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Cover: Illustration: Ruta Kraujutyte, WZMH Architects.
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HVAC for cannabis growers, battery backup, and more.

on topic

Diversity in the Industry

The National Leadership Conference hosted by ACEC-Canada at the end of October included a session entitled 'The struggle for top talent and diversity in consulting engineering.' The panel discussion was perhaps the most impassioned session I attended over the two-day event.

The panel was moderated by Siobhan Robinson of Kerr Wood Leidal, the first young professional to be a member of the ACEC Board of Directors, and notably the only female on the 18-member Board.

The panel discussion addressed hiring challenges, and Rowley Mossop, principal of Innovia Partners, spoke about how expectations have changed for the technically-educated young people firms are trying to recruit today. He points to the high-tech industry as the competition (think Google), and how it's changed perceptions. "Employees now expect an attractive, rewarding, meaningful and inclusive workplace with a thriving culture," says Mossop.

Organizational culture was a recurring theme. Erin Davis, director of global talent engagement with Stantec, encouraged building a culture where all employees are comfortable to bring their 'whole selves' to work.

This means having a safe work environment and addressing diversity and equity in the workforce beyong female representation to include the LGBTQ+ community, individuals with disabilities, and the indigenous community.

Culture was also identified as a core reason why the retention of women in engineering is a challenge. Marcia Friesen, associate dean with the faculty of engineering and design at the University of Manitoba, spoke directly about organizations having either a culture of bias or a culture of belonging.

"Culture is set by the worst behaviour that is tolerated within a organization," said Friesen. She shared one woman's awkward experience of listening to a man share unseemly details about his lunch at a Hooters restaurant while on a conference call. "It's not one thing that drives women away from the profession," suggests Friesen, it's dozens or hundreds of things over time.

Certainly most engineers working on projects in the built environment can relate to unprofessional conversations on job sites or tasteless calendars in job site trailers. The panellist agreed that senior leaders, especially male leaders, have a huge potential to direct culture, both positively or negatively.

Dr. Ishwar K. Puri, dean of engineering at McMaster University, acknowledged that demographics are changing, and the industry will become more diverse over time. "Implicit bias exists in our culture, it's engrained in our patriarchal society," he said. "It's only when we start questioning our implicit biases will we begin to accelerate change."

In 2019 this magazine will be taking aim the topic of equity and diversity in consulting engineering with a year-long campaign to raise awareness of unconscious bias in the workplace. Called 'Point of View', the series of articles will endeavor to create conversations and encourage people to see their workplace through a new lens. I believe we can agree that the consulting engineering industry should better reflect the diverse society that its professionals work so hard to make a better, safer, place.

Seasons Greeting to all our readers and best wishes for a Happy New Year.

Doug Picklyk

FOR PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

CANADIAN CONSULTING engineer

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Stantec

Stantec Tower is the tallest outside of Toronto.

BUILDINGS

Stantec Tower topped off

ICE District Properties Joint Venture officially topped-off Stantec Tower November 16th, just over two years since its official ground breaking. The event gives the 69-storey (66 usable) Stantec Tower the title of the tallest tower outside of Toronto (251 metres tall).

Stantec has consolidated 1,500 of its Edmonton-based employees into its new global headquarters.

Stantec provided full architecture and engineering services for Stantec Tower, which is targeting LEED Gold (exterior) and LEED Silver (interior), and FitWel certification.

"For our employees who worked on this project, as well as for our teams working in the tallest tower outside of Toronto, our iconic head office represents the energy and creativity of our company. We are so proud to be part of what is truly the transformation of the City of Edmonton," said Gord Johnston, president/CEO, Stantec.

PROJECTS

Manitoba awards outlet channel projects to Hatch and KGS Group

Two contracts have been awarded for engineering design and construction oversight for the Lake Manitoba and Lake St. Martin Outlet Channels projects, a $540 million flood protection infrastructure initiative for the province of Manitoba.

Hatch was awarded the Lake Manitoba engineering design and construction oversight contract. The Lake Manitoba channel includes the flood protection channel, water control structure and the preliminary design of two bridges. TREK Geotechnical, Stantec and Dillon Consulting will assist.

KGS Group was awarded the Lake St. Martin engineering design and construction oversight contract that includes the flood protection channel and water control structure. WSP and North/South Consultants will assist on this project.

COMPANIES

Jim McKay rejoins HDR

Jim McKay

Jim McKay has returned to HDR as managing director for the firm's Canadian engineering practice. McKay was previously vp and Canadian resources group leader from 2010 to 2016. Most recently he was the general manager of solid waste management for the City of Toronto.

"My time at the City of Toronto taught me many things, including the types of pressures our clients face as they work to deliver the best possible services to citizens," said McKay in a company release. He is based in HDR's Richmond Hill, Ont. office.

Stantec transit team adds James Purkis

James Purkis has joined Stantec as transit leader within the firm's Transportation Business. Based in Kelowna, BC, Purkis will focus on growing Stantec's transit business, working closely with leaders across North America and globally.

James Purkis

Most recently he lent his expertise to the BC Ministry of Transport & Infrastructure, supporting the development of major projects. Previously Purkis spent two years at Metrolinx as executive vp of capital projects for the regional express railway.

McIntosh Perry acquires Onstream Engineering

Gus Sarrouh

Ontario-based McIntosh Perry has more than doubled in size over the past two years growing across the country through mergers, and the engineering company is growing again in Alberta with the acquisition of Calgary-based Onstream Engineering Ltd., a provider of engineering, procurement and construction management (EPCM) services in Alberta's oil and gas market.

"We are well-positioned in the oil and gas market with OEL Projects Ltd., a McIntosh Perry company, and the addition of Onstream furthers our goal to grow our oil and gas division in Western Canada," said Gus Sarrouh, CEO, McIntosh Perry, in a company release.

Onstream offers a range of engineering services in this sector focused on project control—pipelines and facilities, process engineering, design services, and regulatory approvals.

"Joining McIntosh Perry is a fantastic opportunity to enhance our capabilities," said Wade Brocklebank, president, Onstream in the media release.

"We look forward to working with the McIntosh Perry team as the company continues to grow in Western Canada."

Hatch

The team from Hatch was on hand in Edmonton to accept the TAC Infrastructure Project of the Year Award for the Eglinton Crosstown LRT Tunnels: (l-r) Doug Madsen; Jean Habimana; Gary Kramer; Dan Ifrim; Andre Solecki; Walter Milani and Jimmy Susetyo.

AWARDS

Tunnelling Awards

The Tunnelling Association of Canada (TAC) handed out awards during its two-day conference held in Edmonton November 8-9. TAC's Lifetime Achievement Award was presented to Garry Stevenson of Klohn Crippen Berger.

The Innovation Project of the Year Award went to the John Hart Generating Station Replacement Project; and the Infrastructure Project of the Year was awarded for the Eglinton Crosstown LRT Tunnels

Hatch, a key member of the Eglinton Crosstown project team was on hand to accept the award. "To be recognized as the Infrastructure Project of the Year for a project that will forever change the face of transit in Toronto is a great honour. Congratulations to all involved with the project and for making this successful project an award winner!" stated Gary Kramer, senior vice president, Hatch, in a company release.

Canadian Hydropower Awards

The Canadian Hydropower Association hosted its first-ever Hydropower Awards at this year's annual Hydropower Forum, held November 21 in Ottawa.

The Awards were established in celebration of the Association's 20th anniversary and inlcuded:

- ***CHA President's Award:*** Colin Clark, Chief Technical Officer, Brookfield Renewable Energy Group
- ***Outstanding Project Award:*** SNC-Lavalin for the BC Hydro John Hart Generating Station Replacement project
- ***Path Forwards Award:*** Ontario Power Generation, in partnership with the Taykwa Tagamou Nation, for their recently completed Peter Sutherland Sr. Generating Station Project
- ***Women in Renewable Energy (WiRE) Hydropower Woman of Distinction:*** Shawna Pachal, Acting Chief Finance and Strategy Officer, Manitoba Hydro.

Innovation in P3 Projects

The Canadian Council for Public-Private Partnerships (CCPPP) presented its National Awards for Innovation and Excellence at its 26th annual conference—P3 2018—on November 5th at the Sheraton Centre Toronto.

This year five projects were recognized, with two receiving Gold Awards and three receiving Silver. "These projects represent the hard work and dedication of thousands of people across Canada who are making these critically important infrastructure projects a reality," said Mark Romoff, president/CEO of CCPPP.

The Gold Award for infrastructure went to the City of Saskatoon's North Commuter Parkway & Traffic Bridge Project. Part of the City's Bridging to Tomorrow, the new six-lane North Commuter Parkway bridge, now called the Chief Mistawasis Bridge, and the revamped steel-truss down-

Photo: David Lee for CCPPP

Adam Trewick, Sr. VP Infrastructure, Graham Group (left), and Nicole Slade, Sr. P3 Contracts Manager, City Of Saskatoon accept the Gold P3 Award for Saskatoon's Chief Mistawasis Bridge and Traffic Bridge project.

town Traffic Bridge were officially opened in early October.

The project is the largest infrastructure project ever delivered in the City of Saskatoon and the first bundled transportation P3 in Canada. Partners included: City of Saskatoon and Graham Commuter Partners. Consulting engineers included: COWI Bridge North America (formerly Buckland & Taylor), Tetra Tech, and Clifton Associates.

The Gold for project financing went to the Fort McMurray West 500 kV Transmission Project. Partners included Alberta Electric System Operator and Alberta PowerLine Limited Partnership, a consortium of Canadian Utilities Ltd., Quanta Services CC Canada Ltd., Valard Construction LP and ATCO Electric.

The Milton District Hospital Expansion won the Silver infrastructure award. The Silver for project financing went to the Finch West LRT project, and the Silver for service delivery was presented to the Quad student housing project at York University in Toronto.

PROJECTS

Energy benchmarking tool for Ontario designers

Aimed at accelerating energy-savings in the design and construction of buildings in Ontario, a new digital platform called the energyCompass.design tool is now available for free.

Developed by RWDI in partnership with the Ontario Association of Architects and Toronto's Architecture 2030 District, the tool streamlines energy benchmarking and reporting during the design phase of building projects.

Users register and then upload energy models to the tool, which automatically extracts over 400 variables and completes the submission requirements for six building standards and programs. (Compass can extract data from energy models created using: DOE2 (eQuest, EE4); IES-VE 2017; EnergyPlus 8.7.0+).

The six standards include:

- Ontario Building Code SB-10 Compliance—Form A, Form 11;
- Toronto Green Standard v2—Energy Modelling Report Summary;
- Leadership in Energy and Environmental Design (LEED) Canada 2009—LEED Letter Template;
- Savings By Design Incentive—Energy and Demand Summary; Custom Project Worksheet;
- 2030 Challenge—Program Reporting
- High Performance New Construction (HPNC)—IESO Incentive Worksheet.

The Compass tool is an evolution of the live database called ecoMetrics, initiated by Diamond Schmitt Architects in 2015 and developed with RWDI.

COMPANIES

Stantec divests construction services division in U.S. and UK

Gord Johnston

Stantec has now sold off MWH Constructors, its construction services division, to funds managed by Oaktree Capital Management, L.P. (Oaktree) for $103 million. The company announced that net cash proceeds were estimated to be $46 million after transaction costs and working capital adjustments.

Stantec retained responsibility for closing out one remaining waste-to-energy project in the UK and will retain certain pension obligations.

The sale of MWH Constructors includes both the UK and U.S. divisions and Slayden Constructors. The MWH Constructors group joined Stantec through the MWH acquisition in 2016.

Also, reported in early October, Stantec has announced a planned acquisition in Australia of Perth-based Wood & Grieve Engineers (WGE), a consulting services company focused on buildings engineering. The firm provides structural, mechanical, electrical, plumbing, hydraulics engineering, and a range of related services for clients throughout Australia. The move will add more than 600 engineers to its Australian operations.

In 2017 the Vancouver Convention Centre became the first double LEED Platinum convention centre in the world, and the first v4 Platinum Existing Building project to certify in Canada. The project won a 2018 Canadian Consulting Engineering Award of Excellence for WSP as sustainability consultant.

WSP

UPDATES ON LEED's progress

Canada's green building industry is evolving, and LEED certification is proving that it can too.

By Mark Hutchinson, CaGBC

Heightened focus on energy and carbon emissions reductions has changed expectations and priorities for Canada's green building industry. The Canada Green Building Council (CaGBC) is keeping pace with the introduction of the Zero Carbon Building Standard in 2017 and bringing new certification programs and tools to Canada through the launch of GBCI Canada (Green Business Certification Inc., Canada) earlier this year. The Leadership in Energy and Environmental Design (LEED) rating system also continues to evolve to meet rising expectations.

For over 13 years in Canada LEED has produced more than 3,800 certified projects across the country. The cumulative impact of these projects includes: a reduction in GHG emissions of 2.49 million carbon dioxide equivalent (CO_2e) tonnes, which is like taking 530,000 cars off the roads for a year; energy savings of 12.9 million eMWh, which is enough to power 435,000 homes in Canada for a full year; and water savings of more than 24 billion litres – equivalent to three hours of water coursing over the Canadian Horseshoe of Niagara Falls.

Canadian project teams continue to leverage LEED to drive market transformation with the latest version of LEED, with 600 registrations under LEED v4.

Next steps for LEED

LEED's holistic view is largely responsible for its success, with an emphasis on providing healthier indoor environments for occupants while reducing emissions, maximizing energy efficiency, reducing waste and powering innovation. However, within this framework, continuous improvement is necessary. That is why we have begun rolling out LEED v4.1, with the promise of making the world's most popular green building rating system a more powerful tool than ever for project teams.

Project teams will be able to take advantage of the updated rating systems as soon as they are released, and balloting is expected to occur in 2019. Focused on streamlining, clarifying and strengthening requirements, LEED v4.1 will offer refinements to serve the goal of enhancing the experience of projects pursuing LEED certification.

It will incorporate insights from Canadian project teams and the experience gleaned from working on thousands of LEED certified projects.

Upgrades to the rating system were being released as drafts ("beta" updates) over the course of 2018, with the March 2018 rollout of LEED v4.1 O+M being the first.

LEED v4.1 Operations + Maintenance: Streamlining certification by focusing on outcomes

In order to reduce environmental impacts and improve the health and wellness of occupants, we must always consider the critical role of existing buildings. The operations of our buildings must be substantially decarbonized by 2050 in order to avoid the worst impacts of climate change, and over 50% of the building stock in 2050 will consist of buildings that already exist today.

LEED v4.1 O+M addresses this issue by putting the focus on emissions from building operations as well as transportation. A project's energy performance score is determined in part by its GHG emissions per capita and unit area, while its transportation score is determined by per-capita emissions.

LEED v4.1 O+M's updates were introduced to better enable teams to optimize operations and achieve significant reductions in emissions from existing structures, while building upon v4's emphasis on improved energy performance, human health and integrative design.

By focusing on performance outcomes such as reduced energy and water use, and not on prescriptive measures to improve performance, this update streamlines and simplifies certification. Fully 90% of the points available in LEED v4.1 O+M are based on simple key performance outcomes such as energy and water use, providing flexibility in choosing how to achieve performance objectives.

Leveraging the Arc benchmarking platform across entire portfolios

A key aspect of the streamlined LEED v4.1 O+M rating system is its leveraging of the Arc platform, an online tool that helps collect, manage and benchmark building data and improve sustainability performance.

Stantec

The City of Calgary Compost Facility project achieved Gold level certification under LEED v4, and it was the first project in Canada to certify under LEED v4 for Building Design + Construction. The project also received an Award of Excellence in the 2018 Canadian Consulting Engineering Awards for Stantec, prime consultant on the project.

On the Arc platform, data is assessed in five categories: energy, water, waste, transportation and human experience. The performance metrics correspond to those that represent 90% of the points available in LEED v4.1 O+M, which allows Arc to serve as an on-ramp to LEED certification.

Operations can be monitored and improved over time, and certification can easily be pursued when performance warrants. It also enables building owners to use one platform to track performance across their portfolio of LEED and other buildings, globally. This allows for performance to be compared based on a consistent set of key metrics, while highlighting opportunities to improve performance, and possibly also identifying additional buildings for LEED certification.

Use of the Arc platform is provided free to LEED projects for a period of five years, making it easier for LEED Building Design + Construction (BD+C) projects to monitor performance against design expectations, comply with LEED requirements to provide energy and water use data, and determine the feasibility of O+M recertification.

Tackling emissions

It is anticipated that LEED 4.1 for Building Design and Construction (BD+C) will include updates to materials credit options, daylighting and acoustics. There will also be greater alignment and integration of the various rating systems for homes and multi-family buildings. Perhaps most interesting will be the updates to how energy performance is assessed.

Standards and practices have evolved since LEED v4 was first balloted, and version 4.1 is an opportunity to ensure LEED continues to drive change to address the most pressing environmental issue of our time: climate change.

The CaGBC is working with stakeholders, its Energy and Engineering Technical Advisory Group and the

LEED Canada Steering Committee to identify the best approach for tackling greenhouse gas (GHG) emissions from building operations in the Canadian context.

In recognition of the climate change imperative, a metric that assesses efforts to reduce GHG emissions is being considered. This metric would encourage careful evaluation of energy efficiency measures, the selection of energy sources (particularly for heating and hot water), and onsite renewable energy generation options.

Equal weighting could be provided to overall building energy efficiency in recognition of its particularly complicated and critical role.

Consideration is being given to a new, clear measure of energy performance based on assessing energy savings relative to a baseline with a fixed energy source for heating; historically, cost savings has been used rather than energy savings, and the energy source has changed as a function of the energy source chosen in the proposed design.

A better LEED for a better tomorrow

It's clear we cannot forge a greener future without ensuring the sustainability of both our new and existing building stock. The latest update to the LEED O+M rating system, and the upcoming changes to other LEED rating systems, will simplify and streamline this endeavour and provide helpful tools and technology to aid the process, making it easier for the industry to demonstrate leadership and be recognized for these achievements.

To participate in the LEED v4.1 O+M beta or to learn more, visit cagbc.org/leedv4-1. CCE

Mark Hutchinson is the vice president of green building programs at the Canada Green Building Council (CaGBC).

INTELLIGENT STRUCTURAL PANELS

A Canadian-designed solution for constructing the next-generation of smart buildings.

By Doug Picklyk

A unique consortium of companies in Toronto is fashioning the future of smart building with the introduction of the Intelligent Structural Panel (ISP), the modification of an existing building product that could revolutionize construction in the near future and create the next generation of buildings that are not only smart, but can think and improve their operations over time.

The ISP Team

The origins of the ISP concept goes back to conversations between structural engineering firm Stephenson Engineering and WZMH Architects about a metal structural panel product from UK-based Intelligent Engineering. That company's sandwich plate system (SPS) takes two metal plates and bonds them together with a polyurethane elastomer, creating a solid one- to two-inch-thick panel that can be used as an alternative to reinforced concrete for a building's floors and core walls (it's also used in shipbuilding, stadiums, and bridges).

Zenon Radewych, principal with WZMH and lead on the ISP Team recalls a late-night discussion in December 2017 about the idea of putting intelligence into the SPS panel. "Shortly after that meeting we contacted Quasar Consulting Group, a mechanical/electrical engineering firm that also specializes in information, communication and automation technology—the ICAT engineering side—to bring them on board to help us understand the intelligence side," says Radewych.

In addition they brought along C3PoE, an electronics start-up founded by U of T engineering students that has developed sensor products. Together the ISP Team now includes an architectural firm, a structural engineering firm, a mechanical/electrical ICAT firm, and an electronics engineering team along with software developers and industrial engineers.

"We've created a think tank, and we're developing a real working lab

Illustration: Ruta Kraujutyte, WZMH Architects

with all the firms partnering together, which is very unique for the AEC community," notes Radewych.

The consulting engineering firms see this as a refreshing and necessary approach for their businesses. "Consulting services today are almost becoming a commodity service, you need to separate yourself in different ways," says Zoran Tanasijevic, P.Eng., principal with Stephenson Engineering. "We are stepping out of the commodity service and going into something completely different which will benefit the market as well as us."

The Panel

What the team has developed is a variation of the SPS structural panel that's prefabricated with intelligence inside. Electrical power and IT connectivity, some heating and cooling functionality, along with sensor technology and possibly more is all included within the core of the steel panel. As explained, the circuitry running between the metal plates resembles a computer motherboard or microchip.

"We like to describe it as a prefabricated modular panel that's very much like a smart tablet," explains Radewych. "Picture walking on a smart tablet that has structural capacity—that's what we've developed. You can dance on it and walk on it, but it's also intelligent."

The panels have connectors on the edges linking one panel to another, and each panel also has multiple universal plug-in points on the surface that allow for connecting hardwired devices into the panel. The components can plug in and pull out using basic RJ45 connectors.

The partners all refer to the system as truly plug-and-play, and the connectivity extends to a range of compatible devices including lighting, heating, ventilation and air conditioning, elevators, motorized shades, smoke alarms, security systems, and more.

"One way that this is different from other smart building solutions is that it is completely system and vendor neutral," adds Kenan Huskovic, P.Eng., CEO of Quasar Consulting Group. The intelligence built into the panels removes the need for the complex integration of various systems in a building.

"One way I describe it to clients who aren't very sophisticated with technology is, 'Our smart building solution is about making the fabric of the building smart," says Radewych. "Today's smart buildings are all about devices, our solution is to make the fabric smart and then plug whatever you want into it. And because the fabric is smart, everything becomes smart."

Perfect timing

Why the team believes it's in the right place at the right time is because of the confluence in the demand for smart buildings along with the growing acceptance and emergence of prefabrication and modular construction into the building industry.

"If you look at smart buildings today, there's still the traditional physical component: they're still built with tradesmen wearing rubber boots, pouring concrete," explains Armin von Eppinghoven, P.Eng., executive vice president with Quasar Consulting Group. "The structure goes up, then mechanical and electrical trades install equipment, then hardware and software is put in, and then you have your smart building." He's convinced things are changing.

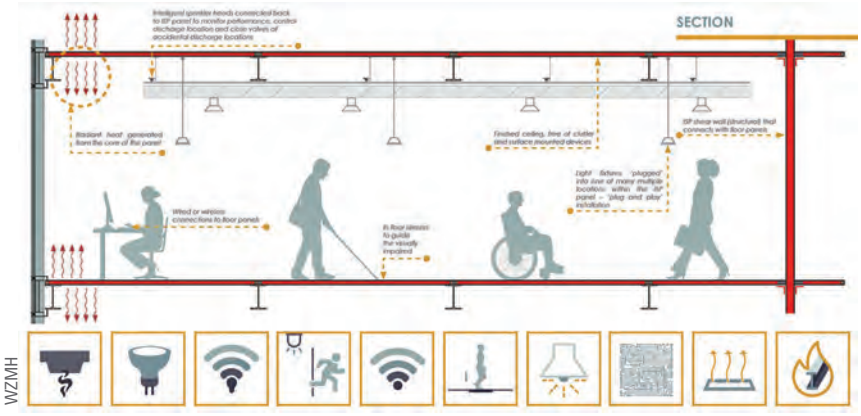
WZMH

A mock-up demonstrating connected devices including: security, telecom, lighting, cooling, a motorized roller shade and solar panels that follow the sun and feed power back to the ISP panel.

All of the partnering companies believe that modular and pre-fab construction is going to be the new way in the near future. "And we really wanted to look at an approach that went beyond what people are looking at today and take it not to the next level, but the next 10 levels by truly bringing technology into the fabric of the building," says Radewych. "We know, based on the feedback from the industry, this solution is very unique, very exciting, and very much out-of-the-box thinking."

Microsoft connection

The technology is attracting attention outside of the building industry, as the ISP Team has been accepted to participate in Microsoft's global Internet of Things (IoT) Insider Labs. The



WZMH

The concept is an intelligent building infrastructure that communicates with the Internet of Things and provides users with a space that is user friendly, barrier free, accessible and safe.

Members of the ISP team with Microsoft Labs partners: (l-r) Connor Hagen (Microsoft); Andre Podnozov (Microsoft); Hiram Boujaoude (WZMH Architects); Barron Barnett (Microsoft); Jacob Shultis (Quasar Consulting Group); Bolis Ibrahim (WZMH/Argentum); Oleh Zhyhinas (WZMH/Argentum); Sean Kelly (Microsoft); Zenon Radewych (WZMH Architects); Mike Roshak (Microsoft).

tech giant learned about ISP through word of mouth and realized its potential to provide artificial intelligence (AI) solutions to the project.

"Microsoft was keen to see the product developed further and very interested in seeing the ISP panel and its key connected devices interact with their Microsoft Azure cloud computing service," says Radewych.

"At our first lab sprint in Redmond, Washington, Microsoft provided 4 to 6 engineers that helped our team further develop components of the ISP panel. This particular sprint was very much focused on software integration into the Microsoft Azure cloud, as well as a peer review of our hardware solutions."

While Radewych describes the ISP panel being the fabric of a building, another analogy may be to think of the panels of as the building's nervous system, picking up signals from hundreds of sensors and devices all connected to the central nervous system, or the Internet of Things. Ultimately reams of data are being sent to the brain, or the cloud, where information is collated, analyzed, and interpreted through AI to respond with intelligent solutions to optimize a building's operations.

It's through the AI, they explain, that a smart building constructed with their product can become proactive to the needs of its inhabitants, instead of simply reactive.

Next Steps

Trial portions of the ISP's software solution are currently being tested in Microsoft's IoT & AI Insider Lab headquarters. "Working as a team, we are completing the development of all the software components that allow us to run connected devices that are 'plugged' into the ISP panel from an APP, which is connected back to Microsoft's Azure Cloud—this component will be ready soon," says Radewych.

He explains that the panel is also going through necessary approvals from standards and testing agencies, and the next step is a larger scale mock-up (in the range of 3,000—10,000 sq.ft.) to be installed in a live and working environment.

WZMH is currently in talks with a number of real estate developers and institutional clients that are interested in seeing a live and working mock-up constructed.

Radewych also notes they are currently working with one of Canada's largest builders to design-build a number of what they are calling 'smart res modular boxes' that are essentially prefabricated residential units constructed using the ISP panel (and other smart building technologies they have developed over the past year).

"The intent is to showcase a solution for an economical, sustainable, prefabricated and smart residential solution that can be built and deployed worldwide for mid- to high-rise housing—including for condos, rental units, student housing, hotels, seniors' residences, Olympic Game housing, workforce housing, etc.," says Radewych. "This concept is possible due to the key fact that our solution for the ISP panel utilizes direct current (DC) and Power over Ethernet as the key electrical solution—which is a universal solution."

Their target is to have the showcase of six modules constructed in the next 6-9 months in a location within Canada for showcasing to the public. The ISP panel itself will be ready for commercialization in the next 12-plus months.

The R&D continues

The ISP Team is continuing to innovate. Stephenson is already working on alternative structural products, and the team is developing artificial intelligence solutions, including some that are top secret.

The R&D work that we're doing is very much about the smart buildings but it's also about looking at how we've been designing things for the past couple hundred years, and if we're going to redesign it, how to do it in a very simple way, and without over engineering it," says Radewych.

"At the end of the day, this work is important to us because it's showing our clients how we're getting ready for the future, and how we're getting them ready for the future, and showing them how they can compete against their clients, in terms of designing, building and operating a better building."

And Huskovic from Quasar Group is convinced they're on the right track. "We believe in the fact that this is where the future will be. We actually don't look at it as spending unbillable hours today; we're preparing ourselves to be ahead of the pack tomorrow. And tomorrow is coming at a very fast pace." CCE

Security Management

www.reliablecontrols.com/security

The MACH-CheckPoint door access controller is a new Power over Ethernet (PoE) device designed to meet or exceed the BACnet Advanced Application Controller (B-AAC) profile. This fully configurable controller integrates up to two doors and four readers, and ships with the Reliable Controls industry-recognized 5-year warranty. Once programmed with the RC-Passport software, the combination delivers a truly integrated facility solution within the Reliable Controls MACH-System.

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ALTERNATIVES TO Grade Separation for Railway Crossings

With over 20,000 at-grade railway crossings across Canada, making all railway tracks cross in a grade-separated manner is not economically viable.

By Alexandre Nolet, P.Eng.

One of the most effective manners to reduce the risk of collisions on a transportation network is to eliminate potential conflicts between road users. Grade-separated railway crossings, where spatial separation between trains and road users (pedestrians, cyclists, and motorists) is provided, is a good example of such practice. However, while there are safety benefits associated with grade-separated crossings, their implementation may not be feasible or desirable in many instances for several reasons, such as the substantial environmental impact due to the sizeable footprint and the high construction cost.

The conversion of an existing leveled crossing to grade separation can range from $50- to $150-million in some urban areas. With over 20,000 at-grade railway crossings across Canada, making all railway tracks cross in a grade-separated manner is not economically viable.

Alternatives to grade-separation that are commonly implemented in Canada can be classified in two categories, including passive and active warning systems. Passive systems primarily consist of the use of static signs in advance of a rail corridor, and active systems consist of flashing lights (to which gates can be added).

Recognizing that each warning system provides different safety levels, an elaborate selection process with the main objective of mitigating risk has been developed and is now considered as industry-practice.

The current treatment selection tool included in Transport Canada's Grade Crossing Standards recommends suitable warning systems based on a set of criteria. These criteria include track design speed, roadway design speed, number of tracks, and road user types.

Descriptions of the most common warning system types used at railway crossings across Canada and the con-

ditions under which they are typically installed are outlined below. Descriptions of low-cost measures that have significant impact on the level of safety of at-grade railway crossings are also provided.

Passive Warning Systems

Passing warning systems comprise the lowest level of control systems used at railway crossings, and mainly due to their minimal construction and maintenance costs they are the most common types of warning systems on our road network.

Almost two-thirds of railway crossings in Canada are controlled by passive warning systems, yet this type of warning system is only practical at crossings under low train and vehicular volumes, as well as low train and vehicular speeds. This is why they are typically observed on local roadways within residential and industrial areas.

Given the absence of warnings activated by approaching trains, the most impactful safety factor at these railway crossings is unobstructed sightlines on the approach to the crossing. Motorists must be provided with the opportunity to perceive potential conflicts with trains and react by reducing their speed or adjusting their trajectory when needed.

True North Safety

Top left: Active warning system with gates. Centre: Passive warning system on a low-speed roadway in an industrial area. Right: Example of an active warning system without gates that would benefit from better delineation, sightlines, and the installation of stop bars for active road users.

Active Warning Systems

A higher level of warning system, and the second most common one in Canada, consists of flashing lights. Flashing lights are red signals that start flashing when a train approaches a crossing. Research has shown that in comparison to passive crossings, the installation of flashing lights is expected to reduce collision risk by 50%.

In addition to the visual warnings provided by the lights, bells are also typically provided as an audible warning. Audible warnings are a key feature used at crossings to draw road users' attention to oncoming trains, especially cyclists and pedestrians, who are more likely to change their decision-making process by auditory information (i.e., from ringing bells) than from visual cues.

Finally, gates can be added to active warning systems with flashing lights to restrict access to the railway track. Substantial safety benefits can be expected by the installation of gates. Compared to just flashing lights, a crossing with gates is expected to reduce collision risk by 37%. Such a warning system is installed under high train and vehicular volumes and speeds. Specifically, they are warranted at locations where the product between the average number of trains and vehicles exceeds 50,000, or where train maximum operating speed exceeds 80 km/h.

Other Safety Measures

While the type of warning system is the most critical safety feature provided at railway crossings, there are several other relatively low-cost and low-maintenance safety measures that road authorities can implement to substantially reduce collision risk. Some of these safety measures are as follows:

Visibility of the safety features—monitoring programs that require periodic inspections of the traffic control devices installed at railway crossings are effective at identifying when vegetation requires trimming for unobstructed visibility of those devices.

Pavement markings—installation stop bars that clearly indicate where road users are expected to stop for an unobstructed visibility of trains, and white edge lines that clearly delineate the desirable path of travel for pedestrians and cyclists through the crossing should be installed.

Adequate travel speed—recommended speeds that match the nature of the roadway and its surface condition should be suggested. At crossings, it is relatively common for a substantial vertical deflection to be present at the track, due to grade variation at the track and/or poor conditions of the track. As a result, advisory speeds that recommend the safe speed to travel across a track should be installed when motorists are required to slow down on the approach to a crossing.

Conclusion

The alternatives to high-cost grade-separated crossings are warning systems and safety measures that have been in place for a long time, and have stayed relatively the same over the years. Currently, new Intelligent Transport System (ITS) technologies to inform road users of approaching trains via dynamic display signs, in-vehicle communication systems, and/or smartphones are being developed. While these technologies are promising, their usage is expected to remain complementary to existing warning systems. Therefore, significant efforts from rail and road authorities should focus on implementing the various low-cost safety measures (i.e., clear sightlines, pavement markings, and advisory speeds), which, although the safety benefits are difficult to measure, would significantly improve the operation and safety of our existing crossings. **CCE**

Alexandre Nolet, P.Eng. is the Vice-President and a transportation safety engineer with True North Safety Group. He provides independent opinions on legal matters related to the design, construction, operations and maintenance of transportation facilities including intersections, interchanges, highways, walkways/trails, bicycle infrastructures, and railway crossings.

By Paul Palmer, P.Eng., and Josip Balaban, P.Eng.

BAT FRIENDLY Progressive Rehabilitation

The Edison Mine in northeastern Ontario required an innovative rehabilitation approach to protect a species at risk.

Rehabilitated Edison Mine site.

Photos: Golder

The historic Edison Mine property is a century-old silver mine located in a remote area of Coleman Township, 8 km outside of Latchford, Ont., about five hours straight north of Toronto in northeastern Ontario. Mining occurred here for only a few years before stopping in 1907 leaving unprotected physical mine hazards on site. To eliminate any liabilities associated with the historic mine, the Eaton Corporation retained Golder to complete a progressive rehabilitation of the property.

The progressive rehabilitation of physical mine hazards is governed by the Ontario Mining Act (O. Reg. 240/00) and Ministry of Energy, Northern Development and Mines (MENDM). Acceptable rehabilitation options include the following:

- Permanent Fencing—requires monitoring in perpetuity;
- Engineered Fill—crequires a clear understanding of mine workings;
- Engineered Caps—a costly, permanent solution.

Also, there are currently four species of bats in Ontario identified as species at risk, and during the winter months they hibernate in abandoned underground mine workings in northern Ontario. The bats are threatened by a disease known as white nose syndrome and it disrupts their hibernation cycle causing them to burn through their body fat supplies before they can be replenished. This disruption in their hibernation cycle has decimated the bat population in Ontario.

The Ministry of Natural Resources and Forestry (MNRF) identified the underground mine workings as a potential location for bat hibernacula and therefore designated the mine workings as protected habitat for species at risk.

Due to this classification, the three physical mine hazards (adit, shaft, open cut) connected to the underground workings were to be preserved and left open, which meant existing rehabilitation practices (i.e. capping, backfilling) could not be implemented.

The remote location of the mine made fencing the most viable solution but would not satisfy Eaton's requirements of a solution that did not require monitoring in perpetuity (i.e. no fencing).

Given that the conventional rehabilitation measures listed above would either inhibit access to the underground workings by bats, or were not a permanent solution, a unique engineered rehabilitation solution for these three surface openings was required.

Through a 16-month design and consultation process involving Golder, Eaton, the MENDM and the MNRF, it was determined that the three open physical mine hazards be rehabilitated with permanent engineered stainless steel bat cupolas and bat gate.

Bat cupolas and bat gates are designed to preserve protected bat habitat while preventing inadvertent access to the mine workings.

The Ontario Mining Act does not provide specific applicable design requirements for the construction and

Bat image: Adobe Stock

Completed Edison open cut cupola with bat-friendly 146-mm spacing between all steel members.

Complete stainless steel construction.

Adit bat gate securely anchored into bedrock walls.

installation of bat-friendly structures. Golder was required to create a site-specific cupola and bat gate design that would satisfy the MENDM and MNRF. The final design had to meet the following criteria:

- constructed of stainless steel;
- adequately anchored to bedrock;
- design load that accounts for dead weight of structure, snow loading, tree impacts and vehicle (ATV/snowmobile) traffic;
- prevent inadvertent access to mine;
- steel spacing of 146 mm to not impede the flight path of bats.

The remoteness of the site and undulating topography made data collection and design work difficult. To aid in the design, Golder completed LiDAR scans and generated a detailed 3D model of the mine openings.

The mine site is located in a remote forested area of northern Ontario only accessible by boat followed by a 5 km hike along a historic mining trail cut through the rough terrain of northern Ontario. Given logistical challenges of the remote location, cost-effective and efficient solutions needed to be implemented to safely transport all personnel, materials and equipment to site. A barge was used to transport larger equipment (excavator, ATV's/UTVs) 12 km up the Montreal River. Once all equipment was unloaded along the shore of the river, it was driven across the rough 5 km trail to site. A helicopter was used to complete 45 lifts and transport 25,000 lbs of material and equipment required for the fabrication and installation of the two bat cupolas and bat gate. A lifting sequence had to be generated to ensure helicopter capacities were met while optimizing the delivery of all material and equipment.

The installation of three bat-friendly structures occurred over a short construction schedule (June-August) due to the migration pattern of bats.

Through collaboration with several disciplines and ministries over a two and a half year project schedule, Golder safely and under budget rehabilitated the mining property to meet the requirements of the MENDM, MNRF and Eaton. The fabrication and installation of the two cupolas and bat gate were one of the first bat-friendly structures to be constructed by a private enterprise in Ontario. The project successfully protected bat habitat for species at risk and prevented inadvertent access into the underground mine workings protecting the public's safety. CCE

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Advancements in the design of NUCLEAR WASTE REPOSITORIES

DBHD = Deep Big Hole Disposal / an example from Germany

By Todd Busch, P.Eng. and Volker Goebel, Dipl.-Ing.

For decades the nuclear industry in Canada has studied the question of what to do with the radioactive waste products that result from nuclear power generation. The favored approaches include proposals to bury the waste products at great depths below ground as a form of geological disposal. There are challenges associated with such proposals including the risks during transportation to a site, validation of the long-term stability of a site, and the life expectancy of containment vessels for the waste.

The nuclear industry in Canada operates under the regulatory auspices of the Canadian Nuclear Safety Commission (CNSC) that defines radioactive waste as follows [1]: "Radioactive waste is any material (liquid, gas or solid) that contains a radioactive nuclear substance (as defined in section 2 of the Nuclear Safety and Control Act) and which the owner has determined to be waste (as per regulatory policy PP–229900, Managing Radioactive Waste). Radioactive waste produced in Canada is managed safely in specially designed facilities. The [CNSC] regulates and licenses these facilities, in order to protect the health, safety and security of Canadians and the environment."

The CNSC classifies nuclear waste as follows:

Low-level Radioactive Waste: "Low-level radioactive waste contains material that is more radioactive than clearance levels and exemption quantities allow. This type of waste loses most or all of its radioactivity within 300 years. It includes contaminated equipment from the operation of nuclear power plants (like protective shoe covers and clothing, rags, mops, equipment and tools). The owners of low-level radioactive waste are responsible for managing the waste they produce. This usually takes place onsite, within its own facility."

Figure 1: DBHD deep repository in a Canada rocksalt formation near New Brunswick.

Intermediate-level Radioactive Waste: "Waste that has been exposed to alpha radiation, or that contains long-lived radionuclides in concentrations that require isolation and containment for periods beyond several hundred years, is classified as intermediate-level radioactive waste. It typically requires shielding during handling and interim storage. This type of waste includes refurbishment waste, ion-exchange resins and some radioactive sources used in radiation therapy. The owners of intermediate-level radioactive waste are responsible for managing the waste they produce. This usually takes place onsite, within its own facility."

High-level Radioactive Waste: "High-level radioactive waste (HLW) in Canada is used (irradiated) nuclear fuel that has been declared as radioactive waste. This type of waste also includes small amounts of radioactive waste from medical isotope production and other applications that generate significant heat via radioactive decay. Used nuclear fuel produces ionizing radiation. This type of radiation has a strong ability to penetrate matter, so shielding against the radiation is required. Since used nuclear fuel contains significant quantities of

radionuclides with long half-lives, it requires long-term management and isolation."

Currently, there are several alternative approaches that have been considered by the various entities that comprise the nuclear industry in Canada for repositories that can accommodate different waste. Ontario Power Generation (OPG) operates multiple nuclear power plants that generate over 50% of the province's electricity. OPG is proposing a storage facility near Kincardine and Lake Huron to inter low and intermediate wastes that is referred to as the Deep Geologic Repository (DGR). However, it is not intended to store high-level radioactive waste. Atomic Energy Canada Ltd. (AECL) has plans for geological disposal of research and operating waste at a location near to the Ottawa River beneath the Chalk River National Laboratory beside the Ottawa River. The Nuclear Waste Management Organization (NWMO), operating on behalf of Canadian utilities, is reviewing the viability of multiple sites to bury all of Canada's highly radioactive fuel waste. Currently, the NWMO is the only organization in Canada that is studying long-term solutions to the problems posed by high-level radioactive waste.

What initiatives are being taken in other countries with regard to the long-term storage of high-level radioactive waste? One example is the Deep Big Hole Repository (DBHD) — for High Level Waste (HLW) that has been developed by engineers in Germany.

The underlying success of such an advancement of repository technology (see Figure 1) is the placement of the site in an area with so-called rocksalt geology, also called Halit, where the gamma radiation is rendered safe after travelling only 30 cm through the surrounding rocksalt. Gamma rays are a form of ionizing radiation that is biologically hazardous and are a product of nuclear fission and fusion processes. They have a high penetration power and will damage bone marrow and internal organs. Unlike alpha and beta rays, they pass readily through the human body and are a challenge when it comes to protection. Due to their penetrating power, gamma rays require extensive amounts of shielding mass to attenuate them to levels which are not harmful to living cells, in contrast to alpha particles which can be stopped by paper or skin, and beta particles, which can be shielded by thin aluminum.

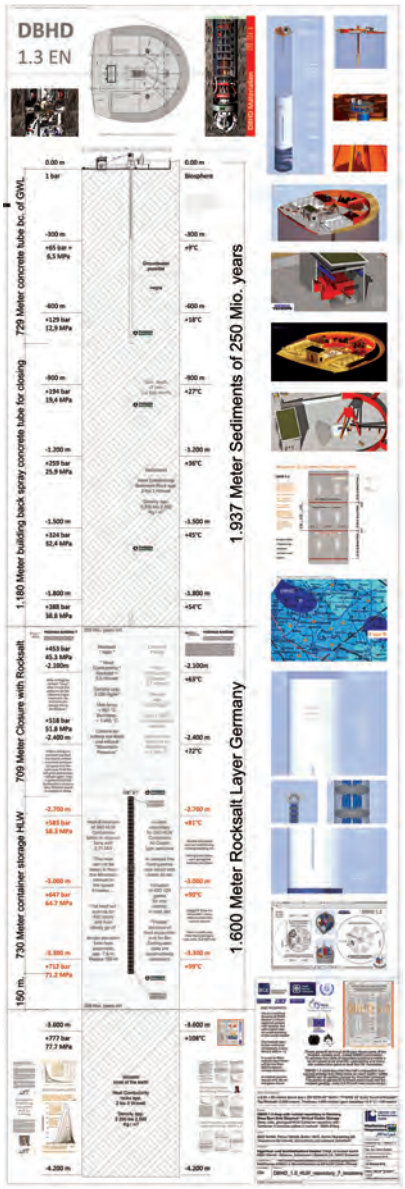

Figure 2: DBHD 1.3 EN Soil Stratification profile for a proposed site in Germany.

The DBHD process begins with the use of a shaft boring machine (SBM) from Herrenknecht AG / DE that is 12m in diameter to drill down to depths on the order of 3,350m. This deep shaft is then subject to further construction to install multiple layers, essentially a series of floors, each of which can support containers that encapsulate the HLW. A single DBHD can store up to eight "Castor" containers per floor with a total of up to 360 per site. The 12m diameter allows for a 113 sq.m. surface for all the ventilation pipes, Castor on steel cable, a staircase, a lift and a concrete tubbing ring to keep the hole open. Each Castor is able to take 10.5 tons of heavy metal (spent fuel).

The maximum temperature from waste heat from HLW after 25 years is 160 K — plus deep environmental temperatures of 105 C ranging up to a maximum of 265 C on the edge of shaft concrete to the surrounding rocksalt. As it turns out, the Castor container sealings are able to take up to +600 C. As such, the DBHD does not infringe on the limits of the Castor containers. Recent estimates from July 23, 2018 suggest that seven such repositories to accommodate 2520 Castor containers at sites in Germany would cost on the order of 5.65 billion Euros ($8.7 billion).

Why Canada? As it turns out, as shown in Figure 1, there are rocksalt formations in the Maritime provinces of Canada, including New Brunswick, Nova Scotia, and Prince Edward Island that are suitable candidates for the advanced repository performance offered by the DBHD technology. As a geologically viable region, it should be subject to consideration for the long-term storage problems associated with HLW. The authors also believe it to be a more cost-effective solution than those currently under consideration by the NWMO and believe its advancements offer improved performance and safety. **CCE**

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WHO OWNS your designs?

By Peter Little and David Reive

In today's world of fast paced construction projects, issues such as ownership of work product often take a back seat to getting the project done. However, not addressing these issues upfront can cause significant headache and expense later on.

There have been many disputes over who owns the rights in work product. Can the consulting engineer use plans created for one client for another? Can the client take plans created by one engineer and have them modified by another? If there is an invention during a project, such as a new tool or method of doing something, who owns it?

As discussed below, the best practice is to have the parties agree on their intentions and memorialize everything in writing.

Legal rights in the product of the human intellect are called intellectual property. Intellectual property is different than other forms of property, such as real estate or equipment, as it is intangible. The form of intellectual property most relevant to consulting engineers is copyright.

Copyright in Canada is governed by the terms of the federal Copyright Act, which provides that copyright subsists in every original literary, dramatic, musical and artistic work. There is a broad definition of these works which includes every original production in the literary, scientific or artistic domain, whatever may be the mode or form of its expression

What kind of work would a consulting engineer produce that would be eligible to be protected by copyright? Copyright subsists in expressions, but not in ideas, systems, methods, or mathematical concepts. An author of copyright has no ownership over the idea they have expressed, regardless of originality. Rather, they have ownership of their particular expression of the idea—the "work" in copyright law. For a consulting engineer, works subject to copyright include all drawings, renderings, plans, specifications, models, and just about any other 2D or 3D thing made.

So who owns the copyright in all these works? Section 13 of the Copyright Act sets out the rules regarding the ownership of copyrighted works.

In order to explore various copyright ownership issues faced by a consulting engineer, let's consider a fact scenario. An engineering firm, ABC Engineering Inc., has been retained by DEF Corp. to assist on a project. As part of their services, ABC will produce CAD drawings and other work product for use by DEF Corp. When all is said and done, does ABC still own the drawings and other works or do the rights transfer over to DEF as the client?

Before even considering the relationship between ABC and DEF, it must be established that ABC does in fact own the copyright of the drawings in the first place. Subsection 13(1) of the Copyright Act states that the author is the first owner of the copyright. However, where the author created the work while in the employment of another, subsection 13(3) states that the employer shall own the copyright in the work.

What if ABC also retains the services of a contract engineer to help produce the drawings? Absent an agreement, it can be uncertain who owns any works created by this contract engineer. To avoid any uncertainty, it is advisable to always enter into a comprehensive agreement with any external contractors that clearly outlines the ownership rights of any intellectual property that arises from the relationship.

Turning back to the question of whether copyright is owned by ABC, the engineering firm, or DEF, the client, subsection 13(4) of the Copyright Act allows the owner of the copyright to assign its rights, but to be effective that assignment muwst be in writing. Accordingly, best practice is that any agreement between the parties should explicitly describe the assignment of the copyright in any works, if that is the mutual intention of the parties.

Copyright law can be difficult to navigate and is not always top of mind for a consulting engineer. Intellectual property rights are best protected with comprehensive agreements and by seeking legal advice in uncertain situations. Intellectual property may be the most valuable product a consulting engineer will produce and every opportunity to protect it should be seized. **CCE**

Peter Little, articling student, Miller Thomson, BSc Engineering and worked for an environmental engineering consulting firm. David Reive, partner and a national leader in intellectual property, Miller Thomson, dreive@millerthomson.com.

Adobe Stock

By Jeremy Eskenazi

Five ways to attract GREAT CANDIDATES

How your company can leverage what employees and candidates say about you to attract top talent

Have you ever struggled to hire the right people? Do most of the people you interview seem like a questionable fit at your company? It might be a symptom of not using your employer brand to your best advantage. An employer brand is what employees and candidates say about your company and the work experience when you're not in the room. It's not something you can go out and buy, or have a fancy branding exercise to develop and replace if you don't like the one you have. Much like branding a product, your employer brand takes on elevated meaning and a predisposition to buy or join. In what is currently a competitive talent market, effective branding creates a sustainable competitive advantage and can make a huge difference in who is interested in working for you.

If you're not sure what your employer brand is today, think about employer review websites online that are popular in North America and many parts of Europe. If you're not familiar with the concept of these sites, they're user-driven platforms that encourage people to anonymously record their experiences with a company as a candidate or employee. They can write whatever they want, even if it's negative, and they can encourage people to run in the opposite direction. The flip side is that reviewers can also sing your praises and wax lyrical about you. Unfortunately, much like any user-driven site, anonymous contributors are usually either delighted with something, or were very upset; so you tend to see wild swings of positive or negative comments.

An employer brand is not necessarily changed overnight, but every time you interact with a candidate, you create an impression. Now multiply these impressions dozens or even hundreds of times. This is a powerful force. This is your professional brand and your opportunity to create (or start to re-create!) the first experience.

The five ways to leverage your employer brand are:

1. ***Asset Assessment.*** Be honest: what are your strengths and weaknesses? How large is your company—do you need people who thrive in an intense corporate environment or do you want people who are happy to have a more stable career? What benefits do you offer? Is there opportunity for advancement? Knowing this and being able to clearly articulate it is important.

2. ***Employee Involvement.*** What is your organizational culture? Is it vertical, with top-down direction and little front-line input, or are decisions made on a broad collaborative basis? Is there opportunity for creative thinking? Knowing how your employees interact today and empowering them to tell the story of how they contribute is powerful.

3. ***Competitive Assessment.*** What other organizations can your candidates work for? You need to know who your competitors are and what they offer. If another company offers higher wages, can you compensate with profit sharing or better benefits?

4. ***Brand Positioning.*** You need to know where your organization fits in the overall market. Are you known for promoting from within? Does your company have a reputation for treating women and minorities fairly? The comments left online are a good starting point for this, as are any internal surveys you run.

5. ***Brand Expression.*** This is the combined result of all of the 'brand signals' that are present in the marketplace and are picked up by clients and candidates. Every element of your employer brand needs to be in alignment. For example, if you claim to care about the environment and candidates are offered Styrofoam cups when they come in for an interview, you'd be surprised how much that can alter perceptions of your company and what you stand for.

In today's competitive global economy, these five steps can help you find the candidates you need. Remember that candidates can be both internal and external. If you bring the right talent into your team, they may be interested and have versatile skills that could allow them to try new jobs at your company.

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Adobe Stock

HVAC

Johnson Controls-Hitachi Air Conditioning announce the Hitachi water source VRF heat pump and heat recovery cooling and heating systems. The unified 6-, 8-, 10- 12-, 14-, 16- and 18-ton single module units are available in 208/230V and 460V. AHRI-certified efficiency ratings for the new water source VRF systems are: Integrated Energy Efficiency Ratio (IEER) — 20.3 to 29; Heating Coefficient of Performance (COP) — 68°F: 4.3 to 6.3.
www.johnsoncontrols.com/

LG Electronics has launched the MULTI V5 575V VRF model to Canada. The Multi V5 is available from 6- to 42-tons, with a choice of three-phase 208/230V, 460V or 575V electrical power as heat recovery/heat pump outdoor units. Its heat operating range reaches -30°C. New to the Multi V line-up are the single frame 16-, 18-, and 20-ton units; the 20-ton.
www.lg.com/ca_en/air-solution

Nortek Global HVAC has been granted a U.S. patent for a method of controlling and stabilizing hot gas reheat circuits in air conditioning systems. The method eliminates hot gas reheat circuit instability and the risk potential of freezing experienced by most current air conditioning reheat technology, especially on dedicated outdoor air systems (DOAS) when operating during cold and high humidity ambient conditions. The current industry standard typically protects systems only mechanically with on/off thermostatic expansion valve (TXV) bypass diversions. The Nortek method, which already appears on Reznor and Mammoth branded DOAS units, uses a DDC algorithm to prevent sub-cooling of the evaporator coil via a DDC-controlled modulating hot gas reheat TXV. For the specifying engineer, this methodology will provide a more effective dehumidification cycle and better, more reliable reheat and air comfort control for DOAS units. Room humidity control remains stable regardless of outdoor ambient conditions.
nortekhvac.com

PUMPS

Armstrong's Design Envelope 4380 Vertical In-Line pumps are now available in stainless steel. Suited for domestic water and light industrial use, the pumps are certified for safe drinking water systems to the NSF-61 and NSF-372 standards. The pumps can also be used in light industry petroleum and chemical applications. The Design Envelope features include parallel sensorless pump control, built in Wi-Fi, touchscreen control and optional pump manager capability.
www.armstrongfluidtechnology.com

LIGHTING

Legrand America and Lumileds have partnered to deliver an easy to integrate solution for high quality tunable-white light. Lumileds will provide intelligent light sources (LUXEON-based solutions) through its Matrix Platform that are characterized and programmed to work with Legrand's Wattstopper Blanco tunable white logic modules within the Wattstopper Digital Lighting Management lighting controls solution.
www.lumileds.com www.legrand.ca

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The point being: there is active work required to engage your current employees as brand ambassadors as well—they too represent and can carry your employer brand far and wide.

Remember, you can't "make" an employer brand. An advertising agency can't help you create a brand. They can help create a brand message. Whether or not you know what your brand is isn't the issue. It's knowing what the themes are that people use to talk about your organization. Then you can manage the expression of the brand—and how people receive it—as part of your brand as an employer. You can do this through your goals, vision, and values, and the taglines that best explain what your company is about.

It's easy for someone to throw out "we aspire to be the best place to work". Your employer brand cannot be solely aspirational—it has to be accurate for where your organization is today. When your position is too aspirational, people will likely be unhappy when they encounter you—both candidates and employees. If you were in their position, don't you think you'd feel let down too? **CCE**

Jeremy Eskenazi is an internationally recognized speaker, author of RecruitConsult! Leadership, and founder of Riviera Advisors, a boutique Recruitment/Talent Acquisition Management and Optimization Consulting Firm. He is a specialized training and consulting professional, helping global HR leaders transform how they attract top talent at some of the world's most recognized companies. For more information visit: www.RivieraAdvisors.com.

Specifier's Literature Review

AHR EXPO: THE WORLD'S LARGEST HVACR MARKETPLACE

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Breaking Barriers

This fall Concordia University unveiled the first Canadian engineering faculty named after a woman, the Gina Cody School of Engineering and Computer Science. Gina Parvaneh Cody arrived in Montreal from Iran in 1979 with an undergraduate engineering degree and went on to become the first woman to earn a PhD in building engineering at Concordia. Her early career began as a crane inspector. She recalls being the only woman, not only in the engineering section but in the entire industry. She ultimately went on to lead a Toronto-based consulting engineering firm, before retiring in 2016.

Cody's $15 million donation to Concordia will support research on smart cities and scholarships, as well as a fund for equity, diversity and inclusion programming.

We spoke with Cody about the school, consulting and women in engineering.

How do you feel about being the first woman in Canada to have an engineering faculty named after you?

I am humbled. I get very emotional about it, but it's not really about me it's about my message. It's about creating an opening for the next generations of women. And why did it take until 2018 for this to happen? That's what I want to echo out to the industry. Really, my hope is that I am soon forgotten because there are so many other women getting recognized after me. It's a start; I want to be the first of many.

Why did you become an engineer?

I always wanted to be an engineer. My three brothers are engineers. My father encouraged strong character in his children, and my mother was forceful, she always said that independence for women is achieved through higher education.

She was very adamant that both my sister and I had to study. I became an engineer and my sister became a dentist.

Part of your gift to the engineering school is a fund for equity, diversity and inclusion. Why was that important to you?

When we talk only about women's equity, or women's representation, a whole section of the population are left behind, which is the LGBTQ community. And if we think women have it rough, we don't know how rough it can be.

For me, I may be talking about women, but it's about time we really talk about gender equity beyond just females. If you think construction is tough for females, send a non-conforming gender individual to a job site and see what happens. We're still way behind. We're in the dark ages when it comes to these issues.

According to Engineers Canada, only 20% of engineering students are women, and statistics say only 12.8% of registered engineers are women. Why aren't women staying?

There are a couple of issues, and some are controversial. When women get into the job there is a frustration. I think they see their peers advancing ahead of them, and then when there is an opportunity to move to another profession, they do it. Some become lawyers, teachers, and other careers where they feel more fulfilled.

It's not that their interest isn't in what engineering can offer, I think it's more about the expectations from them, and a lack of giving them the opportunity to move up.

When interviewing a woman and a man, don't tell me that subconsciously we're not thinking, 'Would that woman be able to give me as many hours as the man?'

Subconsciously we always think that we can get more out of the man. We have to confront these biases and we have to talk about them.

Also, maternitiy leave is an issue. Owners feel they cannot take that chance of having a vacancy in the role for a year at any moment. Yet a male worker can also leave at any moment for any number of reasons. Show a commitment to a woman who takes maternity leave and you have a devoted employee for a lifetime.

Is the lack of women at the executive levels of consulting engineering firms an issue?

There are fewer women than men at the highest levels; that's a fact. There are great women engineers at the executive level and they are beginning to have a voice, but by numbers they are still way lower.

I believe it's especially true in consulting engineering, and I feel it's because there is this perception that because as a consultant you are dealing with clients—and the majority of them are male—they may prefer to deal with other men.

Having said that, I've always believed that having a female presence in the room brings a balance to the equation that keeps discussions, not only more appropriate, but it keeps conversations on the level. It's less 'old boys club'.

If we had a greater female presence our industry definitely would benefit from it. For consulting engineers to be more successful they need more women. As a profession they look out of touch, out of date. **CCE**

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