PROMOTING THE BUILDING ENVELOPE INDUSTRY ACROSS THE WEST

FALL/WINTER 2015

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A BCBEC PUBLICATION

ENHANCING THE BUILT ENVIRONMENT

Adopting the WELL Building Standard in Canada

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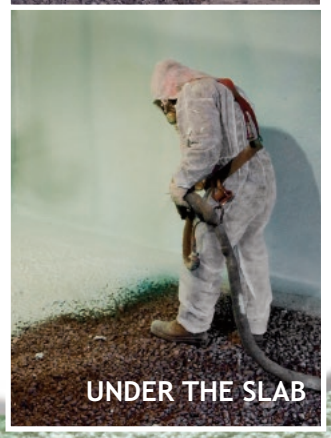

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Thank you for supporting *BCBEC Elements* magazine

FALL 2017
15th Annual Canadian Conference on Building Science and Technology
Watch for More Information

Response to our latest initiative has been very positive. The British Columbia Building Envelope Council (BCBEC) is a non-profit organization dedicated to providing a platform for proponents of the building industry to discuss issues and exchange information on building envelope issues. In keeping with our core mandate, *BCBEC Elements* is another vehicle which provides an opportunity for readers to further education and interaction in the building envelope space.

Our second edition of *BCBEC Elements* will feature a discussion of adopting the WELL Standard in Canada, a profile of Collett Manor (the first Canadian project built to the WELL standard), the design and construction of R22 walls, an update of BCBEC Government Outreach efforts, and an article regarding ventilation and its importance in building design. In addition to our feature articles, our industry interviews profile the career of Bob Thompson, who recently retired from the BC Building and Safety Standards Branch, and Jake Fraleigh, the 2012 BCBEC Education Foundation award winner.

Every year BCBEC's premiere event is our annual All Day Conference and AGM. This year's event is scheduled for Wednesday, September 23 at the Fairmont Hotel Vancouver. Look within this edition of *BCBEC Elements* for a profile of our excellent program.

As leaders of BCBEC, we are particularly proud of the efforts put forward by our directors and volunteers. Initiatives such as our annual AGM and Conference, half-day seminars, regular luncheon presentations, support of local building research efforts through the BRC committee and our efforts to support local building science education programs keep the council busy. In addition to launching our biannual magazine *BCBEC Elements*, BCBEC has been tapped to host the 15th Canadian Conference on Building Science and Technology in fall 2017.

As we grow as an organization, we increasingly require the support and input from our membership and readers. Accordingly, we encourage both readers of *BCBEC Elements* and our BCBEC membership to provide ongoing input, feedback and contributions. Please consider reaching out! ■

ENGAGING IN DIALOGUE WITH GOVERNMENT

By Andrew Pape-Salmon, BCBEC Government Outreach Director

BCBEC launched a government outreach initiative in 2013, focused on the provincial government and major municipalities. Our goal is to inform elected officials and staff on pressing policy matters for the building envelope industry and to raise the profile of BCBEC with lawmakers.

We have sent three letters to the Honourable Rich Coleman, Minister Responsible for Housing, so far. As a result, he provided closing remarks at our 2013 conference and we met with him at the legislature in March 2015.

In 2014, the Board of Directors conducted a BCBEC member survey and 59 respondents highlighted their government policy priorities, the most common being:

- Unified application of the B.C. Building Code across the province,
- Improved compliance and enforcement of building regulations,
- Application of codes and standards to existing buildings; and
- Expansion of energy efficiency standards.

The second letter to Minister Coleman outlined these priorities and requested a meeting. The Minister's Office scheduled a meeting in March that was attended by myself and BCBEC Vice-President Samer Daibess. We worked with the BCBEC Board to prepare a presentation that included results from the member survey and some additional points, such as support for the new *Building Act*, as it aligned with the members' opinions that were articulated through the survey.

In April, a similar presentation was delivered to the HPO Industry and Consumer Advisory Council. At both presentations BCBEC offered to develop a partnership with government to advance our respective interests, seeking input from the building envelope industry on emerging policy issues and helping to chart the future for government policies that affect our industry. *BCBEC Elements* magazine, monthly luncheon seminars, the BCBEC website, email blasts, the annual conference and the CCBST 2017 conference were highlighted as potential conduits for communication.

An example of a policy issue raised by BCBEC Directors is ensuring adequate resources for a more efficient and effective building regulatory system. A number of years ago the Building and Safety Standards Branch proposed a levy on construction to fund a body to evaluate alternative solutions and building products, among other proposals. This did not move forward due to stakeholder concerns about cost and administrative burden. Is this something that BCBEC members would support if there were strict provisions to ensure value for money?

What other activities would you like to see the BCBEC Board pursue with respect to government outreach?

By fall, we will set up a government outreach webpage with copies of the letters sent to government and presentation materials. Furthermore, at the BCBEC conference in September, please see Mr. Pape-Salmon at a booth in the trade show to share your thoughts. Please contact BCBEC through the website at http://bcbec.com/ or email info@bcbec.com ■

VENTILATION:
The Other Part of the Equation

By Molly Rettig, technical writer and communications manager, Cold Climate Housing Research Center, Fairbanks, Alaska

"BUILT TIGHT, VENTILATE RIGHT"

Homes in Alaska are being built tighter than ever before. In an effort to save energy and reduce heating costs, "build tight, ventilate right," has become the mantra of cold climate construction. A modern, well-insulated, airtight home minimizes heat loss through the building envelope, creating a more comfortable, energy efficient, and affordable home over the long term. Homes built in Interior Alaska since 2005 have an average air leakage rate of 3.2 air changes per hour (ACH) at 50 Pascals of pressure – quite airtight compared to the national median of 12 ACH50 (Chan et. al., 2013). This means that occupants can no longer rely on natural air leakage to provide adequate ventilation in newer homes in Alaska, and under-ventilating can lead to health issues as well as structural problems. Mechanical ventilation is a critical component of any energy efficient home, in order to provide enough fresh air to meet occupant needs, maintain balanced air pressure inside the home, and avoid the energy costs of over-ventilating. The Cold Climate Housing Research Center has developed and tested a variety of ventilation strategies that balance energy efficiency and healthy indoor air quality and address the unique climate and culture of Alaska.

INDOOR AIR QUALITY ISSUES

Alaska has some of the most extreme climates on earth. In Interior Alaska, for example, temperatures swing from 90 degrees F in the summer to negative 60 degrees in the winter. With millions of acres of wildfires in the summer and extensive wood burning and cold temperature inversions in the winter, Alaskans are exposed to unhealthy air quality throughout the year. Because of the extreme winters, they also spend more time indoors than people in other climates. For these reasons, ventilation systems are needed that can both filter out pollution from incoming "fresh" air and exhaust contaminants from stale indoor air.

BUILDING SCIENCE – WHY YOU NEED TO VENTILATE

During winter, there is often an extreme temperature differential between the interior environment (typically 70 degrees) and the exterior environment (which can be negative 40 degrees or colder). If moisture is not controlled inside the home, this temperature gradient can lead to condensation in walls, mold growth, and indoor air quality problems.

Vapour drive occurs when water vapour moves to a less concentrated state. In the winter, warm, moist air inside the home

THE BRHEATHE SYSTEM ADDRESSES THE NEED FOR MECHANICAL VENTILATION IN WELL-INSULATED HOMES THROUGH COMBINING HEAT WITH VENTILATION, CONTROLLING HUMIDITY LEVELS AND ENSURING OCCUPANTS RECEIVE ENOUGH FRESH AIR.

tries to migrate through the building envelope to the exterior, where the air is cold and dry. Water vapour escapes through leaks in the building envelope, such as around doors and windows or holes in the vapour retarder. The transport of moisture to cold areas within the wall can lead to water condensation on wood members resulting in mold growth and rot. Older homes often have plenty of air leaks within the building envelope that allow the home to "breathe." But this comes at a cost to efficiency: air that has already been heated a comfortable temperature is replaced with cold air. But new, tighter homes have fewer leaks, thanks to high levels of insulation and good air sealing. That means there is less air flow through the walls, which makes them more energy efficient. But it can also allow humidity levels to build up to unhealthy levels, which can lead to moisture problems.

Signs of high humidity include condensation and frost on the windows and mold around windowsills. Another, less-visible result is condensation inside wall and roof assemblies. When moisture-laden air hits a cold surface, such as plywood sheathing in walls, it condenses into water. If the walls are not able to dry out over time, the condensation can create mold and rot within the wall, leading to structural and worse indoor air quality issues.

Ventilation exhausts stale, moist indoor air and brings fresh outdoor air into the living space, reducing vapour drive and the risk of condensation within the building envelope. It also gets rid of other pollutants like carbon monoxide, generated by combustion appliances, or off-gassing from carpets, furniture or cleaning agents.

VENTILATION OPTIONS

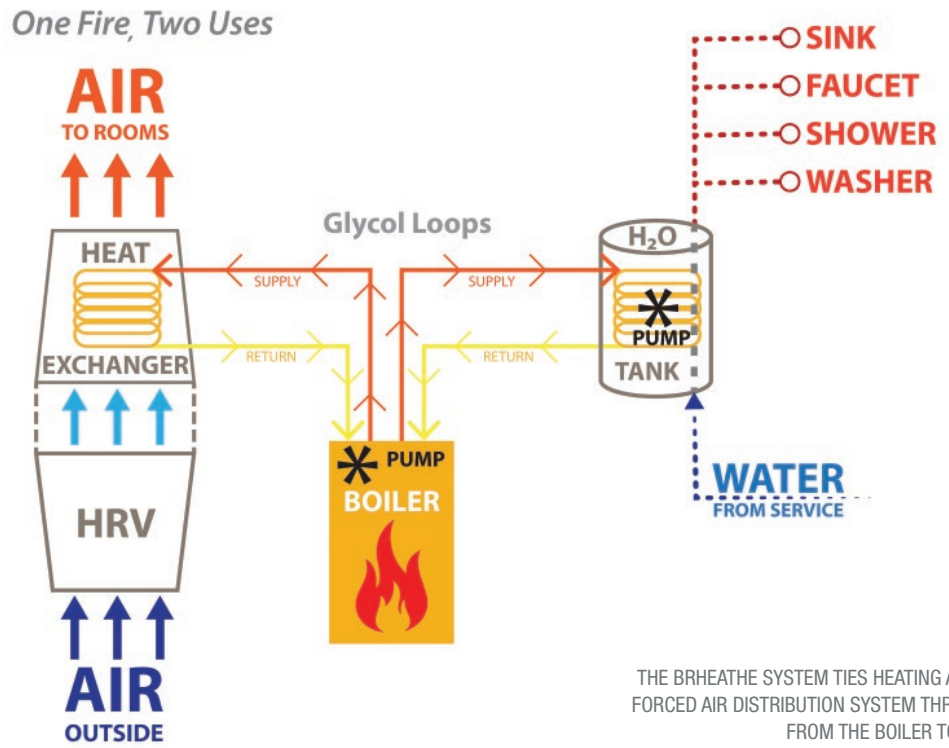
The best ventilation system for a home depends on several factors, including size, occupant behaviour and construction type. For an older, leaky home, exhaust-only ventilation may be sufficient – such as a bathroom and kitchen fan. However, for a tight, energy efficient home, whole-house mechanical ventilation is essential. A whole-house ventilation system exhausts air at the source of pollutants, such as the bathroom and the kitchen, and supplies fresh air to bedrooms, living rooms, and other common areas. Control systems, such as humidity and occupancy sensors, optimize the system to maintain healthy humidity levels and save energy.

In a cold climate, Heat Recovery Ventilators (or HRVs) are ideal for energy efficient homes, providing fresh air throughout the home while conserving heat. HRVs exchange stale indoor air with fresh outdoor air, recovering up to 70 per cent of heat from the outgoing air in the process. Supply and exhaust air run through a heat exchanger core and heat is transferred between the two air streams via conduction. The fresh air is then distributed throughout the home through ductwork, while stale air is exhausted to the outside. A built-in defrost mechanism is activated when the outdoor air reaches a certain temperature to prevent the core from freezing.

COSTS AND SAVINGS OF FRESH AIR

The energy savings of an HRV vary widely depending on type of fuel, average energy costs, and alternative ventilation strategies. For example, the average home in Fairbanks, Alaska would save approximately $550 a year by using an HRV versus exhaust-only ventilation, for a payback period of 11 years (based on heating oil costs of $4 a gallon).

Yet there are also health benefits of ventilation that are difficult to quantify. The cost of poor indoor air quality is seen throughout cold climate regions in the form of allergies and respiratory disease. Alaska Natives have the highest rates of respiratory



THE BRHEATHE SYSTEM TIES HEATING AND VENTILATION INTO A SINGLE FORCED AIR DISTRIBUTION SYSTEM THROUGH RUNNING A HEATING COIL FROM THE BOILER TO THE VENTILATION AIR STREAM.

infection among children and the elderly in the nation. One in five Alaska Native infants are hospitalized each year for chronic lower respiratory problems like bronchitis and pneumonia, up to five times the national average in some regions. These are the often low-income populations living in rural areas with limited access to health care.

THE BRHEATHE SYSTEM

CCHRC's 2014 Alaska Housing Assessment found that 60 per cent of homes in Alaska are under-ventilated, meaning they are relatively airtight and lack mechanical ventilation, putting them at greater risk of poor indoor air quality. This stems from lack of awareness of the importance of ventilation, at both the building industry and homeowner level. Often residents will retrofit their homes to save energy, through insulating and air-sealing, making the building envelope tighter without adding ventilation. HRVs are the solution, but there are several barriers. Because of poor performance and freezing issues in the past, which have since been addressed, there is a stigma against HRVs among some communities. There is also the notion that HRVs waste energy and bring in cold air. This has led some occupants, particularly in rural communities, to disable the system by turning it off or blocking air vents.

To address the health risks of under-ventilation, CCHRC designed an integrated heating and ventilation system called the "BrHEAThe System." BrHEAThe ties heating and ventilation into a single forced air distribution system. Incoming air is brought in through the HRV system and passes through the heat exchanger, gathering heat from warm exhaust air. Next it passes through a second heat exchanger, where a coil of glycol is run from the boiler. The air is boosted to its final delivery temperature and distributed throughout the building. The BrHEAThe System uses a conventional boiler that can be used for both space heating and domestic hot water. It has been installed in several high-efficiency homes that CCHRC has designed throughout Alaska, maintaining healthy humidity levels and saving energy.

With the high cost of energy and extreme climate of Alaska, energy efficiency is a priority for homeowners, with immediate savings that last for the life of the home. The importance of healthy air is not as apparent, but when neglected can lead to serious health and structural issues. After addressing the foundational principle, "Build tight, ventilate right," CCHRC has tackled other barriers to HRVs. The BrHEAThe System is one solution that provides users the ability to achieve thermal comfort while also maintaining healthy air in energy efficient buildings. ■

Chan, W., Joh, J., Sherman, M. (2103). Analysis of air leakage measurements of US houses. Energy and Buildings. 22. 616-625.

Wiltse, N., Madden, D., Valentine, B., Stevens, V. (2014). 2013 Alaska Housing Assessment. Cold Climate Housing Research Center. Prepared for: Alaska Housing Finance Corporation.

This article highlights a cold climate example of principles that are also applicable in coastal areas to meet building code objectives.

PEOPLE POWER:

Q&A With Bob Thompson

By Kelly Parker

Bob Thompson retired recently, wrapping up a distinguished 42-year career. His ultimate position was as a building code administrator with the British Columbia Building and Safety Standards Branch, but his career path included 11 years with the City of Burnaby, four years as a building code consultant with the Office of the Fire Commissioner, and a couple of years with an architects' office before signing on with the province in 1989.

John Nicol, Senior Policy Analyst with the Building and Safety Standards Branch, told *BCBEC Elements*, "Bob Thompson was the voice of the Building Code in B.C. for a generation of building officials, builders and other code users as well as for the national code development system. When I think of how many people we now employ to do everything Bob managed to do almost single-handed, it's hard not to be impressed – even more so since he did it with such patience and grace."

Thompson initially accepted the position with the government of British Columbia as a natural progression in his code development career path, and hoping that working with the Building Standards Branch would allow him to interact more broadly across the construction industry.

In the 1990s, when British Columbia was involved in what was to become known as the "leaky condo crisis," Thompson was asked personally by Dave Barrett to represent the Building Standards Branch and provide input to the Barrett Commission. It was a challenging time that brought with it the threat of a class action lawsuit, but out of which came the essence of what is now known as the Building Envelope Research Consortium (BERC). BERC was formed during the leaky condo crisis and was reconstituted as the Building Research Committee of BCBEC once the crisis had passed into history.

Described as a "pragmatic change agent" who worked closely with the entire construction industry to help facilitate building and safety code development, Thompson took time out to sit down with *BCBEC Elements* and share some final thoughts on the industry before calling it a day.

BCBEC Elements: Speaking as a member, what do you see as BCBEC's most valuable activities/services?

Bob Thompson: Education of the construction industry from single family homebuilders to large commercial and institutional buildings through BCBEC's lunch presentations, half-day seminars and conferences. Right from the early days of what is today known as the Building Research Committee (the BCBEC sub-committee) it was necessary to understand how buildings worked and to "pay attention to the details," and now it's as important as ever to continue to educate and inform the industry, which is of course the core mandate of BCBEC.

BE: In your view, what are the most misunderstood aspects of the code development and code administration process (by jurisdictional authorities, but also by professionals and the public)?

BT: The code development process is not generally well understood by the general public and even industry often wonders why it takes so long. The reality is that Canada is a large country with many diverse stakeholders. The current code development process occurs on a five-year cycle. While managed by NRC and Provincial/Territorial governments, it's reliant on the efforts of volunteers who donate significant amounts of time to move things forward. Canada's building code and the process by which it is developed are internationally respected but it is (a) complex and expensive process. Over the years, while technology has helped there is no substitute, in my opinion, for face-to-face meetings. At the same time, it is increasingly challenging to make these meetings happen with the regular business commitments of the volunteers. Building codes are regulations – legal statements that should not be open to interpretation – and it's extremely challenging to construct the wording to achieve that, just as it's challenging to involve the public in the code development process and code review. We encourage as much involvement as possible, but the response can often be somewhat underwhelming and less broad than we hope, so I always encourage people to get involved and better understand the process and effort behind the whole process.

BE: How do you think the code development process can be improved?

BT: I think that could happen in three areas: It's extremely critical that the code development process is funded more effectively. Since the late '90s when a new continuous process was developed and implemented, there have been increasing challenges and demands on the existing code sales funding model employed provincially and federally. Alternative funding methods like the new Australian model, for example, should be considered. Secondly, there needs to be more public input on the development, review and implementation of codes, and finally, the construction industry seems to want more consistency of approach and more effective regulations, but the challenge is that it doesn't seem to have an appetite for funding it.

BE: What have been your proudest accomplishments at the building and safety standards branch?

BT: Well, I'm proud of being involved in the national and provincial code development process. It has been a challenge over the years to listen to and balance the messaging of the various industry stakeholders including designers, contractors and various levels of government, code officials and numerous others. I feel privileged to have worked with so many and forged strong relationships over the years. I'm also proud of the fact that B.C. is well-respected nationally as a contributor to the code development process and that our relationship with the "NRC Code Development Group" has strengthened over the years. The six-storey wood frame code development process is a good example. Building and Safety Standards was able to complete that process in about 18 months, and in a format similar to the process used at the national level, which speaks clearly to the healthy working relationship with the Canadian (Codes) Centre and the Canadian Commission on Building and Fire Codes. It's also very gratifying to know that my interactions with the industry and general public have been generally positive. I have many examples of where people have thoughtfully reached out to express their thanks for the efforts my colleagues and I have made over the years.

BE: Looking back now, what work that you did do you feel had the most impact?

BT: The two broad subject areas that have had the most impact / involvement in my career are Accessibility and the Building Envelope, which were both challenging and enjoyable. Although the area of Accessibility has gone somewhat quiet over the last several years, the learning and continuous improvements with respect to the building envelope persist. Most importantly for me, however, are the many great people I met and worked with throughout the years; they made my career very satisfying. ■

Building WELL

Adopting the WELL Building Standard in Canada

By Richard Woodbury

The WELL Building Standard bills itself as the world's first building standard focused exclusively on human health and wellness. It uses the built environment as a way to support human health and well-being and does this through combining best practices in design and construction with evidence-based medical and scientific research. "WELL Certified spaces can help create a built environment that improves the nutrition, fitness, mood, sleep patterns, and performance of its occupants," reads its website.

The Well Building Standard is made up of seven categories that play an important role in the health of an individual who is an occupant in a given building. The categories are air, water, nourishment, light, fitness, comfort and mind.

The standard has some overlap with another certification, the Living Building Challenge, a certification that calls itself the "most advanced measure of sustainability in the built environment possible today." The certification is similarly based on seven performance categories, which are called place, water, energy, health and happiness, materials, equity, and beauty.

In Canada, the WELL Building Standard was formally introduced in June 2015 at the Canada Green Building Council National Conference and Expo. "The feedback has been tremendous," said Callie Shumaker Stanton, a spokesperson for Delos, the company behind the WELL Building Standard.

WELL has its roots in a Clinton Global Initiative commitment made by the founder of Delos, Paul Scialla. The commitment was "to improve the way people live by developing spaces that enhance occupant health and quality of life by sharing WELL globally," reads Delos' website.

Shumaker Stanton said a number of projects are already registered for WELL

Certification in Canada. However, because they are privately registered, Stanton said she can't disclose specific information about the projects.

Getting WELL Certified is a five-step process, the first of which is registration. The second step requires that projects complete documentation relating to the process, while the next step is called Performance Verification (PV). PV consists of a site visit by a WELL professional to conduct visual inspections to verify documentation and performance tests to evaluate that specific requirements are being met, such as air and water quality, noise and temperature. Assuming a project has met the first three steps, it will receive WELL certification (step four).

The final step is recertification. Part of the WELL Building Standard's focus is that projects over time maintain "the same high level of design, maintenance, and operations," according to the company's website. For certain types of buildings, WELL certification is only valid for three years, so recertification is needed to ensure the building continues to perform to the WELL Building Standard.

There are three WELL Building Standards: silver, gold and platinum. Certification depends on meeting certain "precondition" and "optimization" standards, of which there are a total of 102. For a project to achieve platinum status, it must complete all 102, while the standards for the silver and gold certification are less rigorous.

Some examples of preconditions include meeting standards for air quality, air filtration, water quality, visual lighting design and exterior noise intrusion, while some optimization examples are increased ventilation, humidity control, antimicrobial surfaces, sound barriers and individual thermal comfort.

To help promote the WELL Building Standard in Canada, Green Business Certification Inc. (GBCI) and the Canada Green Building Council (CaGBC) announced an agreement in early June to promote and advance the WELL Building Standard. The president of GBCI has lofty expectations for the standard. "Just as LEED [Leadership in Energy and Environmental Design] has transformed the building sector to address environmental accountability, WELL will further that vision by focusing deeply on the people in the buildings and providing developers and owners with a new way to account for health and human occupancy challenges," said Mahesh Ramanujam, GBCI's president, in a statement.

(In Canada, GBCI is responsible for the third-party certification of the WELL Building Standard. GBCI is also responsible for LEED certification in the country.)

The statement adds that in Canada there are more than 5,300 LEED projects – which works out to almost 80 million square metres of space – making Canada the top producer of LEED projects outside of the U.S.

Given Canada's fondness for green building projects, it is reasonable to assume the country's developers will no doubt be interested in considering adopting the WELL Building Standard.

Alex McGowan, the vice president of technical services with Levelton – a B.C. headquartered multidisciplinary firm of consulting engineers, scientists and

technologists, which has since been acquired by WSP Global, an engineering professional services consulting firm that is currently working on a WELL standard project – sees parallels between LEED's history and WELL's potential. "LEED took a little to get going," he said, noting that he feels people are still trying to wrap their heads around the WELL Building Standard and how it would work for them.

McGowan said the WELL Building Standard pushes the envelope beyond LEED. "In this case, I think they've taken a bigger leap and said, 'OK, we're getting to a place where the buildings are fairly sustainable and energy efficient and environmentally appropriate, let's take it to the next step,' so it's looking more at the occupants of the building," he said.

Regan Smith, the director of sustainability and energy with WSP in the Greater Toronto Area, shares a similar line of thinking about the WELL Building Standard. "It goes beyond a building's energy and water use and focuses on best practices that address features such as water and indoor air quality, sound reduction, nutrition and fitness. With 90 per cent of our time spent indoors, and with increases in chronic diseases, obesity and stress in our society, WELL has created a tool to maximize indoor environments that improve human health and wellness," she wrote in an email.

McGowan said that with anything that is new or different, it can be human nature to hear that thing be criticized or panned. He said the WELL Building Standard will get that reaction too because it's audacious, much like LEED wasn't universally embraced in the beginning. McGowan cautions people will need to give the WELL Building Standard a chance.

"IT GOES BEYOND A BUILDING'S ENERGY AND WATER USE AND FOCUSES ON BEST PRACTICES THAT ADDRESS FEATURES SUCH AS WATER AND INDOOR AIR QUALITY, SOUND REDUCTION, NUTRITION AND FITNESS."

REGAN SMITH, DIRECTOR OF SUSTAINABILITY AND ENERGY WITH WSP IN THE GREATER TORONTO AREA

The WELL standards relating to air and water quality are two things that might seem a little odd on the surface for a country like Canada. After all, Canadians (generally) enjoy great air and water quality.

In other parts of the world, those standards would certainly have greater relevance. For example, "In developing nations, 80 per cent of diseases are water-related," notes Environment Canada's website.

Closer to home, those standards do have relevance. "While some of these things (standards) are fairly global in their scope, there are things you can take out of each one of them and say, 'Well, locally this actually does matter to us," said McGowan.

Looking at B.C. for example, in mid-August, there were air quality advisories in effect for parts of the province because of wildfires. When McGowan lived in southern Ontario for a time, he remembers air quality advisories being issued each summer after a number of nuclear power plants were shut down and coal-generated ones were fired up in their place.

When working on a project, McGowan said the building science sector could play an important role in helping the WELL Building Standard get adopted. He said the sector has a responsibility of letting clients know what the different options are for projects and articulating the costs and benefits of the options. Ultimately, it will be up to the clients (and the broader market) as to whether they choose to embrace the WELL Building Standard.

Smith says clients are asking about the WELL Building Standard. "We are seeing an increase in the number of building landlords and corporate tenants asking about WELL certification in an effort to support the health and well-being of their employees and building occupants," she says.

For the people working on the projects themselves, McGowan cautions that the standard promotes integrated design, so everyone working on a project has to understand their responsibilities and how their component fits into the larger puzzle. This will place an increased emphasis on the need for team members to work together from start to finish on a given project. ■

COLLETT MANOR

RENDERINGS COURTESY OF GTA GARRY TOMPOROWSKI ARCHITECTURE

One project aiming for WELL Certification is Collett Manor, a proposed four-storey building in Kelowna right across from the Kelowna General Hospital that will feature a mix of residential space devoted to short-term, long-term and permanent stays, as well as commercial space.

The brainchild behind the project is Alana Marrington, whose experiences with caring for ill family members are what inspired her. She envisions some of the residential units for the manor will be used by people who are visiting loved ones staying at Kelowna General Hospital. The ability to be staying right beside the hospital as opposed to being a lengthy distance away is key. "You don't know if the person in the hospital, who is maybe a 20-minute drive away, is going to make it when you get that phone call," said Marrington.

The 82,000-square-foot building will have 41 residential units, of which the residences will take up 45,000 square feet. The plan is for the commercial tenants to provide services that complement each other and the area.

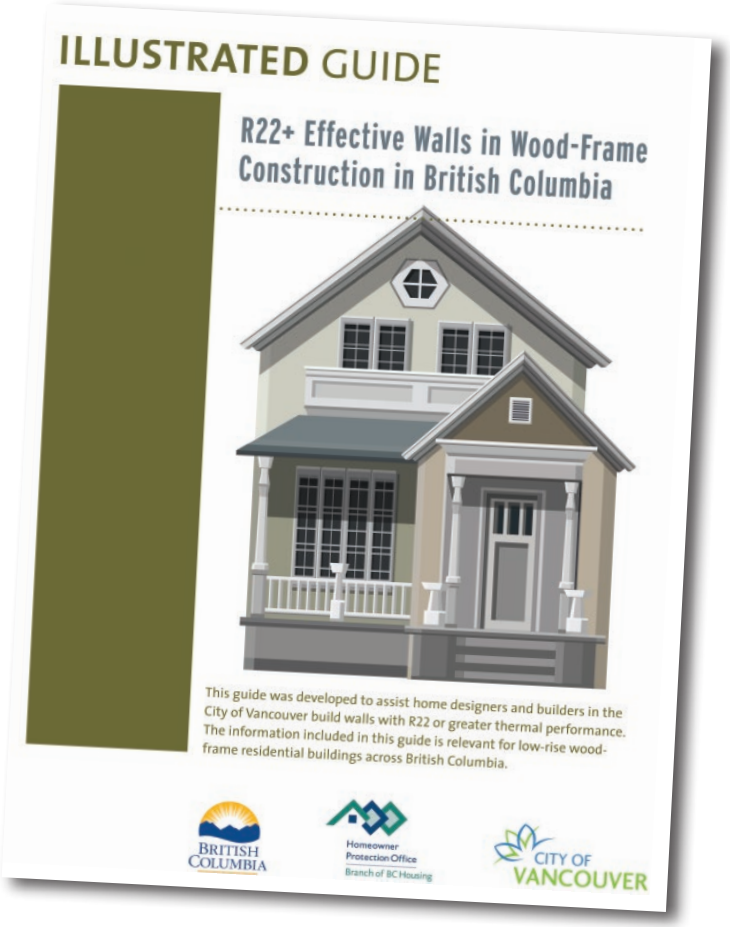
Marrington envisions the manor having a café, market, pharmacy, as well as doctors' offices. With a suite of medical services offered, short-term visitors could even use Collett Manor for their accommodations.

Marrington said the project's next step is to finalize designs, line up financing for the project, write up a disclosure statement, begin the sales process and apply for a building permit. Construction could begin as early as Jan. 1, 2016 and the plan is to have the building open in August 2017.

Some of the features the building will have are the use of ultraviolet germicidal irradiation (UVGI) in the air exchangers to kill bacteria in the air, installing an ozonation water system where the water line is fed into the building to ensure all water taps have purified water, as well as the use of clay on the walls that helps absorb odours.

Marrington said people will feel better after spending time in Collett Manor. "You should feel a little more comfortable in your breathing and being," she said. ■

NEW GUIDE HELPS INDUSTRY BUILD HIGHER PERFORMANCE HOMES IN B.C.



The B.C. building industry has a new user-friendly guide to building higher performance walls: the *Illustrated Guide to R22+ Effective Walls in Wood-Frame Construction in British Columbia*, co-funded and co-published by the Homeowner Protection Office (HPO), a branch of BC Housing, and the City of Vancouver. The guide consolidates information on above and below grade wall assemblies for low-rise wood-frame buildings, which are capable of meeting R22 (or greater) effective thermal performance.

This thermal performance level is now required by the 2014 Vancouver Building Bylaw for new single-family homes, and represents a significant increase in the required level of performance from previous codes.

The new guide will assist industry in meeting this thermal performance level without compromising other aspects of building enclosure performance, including moisture management, air leakage and durability.

The guide applies to low-rise wood-frame residential detached, semi-detached (e.g. duplex to quadplex), and row-houses/ townhomes. This article introduces some of the material presented in the new guide.

BUILDING ENCLOSURES OVERVIEW

A building enclosure is a system of materials, components and assemblies that physically separate the exterior and interior environments. One of the functions of a building enclosure is to provide thermal insulation to help temper indoor temperatures. The guide stresses that for a building enclosure to perform well it must also control water, air, heat, water vapour, fire, smoke and sound. The enclosure is also an important aesthetic element of the building.

R-VALUE CALCULATIONS

Building codes are moving towards specifying the minimum total effective thermal performance of a wall assembly, instead of simply specifying the nominal performance of the insulation within the wall. Therefore, it is important for builders to understand how effective thermal performance values are calculated. The guide shows how to calculate R-values using the *Isothermal Planes* method. Wall assemblies which include multiple components (such as insulated stud walls) are calculated using the *Parallel Paths* method.

CLADDING ATTACHMENT

A number of the wall assemblies that are presented that achieve R22 thermal performance require exterior insulation, which, combined

with their associated cladding attachment and detailing, will be new for some builders.

In a conventional wood-framed wall assembly, cladding is attached either directly to the sheathing, or over vertical strapping fastened directly to the stud wall and wood sheathing. The addition of exterior insulation increases the distance between the sheathing and the cladding, thus changing the loading arrangement. The guide discusses key elements to consider when using a number of attachment methods, including: fasteners through insulation, proprietary thermally efficient spacers and clips, continuous strapping or wood spacers, masonry ties, and structural adhesives.

AIR BARRIER SYSTEMS

The guide has a detailed section covering air barrier systems given the large role they play in the overall performance of the building.

Limiting the amount of uncontrolled air leakage through the building enclosure is important to limit energy loss due to exfiltration, to reduce the potential for air leakage and associated condensation, for occupant comfort, and for indoor air quality.

For an air barrier to be effective, it must meet five design requirements:

1. All the elements (materials) of the air barrier system must be adequately air-impermeable.
2. The air barrier system must be continuous throughout the building enclosure – including at transition and penetration details.
3. The air barrier system must be structurally adequate or be supported to resist air pressure forces due to peak wind loads, sustained stack effect, and mechanical equipment such as fans.
4. The air barrier system must be sufficiently rigid or be supported so that displacement under pressure does not compromise its performance, or the performance of other elements of the assembly.
5. The air barrier system should have a service life as long as that of the wall and roof assembly, or alternatively, be easily accessible for repair or replacement.

A number of different systems exist which can fulfill these requirements, with each having potentially positive and negative attributes. The guide discusses key attributes of different interior air barrier systems (i.e. sealed polyethylene and the airtight drywall approach) as well as exterior air barrier systems (i.e. sealed sheathing, and sheathing membrane).

Typically, the most important factor in designing air barrier systems is maintaining continuity at transition and penetration details. Some of these details are provided in the guide in graphic form, to highlight key locations for maintaining air barrier continuity.

EXTERIOR WALL TYPES

The guide presents four different types of above-grade exterior assemblies, as well as two types of below-grade assemblies.

For each of these assemblies, the guide presents:

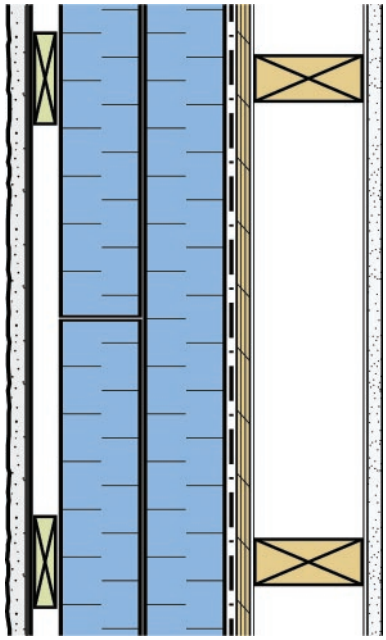
- Overall descriptions

- Key considerations
- Potential cladding attachment methods
- Discussions on water resistive barrier, air barrier and vapour barrier
- Potential insulation types
- Drainage consideration (for below-grade assemblies)

The guide indicates best practices in air, vapour and moisture management, which often exceed the minimum requirements specified by relevant building regulations. This promotes the construction of effective and durable assemblies.

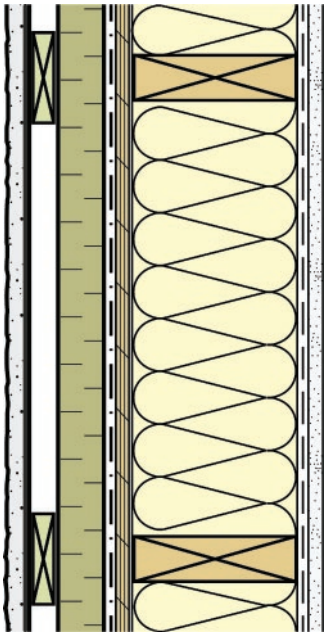
In addition to the six main assemblies covered by the guide, the guide includes a brief overview of alternative wall assemblies that could potentially be used to achieve the R22 thermal performance target, but as of yet are generally less common. As well, the guide shows a number of wall assemblies that would not be able to meet these targets.

The guide ends with a one-page summary where all six assemblies are presented. This summary highlights the minimum insulation levels required to achieve R22, along with a key consideration for each wall type:



EXTERIOR INSULATED WALLS

The method of cladding attachment is important to limit thermal bridging through the exterior insulation while adequately supporting the exterior cladding.

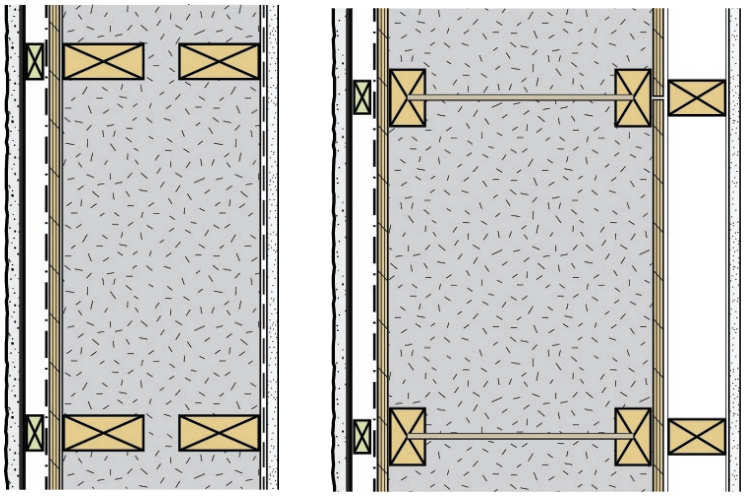


SPLIT INSULATED WALLS

The vapour permeability of the sheathing membrane and the exterior insulation should be carefully considered, so as not to create a risk of condensation within the assembly, or to intolerably reduce its ability to dry.

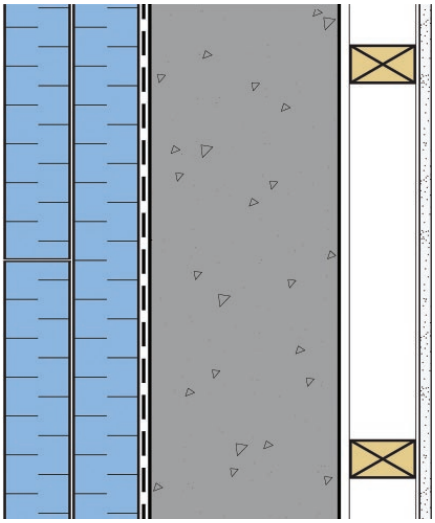
DOUBLE STUD WALL

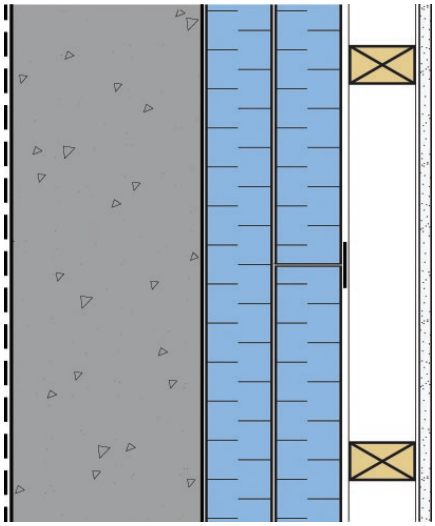
DEEP STUD WALL WITH SERVICE WALL



DOUBLE STUD WALLS AND DEEP STUD WALLS WITH SERVICE WALL

Continuity of the air barrier and installation of a vapour barrier are fundamental to the performance of this assembly as the slightly decreased exterior sheathing temperature increases the risk of condensation and related damage.





EXTERIOR INSULATED BASEMENT

The exterior of foundation walls can be difficult and expensive to access post-construction. Consequently, it is prudent to design these assemblies conservatively with respect to water penetration and to use durable materials.

INTERIOR INSULATED BASEMENT

Detailing of the wall to ensure continuity of the water resistive barrier, air barrier, vapour barrier and insulation at the below grade to above grade wall transition is important to the overall performance. ■

ACKNOWLEDGEMENTS

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BCBEC FOUNDATION AWARDS PROFILE:

Jake Fraleigh

By Matthew Bradford

The BCBEC Foundation was created in 2006 to recognize and reward post-secondary students and apprentices who have gone above and beyond in their studies within the field of building envelope design, construction and technology.

Since the program's launch, the BCBEC Foundation has provided a number of up-and-coming leaders with thousands of dollars to assist them in pursuing their industry careers. In 2012, British Columbia Institute of Technology (BCIT) student Jake Fraleigh joined the long list of recipients and received $1,500 for his success in the school's Building Engineering Technology program.

Now, three years later, *BCBEC Elements* reached out to Jake for an update on his career, his successes and what's kept him busy.

BCBEC Elements: What have you been up to since winning the BCBEC Foundation's award?

Jake Fraleigh: After BCIT, I wanted to continue building in residential construction. I was offered a position as lead carpenter on a challenging project in Deep Cove with Econ Group, a local custom home builder. It was a really interesting and difficult build. The site was a very steep and narrow waterfront lot, and the blasting work alone was $100,000-plus. That, coupled with a large, 16-foot cantilever over a 30-foot cliff, made it an exciting project. In fact, the project's nickname was "Cliffhanger."

I was lead on that project until it completed. Then, I went back to BCIT for the Construction Management degree, which was an intense, 10-month program I finished up last year.

After getting my degree, Econ Group offered me a project management position. They are building some interesting homes, and won the National SAM Award for the Cliffhanger house. They are also focused on Passive House, which is a voluntary building standard that zeroes in on building envelope efficiency – a big interest of mine.

Now, I'm managing a project in North Vancouver that will be the first certified Passive House in the city. Soon, I'll be starting a project that will be a certified Passive House duplex in Vancouver, and I'll be managing that job as well. So I've been busy.

ABOUT THE BCBEC FOUNDATION

The BCBEC Foundation functions as a society under the BCBEC banner, and is run by members of the BCBEC Board of Directors. Its mission is to "promote the pursuit of excellence by all individuals and groups having an interest or involvement in the design, construction or other technical aspects of the 'building envelope,' and includes the organization and/or sponsorship of meetings, seminars and other activities for the education and professional advancement of those individuals and groups."

BE: How has the BCBEC Foundation supported your career?

JF: I'm very committed to investing in my education and learning as much as I can. After BCIT I took the Passive House design course and paid the fees with my BCBEC award.

BE: Financial support aside, how have you benefitted from being part of the BCBEC community?

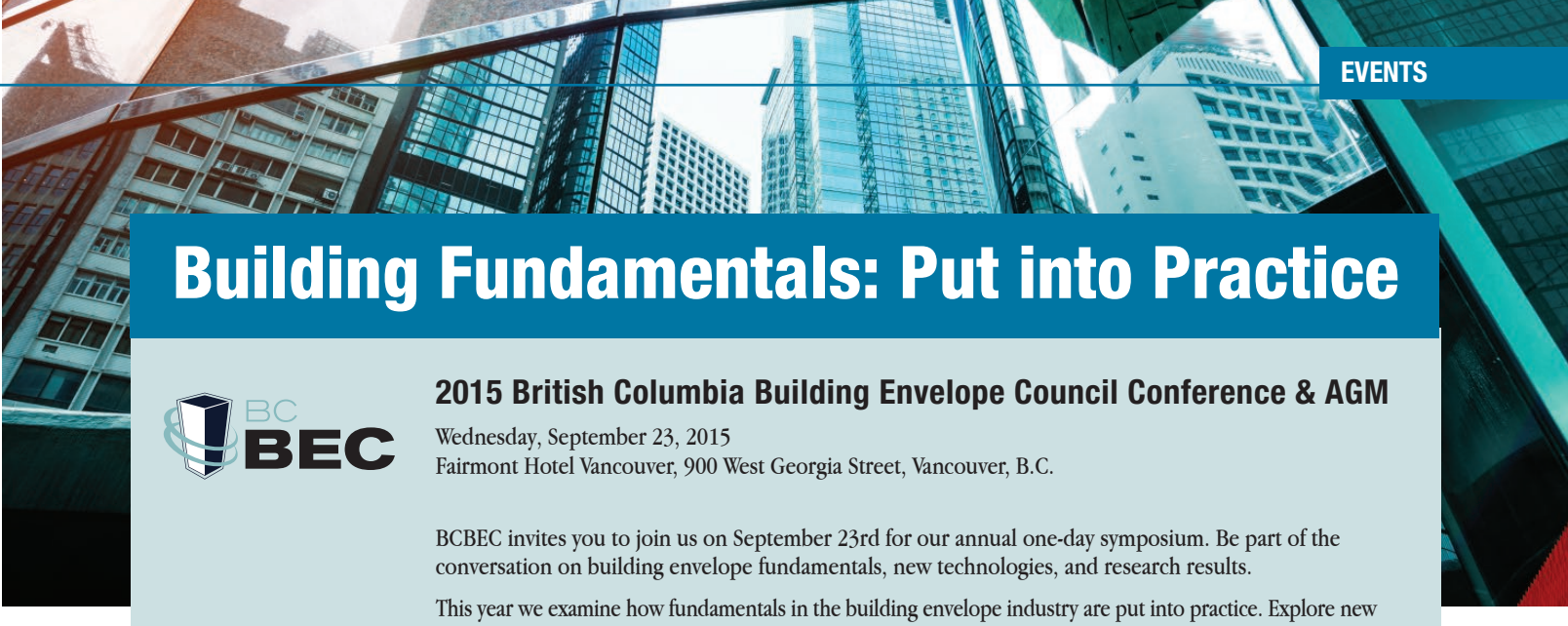
JF: While in the BCIT program, I attended as many BCBEC functions as I could, like their AGMs, workshops and luncheons. As a student, the lowered fees were extremely generous. I met a few people that way, and have kept in contact with them. I now attend some of BCBEC's functions – at least the ones that pique my interest.

For me, it's important to keep that knowledge streaming and BCBEC has been a great source for acquiring new knowledge and information. Because the industry is always evolving, keeping current is critical.

BE: What advice would you give to students who are starting to get involved with BCBEC?

JF: As a student, definitely take advantage of what BCBEC has to offer. The lectures, talks and workshops are firsthand industry-based knowledge that's sometimes hard to find. You learn from experience and the speakers are sharing what they have learned. Take advantage of what BCBEC is offering while you can.

To learn more about the society and future award opportunities, visit www.bcbec.com/foundation.php.



Building Fundamentals: Put into Practice

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Wednesday, September 23, 2015
Fairmont Hotel Vancouver, 900 West Georgia Street, Vancouver, B.C.

BCBEC invites you to join us on September 23rd for our annual one-day symposium. Be part of the conversation on building envelope fundamentals, new technologies, and research results.

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Visit the BCBEC website for more information and sponsorship opportunities.

SPEAKERS AND PRESENTATIONS:

Spray What?
Harold Louwerse
Morrison Hershfield Ltd.

An Overview of the *Building Act*
Lee Nichol
Building & Safety Standards Branch

Living Building Challenge Applied:
Insights and Lessons from Van Dusen Botanical Garden Visitor Centre
Rebecca Holt and Harley Grusko
Perkins + Will

90.1-2010 and NECB 2011 –
Their Adoption With Conditions, and How this Affects Your Building Envelope
Greg McCall
City of Vancouver

Leverage Your Leadership Strengths
Tracy Hutton

BEC Talks – Below Grade

- **A Creek Runs Under It**
  Michael Blackman
  Read Jones Christoffersen Ltd.

- **Detailing Construction and Control Joints**
  Russ Riffell
  Levelton Consultants Ltd.

Professional Development Opportunities –
What is available in our Building Envelope Industry?
Jason Teetaert, SMT Research
Nichole Wapple, Sense Engineering

Your Last NAFS Presentation: Specifying with NAFS
Under Part 5 and Part 9
Al Jaugelis
RDH Building Engineering Ltd.

The Zen and the Art of Guard Design
Leonard Pianalto
Read Jones Christoffersen Ltd.

UPCOMING LUNCHEON SEMINARS

Vancouver Island Seminars:

Oct: Dr. Jieying Wang on wood shrinkage in tall wood buildings

Vancouver Seminars:

Oct 15: Rob Wood on Curtain Wall Retrofits including case studies

Nov 19: Alex McGowan on window condensation, covering physics, diagnostics, on-site remediation and interaction between the envelope and building systems.

PROMOTING THE BUILDING ENVELOPE INDUSTRY ACROSS THE WEST

FALL/WINTER 2015

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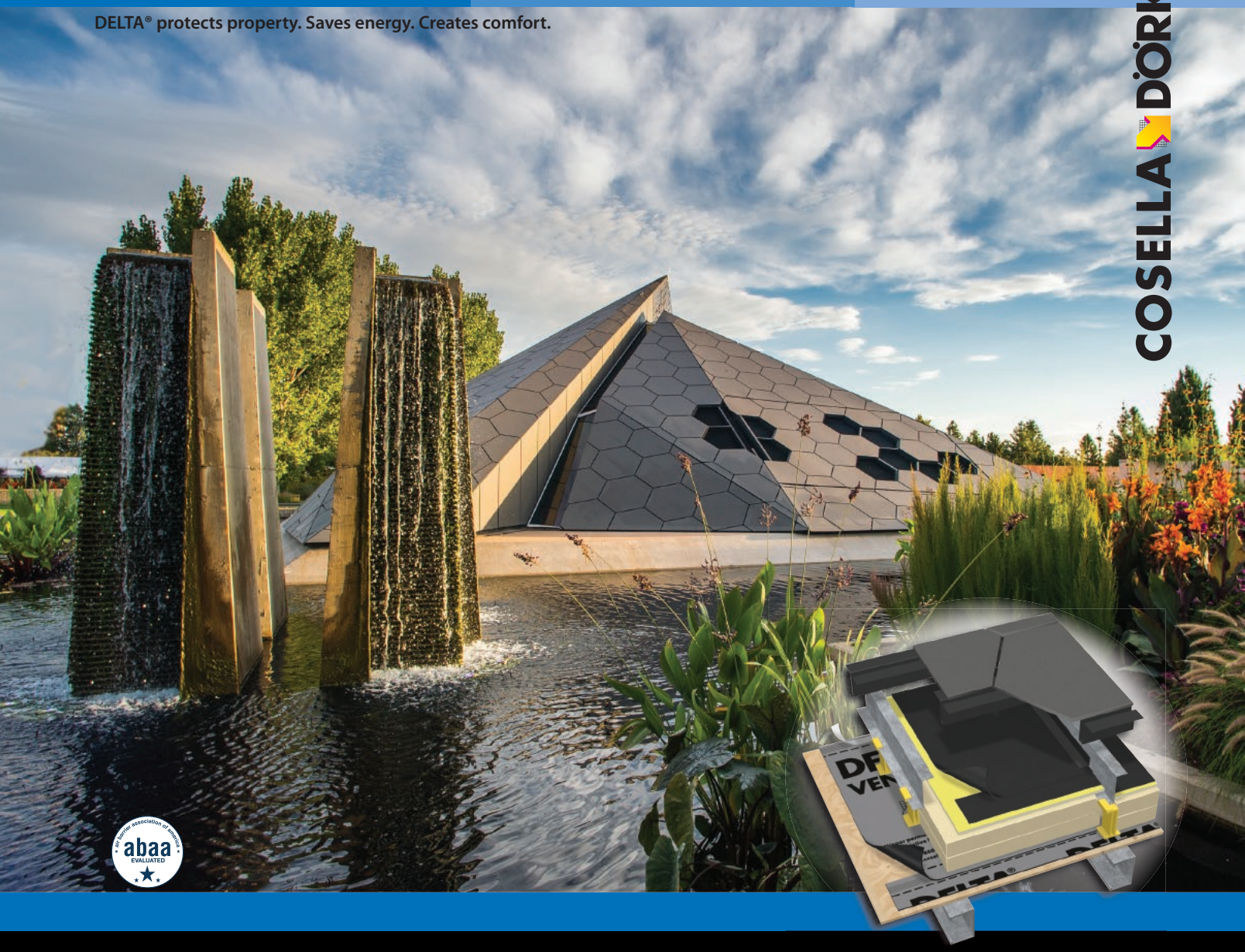

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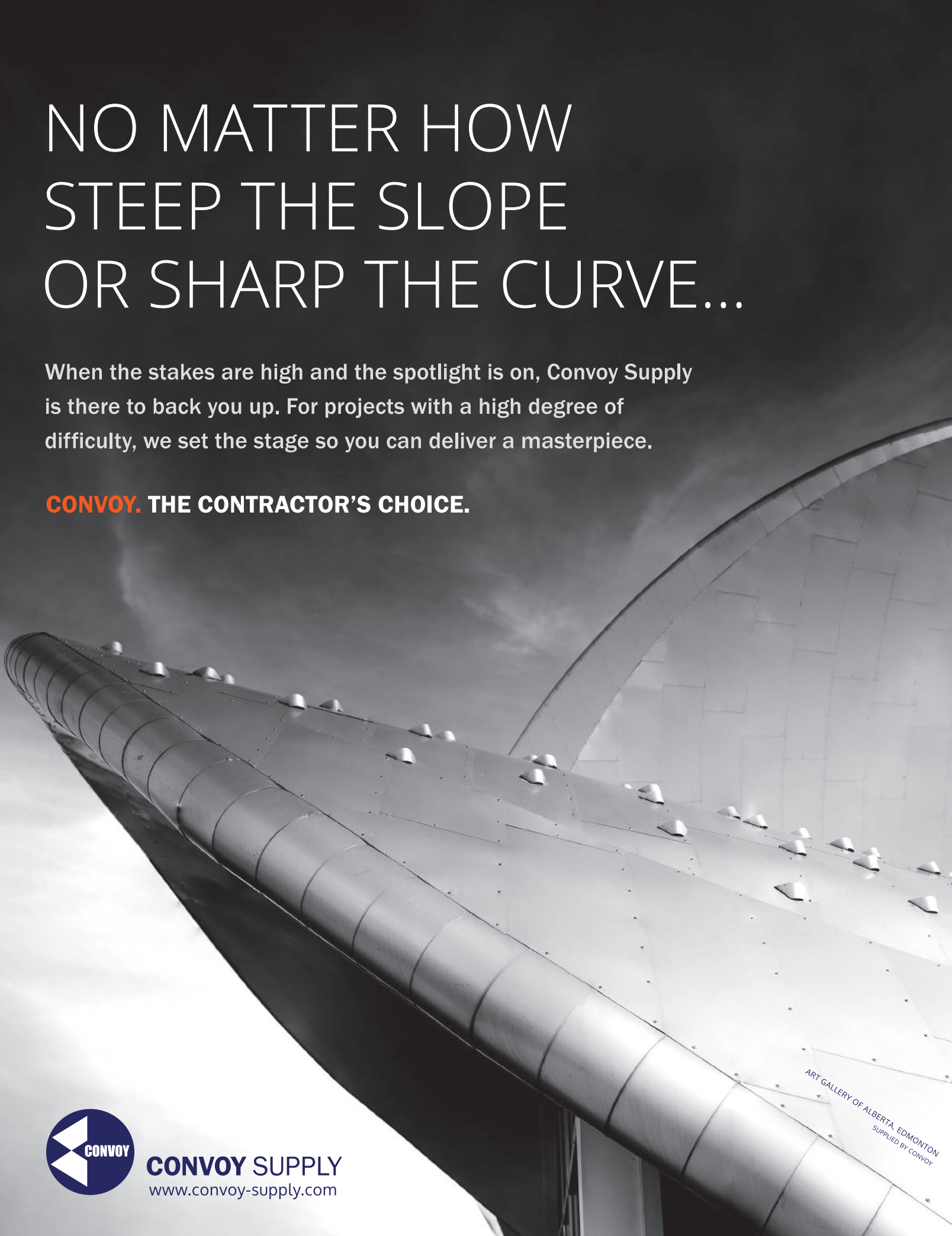

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