

# FROM ROOFING TO WATERPROOFING:

## *How Components in the Building Enclosure Connect*

By Blaine Sibby

**D**iagnosing issues (specifically leaks) is always exciting because every problem in every building is distinctive, and determining the causes of these problems can be tricky. That is why learning the fundamentals of waterproofing is essential. To successfully diagnose hard-to-solve leaks, the consultant or contractor must understand how the parts of the building connect, as well as Kubal's "90 to 1" rule, which states that 90% of all leaks occur from 1% of the building's surface: terminations, transitions, and penetrations.<sup>1</sup>

I learned about waterproofing in conjunction with roofing, and the experience was eye opening. There were times in the beginning when I thought a wall was just that—a wall. Now, however, I understand that it is an intricate facade assembly that experiences a wide variety of issues based on design, material, and installation. To address these issues, we need to grasp the distinctive characteristics of materials such as thermoplastic olefin (TPO) membrane and modified bitumen. Similarly, solutions for the exterior insulation and finish system or for masonry have their own sets of nuances.

The most crucial lesson I've learned is that the "construction industry has yet to adopt the principle that the entire exterior facade must be treated as a single cohesive unit, an enclosure in which all individual components are transitioned into one another in completely waterproof detailing."<sup>1</sup> Furthermore, to achieve this principle, industry professionals must have a high level of knowledge about waterproofing

(below grade and above grade), roofing, flashing, and damp-proofing, *and* they need to apply this knowledge precisely. Unfortunately, not all contractors have the necessary knowledge or skills—and when industry professionals do not understand the principles of waterproofing, building owners and managers are left out to dry (pun intended).

Where I work, 99.9% of our business is negotiated commercial work, where we work closely with management teams, facility engineers, and owners. I help pinpoint problems and design solutions, and sometimes I must have uncomfortable conversations to tell someone that the solution's scope and magnitude are greater than they expected.

For example, I was recently called to investigate a leak on a two-story commercial office building with a TPO roof, an acrylic-coated brick masonry facade retrofitted with a galvanized continuous metal wall panel around the interstitial space between the second floor and roofline, and additional horizontal metal panels between the first- and second-story window bands (**Fig. 1**). The problem was that the interior drywall in an office space on the northern face of the building was extremely wet after a heavy rain. The building engineer cut into the wall to repair the drywall, and he said the experience was like cutting through butter, which then led him to cut out the entire wall.

When I arrived to investigate the area, a few

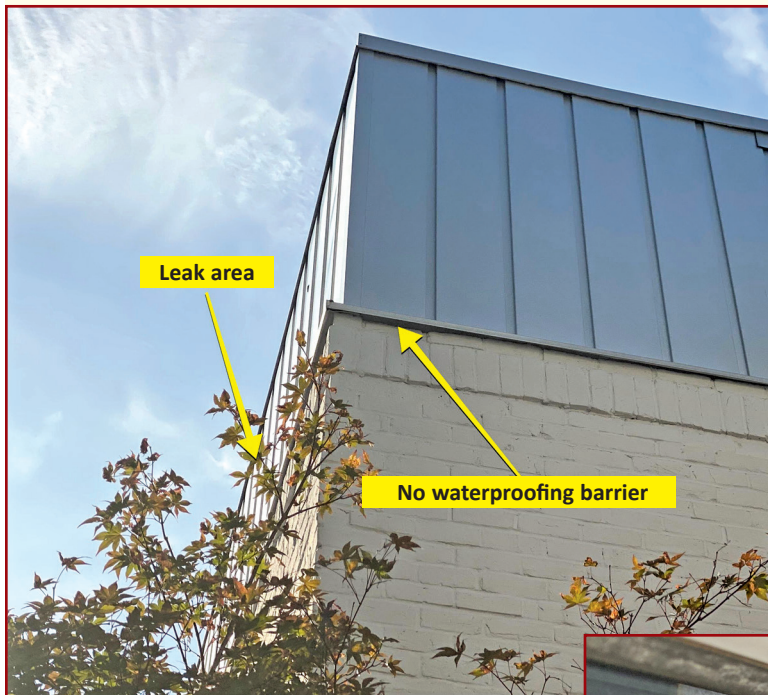


*Figure 1. This masonry facade was retrofitted with continuous metal panels at the interstitial space between the roofline and the second-story ceiling.*

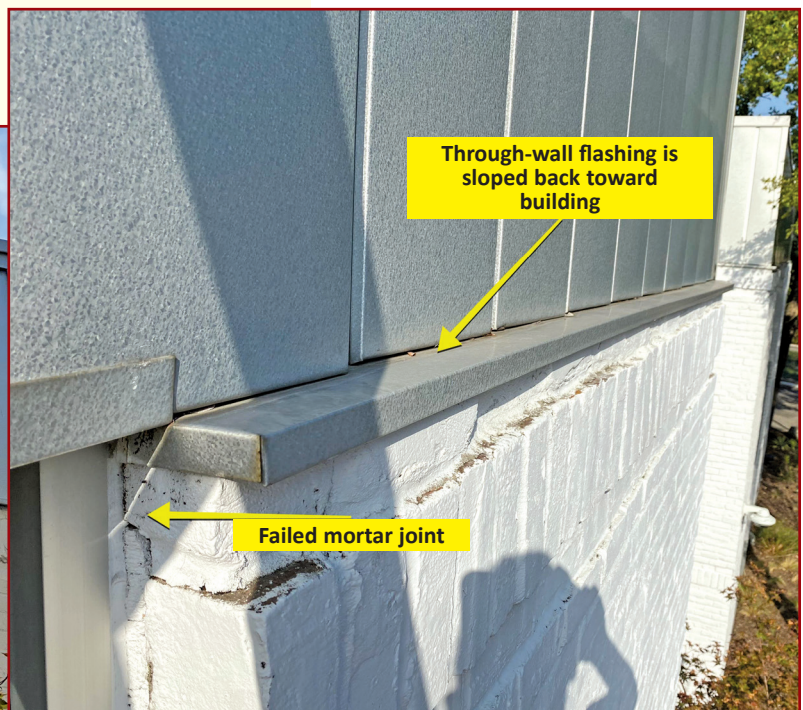
**My journey** into the roofing and waterproofing industry started in 2016. I was an active-duty captain in the United States Marine Corps, serving as executive officer for Region 5, Marine Corps Embassy Security Group. My wife, Allison, and I knew that we planned to transition from active duty to the civilian sector, and we planned to start our own venture. Allison had successfully completed her master's in business and communication, and I was about to complete my MBA. Owning a business seemed like a perfect fit. However, when Allan Rodger offered me a position with the family business at Zenith Roofing & Waterproofing, I realized it was an offer I couldn't refuse.

When I moved into the industry, I instantly fell in love. The work was fast-paced and dynamic, and although Dallas–Fort Worth is a major metroplex, the area and industry within has the same small-community feel that the Marine Corps does. As an officer, I was always challenged to find creative solutions to problems on the go. Those skills transferred over perfectly into commercial roofing. I consistently tell people that the reason I exist is to help solve problems, which is why I find roofing, and especially repair and maintenance, so interesting.

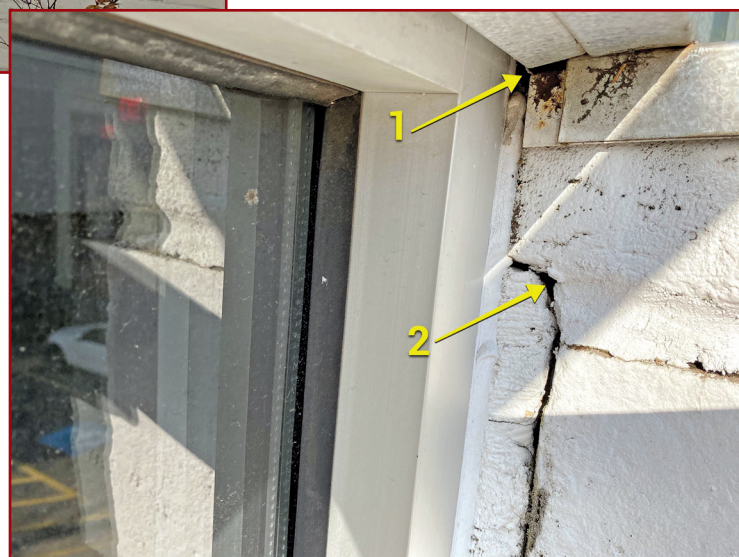
things stood out to me. The first was that the through-wall flashing at the base of the vertical panels was extremely short and did not sufficiently cover the masonry (Fig. 2). The flashing also appeared to lack a waterproofing membrane, and it sloped backward toward the building (Fig. 3). Continuous metal panels constantly expand and contract, and when water enters the system, capillary action occurs; the inadequate metal flashing was a compromising detail. The silicone gaskets around the windows at this location were for the most part sound; however, the culmination point occurred where the sealant stopped at the frame-to-substrate joint, and the mortar in the area was cracked (Fig. 4). As a result, the gypsum sheathing (with no water-resistive



*Figure 2. Inadequate through-wall flashing without proper waterproofing beneath.*



*Figure 3. Through-wall flashing sloped toward the building.*



*Figure 4. Evidence of water intrusion (rust) at the transition of the through-wall flashing, metal panel, and window (1) with failed masonry joints down the wall (2).*

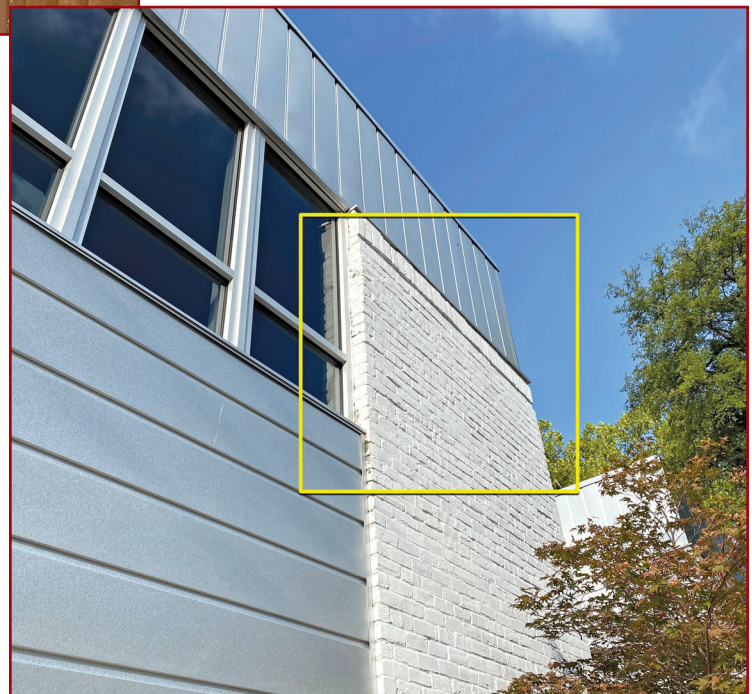
*Figure 5. The interior of the leak area with organic growth on the weather barrier.*



*Figure 6. The weather barrier easily crumbled due to excessive moisture saturation.*



*Figure 7. Exterior view of the leak area.*



barrier) in this area of the building was crumbling and infested with organic substance (Fig. 5–7). Upon further inspection of the interior, my team found noticeable water damage throughout the building around the windows. The building was leaking, and when we cut open the abscess, we could see the infection—but how far did it go?

The next steps were to inform ownership about my findings and offer recommendations for remediating the problems. I wrote a report and documented everything. My final recommendation was to remove the brick at that single location so that the gypsum sheathing could be replaced with new sheathing and waterproofing material. At that time, we could assess the metal through-wall flashing and reseal the joints properly within the area.

My client explained that they wanted to get a second opinion, and I encouraged them to do so. Obviously, they had a big decision to make. I re-emphasized the importance of treating the organic substance within the wall cavity for the overall health and reputation of the building. The bottom line: I advised them to take care of the problems the right way, before people could post complaints on social media or tenants could break their leases.

My client contacted me later to provide a bid for sealing all the

metal joints on the northern face of the building until they decided on how they wanted to proceed. He explained that he was reluctant to de-clad the facade in the area (roughly 70 ft<sup>2</sup> [7 m<sup>2</sup>]), and that a restoration company had suggested sealing the *entire* building. A mentor of mine, David Leslie, RWC, once told me, “If it doesn’t get wet, it doesn’t leak.” Well, I don’t think that this is what he meant.

I explained to my client that by completing that scope of work, we would be treating a symptom of the problem, and that the sheathing issue was going to go unaddressed, which concerned me. I’m used to objections and losing deals from time to time, but when I see someone making a mistake by choosing the wrong solution, that’s always a tough pill to swallow. I explained that the panels were not meant to be sealed and that they needed to weep properly, and I stressed that sealant was only a temporary fix and would become a maintenance issue.

Here was my primary conundrum: I knew the right way to solve the issue but was being invited to bid on the wrong specifications. Another issue was that the project might not commence for six months. During that time, the building would experience moisture intrusion on 80% of the facade through winter and spring. What would the long-term effects of this be?

We all know and have seen what trapped water in a wall will do. And what would happen if the sealant failed, or the roof leaked at the wall? There would be nowhere for the moisture to go. I don’t know what my competitor told my client, but I do know that the other firm agreed to seal the entire building. I couldn’t do that, so I bid my own specifications that would ensure the system wept properly.

There is a delicate balance and fine line between being right and doing what’s right. My relationship with my client is one that I respect and cherish. I would never insult them by refusing their invitation to bid an opportunity. However, I was clear in my proposal that we would take specific measures to create adequate drainage. If we lose the opportunity because the monetary cost is too high, then I am okay with that, but my client will know that I don’t take shortcuts and ultimately have their best interest in mind.

If we as an industry don’t take the time to understand the second- and third-order effects of designed solutions, we can leave the buildings we work on, and their owners, in a worse situation than they faced before we intervened. As I reflect on what I could have done better in this situation, I wish I had proposed that the owner host an on-site walk with all bidders during which we could discuss our observations and


create a scope of work that made the most sense for the project. I would have loved the opportunity to talk with everyone who was involved in making decisions about the project scope. Sometimes this strategy works—if you can get the parties together. However, in many cases, owners just want you to “give them a bid.” It’s best practice to resist this pressure. To ensure everyone’s success, we have to take our time to evaluate the situation, determine the potential causes and effects of the problems we identify, and understand the long-term effects of the work.

As industry professionals, we have an obligation to our companies and to our clients to understand how components in the building enclosure connect. If we shortchange investigation and simply suggest “obvious” or “quick-fix” specifications, we shortchange the industry and our peers. Over time, we will discover improved ways to apply lessons from past experiences to the present, and these improvements will shape our future decision-making processes.

As information becomes more readily available, people will be able to see the history behind the decisions we make, and they will assess the judgment that underlies those decisions. If we fail our clients by allowing them to make poor decisions with their money, our industry will suffer. Owners and contractors who face the consequences of those poor decisions are at serious risk of concluding that our industry is only interested in making money and does so by treating symptoms instead of doing the hard work to solve the underlying issues.

Here’s an analogy: A patient with an injured ankle goes to the doctor. The doctor explains that the patient needs to immobilize the ankle, and further recommends rest, compression, and elevation for a week, with some minimal stretching, to solve the problem. However, the patient rejects the treatment plan as being too slow and too complicated, and says, “Just give me some medicine to take away my pain.” The doctor does what the patient wishes, without disclosing the possible risks or side effects. While the ankle may feel better, the pain medication doesn’t heal the injury. Furthermore, the patient experiences a range of adverse drug effects, such as chronic dry skin, halitosis, and nausea. Even worse, when the patient is without her medication, the pain is intolerable, and she becomes dependent on the medication. Is this really the way that we want to treat our “patients”? As professionals, we owe it to everyone to identify the problem correctly and provide the best solutions.

If we are to make the industry better, we must understand and uphold Kubal’s principle. By ensuring that our employees and others

throughout the construction industry are better educated, we help owners make better decisions from the start and throughout the lives of their buildings. More specifically, contractors, consultants, and those who maintain the building own a piece of the effort. Ideally, problems can be prevented from the very beginning; read Leslie’s article in the September 2018 issue of *RCI Interface*.<sup>2</sup> However, we need to keep buildings in our current inventory from entering what I call “the fatal funnel.” We know that our community can create more sustainable buildings with healthy spaces for the tenants, and we can help owners make choices to avoid costly repairs in the future. If everyone in our industry makes a concerted effort to truly educate owners and colleagues about how components of the exterior facade components or assemblies must work in unison, we will all be better off. Understanding how the components of the building enclosure connect and interact has been an absolute blessing, and, as time goes on, I am positive I will have fewer stories like this one to share. Until then, I will do my best to learn, educate, and pay it forward. 

## REFERENCES

1. Kubal, M. T. 1992. *Waterproofing the Building Envelope*. New York, NY: McGraw-Hill Professional.
2. Leslie, D. 2018 “The Building Maker.” *RCI Interface*, September. pp. 21–24. <http://iibec.org/wp-content/uploads/2018-09-leslie.pdf>.

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