WINTER 2025

BUILDING SCIENCE perspective

BUILDING ENVELOPE: TOOLS AND TECHNOLOGY

The three Ps of prefabricated EIFS-clad wall panels

The odd couple: HVAC systems and windows

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Christa van Dyk, C.E.T.
President, ABEC (North)

Message from the ABEC North president

It is with great pride that I welcome you to this edition of *Building Science Perspective*. What makes our council special is not just the science we advance, but the community we build together. Innovation thrives when paired with collaboration, laughter, and shared experiences.

This summer we celebrated our third-annual ABECN Appreciation BBQ with our friends from Construction Specifications Canada – Edmonton Chapter. Rain couldn't dampen the fun — roast pig, burgers, and plenty of smiles reminded us how strong our network has become. I'm already looking forward to our fourth-annual BBQ in August 2026, and I hope to see you there.

We also toured All Weather at Home and joined the Duxton Symposium, exploring exciting innovations in glass and glazing. Our Casual Night Series found a new venue, giving us fresh opportunities to connect and share ideas. These moments of learning and laughter keep our community vibrant, and we're excited to build on this momentum in 2026.

Looking ahead, the new year brings more plant tours, workshops, luncheons, and casual nights. Each event is designed to expand our knowledge and strengthen the bonds that make our council such a welcoming and inspiring place.

Together, we'll keep pushing boundaries and making building science a cornerstone of progress. Dive into this issue's articles and case studies — let them spark ideas, fuel conversations, and inspire action.

Thank you for your support and engagement. Our strength lies in the passion, expertise, and camaraderie of our members, and I am honoured to serve alongside you.

Christa van Dyk

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The Emissions-Neutral Buildings Information Exchange (ENBIX), an Alberta Ecotrust initiative, brings industry together to share knowledge, build capacity, and advance building practices across Alberta.

CALENDAR OF EVENTS

ABEC North Schedule of Events

January 22, 2026
Design & Detail Workshop for U of A project
Highlands Golf Club

February 19, 2026
Annual General Meeting
Highlands Golf Club
And third Thursdays of every month

Casual Night Series

January 13, 2026
Building Envelope – Theory vs. design
vs. constructability vs. common practice
New location: TBA

February 10, 2026
Building Envelope Detail follow up
New location: TBA
And second Tuesday of every month

ABEC South Schedule of Events

Monthly Luncheons
January 28
February 25
March 25
April 22
May 27

Social Events
Spring Social – TBD
June 24 – Golf Tournament

WHERE ENGINEERING MEETS EXPERIENCE

Spotlight on Heather Elliot, P.Eng

Heather Elliot, P.Eng., LEED Green associate, doesn't just understand building envelopes — she sees them as a blend of math, science, architecture, anthropology, and lived experience.

A leader in the building science world, Elliot has built a career investigating, restoring, and designing envelope systems that stand up to both climate change and time. With a foundation in engineering and a natural curiosity for how things work and how buildings perform, she's known not only for her technical fluency, but also for her ability to navigate complexity with creativity and conviction. As one of her colleagues put it, Elliot is the kind of professional who "commands rooms without arrogance" and helps shape the future of the industry by leading with both principle and openness.

In this conversation, Elliot reflects on her unconventional path into building envelope work, shares insight on industry innovation, and offers thoughtful advice to the next generation of envelope professionals.

Q: How did you come to specialize in building envelope work?

I started off planning to be an architect or an architectural technologist — I had grown up obsessed with building LEGO, doodling houses, and loving hand drafting and CAD in high school. But a perceptive high school teacher noticed my analytical side and nudged me towards engineering.

At the University of Calgary, I studied civil engineering with a structural minor. In my final year, a well-timed guest lecture within the confines of my masonry design course led me to pursue a building science elective and that was a game changer. I fell in love with that blend of architectural design mechanics and engineering physics. I spent my first year after university working in the civil engineering field, but on the sidelines hunted out a building science position. Once I found one, I never looked back.

Q: What continues to inspire you about the field?

It's the sheer diversity and pace of innovation. Every project is unique — residential, commercial, institutional — each with its own envelope challenges. Are you working on a building from 10 years ago? 100 years ago? Materials and construction methods vary decade to decade, so you learn localized history, as well as develop an appreciation for what worked well in the past and why. Newer materials — from fiberglass to advanced polymers — keep rolling out within the industry, and finding the right combination of products for specific climates and project goals is endlessly fascinating. You have to stay curious, adaptable, and regionally aware.

Q: What's a standout innovation in the building envelope industry you've encountered?

I expect the rise in building envelope commissioning and testing to continue to be transformative as it becomes more common-place, specifically in Alberta. It's not exactly an innovation as such, since we've been able to test building envelope components for a long time, including verifying envelope performance with tools like thermography, ultrasonic testing, and large-scale air and water testing. But while testing and commissioning can still feel like a nice-to-have extra in Alberta's industry today, I think we have begun to see the shift to it being an ordinary

routine. As the world gets wiser, it is setting higher targets to achieve better envelope performance and meet goals related to energy efficiency, sustainability, and passive survivability. Compared even to a decade ago, more and more architects, contractors, and consultants appreciate the nuances of effective R-value, airtightness, and how to use envelope first principles to design high-performance buildings. In the near future, Alberta's building scientists are not going to be assuming an installation achieves its set goals based solely on visual inspection, for example. Testing becomes the obvious benchmark by which to measure our success. I believe innovation will come in available types of in-situ testing methods and the breadth of projects for which the expectation will be to perform testing to prove out that systems meet or exceed expectations.

Q: If you could go back, what would you change early in your career?

Hands-on site experience. I wish I'd spent more time on-site to see how detail drawings translate into real-life build. And that is coming from someone who was afforded a lot of on-site time early on, yet still I feel like it can never be enough! Watching people install various envelope-related materials is essential, as well as trying it for yourself and often finding out you're utterly useless at it, brings real respect for skilled trades. Actively engaging with contractors while they are installing assemblies versus simply photographing their finished work brings insights that only come from seeing the process.

Q: What advice do you have for newcomers to the field?

Stay open minded and try everything, as there are so many pieces to the puzzle that is building science. Roofing, waterproofing, flashings, glazing – the number of systems to learn about and design details for alone is staggering. Throw in condition assessment, specification writing, effective U-value calculation, commissioning, and more. You can be a forensic investigator. You can be a designer and sketch out every little detail. You can be an on-site contract administrator. You can be everything in between, sometimes all inside one project's workflow. Oh, and did I mention you can do all of the above for new builds or for existing buildings, and that each brings its own set of unique challenges?

When I describe the number of things a building scientist can actually be involved with to family and friends they often develop a look of awe (or terror, it may be terror...) and rightly so. The bottom line is envelope work is layered and complex. Find your strengths by experiencing it all, then specialize if that floats your boat. And be open to learn from absolutely everyone. Colleagues of all levels and backgrounds bring fresh perspectives.

Q: What are some commonly overlooked envelope details?

Roofing, below-grade waterproofing, and flashings — often no one sees these systems (or in the case of flashings, many architects want to make them as invisible as possible), so their detailing can be sidelined, but they are a building's first line of defense. Getting those details right is essential, even if they're not as glamorous as other architectural features.

Q: What personal traits are essential for success in envelope engineering?

Creativity is critical. No two projects are alike, so you need to adapt your designs to unique spatial, climatic, and client needs. Being a multitasker, embracing change, and having a continuous learning mindset are absolute musts.

Q: In your opinion, how is the industry evolving?

We're seeing more modular and automated in-factory style construction, ever improving 3D model integration, and VR-related tools. The most effective future design and construction will blend digital tools with on-site know-how and human insight. Additional developments in materials to allow "smart" performance depending on the surrounding conditions and advanced technology integrated into building envelope systems also seem to me to be the obvious next step in building science evolution.

Q: What's been a career highlight?

Every project has a story. New buildings lift your heart — the final beam-raising and facade installation moments can be magical. But I've also done assessments and restorations that aren't flashy to look at but make buildings healthier and people safer. Either way, there's something special about walking through a city and recognizing buildings you have helped shape — that's monumental.

Q: What's a lesson learned the hard way?

Learning to say no. I have struggled to balance the mountain of asks that inevitably come your way in the consulting world and have often overloaded myself trying to do everything. What I have realized is that construction never slows down, so setting boundaries and prioritizing become essential.

Q: Who have been your biggest influences or mentors?

My mom taught me resilience, herself also working for years in a male-dominated field — she showed me you can break through any ceiling without compromising who you are. Other mentors come in all shapes: building science colleagues and leaders in other fields entirely. If you're open to it, everyone can teach you something.

Q: What's been your proudest moment in your career so far?

I've been fortunate to work on many incredible projects, but one of my favourite things is walking through downtown and noting buildings I've contributed to — roofs I've stood on, details I've helped solve. I like to think skyline tells the story of my career. And it's not all about the flashy new towers and that kind of stuff – it's all meaningful.

Q: Any standout memories or field stories?

I find thermography scans are always memorable — standing in the dark, usually crazy cold, snapping infrared photos and seeing a view no one else gets. I've had the police called on me, uncovered numerous critter hidey holes, and watched some beautiful sunrises from some odd places. I have many fond on-site memories as well. I've found myself high up on swing stages with more wind than to my liking, and down low in parkade pits watching panicked below-grade waterproofing repairs a few feet in front of ongoing shotcrete. Each day truly brings a new perspective.

Q: What do you miss most as you have taken a step away from consulting?

I'm enjoying stepping back, as I've been able to really focus on family, future planning, and my own mental health. Work isn't everything — and taking a break can actually open new creative paths. It's not a loss — it's a rebalancing. But I absolutely do miss the people. There is collaboration, creativity, and purpose that comes from interacting with a group of like-minded people. I remain a building science nerd at heart!

Heather Elliot's journey is a reminder that building envelope work isn't always orderly and structured — it's creative, full of surprises, and profoundly human. She's a champion of innovation balanced with humility, hands-on insight, and the genuine recognition that you learn from every layer — material, system, colleagues, industry, and family alike. ■

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THE ODD COUPLE...

HVAC systems and windows

By Joseph W. Lstiburek, Ph.D, P.Eng., Fellow ASHRAE

HVAC systems and windows have almost as interesting a relationship as the "Odd Couple" – Oscar and Felix – did in the '70s*. However, unlike Oscar and Felix's relationship, the relationship between HVAC systems and windows has changed dramatically over time. How they now live together is interesting and changing.

Way back in the day we had "lousy" windows. They were thermal nightmares. Insanely uncomfortable in the winter and ugly uncomfortable in the summer. You couldn't be near them when it was cold or when it was hot and sunny. Thank god for HVAC systems. Good HVAC systems saved "lousy" windows. We had to blow warm air against them in winter to raise the mean radiant temperature and blow cold air against them in the summer to lower the mean radiant temperature. Laying out ductwork was a big deal.

In cold climates, warm air would be blown up against the cold glass from floor registers located under the windows. The "blown" air would rise to the ceiling and the assumption was that the air would flow across the ceiling, be cooled, fall downwards, and be picked up at the bottom of interior walls by a return register (Figure 1).

In hot climates, cold air would be blown down against the warm glass from ceiling registers located above the windows. The "blown" air would fall to the floor level and the assumption was that the air would flow across the floor, be heated, rise upwards, and be picked up at the top of interior walls by a return register (Figure 2).

As buildings became better insulated it turned out that the air at ceilings would no longer be cooled in cold climates and fall to floor. The simple fix to this issue was to locate returns at the top of interior walls (Figure 3).

As window thermal performance improved we learned to "throw" the air across the room from registers located high on interior walls (Photograph 1). The air would "flow" across the ceiling, get to a window, be cooled, fall to the floor, flow across the floor, and be picked up by a return register located at the bottom of the wall on interior walls (Figure 4).

Better windows also meant smaller ducts. Ducts could easily fit in interior walls (Photograph 2). Not done yet. It got even better with better windows. The return at the bottom of the wall

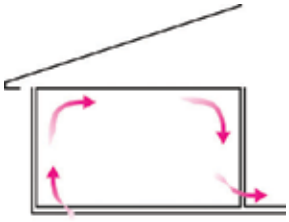

Figure 1: Cold Climates – Warm air would be blown up against the cold glass from floor registers located under windows. The "blown" air would rise to the ceiling and flow across the ceiling, be cooled, fall downwards, and be picked up at the bottom of interior walls by a return register.

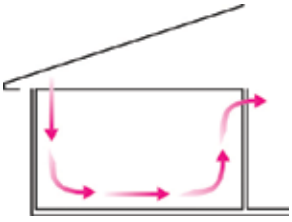

Figure 2: Hot Climates – Cold air would be blown down against the warm glass from ceiling registers located above windows. The "blown" air would fall to the floor level and air would flow across the floor, be heated, rise upwards, and be picked up at the top of interior walls by a return register.

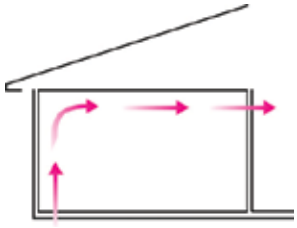

Figure 3: High Returns – As buildings became better insulated, air at ceilings would no longer be cooled in cold climates and fall to floor, thereby requiring high returns.

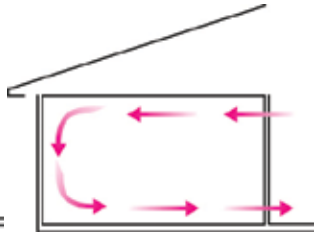

Figure 4: "Throwing the Air" – With good windows air could "flow" across the ceiling, get to a window, be cooled, fall to the floor, flow across the floor, and be picked up by a return register located at the bottom of the wall on interior walls

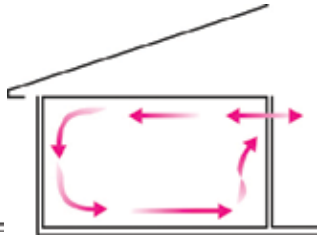

Figure 5: More Good Windows – The return at the bottom of the wall in Figure 4 could be moved to the top of the wall. Furniture no longer interfered with air flow.

Left – Photograph 1: High Supply Registers – As window thermal performance improved, we learned to "throw" the air across the room from registers located high on interior walls. Centre – Photograph 2: Small Ducts – Better windows also meant smaller ducts. Ducts could easily fit in interior walls. Right – Photograph 3: No Short Circuiting – The supply duct and the return duct could be located up high on the same wall a couple of feet apart.

in Figure 4 could be moved to the top of the wall (Figure 5). What was nice about Figure 5 is that furniture did not interfere with air flow. Let me repeat, furniture did not interfere with air flow. Yeah! Can't tell you how much interior designers interfered with ductwork layout.

The supply duct and the return duct could be located up high on the same wall a couple of feet apart (Photograph 3). Short circuiting of flows did not occur because the supply air was "thrown" with a high positive pressure whereas the return had a small negative pressure. With well insulated walls and ceilings, and real good windows Figure 5 worked in all climates.

While all of this was going on, we started to really look at return systems. Did we in fact need them in each room? We discovered "transfer grilles" (Figure 6 and Photograph 4) and "sound attenuated" transom vents that were baffled (Photograph 5) that allowed the hallway and stairwell to act as the return system with a single return hard-ducted to the air handler. What? Folks freaked out. A single return…and on the main floor of a two-storey house…no way that will ever work. But it did**.

All kinds of options. Figure 7, Photograph 6, and Photograph 7 show a basement air handler with a single return at the main floor level. Note that the supply system is fully "hard" ducted. The single return had an "offset" to handle blower noise. Folks in cold climates loved it.

Left – Photograph 4: Transfer Grilles – Grille high on one side, low on the opposite side to control light and noise transfer.

Above – Photograph 5: Transom Vents – "Sound attenuated" by being internally baffled.

Right –Photograph 6: Basement Air Handler – Single hard ducted return.

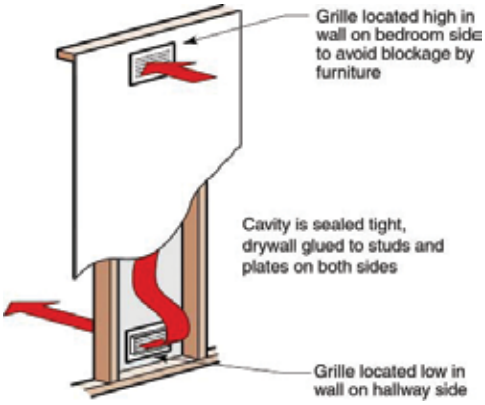

Figure 6: Transfer Grilles – This approach allowed the hallway and stairwell to act as the return system.

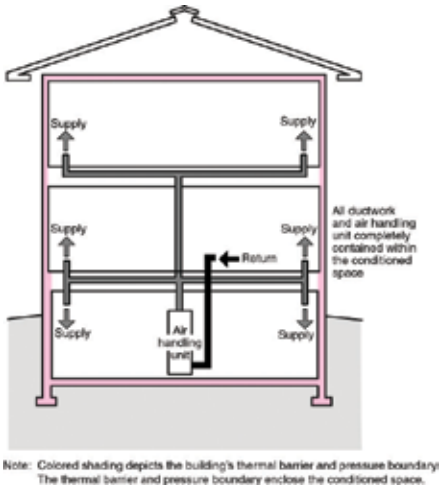

Figure 7: Single Ducted Return – Basement air handler with a single return at the main floor level coupled with transfer grilles.

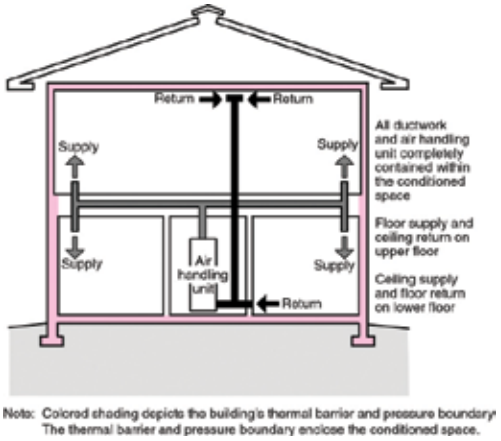

Figure 8: Slab Houses – In hot climates with slab houses, we first started with returns in the upper hallways, not in individual bedrooms. The approaches soon morphed into a single return at the air handler as in cold climates.

In hot climates with slab houses we first started with returns in the upper hallways, not in individual bedrooms (Figure 8). In crawlspace houses, particularly in hot-humid and mixed-humid climates, we began to see conditioned crawlspaces (Figure 9). The approaches soon morphed into a single return at the air handler as in cold climates. Folks in hot climates loved it.

We weren't done yet. In cold and hot climates, we soon coupled the "throwing the air across the room" from interior-located high wall registers with single returns (Figure 10 and Figure 11). Ductwork could be located in a hallway/corridor dropped ceiling (Photograph 8 and Photograph 9). The supply and returns could be in the same dropped ceiling. The returns were "passive" – transfer grilles into the dropped ceiling and a large ceiling register in the corridor dropped ceiling connecting the dropped ceiling to the corridor. The supplies were "active" hard ducted. The supply grilles and return grilles shared the same wall (Photograph 10).

Still not done. With "fabulous" windows we can get rid of the supply return ducts all together (Photograph 11). Having said that, we will still need some means of distributing ventilation air. Fully ducted HRV's and ERV's are more than up to the task.

There has to be some issue with all of this. Yup. Lousy windows saved old buildings with lousy walls. They acted as "dehumidifiers" and prevented high levels of interior moisture (Photograph 12). Lousy windows were the "first condensing surface" in a building in a cold climate. When we got better windows, we moved the condensing surface to the interior surface of the exterior sheathing. And better windows allowed higher levels of interior moisture. The higher levels of interior moisture messed up our walls. We had to get better walls. Better windows made us get better walls.

Photograph 7: Single Return – The single return at the main floor level has an "offset" to handle blower noise.

Photograph 8: Dropped Ceiling – Ductwork located in a hallway/corridor dropped ceiling. The supply and returns are in the same dropped ceiling.

Photograph 9: More Dropped Ceiling – The returns are "passive" – transfer grilles into the dropped ceiling and a large ceiling register in the corridor dropped ceiling connecting the dropped ceiling to the corridor. The supplies are "active" hard ducted.

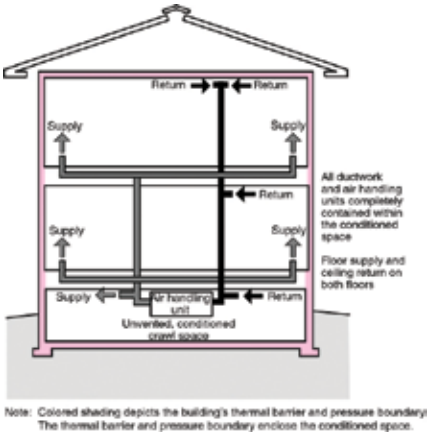

Figure 9: Crawlspace Houses – In hot climates, specifically hot-humid climates and mixed-humid climates, we began to see conditioned crawlspaces. Again, the approaches soon morphed into a single return at the air handler as in cold climates.

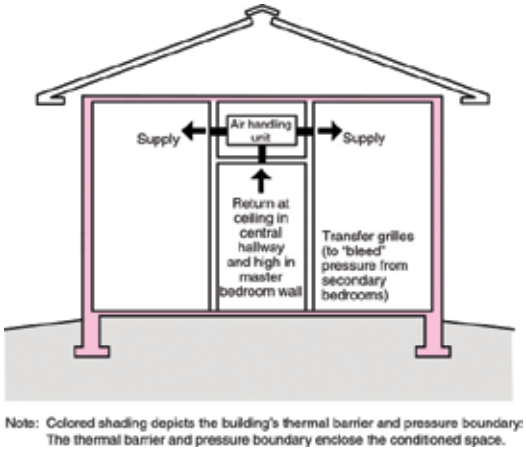

Figure 10: Dropped Ceilings – Supply and returns could be located in a hallway/corridor dropped ceiling.

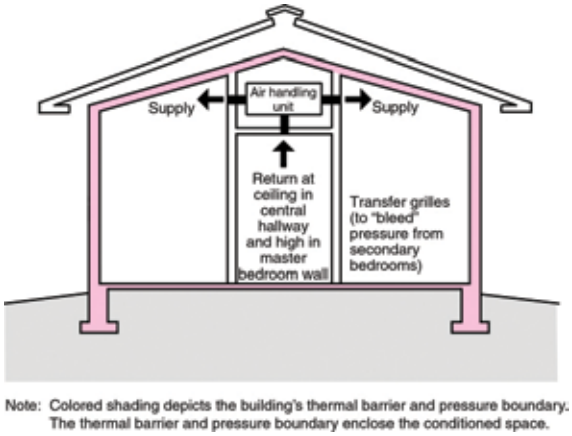

Figure 11: More Dropped Ceilings – The returns are "passive" – transfer grilles into the dropped ceiling and a large ceiling register in the corridor dropped ceiling connecting the dropped ceiling to the corridor. The supplies are "active" hard ducted.

Having pointed that out, we are beginning to get even better windows. Fabulous windows actually. This will allow even higher levels of interior relative humidity in cold climates. It will allow COVID-levels of interior relative humidity. Yes. We were here before, not that long ago ("Covert COVID Thoughts", *ASHRAE Journal*, February 2022). Guess what, that means we are going to have to get fabulous walls. Fabulous windows are making us get fabulous walls. Odd, indeed.

An edited version of this insight first appeared in the ASHRAE Journal.

*The Odd Couple *was a movie starring Jack Lemmon and Walter Matthau that turned into a TV series with Tony Randall and Jack Klugman. The premise was about two separated men who have to live together whose "ideas of housekeeping and lifestyles" were "as different as night and day".*

I had a lot of fun in Minneapolis in the late '90s with the code folks. They said they were never going to allow the approach. No way. I said how about letting me build a couple of houses with both approaches in each house. Run them one week, one way, and one week the other way through the winter and summer. At the end of the year you tell me which way you will allow and I will convert the houses to that way. It helped that I had a big-time builder who had my back, Bill Pulte; I miss you big time. The houses had real families in them… "friends of Bill". They were instrumented "up the wazzou". Thank you DOE and the Building America Program. At the end of the year even the code folks were impressed…and we changed Minneapolis….and then most of the rest of the country.*

**** "Wazzou" is a metric term…it is two "Ying-yangs".* ■

Above –Photograph 10: Still More Dropped Ceiling – The supply grilles and return grilles share the same wall. Right – Photograph 11: Fabulous Windows – With "fabulous" windows we can get rid of the supply return ducts all together. Having said that, we will still need some means of distributing ventilation air. Fully ducted HRVs and ERVs are more than up to the task. Far right – Photograph 12: Lousy Windows – "Dehumidifiers" that prevented high levels of interior moisture.

THE THREE Ps OF PREFABRICATED EIFS-CLAD WALL PANELS

By Alex Ardelean, Elizabeth V. Rodenkirch, and Peter M. Babaian

Abstract

Traditionally field-installed, exterior insulation and finish system(s) (EIFS) is becoming increasingly common as cladding for prefabricated, modular wall panels. Prefabricated EIFS-clad wall panels can offer schedule and quality advantages over traditional field-installed EIFS but can also introduce more coordination pitfalls. Designers, specifiers, fabricators, contractors, and suppliers must coordinate closely to ensure the success of prefabricated EIFS panel cladding projects.

This paper presents items to consider for your next prefabricated cladding project, with a focus on prefabricated EIFS-clad wall panels. Based on our experience with prefabricated EIFS panel cladding in health care and biotech projects, we present three categories: "The Three Ps" of items that warrant special consideration: Preparation, Production, and Placement.

Introduction

In its most general form, EIFS is made of expanded polystyrene (EPS) insulation board coated with a reinforced polymer-modified cementitious base coat and a polymer-based finish coat. Other less commonly used types of rigid insulation boards used in EIFS include extruded polystyrene (XPS), polyisocyanurate (polyiso), and mineral wool. Drainage EIFS, as opposed to barrier EIFS, includes a dedicated water-resistive air barrier and drainage plane.

EIFS is lightweight and uses relatively few materials. It is typically adhered in place, eliminating cladding anchorage penetrations through the water-resistive air barrier. EIFS-clad wall panels can be fully prefabricated, from the structural backup out to and including the EIFS finish coat. EIFS adhesives, typically polymer-modified cementitious materials, are compatible with many water-resistive air barrier chemistries. EIFS provides continuous insulation on the exterior of the building, which increases the effective thermal resistance of the assembly. EIFS can be readily sourced from several manufacturers, many of which have already performed a myriad of assembly tests, including fire performance, bond strength, impact resistance, and drainage efficiency, among others, and obtained assembly approvals in major jurisdictions. EIFS is also a cost competitive cladding in many markets. As a result, EIFS has become an attractive cladding option for use in prefabricated wall panels.

Despite its potential benefits, EIFS also has limitations that must be considered when used as a prefabricated wall panel cladding. By nature of having continuous, and often flammable insulation on the exterior side of the wall, EIFS is susceptible to melting, ignition, and fire propagation. It is prone to impact damage during transportation, installation, and service, particularly at panel edges. Where field repairs or modifications are necessary, it can be challenging to repair the prefabricated panel in the field in a way that restores water-resistive air barrier continuity and provides a matching finish texture. While fully adhered systems offer certain advantages, their water management performance is entirely dependent on the quality of the installation, specifically, the quality of the drainage channels, which is rarely verified. As with any prefabricated panel cladding, joints and transitions to adjacent enclosure systems require a significant amount of forethought and planning while considering constructability in the shop and in the field.

You can realize the schedule and quality benefits of prefabricated EIFS-clad wall panel construction using the three Ps: appropriate scope and detail design during preparation, robust quality assurance and control processes during production, and execution during placement.

Preparation

Scope. A portion of most prefabricated cladding construction projects will inevitably require field installation. Successful prefabricated

cladding projects clearly delineate the prefabricated and field-installed portions of the work. Prefabricated construction is usually conducted through delegated design and affects many project stakeholders, so it is important to have all parties aligned as early as possible during design. Engaging the general contractor, along with a delegated designer and fabricator, early in design to provide insights on scope, construction sequencing, and cost can help streamline the design and construction process.

Establishing the prefabricated construction scope is highly dependent on the type, location, and frequency of unique details in the project. Ideally, prefabricated cladding is installed in a continuous and uninterrupted sequence by a single contractor and with minimal mobilizations. Unique details require coordination and sequencing with other trades, interrupting the prefabricated cladding installation and increasing the risk of mistakes and re-work. These details can negate the schedule and/or cost savings that prefabrication can offer. The general contractor should create a register of all unique details associated with the prefabricated construction scope. The register can be used to identify the trades and sequencing required with each detail and to keep track of changes in detail over time due to changes in design. Three-dimensional models are a great tool for identifying unique prefabricated construction details to populate the detail register (Figure 1). Models do not need to be extensively developed for this purpose; this work can be done early in the prefabrication contractor's design and shop drawing process.

In tandem with determining the prefabricated scope of work, the project team, in consultation with the delegated designer, fabricator, and manufacturer, must determine which parts of the wall panels are prefabricated and which are installed in the field. Wall panels may be fabricated as full assemblies (from the structural backup out to and including the EIFS cladding and fenestrations), bare assemblies (only the structural backup and sheathing), and other configurations in between. Generally, full assemblies yield the most schedule savings and take the most advantage of enhanced quality assurance and control offered by prefabrication. Cost, sequencing, and transportation logistics are some of the reasons a project team may elect to fabricate a partial assembly.

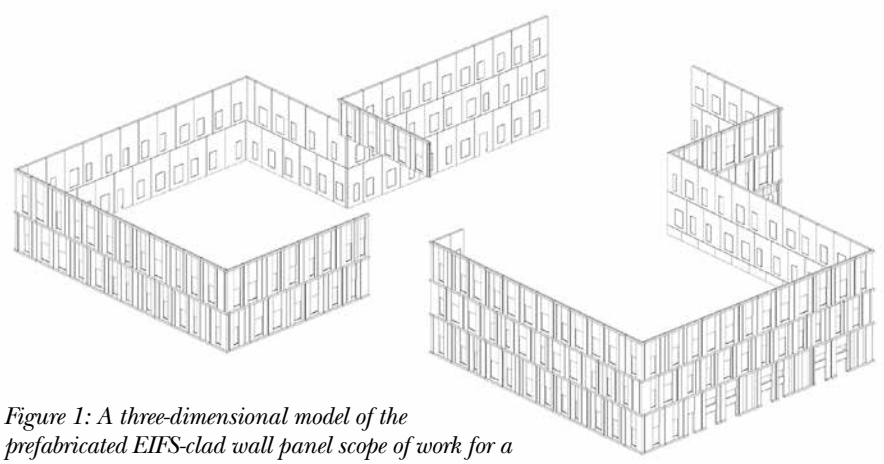

Figure 1: A three-dimensional model of the prefabricated EIFS-clad wall panel scope of work for a commercial project with a modest level of development (LOD300 or less). Even at this stage, a three-dimensional model is helpful for identifying unique prefabricated construction details and potential conflicts.

Joint Type. One of the most critical and challenging aspects of designing prefabricated wall panels, EIFS-clad or otherwise, is providing continuity of the four barriers, thermal, water, air, and vapour, across joints between prefabricated panels and transitions to adjacent enclosure systems.

Joints between prefabricated panels and adjacent enclosure systems that must be given special consideration include:

- Panels to below-grade waterproofing.
- Panels to grade (landscaping and hardscaping).
- Panels to exterior doors.
- Panels to field-installed exterior wall systems.
- Panels to through-wall movement joints (i.e., expansion joints).
- Panels to roofing systems:
- Where the roofing transition is at the base of the panel in a rising wall condition.
- Where the roofing transition is at the top of the panel in a parapet condition.

There are two common joint types in prefabricated construction: butt joints and shiplap joints. Butt joints provide a basic level of weather protection and require less work than shiplap joints during prefabrication and installation but rely heavily on sealant.

Shiplap joints offer redundancy in weather protection due to their inherent layering that sheds water, but they require additional work in both fabrication and field installation.

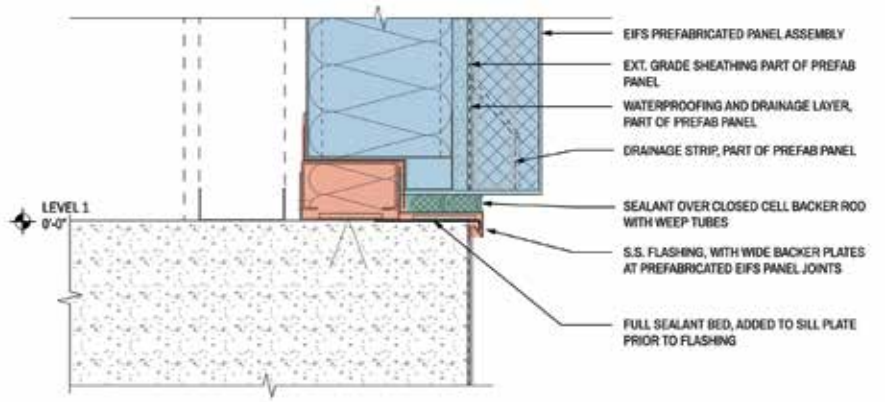

Figure 2: Detail of prefabricated EIFS-clad wall panel at grade using a shiplap-style joint. The blue area represents the prefabricated portion of the joint. The red and green areas represent the field-installed portions of the joint before and after the panel is installed, respectively.

During fabrication, panels are fitted with one-half of the shiplap joint, and in the field, adjoining construction, such as concrete curbs at grade, is prepared with the receiving end of the shiplap joint (Figure 2). Preparing the receiving end of the shiplap joint in the field generally involves one trade installing the joint framing and another trade flashing the framing to integrate it with the adjacent enclosure. This additional work may require multiple trades to make several passes at a detail during construction, depending on how it is bought out and coordinated by the general contractor.

Wall panels with shiplap joints may also require installation in a particular order on the building. The prefabricated wall panel shiplap joint installation sequence should be established early and fully coordinated so that other trades' work can be scheduled accordingly.

Joints can occur more frequently in prefabricated EIFS-clad wall panel construction than in traditional field-installed EIFS construction. Prefabricated panel joint frequency/spacing is often limited by trucking limitations and crane capacities. Panels must fit on the trucks that transport them to the site and in the lanes that the trucks drive in. They must also be safely handled during installation and hoisted onto the building.

Joint Width: Wall panel joint widths are governed by the type and magnitude of the anticipated wall panel movement and joint sealant limitations. The minimum joint width is determined by code-based structural requirements; simply put, panels must not collide during service-level movement. Service-level movement includes both building movements (inter-story drift, floor deflections, and thermal stresses) and panel movements (thermal stresses). Owners can elect to further enhance the structural performance of the wall panels beyond the code-based requirements, using prescriptive criteria based on the owner's tolerance to risk and loss acceptance.

Seismic areas, high-importance structures, and especially the combination thereof generally have the most demanding structural requirements. These requirements are typically met by designing larger joints between wall panels, specifying joint sealants with high movement capabilities, locating panel collision points away from higher-risk areas of the building (i.e., emergency egress and assembly areas), or providing crumple zones in the cladding (areas where it is deemed acceptable for the cladding to crush during movement that exceeds service levels).

On the other end of the spectrum, the maximum joint width is determined by the movement capacity of the sealant material. Gun-grade silicone sealant can be installed into a maximum joint width of four inches. Some manufacturers suggest even stricter joint width limits when using silicone sealants and even stricter still with other sealant chemistries. As the sealant joint width increases, the sealant's movement capability suffers, and it becomes increasingly difficult to reliably install the sealant, especially on vertical surfaces.

Designers and specifiers must also carefully consider panel fabrication and installation tolerances because they directly affect panel joint widths. Irregular joint widths can occur due to a variety of fabrication-related issues, including a buildup of material at panel edges and imprecise panel size and squareness (Figure 3). Installation issues generally include wall panels not being installed plumb; sometimes this can be caused by superstructure installation tolerances that cannot be accounted for by the panel anchorage.

Figure 3: The vertical gap between wall panels is irregular at the four-way panel intersection due to excessive buildup of material at adjacent panel corners.

Designers should consider the appropriate combination of tolerances and anticipated movements in determining panel joint widths. As a result, typical joint widths between prefabricated wall panels and adjacent wall systems can differ from typical joint widths between prefabricated wall panels themselves.

Repairs. Often overlooked, it is critical to plan for wall panel repairs early in the design process. In our experience with prefabricated EIFS-clad wall panel construction, it is likely that some panels will require field repairs or replacement after installation due to construction damage, field modifications, or other unforeseen conditions. Mockups of field repairs should occur before the construction phase to establish standards of what constitutes repairable damage or modification (versus damage or modification that requires full panel replacement) and specify field repair and finish requirements that result in a product acceptable to the owner. It is helpful to include these requirements and procedures in an operations and maintenance manual for the owner/operator at project turnover to address in-service damage.

Due to wear and age, panel components will require repair or replacement. Joint sealants and fenestrations, among other components, are expected to deteriorate and should have an associated inspection, maintenance, and replacement schedule. Give special consideration to means of access for inspection and maintenance activities. It is also important to consider how noise, vibration, and particulate emissions will be controlled during field repairs and replacement work.

Production

Quality Assurance/Quality Control (QA/QC). Prefabricated construction lends itself well to robust QA/QC programs. The project team should establish and vet QA/QC processes well before fabrication and ensure they align with the owner's project requirements and contract documents.

Quality assurance documentation should include information regarding product batch numbers, material manufacture and expiration dates, material installation dates, environmental conditions at installation, and installation procedures.

Quality control documentation should include testing procedures, environmental conditions during testing, testing apparatus information and calibration dates, testing results, and a description of where the testing occurred on the panels and panels tested. It should also include the sizes of the panels, including squareness at corners and flatness along edges, and cladding thickness measurements.

Prefabrication allows the panels to be staged so that all panel components and surfaces are easily accessible for inspection and testing. Prefabricated panels are typically constructed on horizontal surfaces, eliminating the need to work at heights and preventing issues such as falls.

Prefabricated EIFS panel testing should include wet and dry film thickness testing for fluid-applied water-resistive air barriers, adhesion testing for fluid-applied and self-adhered water-resistive air barriers, transition materials, and flashings to the panel sheathing, adhesion testing for the EIFS insulation to membranes and flashings, and adhesion testing for joint sealants at all sealant-substrate combinations planned for use in the field; this includes sealant-substrate combinations to adjacent construction by others. Special inspections of the water-resistive barrier coating must be performed where required by the applicable building code. Metal flashings and diverter tracks can be examined to ensure a positive and outward slope. Under controlled conditions in a factory setting, metal flashings and diverter tracks should be continuous and installed without joints; however, if they occur, they should be examined to ensure they are watertight.

Logistics. The fabricator must consider logistics, including transportation and packaging, when determining which panel components are installed at the shop. Some panel components are at higher risk of getting damaged during handling and transportation. EIFS is especially sensitive to transportation-related damage from lifting and strapping, particularly at panel edges (Figure 4).

Figure 4: Damage along the inner edge of the EIFS-clad wall panel from strapping.

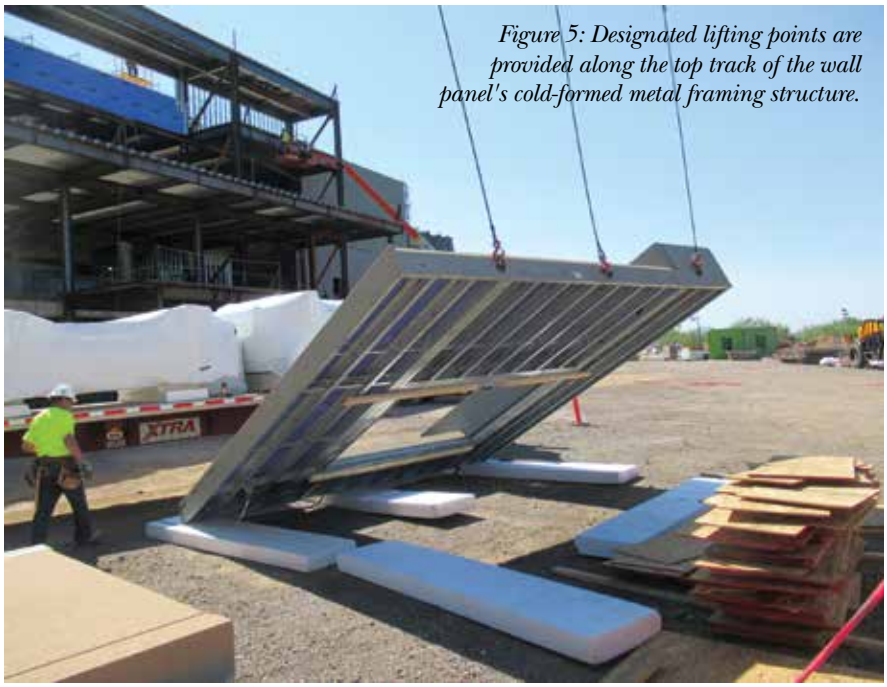

Figure 5: Designated lifting points are provided along the top track of the wall panel's cold-formed metal framing structure.

Designated lifting locations (Figure 5) and touch points for strapping panels to the trucks should be clearly marked on each panel and reinforced in the panel packaging, on the panels themselves, or both. Panels with protruding elements, such as EIFS features, penetration sleeves, or other appurtenances, should also be packaged and oriented thoughtfully during transport to avoid damage.

Modern glazing systems offer solutions that can be fully shop-installed (Figure 6), fully field installed, or partially installed in both. An example of a partially pre-installed window is a flanged, receiver-set system. The flanged receiver framing is fully set in the rough opening, treated at joints and corners, and integrated with the panel water-resistive air barrier in the shop. The glazing and glazing seals are packaged separately and set into the pre-installed receivers, in the field. This is an effective way to provide a robust window installation that takes advantage of the enhanced quality control in the shop when integrating the window flanges and minimizes risk during transportation by leaving the glazing out of the prefabrication portion of the work. As part of selecting the panel scope during preparation, the project team should consider the logistics required to safely handle and transport panels with pre-installed windows.

Figure 6: The punched window system is installed onto pre-treated wood bucks in the panel opening. This process is done entirely in the shop. The panel is shipped to the site with the cladding and fenestrations pre-installed.

When incorporating air-sealed systems like insulated glass units (IGUs) into prefabricated wall panels, consider whether pressure equalizing is necessary. A large change in elevation between where the IGUs are sealed and the project site, over a sustained period, causes stresses in the IGU seals due to the difference in air pressure inside and outside of the IGU. This can lead to early deterioration of the IGU. The pressure difference can also lead to the bowing of the glass panes and visual distortions.

Mockups. Construct mockups that maximize the project-specific prefabricated wall panel conditions. Mockups are beneficial not only for the design team to evaluate the aesthetics of the construction but also for the fabricator to train installers in specific installation roles and techniques, especially for unique details. Approved mockups should be protected and used to establish the technical and aesthetic requirements of the completed work. Consider assigning shop staff exclusively to install shop-fabricated components of the mockups and, conversely, field staff exclusively to install field installed components of the mockups as a training and teaching exercise;

Figure 7: Mockup that includes several typical panel details and aesthetic components for review.

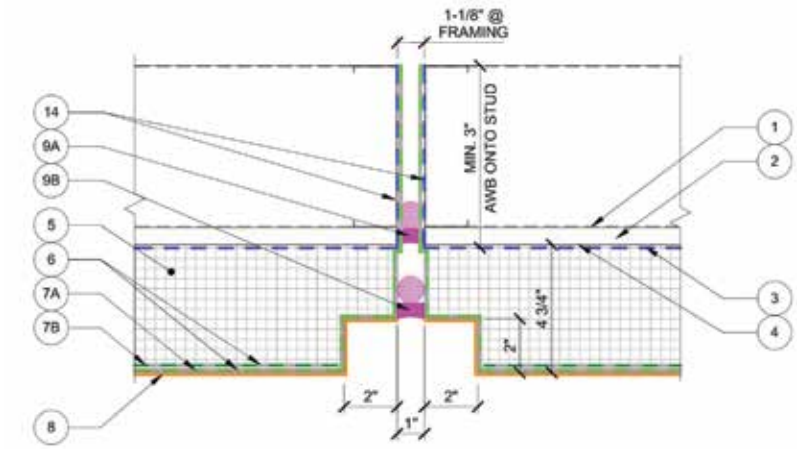

Figure 8: Typical vertical joint between EIFS-clad wall panels, with a centred reveal and dimensions providing clearance to install and inspect both primary and secondary joint sealants.

this applies to both visual and performance mockups if there are multiple.

Mockups should contain all typical conditions, including the field of wall finishes and textures, fenestrations, appurtenances, typical penetrations, and panel joints, including back-wrapped and edge-wrapped panel edges (Figure 7). We also recommend including field repairs in the mockup.

It can be advantageous to construct and display mockups off-site, but consider that the aesthetic evaluation of some components is better suited for the project site, with site-specific exposures, adjacent cladding systems, nearby buildings, landscaping, and hardscaping, among other conditions.

Performance mockup testing can be very valuable if specified appropriately. Consider that certain tests can occur on individual panels at the shop and others must take place on the building as part of the permanent construction. Testing that can be performed at the shop is generally more cost-effective not only for the testing itself, but also for subsequent diagnostic and repair efforts. Testing should be performed as early as possible to identify and repair any systemic issues before the issues are replicated.

Placement

Joints. Joint sealant performance depends on workmanship quality. To ensure consistent results, limit joint sealant installers where possible. Consider employing a project-specific certification system for the installers using the visual and performance mockups (i.e., installers that produce joints acceptable to the design team on the mockups are approved to install joint sealants on site for the project).

Designers can also greatly impact joint sealant installation success in how they provide clearance for joint sealant installation. Consider the space provided between prefabricated panels that include the cladding and finishes; the thicker the cladding, the less access installers have to the joint where they need to install sealant, and the more unreliable the joint sealant installation is. Inspection and maintenance of the joint sealants would be equally as unreliable. Considering that prefabricated panels are generally installed half inch to one inch apart, we suggest that the cladding thickness is limited to three inches immediately adjacent to panel joints. Stepping the cladding thickness down at panel joints with the use of reveals or chamfered edges can provide reasonable clearance to panel joints while maintaining thicker cladding in the field of the panel (Figure 8).

Figure 9: In-progress field repair of a field penetration. The size of the repair area is considerably larger than the size of the penetration itself.

Field Penetrations. Penetration locations should be coordinated so that flashed openings can be prefabricated, however, some field penetrations during construction are inevitable. The repair area for field penetrations is always larger than the area of the penetration itself. It includes the penetration itself, the gap between the penetration and the panel, and the space required to adequately integrate the penetration flashing to the panel water-resistive air barrier (Figure 9). Using the pre-approved repair criteria and procedures established during preparation, contractors can perform field repairs without delay for design approval.

General contractors should engage trades that require exterior wall penetrations, such as mechanical, electrical, plumbing, security, and signage, as early as possible during subcontractor procurement to finalize penetration requirements and locations. These requirements should be monitored as part of the detail register and closely coordinated between the general contractor, relevant trades, the delegated panel designer, and the panel fabricator.

Conclusion

With appropriate coordination during preparation, production, and placement, you can successfully use EIFS in your next prefabricated wall panel project:

- Preparation: Determine an appropriate prefabrication scope of work; be proactive in design detailing by considering both construction and maintenance constraints.
- Production: Make the most of shop fabrication by implementing the right quality assurance and control processes; take advantage of mockups; package wall panels thoughtfully, not only for installation, but for all steps in between, including handling and transportation.
- Placement: Execute within the project tolerances; manage field issues using established project procedures.

The items presented here are based on the authors' experience, are focused on prefabricated EIFS clad wall panels, and are by no means an exhaustive study of the benefits and challenges of prefabricated construction. They convey the importance of planning appropriately for prefabricated EIFS-clad wall panel use on buildings and provide a road map to identify potential issues that can affect the project.

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BUILDING ENVELOPE TOOLS AND TECHNOLOGY

By Nicholas Fuss, A.T., P. L. (Eng.), P. Tech. (Eng). SK, L.L. (Eng.) YT

Stantec

The focus of this article is to briefly explore the historical reliance on specific tools and technologies that have supported the broader practice known as the "building envelope". Much of what defines the building envelope cannot be quantified or assessed through visual inspection alone, making it essential not only to have the right tools, but also to understand how to use them effectively.

A history of the world (of building envelope) — Condensed

In the late 20th century, there was a significant turning point in building envelope engineering where the profession shifted from craftsmanship to data-driven design and performance verification. Engineers and industry began to develop and rely on newer tools to quantify how building envelope systems would perform under real-world conditions.

Blower door systems were introduced in the late 1970s and became more widely adopted in the '80s and '90s. They became the standard for quantifiable measurement of air leakage in buildings. These calibrated fans and pressure sensors allowed for the quantifiable analysis of envelope tightness and infiltration troubleshooting.

Infrared (IR) thermography was originally developed in the First World War where the first IR scanning devices were created for night vision and target detection. The first IR line scanners were developed in the 1950s and were capable of detecting temperature variations across surfaces, although still confined primarily to aerospace and military use. In the '60s, bulky IR cameras became commercially available, primarily for industrial applications, developing further in the '70s where they were used more for civil engineering and building diagnostics. In 1973, there was an oil crisis that created a need to study energy efficiency, and IR thermography was used to visualize heat loss in buildings for the first time. In the '80s, the use of IR cameras was more widely adopted in engineering circles, leading to today where they are widely available and relied upon.

Devices such as hygrometers, dew point metres, and capacitance-based moisture probes were developed as early as the 18th century, expanding in the 19th century where these tools were mostly used in meteorology and laboratory work. In the '70s and '80s, engineers began using dew point metres to predict when and where condensation might appear inside wall assemblies, particularly in cold climates or high-humidity interior environments.

Technology and building envelope

As many components of the building envelope are hidden from sight (air, vapour, heat flow, and the nature of concealed materials), finding issues first began as a reactionary methodology. Modern building envelope design emphasizes preventive strategies grounded in empirical data and historical precedent, establishing performance criteria that are both highly reliable and supported by proven analysis. To assist with this endeavour, the relationship between technology/tools and the ability of specialists and engineers to perform their duties has become a closely linked paradigm.

In this authors opinion, the best and most effective subject matter specialists are those who are able to find the happy medium between using tried and true techniques, and also pushing the envelope on innovation, while not succumbing to marketing strategies and shiny things. In the famous words of the fictional, yet brilliant chaos theorist Dr. Ian Malcolm, "Your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should".

As with many new tools or technologies, users often expect them to revolutionize existing practices — overlooking potential risks, unknown variables, margins of error, and unforeseen impacts.

Artificial intelligence (AI) — Help or hindrance?

The new "cool kid on the block". It is nearly impossible to avoid hearing about AI in almost every aspect of life. With the obvious concerns about potential self-awareness manifesting (i.e.: SkyNet), the inherent risks with AI in building envelope consulting may not be as immediately apparent. AI models typically tend to respond with an absolute level of assurance and confidence, with no context provided for assumptions and limitations. With some simple probing, AI often quickly changes the absolute responses, sometimes in the completely opposite direction.

The building envelope, comprising a series of interrelated systems and components, is exceptionally complex and nuanced, and its definition can vary significantly across regions and among professionals. AI has not yet proven to be developed enough for it to be relied on; however, it can be a particularly strong tool for helping point one in the right direction. Like with any tool, operational intelligence of the user is of utmost importance, without which the results are highly questionable and variable. Similar to what is often encountered in IR scanning, if the tool is being operated by someone that isn't properly versed, it can be misuse in such a way to mislead the operator, end-users, and all manner of stakeholders.

Theory vs. reality — Bridging

One of the most important aspects of the modern world of building envelope consulting is connecting theory and predictive models to real-world construction conditions. The highly skilled and knowledgeable people who work in the theory realm are often at odds with construction reality. It is critical to understand these two realms, and more important to connect the two. In order to do so, the use of the proper tools and technology becomes vital to not only develop proposed systems, but also prove that they have been installed and are performing in the manner in which they were intended. Should there be variation between the two, careful analysis and deep understanding become vital to determine what steps need to be taken, if any.

Without the connection established, and the knowledge to understand what this connection means, vast swathes of analytical effort are effectively useless. Perhaps more concerning, it would mean that buildings are being constructed in a way that does not match what was designed, leading to false senses of security in ownership and operational groups.

Technology innovation

Innovations in the industry are being developed actively, and it is incumbent on those that wish to excel to not become stuck in the "old ways" due to comfort and ease. Presented below are a few innovations that are either in development as fresh technologies, or have been around for some time, yet have not been fully adopted for a multitude of reasons. These are presented without opinion or stake, as informational samples of what might be to come.

Schlieren photography

In theory, this technology involves photography that effectively transforms invisible physics such as heat, air, and motion into visible patterns. The principle of this technology is that a beam of light passes through a test area, and air density changes are detected causing light refraction which can be detected and measured. The base technology was initially invented in the 1860s to study shock waves from explosions and has since been adapted for aerospace testing and thermal fluid studies.

Although Schlieren photography is less commonly used compared to IR technology, it is showing advancements in the building envelope industry. Research is progressing to determine the potential applications which could allow users to visualize air leakage paths around windows, doors, and joints, as well as observing convection currents near glazing or facades. Where IR thermography highlights temperature variations from which inferences can be made, Schlieren photography visualizes actual flow paths and patterns.

Radar/LIDAR/X-Ray

Common in the world of building envelope diagnostics, the phrase, "If I could just see through materials, I'd be rich" — well various research groups are attempting just that. The Oak Ridge National Laboratory (ORNL) has been developing microwave/radar-based non-destructive moisture detection technology which would in theory allow for the measurement of moisture content in wood sheathing inside wall assemblies. Initial lab tests have shown that the camera can detect and measure moisture content with approximately three per cent result differential compared to handheld moisture metres.

The technology uses a selected microwave frequency range where some envelope layers are effectively "transparent" and trapped moisture can create a measurable change in the readings. By measuring the returned waveform (timing and amplitude), the system can map layers and infer detected moisture content.

Progress remains in development and is not commercially available at the time of writing, and has numerous challenges to overcome, but the potential is promising to really change the way we approach existing wood-framed buildings.

Acoustic visualization

Acoustic imaging hardware and software ("sound cameras") are a system of devices that combine arrays of microphones with signal processing to overlay a heat-map of sound sources on a visual image (video) of the subject. This is useful for building envelope diagnostics in that it can detect air leakage paths because air movement or turbulence can generate sound that is visualized.

The theory and use of these systems is not as common as IR thermography for example, but it benefits for not being dependent on exterior temperature conditions, and is not typically considered a single tool, but rather one of multiple tools that should be used in any diagnostic imaging. The tool is also not reliant on pressurization of the subject building, which can cause issues to "hide" in traditional IR scans if not managed correctly.

Artificial intelligence — As-built performance

As previously noted, there are efforts in the building envelope industry to integrate AI as a support tool. Some of the more interesting approaches are attempting to use the computing power and insight of AI to assist with establishing estimated baseline performance of existing buildings. The approach proposes to utilize a variety of methodology and algorithmic computing based on photogrammetry and IR technology. While remaining questionable in terms of accuracy, it begins to provide some measure of establishing a "starting point" for existing buildings, something that is sorely lacking without extensive and expensive comprehensive testing and destructive investigation. These tools remain in development, and it has yet to be seen how they can be relied on in a meaningful way with preliminary results being varied and, in some cases, inaccurate based on assumptions made by the AI models and algorithms. As the use of such a tool grows, caution must be made when relying on the output without knowing how the input data is handled and collated.

New tools and tech — Risks/challenges

New tools and technology come with risks, one of the largest being lack of empirical precedent and challenge analysis. Without an established history of widespread use and success, it is a risk to the user to rely on such information unless their underlying technical knowledge has provided substantial evidence and proven application. Today, when someone uses an infrared thermographic camera, there is an inherent trust in the technology borne from decades of support from manufacturing and user-groups alike. Similarly, something like acoustic visualization has less industry-wide adoption and as a result there is a general lack of familiarity and thereby trust in the system (yet).

Innovation does not occur in a vacuum and sometimes it requires a leap of faith and stepping outside of the traditional comfort zones to help things advance. Those pioneers pushing for new technology need user group input and trials to know how to improve things, and to build support across the community. It is this author's opinion that it is on us, as a user group, to challenge technology and tools, provide valued feedback, use with a high degree of caution, and push back against only relying on that which you know, and is of comfort. A new shiny toy is just that, a toy, unless it can be shown how there is a distinct value versus traditional methods. Too often people are attracted to something because of its perceived level of "advancement", not realizing that it does the same job, or worse, than something simpler.

Proceed with caution — but do in fact, proceed.

Nicholas Fuss currently works as a building science consultant at Stantec in the Calgary office as a part of the greater Building Specialty Services group. He has over 14 years of experience in both new construction and existing buildings, and is particularly passionate about balancing the use of the right tools and technology against those which end up being gimmicks with minimal actual value. ■

ALBERTA CREWS BUILD SAFER STARTS

Alberta's construction crews face a troublesome reality: 55 per cent of injury claims involve workers in their first year with a company. This number reveals a pattern — the worker who hesitates to ask about a procedure, the experienced crew learning new protocols, or the supervisor rushing to meet a deadline are contributing to these injuries.

Struck-by incidents, falls to lower levels, and back injuries are common across worksites. Each incident disrupts more than schedules. An injured worker means recovery time and lost wages while crews adjust to coverage gaps and companies deal with investigations and rising premiums.

Leaders and crews recognize this challenge and are stepping up together. They are creating space for conversations and investing in solutions — understanding that preventing incidents requires both technical knowledge and open communication.

"Leaders create safer worksites when they take an active role by building trust, encouraging teamwork, and acting early to prevent injuries," says Mark Hoosein, ACSA CEO.

Beyond skills training

Technical skills training alone won't prevent these incidents. Factors include unclear expectations and communication gaps that leave crews uncertain about when and how to speak up about safety concerns.

When the ACSA launched Crew Brew visits across Calgary, Red Deer, and Edmonton, leaders encouraged their teams to participate. These onsite visits created space for crews to share daily experiences over coffee.

One participant shared, "Discuss habits and set clear expectations during onboarding and safety check-ins to prevent incidents" — practical advice that resonates because it addresses the gap between knowing procedures and feeling comfortable using them.

Team-centred solutions

Based on industry data and earlier research in partnership with Berlin Communications and MacEwan University, the ACSA developed resources to address common first-year risks. Crew Brew visits later confirmed what crews valued

Safety Showdown transformed routine safety discussions into engaging team competition. Over 500 workers across 150 teams participated, tackling real-world safety scenarios.

Kidco Construction Ltd.'s crew earned an ACSA-sponsored team lunch.

most — practical onboarding tools, engaging toolbox talk materials, and clear ways to reinforce safety knowledge. These insights strengthened the foundation of the ACSA's Injury Prevention Campaign, which also featured the Safety Showdown contest.

Safety Showdown transformed routine safety discussions into engaging team competition. Over 500 workers across 150 teams participated, tackling real-world safety scenarios.

"Safety Showdown was fun and boosted employee participation in safety; I hope it continues," says Christie from Kidco Construction Ltd., whose crew earned an ACSA-sponsored team lunch.

Great resources come from listening to teams, which has led to expanded and refined tools that can be found at firstyear.youracsa.ca.

Impact starts with camaraderie

Everyone has a role in creating safer worksites. Lasting change happens when entire teams adopt the right mindset and demonstrate safe behaviours consistently — and it starts here:

- Stay connected. Subscribe to the Injury Prevention Campaign — we're committed to continuing these discussions to build on what we've learned together.
- Build on your safety talks. Download tools at firstyear.youracsa.ca. These resources include discussion guides that help workers ask questions and engage more actively, plus an onboarding toolkit that reinforces safety behaviours from day one, and more.
- Make it practical. Adapt and implement resources that fit your team's needs and worksite — because hazards look different on every job site. Track and monitor your efforts using our activity summary for first-year worker safety, available at firstyear.youracsa.ca.
- Champion safety. Prepare to onboard first-year workers through the ACSA's Basic Instructional Techniques (BIT) virtual course. Practice real safety training you can bring back to your worksite to empower your crew.

Be part of the journey

Safety excellence drives business excellence. Strong participation in Crew Brew and Safety Showdown proves these solutions work, but more teams mean stronger insights for everyone.

Those who participated in Safety Showdown and used our resources — share your experiences. Tell us what you've implemented and what impact you're seeing. Whether you're seeing improvements, facing ongoing challenges or discovering unexpected insights, this evidence-based feedback will help establish benchmarks and guide our collective efforts to scale these solutions across Alberta's construction industry.

"Your voice, experiences and commitment to excellence will shape the future of safety in Alberta's construction industry," says Hoosein.

Share your feedback at MyEngage (engage.youracsa.ca). ■

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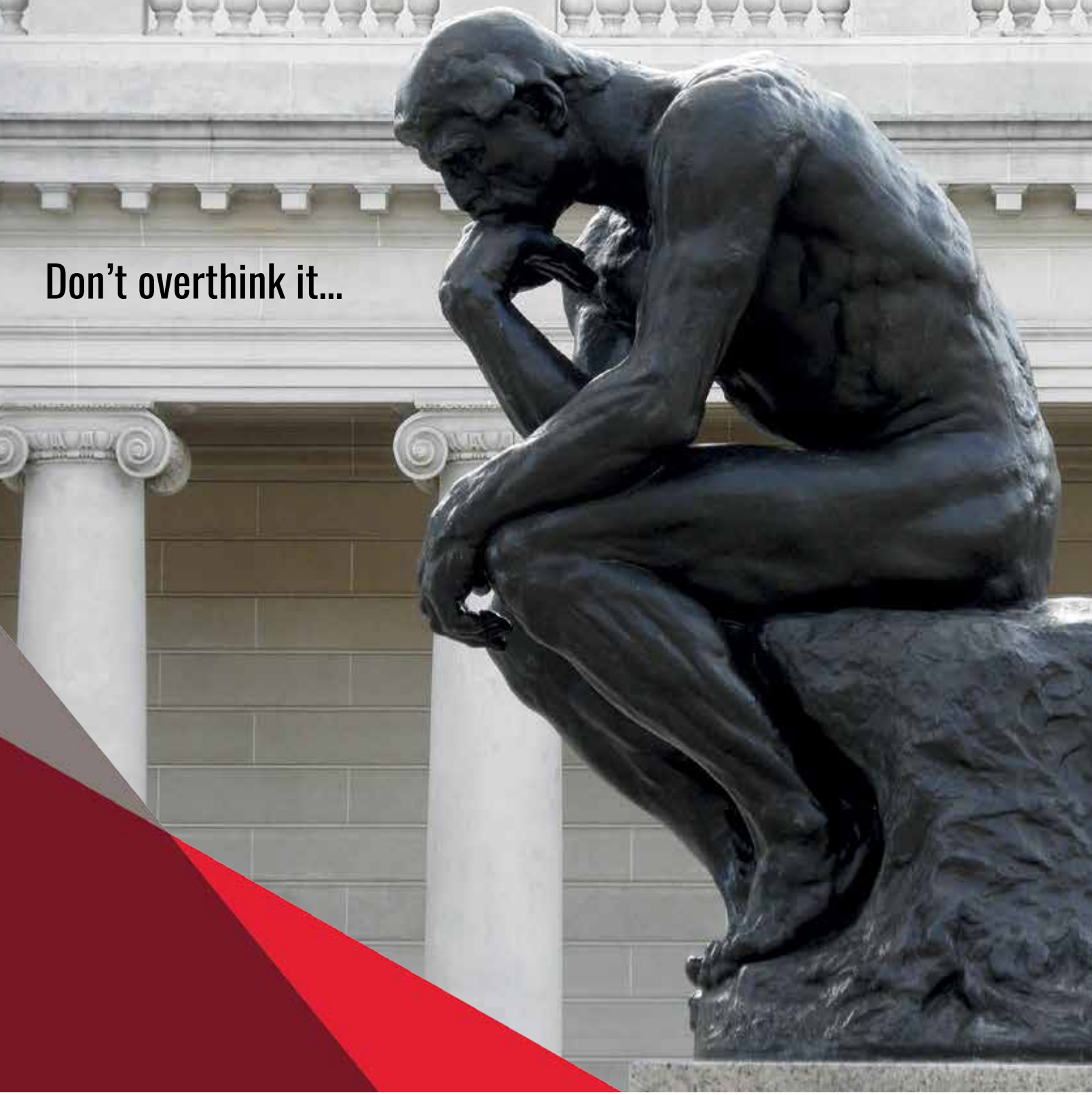

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