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JANUARY/FEBRUARY 2019

CANADIAN CONSULTING engineer

EMBRACING DIVERSITY IN ENGINEERING

A conversation with Deanna Burgart, P.Eng.

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Cover: Deanna Burgart, P.Eng., CET (photo: AISES American Indian Science and Engineering Society). See page 17

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The more things change...

Welcome to 2019. This year marks the 60th anniversary of Canadian Consulting Engineer magazine. I've had an opportunity to look through that first issue, and it's interesting to see how the industry has changed, and how it remains the same.

Launched in June, 1959, the lead article in that first issue focused on public relations for consulting engineering firms. The article explains that a company answers to many 'publics', and the key to good public relations is being a good citizen:

"The first prerequisites are sound policies and good performance. The shareholders should feel the company is a good investment; the employees should feel it is a good place to work; the customers and suppliers should feel it is a good company with which to do business; and the community should feel the company is a good industrial citizen."

This 60-year-old advice becomes acutely relevant following recent headlines drudging up the six-year-old SNC-Lavalin corruption scandal. The message for firms of all sizes is the same today as it was in 1959: be a solid corporate citizen locally and abroad, and shine a light on the projects and innovations your firm contributes to—show how engineering continues to improve our quality of life and safety. Companies should take advantage of those opportunities wherever they can.

Another article from 1959 applauded the new St. Lawrence Seaway, explaining how it was opening the market for Canadian iron ore to be shipped south of the border. The strategic importance of that access for the U.S. steel industry actually helped secure the construction of the Seaway—a fact that's interesting today in these times of steel tariffs.

Finally, the 1959 edition included an article on "Engineering as a liberal education". The gist was that then, as now, there was an ongoing effort to persuade more students to enter the fields of science and technology. The article encouraged a more well-rounded curriculum ensuring engineers are: "not only competent but also wise, not only intelligent but humble, not only original but also sympathetic."

One massive difference between then and now was the complete absence of women from the conversation. For example: "On the one hand [educators] have to prepare people to do the jobs which have to be done for the welfare of the community, and, on the other hand, they have to try to offer to every student the means to enlarge his personal life, his intellectual horizons—to become, as it were, the ideal man within the limits of his natural gifts."

So while the need to graduate a greater number of broadly-educated engineers remains a challenge, the desire to also encourage a more diverse and inclusive stream of engineers in 2019 will ultimately create an industry that embraces a much greater variety of perspectives and will be filled with professionals who are all living their ideal life.

On that topic, this first issue of 2019 introduces our Point of View series: articles encouraging new perspectives on the changing face of the consulting engineering industry. Please read and respond with any comments or ideas you have for future articles in the magazine.

Also, the 2019 Canadian Consulting Engineering Awards are now open for entries: visit canadianconsultingengineer.com to learn more.

Doug Picklyk

FOR PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

CANADIAN CONSULTING engineer

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York University

The new Rob and Cheryl McEwen Graduate Study & Research Building, attached to the Schulich School of Business at York University in Toronto.

BUILDINGS

York U's new energy efficient building

York University has opened the Rob and Cheryl McEwen Graduate Study & Research Building, designed by Baird Sampson Neuert Architects to be one of the most environmentally sustainable academic buildings in North America.

The 67,000-sq.-ft. building, targeting LEED Gold, features a glass solar chimney rising 27 metres to provide passive natural ventilation for the entire building and preheating of intake air. It will be naturally ventilated 40% of the time it is occupied, and it has more than 200 automated computer-controlled and operable exterior windows.

All exterior glazing on the building is triple glazed Low E energy efficient glazing. The energy use is modeled to be 71.4% below Canada's Model National Energy Code. Structural engineers were Blackwell, and Crossey Engineering was the mechanical/electrical engineer.

COMPANIES

CIMA+ acquires KFR Engineering

CIMA+, the Quebec-based multi-disciplinary engineering firm with 31 offices across the country, has acquired Edmonton's KFR Engineering, specialists in mechanical engineering design for the buildings sector.

"We are delighted to welcome KFR Engineering's team of 22 employees and partners to the CIMA+ family," said Francois Plourde, president and CEO of CIMA+, in a company release.

"For CIMA+, the acquisition of KFR Engineering is strategic for several reasons, namely in that both of our firms share a common business culture that focuses on quality engineering and the well-being of our employees and communities."

East Coast Consolidation

Halifax-based CBCL Ltd. has acquired Conquest Engineering Ltd., a 30-plus person geotechnical and materials testing firm based out of Saint John, NB with additional offices in Fredericton, Moncton and Halifax.

CBCL is Atlantic Canada's largest employee-owned multidisciplinary engineering consulting firm with some 360 employees across eight offices (Halifax, and Sydney, NS; Charlottetown, PE; Saint John, Fredericton, and Moncton, NB; St. John's and Happy Valley —Goose Bay, NL).

COMPANIES

WSP Canada's new CEO

WSP Global appointed Ryan Brain president/CEO of WSP in Canada. A certified management consultant, Brain brings over 20 years experience in the professional service industry, (see more on page 38).

In addition, André-Martin Bouchard is now WSP global director, environment. Joining WSP in 2006, Bouchard was a member of WSP's Canadian leadership team in the role of executive vice president, environment.

André-Martin Bouchard

Dillon names Hanlon president

Sean Hanlon, P.Eng., has been named president of Dillon Consulting Ltd. and Dillon Consulting Inc. after serving as interim president since last April. Based out of Dillon's Saint John, NB office, Hanlon joined the firm in 2002, becoming a partner in 2007 and has been a board member since 2010.

Sean Hanlon

SNC-Lavalin's new COO

SNC-Lavalin named Ian Edwards Chief Operating Officer. All business sector presidents report to Edwards. He has led SNC's infrastructure business since 2014.

Ian Edwards

Changes at HIDI Group

John Ferguson

Toronto-based HIDI Group's John Ferguson has transitioned from managing principal—Toronto office to design principal, focusing on design and the needs of smart and sustainable buildings.

David Sinclair

David Sinclair has been appointed managing principal—Toronto office in addition to his current role as mechanical principal and principal of HRCx Building Systems Commissioning.

Dario Di Carlo

And Dario Di Carlo has been appointed chief strategy officer in addition to his current role as electrical principal.

(*photos: Trevor Godinho*)

Canadian leader for Burns & McDonnell Energy Group

Jeff Reid

Jeff Reid has been named director of Canada for the Burns & McDonnell Energy Group, the Kansas City-based firm's power generation division. In his new role, Reid will oversee new generation opportunities, power generation upgrades, retrofits and related expansion activities across Canada.

ParioPlan joins Associated Engineering: top row (l-r) Owen Mierke (AE), Chris Skowronski (AE), Marcelo Figueira (PP), Nelson Dos Santos (AE); Front row (l-r) Helder Afonso (AE), Armin Preiksaitis (PP), Martin Jobke (AE).

AE adds ParioPlan

Associated Engineering announced that the team of community planners and urban designers from ParioPlan has joined the firm's Edmonton office.

The land use planning and design consulting firm will now operate as Associated Engineering.

"For over 20 years, our companies have partnered on award-winning projects in communities throughout Alberta," said Martin Jobke, president, Associated Engineering. "We look forward to continuing to work with our clients to develop creative solutions for healthy and resilient communities."

Engcomp aligns with Strategic Decisions Group

Saskatoon-based consulting engineering firm Engcomp and U.S.-based management consulting firm Strategic Decisions Group have formed a strategic alliance to advise Canadian companies in mining and related downstream industries on strategy and risk management.

MH grows data centre services

Morrison Hershfield Group has added Baltimore, Maryland based CCG Facilities Integration Inc. to the company, strengthening the firm's mission critical and data centre service across North America. Both companies deliver mechanical, electrical and other professional services for mission critical environments.

Footprint lands in Ottawa

Footprint, the sustainability arm of the Smith + Andersen group of companies, has opened an Ottawa office, marking the seventh Footprint location in Canada.

The new office is led by Footprint associate Christianne Aussant, P.Eng., who brings more than a decade of experience.

The Footprint list of services includes sustainability certification, energy modelling, measurement and verification, energy management, and daylighting analysis.

"Footprint has already worked with some fantastic teams in and around Ottawa, and we're looking forward to having a dedicated local team," says Lyle Scott, founding principal of Footprint. "With Christianne's leadership, this new office location is a clear indication of our focus in the region. We look forward to strengthening relationships with our existing clients and developing new partnerships."

The Footprint Ottawa office is located at 1600 Carling Avenue (Suite 530) in the Carlington neighbourhood of Ottawa.

LETTERS TO THE EDITOR

Re: 2018 Awards issue

As an avid reader of CCE and its annual Awards issue I was surprised and puzzled by an apparent error in the October/November issue. In the summary table of "Entries by Province" provided on page 21 we were told that there were no entries from New Brunswick. Yet, in the write-up provided for the Award of Excellence winner "Area Risk Assessment for Ship-Source Oil Spills in Canada" (pages 69, 70), the project team was clearly identified as the Fredericton Office of Dillon Consulting Ltd. Indeed, a list of six employees was provided, presumably all based in New Brunswick's capital city.

I realize that the Dillon head office is located in Toronto, but the firm has a long-time presence in the Maritimes with considerable expertise based in the region. If the bulk of the work on the winning project was done in Fredericton then shouldn't the project have been listed as a "Made-in-NB" production, even if the entry was submitted by head office? This is not a trivial point: there is engineering expertise throughout Canada and it should be recognized wherever it excels.

Clarification please.

Andrew Steeves, P.Eng.

Mr. Steeves, one of our editorial advisors, was correct. The Dillon entry did belong in the New Brunswick column, and also, the Inuvik Tuktoyaktuk Highway project submitted by Tetra Tech and Stantec should have been identified as work done by the Northwest Territory offices. We apologize for the error. In a follow-up, Mr. Steeves commented:

My guess is that project misidentification occurs quite often in Awards submissions due to several factors:

- the breadth of coverage of many of our large firms and the resultant consolidation of many administrative functions in one location—usually the head office. This is likely what happened in the Dillon instance;
- the perception of staff in many smaller firms and offices that "the Awards will be won by the big guys with the big projects, so why bother?" This rational—faulty as it is—has often been stated by firms in my province. Many small, regional firms (and branch offices) are quite innovative albeit on a small scale as witnessed by the Dillon project;
- the lack of an Awards competition in several provinces and territories—likely the reason for the Inuvik Tuktoyaktuk Highway project being identified as from elsewhere;
- busy-ness and a perception that spending non-chargeable time on an Awards submission is not productive. This is a problem across our industry.

It is my observation that ACEC-Canada and its member organizations are trying to address these factors. As you noted in your Awards issue editorial the variety and scope of the work done by Canadian consultants is impressive and the value of these projects to Canada is vital for public safety and economic well-being. There is an infrastructure crisis in Canada and it must be addressed.

Re: December 2018 issue

The last issue of [the] magazine had an article on dumping nuclear waste. It discussed three levels of radioactive waste. While it mentions that low level waste lasts 300 years, the following two levels of waste had no time line.

I think it would have been helpful to know what this timeline was. 'Beyond several hundred years' is a bit woolly for an engineering publication. It should mention 100,000s years for high level toxic radioactive waste. So since that is well beyond any engineering durability known to man, why are we even thinking of dumping the waste. Why do we think we even stand any chance of attaining long term containment? In Germany they are having to dig up what they once thought of as 'safe containment' and having to start all over.

Should members of the public reading this publication not be told that if they accept a nuclear waste dump that it will need to be maintained for 100,000s of years? Plus such a dump site will not be insurable against leakage. So if anything goes wrong the public pays the consequences. Isn't it better to keep the waste where we can see it? What risks are there? This was not really discussed in any great detail.

I found the article was trying to destigmatise us of the very serious issues and risks involved. It is not a simple matter as the article, in my opinion, made it out to be. How does a 3km hole behave over a 100,000 years at 265°C? Is being a 'cheap solution' the main issue when it comes to nuclear dump sites? I would say it is the last thing we should be concerned about. There was simply no proof that this is the best Engineering solution that could last 100,000s of years and how it compares to what NWMO [Nuclear Waste Management Organization] is dreaming up.

The 20/20 hindsight on all this is that we should never think of producing another nuclear power station. Many countries have put a moratorium on this form of power supply. Quite rightly so. Canada should too.

Richard Annett, P.Eng., C.Eng

Canadian Consulting Engineer welcomes and encourages letters from our readers to provoke thoughtful discussion. dpicklyk@ccemag.com

CHAIR'S MESSAGE

Embracing change in 2019

Our world faces constant change and as the world changes, so must consulting engineering evolve to leverage the resulting opportunities and challenges. New methods for procurement and delivery of projects, construction companies developing more in-house capabilities, off-shoring of detailed design efforts, arrival of new technologies and greater integration of engineering design with other professional services are some of the changes we can see. Slower than expected infrastructure investment, uncertainty around the approval of major capital projects, and new national and international trade agreements also add colour to the context in which we do business.

In February, our Board will focus on the challenges and opportunities brought on by change in our industry during a planning session to review and update our Strategic Plan. A dynamic roadmap for our organization, this living document and its associated strategies and actions will provide the framework for success in the years ahead.

The upcoming national election will also bring change, with newly elected officials at the helm of portfolios that impact our industry. The time has come to harvest our past efforts in government relations and contribute meaningfully to the national discourse. The election campaign is an opportunity to share our industry's priorities with candidates, have our voice heard by the national media and educate the public at large on the important role consulting engineers play in their communities.

Taking part in coalitions and partnerships that share in the outcomes of these opportunities and challenges is a way for ACEC to compound its influence with key decision makers. During the year ahead, I will actively support ACEC's partnerships with like-minded organizations such that we can amplify our voice and ensure that it contributes to the national discourse.

Building on the work our Board and staff have accomplished in 2018, which is outlined in the coming pages, the year ahead promises to be exciting. My fellow Board members and I are confident that ACEC is well prepared for the year ahead.

MICHAEL SNOW, P.ENG., ING., M.A.SC.
CHAIR, BOARD OF DIRECTORS, ACEC-CANADA

MESSAGE DU PRÉSIDENT DU CONSEIL

Accueillir le changement en 2019

Le monde évolue sans cesse et le secteur du génie-conseil doit en faire autant pour saisir les occasions et relever les défis provoqués par cette évolution. Au nombre des changements auxquels nous assistons, signalons les nouvelles méthodes d'approvisionnement et de livraison de projets; des entreprises de construction qui multiplient leurs capacités à l'interne; la délocalisation de la conception détaillée; l'arrivée de nouvelles technologies et l'intégration plus soutenue de la conception technique à d'autres services professionnels. Le contexte dans lequel nous travaillons est également marqué par le rythme des investissements en infrastructure plus lent que prévu, l'incertitude entourant l'approbation de grands projets d'immobilisation et les nouveaux accords commerciaux nationaux et internationaux.

En février, lors d'une séance de planification visant à réviser et à actualiser notre plan stratégique, le conseil d'administration de l'AFGC va se pencher sur les défis et les occasions que suscite le changement dans notre industrie. Le plan stratégique est une feuille de route dynamique pour notre organisme. Ce document évolutif et les stratégies qui l'accompagnent constitueront un cadre de réussite au cours des prochaines années.

Les élections fédérales qui auront lieu cette année seront également une source de changement puisque de nouveaux élus prendront en main les dossiers qui ont une incidence sur notre industrie. Le moment est venu de récolter ce que nous avons semé dans le domaine des relations gouvernementales et de contribuer efficacement au discours national. La campagne électorale nous donnera l'occasion de promouvoir les priorités de notre industrie auprès des candidats, de nous faire entendre dans les médias nationaux et d'éduquer le public dans son ensemble au sujet du rôle important que jouent les ingénieurs-conseils dans nos collectivités.

Pour exercer une influence sur les principaux décideurs, l'AFGC fait partie de coalitions et de partenariats qui partagent les résultats de ces occasions et de ces défis. Au cours de l'année à venir, je vais soutenir activement les partenariats de l'AFGC avec des organismes ayant des idées similaires, afin de nous faire davantage entendre et de participer au discours national.

Grâce au travail réalisé en 2018 – résumé dans les pages suivantes – par notre conseil d'administration et nos effectifs, cette nouvelle année s'annonce prometteuse. Mes collègues du conseil d'administration et moi-même sommes certains que l'AFGC est bien préparée à défendre du mieux possible les intérêts de notre industrie.

MICHAEL SNOW, P.ENG., ING., M.SC.A.
PRÉSIDENT, CONSEIL D'ADMINISTRATION, AFG-CANADA

YEAR IN REVIEW

WHAT WE'VE ACCOMPLISHED IN 2018

Over the course of the last year, ACEC worked diligently for a more favorable public policy and business climate for consulting engineering companies in all sectors and by extension for all Canadians. We did this by influencing the federal government and collaborating with national stakeholders on a host of issues to help make Canada competitive and prosperous. ACEC's team is proud of the important work it has accomplished over the past year. Here's a snapshot of what we achieved in 2018.

TIMELY INFRASTRUCURE INVESTMENTS & FREE TRADE

Infrastructure investment delays and how to address them was the primary message ACEC President & CEO John Gamble carried to Parliament Hill when meeting with Parliamentarians. In the spring, Mr. Gamble testified to the House of Commons Standing Committee on Transport, Infrastructure and Communities on the importance of sustained financial commitments, the government's infrastructure plans, and outlined a series of recommendations that would improve its implementation. It was the message he also delivered to the Minister of Infrastructure and his senior policy advisors during face to face meetings in the late winter and early spring. This message became a core piece of ACEC's submission to the Finance committee in our pre-budget submission in August.

Janice Fukakusa, Chair of the Board of the Canada Infrastructure Bank, sharing her vision for the Bank at the ACEC national leadership conference in October.

We also shared our knowledge and expertise of infrastructure development with the President and CEO of the Canada Infrastructure Bank Pierre Lavallée during an introductory meeting. ACEC further strengthened its relationship with the Bank when its Chair of the Board, Janice Fukakusa, shared her vision for the Bank during a fire side chat at our October national leadership conference. The year ahead will be an opportunity to strengthen this new relationship to ensure the interests of the consulting engineering sector, and all Canadians, are top-of-mind as the Bank identifies investors and projects that it will finance

John Gamble, ACEC-Canada President & CEO met with the Honourable Perrin Beatty, President & CEO of the Canadian Chamber of Commerce to discuss NAFTA and ACEC's support of, and participation in, the *Coalition to Keep Trade Free* in Summer 2018.

ACEC continued to collaborate with the Canadian Chamber of Commerce (CCC) on ensuring the government is aware of the need for Canada to remain competitive on the world stage. ACEC also joined the Chamber led Coalition to Keep Trade Free, formed over the summer during the NAFTA renegotiations to address the ongoing trade uncertainties. The Honourable Perrin Beatty, President and CEO of the CCC, provided a thought-provoking opening keynote address at the ACEC national leadership conference on Canada's competitive-

ness on the world stage. With the federal election expected next fall, we will continue to collaborate with the Chamber on trade and issues that impact the delivery of major resource projects.

MOVING THE YARDSTICK ON QUALIFICATIONS BASED SELECTION (QBS)

After years of advocacy by ACEC and the Provincial /Territorial Associations for QBS when procuring consulting engineering services, our efforts resulted in a breakthrough. Public Services and Procurement Canada (PSPC) launched a Qualifications Based Selection (QBS) pilot project following consultation with industry. ACEC, along with the Royal Architecture Institute of Canada (RAIC), worked with PSPC for several months to familiarize key leaders within the federal government on the many benefits of QBS. In recognition of its leadership within the federal government and openness to QBS, the PSPC team was awarded the 2018 Chair's Award at the Canadian Consulting Engineering Awards.

ACEC also joined with Consulting Engineers of Alberta in helping finance a national study by the University of Alberta that will quantify the benefits of QBS using a database that once completed will be accessible to all levels of government. We believe the results of this work will encourage more jurisdictions to follow PSPC's lead in adopting QBS. It will also help support converting current QBS pilot projects into long term procurement policy for clients.

RESPONSIBLE RESOURCE DEVELOPMENT

Our message to Canadians and Members of Parliament on resource development was twofold. First, accessing Canada's natural resources and transporting them to market would create enormous economic opportunity. Secondly, consulting engineers can help the resource sector be economically viable as well as socially and environmentally responsible. ACEC believes that the creation of a national infrastructure corridor—essentially a network of rights-of-way for nation building infrastructure —would make it easier and more economically viable to move resources to market, would connect northern and remote communities to vital economic and quality-of-life-enhancing infrastructure such as power, communications, road and rail. It would also reduce the environmental footprint and provide a positive framework for industry and First Nations to collaborate on the development of major projects like the Trans Mountain pipeline. Although a lofty goal, ACEC believes this nation building project merits continued promotion to elected officials and senior government officials in the year to come.

Todd Smith, P.Eng., (center) past Chair of the ACEC-Canada Board of Directors presenting the 2018 Chair's Award to PSPC at the Canadian Consulting Engineering Awards gala in October. Arianne Reza, Assistant Deputy Minister, Procurement, and Michael Mills, Associate Assistant Deputy Minister, Real Property Services accepted the award on behalf of PSPC.

continued on page 16

John Gamble, ACEC-Canada President & CEO and the Honourable François-Philippe Champagne, Minister of Infrastructure and Communities discuss the impact of infrastructure on society at the ACEC national leadership conference in October.

THE CULMINATION OF OUR EFFORTS

ACEC's yearlong advocacy efforts culminated with our annual Parliament Hill Day, which took place on October 23rd during the ACEC national leadership conference. It provided the opportunity for nearly 70 representatives from ACEC member firms to meet face-to-face with Members of Parliament to discuss these issues. The association's most successful government relations event and the cornerstone of our national advocacy program, this year's Parliament Hill Day was a great success, leading to requests for additional meetings by MPs with our members and the association.

THE YEAR AHEAD – LOOKING FORWARD TO 2019

Although early in the New Year, ACEC is gearing up for another busy 12 months ahead. The team is working on exciting projects for 2019 that will further support our strategic priorities. Stay tuned for our Source newsletter and for details on what to expect from your national association in the year ahead!

Throughout 2019 *Canadian Consulting Engineer* explores the topic of diversity in the industry through a series of articles called Point of View; stories designed to get readers thinking about their profession, their day-to-day workplace and maybe seeing their surroundings through a new lens.

Working better TOGETHER

Deanna Burgart, P.Eng, CET, president of Indigenous Engineering Inclusion Inc.

Kicking off our Point of View series we interview Deanna Burgart, P.Eng, CET, the president of Indigenous Engineering Inclusion Inc. in Calgary. An adoptee from the Fond du Lac (Cree/Dene) First Nation in Northern Saskatchewan, born in Alberta, Burgart spent her early formative years in Singapore. She is an Indigenous youth mentor and has developed her love for finding cross-cultural collaboration opportunities between youth, government, Indigenous communities and industries.

How did you first get interested and involved in engineering?

In 1998, I completed my high school upgrading as a single mother and decided to pursue chemical engineering at SAIT [Southern Alberta Institute of Technology, Calgary]. I immediately joined the petroleum industry as a technical sales representative for a reservoir-engineering-focused laboratory, and then went on into production engineering in the upstream sector. In 2007, I returned to university to get my Bachelor of Engineering in Chemical Engineering from Lakehead University.

What was your path to your first professional engineering job?

I was recruited out of university to a global engineering firm in their pipelines division where I initially worked in small project pipeline design and regulatory permitting.

What has been your engineering work history, and have you worked with consulting engineering firms?

The first half of my career as an engineering technologist was mainly in junior to mid-size oil and gas producers. I had a strong focus on production and environmental and regulatory compliance. I did not work with a consulting engineering firm until I graduated and started working towards my P.Eng. I am now a proud professional engineer (APEGA) and certified engineering technologist (ASET).

How did the Indigenous Engineering Inclusion Inc. business come about?

The concept of "Indigeneering"—combining scientific principles like engineering with an Indigenous perspective of respect for Mother

"The key to maximizing the gifts our diversity brings is in creating cultures of inclusion. Cultures where individuals feel empowered to let those different viewpoints be known to solve challenges in a way we never have before."

Earth—evolved from various career presentations I made to Indigenous youth starting in 2008 when I was being considered for the Canadian Engineering Memorial Foundation's scholarship for Aboriginal women in engineering.

It shaped my theme in talks and workshops going forward for the next several years. In the summer of 2016, I decided to leave my position in industry to focus on this vision full time. It has evolved to where I am now focused on delivering workshops and keynote talks across Canada and the U.S. on the value of Indigenous perspectives and how they can help solve some of our greatest challenges in engineering, energy and sustainability.

I'm working with post-secondary institutions such as SAIT and the University of Calgary to increase Indigenous perspectives in engineering and technology curricula.

You are an active speaker advocating for diversity in engineering, what does diversity mean to you and why is it important for engineering?
I believe every person brings diversity to the table, whether we can see it or not. Diversity can be the different lenses we have that shape how we view the world around us—diversity of genders, race, lived experience, ability, ways of thinking, upbringing, and more.

The key to maximizing the gifts our diversity brings is in creating cultures of inclusion. Cultures where individuals feel empowered to let those different viewpoints be known to solve challenges in a way we never have before. This is the key to true innovation, and when we start to foster these cultures, we will see transformation in our organizations.

Engineers Canada has its national 30 by 30 campaign, aiming to achieve 30% of registered engineers in Canada to be women by 2030, up from about 12.8% today. What are you views on that initiative?
I think setting goals is so important. The focus of my work is on supporting this, as well as encouraging more Indigenous youth to consider careers in engineering. As of last fall, of the over 70,000 Professional Engineers and Geoscientist members in APEGA, only 323 self-identified as Indigenous. It's imperative that if we are going to increase gender, race and Indigenous diversity in engineering, we must work hard at changing the culture towards inclusivity of these differences.

Can you share one or two engineering workplace encounters you've experienced, or been told about, that provide an example of unconscious bias based on gender or race?
Unfortunately, situations like this are frequent. I have a very exuberant personality and was once told I was "too friendly and needed to be more professional" with the field staff. The individual was judging my behaviour through their own lens that said a leader should be more stoic and serious in order to lead effectively.

I had a former colleague tell me that her manager would only invite the men on her team for drinks after work because he assumed that she had to go home to her family. This kind of exclusion is an unfair assumption and a barrier to her building effective relationships with the rest of her team.

The trouble with both conscious and unconscious bias is that it is not comfortable to focus on our own. We need to embrace humility and acceptance that we all have biases. We need to have the courage to examine our own and do our best to mitigate any negative impact it might have on others.

Often the exclusion is unintentional and not malicious at all, sometimes it is. In some

environments, the person who feels excluded or judged unfairly does not feel safe to speak out about it for fear of rocking the boat or being seen by their team as "that person".

How should people react to such occurrences when they recognize them?
In a truly inclusive and trust-based environment, individuals should be encouraged to share when they feel excluded. Standing up for others when they feel excluded can be an excellent bridge to creating this environment.

It is always easier to speak up for someone else, and if we get comfortable doing it for our peers, we can eventually build up the confidence to do it for ourselves. Leaders and allies need to be open to receiving such feedback.

The best way to do it is to remove any blame, shame or judgement and see it as shining a light on unconscious bias.

How can the industry raise awareness of these "social norms" that are getting in the way of embracing diversity in the industry?
The key is to create the opportunity for conversations around unconscious bias, microinequities and how to create more inclusive spaces before it becomes a crisis.

Once an organization or a team becomes toxic, with low levels of trust, these conversations can be significantly more difficult, and it will be much harder to turn things around.

The effort is worth it though. Statistics show that diverse teams that are managed well in an inclusive environment outperform more homogenous teams. Fostering these conversations free from blame, shame and judgement, and the acknowledgement that we all bring diversity and unconscious bias, makes diversity and inclusion about every person in the room. Then it moves beyond an us (dominant demographic) and them (minority demographic) conversation and into a "how do we all work better together and bring out our unique brilliance?" It is much more of a collaborative approach.

Women who graduate from engineering programs don't seem to stay in the industry, why do you think that happens?
I can't speak for all women, but anecdotally I have heard that many women leave because they do not see a path forward for them in industry. They leave due to lack of understanding of their needs and values, lack of a pathway of career progression, and lack of respect for their unique perspectives.

One woman once described it to me as the feeling of "pushing a rope uphill." That to navigate her career was exhausting because she had to work that much harder to prove herself, to be heard and to be considered as a technical equal.

As an individual, I navigate my role as mother, grandmother, and creative thinker. I have a passion for Indigenous inclusion in engineering and there really was no space for that in industry outside of Indigenous relations.

I also live with a chronic pain condition that has limited my physical ability to do a lot of the work I used to do in the field (steel toed boots – eight-hour workdays behind a desk), so I decided to recreate and build my new work based on my passions and needs.

Do I miss working in an organization with teams daily? Absolutely, but I had to prioritize my family and my wellness. I think many women are in similar situations as myself.

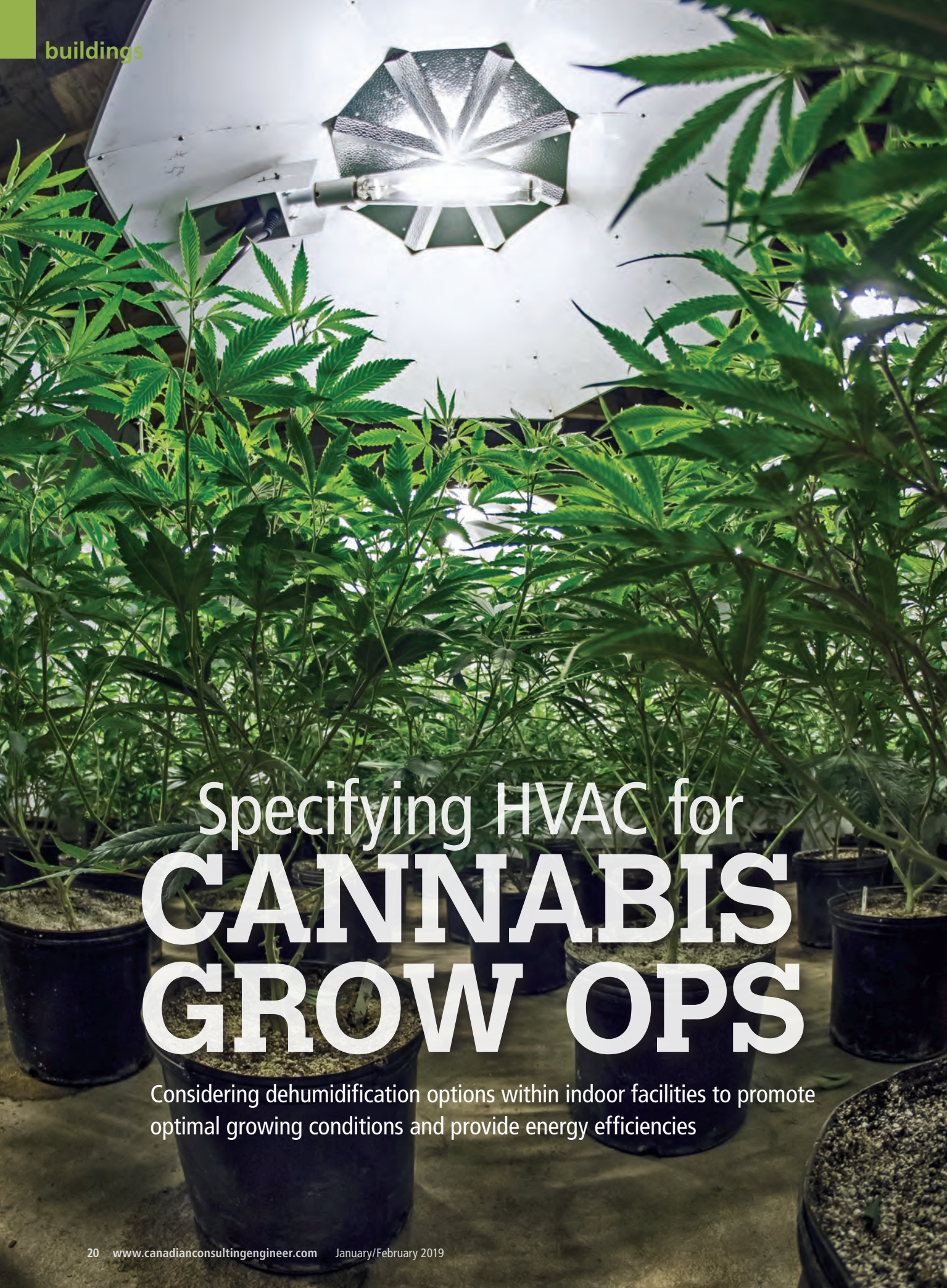
Finally, women and minorities may be growing in numbers in the industry, but how important is it for more diversity at the leadership level of firms, and how will that happen?
The lack of diversity in leadership positions is something that needs to change. When women and minorities do not see themselves reflected in the leadership teams of their organizations, it becomes implied that there is not a role for them there either—nor are their unique perspectives going to be included in the decision-making activities of the organization.

We still have a prevailing perspective that to increase diversity in leadership roles requires the sacrifice of merit or ability. When we do not have diversity in leadership, leadership teams ultimately end up evaluating employees based on their own lens—and promoting those more like themselves. The perspective of "merit" itself can be biased.

Until there is awareness and understanding, and there is a willingness to start addressing this bias, I do not think we will see much change.

I have seen the conversation around equity, diversity and inclusion increase substantially in industry and post-secondary institutions, I am very hopeful that we are moving in the right direction. I am excited to be a part of this movement. CCE

When we do not have diversity in leadership, teams ultimately end up evaluating employees based on their own lens—and promoting those more like themselves.



Specifying HVAC for CANNABIS GROW OPS

Considering dehumidification options within indoor facilities to promote optimal growing conditions and provide energy efficiencies

By Geoff Brown and Ralph Kittler, P.Eng.

For consulting engineers the question is no longer "if," but "when" they will design a system for a cannabis growing facility.

If Health Canada's recent cannabis prediction statistics prove true, designing a new construction or retrofit cannabis grow-op HVAC system in 2019 is almost guaranteed for most Canadian mechanical consulting engineering firms in the very near future.

Health Canada estimates that Canadian growers need to expand their grow areas by 14 to 15 million square feet to meet cannabis needs in 2019 thanks to last October's cannabis law reforms that have expanded from medical use to now include recreational use.

Previously, cannabis grow-op facility managers believed growing spaces required only sensible cooling and that humidity wouldn't prove problematic once the lights were turned off half of the day during the flowering cycle. They were wrong.

Conventional air conditioning is fairly adequate for handling the sensible heat loads when the lights operate. However, when lights are off, air conditioning technology falls well short of handling the heavy remaining latent loads without overcooling.

Furthermore, air conditioned grow-ops were paying a large reheat energy penalty to maintain temperature. High humidity levels also stunted crops and lost entire plants to mold. Many were forced to supplement with portable dehumidifiers, which raised energy costs further.

Recently, growers have realized similarities between grow-ops and indoor swimming pool environments, because they shared similar latent load handling requirements.

Indoor swimming pool mechanical dehumidifier technology, which was invented in the 1970's, enabled the skyrocketing emergence of natatorium design in the 1980's and 1990's and now encompasses an entire design chapter in the ASHRAE Handbook.

Pool dehumidifiers recirculate humid natatorium air through deep dehumidification/cooling coils to remove moisture and then can efficiently reuse compressor waste heat to heat the pool water or reheat the processed air as needed. In a grow-op design, the heat recovery can be used when the lights are off to efficiently reheat the dehumidification coil's cold discharge air without employing costly gas-fired or electric heat.

While latent heat loads are challenges, another design obstacle is the fact most grow-ops typically operate four separate areas all requiring different humidity and temperature set points.

Typically a grow op will have cloning, vegetation, flowering and drying rooms. Humidity can range anywhere from 55 to 75 relative humidity (RH) from one room to another. Tight tolerances of ±1-percent can affect final productivity.

Adding to the challenge is the fact that no standards or recommendations for grow-ops have been established from organizations such as the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE). However, ASHRAE and the American Society of Agricultural and Biological Engineers (ASABE), have recently begun working jointly on a grow-op guideline.

Consulting engineers have basically four types of dehumidifier concepts that can be employed in a grow-op.

Compact Units—applicable for more than 100 square feet, and multiple units can efficiently condition up to 2,000 square feet of space. These lightweight, portable units operate without ductwork and can remove up to about 500 pints/day. They are generally reheat dehumidifiers with no capacity for cooling. The disadvantage is their discharged compressor heat creates an energy penalty for removal within the space. Thus, they're only ideal as supplemental units for spaces using conventional air

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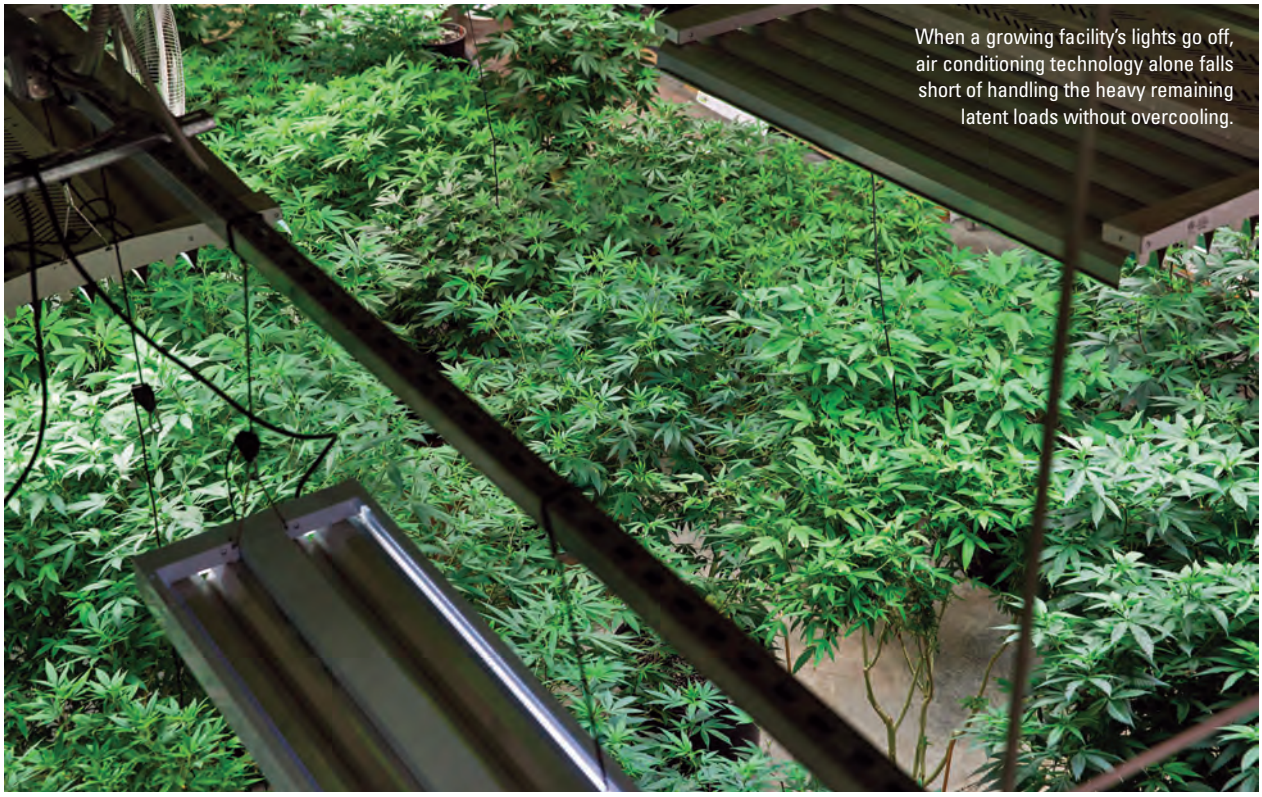

When a growing facility's lights go off, air conditioning technology alone falls short of handling the heavy remaining latent loads without overcooling.

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conditioning that is unable to handle the humidity loads. Generally, they're designed to fix a sensible cooling-only room's inadequacies.

Larger Units—applicable for medium-sized rooms of up to 10,000-square feet requiring up to 100-lb/hr moisture removal and up to 8,000-CFM. These packaged dehumidification/cooling units are designed for relatively smaller areas that require space-saving rooftop systems. They can be ducted or simply downflow discharged into a room from their rooftop position. Sophistication can range up to monitoring/controlling with web-based browsers and smartphone apps. These and other rooftop systems are infrequently specified, because many grow spaces are retrofitted industrial or warehouse spaces not designed with heavy weight-bearing roofs that can support large HVAC systems.

Largest Units—applicable for new plan/spec construction projects with capacities ranging up to 800-lbs/hr moisture removal and up to 70,000-CFM for very atypically large grow buildings. Generally they are specified as one large unit when there is enough property space to accommodate a ground-mounted system to save indoor space and circumvent the expense of heavy-duty roof structures that would support rooftop units. They provide cooling, heating and dehumidification and their designs, capacities and operating sequences are very similar to indoor pool environmental systems. They are packaged or split systems (with dry coolers) that distribute air through ductwork that is many times fabric air dispersion systems to remain under the weight-bearing capacity of the roof.

Medium Units Used in Tandem—applicable for any size grow-op room supplying nearly unlimited moisture removal capacities and CFMs, because they can be used in tandem in medium to large rooms. Generally, they are split systems with indoor dehumidifying capabilities. They can be located in a cooling mechanical room or corridor that distributes air into the space through ducts. It can use heat recovery for reheat or reject heat to outdoor dry coolers. These too can offer web-based browser monitoring and controlling from a remote dashboard or smartphone app. Alarms, historical data recording and remote factory technician access are just a few of the advantages of the control and software sophistication.

As the grow-op building boom develops across Canada, engineers may find this final option, medium units used in tandem, to be the most preferred and flexible for specification, especially in new construction.

Grow-op HVAC options should include built-in redundancy, such as dual compressors and dual air pass designs, so each can independently dehumidify the space in the event its counterpart requires service.

Cannabis plants can survive a couple of days of darkness, but not high humidity.

Scalability is also important because the grow-op business is expected to expand exponentially. Engineers tend to specify medium sized units, versus one large system, because multiple units can operate in tandem for any size facility or provide custom humidity/temperature set

points for specialty rooms.

Systems that minimize refrigerant leak liabilities with reduced refrigerant equipment, such as glycol run-around loops for heat rejection to dry coolers, will undoubtedly be favored by grow-op managers once the methodology becomes known in the industry. Refrigerant leaks in grow rooms will damage or destroy crops. The system's mandatory refrigerant circuit for dehumidification and cooling should also be factory sealed to avoid on-site charging errors.

As the investment community's interest in cannabis continues to grow, it will be the engineer's responsibility to help grow-op managers navigate the trade-offs of cost versus performance.

Investors will undoubtedly continue pushing toward less expensive equipment, such as conventional air conditioning, versus more performance-oriented equipment with commercial dehumidification to handle the grow-op industry's significant latent loads. However, performance versus cost will reap energy-saving dividends in the long term.

Therefore, it should be the consulting engineer's responsibility to educate grow-op operation managers on the type of equipment that will generate both performance, reliability and long-term energy-efficiency goals without sacrificing crop quality. CCE

Geoff Brown, business unit and brand manager, AgronomicIQ (www.agronomiciq.com), is a former sales manager and sales engineer for Seresco Technologies (www.serescotechnologies.com), Ottawa, Brown has 15 years experience in the HVAC manufacturing business and currently speaks on grow-op HVAC issues throughout North America as a contributing member to ASABE's X653 guideline "Heating, Ventilating, and Air Conditioning (HVAC) for Indoor Plant Environments without Sunlight." AgronomicIQ is a division of Montreal-based Dehumidified Air Solutions (DAS) www.dehumidifiedairsolutions.com. He can be reached at GeoffBrown@DehumidifiedAirSolutions.com.

Ralph Kittler, P.Eng., is vice president of sales at DAS. Kittler is the co-founder and former vice president of sales/marketing at Seresco Technologies. Kittler is an ASHRAE Distinguished Lecturer and the reviser responsible for Chapter 25 ("Mechanical Dehumidifiers and Related Equipment") for ASHRAE's 2016 Systems and Equipment Handbook. Kittler can be reached at RalphKittler@DehumidifiedAirSolutions.com.

Hospital Construction: INFECTION PREVENTION

What is infection prevention and control in hospitals, and why consulting engineers need to know about it

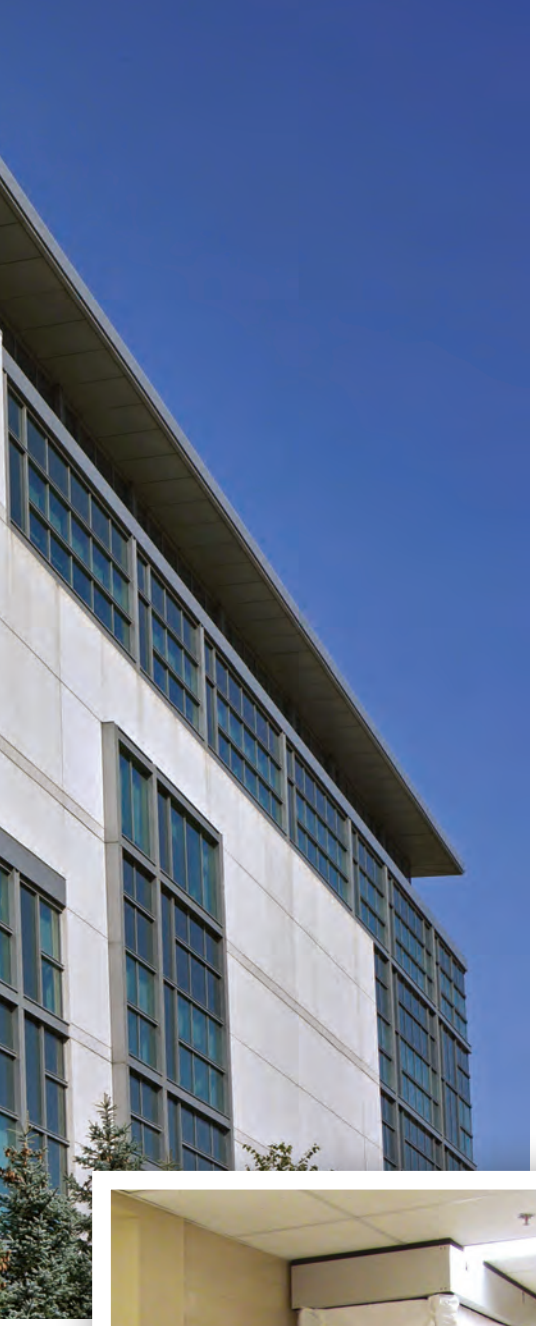
By Gordon Burrill, P.Eng.

You've just been successful in your response to an RFP for an upcoming hospital project. Congratulations! In those documents, there was something about infection prevention and control methods to be used during site verification work and construction. What does that mean anyway?

Well, "infection control" is a broad term that can mean many things to different people. In the hospital context, there are a group of professionals known as Infection Control Professionals (ICPs) who are charged with preventing the spread of infections within the healthcare setting. Over the last couple of decades this profession has grown, both in numbers and in profile, in response to several significant events and research that is helping us to better understand how the microbial world of infections works.

Many of us will recall the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003. At the time, SARS challenged the healthcare world with a new illness of which we had little previous knowledge. This global event and particularly the Canadian impact of SARS shone a spotlight on the importance of hospital-based procedures to limit the spread of such infections.

At about the same time, Health Canada had been studying an



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Credit: courtesy Abatement Technologies

A worker enters a containment vessel to access the ceiling cavity in the corridor of a hospital.

emerging area of concern. What were deemed "nosocomial" infections in the early 2000's were determined to be a significant challenge. Now known as Healthcare Acquired Infections (HAIs), the healthcare community has recognized just how significant this challenge is. Health Canada estimates that somewhere between 8,000-12,000 Canadians die every year in hospital as a result of an infection that they acquired while in the healthcare facilities. As such, ICPs and many others are busy working to reduce and possibly even eliminate that risk to patients.

So how does all this tie in to your new hospital project? In hospitals, there are hundreds of specialized standards and guidance documents that dictate how the infrastructure must be brought together to ensure a realistic control of many hazards and risks through engineered controls. Such things as special electrical systems to ensure that the power stays on in the operating rooms, even in the event of a power outage, is an example of the unique nature of the engineered systems in many healthcare buildings. Infection prevention and control risks are now known and many of these documents incorporate procedures to control such risks.

The Canadian Standards Association (CSA) defines a health care facility as "a set of physical infrastructure elements used to support the delivery of health related services." While certainly more encompassing than just hospitals, this definition definitely applies to hospitals. In addition, the National Building Code of Canada (NBCC) identifies "care occupancies" as needing special attention when designing the infrastructure systems while quoting several health care specific reference standards.

Throughout all of these specialized documents, there are infection prevention and control reasons for many of the unique requirements. Engineers working in healthcare facilities of all types need to be aware of these requirements to protect the public from what now is a known significant risk. It's not a bad idea to be aware of some these items from the point of view of protecting yourself and your staff who are working in the healthcare facilities as well.

Getting back to those RFP documents; you may well find a couple of key standards listed in there that will have an impact on how you go about doing your work. Firstly, CAN/CSA Z8000-18 Canadian health care facilities (Z8000) is a broad planning and development standard that covers many topics.

Any prime consultant working in healthcare would be well served to have an understanding of what is in the document and how to navigate this substantive standard.

Z8000, now in its second edition, begins by outlining planning and programing requirements, which are necessary for any healthcare project including infrastructure projects. It then becomes more detailed on design elements covering everything from materials selection to use and functionality. It finishes by diving deeper into technical issues.

While many engineering technical issues are covered within their own dedicated standards, Z8000 sets the stage and references many of those technical standards.

One of the fundamentals principles within the Z8000 standard is the principle of infection prevention and control (there are five principles listed within the Z8000 standard of which this is one).

When planning any type of project, awareness of and attention to all of the fundamental principles within Z8000 will help ensure health care facilities that can mitigate many of the risks in these buildings. The infection control risks are becoming better known all of the time, and mitigative strategies continue to evolve. Consulting engineers

are well served to stay abreast of all standards that affect their clients and take advantage of the lessons contained within those documents.

Another document likely referenced in your RFP may well be the CAN/CSA Z317.13-17 Infection control during construction, renovation and maintenance of health care facilities (Z317.13) standard.

By its title, it is clear that this document applies to construction techniques to be used in the health care setting. Z317.13, now in its fourth edition, has evolved from the studies performed by Health Canada in the early 2000's. Based on a risk assessment and mitigation model, this landmark Canadian standard has led the industry on a global basis significantly improving protection provided to patients, designers and construction workers during health care construction projects.

With more than 5% of all HAIs being attributable to construction and maintenance activities including infrastructure improvements, there is the opportunity for the consulting engineering world to be part of the team helping save hundreds of Canadian lives every year.

Credit: courtesy Teegor Consulting

Temporary construction air handling systems used to ensure pathogens raised in the construction area to do not reach immune-compromised patients outside of the construction space.

"With more than 5% of all healthcare acquired infections being attributable to construction and maintenance activities including infrastructure improvements, there is the opportunity for the consulting engineering world to be part of the team helping save hundreds of Canadian lives every year."

Notable concerns during construction include the spread of fungal or bacterial spores, which can be deadly for immune-compromised or immune-suppressed patients that make up a high percentage of the patient population in most hospitals these days. Another concern is to ensure that design and construction team members are aware of, and taking protective steps to avoid the spread of, infectious agents within the healthcare building.

While doing your work on this hospital project, you will find that the ICP will be an intimate part of your planning discussions. Even for projects that seemingly create limited infection risk the ICP will still be involved in the risk assessment and determining the best mitigative construction strategies.

Some of those strategies might include working in containment vessels, separating construction areas from patient occupied areas and providing unique construction access routes and special construction air handling systems. All of these are used to separate construction functions from clinical functions in as much as possible.

While hospital projects are different than other projects in many ways, infection prevention and control measures are unique to healthcare environments. Your new project will be an exciting project for your firm, and you have the ability to significantly improve the safety of everybody involved and those around the project by bringing good infection control procedures to this project. Thank you for taking the extra effort to protect those who do not even know they are depending on you to do so. CCE

Gordon D. Burrill, P.Eng., CCHFM, FASHE, CHC, CHFM is president of Teegor Consulting Inc., a consulting firm working internationally and specializing in codes and standards compliance in health care. Gordon is chair of CSA's Technical Committee for Healthcare Facilities and provides training services on both the Z8000 and Z317.13 standards across Canada and on similar subject matter throughout North America. He can be reached at gordon.burrill@teegor.com.

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By Craig Clydesdale

Stoneridge Ice Centre in Burlington, Ont.

OOM Energy

SKATING AWAY from the GRID

Stoneridge Ice Centre in Burlington, Ont. signs up for localized private utility service

Sky-high electricity rates in Ontario have had a big impact on recreational facility operations, especially skating arenas, but those days may be changing.

The energy supply in Ontario comes from large centralized sources—primarily power stations using nuclear, gas and hydro. More recently, renewables like wind energy and solar also feed into the power grid, but these renewable sources are intermittent.

For arena operations, which require refrigeration plants, mechanical ventilation, heating, air dehumidification and adequate lighting, significant amounts of consistent power is a necessity. Facilities like these are seeking new, affordable and reliable sources of energy that keep pace with the changing energy landscape and meet their demand, while lowering their carbon footprint, if possible.

Stoneridge Ice Centre, formerly known as the Wave Twin Rinks, in Burlington, Ont., has adopted a new alternative energy platform that allows it move away from the public utility grid. The facility has signed up with Oakville, Ont.-based OOM (for Order Of Magnitude) Energy, a private utility that provides an alternative to the traditional public grid by producing and distributing electricity on site.

Stoneridge is a dedicated hockey training centre with two full-size rinks and two mini pads. It has a dryland training centre for hockey, a pro shop, physiotherapy clinic, and a fully licensed restaurant. Its programming covers all areas of hockey right from learn to skate, house league, rep hockey, and pathway to Junior A hockey, adult hockey, camps and clinics.

As with any arena facility, Stoneridge has high energy costs, and in recent years the increases have been dramatic. However, by adopting the private-utility option, power costs for Stoneridge will be lowered, and their electric power will be more reliable. The onsite combined heat and power system put in place in January also provides energy efficiencies.

The arena industry has been particularly hard hit in Ontario by rising electricity rates. For example, a facility with a single ice pad is looking at a cost of about $180,000 per year for electricity. A facility with two ice pads could have costs double that. By using a private utility—which creates and distributes electric power for the facility alone—estimated savings are about 20%, which in the case of a large operation like Stoneridge could amount to $70,000 per year.

OOM's Integrated Energy Platform (IEP) is a portable, onsite power system that uses clean technologies (including trigeneration or cogeneration, batteries, carbon sequestration and more) combined with sophisticated software, resulting in cleaner power that is reliable and secure. The multiple onsite sources of power are fully redundant and independent of

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weather events, so the systems are not constrained by the geographic boundaries of the public utility, nor by an unreliable and unsecure aging infrastructure.

The backbone of the Stoneridge IEP includes two 250kW natural gas cogeneration systems. The fully automatic engines can produce rated power, in parallel with the local utility or independent of the local utility (islanded). Essentially, it is a dedicated power plant in a box which includes the generators, a glycol cooling system, overhead exhaust system, radiator, heat-exchange system, and a roof-mounted fan evaporator. It is CSA- and TSSA- compliant.

The generators are located in a self-contained, walk-in, weatherproof enclosure that is half the size of a shipping container. The bare system produces noise levels consistent with 60 db at 50 feet. However, once placed in the sound-attenuated enclosure, noise is reduced to a level that is no louder than an idling car.

The system is also synchronized to the public utility which serves as back-up power. Thus, in this case the private utility does not necessarily replace the public grid, but works in tandem.

Also onsite is a containerized, 480-volt main switch paired with an automated-transfer switch which can toggle between the IEP and utility. Inside, the company's cloud-based intelligent software manages and monitors the facility in real time, which ensures uptime, optimizes the IEP's operating parameters, and provides insights used for safety, maintenance, production and security purposes. This enables 90% of the maintenance to be done remotely from desktop and mobile devices. Although the system is fully automated, it still requires local maintenance technicians to perform onsite general maintenance.

When contemplating the evolution from centralized power production to widespread, small-scale distributed-energy production, one only needs to look back at the evolution of computers. The central idea of the Dedicated Energy System is to generate electricity for localized use; it is the equivalent of going from an old mainframe computer that takes up an entire room to an iPhone in your pocket.

OOM Energy

Interior of the power-generating unit located outside the arena.

Just as cellphones liberated us from being tied to landlines, OOM envisions a future where Dedicated Energy Systems liberate users from being tied to the inflexible nest of wires that comprises the transmission grid.

Under a long-term contract, Stoneridge now pays a fixed monthly fee for energy under a predictable Energy Services Agreement at a rate less than what the public utility currently charges.

The system comes in a portable box placed outside the complex. Power generated is not shared, but is the facility's own power. There are no hydro-electric poles, government money, or subsidies involved. That means brownouts and blackouts are eliminated, and the facility receives a safe and reliable source of energy.

But the benefits go beyond cost savings. OOM's engineers also showed Stoneridge how to reduce water consumption and create their own snow-melting system using reclaimed heat. Says Anthony Miele, Managing Partner of Stoneridge Ice Centre: "The effect on our total costs and on our bottom line will be significant."

According to the IIHF (International Ice Hockey Federation), there are more than 3,300 indoor ice hockey rinks in Canada, and high electricity costs impact them all. But any rink could benefit from the private-utility solution. So could the NHL. In fact, OOM is talking to an NHL team about using the system for its arena.

OOM owns and finances all its projects independently, so customers are not burdened with upfront capital cost, and as a private utility it offers fixed monthly energy costs. Existing installations include: manufacturing facilities, food-processing plants, hotels, condominiums, commercial buildings, gas-treatment facilities and greenhouses.

From the beginning, the overriding mission statement of the private utility has been: To combine our innovative energy solution, expertise, and commitment to the harmonious balance of people, planet, and profit to help build a truly connected and sustainable world. **CCE**

Craig Clydesdale, founder and CEO of OOM Energy Inc., has over 30 years of senior management experience in the energy industry, and has specialized in power marketing, facility operations, environmental sustainability, and electrical and oil and gas process controls.

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NEXT-GEN Leadership

Why it's hard to bring younger engineers into management—and what to do about it

By Jeff Lutzak, CPA

As today's Boomer-age management team members and engineering firm owners plan or start their retirement, they may be growing worried about who's going to pick up the roles they're relinquishing. In my conversations with the leadership teams of engineering firms, there's an often-expressed concern that the younger generations—such as Millennials and Generation Z—are less interested in a management role than their older colleagues were.

Some also say that if they do find someone interested in a management role, it can be hard to keep them around.

And that's posing a problem for today's leaders who want to be able to fund a comfortable retirement partly through the sale of their stake in the firm, and also to see their life's work continue to prosper.

Here's how this problem is manifesting itself in today's engineering firms:

What's holding back young engineers?

We find four main reasons why it can be hard to persuade engineers in their 20s and 30s from getting onto a track that leads to management and possible co-ownership:

Quality of life: Many younger people are concerned about quality of life and work/life balance. They may see the firm's leaders working long, unpredictable hours, and not want that trade-off. That's particularly the case if a slow economy means that the slim profits to be shared by management team members may put their total compensation at only a slight premium compared to their more junior colleagues, who do not have a stake in the business. Junior professionals may also find that the buy-in amount is high, compared to the benefits they expect to receive.

Current owners waiting for a better deal: We have seen partners in some engineering firms delaying their retirement during economic stagnation in hopes of a turnaround that will mean higher revenues, shoring up lost or reduced income over the past several years. This leaves fewer opportunities for younger professionals to move up.

Lack of longevity: Members of younger generations, who are of an age to step into management's shoes, often don't stay with one firm long enough to build experience in management. They're less inclined to have just one employer for life, more likely to keep trying new experiences. This means they often don't have the in-depth knowledge and personal connections about the firm's clients, previous work done for those clients, and the abilities of the firm's people, in order to manage work effectively and bring in new business.

Delayed too long: Some of the management team members may take the

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view that leadership roles come only with time, after paying one's dues. For their part, younger members of the firm wanting leadership roles may feel they should not have to wait—and may leave to seek greater opportunities elsewhere.

Solutions involve technology and culture

Many of these challenges are found in all organizations, but they are particularly strong in engineering firms. So too, the solutions are specific to the culture of engineering firms.

Bake leadership skills into the job early: Many engineers start out with the focus on being competent, technically skilled 'doers.' They gradually move up to becoming a senior technical lead, with their strength being their technical knowledge and project management skills. For many, it's a major cultural shift to get good at working strategically with clients and winning new work. It's an even bigger cultural step to think about the larger firm-wide issues such as project profitability, staffing and issues around finance and human resources.

This means that it's a good idea to bake those considerations into the training and mentoring that firms offer, right from the start of that person's career. Rather than focus simply on the technical aspects of a project, the senior leadership should encourage those less senior to think about project costs, how to manage those costs, and how to look for other client needs that the firm can satisfy.

If employees start to think of the larger business issues early in their careers, it will not be such a huge step if they are asked to take on a more senior leadership role. And once given a taste of working on strategic issues, they may be more inclined to move into leadership.

Knowledge management that works: Many firms are concerned about how to retain the wide range of knowledge held by senior members of the firm: anything from the location of an underground tank at a client's property, to knowing the most influential members of the local municipal council. Once these members of the firm retire, that knowledge may be lost.

Fortunately, there is a growing array of knowledge management (KM) solutions available. Firms need to work hard at capturing the know-how of senior members of the firm. This includes having the right technology available, developing a culture in which the data in the system is kept up to date, and providing effective ways to make sure that valuable knowledge is not lost when a member of the firm leaves.

This KM solution must be built with the needs and habits of all generations in mind. For example, reports indicate that it's becoming less common for Millennials to seek answers through search engines, but rather take a peer-to-peer approach such as posting questions to discussion boards. Members of the firm should be surveyed to find out how they like to learn and build their skills.

Developing an attractive package: Attracting and retaining skilled employees goes well beyond a competitive pay packet and desirable benefits. Making leadership attractive to people who would consider themselves Millennials or Generation Z means finding out what they value, and then doing what you can to provide that.

Many people in this age range value quality of life and the ability to fit other aspects of their lives into their work life. This often revolves around flexibility—perhaps allowing someone to work a long workday and then take part of another day off. Or it might mean the ability to work remotely—from home or a nearby coffee shop.

Some workers like the idea of frequent travel as part of their job. Others prefer to be able to get home every night so they can take care of family responsibilities—maybe caring for young children, or aging parents.

Attracting and retaining a diverse workforce, including substantial female representation, depends on the firm's ability to determine what each member of the firm values, and then helping them get it.

Three keys to successful implementation

There are three key aspects to making this happen:

One is having the policies and practices, as well as culture, set up in a way that values results rather than just putting in the hours. It might involve a firm in which an employee would be told what needs to be done by which deadline. In doing so, it is the employee's responsibility to direct their behaviour to meet their obligations.

The second aspect to flexibility is technological—which can involve cloud-based interfaces so that an employee can access and work on project documents from any place. It should provide due attention to client confidentiality and data security.

Third, communication is key. This can include making sure that current employees know what possibilities are open to them in such areas as when and where they get their work done. It also must include conveying the firm's distinctive culture to potential employees—and not just in interviews with potential hires, but through the firm's social media channels and website that give examples of employees benefiting from the firm's culture and policies.

Helping to ensure a smooth succession between generations, for an engineering firm, involves finding out what the younger generation is looking for in a career, and then finding ways through technology and cultural changes, to make that possible. CCE

Jeff Lutzak, CPA, is a partner with RSM Canada, the leading provider of audit, tax and consulting services focused on the middle market, based in the Calgary office.

By Jonathan Martin, Miller Thomson

Wrongfully SUED?

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Options available if you have been wrongfully named in a construction lawsuit

Litigation arising from construction projects gone awry can be complex multi-party affairs. Because of the abundance of possible remedies under builders' lien legislation, not to mention the law of negligence, the tendency is for plaintiff's counsel to sue first and ask questions later.

This can often result in innocent parties being named. Parties may also be sued to grow the pool of defendants from which to obtain a settlement.

Though such litigation is a cost of doing business, the risk can be mitigated. Litigation insurance, indemnity provisions and liability cap provisions are some of the more common ways parties will seek to protect themselves. But these do not completely eliminate the problem.

Insurance premiums reflect the risk involved and will increase concomitantly with the number of claims. Sufficiently robust indemnity clauses cannot always be negotiated and do not enforce themselves.

Furthermore, liability caps are ineffective against third parties, which means they cannot be raised against a subcontractor, for example. None of these protections replace the need to understand all of one's legal options once sued.

The first thing a wrongfully named defendant will wish to do is examine the nature of the allegations against them to determine whether the claim could be summarily dismissed through an application to strike or an application for summary judgment.

Other summary procedures may be available, such as a summary trial of a specific issue or an application for a determination of a question of law, if the relevant facts are not in dispute. The obvious advantage of these procedures is that a claim can be dismissed in less time and for a fraction of the cost of a conventional trial.

Key considerations in deciding whether such procedures are appropriate will include whether the claim is based on a legally recognized cause of action, as well as whether there is good documentary evidence available to determine the issues at stake.

The monetary amount of the claim and the complexity of the issues as a whole will also be relevant. If the issues are intertwined with the claims against other defendants, a summary procedure may be more difficult to access.

Summary proceedings are less expensive than a trial, but by no means cheap. Because there is no such thing as litigation damages for being wrongfully named in a civil suit, the main remedy available to a successful defendant will be their costs of defending the action.

The most common costs order rendered by a court will be for "party and party" or "partial indemnity" costs, which typically cover less than 40% of one's actual legal expenses. Less common are "solicitor and client" or "substantial indemnity" costs, where the losing party must pay the winning party's entire legal costs.

Courts are hesitant to order solicitor and client costs and will generally only make such an order if there is evidence of bad faith in naming a party or some scandalous allegation that was not proven.

A claim may not have legal merit, and may even be frivolous, and still not be the product of bad faith. On the other hand, solicitor and client costs have been ordered against plaintiffs for making allegations without "any foundation in law".

The distinction can be quite subtle but what the reader should understand is that being wrongfully sued does not automatically entitle a party to substantial indemnity costs.

The best mechanism for putting maximum cost pressure on the opposing party early on in the litigation process is to make an immediate Formal Offer to Settle.

Such offers are made to an opposing party using a specific court form. In the event the party making the offer achieves an equal or better result in court compared to what it offered previously, double party and party costs will be imposed on the losing party.

A Formal Offer to Settle should, in favourable circumstances, be followed by an application for summary dismissal. In this way, the wrongfully named defendant confronts the plaintiff with the prospect of a cost order against them in the near future unless the claim is discontinued.

Conclusion

Players in the construction industry should always be prepared for litigation by keeping good documentary records of all interactions. Such evidence may significantly increase one's chances of succeeding through summary judgment.

Good documentary evidence, combined with the cost consequences that result from an early Formal Offer to Settle, will put a wrongfully named defendant in the best position to negotiate an early discontinuance of the action against them on the best terms possible. **CCE**

Jonathan Martin, Associate, Miller Thomson, jomartin@millerthomson.com.

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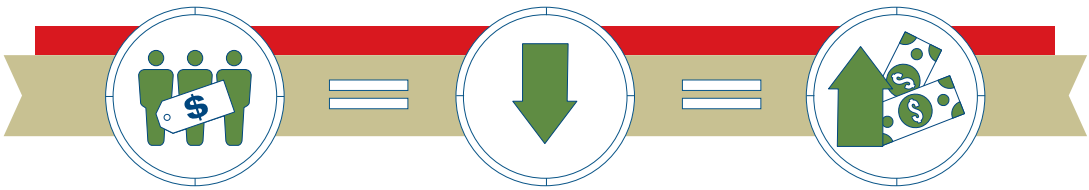

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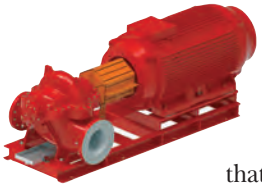

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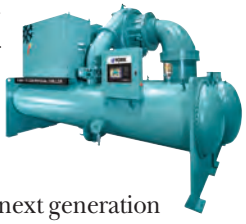

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Building Relationships

On January 9th WSP announced the appointment of Ryan Brain as president and CEO of WSP in Canada. Introduced as a growth leader who will play a key role in continuing to professionalize the firm, Brain is a certified management consultant with over 20 years in the professional service industry, mainly at Deloitte.

He joined WSP's Global Leadership Team weeks before the firm laid out its 2019-2021 Global Strategic Plan, which includes growing net revenues from $6B to as much as $9B, and increasing its headcount by 35% worldwide through strategic acquisition and organic growth.

The plan includes a continued push in established markets like Canada, pursuing opportunities in new market sectors and adding more management and advisory services.

We reached out to Brain to find out more about him and what he brings to the consulting engineering industry.

What attracted you to WSP?

I've worked in professional services for more than 20 years, mainly with Deloitte. My projects have been quite wide ranging but always in the area of consulting and advisory. I've focused on the market, clients and bringing together multi-disciplinary teams. It's that experience, along with WSP's purpose and remarkable work that brought me here. Also, important to me, was the opportunity to join a Canadian-based, global firm.

You bring experience in M&A due diligence and integration, what is key to finding a great fit for a merger?

Successful mergers happen when there is a match, synergy and compatibility between the two organizations. But there also needs to be a very strong vision of what that new company wants to become. It pulls everything together. WSP is proof of that. We're built on the legacies of some incredible firms. We have a great future ahead of us with our new Global Strategic Plan. I'm thrilled WSP in Canada has a big role to play in it.

What aspect of this industry appeals most to you?

I get really excited about the scale of innovation and the potential of projects to improve peoples' lives. It's amazing that we have engineers, planners, managers and designers, working in communities right across Canada and finding solutions to some pretty complex problems in our society.

You've experienced many corporate CEOs, how would you describe your own management style?

It's really important for me to build relationships with people. Professional services is a relationships business. Connecting, listening and learning is one way I measure my success.

I've got to know many amazing people in professional services. WSP has 140+ offices in Canada so the goal I've set for myself here is to meet as many employees as possible with my first 100 days. It's going take me right across the country, and I'm looking forward to all of it. I also look forward to connecting with our clients and learning directly from them on where they see opportunity.

It's early days, but is there a particular feat of Canadian engineering that has made an impression on you?

The Garden City Skyway. I live in Burlington, Ont. My family and I are very active so we travel a lot around the Niagara Region. I've crossed it many times, and I'm always amazed by its scale and height. Also close to home is the David Braley and Nancy Gordon Rock Garden at Royal Botanical Gardens, which has unquestionable natural beauty and is proud WSP project.

We visit frequently as a family. But I'm also excited to visit sites across Canada to learn about our current projects. **CCE**

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