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AUGUST/SEPTEMBER 2016

CANADIAN CONSULTING engineer

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QUEBEC CITY

ANDRÉ ROCHETTE: a profile

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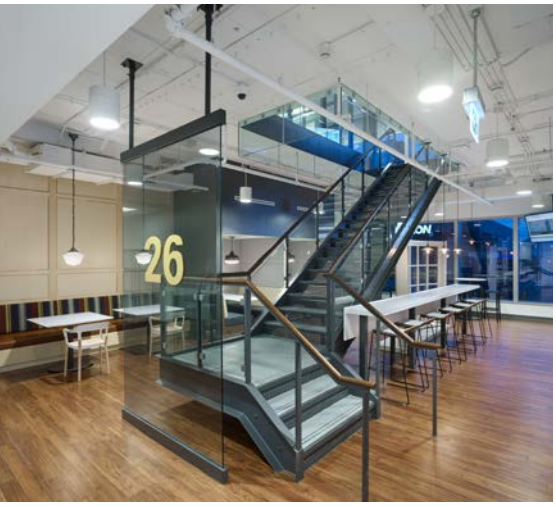

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on topic

Radical problems call for radical change

They say everyone is either an optimist or a pessimist, and I generally count myself in the latter camp. So when I arrived in the U.K. in June just after the Brexit vote, I was surprised to find myself sounding the upbeat notes. When my friends told me they had been distraught for a week over the decision to leave the European Union, I bounced back cheerily and said I didn't think it would be so bad. I'm no economist, so I'm not certain what the impact on the U.K. markets will be (so far it's been fluctuating), but since global corporations are generally in control of much of our economic realities, I suspect not much will change. Besides, from an environmental point of view, aren't there benefits? Wouldn't smaller, restricted markets encourage more diversity in farming practices and make it more likely that people will eat locally grown produce? If this is a radical idea, so be it.

André Rochette is an optimist. The Quebec engineer featured on page 34 admits that he sees things through rose-coloured glasses. And while he might not agree with my outrageous(?) economic theories, he does believe in taking a radical approach to the use of energy in buildings.

Rochette is the president of Ecosystem, a Quebec design-build/energy contracting company that he and a partner founded in the 1980s. Ecosystem does "deep retrofits." They like to go into a building and rethink the entire way the energy systems work. The results are 30-40% savings.

Ecosystem is certainly not the only company to be spearheading radical energy saving engineering for buildings, but it was fascinating to hear the personal story behind the firm. And during our interview (a part not included in the article) Rochette asked "When are we going to become really serious about reducing our impact on the planet?" He pointed out that European buildings have an energy intensity half that of North American buildings, and suggested that we need carbon pricing, regulations and higher energy prices. Are these radical ideas these day?

Despite all the lip service paid to environmental stewardship our deep attitudes and habits have not changed. As I write this, southern Ontario is sweltering through record heat in August; the grass is as parched as in the Serengeti and the trees are turning brown.

We have energy codes, yet down on the Toronto lakefront there are walls of new condominiums, basically greenhouses of 30+ stories with ceiling-to-floor glazing facing south. Buyers snap them up as soon as they're built. The expressway below is jammed. We are building new transit to get workers out of their cars. But my company just did a survey of employees, according to which "the majority of staff would not take public transit even if it was available." In developing countries millions of new middle-class people are following the West's lead. The world is heading for its third year of record heat temperatures.

We need to get serious about changing the way we live if we are going to halt global warming. At the moment I'm struggling to be optimistic about our chances of that happening.

Bronwen Parsons

FOR PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

CANADIAN CONSULTING engineer

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Canada

Diamond and Schmitt/KWC

Temporary home for the Senate of Canada in Ottawa.

BUILDINGS

Ottawa train station to house Canada's Senate

A landmark historic train station near Confederation Square in Ottawa is to become the temporary home of the Senate of Canada.

The construction will be the second wave of changes to the grand 1912 Beaux-Arts structure. In the 1960s the station was converted into a government conference centre. The trains that once stopped conveniently close to the Parliament Buildings and national capital, were banished to a new station built several kilometres outside the city's core.

The new changes will transform the historic station to hold the Senate Chamber, committee rooms and parliamentary offices. They will reintroduce a processional route through the building and add a contemporary wing on the east. Some of the fine detailing in the station's waiting room and concourse will be restored.

The $269-million project is being designed by Diamond and Schmitt Architects, with John G. Cooke & Associates (structural), Crossey Engineering (mechanical-electrical), WSP (sustainability and building envelope), Golder (environmental), LMDG (code/fire protection), and PCL (construction).

CIVIL

Manitoba Auditor General finds problems in bridge inspection program

In a report issued July 21, Norm Ricard, Auditor General of Manitoba, found problems in how the province's 3,000 bridges and large culverts were being managed.

The audit was of bridges and large culverts, many over 50 years old, located in roads and in waterways. Ricard's report included 20 recommendations.

First, Ricard found that not all the bridges were being inspected as often as necessary, and 616 structures, mostly large culverts in the waterway system, were not being inspected at all. Another 288 structures were not being inspected by Manitoba Infrastructure because it considered other government departments or conservation districts were responsible for them.

Ricard also found that even when bridges and their components were being inspected often enough, there were problems with inadequate documentation.

continued on page 8

COMPANIES

Stantec reorganizes after MWH acquisition

Stantec reported overall gross revenue growth of 47% for the second quarter of 2016, reflecting its biggest acquisition so far — MWH Global.

MWH is a Colorado-based company with 6,800 people located in 187 offices in 26 countries. The company specializes in water and natural resources infrastructure. Stantec now has a population of 22,000 staff.

With the acquisition Stantec said it is reorganizing its business into two parts: consulting services (Stantec's "legacy business"), and MHW's construction management services.

MWH's history dates back to 1820 as the Ames Crosta Company. It was bought by Biwater Services, a U.K. company, which in turn was acquired by MWH in 2010.

PEOPLE

Former MMM executive to head WSP Canada

Hugo Blasutta

WSP Global has appointed Hugo Blasutta, P.Eng. as president and chief executive officer for WSP Canada.

Blasutta was previously the chief executive officer for MMM Group, based in Toronto. MMM was one of Canada's largest privately owned consulting engineering companies before WSP acquired it last year.

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BUILDINGS

Brock Commons at UBC to set world record

The final wood panel was installed on the Brock Commons Building at the University of British Columbia in Vancouver on August 9. The 18-storey student residence will be the tallest wood structure in the world when it opens next year.

Fast + Epp (Paul Fast, P.Eng., lead) are structural engineers and Acton Ostry are architects of the building. It combines modular construction with cross-laminated timber (CLT).

The approach eliminates the need for supporting beams. Instead the structure has flat timber panels stacked on wood posts in a "Lego" concept. The modularity speeds construction and the compartmentalized design helps to limit the spread of fire, along with other measures.

Fast + Epp

Final wood panel is hoisted up at Brock Commons, University of B.C.

Fast+Epp has seen a surge of interest in wood structures in the U.S. and recently opened offices in Seattle and New York.

TRANSPORTATION

Fort Erie Bridge involves eight hour lateral slide

To minimize the impacts and disruption to traffic when replacing the 63-year old Central Avenue Bridge in Fort Erie, Ontario, Hatch designed a complex construction process. The bridge carries more than 10,000 vehicles a day over a major CN rail corridor in the Regional Municipality of Niagara.

New piers and abutments were built below the existing bridge, and a new substructure was built alongside. The old bridge was demolished. Then over eight hours on July 21 the superstructure was slid into place. It is 115 metres long, in three spans, 14.4 metres wide, and weighs approximately 5,000,000 lbs.

Hatch (Bijlana Rajlic, P.Eng., lead) was prime consultant, responsible for design, project management and construction staging.

Hatch

New Central Avenue Bridge, Fort Erie, Ont.

PROFESSION

B.C. licensing body considers regulating firms

The Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) is investigating whether it should be regulating engineering corporations. It has set up an advisory task force to look into what it says is a "complex issue," which revolves around its duty to protect the public. It says: "The issue of corporate regulation is raised on an ongoing basis by members and organizations that look to APEGBC to ensure that practitioners and companies within various sectors meet the same quality assurance standards, particularly whenever major incidents involving engineering or geoscience in B.C. or elsewhere occur."

Member input was invited until August 28.

CODES

New National Building Code

The National Research Council's Canadian Codes Centre officially launched the new version of the National Model Construction Codes ("Codes Canada") on June 28.

The codes include 600 changes and reflect changing technologies.

CHAIR'S MESSAGE

Low Fees Devalue Our Services

As a representative of the consulting engineering sector, ACEC advocates on behalf of all our firms for Qualifications-Based Selection (QBS) as the preferred method of consultant selection. We do this because selecting consulting engineers using QBS, rather than lowest fees, provides a marketplace energized by ideas, productivity and mutual respect. It results in projects that are of a higher quality and provides significant life-cycle savings for our clients and owners. ACEC would like for QBS to be the status quo someday, but that is not the case in today's market.

But what is the status quo? In most cases, we are still an industry where price competition defines our value, where clients regard us as a commodity, where we are increasingly trying to do more with less. While we have made some progress in recent years, QBS continues to be a tough sell among ourselves and for many clients and owners. Why is this the case? It seems that our actions speak louder than our words.

Clients treat our industry exactly the way we have taught them to treat us. We are telling clients the market value of our services every time a consulting engineering firm submits a fee proposal. And what are we telling our clients? Too often, proposals with unrealistically low fees tell our clients that we are a commodity in which price competition defines our value, where clients expect us to deliver more with less. If we aspire to be an industry respected for our ideas, where clients trust our judgement, where we are given the tools and resources to practice our profession the way we were trained, then we need to tell clients our true value through responsible fee proposals.

QBS advocates for the latter, but we will not get there as an industry unless we stop practicing the former. If we are to influence consultant selection processes, then perhaps we individually need to practice client selection — "firing" the clients that undervalue engineering service will allow us to reward the clients that value us.

PERRY MITCHELMORE, P.ENG., PMP
CHAIR, ACEC BOARD OF DIRECTORS

MESSAGE DU PRÉSIDENT DU CONSEIL

Les faibles tarifs dévalorisent nos services

En tant que représentante du secteur du génie-conseil, l'AFIC, au nom des firmes qu'elle représente, fait la promotion de la sélection basée sur les compétences (SBC) comme le meilleur mode de sélection d'experts-conseils. Le fait de choisir des ingénieurs-conseils en fonction de leurs compétences et non selon le prix le plus bas se traduit par un marché dynamisé par les idées, la productivité et le respect mutuel. Le résultat : des projets de plus grande qualité et des économies substantielles sur le coût du cycle de vie pour nos clients et pour les propriétaires. L'AFIC souhaite que la SBC devienne un jour la norme, ce qui n'est pas le cas dans le marché actuel.

Mais qu'en est-il actuellement? Dans la plupart des cas, c'est toujours la concurrence des prix qui définit notre valeur. Nous évoluons dans une industrie où les clients nous perçoivent comme une marchandise et où il faut faire toujours plus avec moins. Bien que nous ayons fait certains progrès au cours des dernières années, l'idée de la SBC continue d'être difficile à vendre, autant entre nous qu'auprès de nos clients et des propriétaires. Mais pourquoi donc? La réponse semble se trouver dans nos actions, plus éloquentes que nos paroles à ce sujet.

En fait, les clients traitent notre industrie de la façon dont nous leur avons enseigné à le faire. Chaque fois qu'une firme de génie-conseil soumet une proposition de frais, elle annonce aux clients la valeur marchande de nos services. Et quel est le message qu'on leur envoie? Trop souvent, les propositions, qui comprennent des tarifs irréalistes, indiquent à nos clients que nous sommes en fait une marchandise et que c'est la concurrence des prix qui définit notre valeur. C'est pourquoi ils s'attendent à ce que l'on fasse toujours plus avec moins. Si nous voulons que notre industrie soit respectée pour ses idées, que les clients aient confiance en notre jugement et que l'on nous donne les outils et les ressources dont nous avons besoin pour exercer notre métier comme on nous l'a enseigné, nous devons faire connaître aux clients notre vraie valeur, en soumettant des propositions de frais responsables.

C'est ce qu'entraînerait la SBC, mais pour y arriver, nous devons changer nos façons de faire en tant qu'industrie. Si nous souhaitons influencer le processus de sélection d'experts-conseils, peut-être devrions-nous, de façon individuelle, commencer par sélectionner les clients, en « congédiant » ceux qui sous-évaluent les services d'ingénierie et en récompensant ceux qui les apprécient à leur juste valeur.

PERRY MITCHELMORE, P.ENG., PMP
PRÉSIDENT DU CONSEIL D'ADMINISTRATION DE L'AFIC

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ACEC Report Looks at Sustainable Engineering

Sustainability has caught the attention of private and public sector clients in recent years. A case in point is the Liberal government's recent budget, which included significant measures encouraging and supporting environmental sustainability with regard to infrastructure investment. However, sustainable development is not new to the consulting engineering sector; it has been paying attention to this issue since its inception as major changes to project design is fundamental to achieving sustainability.

The concept of sustainability has been around since the mid-1970s. A term coined by the Brundtland commission, sustainability is defined as "meeting the needs of the present without preventing future generations from meeting their needs." The challenge with this definition, according to Dr. John Boyd, is that it does not clearly outline what a sustainable world looks like or how one achieves it. This led to much debate and the proliferation of requirements to define and measure successful sustainability. Since tools were developed by organizations facing different political, social and economic environments, they often contradicted each other. Some of the systems that have been developed include Envision™ from the United States, CEEQUAL© international from the UK, AGIC IS from Australia, and CBDD from France. However, none have been universally recognized as the quintessential indicators of successful sustainability, a challenge for the consulting engineer.

To support engineering companies and their clients in delivering sustainable projects, the International Federation of Consulting Engineers (FIDIC) has developed various publications that address the issues engineers should consider to achieve sustainable project design. FIDIC has also developed a committee that works to identify best practices related to sustainable development achievements and technological advances.

Sustainability is not new for ACEC

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ACEC Seeks Endorsement of QBS by the Canadian Construction Association

Over the past year, the Canadian Construction Association (CCA) and local construction associations across Canada undertook a series of 12 cross-Canada workshops that brought together stakeholders to discuss what CCA members perceived as poor quality and incompleteness of construction documents and to find potential solutions to address this issue. Many ACEC members and other stakeholders were present at the meetings and also took part in follow up surveys. In April, a report capturing the results from the workshops and surveys was issued. It suggested that the incomplete or unclear project scope and insufficient design resources (i.e. insufficient design fees and schedule) potentially impacted the quality and completeness of documents.

While the report is largely anecdotal, ACEC believes that the delivery of projects can be improved throughout the supply chain by the adoption of Qualification Based Selection (QBS) for design consultants. QBS will not only result in higher quality documents, but would also result in more innovation and increased life-cycle savings over the design life of projects. The American Public Works Association and the American Consulting Engineering Council show that using QBS for engineering services reduces construction cost overruns from an average of 10% to less than 3% - equivalent to a savings of up to $700K on a $10M capital project. Consequently, ACEC has invited the Canadian Construction Association to adopt QBS and to promote its adoption by owners and clients when selecting a consulting engineering firm.

Seeking endorsement of QBS was the main message ACEC Chair Perry Mitchelmore and President and CEO John Gamble brought to their meeting with CCA Standard Practices committee and Board in early June.

Association of Consulting Engineering Companies – Canada (ACEC-Canada), 420-130 Albert Street, Ottawa, ON, K1P 5G4, tel: (613) 236-0569, fax: (613) 236-6193, info@acec.ca, www.acec.ca. ACEC Member Organizations: Association of Consulting Engineering Companies – British Columbia, Association of Consulting Engineering Companies – Yukon, Consulting Engineers of Alberta, Association of Consulting Engineering Companies – Northwest Territories, Association of Consulting Engineering Companies – Saskatchewan, Association of Consulting Engineering Companies – Manitoba, Consulting Engineers of Ontario, Association of Consulting Engineering Companies - Québec, Association of Consulting Engineering Companies – New Brunswick, Consulting Engineers of Nova Scotia, Association of Consulting Engineering Companies – Prince Edward Island, Consulting Engineers of Newfoundland and Labrador.

ACEC Report Looks at Sustainable Engineering

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either; we've been leading the discussion on sustainability since 2012 when we published the report *Sustainable Development for Canadian Consulting Engineers*. The report, prepared for ACEC by Dr. John Boyd, had three overall objectives. The first was to put together a summary of the background to sustainable development and its implications for consulting engineers and their clients. The second was to look at existing systems to measure the sustainability of infrastructure projects and consider their possible use in Canada. Finally, the report suggests an approach that would support our members in their efforts to execute projects more sustainably.

With the federal government's commitment to invest $124 billion over 10 years in infrastructure, and with a need to develop natural resources in a responsible and sustainable manner, ACEC has updated the 2012 report to reflect the latest tools and methodologies along with a new foreword by the author. The updated report, as well as other useful information, is available on the ACEC website at www.acec.ca/sustainabilityreport. This new tool ensures the issues of sustainability are taken seriously and will help develop practices that produce more sustainable project solutions.

SUMMARY OF SUSTAINABILITY SYSTEMS

Name	Project Sustainability Management (PSM)	Envision™	CEEQUAL ©	CBDD: Project Sustainability Logbook (PSL)	Infrastructure Sustainability (IS)
Country of Origin	International	USA	UK, international through adjustment of score weighting	France, Pan-European	Australia
Organization	FIDIC	Institute for Sustainable Infrastructure	CEEQUAL	European Federation of Engineering Consultancy Associations (EFCA), FIDIC	Infrastructure Sustainability Council of Australia
Type	Guideline	Rating and Certification	Rating and Certification	Guideline	Rating and Certification
Objective	Selection of target sustainability issues and performance objectives	Assessment of project sustainability performance against specific issues with defined targets	Assessment of project sustainability performance against specific issues with defined targets	Integration of sustainability into infrastructure decisions across asset lifetime from planning to operation, monitoring of performance	Assessment of project sustainability performance against specific issues with defined targets
Performance Indicators	Qualitative, relative importance of issues left open	Numerical, integrative, prescriptive	Numerical, integrative, prescriptive	Comparison between planning objectives and operational performance	Numerical, integrative, prescriptive
Sector	Infrastructure	Civil infrastructure, excluding buildings	Civil infrastructure, landscaping and the public realm	Management reporting	Civil infrastructure
Intended Users	Designer, but useable by all industry stakeholders	All industry stakeholders	Client, designer and principal contractor	Asset owner or representative	All industry Stakeholders
Complexity	Open, selectable, uncomplicated	Specific, prescribed, comprehensive	Specific, prescribed, comprehensive	Specific themes with self-defined planning objectives	Specific, prescribed, comprehensive
Training	Sporadic training, manual-based, intended for self-assessment	Regular, includes certification of trained professionals	Regular, includes certification of trained professionals	None, manual-based	Intended for self-assessment based on Excel tool and other calculators, some organizational support
Applicability	International	USA	UK, Hong Kong	International	Australia
Recognition of Compliance	No	Yes	Yes	No	Yes

Entrance to the complex.

Quebec City's new hockey arena and entertainment venue welcomes visitors into a grand soaring hall banked with immersive technologies. But behind the scenes, the engineering of the building structure and mechanical systems are just as extraordinary.

By Samuel Paradis, ing, SNC-Lavalin

CENTRE VIDÉOTRON

Following the departure of the Quebec Nordiques in 1995, the City of Quebec proposed the idea of building a multi-purpose arena to replace the aging Colisée Pepsi, which was not suitable for staging international shows or hosting teams from the National Hockey League (NHL). The proposal gained considerable public support — leading to the launch of the Videotron Centre project in late 2010.

In November 2011, the SAGP consortium, consisting of SNC-Lavalin, ABCP Architecture, GLCRM Architects and Populous, was selected to design and build the arena. All of the engineering for the project was carried out in Quebec by SNC-Lavalin.

The new building had to be capable of hosting major international sporting and entertainment events. Most importantly, it had to provide a contemporary hockey arena environment suited to serving as the home of a potential new NHL franchise.

The constraints established by the city included a $400-million budget and a July 2015 completion date. The city also wanted a building design based on sustainable development (LEED certification) and energy efficiency.

Construction was completed on schedule in July 2015. It involved many logistical challenges, with up

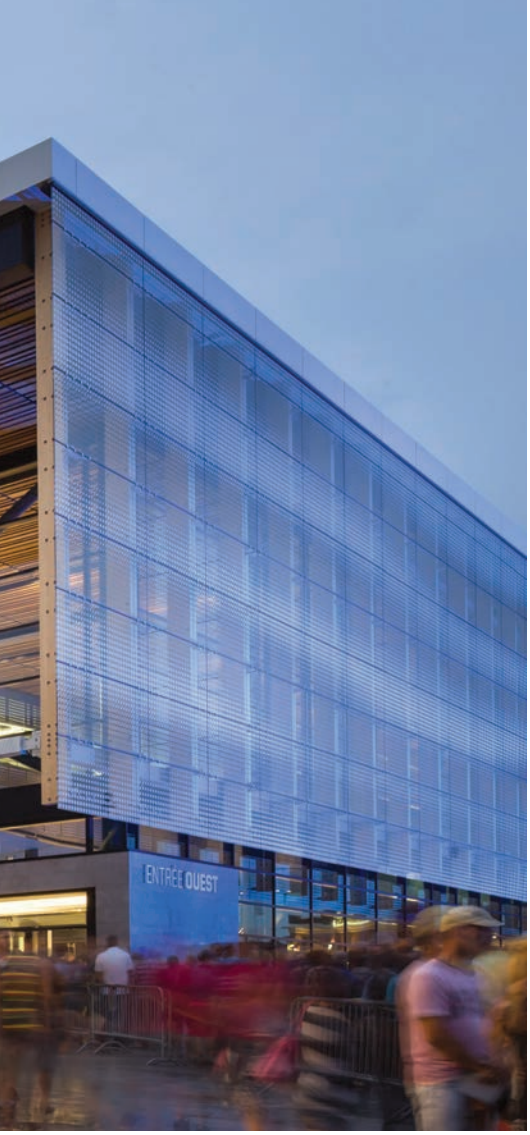


Photo: Stéphane Groleau

to 480 workers on the massive site at the same time. Thanks to the dedicated efforts and close collaboration of everyone involved, the project was finished at a construction cost of $30 million below the initial $400-million budget.

The vast glass-enclosed entrance hall, over 93 metres long and 11 metres high, provides an awe-inspiring welcome for visitors arriving at the 65,037-m^2 oval centre. The main building is equally majestic, with integrated open concourses and a main amphitheatre bowl on two levels that holds 18,310 seats for hockey events, and 20,500 for show events. Over 1,800 square metres of state-of-the-art video screens and over 1,000 loudspeakers surround the spectators with high-quality sound, allowing them to become totally immersed in the spectacle or sporting event they have come to see.

STRUCTURAL DESIGN

Hybrid steel and glulam structural frame

The Centre Vidéotron is a compendium of innovative ideas and technical accomplishments.

The structural frame is a hybrid of steel and glulam timber. Wood was used to support the shell of the main volume to blend with the elegant curvature of the outer envelope and give the peripheral concourse a unique appeal.

From the main concourse to the lower roof — a total height of more than 25 metres — the structure has only one point of intermediate support. The composite glulam arcs are spaced 5 metres apart, comprising the 92 facets of the entertainment area's oval volume. Metal bridgework fills the spans between the arcs and serves as interior finishing while also supporting the envelope waterproofing and insulation. Black spruce in 25 by 25 millimetre sections was selected for its local availability and structural qualities that facilitated fine-tuning the imposing arcs.

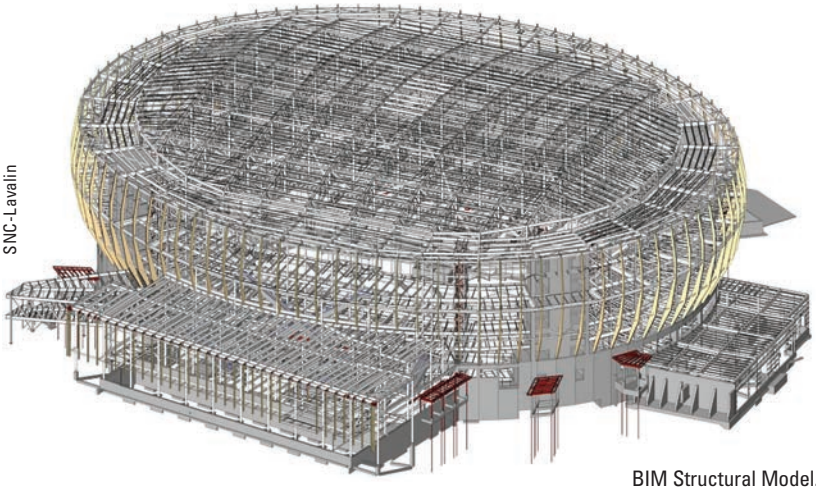
Wood is a material that does not perform well under stress or inverse loading (as in roof trusses, for example). For this reason, steel was chosen for the Centre's roof, some members of which have to support nearly 20,000 kN in tension. Wood was selected for the envelope columns (see 3-D model below).

The wood portion also serves to anchor the envelope's white exterior siding panels, each of which is movable and independent. In addition to waterproofing the building and being aesthetically pleasing, the panels also function to ventilate the building laterally. Doing so required a highly complex steel-to-wood anchoring system.

Reinforced concrete cages

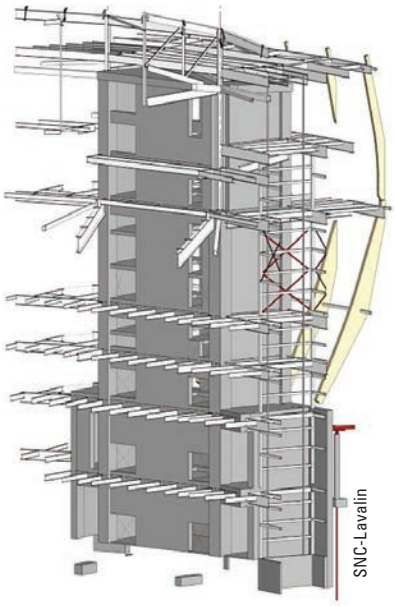
The Videotron Centre is the first NHL-calibre arena stabilized exclusively by concrete cages (see drawing p. 16). Other NHL arenas are stiffened using conventional steel vertical wind bracing, with stairwells consisting of concrete blocks supported by the steel structure. For the Videotron Centre reinforced concrete cages were created with walls at least 400 mm thick. Lateral loads were fully taken up by the cages, which freed up a huge amount of space inside the building, since there were no vertical wind bracing members.

The next challenge was to attach the 98-m steel trusses to the concrete cages. The team decided to design steel columns into niches built into the concrete cages. By doing so it was able to transfer some of the very large horizontal loads onto the cages, thus eliminating the need for vertical wind bracing. Free spaces could therefore be more numerous and



SNC-Lavalin

BIM Structural Model.



3D view of concrete cages used to stabilize the structure.

more open without affecting the stiffness of the structure. The structural system benefited the architecture and enabled the public to watch games in an open, expansive space with no visual obstructions. It can be favourably compared with the Bell Centre in Montreal, built using a different principle in 1996, where games cannot be viewed from the concourses because of the presence of the seats. Recognizing the benefits of the Videotron Centre's structural solutions, an NHL arena in Las Vegas has taken the same approach.

MECHANICAL AND ELECTRICAL ENGINEERING

Displacement ventilation from lower seating levels

Since the multipurpose building was intended to be a hockey arena capable of operating year round, the HVAC system, rink refrigeration system, and electrical power specifications, were crucial. What's more, energy efficiency, as a key requirement of the project, played a central role in generating original engineering solutions.

In terms of ventilation, the quest for energy efficiency produced innovative design concepts that have never been used anywhere else in the world for buildings of this type.

The air circulation principle consists of displacement ventilation, with air being supplied at the lower seating levels rather than via air ducts located in the roof structure, which is the usual method. This approach reduced the HVAC load by treating air locally, without having to handle the entire volume of air. It also provided increased spectator comfort while ensuring optimal ice quality thanks to a locally conditioned zone above the rink surface. Acoustics were enhanced too, due to the low air velocities involved.

Cooling through the scoreboard

Implementing displacement ventilation posed a formidable challenge to the design team, who resolved it with an innovation that is the first of its kind in the world: cooling through the scoreboard. In addition to its proximity to the rink, the scoreboard has the advantage of being relatively empty inside, allowing for the insertion of ventilation ducts and air diffusers.

Using the scoreboard for air distribution enabled the creation of a cooler temperature zone for the rink, creating optimal ice quality and increasing player comfort. The main concept was to produce a dome of cool air that would create a microclimate on the ice. The system supplying the scoreboard has a 15,000-cfm flow capacity and 46-ton cooling capacity, allowing air to be supplied at temperatures as low to 8°C in this zone.

In parallel with the distribution design, conditioning the ventilation air was also critical to preserving optimal ice quality. Since maintaining the relative humidity level in the enclosure was vital to meeting these objectives, four 40,000-cfm outside air intake units with active desiccant wheels were used to supply the seats and other ventilation systems. Among other benefits, the desiccant wheels in these units keep the dew point below the ice temperature, thereby preventing surface condensation that would reduce the ice quality. The dew point of the air supplied from these units can reach levels as low as -13°C (10 grains of water per pound of dry air).

Directly fired natural gas burners are used to obtain the higher reactivation temperatures (about 139°C / 285°F) required for adequate dehumidification, with a total capacity of 8,370 pounds of water per hour. This humidity control provides superior ice quality that meets the highest standards.

Energy-efficient hydronic systems, boilers, chillers and heat recovery

In terms of heating and cooling systems, a number of technologies and energy-efficiency measures add to the building's overall performance. For example, practically all the hy-

Scoreboard cooling principle; the system creates a dome of cool air over the ice.

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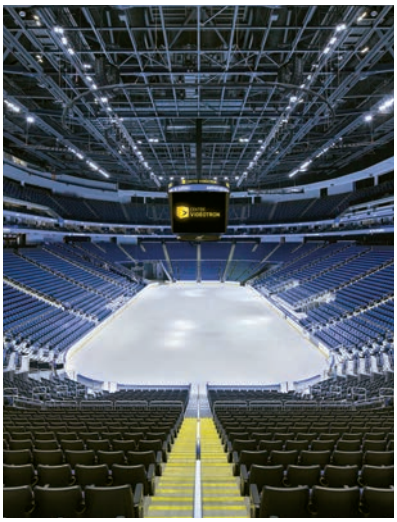
Lounge area with views to the amphitheatre.



Photos: Stéphane Groleau

Inside the amphitheatre.

dronic system circulating pumps are fitted with variable frequency drives capable of reducing motive power during partial loads. Higher than normal temperature differentials are also employed for greater impact on pumping energy consumption — differentials of 30°F for heating and 16°F for cooling, compared to 20°F and 10°F respectively for most standard systems.

The building heating plant consists of 12 natural gas-fired, 3,000-MBH, condensation-type boilers with an efficiency of up to 97% in modulation. The boilers have stainless steel heat exchangers for enhanced durability, and there are enough of them for considerable redundancy.

High-efficiency chillers are also installed. The four chillers provide a total of over 2,330 tons of available cooling. Notable among these is an 800-ton centrifugal chiller with a variable frequency drive enabling a non-standard partial load value (NPLV) of 0.374 kW/ton. The cooling plant also has two chillers for recovering energy from interior loads and other sources to provide 5,000 MBH of heating up to 120°F. This heat is then transferred to the building low-temperature heating system, allowing offloading of two to 12 boilers. The heat comes primarily from exhaust air recovery coils, server rooms, cold storage rooms and especially from the refrigeration system, since up to 2,850 MBH of energy can be extracted from the system via a heat exchanger in heating demand periods. All the recovery results in substantial natural gas savings, thus also reducing greenhouse gases and energy costs.

For ice rink refrigeration, the system uses ammonia as the primary refrigerant. Ammonia has multiple advantages: it is 100% natural, emits no greenhouse gases, is optimally efficient and is containable at the source. The plant consists of three 150-HP, 100-TR, industrial-quality, single-screw chiller compressors, with soft start and oil coolers for energy recovery. One hundred per cent of the heat generated by these chillers can be recovered and redistributed into the building heating system, thereby limiting energy consumption.

Awards

The building has already been recognized for its innovations. It was ranked by Stadia Magazine among the top five new sports infrastructure projects of 2015. Also the Association des firmes de génie-conseil du Québec (AFG) awarded it a 2016 Grand Prix in the building structure category.

Little more than a dream a few years ago, the Videotron Centre is a remarkable engineering achievement that has become a new Quebec City landmark. **CCE**

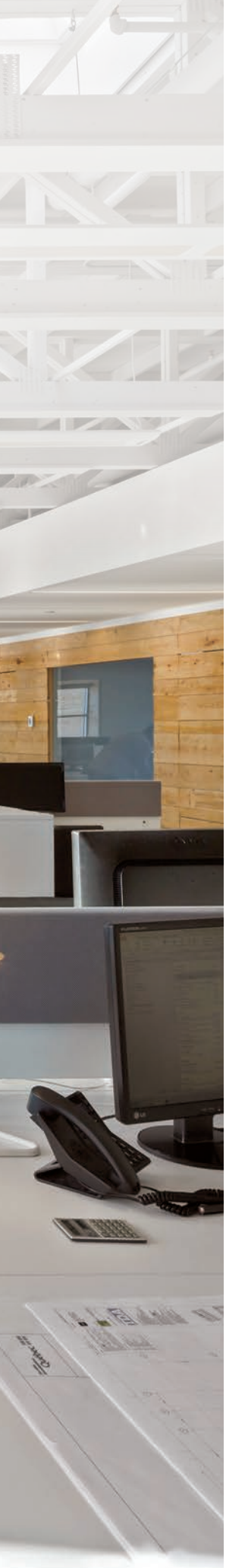
Videotron Centre Project Team

Client/Owner:	Ville de Québec
Design-Builders:	SAGP consortium/SNC-Lavalin, ABCP Architecture, GLCRM Architects, Populous
Structural, mechanical & electrical engineers:	SNC-Lavalin (Rémy St-Pierre, ing., André Cantin, ing. Yves St-Georges, ing., Daniel Bourgeois, ing. Marc Leblanc)
Other key players:	WSP (project management), Pomerleau (construction management),

STGM HEAD OFFICE

An architect's head office in Quebec City is the first commercial building in Quebec to earn LEED Platinum certification. Its sophisticated, minimal style is complemented by its innovative and highly efficient energy systems.

Open office space; the building's linear form provides ample daylight.



By Sébastien Hogue, Ambioner

In the heart of a future eco-district in Quebec City stands an innovative building with many energy efficiency systems, wood materials and natural light. Housing 50 employees of the head office of STGM Architects and its tenant, electrical-mechanical engineering firm Ambioner, the building was completed in 2014 near the intersection Boulevard Ste-Anne and Avenue d'Estimauville. It was the first commercial building in Quebec to earn LEED Platinum certification, which requires water and energy consumption levels respectively 55% and 45% lower than similar buildings that comply with the Model National Energy Code of Canada. STGM were the building's architects, with Ambioner doing the mechanical-electrical design.

Thanks to the minimalist approach used for its design, the inspiring project required only a $2.7-million investment, with $250,000 dedicated to energy efficiency measures and systems. The 1,000-m^2 building has a light wooden structure and a longitudinal shape (13.2 m x 39.75 m, on a north-south axis) that, along with the many windows, skylights and the positioning of openings, favours natural light penetration in 90% of the building and natural transversal ventilation.

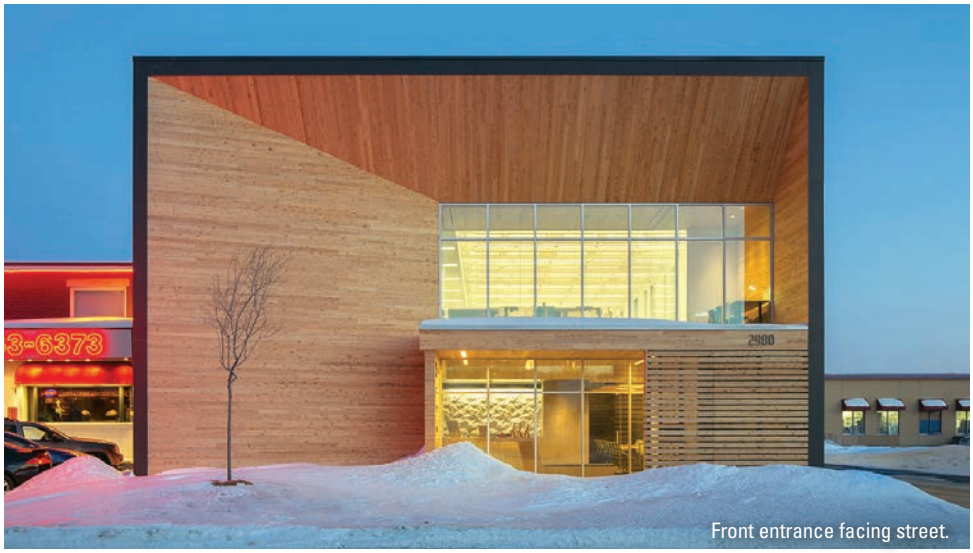
We also made sure that construction resources were used responsibly by giving priority to salvaged materials and furniture, wood extracted from durable forests (53%), and recycled, low VOC emission and local materials (37%). A total of 96% of the construction waste was diverted from landfills. The terrain, once occupied by a gas station, was decontaminated.

Not only does this project contribute to the revitalization of the neighbourhood, it also provides an inspiring work environment for the benefit of both our clients and employees. Its two levels include a hall, offices, three conference rooms, library and kitchen area.

Aerothermal and solar technologies

The building distinguishes itself especially by its use of renewable energies and its various energy efficiency systems.

First of all we used a very cost effective and comfortable aerothermal technology. It recuperates heat from outside air by means of high efficiency heat pumps working continuously in accordance with the building needs. The R410a variable refrigerant volume (VRV/VRF) system, composed of pumps with several decentralized evaporator units and a dual condenser, has an installed heat capacity of 84 kW, while its cooling capacity is 94 kW. It favours simultaneous energy transfers from rooms that need air conditioning (for example the server room) to those that need heating. Heating and cooling distribution is ensured by fan coil units linked to a central fresh air system. High induction air diffusers were chosen for



Front entrance facing street.

Photos: Stéphane Groleau/STGM

Stéphane Groleau/STGM

Glazed garage doors at the rear are opened or closed depending on the season; this contributes to the effectiveness of the heat pump system in the room behind.

most parts of the building, except in the two open work spaces. Besides the rigorously controlled temperature, a good air quality is ensured by CO_2 sensors that automatically command appropriate ventilation throughout the different rooms.

The fact that the heat pumps are located in an uninsulated buffer space equipped with glazed garage doors giving onto the outside enables the system to make the best use of climatic conditions: the glass doors facing south are closed during cold days, thus creating a greenhouse effect, and opened in warm weather to allow heat rejection outside. In heating mode, depending on outside temperatures, the system's coefficient of performance (COP) varies from 2 in cold periods to 4 or 5 in normal operating conditions. Also an enthalpic core heat recovery system (average efficiency of 70%) reuses residual heat from the building's stale air, all of which is rejected to the heat pump room.

In addition to this aerothermal system, an 85 kW natural gas boiler is used to provide the few degrees necessary to reach the prescribed COP when deep cold hits in winter, and to heat up the entrances, bathrooms and stairwells. Interesting fact: the boiler only worked three times in the freezing 2014-2015 winter. The boiler might also replace the heat pumps in case of failure.

A 42-m^2 solar wall on the building exterior serves to preheat air in winter. Air is drawn into the plenum space between the building envelope and the solar wall through perforations and then sent to the HVAC system. In total, solar energy provides 1% of all the building's energy and 24% of its heat.

Other energy efficiency features include the building envelope's increased insulation, both in the walls (R-31), the roof (R-47) and windows (R-4, 12). LED lighting fixtures (average lighting power of 0.037 W/m^2) were used and were linked to individual brightness sensors in the two main open spaces.

The performance of the building is continually monitored by its design team to optimize the systems. The systems were selected to support 200% growth in the two occupying firms while giving the same levels of comfort and, especially, the same energy performance.

Water conservation

Capturing and treating rainwater in order to reuse it the buildings' bathrooms was not rocket science. "It's not a major cost and well worth the effort when it comes to saving drinking water, a resource as important to preserve as energy," says Sonia Veilleux, the design engineer with Ambioner.

The building's water management system relies on the roof's 25 m^3 retention capacity (the roof has a concave shape with a flow control drain at the centre) and an underground 170-m^3 retention tank below the mechanical room.

Thanks to all these features, annual water consumption in the building is reduced to 410,000 L (namely 85,000 toilet flushes) in comparison to a model building of the same type. Speaking of toilets, the plumbing was adapted so that it could accept the most water-efficient devices: sinks and showers have a 5.7 L/min flow, while those of dual flush toilets are 3 and 6 L/flush.

Inspiring work environment

As well as combining high technology and innovative systems, STGM's building offers a stimulating work environment, and that explains a lot why STGM and Ambioner have a high staff retention rate. Amongst other features, two parking spaces are reserved for carpooling and an electric charging point is available. But the increasing number of people who use alternative means of transportation are pleased with the building's proximity to public transit system and bike paths, and its safe bike storage. And when employees arrive at work, they are happy to find that 94% of the workspaces have a view to outside, and a terrace with plants and fruit shrubs where they can take their lunch.

"Ultimately, people in the industry will do as we did and make concrete and necessary gestures to attenuate their buildings' environmental impact," says Stéphan Langevin, associate architect at STGM. "It's not that complicated!" **CCE**

STGM Head Office Project Team	
Client/owner:	STGM Architects
Architect:	STGM
Mechanical-electrical engineers:	Ambioner (Sonia Veilleux, eng., Rémy Parent, eng., Pascal Bussières, tech., Christian Nadeau, tech., Jonathan Verreault, eng.)
Structural Engineering:	Alco
Civil:	Roche
Construction:	E Huot
Landscape:	Les Urbainculteurs
Photometric study and lighting design:	PhotoLux Design

SCHOOL PROJECT

Over 100 schools in the Calgary Board of Education are having their building automation systems revamped and put under central control, but the buildings are diverse and each requires its own BAS logic.

By Terry Irwin, CEM and Annie-Claude Thibeault, P.Eng., Ecosystem

A comprehensive retrofit of the building automation systems (BAS) at the Calgary Board of Education, Alberta's largest school board, is taking place. Expected to be completed in 2018, the project will upgrade the systems of 102 schools and centralize them onto one single BAS platform.

The process started in June 2014 when the Board issued a public request for proposals in search of an engineering company to design and implement energy conservation measures pertaining to building automation systems. Ecosystem, a complete design-build and energy performance contract firm, was the winning bidder. Upgrades have already started and 38 schools will be on one central BAS by the end of this year. Between 45 and 50 schools will be added in 2017, and the remaining schools will be completed in early 2018.

A building automation system is a type of direct digital control (DDC) processor-based system and includes components such as: inputs (e.g. temperature sensors); outputs (e.g. relays to start a heater); and the processor, also known as the controller. The controller hosts the control logic, or the brain of the BAS. This logic can be prewritten by the controller manufacturer, or customized by the BAS programmer. With most BAS systems, the customized logic is often only limited by the imagination of the programmer.

PROJECT BENEFITS

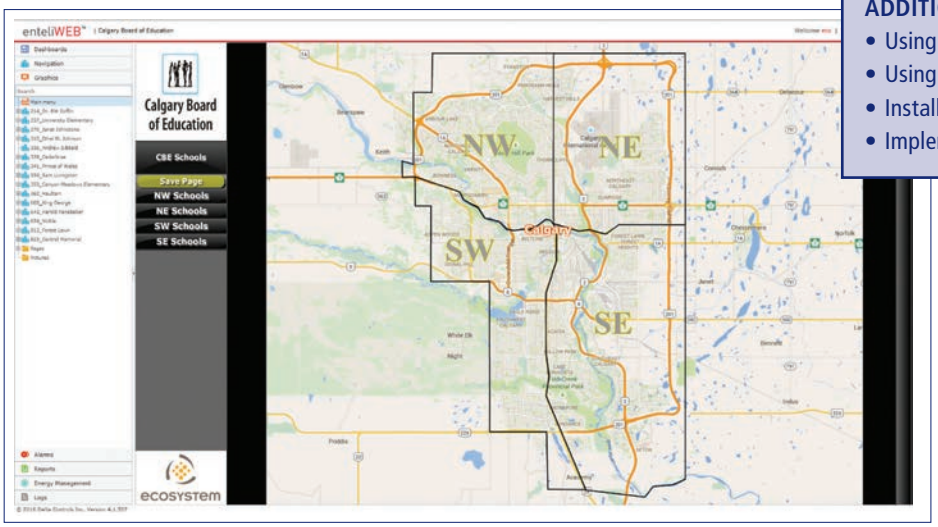
- Optimize the quality of the learning environment by improving occupant comfort
- Facilitate a more efficient and effective operation and maintenance program
- Provide remote access to 102 schools
- Lower utility expenses and demonstrate environmental stewardship

Programming for 102 unique buildings

The 102 buildings in the project are made up of 74 elementary schools, 16 junior high schools, 11 senior high schools, and one office building.

The schools vary in size and age: Crescent Heights High School was built in 1915, while Somerset School and Valley Creek School were built in 2003. About 80 of them are less than 5,000 square metres in area, but there are exceptions to the norm. The Scenic Acres School has an area of only, 1,432 square metres, while Crescent Heights High School has an area of 29,208 square metres. The ages of the equipment vary as well. For example, while the majority of the boilers were installed between 1955 and 1975, Altadore School has a boiler that was installed in 1952, and Sunalta School's boiler was installed in 2005. Almost 30 schools are on steam networks and the remainder are on hot water networks.

Given that each school is different, the BAS logic for each school is unique. Ecosystem started the project with several BAS logic templates, but modified and customized them to appropriately address each school's unique needs and challenges.



Screen capture of the BAS software, showing the widespread geographical area of the Calgary Board of Education schools. Previous page: Crescent Heights School.

ADDITIONAL STRATEGIES:

- Using reset curves
- Using Optimal Starting
- Installing Variable Frequency Drives
- Implementing equipment staging

A huge advantage for implementing the Board's wide-ranging system, which covers a total of 584,900 square metres in buildings spread out all over Calgary, is the ability to use the internet to remotely access the BAS from any of the schools. In day-to-day operations, it allows a controls technician to troubleshoot an issue at a particular school and program a change to the control logic; a building operator to check on the state of his building; and a facility manager to monitor the building's energy performance and benchmark it against other schools — all without driving to the actual site.

Accessing the BAS

Each school has its own controller unit that connects to the central BAS. The central BAS is located in the server room of the Sherwood School, and the Board has the capacity to manage a maximum of 500 schools on its network. Access to the system is tightly monitored by the school board's IT department.

Reusing old, functional equipment

In many retrofit or upgrade situations, it is common to have an old pneumatic system that needs to be integrated into a new DDC-style BAS. This is the case in this project. The schools were controlled using mainly pneumatic systems and mechanical timers to schedule the equipment and maintain the required ventilation rates and temperature levels.

Pneumatic controls are generally robust and long-lasting, but they use a lot of energy and require maintenance. Working with the school board's building operators and controls technicians, Ecosystem was able to reuse some of the pneumatic end-devices, such as damper actuators and heating and cooling valve actuators, instead of sending them to a landfill. Devices that translate electronic signals to pneumatic signals were installed to integrate the old system into the BAS.

Group scheduling

Upgrading multiple control systems into one single BAS brings multiple benefits. Similar equipment can be grouped to share common schedules for ease of editing. For example, as the 74 elementary schools are unoccupied in the summer, the BAS can turn off the heating network, cooling network, and ventilation systems, all at once.

Reset curves, optimal starting, and other strategies

The project involves implementing a number of other strategies. For example, the central BAS will use reset curves. Many boilers are set to deliver heat at 180°F or higher. A reset curve changes the desired temperature of the heating water based upon the outside temperature, making the boiler setpoint lower when it's warm outside, and conversely higher if the outside temperature is low.

The BAS can also "learn" from experience. Using an algorithm called Optimal Starting, the BAS controlling an air handler at a particular school can predict how much time the fan would need to start to reach appropriate temperature in time for occupancy. For example, if a classroom is to be occupied at 8 a.m., the algorithm would look at the history of that system and may determine that the system would need to start at 7:22 a.m. to have the classroom conditioned in time.

Variable frequency drives (VFDs), which control pump or fan motors, are also being installed to manage energy usage and costs. Many pumps are actually oversized for typical applications because they need to deliver for the worst case scenario. A chilled water pump needs to be sized to deliver enough cooling on the hottest day of the year. However, these conditions are not the norm and as such for the majority of the time the pump is working (and consuming) much more than required. A VFD can vary the speed at which the pump is rotating and as such vary the amount of cooling the chilled water pump is delivering and dramatically reduce the energy use. The relationship between the elec-

tricity consumed and the speed at which the pump is rotating is a squared or even cubed curve. For example, a VFD at full speed (100 per cent) will obviously use 100% of the electricity. However, a VFD running at 80% of full speed may only consume slightly more than 50% of the electricity.

Equipment staging is another energy saving strategy being implemented. The BAS programmer can write sequences for a particular building using the most appropriate piece of equipment for the task at that time. For example, instead of having two boilers of equal size that are each capable of providing the necessary heat for that building (redundancy requirements often call for this), a smaller, more efficient boiler that is sized closer to the typical heating load could be added. The BAS will use the smaller boiler most of the time, and when it senses that there is not enough capacity, the larger boiler will be used.

The human factor

Implementing a BAS retrofit at 102 schools requires close collaboration and careful planning. Before starting work at every school, Ecosystem meets with the principal and key staff to present the project, explain the benefits, and outline the actions that will take place. Concerns are addressed and issues are clarified. "It is important that our facility operators and controls technicians have a sense of ownership of this project," explains Earl Badger, P.Eng., Calgary Board of Education environmental projects coordinator. "The most intelligent BAS can still fail when it does not have the buy-in and support of the staff. Therefore, Ecosystem is providing staff training so that a seamless transition can take place once the project is completed."

"Overall, all parties have demonstrated excellent teamwork," adds Annie-Claude Thibault, P.Eng., Ecosystem's construction manager. "We know the technology but the CBE staff know the buildings best. As a result, we listen to and seek advice from the CBE staff to ensure that our BAS programming addresses their buildings' needs." **CCE**

Building Automation System Upgrades at Calgary Board of Education

Owner/Client:	The Calgary Board of Education
Design-build-energy performance contract:	Ecosystem (Annie-Claude Thibeault, P. Eng., André-Benoit Allard, P.Eng., Stéphane Lafortune, Terry Irwin, CEM)
BAS Contractor:	EsC Automation

Cisco's Canadian headquarters in WaterPark Place, downtown Toronto, has Power-over-Ethernet lighting among its advanced systems. There are 1,400 PoE LED luminaires deployed throughout the 100,000-sq. ft. space, with uplight, linear recessed, potlight and 2x2 troffer configurations.

By Andy Schonberger, P.Eng., Cisco Systems Canada

NEXT GENERATION BUILDINGS

In the emerging era of the Internet-of-Things and IP networks, the use of Power-over-Ethernet is a technology that can simplify a building's electrical and communications infrastructure.

Buzzwords abound in business circles. Admit it, "leverage," "synergy," and "low hanging fruit" all just came to mind. In technology circles, the "Internet of Things" or — IoT — falls into that category. It refers to billions of devices connected to the Internet, providing value and better experiences.

But what does all this mean in buildings, where we spend 90% of our waking lives? It means our buildings are becoming smarter.

Power over Ethernet – simplified communications infrastructure

A feature of the new generation of buildings is their use of one Internet Protocol (IP) based network. An IP-based network connects most building systems (fire and life safety being an exception), but it can also deliver electrical power to the devices as well. In a new building this "Power-over-Ethernet," or "PoE," simplifies the communications infrastructure, eliminating conduit and cable, and enabling the cost-effective deployment of next generation "Internet of Things" sensing and devices.

PoE simplifies the building's infrastructure because so many of the devices in buildings now consume DC power and require a network for data connectivity and control. Converting energy from AC to DC causes losses of ~13% of the energy delivered to that device, so it makes sense to centralize this conversion process for better efficiency. It has been done by IT networks for decades (think of your VoIP phone) with power transmitted by structured cable.

Structured cable is rated in different categories by the ANSI/TIA/EIA-568-B.1 and ISO/IEC 11801 standards, with examples of Category 5E or 6A being common for data networks today. This power delivery is not bleeding edge, but uses Ethernet and Power-over-Ethernet based off the IEEE 802.3 standard. The global power standard is 802.3, delivering up to 30 watts, and in the near future up to 100 watts with Ethernet. There are market solutions currently delivering 60 watts over PoE, with the IEEE 802.3bt standard expected this calendar year.

Using this DC infrastructure to also power connected devices offers value through quicker installation costs and lower labour rates. Savings can range from $0.30-$0.60 USD per square foot, and the building need not run any differently than a traditionally designed, integrated and constructed building.

Clearly the approach requires that the designers rethink the networks in the building early in the design process. It means:

- moving some traditional electrical distribution to structured cabling and communications designs;
- a shift of distribution infrastructure from the electrical room to the LAN (local area network) room — also referred to as the intermediate distribution frame (IDF) room;
- using expanded cable trays in drop ceilings, with reductions in conduit, junction boxes and line voltage terminations;
- considering PoE cable length limitations of 100 m from the switch to the connected device;
- ensuring that the network has the capability to handle all of the traffic that will flow over it; many are currently using 10Gb as a standard today;
- including security appliances (firewalls), servers and storage in a physically secure location;
- considering that this network infrastructure needs to be deployed earlier than with traditional designs during construction scheduling.

Day in the Life of a Tenant in a Smart Building

While on a conference call, you drive into the building and the CCTV camera in the parking garage scans your licence plate.The gate opens to let you in (no waving a pass you may have forgotten, no pulling your wallet out). You are guided, via ceiling mounted green lights, to an electric car charging station (you registered as an EV driver), where the charger is free as a building sustainability amenity.

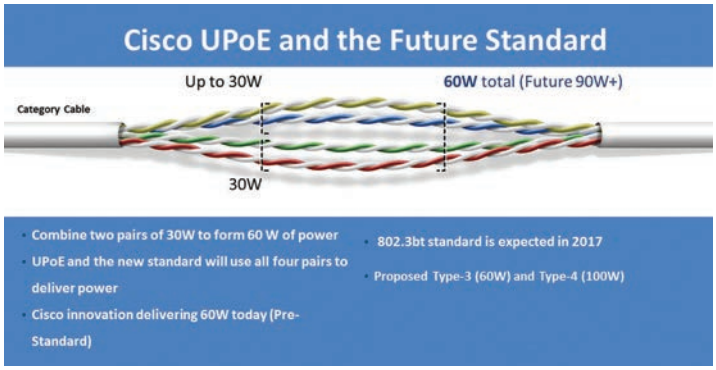
You tell the elevator what floor you are travelling to and the building directs you, and others with similar destinations, to one elevator to reduce travel time. You stay on your call through the parking garage and elevator (no dropped call), and while enroute tap your phone on the access control reader (no more access cards!) to obtain access to your tenant floor. You head to an open concept desk and transfer your call to the land line where you are automatically added to the video conference. While on that call you feel uncomfortably warm, and pull out the building's mobile app to tell the system you are too warm. Within minutes, the temperature in your zone drops one degree.

Once that call wraps up a colleague asks about a project you've been working on, and so you grab an available audio privacy room. As you walk in, the lights turn on to your preferred setting (dimmer than the rest of the office), the video conference unit connects to your phone and you use it to share a draft presentation you've been collaborating on. You finish that discussion and manually turn the light level back to normal through the building app, as your colleague wants to show you a new design they have sketched out on the whiteboard.

Photos: Tom Arban/HOK

Lighting and PoE — Cisco Canada's Canadian Headquarters

A good example of the move to more directly network connected systems is lighting. PoE-powered lighting can provide up to 75% energy savings when compared to fluorescent lamps. This is the result of the combination of LED luminaires, which can reduce consumption by 50% (compared to fluorescent), and embedded controls, which can provide up to 25% additional savings through daylight harvesting, occupancy detection, and individual control strategies. PoE lighting is also faster and simpler to install than comparable line voltage systems.



At Cisco Canada's Canadian headquarters in Toronto's RBC WaterPark Place, 1,400 PoE LED luminaires are deployed throughout the 100,000-sq.ft. space. The system consists of uplight, linear recessed, potlight and 2x2 troffer configurations, with touch panels for control in enclosed spaces. Powering these lights are 8 port switches mounted in stacks distributed in the drop ceiling. Each switch is plenum rated, fan-less and designed for this application, not requiring additional cooling. Category 6A cabling provides power and communication to the lights and sensors. Modelled and designed by Hidi Rae Consulting Engineers, the system has a lighting power density of 0.47W/sf, exceeding ASHRAE 90.1-2004 by 52.6%.

The network architecture is relatively simple by IT standards, being typically designed with "dual-star" topology, meaning consists of dual core switches (for redundancy) and access layer switches on each floor (or alternating, depending on how many devices need access).

The network for the LED lights in Cisco's space is owned and managed as part of the base building systems by Oxford Properties, which also connects and powers 2,200 PoE VAV boxes, PoE CCTV cameras, energy meters, common area WiFi by Cisco and other base building systems at controller levels.

Converged control networks

In a retrofit capital costs can be decreased by using a single network as opposed to relying on individual vendors to provide proprietary control networks. Cameras, building automation systems, digital signage, lighting, access control, common-area WiFi and more all need a network for controllers, and devices, to communicate with management systems and operator interfaces. Depending on the number of connected systems, this unifying communication infrastructure can pay for itself within two or three system upgrades.

The trigger to installing the infrastructure will vary by building, depending on the business drivers. Examples of these include:

- energy cost/consumption challenges
- tenant vacancies
- systems upgrades
- competitive pressure and a need to reposition an aging asset
- obsolescence or security challenges of a legacy network.

Competitive pressures are likely the largest driver in hot markets. Toronto, for example, had almost 4 million square feet of new office space under construction at the end of the second quarter of 2016. In these situations existing assets are struggling to compete with old infrastructure.

How does this change the design process?

Integrated design teams where architects, engineers, operations staff and constructors collaborate through the design and construction process have been on many developers' and owners' radar for a while, particularly in green buildings such as LEED-targeted projects. But a smart building as described here is only achievable if those specifying and managing the controls are engaged in the same process — meaning there must be representation from IT experts on the design team. Otherwise, it is typical for decisions to be made, contracts to be awarded, and for it to be "too late" to change course for a building team.

The next generation of buildings will see the Internet-of-Things enable buildings to provide a personal experience, as their systems react to our individual tastes and requirements. Thanks to increasingly adept and fast networks, the IoT technology buzzword is becoming tangible in the built environment, whether it is in the existing structure in which you are sitting, or the one being built across the street. **CCE**

Andy Schonberger, P.Eng, MBA, LEED AP, CEM, is head of business development and smart and connected real estate with Cisco Systems Canada in Toronto. He helps businesses to evolve and deliver next-generation buildings.

CRITICAL Protection

Getty Images/Thinkstock

In designing upgrades to the fire protection systems for a casino surveillance operations room, WSP evaluated various advanced systems for suppression and detection.

By William Kuffner, P.Eng.,
Senior Fire Protection Engineer

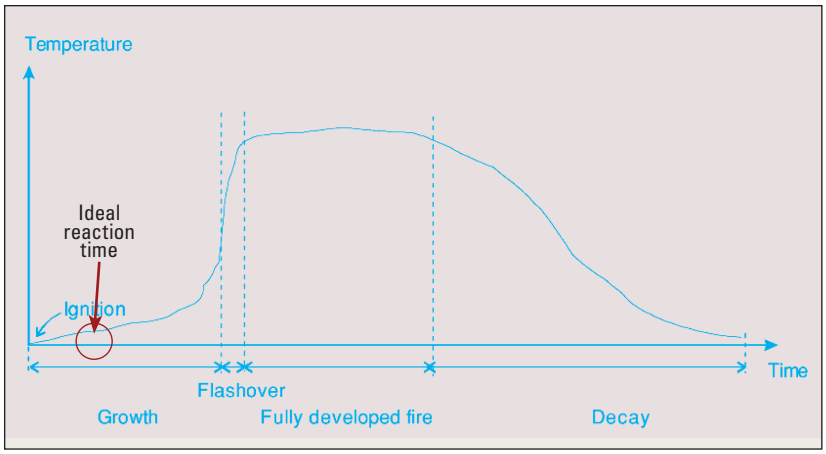
Since the advent of "objective-based" building codes in Canada in 2005, the role of the Fire Protection Engineer has evolved. As a specialist, the fire protection engineer applies fire safety science to evaluate proposed alternate building designs against what were traditionally known as the building code "prescriptive" measures. The prescriptive measures are now called "acceptable solutions." Most of the time the acceptable solution is a reasonable approach, but for special circumstances it is the fire protection engineer's specialized skills that enable the use of an alternate design in compliance with Canada's objective-based building codes.

Several motivations make the objective-based process worthwhile. First, it gives the ability to take advantage of new materials or methods that are not yet codified into prescriptive measures. Next, the vision of the architect or designer can be realized to include a unique building feature that would traditionally be rejected as not fitting into an acceptable solution. Finally, it offers the ability to minimize costs by taking advantage of different options for the required fire safety features.

Let's take a look at a case study of a recent project to highlight some of these skills.

Clean agent fire suppression

A casino decides to "double down" on the protection of its critical infrastructure by going above and beyond the minimum building code requirement by adding a clean agent fire suppression system to its back of



WSP

Figure 1 — Idealized Fire Temperature/Time Profile

house equipment and operations rooms. There are no prescriptive code requirements that mandate the installation of this kind of system and it takes a specialized skill set to ensure the equipment is protected against fire while maintaining operational effectiveness and life safety to the users of the equipment.

Clean agent fire suppression agents are designed to be used in spaces that could be occupied and are safe for use on energized electrical equipment without any lasting physiological effects, damage to equipment or environmental concerns. They come in two basic types: they work by either reducing the oxygen content of the space to a level below that which can support a fire, or by cooling flames to extinguish fires.

For clean agent systems there is no requirement from the Canadian building codes, but there are standards, such as NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems. The protection concept is to provide very early detection of a fire and to activate the clean agent suppression system before the building sprinkler systems activate, hopefully before critical damage to equipment occurs. Because some of these operational areas are occupied by people from time to time, and it is possible for early warning equipment to activate before the rooms are evacuated, extra caution is required to ensure that the activation of the new suppression system would not add to the life safety threat.

A clean agent system that reduces oxygen content is designed to displace the air in a room with an inert gas such as nitrogen in enough quantity to be effective in extinguishing flame — while still enabling occupants to breathe for long enough that they can evacuate. A clean agent system that works by cooling is known as a halocarbon due to its chemical structure (organic compounds containing carbon atoms covalently bonded with halogens: fluorine, chlorine, bromine, or iodine).

Each chemical agent has its own set of pros and cons, including environmental and physiological properties.

The environmental qualities include the ozone depletion potential, and global warming potential, which is a value assigned to a chemical based on how long is remains in the atmosphere after discharge and its ability to absorb infrared radiation.

Physiological properties include the safety factor associated with what concentration is required for effectively extinguishment, measured against the concentration where toxic effects become a consideration (the concentration limit at which no or low observable adverse effects are measured in laboratory tests). These systems are intended to be used in total flooding applications, which means the clean agent gas is discharged into the protected space and allowed to remain there for a period of time ("soak time") to ensure its effectiveness before the space is evacuated of the gas mixture and operations are returned to normal.

In order to better inform the casino's stakeholders WSP analyzed the options available. The team reviewed different clean agent systems, including a fluoroketone (FK-5-1-12) and a heptafluoropropane (HFC-277ea), as well as a hybrid water/nitrogen system.

The analysis included the fundamental extinguishing methods of the different options; their costs for installation and maintenance; and their environmental factors and physiological factors, including the lowest and "no observable adverse effect" concentration. Also reviewed were operational factors such as the need for "room integrity" i.e. the room needs to be relatively airtight and able to withstand some "over pressure" so that the gas stays in the room for the minimum soak time. There are dampers installed to control the mixture of the gas and air.

The analysis included the fundamental extinguishing methods of the different options.

Following the analysis, the client chose to go with the fluoroketone (FK-5-1-12) agent.

At this casino most emphasis was directed at smoke detection and creating a system that could operate reliably but very early in the fire development process. Fire detection buys time: time to react, time to conduct a preliminary investigation into the source of fire, time to exercise planned shutdown strategies, and time to prevent the escalation of a

conflagration beyond a facility operator's ability to control it.

Understanding fire growth and detection

Fires tend to grow in intensity over time depending on the available fuel and oxygen, but they don't generally grow linearly with time. Fires are often modeled as being proportional to the square of time. The development of smoke generally follows fire growth patterns.

The graph opposite shows an idealized fire time temperature profile. The first portion of a fire after ignition is called the growth phase, followed by a transition from one burning item in a room to the burning of all of the items in the room, termed flashover. Next comes the fully developed burning period, followed by a decay time, when the intensity of the fire is controlled only by the remaining available fuel. The time period shown is that of minutes, with the whole event taking place in approximately less than an hour, with temperatures reaching as high as 1000°C.

The detection of smoke at the early growth phase therefore has disproportionately higher benefits than detection of smoke later because of this non-linear growth tendency. On this basis, a very early smoke detection system using an air aspirating smoke detector was selected at the casino to provide detection for the equipment and operational spaces.

An air aspirating smoke detector is an improvement over the standard spot type detector in that it actively samples the air around a protected space by drawing air through a series of pipes to a detection unit located close to the protected space. When coupled with very sensitive detection equipment, the air aspirating smoke detector provides many orders of magnitude more sensitivity over spot type smoke detectors. This early detection, coupled with clean agent suppression, provides the casino with a superior fire protection system that makes the best use of available technology, delivers the highest level of fire safety available for both occupants and infrastructure, and exceeds the minimum requirements of the Building Code. **CCE**

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By Bronwen Parsons

Designing security systems for casinos and hotels means balancing the need to have coverage and stringent security, without making patrons feel as if they are being constantly watched.

Security at Casinos and Hotels

Mike Prsa, P.Eng., vice president at Mulvey & Banani International in Toronto, has seen a great advance take place in security systems in the last decade. "No longer are security systems simply hardwired door locks and pixelated gray scale images of vacant corridors," he says.

In advanced buildings that have IP (internet protocol) converged networks, the security systems become part of a common protocol environment and comprehensive "building intelligence," explains Prsa. Thus a security camera might be used not only to capture images: "It is also a motion detector to activate lights and HVAC, a photo sensor to dim lights and draw motorized blinds, a security camera as well as a video conferencing camera, a microphone and speaker for two-way synchronized audio/video communication — and this [camera] is only one of hundreds of IP-based devices deployed in a building."

For Jason Chiu, associate and group lead of HIDI Security Consulting in Toronto, the advances in technology are a highlight of his work. "I'm a very technology-focused person so I find it invigorating that I have to constantly stay up to date in an evolving industry. That's a big plus in my job."

But Chiu knows that for casinos and hotels, the issue is not just finding the right technologies, but also meeting clients' operational needs. With casinos and hotels, the biggest issue is finding a balance between having good security coverage, while ensuring guests do not feel as if they are constantly being watched.

Roman Dabrowksi of Canon Canada, manufacturers of security video systems, agrees. "Hotels and casinos are trying to find a balance between the needs of protecting privacy for clients and protecting property. So they want to make sure that they have coverage in case something goes wrong, but they don't want to make the clients feel that they're watching their every move."

In practical terms it means finding discreet locations for the cameras — something particularly crucial in the casino gaming rooms where cameras cover every table. But cameras are needed throughout these complexes: in entry foyers, at the ends of corridors, at emergency exits, and roof doors, for example. Depending on the location, different cameras, with different coverage and lighting sensitivity are required.

Coordinating technical needs

Chiu says that as security system designers they spend a lot of time talking to clients and finding out what their needs are, both technically and operationally. They have found that sometimes electrical engineers who aren't security specialists leave too many specific decisions up to the contractor, which can lead to problems for owners down the road. For example, owners find out the system they have installed isn't flexible and scalable, or it requires a lot of investment "at the back end."

Another big chunk of Chiu's time is spent working with other members of the design team during the design phase to coordinate the security system with the other building systems. For example, the location specified for camera equipment might conflict with ceiling light fixtures or an HVAC duct. Working together they can develop a solution that mitigates problems during construction.

And the most advanced solutions are not the right solutions in some circumstances. "Sometimes clients jump to newer technologies, thinking [they're] beneficial," says Chiu, "when in fact if you deep dive into the requirements, it may be appropriate to consider older, tried and true solutions."

For example, when an owner adds an IP-based camera to an older coaxial cable network, there can be a

delay in the camera's response time.

As a result, some casinos are choosing to stay with analog camera equipment and coaxial analog cable, or with hybrid systems, he suggests.

Dabrowski agrees the reason casinos are sticking with older technology is that it can be very disruptive to completely rewire a casino. Instead of closing down operations which means losing revenues, owners may put in IP cameras and install converters to enable them to reuse the existing coaxial cable. However, Dabrowski says they should do a cost analysis, since converters can be as expensive as the cameras.

Dabrowski has seen designers overlook something important during the early design phase: the need to provide separate security equipment rooms. "The days of putting the recorder underneath the guard station are over," he says.

The security equipment rooms have almost data-centre requirements. They have to be secure "so that people don't get in to damage the equipment and change things." And they require power, cooling, and network connections. "The engineer has to make sure that he communicates with the architect to provide the appropriately sized rooms and services," Dabrowski says.

For casinos and hotels it's also important, he says, to provide centralized uninterruptible power supply (UPS), both for the monitoring equipment and the cameras. The building's emergency generator might take time to kick in, which means "the cameras may start to shut down and then turn on again. But if they're on centralized UPS power from the security equipment room or data centre the cameras never shut off."

Choosing a supplier

Dabrowski says the security systems industry is seeing fierce competition with an influx of cameras from overseas. A camera with the same features made by different manufacturers can range from $500 to $5,000. He says it's important to know that the manufacturer has reliable products and will stand behind them.

As a consultant Chiu says: "We try as much as possible to specify multiple systems to help our clients get the most competitive bid possible. But there are always going to be cases where they need special features and we have to do our homework. There are quite a few situations where we end up with just one manufacturer that makes the particular product our client needs." CCE

By Bronwen Parsons

ANDRÉ ROCHETTE

A story of resourcefulness and optimism

"I think people wake up in the morning to do good. So given the right set-up, if you allow them to do better work, you don't need to pressure them. It's just human nature."

André Rochette, P.Eng., is sitting in the Toronto office of his company Ecosystem. Outside the renovated 100-year old building the sun is shining down on the business crowd hurrying along King Street West.

Rochette is talking about how Ecosystem operates. The company specializes in "deep energy retrofits" for buildings, which result in "anywhere between 30% and 40% savings." It also acts as a design-builder, assigning projects to teams who work as construction managers as well as designers. And it does "Integrated Energy Performance Contracting" whereby it guarantees the results of the energy retrofits to the building owners — sometimes for up to 20 years.

The 46-year old Rochette is tall and lean, with a wide smile and tousled hair. He speaks flawless English, tinged with a Quebec accent. He's open and friendly, attentive without being intense. It's easy to see him as an effective leader and co-partner in a company that started in his parents' basement in the 1990s and has grown to have 150 employees. Ecosystem is based in Quebec City, but now has offices in Montreal, Toronto, Calgary, New York and Boston. In an era when engineering companies are becoming ever more gigantic and globalized, Ecosystem shows it is possible for start-up Canadian firms to flourish and march to their own drumbeat.

Venturing out

Worms, not HVAC systems, were on Rochette's mind when he was first venturing out. He had studied chemical engineering at Laval University. "They were the years of [concern with] acid rain, and I thought I would work with an industrial company on controlling emissions," he says. He graduated in 1992, but: "Those who remember those years know that it was a pretty bad time for finding jobs, especially in engineering."

Unbowed by not being able to find suitable work, he started to think about different possibilities. He had an idea to make residential recycling bins. He tested a model in his parents' basement. One side was for glass and metal, while the other compartment was a composting section inhabited by red worms who were supposed to digest the waste. The trouble was his parents liked eating grapefruits, but the worms did not. "The stuff became too acidic, and the worms ran away — not very far, just a couple of feet over the dry concrete," he laughs. "So that was my first idea, and it was going to be called "Ecosystem."

The father of a friend set him on a different track. The friend had installed a $300 thermostat in his small industrial unit, and suggested that Rochette should sell the devices to the other units in the park. The thermostats were simple equipment to adjust a building's heating temperature at night and on weekends. Ro-

André Rochette, president and CEO of Ecosystem, started a company in his parents' basement in Quebec City 20 years ago.

André Rochette.

Photo: Nicolas Houde

chette found himself in sales ("which had nothing to do with my chemical engineering background") and embarked on his first real business. "I realized there was a market called energy efficiency."

Then he met engineer Richard Tremblay, which led to another transformation. One of Rochette's clients in the industrial park was expanding his premises and asked Rochette if he could help him out with drawings to get the building permit. Rochette didn't have the expertise so in those pre-Google days he went to the Yellow Pages looking for a small consulting engineering company to help. "To me it looked like the companies with the big ads would be too expensive," he says, "so I took the names that were printed as small as I could find." He came across Beaudoin Tremblay. Richard Tremblay was the "mechanical guy."

It was a fortuitous meeting, one that saw Tremblay and Rochette eventually become partners, along with a third person, Patrick Raby, who was a partner from 1993 to 2005 and is still with the company.

Rochette and Tremblay have complementary skills. "I'm very open by nature, so I like crazy ideas," says Rochette. "So the day I met with Richard and he was coming up with all these innovative designs, I thought it was the greatest thing. Richard is very creative and he always had the solution that nobody had ever thought of. I liked the idea of having him take care of the technical side, and me taking care more of sales and management."

"When Richard came on board is when we started to sell more integrated solutions; we started to do more deep retrofits," continues Rochette. "The easy solution is to say, 'O.K., we'll stop the heating at night and we'll change the lightbulbs to LEDs.' But to reinvent and re-engineer the entire production and distribution of energy — that's what we like to do. That's where the innovation is and that's where you can do what we call a deep retrofit to generate the 30 or 40 per cent savings."

"The day I met with Richard and he was coming up with all these innovative designs, I thought it was the greatest thing."

Holistic approach

Business was slow at first. Ecosystem operated from Rochette's parents' basement for a couple of years, and Rochette's father, who had recently retired, looked after the accounts. Then in 1998, the Quebec government passed a regulation to allow design-build energy performance contracts to be used for its build-

ing retrofits. The process required a fully designed proposal that would be evaluated by its technical merit and "net present value." Ecosystem already had some experience in doing these projects that guarantee energy savings to the owner over the long term, so it was good news for them. Two years later, when the price of gas "went through the roof," says Rochette, the market for energy efficiency projects took off.

One of their most important projects was a wholesale reorganization of the cooling and heating systems for the Biodôme ("Space for Life") in Montreal, which is a vast, indoor nature exhibition space enclosed in glass. Ecosystem applied its holistic approach and found radical ways of recycling energy between its different ecosystem areas.

"It's not just design. Our people are construction managers. They're not there just to build what's on the drawings ... They adapt constantly."

The Biodôme was being heated and cooled from steam and chilled water supplied from the Olympic Stadium nearby. Ecosystem's engineers took this further and incorporated heat exchanges within the building. For example, they took the heat energy being extracted from the Polar ecosystem, and use it to heat the Tropical Rainforest area.

"Then at some point my crazy partner goes on the subway. 'André,' he says, 'you know that in the subway [tunnels] there is water leaking everywhere. There must be a lot of water in the ground. Why don't we do a geothermal system?'"

"So we ended up with an open loop geothermal system. There is enough water in the underground lake — or river (nobody knows) — to heat the entire Biodôme throughout the winter."

It sounds simple now, but it took an enormous effort and almost 10 years to see their ideas realized. Rochette and Tremblay phoned the manager of the Biodôme, Jean Bouvrette, "out of the blue," and he was receptive.

At the time Ecosystem was still a small, struggling company without large resources. Still Bouvrette "kept talking to us," says Rochette. "We probably had 50 meetings."

What partly held things back was the fact that the city of Montreal did not have the legal and financial instruments to enter an energy performance contract at the time. Eventually the city sorted things out, held a competion, and Ecosystem won it against one of North America's largest controls manufacturers. Ecosystem completed the project in 2010. It won the ASHRAE Technology Award in 2013, and the Association of Energy Engineers International Energy Project of the Year Award last year.

Not fat, but muscle

The company opened its Toronto office in 2000, initially to retrofit the CBC building. In the U.S. they opened up shop in New York in 2009, doing a retrofit of the Beth Israel Medical Centre. It was a $4 million project where they converted the heating system from steam to hot water, achieving 85% efficiency.

They're currently helping the Calgary Board of Education (see p. 23), and recently completed a retrofit of the Montreal headquarters of CAE, a large global aviation and defence company.

Rochette is confident about their approach. "People sometimes tell me, 'Well there must be a lot of fat in your model because you spend more money on design and you guarantee that you are never going to charge extras on a project."

"But the reality is it's not fat, it's muscle. If you are going to come up with the most innovative solutions, you have to have your best people putting efforts in the design."

He continues, "It's not just design. Our people are construction managers. Every day they spend money on a project they have to make sure it will lead ultimately to results. They're not there just to build what's on the drawings, they're there to build the best solutions and they adapt constantly. So we have to have a very agile model where you constantly revise things to make sure it's the best solution for tomorrow."

They assign each project to one of eight project managers who are then given autonomy over the work. Rochette's confidence in them comes from respect for people's individuality. "I tell our people you have to find out what your strengths are, and you have to find the job inside the company where you can make full use of your strengths. Then whatever weaknesses you have is not an issue."

"Richard and I," he continues, "we're so different. Richard is this really crazy innovator. I'm more the manager and the sales guy. It's the way I've structured the business. I realized that in life there's a palette of colours and nobody has all the colours. So the people who are good with blue, let them do a lot of blue. And those who are good with red, let them do that. Some people are very, very worried about risk. Some love to take on more risk. Some are very creative. Some are very organized."

And how does Rochette view the world? "I tend to wear rose-tinted glasses more than dark ones," he replies with a smile. **CCE**

By Rosa L. Mauro, Miller Thomson LLP

The Canadian Construction Documents Committee recently issued two new documents that relate to procurement practices in the industry.

CCDC issues new documents

The Canadian Construction Documents Committee (CCDC) consists of four member organizations including the Association of Consulting Engineering Companies-Canada (ACEC), Canadian Construction Association, Construction Specifications Canada, and Royal Architectural Institute of Canada.

Over several decades, CCDC has developed a suite of standard construction documents, the objective being to have a degree of consistency and uniformity in bidding processes and contracting arrangements as well as to reduce negotiation time and to minimize claims and disputes.

Every few years, CCDC will review and update its documents or develop new documents as the construction industry evolves.

Among the most recent documents the committee has introduced are two new ones: *CCDC 29 — A Guide to Pre-Qualification (CCDC 29)*; and *CCDC 2MA — Master Agreement and Work Authorization (CCDC 2MA).*

CCDC 29 — A Guide to Pre-Qualification

CCDC 29 provides guidance to owners and procurement authorities on the best procurement practices for the prequalification process for finding the companies that will work on their construction projects. It is a guide to use when prequalifying primarily contractors, but the concepts and principles also apply to the prequalification of consultants, construction managers, subcontractors, and design-builders, among others.

CCDC 29 sets out the different types of pre-qualification processes that exist, including an open competitive pre-qualification process, an invitational pre-qualification process, and a pre-qualification process to establish a source list of possible companies who are suitable to do the work.

The document takes a step further by also providing a checklist of items to consider in pre-qualification process documents. CCDC 29 also provides sample documents, such as a sample advertisement, invitation letter, and evaluation form.

When looking to the CCDC 29 for guidance, owners and procurement authorities should also ensure that they have considered any directives, purchasing by-laws, policies, and/or trade agreements to which they are bound.

CCDC 2MA - Master Agreement and Work Authorization

CCDC 2MA will be of great interest to owners and procurement authorities who are involved in ongoing capital repair and maintenance programs. It is a form of Master Agreement designed to be used in a contracting arrangement where there are a series of different projects of varying scale to be performed over a period of time by a single contractor.

The purpose of the CCDC 2MA is to limit having to negotiate the general conditions of the base contract each time there is a need for renovations or capital repairs. The contract can be signed by a single contractor or by each contractor on a source list. Then, if and when, a contractor is to be engaged, the owner or procurement authority will either assign the work to a particular contractor by signing a Work Authorization form, or will issue a request for quotation or bid documents to a group of contractors on a source list. Once the quotations or bids are evaluated and a contractor selected, the Work Authorization form is issued and signed by the successful contractor. The Work Authorization form was drafted to accompany CCDC 2MA and to be read together with that document.

The CCDC 2MA document itself does not establish a contract for the performance of specific work even though it contains terms and conditions that are similar to the CCDC 2. Paragraph 1.1 of Article A-1 — *THE WORK*, specifically states: "Work to be performed from time to time shall be set out in the Work Authorization in the form attached hereto and incorporated herein by reference." The Work Authorization form, once executed, will trigger the obligation for a contractor to perform a specific project.

As with any CCDC document, CCDC 2MA can be amended by way of supplementary conditions to take into account any specific requirements of the owner or the project. In such cases, however, it is recommended that a construction law practitioner familiar with the CCDC suite of documents be engaged to assist with addressing specific needs. **CCE**

Rosa Mauro is a lawyer in Miller Thomson LLP's procurement, construction and infrastructure group. She is based in Toronto.

By Marlin Miller, Collins Barrow

When a firm decides it's time to expand into a new province or even into the U.S. or overseas, what are the must-know tax risks and implications?

Branching Out

Expanding your engineering firm's operations with a new branch in a different province or country can be a significant step in your growth trajectory, but the process itself can be overwhelming.

New province, new rules

From an income tax perspective, you first need to establish whether your firm — in this case a corporation — will have what's referred to as a "permanent establishment" in the new province, because this will determine which province you will be taxed in. Taxable income is allocated among all provinces in which you have a permanent establishment on the basis of revenue earned and wages paid in each province.

The provinces generally follow the federal definition of permanent establishment. Essentially it means the presence of a physical location, but the term can also apply if you have an employee or agent in the province, if you're holding and distributing inventory there, or if you bring significant amounts of equipment into a province.

From an income tax rate perspective, the implications of where your permanent establishments are located in Canada are not particularly severe because corporate tax rates don't differ greatly from province to province. Consider the January 1, 2016 federal/provincial combined general corporate tax rates for B.C. and Ontario — 26.0 and 26.5 per cent, respectively. Further, there are relatively few differences between provincial and federal income tax calculations, minimizing the burden of filing corporate income tax returns in different provinces (though Alberta and Quebec do have separate provincial corporate tax returns that must be filed directly with provincial authorities).

One of the biggest practical tax issues your firm is likely to face when opening a new branch is provincial sales tax (PST). Rules for provinces like B.C., which has both PST and GST, can be convoluted and different from provinces that have HST (harmonized sales tax), or only GST (goods and services tax). You'll need to determine what services and activities are subject to PST; you could even end up in a situation where you need to remit PST on equipment you bring into the province on a temporary basis.

And before making the move, familiarize yourself with the legal regulations associated with operating in the new province.

Be structure savvy — branch or subsidiary?

Opening a "branch" normally suggests you will operate under the same legal entity, just in a new jurisdiction. In this structure, the same entity has tax filing and payment obligations in multiple jurisdictions.

The common alternative structure, in which a new legal entity is created to operate in a new jurisdiction, is commonly referred to as incorporating a "subsidiary." A subsidiary determines its own tax filing and payment obligations depending on where it operates. Each option has advantages and disadvantages.

Within Canada, creating a new subsidiary may not offer significant tax advantages but could still be the best course of action in cases where there are specific ownership or other legal requirements in a province — or if there are concerns about potential liabilities that need to be compartmentalized.

For example, consider an Ontario corporation opening an office and commencing operations in B.C. The minimal tax rate differential means overall corporate income taxes paid in a branch structure will be similar regardless of the split in taxable income between provinces. However, if there are other reasons that a corporate subsidiary is desirable, generally one could be incorporated to operate in B.C. without creating an inefficient tax scenario. Taxable income in a B.C. subsidiary would be subject to tax in B.C. at the same rates as taxable income allocated to B.C. in a branch structure. Further, earnings from a Canadian resident subsidiary can usually be distributed to a Canadian resident parent corporation, without incurring additional tax.

Cross-border expansion

Opening a U.S. branch may be woven into your growth strategy, but Canadian and U.S. taxes don't always integrate well. In particular, at the state level you could face complex issues, as each state has its own tax regulations. For example, you could end up required to remit sales taxes to the state, even if you aren't required to file income tax returns in the same state.

Expanding into the U.S. (or other foreign jurisdictions) is significantly more challenging to structure on a tax effective basis and requires specialized assistance. Often companies that expand into the U.S. enlist a U.S. resident advisor to help them, but tax inefficiencies can arise when advisors don't understand taxation on both sides of the border. Some structures

continued on page 40

Specifier's Literature Review

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Branching Out

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that are commonly used in the U.S., such as LLCs, can be particularly problematic for Canadian residents.

At a basic level, U.S. corporate tax rates are higher than those in Canada and there are usually additional taxes incurred when funds are repatriated to Canada, whether from a branch or subsidiary.

The Canadian compliance costs of a foreign subsidiary or branch operation can also be significant, as can penalties associated with non-compliance. For example, additional tax information returns (to report the existence of, and transactions with, foreign affiliates) must often be completed. In addition, the allocation of income and expenses cross-border is subject to a high level of scrutiny under transfer pricing rules. It is a requirement under these rules to maintain detailed documentation about cross-border charges.

If your firm is considering cross-border expansion, ensure you consult an advisor who understands both Canadian and U.S. tax. And even if your growth is closer to home, it's advisable to involve your accountant early on in the process to ensure success. **CCE**

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Contact: Barbara Adelt, badelt@annexbizmedia.com, Tel. 416-442-5600 x3546

Kathy Baig, ing., president of the Quebec engineers' licensing body, responds to questions about what has prompted the province to temporarily take charge of the organization.

Situation at the OIQ

On July 6 the Office des professions du Québec, an arm of the provincial government that oversees professional bodies, placed the Ordre des ingénieurs du Québec (OIQ) under its administration. The order effectively removes the engineering licensing body's right to be self-governing for an unspecified period. Kathy Baig, ing., FIC, MBA, had been elected President of the Order just a few weeks before. Ms. Baig replies to three questions posed by CCE.

Q. What is the current situation of the OIQ?

The Ordre des ingénieurs du Québec is continuing efforts to transform the organization that it began over two years ago. This major project coincides with the OIQ's desire to modernize its public protection activities and step up its prevention efforts in the area of ethics.

In fact, although the vast majority of Quebec engineers rigorously follow best practices, the media revealed that certain engineers had been involved in public contract sharing schemes. We believe that compliance with very high standards of ethics and professional conduct is a basic condition for practising as an engineer in Quebec.

Our efforts toward that end continue under the supervision of administrators designated by Quebec's Minister of Justice.

Q. What have been some of the troubles faced by the OIQ that have led up to the current situation?

While the Minister acknowledges that the OIQ has taken great pains to deal with this situation in the last two years, she expressed a desire for the OIQ to speed up its efforts to reorganize its public protection activities.

More specifically, she would like the OIQ to reduce the period of time it takes to process complaints filed with the disciplinary committee that concern the small number of engineers who have not complied with the Code of Ethics. She also expressed a desire for the OIQ to modernize its professional inspection activities, and this project is already under way.

These are shared objectives that we are working on right now.

In the coming months, we need to improve communication with members and the public through concrete actions that will allow us to secure their trust.

Q. How are you hoping the situation will be resolved eventually?

The Ordre des ingénieurs du Québec is already on the right path. Our organization began to review its professional inspection activities in the interest of making them even more relevant; the disciplinary office is working twice as hard to complete its inquiries, and we have a solid financial plan.

In the coming months, we need to improve communication with members and the public through concrete actions that will allow us to secure their trust. By becoming more efficient in executing our activities and better highlighting engineers' role in society, we will definitely achieve this. CCE

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