that we would like to see it done. So why isn't it done that way if that's the right way to do it? I would say that sequencing or scheduling of trades is the number one reason, whether it's a good reason or a bad reason, it's just the reason that the contractors don't want to have to take down a reset scaffolding to wait for that during that lag time when the mechanicals are going in.

***CURTIS:***  And it's not usually as simple as taking down, you know, if you've got a vent pipe that's going through siding, it's not just as simple as taking off a small area around that because that siding is in 12- or 16-foot planks. So you're taking off a whole section just to get to one little penetration, right?

***RHONDALYN:***  Which is a reason why we would like to have the house completely dried in, mechanical penetrations through the exterior, have those flashed so it restores the integrity of the weather resistant barrier before you start putting any type of exterior on it, regardless of the type of exterior.

***CURTIS:***  Yeah. What's your thought on penetrations through the sidewall versus the roof? I prefer as many penetrations as we can to go through the sidewall and not through the roof just because, yes, the sidewall is getting wet, there's waterproofing issues, but it's not as much direct water load as you would get on the roof.

***RHONDALYN:***  You know, I tend to agree with you. I think the penetration through the sidewall, to the extent possible, is a better place to have them, again, just so long as we're restoring the integrity of the water resistant barrier. We wouldn't dream of putting a penetration through the roof and not flashing it with a roof boot, right? So I don't know why anybody thinks that it would be okay to put a penetration through the sidewall without the same degree of care.

***CURTIS:***  And there's a lot of good flashing products that are sold now, so you're not having to just put tape around it or, I mean, you could do the liquid applied flashing that you mentioned, but there's a lot of manufacturers that are making various boots and things to slide over penetrations that you can then tape or put the liquid applied flashing around those boots. But those are really a much more robust way to go than what we were doing 20 or 30 years ago, right?

***RHONDALYN:***  Absolutely. I do like those, the flashing devices that have the hard plastic flange and then a neoprene or rubber type seal around a pipe, for example. The thing that we do find with those during inspections most commonly is that the contractors used improper size for the application, whether they pick one that's, say, for example, intended to go around a one and a half inch pipe and they've stretched it to the hilt over a three inch pipe, which means that it's probably going to stress fail, or they've cut it so that it'll go around a larger opening. And then the opposite is true where you have an opening for a one inch pipe and they put it around a piece of like Romex electrical conductor and it doesn't even touch the conductor at all. So, you know, I think the takeaway is use the right product for the right application and making sure that it is actually doing what the intended purpose is, which is to seal, to keep water and air out. I really like that.

***CURTIS:***  There's a product called the QuickFlash panels for HVAC penetrations. The HVAC line sets that come out the side wall of a house that go to your outside AC unit are one of the more difficult things to waterproof as penetrations go because you've got usually a bundle of copper pipe and various things that's wrapped in pipe insulation that's coming out. And it's kind of coming out at a sweep. It's not coming straight out the wall. It's coming in a gentle sweep so that that copper line is not getting pinched. And so when those things come out at that angle, it creates a really awkward thing to try to seal around. And so QuickFlash has these boots that I love to use that are a hard plastic, like a 45 degree angle, and your line set just goes right through that. And it's really easy to tape around it and seal around it and no problems.

***RHONDALYN:***  Yeah, you know, I love those as well because you're right. It gives a nice place for the exterior cladding to terminate to. And it also gives us a great opportunity to be able to flash that watertight and neatly. So when we think about the penetrations, we also have to think about how does an exterior cladding interfaces with those penetrations. So once we come away from the weather resistant barrier, how are we going to terminate the cladding to that? And so those HVAC sleeves by QuickFlash are a great option. You know, before those QuickFlash boots, we used to have people use roof jacks or roof boots and run the AC lines through those and just force that drip loop. It forced the watershed away from the house. But in recent years, we've had people write, third party inspectors write those up as not approved for that use. I think it works well.

***CURTIS:*** But now we have a product designed specifically for that with the QuickFlash sleeve. Yeah, like you said, it's the part where the line set exits is square. So if you're doing siding, you can make a nice clean stop on all sides of that boot. And also with Stucco, it's a really nice finish. I hate seeing line sets come out of Stucco where you could tell the Stucco was just kind of smeared around the line set. It looks sloppy. And that you know over time, if that line set moves, if the unit moves a little bit, it's going to crack all around that.

***RHONDALYN:*** It's a great point for water entry or insect entry or whatever. In addition, the insulation used on the line set, the suction line, that insulation, as we all know, over time, UV deteriorates. So we have that insulation that decays or deteriorates over time around the refrigerant lines. We have some or similar insulation at plumbing penetrations. And so if we're just terminating directly to the insulation, once that insulation goes away, then we have these huge half inch or so gaps between where our cladding stops and our actual pipes are. And so if it's not maintained, if it's not sealed, the insulation's put back and we just have these wide open holes in the side of the house, which is not good for water resistance. And it's also not good for air resistance. I imagine that you and Toner talked about air infiltration last week as well.

***CURTIS:***  Yeah. And also, if that line set has to get replaced in the future, that boot makes it really easy to get a new one through without having to cut a new hole. It's fairly common, like during construction, somebody accidentally puts a nail through a copper pipe coming out of there and they have to fish a new line set out through the wall out to the unit. And if that boot is in place, just pull the old one out, slide the new one through it. It's got a rubber gasket on the inside that kind of self-seals around what you're putting through it. It makes it easy to replace it if it needs to be replaced without having to drill a new hole in the wall or kind of resealing something that's, you're kind of blind resealing it as you go. Yeah. So great product. I also wanted to talk about, and this is more often seen on modern style houses, on roof caps, on parapet caps, parapet caps, wall caps, things like that. What is usually missed on those? What causes problems on those situations?

***RHONDALYN:***  Parapet walls are special. So I think probably if we're starting at the builder's level, at the framing, a lot of times what happens is the builder will put a sheet product over the top of that, something again like a Tamlin house wrap or Tyvek house wrap, and then they just walk away from it. But those products are not designed as flashing. And so whenever we have a, what I say, skyward facing surface, I really want a self-healing, self-sealing, heavy membrane flashing over the top of that parapet wall. And preferably we want it left hanging out on the side so that we can run our cladding up underneath and that flashing actually overlaps the exterior cladding. So if a leak occurs, that it doesn't, it's not directed behind the cladding on the wall, it's directed over the cladding. And of course code requires some sort of non-absorbent coping cap on all parapet walls. So that can be something like a cast stone. Most of the time I'm going to recommend a metal type coping cap secured with cleats, which is for the audience is a strap that's put onto that wall and the coping cap snaps down onto it instead of having to screw that cap into the wall. The other thing is that I don't really, we don't need cladding up there. We don't need on top, we don't need stucco on top, we don't need siding on top, especially if we're going to cover it with a metal cap. So that's going to minimize the amount of penetration for fasteners in the top of the parapet wall.

***CURTIS:***  So what about sloping the top of parapet caps? I've noticed that a lot of them often get left flat. Should they have an angle to the top of them to shed water away?

***RHONDALYN:***  Yes. Sloping should be sloped even if it is just a cap. So most of the time what we'll see is we'll see that the cap is sloped towards whatever roof structure is behind it or roof surface is behind it. But having a slope doesn't negate the need for a cap because building code actually requires that all parapet walls be capped with a non-absorbent material.

***CURTIS:***  Talking about slope brought to mind another point of failure that we come across a lot and that is balconies or rooftop decks or balconies we see a lot of, especially here in Houston on townhomes, but even on single-family homes we're seeing a lot of balconies. So talk about the different issues that we see with waterproofing and kind of failure points on balconies.

***RHONDALYN:*** Well, so let's talk about while we're on upward-facing surfaces. So a lot of times we'll have a wall, a half wall, or a cutout of a wall around a balcony as a guard in addition to a rail. So anytime again that we have a skyward-facing surface we want a slope. That doesn't technically qualify as a parapet wall, but we'll need to have a slope on it. With regard to stucco specifically, what our standard says is that the slope should be sufficient enough to shed to prevent the accumulation of water, snow or ice. Well, snow or ice is not a big problem in Houston, Texas but water certainly is. So there's not really a prescribed slope or pitch. The other thing is that I always look at balconies as roofs that were designed to be walking surfaces, right? So we're going to treat the balcony just like a roof except that it's got to be beefed up because we have people walking on it. Probably the biggest failure point that I see with balconies is that the flashing from the balcony floor extending out towards the facade of the building does not extend far enough or there's a breakdown in the transition somewhere. So I always tell my clients, my builders, my homeowners that I want the flashing to be left extending way out past the finished surface of the wall at least initially because then we can trim the flashing back and tie it in and make it look pretty later. But I'd rather to know that we have enough balcony flashing there to start with versus it be too short and not clear and direct water all the way to the exterior finished surface of the wall, whether it be stucco again or brick or siding.

***CURTIS:***  What kind of waterproofing system do you like the most for balconies? I mean, I've seen a lot of different things done. We've seen like a modified bitumen down there. We've seen TPO. We've seen people do stainless steel, all kinds of stuff on a balcony surface. What do you think the best assembly is for that?

***RHONDALYN:***  A modified bitumen absolutely is kind of a long-time proven system, right, that I don't mind but it has to be covered. I don't necessarily like TPO. Simply from the fact is, if you look at most TPO manufacturers literature, it is not intended for a walking surface. So while it might work just fine and may work fabulously, if there is an issue that comes up down the line, it may leave the homeowner and the builder out to dry because it's not the proper application for that material. So with that said, there's a lot of products on the market that are fluid applied products. I can't think of a brand name off the top of my head right now, but a fluid applied product is my preference. You put down a trial able fluid applied first and then it's two or three layers and normally the last finished coat layer has some sort of stamp or stencil to make it look like cool deck for a pool or you can stencil it to make it look like tile and stain it, which is a really nice option. I can tell you that historically, a modified bitumen with say, for example, a thin set tile over the top of it, tile on a balcony floor in Houston, Texas is just a bad idea. Just a bad idea. And I don't like raised wood drain through deck on a balcony, even if it has modified bitumen under it as well. Why is that? You know, again, because that drain through deck, we've got to set that on screeds have penetrations through the modified bitumen and it just seems to accumulate stuff and over time it just it breaks down.

***CURTIS:*** Going back to TPO for a second. So TPO manufacturers do make a walking path material. You see a lot of that on commercial buildings. You'll see the whole roof is TPO and then the access going to the units is a different material that's applied, that's meant for walking, right? And so that product is okay to walk on. It's designed to be walked on, but just the regular TPO that doesn't have that is not approved as a walking surface.

***RHONDALYN:*** Right. Yeah, absolutely. So, you know, the thing is this is we'll have the TPO. I think most importantly what are you putting on top of it? There are some great systems, I don't know how else, that are tiles that are set on feet that are, you know, little standoffs. The little standoffs. Yeah. The thing is this is that that would be fine, but are you going to put that walking surface then over the entire surface of the balcony so that you can put the great system on it so that you're not basically wearing holes in the TPO as you're walking on it?

***CURTIS:*** Yeah. I think it goes back to just making sure that the products that you're using are designed to be used in the manner that you're using them in and to make sure that they're tested for that.

***RHONDALYN:*** Right. So you said stainless steel. I do like stainless steel as perimeter or edge flashing. I always say I'm a girl and girls can talk a lot. The more I talk, the more money I can spend. So, you know, stainless steel flashing is not cheap. It's not as expensive as copper. But stainless-steel flashing, if I had my choice, that would be the flashing that I would want to see around a balcony perimeter extending out beyond the face of the balcony and flashing any door threshold that leads to that balcony.

***CURTIS:*** I mean, we've talked several times on this podcast about the importance of using systems because the manufacturers typically will test their products in combination with different things. Toner9 and a couple other folks went to Tremco up in Cleveland a couple of months ago and saw their testing facilities and they really go to great lengths to make sure that their TPO products are being tested with their adhesives and they're being tested in different situations. So, you know, as a builder, I'm protecting myself by, you know, using all these different materials that have been proven to work together. But once you go outside of that, you're really kind of doing that at your own risk.

***RHONDALYN:*** Right. So, yes, as an inspector, I always recommend that builders use single source systems because Number one, to your point, they're tested to work as a system and they're compatible. Once you introduce a foreign part into a system, you've done a couple of things. Number one, you've probably voided the manufacturer's warranty. Number two, you've transferred some responsibility or liability from one product to another. And I can tell you that if it's everybody's responsibility, it probably then comes out to be nobody's responsibility. And in that instance, that becomes the builder's responsibility because the builder is the one that's trying, coordinating all the trades and the materials that are being brought onto the job site. So yes, single systems, most definitely.

***CURTIS:***  So as a homeowner, I think we're talking about things that builders can do to protect themselves. But as a homeowner, a lot of the stuff is things that they don't see. So how does a homeowner protect themselves in these situations? I mean, I guess really it boils down to just hiring somebody who does things the right way. But how do you know they're doing things the right way? They attend the right classes, training, they keep up with their education, but they're also learning from the manufacturers on the right way to install things. Do you have any thoughts on that?

***RHONDALYN:***  There is no shortage of education, especially for manufacturers of materials. A homeowner can reach out to a technical department at a manufacturing company just as easily as a builder. They're going to provide some sort of resource or support for a homeowner just like they would provide a resource or support for a builder or a subcontractor. So I think that just visiting these manufacturers' websites, looking at the videos that they have to offer, reading the specifications and the installation details and instructions is a tremendous place to start educating yourself on how things are supposed to be installed.

***CURTIS:***  Within also hiring that third party inspector too, I tee-d that up for you. I was trying to get you to say, hire an inspector.

***RHONDALYN:*** Well, you're right. I totally missed that. Yes, hire an inspector. We'll certainly do that for you.

***CURTIS:***  Yeah. And that's what we talked about last time was the importance of third-party inspectors. And so there are certain key phases that you need to come in to do your work. So we touched on that before, but let's just briefly talk about if you're a homeowner and your builder is not using an exterior inspections type company, but you want to protect yourself, what are those key phases that they should be hiring you to come in and provide that service?

***RHONDALYN:***  So the first phase is what we call the dry end phase. And that's kind of a slang term that's been around for a long time. And I think people have lost the meaning of what dried end means, but dried end means that you have all your windows installed, you have your doors installed, your weather resistant barrier is on the walls, your penetrations through the walls are flashed and the roof is on the structure. In other words, if it was short of a hurricane, a heavy downpour rainfall, that that house is dried in, it is weather tight. For me, that is the most important inspection of the exterior of the structure, because if it leaks prior to your exterior cladding, your brick, your stone, your stucco, your siding going on, it's going to leak after. So that's the single most important inspection to me. What's the next inspection that you would do after that? So if I was doing a stucco house, the second inspection would be a lab inspection. The reason I say that is because it's important that the structure of that plaster be installed properly to try to mitigate cracking. Now that is not to say that stucco won't crack because it's kind of the characteristic, but we can mitigate cracks by proper foundation for the stucco. And then our last inspection is what I call a final or finish and sealant inspection. And that last inspection is, again, looking at anything that would cause or contribute to the building envelope, failure, or water intrusion. So we're looking at, did all the flashing make it from the very beginning, the first inspection through the last inspection, without being cut or modified or damaged in some way? Did everybody get the windows, the doors, the pipes all caulked? Do we have enough clearance to hard surfaces? Is the grade sloping away from the house? Where are the sprinkler heads set? Those types of things.

***CURTIS:***  How many inspections, let's just say someone's building a house with stucco, how many inspections, how many times do you normally come out during that build process?

***RHONDALYN:***  So that's normally three or four site visits, provided that there aren't items that are corrective action items that need re-inspection. I would say that the number of inspections is three to four. The actual site visits generally run somewhere closer to five or six, just because if we see a corrective action item, something that needs to be fixed prior to a build or proceeding with construction, we would call for re-inspection so that we can go back and verify that that thing has been corrected and we can photo document that it was corrected. I was just thinking about how sometimes additional penetrations will magically appear during the process.

***CURTIS:***  So I've seen, you'll get all the way to the end of the job and you'll find that the plumber, the AC guy, the electrician, they forgot one thing or one thing got covered up and then boom, a new penetration magically appears out of the blue, right? As an inspector, what do you do in that case? If there's something else that pops up at the end that you hadn't seen before, what do you tell those people at that point?

***RHONDALYN:*** Well, at that point, we just look at what was the finished product, right? So hopefully they didn't just punch a hole in the house and run it, say, for example, I'll pipe through and just leave it open, right? So we look to see that the integrity of the exterior cladding has been restored to the extent possible and that it has been sealed to watertight from the surface anyway. At that point, that's about the best you can do, right? It's just put somebody on notice that this is a new penetration, that it hadn't been, wasn't here through the rest of the process and that it's been addressed appropriately and as watertight as it can at this point.

***CURTIS:*** You kind of flag that as a maintenance item. Hey, this one you probably just need to check a little bit more often visually and make sure that the sealant is intact around it, things like that. Yes. So going back to stucco in general, what are the most common failures that you see in the long term with stucco? You know, we touched on maintenance and maintaining sealants and things like that, but, you and I are working on a project right now that had a pretty major stucco failure. A lot of water got behind there. Is that the typical type of failure that you, see? What, when you get called out and someone's worried about a stucco issue, what do you most often come across?

***RHONDALYN:*** I know I keep harping on this, but, you know, first and foremost, what I'm looking for is to have the house been maintained outside and maintained. Then I'm looking for things like cracks or other damage to the plaster that would provide an entry point for water to go through the stucco and get behind the stucco. And so a lot of times that's what I call compression cracks, particularly at corners of a building where on multi-story construction, there's a control join or an expansion joint at each of the floor lines and where they meet at the corner. Very commonly, when that house settles, that corner will crack, and it will pop open, and water will just get in behind that stucco accessory and just run those corner studs from all the way from the top to the bottom. And that's one of the things that happened on the project that you and I are working on. You know, in general, I would say that water just doesn't readily go through stucco. It's got to have some sort of entry point or breach. And a lot of times the water intrusion causes the cracks, which then contributes to additional water intrusion. Very rarely do I see hairline cracks in stucco that are the cause of water intrusion behind stucco. But as water gets behind stucco, then those cracks tend to get larger and more open. And as that happens, then it just perpetuates. Once that wood gets wet and starts to swell or the plywood substrate starts to swell, it puts more pressure on it, right?

***CURTIS:***  It makes it worse. But going back to one of the very first things we said, if it can't dry, it will die. You know that particular house, and we actually see a lot that are missing the weep screed at the bottom. So the assumption with all exterior claddings has to be water is going to get behind it at some point, right? So if water gets behind it, when water gets behind it, how is that water going to dissipate? Right? So the stucco should have at the bottom a weep screed with little holes in it all the way around the bottom. So if water gets behind there, it's going to just drain on out the bottom. If that weep screed is not present, that water is just going to get trapped and it's going to sit there and just saturate that wall, right?

***RHONDALYN:***  We've got a couple of different ways that stucco is terminated at a foundation versus like in a house that you and I are working on where we have a second and third floor that overhangs the first floor. And absolutely, the overhang where we have a vertical to horizontal return is what we call it in my office. So that could be cantilevered upper floors. That could be the bottom of a window box or some other similar detail, right? Yes, we have to have some provision for drainage on the underside of a vertical to horizontal transition. And while that's been in our code in our ASTM document for a really long time, I can tell you that the practice of installing it hasn't been around for a very long time. Probably only in the last eight or 10 years have we as an entire industry realized that, hey, if that second or third floor window leaks, the water is just going to flow to the bottom of this wall and just set and hang out and rot this beam. So there's a number of different weep accessories for those as well.

***CURTIS:*** I'll ask Daniela to pop some photos of that project on this video because we have a lot of photos and that's still ongoing. But one of the things that we saw in that house was that water got in a couple areas and if it had been able to drain out, it probably wouldn't have caused as much damage as it did. So on that one, we had damage all the way down the corners of the bump out. So he talked about all those corner studs that were rotten and then all the way across the bottom of the wall at the bump out, that water just sat there. And so the bottoms of all the trusses and the joists are just gone. And so we're currently waiting for the engineer to finish his recommendations on how we're going to get that repair done and then get on to covering it back up.

***RHONDALYN:*** With Stucco, we have those termination accessories. I don't know, we've talked about not this episode, but I'm certain you've talked about rain screens in previous episodes. That is something that is required in our 2021 building code. The thing is that most municipalities in and around Houston have not adopted nor are they enforcing the 2021 building code. But once we get that designated air space behind Stucco and siding for that matter, providing some ventilation and a designated drainage space and an outlet for water intrusion, I think we're going to be better off. People are really sensitive to Stucco-clad houses. However, what I'm seeing is I'm seeing similar conditions in cement board siding for all the reasons that we've discussed. Punch in openings after the siding goes on and not flashing them, then them not being maintained. We're seeing the same kind of conditions behind cement board.

***CURTIS:*** Well, think about how many penetrations you have through the WRB with siding on all the houses. Like you said, the rain screen is not required. They're just applying the siding straight to the WRB, the Tyvek, or the Tamlyn wrap or whatever. That siding is just going straight on there. So you've got nails all the way up and down the entire face of that wall. That stuff is supposed to be self-sealing to some degree, but still, when you've got hundreds and hundreds of nails on one face of one wall, that's a lot of opportunities for failure. Absolutely. When we install the rain screen, for those of you who don't know what a rain screen is, typically it's strips of wood or PVC or another material. Actually, there's different ways to do it. The rain screen just creates a space, a gap between the siding and the WRB for water to drain, for air to move. When we install siding, what I prefer to do or to install furring strips that are going to get that siding off the wall about three quarters of an inch or half an inch, depending on what we're using. That's what we're nailing into. So we're not nailing into the WRB, we're nailing into the furring strips. It does two things. It keeps all those nails out of the WRB and then it also creates that half inch or three-quarter inch air gap all the way around the whole house for that wall assembly to dry. Yeah, absolutely. Let's touch on the brick and stone real quick too. That's kind of the one cladding we haven't really talked about yet. So with brick and stone, kind of like having a weep screed on stucco or a rain screen on siding, the brick and stucco veneer should also have, well, it does have an air gap between it and the WRB. But what happens with that air gap is a lot of times it just gets full of gunk, right? It gets full of mortar and all that kind of stuff, right?

***RHONDALYN:*** So what I would say is with brick and stone, we do have that designated air gap of one to four inches between the backside of the stone and the structure itself because it is veneer. People become complacent with claddings that have been around for a long time that are not really on the radar for water intrusion or air infiltration. And so what I see is the contractors become less concerned with breaches in the weather resistant barrier, not only from a water intrusion perspective, but also an air infiltration perspective. It's not uncommon, as you well know, to go to a job and the mason missed the stud with his fastener and his wall tie, right? So he just takes and drives a nail every inch or so for the next 10 inches until he hits a stud and then he leaves the other nine holes just open. I would say that the brick and the stone are a bit more forgiving because they do have that large air space. But you're right. If the mason is not keeping mortar out of that air gap, then the mortar just builds up behind the masonry and does a couple of things. It prevents air, it prevents ventilation through the weep holes. It also prevents the evacuation of moisture through the process of evaporation, right? So I always say if we walk up to a house and we see water coming out of weep holes at the bottom of a brick wall, you probably better call the plumber because that's not really how weep holes work. It's more so that the water goes through the veneer surface, condensates or ventilates in that air gap and the airflow comes from weep holes. And then weep holes can evacuate some moisture that occurs due to condensation. When we see problems with brick veneer, a lot of times they are very advanced because water intrusion and rot and death and destruction as a result are not on people's radar that have brick veneer or stone veneer.

***CURTIS:***  We touched on the weep holes with Toner a little bit last week and he mentioned something that we've switched to as well. That's kind of getting away from the typical weep hole on brick, which is basically just you don't put mortar in between two bricks. You've got a vertical gap that's left and switching to a horizontal weep hole product that's a rigid plastic product that you're slipping in that's creating that ventilation path. And I like those. That's a better way to do it. What happens with those brick veneer wall assemblies is as the mason is going up, a little bit of mortar on every single course is falling back in there. And it may just be a tiny little bit on each course, but by the time you get to the top of the wall, there's a whole bunch of mortar at the bottom of that wall and it's clogging those weep holes.

***RHONDALYN:*** It's not unusual if you took down a brick veneer wall to have say 12 or 18 inches of mortar just piled in that airspace along the foundation. So there are products like what's called a mortar net. It's kind of a woven polypropylene plastic that can help keep the bottom of that assembly or the bottom of that air gap open. And then like you said, using a rigid plastic to create the weep holes also is a good thing to do.

***CURTIS:***  Yeah. And like anything else I'm building, it's having trades that care about these things too, that aren't just trying to do it as fast and quick as cheap as possible. The trades who take pride in their work and their craft are going to take more care not to have that kind of situation. I think we tend to knock production builders a lot on this podcast, but those types of problems I see a lot more in production homes because they are all about speed, slap that wall up, get it done and move on to the next one. And also they tend to have less supervision in those situations too. So there are some good production builders out there. I'm not knocking them all here by any means, but certain ones, it's all about the speed.

***RHONDALYN:***  I'm going to have to defend some production builders here because we have about eight or ten production builders in the Houston market. I knew you were going to say this. Yeah. So if you've got one of my production builders, hopefully it's one of the ones that have us inspect the whole weather resistant barrier prior to putting up any exterior cladding. Now, some of them we just look at stucco areas and other of those we look at the entire house. Yeah. But yeah, you're right. A lot of times the trades are trying to do as fast as possible, as cheap as possible. If you have a builder that takes the time and the care to do the inspections and educate themselves and educate the trades, many times the trades are there and they're just doing what the guy before them taught them to do. It's the classic case of, well, I've been doing this for the last 30 years. Why should I do it differently now just because some third party inspector lady came on the job site and told me to do it differently? What I found is that if we educate and give people the why, then they're more likely to do the job correctly, number one. And number two, I think ultimately everybody wants the same thing. The homeowner wants a good house that's not going to have a warranty call. The builder doesn't want a warranty call and stuff tends to roll downhill. So if the builder gets a warranty call, the subs are most definitely getting the warranty call, right?

***CURTIS:***  Yeah, absolutely. I think the people, I mean, people don't, most of them don't set out to do a bad job. They get pressured into meeting a schedule or they get pressured into doing it for a cheaper price or whatever it is. So they get pushed into that way of doing things where they're just like, screw it, I'm just going to get it done and get out of here, right? As a builder, it's having a good relationship with your subs. It's teaching them why we're doing things a certain way, but then they're verifying that they're actually doing it that way, right? So us verifying it, having you verifying it, it's the trust but verify that we've mentioned on here many, many times. Well, that's a great place to wrap it up. Again, I thank you so much for being back with us today. Well, thank you for inviting me. Always great to have you. We'll do it again and we'll be sure and link all your information on here. So if you're in the Houston market, actually you're in the Austin market now and where else are you?

***RHONDALYN:***  So we are currently based in Houston, but we also are in San Antonio, Austin and DFW now. So yeah, we're in all four major metropolitan areas in Texas.

***CURTIS:***  Well, great. That's great information because before I've just talked about you being the Houston area inspector. So now almost anywhere you are in Texas, maybe not El Paso, but in the future? Maybe. I mean, we are talking about South Texas, Corpus Christi McAllen area down in the valley. So you may see us there soon. Yeah, there's a big need for that down there. Similar climate, especially on the coast, is what we have here. Similar construction methods and problems, I'm sure, right? That's right. So, all right, we'll call Rhondalyn if you need help with your exterior inspections and if you're building a house, you do. Thanks for joining us again here on the Your Project Shepard Podcast and we will see you next time.