For professional engineers in private practice

JANUARY/FEBRUARY 2017

CANADIAN CONSULTING engineer

HIGHER LEARNING

Exploring open spaces in Ryerson University's Student Learning Centre

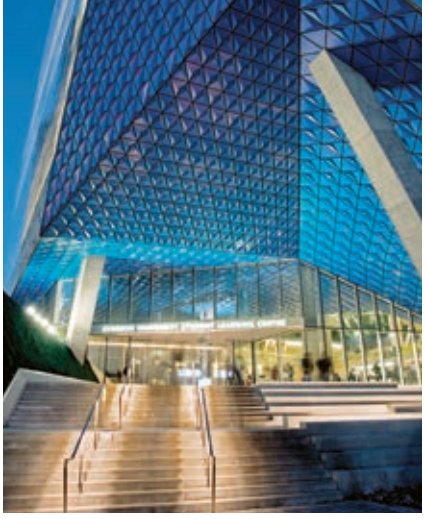
PLUS:

Healthcare at the **TORONTO ZOO**

UBC PARKADE
Energy hub project

www.canadianconsultingengineer.com

January/February 2017
Volume 58, No. 1



Cover: Ryerson Student Learning Centre, Toronto. Photo by Lorne Bridgman.
See page 14

See page 20

features

departments

Next issue:
Transportation, bridges, concrete bridge construction, wastewater treatment and mentoring the next generation.

on topic

Hello, a newcomers view

As a newcomer to the consulting engineering profession my learning curve will be steep, but after only one month in the role as editor of this magazine I've seen where intelligent technology cannot completely replace the need for a human touch.

For example, in late January I had the opportunity to attend the AHR Expo in Las Vegas to learn about the latest advancements in the HVAC&R industry. Mechanical systems in buildings aren't only getting more efficient, but they're getting much more intelligent and connected. Almost every new technology on display was a showcase in smarts.

There was a lot of talk about building automation and control systems (BACS), a $21 billion global market according to research from BSRIA (the Building Services Research and Information Association), of which North America leads the world in installed systems—driven largely by energy efficiency legislation.

As these centralized systems can monitor and control functions in a building, like heating, cooling, air quality, lighting and security systems, often the goal of the systems is primarily to reduce energy costs.

Sitting in on a session hosted by the Ottawa-based Continental Automated Buildings Association (CABA), the title of their talk was Intelligent Buildings and the Impact of the Internet of Things (IoT).

Harry Pascarella with Harbor Research explained that it's still early days in the IoT game, as building management systems today are still missing out on their full potential. The next level relies on the thousands of sensors in 'smart' technology and the control systems in buildings interacting with other intelligent systems in the cloud, providing a continuous loop of feedback and response. For example, building systems being connected to weather reports so a building's mechanical systems can self adjust based on forecasts. Or equipment being connected back to vendors or contractors so predictive maintenance can be controlled, keeping systems operating at their peak efficiency at all times.

However, while all of this data is being transferred back a forth, for building operators a key requirement—at least according to many people in the room where this presentation was being delivered—is maintaining the comfort of the people inside.

"The human is the ultimate sensor," noted Pascarella, who also insisted that although the technology is getting smarter, facility managers still have a very important role in how to react to the data flowing through the systems.

For engineers the attraction of connected systems and smart buildings and smart networks may seem like the inevitable future, but there still seems to be a need to maintain human control in these environments.

As I mentioned, I have plenty to learn about the world of consulting engineers and the many disciplines they interact with in the build environment, but I do know I will learn the most from speaking with people and learning from their experiences. I look forward to having those conversations in the days, months and years ahead.

Doug Picklyk

FOR PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

CANADIAN CONSULTING engineer

Editor
Doug Picklyk (416) 510-5119
dpicklyk@ccemag.com

Senior Publisher
Maureen Levy (416) 510-5111
mlevy@ccemag.com

Art Director
Andrea M. Smith

Contributing Editor
Rosalind Cairncross, P.Eng.

Advertising Sales Manager
Vince Naccarato (416) 510-5118
vnaccarato@ccemag.com

Editorial Advisors
Bruce Bodden, P.Eng., Gerald Epp, P.Eng., Chris Newcomb, P.Eng., Laurier Nichols, ing., Jonathan Rubes, P.Eng., Paul Ruffell, P.Eng., Andrew Steeves, P.Eng.

Circulation
Barbara Adelt (416) 442-5600 x3546
E-mail: badelt@annexbizmedia.com

Account Coordinator
Cheryl Fisher (416) 510-5194
cfisher@annexbizmedia.com

Vice President/Executive Publisher
Tim Dimopoulos (416) 510-5100
tdimopoulos@annexweb.com

COO
Ted Markle
tmarkle@annexweb.com

President & CEO
Mike Fredericks

CANADIAN CONSULTING ENGINEER
is published by Annex Publishing & Printing Inc.
80 Valleybrook Drive,
Toronto, ON Canada M3B 2S9
Tel: (416) 442-5600 Fax: (416) 510-5134

EDITORIAL PURPOSE: Canadian Consulting Engineer magazine covers innovative engineering projects, news and business information for professional engineers engaged in private consulting practice. The editors assume no liability for the accuracy of the text or its fitness for any particular purpose.

SUBSCRIPTIONS: Canada, 1 year $62.17. Single copy $8.00 Cdn + taxes. (HST 86717 2652 RT0001). United States U.S. $62.17. Foreign U.S. $62.17.

ISSN: 0712-4996 (print), ISSN: 1923-3337 (digital)

POSTAL INFORMATION: Publications Mail Agreement No. 40065710. Return undeliverable Canadian addresses to Circulation Dept., Canadian Consulting Engineer, 80 Valleybrook Drive, Toronto, ON Canada M3B 2S9.

PRIVACY: From time to time we make our subscription list available to select companies and organizations whose product or service may interest you. If you do not wish your contact information to be made available, please contact us. tel: 1-800-668-2374, fax: 416-510-5134, e-mail: vmoore@annexbizmedia.com, mail to: Privacy Officer, 80 Valleybrook Drive, Toronto, ON Canada M3B 2S9.

Member of the Audit Bureau of Circulations.
Member of the Canadian Business Press

We acknowledge the [financial] support of the Government of Canada.

Canadian Manufacturing at its Finest

Bibby Foundry in Ste-Croix, Quebec

Manufacturing is the cornerstone of the Canadian economy. Bibby-Ste-Croix employs over 500 team members in their Quebec foundries who are responsible for the production of cast iron soil pipe and fittings used in drain, waste and vent (DWV) plumbing systems, as well as street castings, manhole frames and covers, and municipal road castings. For each job Bibby creates, there are three additional jobs created within the community which contributes to the overall economic growth of the country. The company is privately owned and dates back to 1921.

Modernization and Technological Advancement

The company is technologically advanced in manufacturing cast iron soil pipe and fittings, and is making significant investments of millions of dollars every year to improve production and the working environment of our team members.

Canadians Hard at Work

Environmental Responsibility

Bibby-Ste-Croix was the first foundry in Canada to earn an ISO 14001 certification. We believe in being good stewards to the environment and are proud of our environmental and safety record. Bibby products are made from ~95% post-consumer scrap metal and are 100% recyclable at the end service which further reduces the demand on landfills.

Reclaimed. Recyclable. Responsible.

BIBBY-STE-CROIX

MADE IN CANADA

Bibby-Ste-Croix is a Canadian manufacturer of cast iron soil pipe and fittings for drain, waste and vent plumbing system.

6200, Principale Street • Ste-Croix, Quebec G0S-2H0 • Bibby-Ste-Croix.com • 800-463-3480

Source: BC Hydro

Illustration of a potential park in downtown Vancouver as part of BC Hydro's proposed 'seed' program to establish two new underground substations and refurbish an existing underground facility.

ENERGY

BC Hydro proposes Vancouver underground substation

With its existing downtown Vancouver substations nearing their end of life, BC Hydro has introduced a new electricity infrastructure concept it's calling 'seed', a proposal to build underground while also funding new amenities like schools, daycare spaces and park upgrades.

Demand for electricity in downtown Vancouver is expected to grow by over 75% in the next 30 years, and BC Hydro currently has three substations in the downtown core: Cathedral Square (to be upgraded); Murrin substation in Chinatown (built 1947); and Dal Grauer substation on Burrard St. (built 1953).

Building traditional substations requires almost half a city block for each new site in a city where land is scarce and valuable.

With 'seed' BC Hydro is proposing to build two new substations underground in the West End and Yaletown respectively, putting the ground above to use in the community.

"Having to build for the future in a city where land is scarce and expensive, challenged BC Hydro to find a new approach," said Jessica McDonald, president and CEO of BC Hydro, in a company release. "By literally planting our substations underground, the available budgets and the land above can be used to grow community benefits, whether that is a school, a park or a playing field. We think the 'seed' concept is an innovation that makes this livable city even more leading on a global scale."

BC Hydro's Cathedral Square was the first underground substation built in North America, and it has been operating since 1984. Toronto Hydro is building its Copeland Transformer Station on excavated land at the historic John Street Roundhouse, beneath tourist attractions deep in the business and entertainment core of Toronto.

BC Hydro says that along with new and upgraded electrical infrastructure, 'seed' could fund community benefits, including: a new school in Coal Harbour (2020); a new school, daycare and green space in the West End along with underground substation (2025); refurbishment of Emery Barnes Park (2039) with new underground substation under the park (2041); and upgrades to existing underground Cathedral Square substation (2050).

The concept has been shared with the City of Vancouver, the Vancouver School Board and Vancouver Park Board. BC Hydro is also seeking feedback from the public. A decision on whether or not to proceed is expected by the end of March. bchydro.com/seed.

continued on page 8

BUILDINGS

Corner Brook health facility

Newfoundland and Labrador Premier Dwight Ball announced a new long-term care home will begin construction in Corner Brook this fall. "This is the first construction project for the new Western Memorial Regional Hospital campus in Corner Brook, and will set the stage for the larger health care project in the future."

BUSINESS

GHD commits to Waterloo

With a history in the Waterloo Region of Ontario dating back to 1976, GHD has announced the amalgamation of its Waterloo operations into a single flagship facility located in Waterloo's "Idea Quarter", with a move-in scheduled for December 2017. "The new 100,000 sq. ft. of building space will improve our ability to collaborate and work together," said Steve Quigley, GHD's general manager, North America.

ENERGY

Energy Ottawa teaming up with Costello

Energy Ottawa, a wholly-owned subsidiary of Hydro Ottawa Holding and Ontario's largest municipally-owned producer of green power, has announced that it is working towards a strategic alliance with Sudbury, Ont.-based Costello Associates Inc. to bring its utility engineering and consulting services to Eastern Ontario.

BUSINESS

PEO launching PEAK

On March 31, Professional Engineers Ontario (PEO) will launch a new program to gather information on the practices of its 80,000 licence holders and gauge their professional knowledge activities.

Under PEO's Practice Evaluation and Knowledge (PEAK) program, practising licence holders will be asked to complete both a practice evaluation questionnaire and an online ethics module prior to their licence renewal date. Based on the results of the practice evaluation questionnaire, practising licence holders will be provided with a recommended number of hours for continuing professional knowledge per year to maintain a level of knowledge commensurate with safeguarding the public interest. They are then asked to report their continuing knowledge activities to PEO prior to their subsequent licence renewal date.

Those who self-identify as non-practising licence holders will only be asked to declare they are not practising professional engineering and complete an online ethics module prior to the date of their licence renewal.

"The PEAK program is designed to provide us with real data about the nature of engineering practice in Ontario that will enable PEO to focus its regulatory efforts on gaps in practice standards and enforcement of rights to practice," says PEO president George Comrie, MEng, P.Eng., CMC, FEC. "The data would also go a long way towards enhancing public and government confidence in PEO as a regulator."

While participating in the PEAK program is not mandatory to renew or maintain a licence, the completion status for each element of the program will be publically noted for each licence holder on PEO's online directory of practitioners.

As part of the program, practising licence holders will be able to design their own continuing professional knowledge plan by choosing opportunities that align with their specific area of practice—anything from university/college courses, reading technical journals to attending technical seminars.

The online module is intended to serve as a refresher on professionalism and ethics.

A complete overview of the program is available at www.peopeak.ca.

Source: The Armour Group

Queen's Marque rendering.

PROJECT

Queen's Marque District underway

Development of the Queen's Marque District, a mixed-use commercial, retail and residential development including 75,000 sq. ft. of public space and three new wharfs, is now underway on the Halifax waterfront. The project is expected to take approximately three years.

Located in the heart of the waterfront district, the site covers almost five acres. Known historically as Queen's Landing, the area is rich in military, marine and mercantile history. The new destination includes designs speaking to the province's shipbuilding past, present and future. Features will include a central public plaza, passageways, and an art installation.

"Queen's Marque is a deeply local project," said Scott McCrea, CEO of The Armour Group Ltd., the project's developer. "To create something born of this place, it is essential to draw on local talent and knowledge. The architects, consultants and builders wherever possible will be local to this region."

Source: CAMH

BUILDING

CAMH project progressing

Infrastructure Ontario named Plenary Health CAMH group as preferred proponent to design, build, finance and maintain the Phase 1C redevelopment project for the Centre for Addiction and Mental Health (CAMH) in Toronto. The team includes developer: Plenary Group (Canada) Ltd. and PCL Investments Canada Inc.; design-builder-PCL Constructors Canada Inc. (Toronto); architect – Stantec Architecture Inc.; facilities management – ENGIE Services Inc. The project includes the construction of two buildings.

BUSINESS

WSP Canada appointments

Gregory Northcott, formerly vice president transportation, has assumed the new role of COO at WSP Canada. And Ian MacLeod, WSP's chief human relations officer is now leading the company's health, safety and environment functions and will also serve as Chief Safety Officer.

Greg Northcott

Ian MacLeod

CHAIR'S MESSAGE

Dialogue Leads Differing Perspectives to Common Ground

This issue's theme is applicable to the relationship between the construction industry and the consulting engineering sector; like any relationship, each brings a different perspective to the table. But differing perspectives can strengthen the relationship depending on how it is approached. ACEC and the Canadian Construction Association (CCA), meet regularly to discuss the challenges that impact our respective industries. As incoming Chair, I had the opportunity to participate in meetings with CCA, an experience I found valuable to increasing my understanding of how our organizations collaborate on shared challenges. It also showed me to a different viewpoint on matters such as fees, schedules, and owner issues. A recent example of varied perspective between our sectors is the perceived challenges with quality and incompleteness of some construction documents. After 12 cross-country workshops and an anonymous survey by participants, CCA's viewpoint was that some of the contributing factors include incomplete or unclear project scope and insufficient design resources (i.e. insufficient design fees and schedule).

ACEC's perspective is that there are challenges and opportunities with regards to construction documents for the entire construction delivery chain, including owners, design consultants and constructors. ACEC believes these issues can be addressed to a significant degree through the adoption of **Qualification Based Selection** (QBS), which would not only result in higher quality documents, but would also result in more innovation and increased lifecycle savings over the design life of projects. Consequently, ACEC has invited CCA to adopt and promote the adoption of QBS by owners and clients of design consultants.

Our discussion may have started with differing perspectives, however our industries have moved toward solutions that are more closely aligned. CCA agrees that procurement of design services should focus more on qualifications and less on fees and may even consider endorsement of QBS. Whatever they the dialogue that has taken place is a clear indicator that, despite sometimes differing perspectives, there is significant alignment between our industries.

RICHARD TILLER, M.ENG., P.ENG., FEC
CHAIR, ACEC BOARD OF DIRECTORS

MESSAGE DU PRÉSIDENT DU CONSEIL

Un Terrain d'Entente Grâce au Dialogue

Le thème de ce numéro, touche à la relation que le secteur du génie-conseil entretient avec l'industrie de la construction. Comme dans toute relation, chaque partie en présence arrive avec une opinion qui lui est propre, ce qui peut être une source de resserrement de la relation. Tout dépend de la manière dont les différences sont traitées. L'AFIC et l'Association canadienne de la construction (ACC) se rencontrent régulièrement pour parler des enjeux qui influent sur nos industries respectives. En tant que nouveau président, j'ai eu l'occasion de participer à des réunions avec l'ACC, une expérience qui m'a été utile pour mieux saisir comment nous collaborons pour relever des défis communs. Ces rencontres m'ont également permis de mieux comprendre un point de vue autre sur certaines questions, par exemple les honoraires, les échéanciers, et les problèmes de propriétaires. Récemment, nous n'avions pas la même conception sur la qualité de certains documents de construction, notamment à ce qui a trait au manque d'information sur ceux-ci. Après 12 groupes de travail organisés au travers du pays et un sondage anonyme réalisé auprès de ces participants, l'ACC en est arrivé à la conclusion que les difficultés étaient en partie liées à des projets dont la portée n'était pas clairement définie ou même incomplète, et à des ressources insuffisantes à l'égard de la conception (c.-à-d. honoraires insuffisants pour la conception et des échéanciers trop courts).

Pour sa part, l'AFIC pense que toute la chaîne de livraison de l'industrie de la construction – y compris les propriétaires, les firmes de conception et les entrepreneurs en construction – est concernée par les difficultés et les possibilités relatives aux documents de construction. L'AFIC estime que ces problèmes pourraient être en grande partie résolus en adoptant le système de **sélection basée sur les compétences** (SBC), qui ne permettrait pas seulement d'obtenir des documents de plus grande qualité, mais également d'innover davantage et de multiplier les économies sur le coût de cycle de vie des projets. Par conséquent, l'AFIC a invité l'ACC à adopter et à promouvoir l'adoption de la SBC auprès des propriétaires et des clients des firmes de conception

La conversation est peut-être né d'opinions divergentes entre nos deux industries. Toutefois, nous cheminons ensemble vers des solutions communes. L'ACC convient que les marchés publics de services de conception devraient mettre davantage l'accent sur les qualifications et moins sur les coûts et, elle pourrait même envisager de souscrire à la SBC. Quoi qu'il en soit, nos deux industries entretiennent un dialogue constructif, ce qui prouve que nous avons bien des choses en commun.

RICHARD TILLER, M.ING., ING. P., FIC
PRÉSIDENT DU CONSEIL D'ADMINISTRATION

YEAR IN REVIEW – WHAT WE'VE ACCOMPLISHED IN 2016

It has been an exciting year for the consulting engineering sector. From multi-billion dollar infrastructure investment announcements by the Federal Government, to the Budget update's Canada Infrastructure Bank launch, to major oil and gas project approvals. The last 12 months were also eventful for ACEC. Much was accomplished by the Board and our team to advance the new strategic plan launched in April. The following is an overview of what we've achieved in 2016.

ADVOCATING FOR OUR MEMBERS AND FOR ALL CANADIANS

How to invest effectively in infrastructure was the message ACEC President & CEO John Gamble carried to Parliament Hill when meeting with key Parliamentarians. He discussed the issue with Members of Parliament sitting on the Transport, Infrastructure and Communities Standing Committee, and met with senior bureaucrats and senior advisors to the Minister of Infrastructure and Communities, and the Minister of Public Services and Procurement. Our annual Parliament Hill Day on October 25th, the cornerstone of our national advocacy program, provided the opportunity for over 30 representatives from ACEC member firms to deliver the same message when meeting face-to-face with Members of Parliament. The same day, a delegation led by newly elected ACEC Chair Rick Tiller had a brief meeting with Prime Minister Justin Trudeau. To increase the number of advocates promoting ACEC's key messages, we opened our Parliamentary Partners program to the entire membership; participants furthered the reach of our message to their Members of Parliament in their own communities. In September, John joined the Honourable Amarjeet Sohi, Minister of Infrastructure and Communities, to discuss the Federal Government's $126M infrastructure investment plan, the importance of infrastructure investment, and the role that consulting engineers will play in its implementation. In addition to these advocacy efforts on infrastructure, meetings took place with MPs and key government officials on the Temporary Foreign Workers Program, sustainable buildings, supporting Canada's resource sector, and public procurement.

ADVOCATING FOR SMART, SHOVEL WORTHY INFRASTRUCTURE INVESTMENT

ACEC was invited by the Department of Finance to attend the federal budget "lock-up" for a confidential preview of the budget, which contained the largest federal commitments to infrastructure investment in Canadian history. ACEC issued a comprehensive report on how the budget impacted consulting engineers and their clients within hours of the budget's public release. In a follow-up submission to the Standing Committee on Finance in August 2016, ACEC proposed specific recommendations that would prioritize infrastructure investments to enable economic prosperity.

ADVOCATING FOR A STRONG BUSINESS CLIMATE FOR CONSULTING ENGINEERS

Promoting business practices that are fair and equitable for our industry is a priority for ACEC. This includes advocating for the adoption of Qualifications-Based Selection (QBS) by making presentations to owner groups and procurement officials across the country, including a keynote address to the Canadian Public Procurement Council. ACEC endorsed a position paper from ACEC-British Columbia expressing significant concerns with the use of reverse auctions by some clients, and used the opportunity to educate these clients on the advantages to them of using QBS for the selection of consulting engineering firms. ACEC also made a case to Innovation Minister Navdeep Bains that the adoption of QBS was an effective way for the federal government to leverage its infrastructure investments and the development and upkeep of its own assets to encourage innovation.

The Board formally adopted a position that supports the right of each consulting engineering firm practicing in a free market to independently establish billing rates and fees in order to successfully execute the project; to earn a reasonable return on investment; to earn a reasonable return on risk; and to be fairly and reasonably remunerated for the value provided to the client. This was in response to the clients that prescribe maximum billing rates that can be charged by consulting engineering firms. In some cases, clients even attempt to "regulate" the payroll multipliers used by consultants.

ACEC is a founding member of an industry liaison committee along with Architecture Canada, the Canadian Construction Association and Interior Designers of Canada to address concerns with federal real property projects administered by Brookfield Global Integrated Solutions (BGIS) on behalf of the federal government. BGIS has stated its intention to adopt ACEC standard forms of agreement for its next round of standing offers for federal projects in 2017. ACEC has been promised an opportunity to review any supplementary general conditions proposed by BGIS.

ACEC delivered submissions to the House of Commons Steering Committee on Human Resources and Skills Development with recommendations to improve Temporary For-

eign Worker Program (TFWP) that would reduce red tape and delays for members that utilize the TFWP.

ACEC will continue to represent the consulting engineering sector's interests regarding fair business practices, including procurement systems, delivery models, and contracts, in our ongoing effort to promote a business climate that offers consulting engineers an appropriate share of risk and reward.

ADVOCATING FOR RESPONSIBLE RESOURCE DEVELOPMENT

ACEC continues to support the need for responsible resource development and the establishment of resource infrastructure to allow both access to resource and access to markets. The ACEC Board of Directors adopted a public policy position in support of the development of a network of transportation-utility corridors. John Gamble wrote an article based on the policy position that was published in iPolitics, a widely read web-based news service that follows federal politics. It was noted by other stakeholders including CAPP and the Canadian Chamber of Commerce who in turn distributed it to its membership.

THE YEAR AHEAD – ACEC LOOKS FORWARD TO 2017

As we look forward to the year ahead, ACEC is gearing up for another busy year. The team is already working on exciting projects that will be launched in 2017 to further support our strategic priorities. Stay tuned for our monthly electronic newsletter Source for details on what to expect from ACEC in 2017.

ACEC representatives meet with the Right Honourable Justin Trudeau. Left to right – Katrina Nokelby, President ACEC-NT, Rick Tiller, Chair ACEC-Canada, Christine Harries, Chair ACEC-YPN.

The Honourable Judy M. Foote, Minister of Public Procurement and Services, meets with Rick Tiller, Chair ACEC-Canada, and John Gamble, President & CEO ACEC-Canada.

Association of Consulting Engineering Companies – Canada (ACEC-Canada), Tel: (613) 236-0569, 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, Association of Consulting Engineering Companies – Newfoundland & Labrador

By Brian Siefkes, Deltek

Power Your Business with the Project Lifecycle

Projects are the lifeblood of AEC businesses. Regardless of the size or complexity of a project, they all follow these five phases of the Project Lifecycle, which is why more and more project-based businesses are looking for solutions that connect and automate the project lifecycle. Here are a few best practices to help you eliminate time consuming and manual processes while improving business performance.

1. Win New Business

It is important to know the clients and types of projects that contribute the most to your firm's profitability. This business intelligence will allow your team to focus properly, create more accurate cost estimates and set the right prices. Better information will also provide the insight to pursue projects that best match your firm's skill sets.

With a Deltek project-based ERP solution you'll impress prospective clients by easily providing past performance information that demonstrates your firm excels in the type of work that matches their needs.

2. Plan and Manage Projects

After each new project is won your team needs to establish a detailed plan to ensure it is delivered on time and under budget. Well-defined processes must be in place so that project tasks can be executed at the right time and in the right sequence.

If you're using separate systems to manage your business, you're increasing the likelihood of missed deadlines, budget overruns and backlog problems. A Deltek project-based ERP solution provides all of the resource management, scheduling, and budgeting tools you need to plan and manage profitable projects.

3. Find and Develop Talent

A successful project-based business must have the right mix of skills and the ability to assign them properly to each project. When you can combine these talent details with your project backlog you'll be better able to predict staffing needs based on business needs.

Deltek project-based ERP with integrated Talent Management will help your firm recruit, develop, and assign staff more efficiently across projects. It will also help you cultivate talent over time by monitoring employee milestones, compensation levels, and benefits to ensure key people stay with the company and strengthen your firm's core competency.

4. Deliver Results

Managing your business for profit and performance requires clear visibility across all current and future projects. If your existing systems are separate, it will extend the time necessary to find information about where a project stands and how to course correct.

A Deltek project-based ERP solution provides real-time visibility into project intelligence, risks, and potential opportunities. Customizable dashboards and alerts help prevent budget overruns and schedule slippages. Quick access to accurate information enables your teams to take proactive steps before problems impact project delivery.

5. Track and Measure Everything

Many project-based businesses know what information they are lacking, but struggle to find it due to a reliance on disconnected systems.

Deltek Project-based ERP solutions offer granular visibility into your entire business with easy benchmarking of key performance indicators (KPIs) across the project-lifecycle. For over 35 years, Deltek has focused solely on project- and engagement-based businesses to help them automate the project lifecycle, improve performance, and increase profitability.

Brian Siefkes manages product marketing at Deltek, the leading provider of business solutions for AEC firms. For more information, you can reach out to Brian directly at brian siefkes@deltek.com or visit www.deltek.com

Find out what the future holds for your AEC project-based business in this complimentary webinar hosted by Deltek and PSMJ. www.deltek.com/psmj

MACH-ProView™ LCD

Celebrating 30 YEARS of EXCELLENCE

SPACEview

LISTview

STATview

Celebrating thirty years of building automation excellence, Reliable Controls unveils the new MACH-ProView™ LCD controller. This freely programmable, combination BACnet® building controller (B-BC) and BACnet operator display (B-OD) resides on Ethernet, Power over Ethernet, Wi-Fi or EIA-485 networks. Backed by an industry-recognized 5 year warranty and a nation-wide network of certified Authorized Dealers, the new MACH-ProView LCD will empower you to stay in touch with your building's performance.

people and technology you can rely on.™

Member of BACnet International

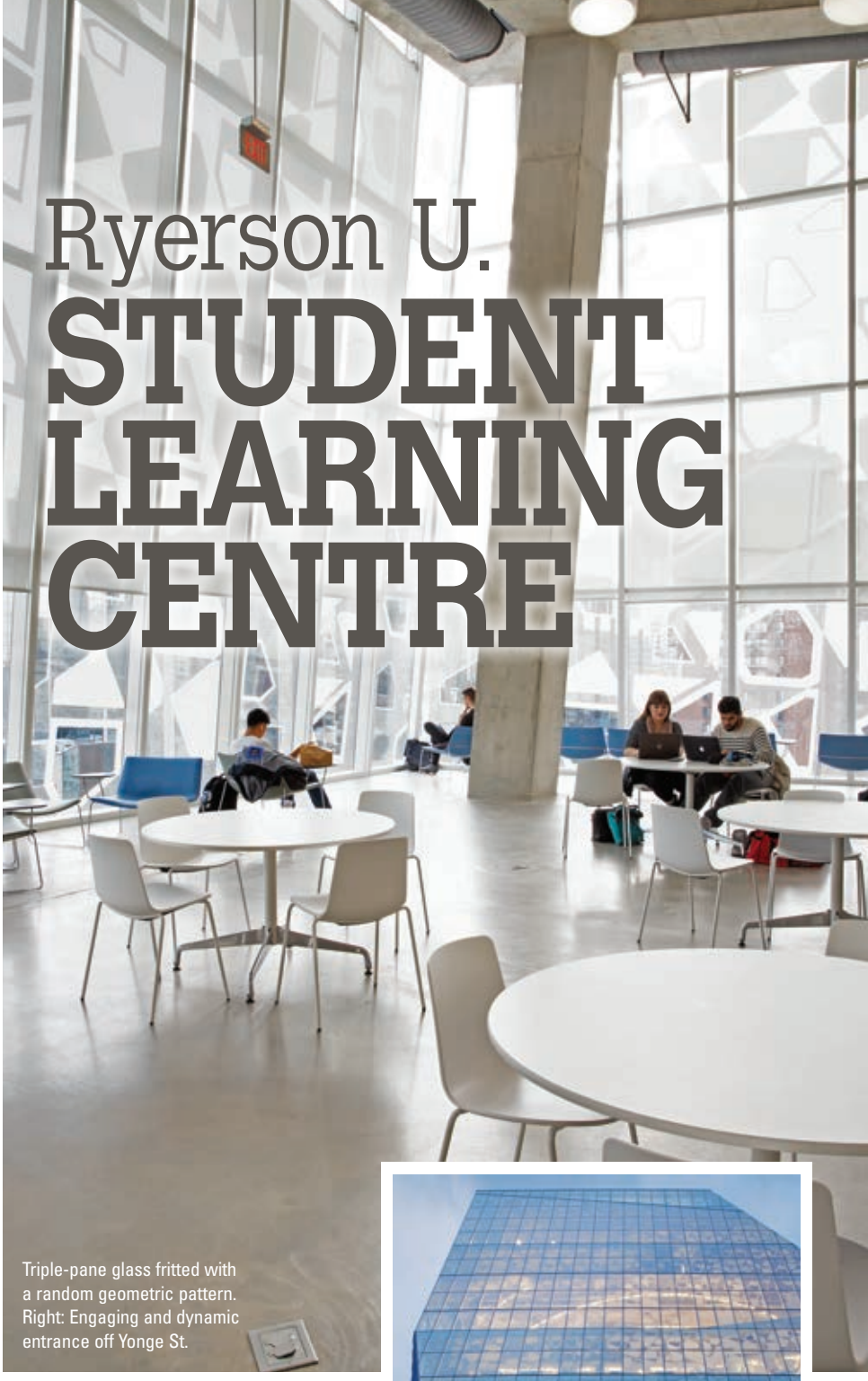
Member

ISO 9001 14001 QUALITY ENVIRONMENTAL ASSURANCE

www.reliablecontrols.com/MPV-L

Reliable® controls

Ryerson U. STUDENT LEARNING CENTRE



Since 2015 a stunning new building has served as a "beacon" and gateway to Ryerson University off Toronto's most famous downtown street. Located on Yonge at the corner of Gould Street, the Ryerson University Student Learning Centre provides much needed study space for the students, but is also open and engaging to the public.

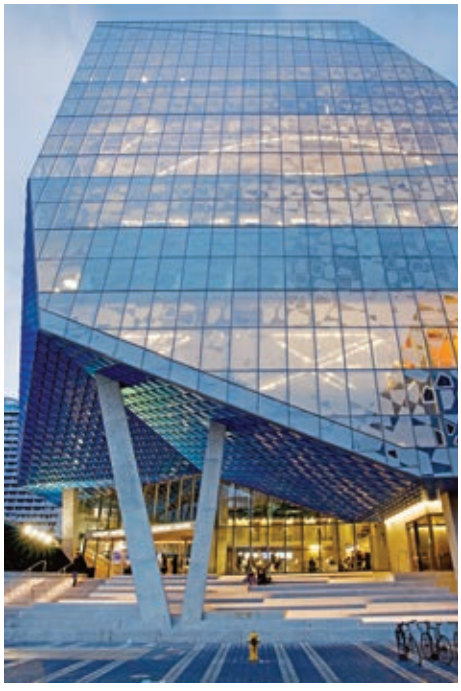
Designed by architects Zeidler Partnership and Snøhetta, the eight-storey structure is connected to an existing library but is itself entirely devoid of books. Students and faculty have eight floors of digitally serviced space, with free wi-fi and outlets embedded in the walls, floors and step risers.

Each level of the building has a different theme, explains Mike Smith, senior associate with Zeidler Partnership Architects. The floors vary between those that are lively and full of action, to others that are subdued, quiet and tranquil. The first floor for example is a large almost auditorium-like space with stepped seating where events can be staged, such as a rally or a fashion show. The second floor has a bridge connection to the library, and the third "Tech Floor" is an incubator space for IT start-ups. Above that are the quiet, green-themed "Garden floor," and the red-and-orange-themed "Sun" floor with open and closed study areas. On the sixth floor is something entirely different: the "Beach," which is an all-open area with sloped floors where students might be found break dancing, playing the guitar or simply relaxing. The students helped to choose the furniture throughout the spaces. The seventh "Forest" floor is a silent study area with dark earth tones and which allows an area secured for graduate students. At eight, the top floor, the "Sky" space opens and soars to double height with grand views of the city to the south and west.

The form of the 155,000 sq.ft. building was defined partly by its tight site and height restrictions, says Smith, but the architects added interest by chamfering the corners and creating a large "popped up" volume over the main entrance.

The entrance is set back on the street corner at Gould and reached by a broad set of steps. The uptilted roof soffit here rests on V-columns and creates a sheltered microclimate out of the hot sun and cold wind that has become a popular place for people to meet and just hang out.

Clear glass provides transparency at the building's lower and upper levels and corner areas, while elsewhere



Triple-pane glass fritted with a random geometric pattern. Right: Engaging and dynamic entrance off Yonge St.

All photos credit: Lorne Bridgman Photography

Every floor in the new student building at Ryerson University in downtown Toronto has a different theme, ranging from the lively "Beach," to the tranquil "Forest," to the soaring city views in the "Sky" level at the top.

the building is enveloped in high-performance, three-pane glass that is fritted with a specially designed random geometric pattern. The frits help to reduce glare and reflect heat, providing an almost opaque surface on 50% of the envelope and thus reducing the building's cooling load in summer. They also have an aesthetic effect: "As the sun moves across the sky, the sun and shadows play across the walls and ceilings," says Smith.

The construction challenges, he says, were mostly having to fit the building on a tight site with little lay down space. Also the project had a fairly strictly controlled budget "so we couldn't be too crazy with the design."

They chose a concrete structure because it provides better acoustic absorption, and left the surfaces exposed, experimenting with the finish colour and texture with a full-scale mock-up. The concrete also incorporates flyash which helped it achieve LEED gold. The flyash also "gives a smoother and lighter finish to the concrete, which was something we wanted," says Smith.

To add interest without spending a lot of extra money they also rotated the structural grid 45 degrees, so the observer looks up and sees a diamond formation in the ceiling rather than orthogonal bays. The interior has long 11-m spans to minimize the number of interior columns and allow flexibility. "We also tilted the south face 5 degrees from the vertical to make it more interesting, so the columns are sloped on that side. It added complexity to the formwork," says Smith.

"And in the top "Sky" space we tilted the roof slab to give us a double-height space without increasing the amount of material. So we did some very simple things with the structure that don't have a large budget impact, but have a big spatial and visual impact," he says.

— By Bronwen Parsons/CCE

The building foyer, an interactive lounge space/amphitheater for events.

MECHANICAL & LIGHTING DESIGN

By Hossein Khoee, P.Eng., and Ion Luh, M.Sc., IALD, Crossey Engineering

Mechanical design, from the earliest stages of the work, was developed to meet both the energy performance required for LEED gold and to integrate seamlessly with the open ceiling and sloped floors. Revit design drawings were used to plan service routing in 3D and locate sleeves for pipes and ducts to pass through beams in an organized and aesthetically acceptable manner.

The architectural feature of floor-to-floor glazing on the south and west sides of the building caused energy and design challenges. Triple glazing glass and fritting was used to reduce load and energy consumption, while in-floor heating and cooling pipes combined with a dedicated perimeter variable air volume unit were used to provide comfort. The combined use of these systems maintained the clean open building look with minimal mechanical system interference.

The five air handlers required for the interior spaces were separated from the perimeter to permit the two systems to have different supply air temperatures as required. All units were located in the penthouse and distributed air to the spaces served through exposed oval ductwork. Aircraft wire ductwork suspension was used to further enhance the appearance of the ducts. Units were selected for performance and low noise generation. Silencers were used in duct mains to ensure the spaces met desired background noise levels.

The central heating system is based on low temperature hot water heat distribution with two condensing hot water boilers designed to operate at 94% efficiency. The choice of the system suits the in-floor heating and was a major contributor to the energy efficiency required for LEED gold.

The chilled water system for the building is directly supplied from Ryerson University's central plant. In winter and shoulder seasons the cooling of interior areas is achieved from the outside air free cooling option built into the air handlers.

Minimum outdoor air is provided through a dedicated outdoor air unit with a heat recovery enthalpy wheel. The unit supplies a variable amount of outdoor air to all recirculating air handling units based on carbon dioxide readings from the zones served.

The building automation system controls all aspects of the mechanical systems. It was developed to monitor and control space comfort and energy consumption. In addition to regular start/stop optimization, temperature reset, night setbacks, etc., the control system monitors occupancy to shut off lights and ventilation to unoccupied areas, and daylighting controls shut off lights in the perimeter zone when glazing is providing sufficient indoor illumination.

The building's storm water system is collected in concrete tanks constructed in the basement, and Grey water is pumped to irrigate a green roof as well as to be used in water closets and urinals. The plumbing fixtures were all selected to use the least amount of water possible.

Lighting

As a 'Gateway to the University', the eight-story Student Learning Centre features an elevated plaza and its blue tapered roof creates a dynamic entrance. The lighting design objective was to showcase the gateway identity and create a strong visual beacon.

The plaza visual effect extends into the atrium; a series of bare fluorescent strips delineate the diagonal beams to create a powerful dialogue with the juxtaposition architecture.

Strip lights were carefully positioned for maintenance from the floor, with the randomness providing a visual reference.

The building foyer is an interactive lounge space doubling as an amphitheater for events. Curtainwall integrated CMH fixtures up-light the blue dome, while wall mount linear fixtures provide dimmable ambient light adaptable to events and festivals.

With each floor having an individual identity, the design creates a unique experiential opportunity for learning but also challenged the lighting design. Six lighting schemes were created with light levels tailored to suit each program—custom T5 strips are the common element throughout.

The sixth floor's unique terrace demanded an imaginative lighting solution as its sloped floor opens up to a downtown view and beyond. Custom T5 strips were assembled to form the circular sun, and multiple on-site mock-ups confirmed a non-obtrusive clean suspension.

The building's concrete structure is 70% exposed, which provides a vehicle for lighting layers. Strip lights reinforce the geometric beams with uniform ambient illumination.

The building is designed to promote collaboration and a decentralized learning environment. The lighting provides flexibility and versatility, facilitating way-finding while also being integrated into the learning experience.

The integration of automated controls kept the project 20% below ASHRAE 90.1-2010, the design is LEED gold compliant, and the project came together within budget. **CCE**

Ryerson Student Learning Centre Design Team

Owner:	Ryerson University
Architects:	Zeidler Partnership in association with Snøhetta
Structural engineers:	CH2M (Neb Erakovic, P.Eng.)
Mechanical-electrical engineers:	Crossey Engineering (Project manager: Momcilo Grahovac; Team leader: Hossein Khoee, P.Eng.)
Contractor:	EllisDon

By Philip Chow, P.Eng., P.E.

Architectural rendering of the Toronto Zoo's new Wildlife Health Centre.

Photo: H.H. Angus

Healthcare for Animals

The Toronto Zoo constructs a new Wildlife Healthcare Facility.

The Toronto Zoo is Canada's premier zoo and home to over 5,000 animals, including invertebrates and fish, representing 460 species from a variety of geographical regions around the world. Encompassing approximately 710 acres, the Toronto Zoo is Canada's largest zoo and is divided into seven zoogeographic regions, ranging from the Americas, to Africa, Australasia and Eurasia.

The campus includes numerous support facilities dedicated to animal care, operations, maintenance and veterinary services. With the existing veterinary facilities dating back to 1974, the Toronto Zoo recognized the need for redevelopment and expansion. The mandate for the new Wildlife Health Centre is to provide a state-of-the-art facility for veterinary services, that will further the Toronto Zoo's commitment to wildlife health, nutrition, species survival research, conservation and education.

Planning for the new centre commenced in 2011 with Diamond Schmitt Architects, in collaboration with animal healthcare specialists Design Level, leading the team and preparing the architectural design for the new facility.

With a total gross area of 32,000 sq. ft., the new two-storey building would be located in the centre of the Toronto Zoo's existing animal support complex and would be constructed in the footprint of the existing veterinary services building. Adjacent service buildings, including the existing Research, Animal Holding, Quarantine, and Conservation and Biology facilities, would connect to the new Wildlife Health Centre.

Design considerations

The functional program for the new centre would have to meet a variety of objectives, including: meeting the needs of the different animal species, taking into account diverse environmental requirements for the various habitats, providing a layout that promotes the effective delivery of ongoing healthcare services and meeting the requirements of the veterinary professionals who perform these services. Eric Lucassen, Project Architect at Diamond Schmitt, notes, "Working with the Toronto Zoo to create functional programming that supports animal healthcare, while meeting the unique habitat requirements for the various animals, involved a detailed planning process."

The facility program for the Wildlife Health Centre is split over two floor levels and consists of animal treatment and surgical areas, diagnostic imaging, an intensive care unit, laboratories, animal holding areas, offices and support spaces, and a public viewing area. Animal holding areas are further divided into spaces for small and large

animals, which require ceiling-high caging to provide safety for the staff.

Surgery and diagnostic imaging spaces are centrally located and are accessible via wider corridors to facilitate the easy transport of animals into these areas. A garage is located adjacent to the surgery area, and an electric hoist and hoist beam runs from the garage to the surgery area to help the transport of larger animals.

The majority of two-storey rooms have large clerestory (windows just below the ceiling) around the perimeter of the spaces. This architectural feature allows a significant amount of daylight to enter the interior of the building and creates the feeling of being in an open, natural environment. Laboratories and support spaces are located in close proximity with animal care areas to minimize travel distances for support services.

Mechanical considerations

Given the varying functionalities and diverse environmental requirements of the different spaces, a number of innovative applications of mechanical and electrical systems were incorporated in the building's design. The holding area for fish and reptiles required that tropical temperatures be consistently maintained throughout the year, maintaining 100% relative humidity. Electric heat tracing cable, specifically modelled for the application by Tyco Thermal Controls, was installed in the slab to ensure that the temperature in the area would be maintained during winter months. While the electric heat tracing cable maintained a heat pad for reptiles, additional radiant floor heating was used to maintain the environment and create general floor comfort for animals.

Ventilation systems in animal care areas throughout the facility rely on a continuous 100% fresh air supply, with no return air, to ensure that contaminants and excrement are not circulated through the ventilation system. A heat recovery system was provided on the exhaust air system to increase energy efficiency. Animal surgery areas utilize a dedicated supply air system, which incorporate air change requirements and filtration comparable to the requirements for a human healthcare facility. By utilizing a separate, dedicated supply air system for surgery areas, energy efficiency is maintained in areas that require fewer air changes per hour.

Other energy efficient elements in the design included the use of low flow plumbing fixtures, roofing and landscaping features that promote heat island reduction for the site and the use of insulated glazing that provides an optimal balance between daylighting and heat transfer.

Electrical and lighting requirements

Unlike hospitals where patient care equipment is standard and there are prescribed standards for electrical circuiting requirements, animal care areas have speciality equipment items, and require multiple dedicated circuits and receptacles. Additionally, animal care areas were considered wet environments, due to the

Photos: H.H. Angus

Clockwise: The two-storey-high animal surgery room has a hoist beam and electric hoist to transport larger animals; Large clerestory located around the perimeter of animal holding spaces and animal treatment rooms provide natural light; Main runs of mechanical and electrical services were confined to corridor ceiling spaces; The roof top air handling units supply 100 per cent fresh air to animal care areas.

frequent washing that occurs after animals are returned to their habitats. Ground fault circuit interrupter (GFCI) receptacles were used in these areas to maintain electrical safety. Lighting fixtures throughout the facility were selected to provide both illumination requirements for animal care and were vapour tight, to maintain infection control practices and protect luminaires from inadvertent spray during cleaning.

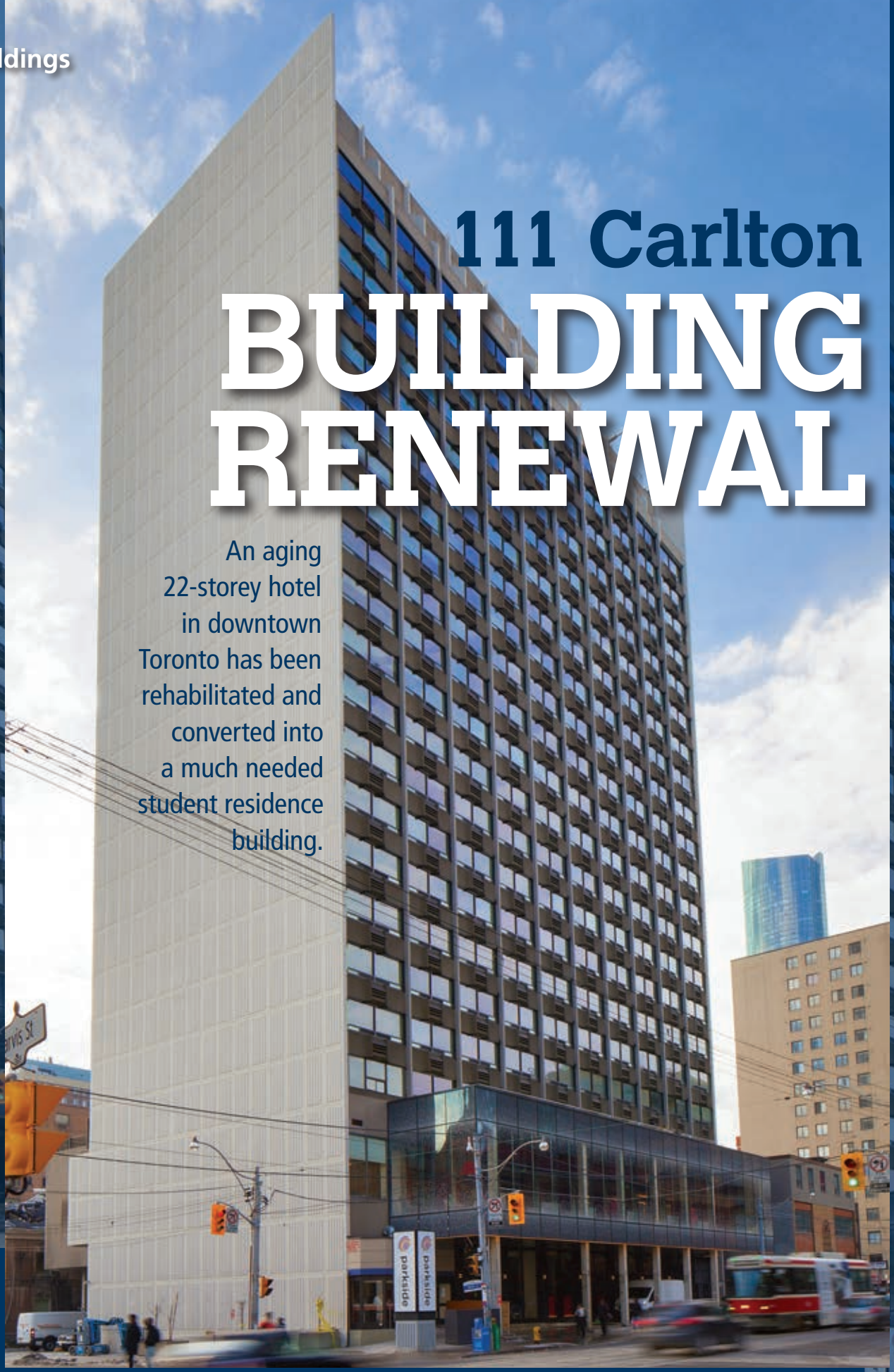
Occupancy sensors and multiple light switches were used throughout the facility to give users a wide range of automatic and manual lighting control, which allow lights to be turned off when there is enough daylight present through windows and clerestory. To avoid interference with full height cages, architectural clerestories, and to minimize the likelihood of interaction with animals, overhead mechanical and electrical services were routed outside of animal care areas and confined to corridor spaces. This created several installation coordination issues that were resolved by the contractor, via the creation of detailed interference drawings during the construction phase of the project.

Nearing completion

The project was competitively tendered and awarded to Gillam Group Inc., with construction commencing in February 2015. The new building is in the final phases of construction and is scheduled to be complete during the first quarter of 2017. Working on an animal healthcare facility designed to accommodate a variety of different species, with diverse requirements, proved to be a unique challenge.

While healthcare standards are readily available for hospital construction, there are minimal design and construction standards available for this type of animal care facility. Environmental standards established by the Canadian Council on Animal Care and general healthcare design experience contributed to the overall design. Furthermore, involving the users throughout the project was critical in identifying the unique needs of various animal groups. Eric Lucassen notes, "Having the Toronto Zoo's veterinary staff provide input into specific design requirements at every step of the project helped the design team develop innovative solutions to provide an enhanced animal care environment." CCE

Philip Chow, P.Eng., P.E. is a senior project manager at H.H. Angus & Associates Ltd., the mechanical and electrical engineers for the project. Philip.Chow@hhangus.com.



111 Carlton BUILDING RENEWAL

An aging 22-storey hotel in downtown Toronto has been rehabilitated and converted into a much needed student residence building.

By James Cooper, P.Eng., Read Jones Christoffersen Ltd.

Toronto's aging building stock can often be lost and forgotten among the many new glass clad structures that are rising on our skyline. Often the older low-rise buildings located in prime locations are demolished to make way for new high-rise developments.

This project is different. In downtown Toronto, one challenge the city faces is the lack of available student housing for the several post-secondary intuitions located in the core. Rather than using the "new build" model, Knightstone Capital Management set its sights on an ambitious building renewal project. The company chose to convert an existing 45-year old, 22-storey, hotel constructed circa 1970 located at 111 Carlton Street (at Jarvis) into a contemporary purpose-built student residence to serve students of several downtown post-secondary institutes.

The conversion included significant structural rehabilitation and modifications, along with the replacement of waterproofing systems throughout the building. The design team successfully completed this challenging project within budget semester.

Reconstructing the upper parking level slab

As structural engineers, Read Jones Christoffersen (RJC) carried out a detailed condition assessment and found that the upper parking level slab of the two-level (approximately 25,000 sq.ft.) underground garage had widespread corrosion and deterioration, and lacked a proper and functioning waterproofing system.

The repairs included the complete removal and replacement of the upper parking level slab. Extensive lateral wall/column bracing and shoring were installed to provide support while the replacement work took place. The shoring consisted mainly of hollow structural steel members bolted into the existing walls/columns and into the slab-on-grade below. Typically there were four braces per column, but some critical locations had upwards of eight braces—it definitely made installation and construction challenging.

The replacement of the slab was completed in sequences as follows: installation of all bracing/shoring, saw-cut removal of the existing slab; installation of formwork; installation of steel; and placement of new concrete.

Due to the tight schedule, a lot of this work overlapped, with some portions of the slab still in the saw-cutting phase while other areas were having reinforcing steel installed. The new slab was designed to provide better drainage and to meet current Building Code requirements and the Parking Structures Code CSA S413.

Photo: Read Jones Christoffersen Ltd.

Lateral wall/column bracing and shoring were installed during parking level slab replacement.

Photo: Read Jones Christoffersen Ltd.

The original podium deck slab did not include any waterproofing.

Podium deck challenges

The podium deck surrounding the building quickly became a challenge for the project team. This was the main access/egress point for the numerous trades working on site. Only once the overburden concrete paving and interlocking had been removed did we discover that the original construction of the podium deck slab did not include any waterproofing. The slab had extensive concrete delaminations which required repair. The work may sound simple—just expand the repair patches and move on—but due to other trades and projects it became a serious problem. Directly below the north podium deck work was being undertaken to construct a large kitchen and dining area—an extremely important (and expensive) part of the interior redevelopment.

The restoration team developed a plan to install scaffolding completely under the repair areas to allow work to progress below. The scaffolding was strong enough to support the weight of the workers and the wet concrete but was also designed to be watertight to prevent leakage into the work area below.

Concrete repairs to the exterior walls and shear wall ends

The building exterior walls consist of both exposed reinforced concrete elements and precast concrete elements, which were deteriorating and suffering from corrosion. They were repaired and given a new pro-

tective coating.

The east wall of the building was in considerably worse shape than the west wall and required more than 10 times the amount of concrete repairs. It is typical of most buildings that the east and north drops are in worse condition that the south and west drops. The east drop will generally get cool morning sunshine, and the north drop sees little to no sunshine, which results in significantly less drying. Moisture was a large cause of the observed deterioration.

The original architecture of the building presented a technical challenge—the concrete repairs had to be finished to match the existing ribbing. If this was not done perfectly, every single repair would stand out. The repairs became a sight to see, especially since the building was located at the corner of two major streets. At some points it appeared that we were turning the east wall into Swiss cheese. The contractor used a mast lift to undertake the concrete repairs.

New entrance and other structural changes

The showpiece of the renewal project is a 125-ft. long by 40-ft. tall glass box façade which was added on the north building entrance. In addition to the rehabilitation of the base building structure, other major structural changes included the infilling of a pool on the lower roof and the introduction of new openings in various walls throughout the building.

The renovations also involved a complete interior retrofit, including finishes, mechanical and electrical systems, life safety systems and other architectural improvements.

Today the renamed Parkside Student residence stands out among the glass towers downtown. It has been renewed and given a second life to serve the next generation of young minds living in the city. **CCE**

James Cooper, P.Eng., LEED AP O+M is an Associate with Read Jones Christoffersen's Building Science and Restoration group. He is based in Toronto.

Photo: Read Jones Christoffersen Ltd.

Exterior walls of both reinforced and precast concrete elements were deteriorating.

Photo: Read Jones Christoffersen Ltd.

Concrete repairs had to match the existing ribbing.

111 Carlton Renewal	
Owner-client:	Knightstone Capital Management
Prime consultant (excluding glass and interior), structural, restoration and structural engineers:	Read Jones Christoffersen (Jeremy Horst, CET, James Cooper, P.Eng., Nensi Baboci, Michael Moffatt, P.Eng., Alex Wong, P.Eng., Daniel Sokolowski, P.Eng.)
Architect:	Diamond Schmitt Architects
Construction manager:	Woodbecker
Contractors:	Eagle Restoration (parking garage and podium restoration), KIB Building Restoration (exterior wall restoration).

By Dr. Paul Lusina, P.Eng., Dr. Martin Ordonez, P.Eng.

Rethinking PARKADES

Parking facilities seen as an opportunity—from eyesore to energy hub.

Thousands of people travel to the University of British Columbia (UBC) every day. Researchers have now joined forces with UBC Parking and industry partners to use the parking system itself as a research laboratory and teaching facility as well as a state-of-the-art parking facility.

UBC Parking offers over 9,000 parking spaces to serve 52,000 students and 14,000 faculty and staff. The Vancouver campus has six major parkades and numerous surface lots on campus close to sports facilities, conference halls, academic buildings and the UBC hospital. Aside from their utilitarian role, UBC researchers and UBC Parking also see parking facilities playing a key role in the University's mandate for teaching, research and community engagement, and the new UBC Energy Hub project will show how a parkade can support all three of these goals.

Parking facilities are often where people arrive when they visit the University, and the last place they see when they depart. While UBC Parking has put in resources to make the business side of parking easy for customers, there is potential to use parking facilities to showcase UBC's leadership and innovation. The facilities are venues for art exhibits, technology demonstrations and research collaborations between UBC faculty and the community at large.

There is an increasing trend towards leveraging the value and potential of parking facilities. For example, the Santa Monica Civic Centre includes solar charging facilities for electric vehicles and energy-saving LED lighting; the Herma in South Korea uses polycarbonate and stainless steel panels to create an aesthetically appealing parkade, and the Veranda car park in Rotterdam is designed to blend into existing city architecture as well as to provide space for shopping and dining.

Benefits of Microgrids

The energy grid of the past century is based on a centralized approach to energy generation and management.

Photo: UBC

The Health Sciences parkade on the UBC campus will be the site of a new Energy Hub microgrid project.

Large facilities, such as hydro-electric stations, nuclear power plants, and coal/gas-powered facilities transmit energy over large distances to distribution networks that power domestic and industrial loads. The centralized grid is over-designed to meet reliability requirements and growth projections. Energy production follows energy demand, and grid generators must be able to quickly increase or decrease their output to meet customer needs.

In contrast, energy microgrids are based on a small-scale distributed approach to energy generation and management. Microgrids include renewable energy generation, such as solar and wind power, energy storage and a variety of loads, which are classified in terms of priority and operational requirements. Microgrids may be either independent of the centralized grid (islanded mode) or connected to the centralized grid (grid-tied mode). Because most renewable sources of generation are intermittent, microgrids must be able to dynamically manage energy distribution in ways far different from those used by the centralized grid. This includes delaying or denying power to low priority loads (such as electric vehicle chargers or heating/cooling units) or accessing stored energy resources (which may include batteries, hydrogen fuel cells or diesel generators). In microgrids, energy generation constraints result in customer behaviour being modified by the amount of energy available.

Microgrids have the potential to become an important addition to the overall energy system, but they need field testing. In order to function, microgrids need to mesh energy and communications systems with automated decision and control. While many of the proposed system components are novel, component level verification is relatively easy using bench-scale testing and emulation software. However, complex interdependencies among energy and communication systems can only be explored through field testing. Furthermore, the success of automated decision and control systems can only be established using real data transmitted over real networks. UBC's Energy Hub parkade will be the facility used for system-level experimentation and research. Feasibility for the project was completed at the end of 2016, and the expected completion date is the end of 2018.

Demonstrating new energy systems

UBC is re-imagining the role of parkades by transforming one facility into the Energy Hub microgrid. The Energy Hub parkade will integrate emerging energy technologies into a single interdependent system. It will incorporate solar power, energy storage, EV charging, lighting and IT infrastructure to implement demand side management of energy, improve user safety and generate energy that will be integrated into the local grid.

The building will function as a smart microgrid and showcase new technologies, including DC distribution, inductive charging of electric vehicles and automated control based on artificial intelligence and data analytics.

Energy Hub is the latest project in UBC's Campus as a Living Lab (CLL) initiative. The CLL program forms partnerships among researchers, industry, and campus operations in order to make UBC a first adopter of new technologies and solve operational needs on campus. Energy Hub will serve as a model solution for two UBC challenges. First, it will provide on-site sustainable generation, which UBC needs in order to meet its commitment to achieving a GHG neutral campus by 2050. Second, it will reduce UBC's reliance on power provided by BC Hydro, which will postpone or remove the need for electrical infrastructure upgrades necessary to meet energy demands as the campus grows.

Energy Hub is a multimillion-dollar project to be funded by industry partners including Cisco, BC Hydro, Fortis BC, Mercedes, and Opal-RT, along with municipal, provincial, and federal governments. UBC's engagement includes the faculty of Applied Science, five research laboratories, UBC Parking and Energy and Water Services. The industry partners are engaged in individual RD&D projects utilizing the infrastructure to test new concepts in urban mobility, low power telecoms, connected transportation and resilient urban infrastructure to name a few.

Payoff for investment

Energy Hub will have a significant value for all participants. UBC will have a demonstration project that lets people see working renewable energy systems that contribute to the University's GHG reduction targets. Industry partners will have a full scale test bed for developing commercial products, will build partnerships with UBC's research faculty and benefit from their expertise. Finally, the facility will be a sandbox for training highly-qualified personnel for the smart grid sector.

Training the next generation of leaders in power/energy is part of UBC's core mission. Experimentation and case studies based on Energy Hub will contribute to UBC's Masters of Engineering Leadership (MEL) in Smart Grid Energy Systems program. Graduates of this program will have advanced interdisciplinary training in the latest smart grid technologies from researcher scientists in the department of Electrical and Computer Engineering (ECE), and leadership and business training from UBC's Sauder School of Business.

UBC's investment in Energy Hub is representative of how the university serves the needs of society by providing not only the research results, but also educating people who can turn those results into innovations. CCE

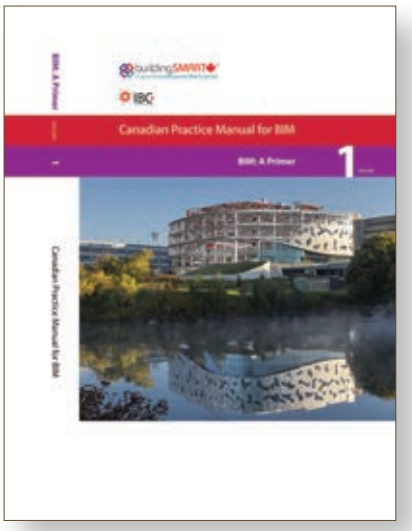
Dr. Paul Lusina, P.Eng, is research associate/sessional lecturer, and Dr. Martin Ordonez, P.Eng, is associate professor, both on the Electrical and Computer Engineering faculty at UBC.


™ The heart and / Icon, "Heart&Stroke" and "Life. We don't want you to miss it" are trademarks of the Heart and Stroke Foundation of Canada.
Life.
We don't want you to miss it.™
Heart &Stroke™
Life's best moments aren't the big ones. They're the billions of little ones. The simple ones we miss the most after they're taken from us. And then it's too late. That's why we love life. And that's why we're doing everything possible to make sure you don't miss it.
See how at heartandstroke.ca

By Paul Woodard

Getting a HEAD START

Launching early this year, the Canadian Practice Manual for BIM will set the stage for greater adoption.



buildingSMART Canada is releasing a new practice manual to serve the construction sector in the adoption of lifecycle Building Information Model (BIM).

Titled the Canadian Practice Manual for BIM, this three-volume practice manual is designed to provide novice and intermediate BIM users the context and framework for developing and adopting company-centric practices to streamline and improve their use of digital information. For more advanced organizations, the manual provides approaches to collaboratively exchange models and information between project participants.

According to buildingSMART Canada (bSC), there is a growing consensus that systematic change is needed in the construction sector, and they formalized a roadmap to lifecycle BIM that identifies priorities through to 2020. Part of this plan is to develop national BIM strategies, standards and practice manuals. Several practice manuals have been written around the world, all with particular strengths and weaknesses. While all have useful material, none of them fully meet the needs of the Canadian practitioner. Other countries have strong government issued BIM mandates, and/or have strongly integrated supply chains. In Canada, the push for BIM adoption comes primarily from practitioners who have a wide range of business relationships.

According to Bill Moore, vice-Chair of bSC and one of the Association of Consulting Engineering Companies' two representatives to the Institute for BIM in Canada, the practice manual is intended to be a guiding document that can be used across Canada. "Compiled by Canadians - for Canadians, the release of the buildingSMART Canada Practice Manual for BIM provides our AECOO community with highly sought after guidance and wisdom related to BIM in a Canadian context," said Moore.

"Compiled by Canadians — for Canadians, the release of the buildingSMART Canada Practice Manual for BIM provides our AECOO community with highly sought after guidance and wisdom related to BIM in a Canadian context."

A technical advisory committee proposed the creation of a three-volume practice manual that would be focussed on Canada. The first volume would provide a common introduction and understanding, the second volume to provide an overview of BIM within an organization, and the final volume to provide an overview of BIM within a multidisciplinary project. After the technical advisory committee collaboratively authored volume one, bSC decided to produce the final two volumes in parallel.

Over 60 AECOO professionals from across Canada contributed material and expertise in-kind to the practice manual. "Significant effort was focused towards ensuring the Practice Manual for BIM is recognized as a valuable resource by all stakeholders responsible for the Canadian built environment," said Moore. Additionally the National Research Council's Industrial Research Assistance Program provided financial support to offset some of the incremental costs required.

For many practitioners who may already be familiar with BIM, the two most relevant parts of the practice manual compilation will be Volume 2: Company Context and Volume 3: Project Context.

Volume 2 lays out the most common approaches for organizations who are considering using BIM internally. It helps managers and end users understand how BIM can be used within their organization and how information-based approaches are likely to impact them. The volume begins with best practices to understand and document how BIM fits in with their business plan and progresses through technology and human resources aspects, and concludes with common challenges faced by companies with their first few BIM experiences.

One important best practice is tied to the fact that many companies neglect their current strengths when adopting BIM. Instead of using technology to streamline the process of getting the information needed to perform one's job, they focus on the technology itself. Instead, the practice manual highlights the importance of analyzing current business practices to identify information needs and to map those needs to model capabilities. As part of this, the manual stresses the importance of building test cases and pilot projects to ensure that technology is reducing work, not increasing it.

Volume 3 approaches BIM from the project perspective, particularly when it comes to collaborative use of BIM, where models are to be used by multiple stakeholders. It helps managers and practitioners understand and document where information can be shared and used in a project to reduce overall risk. It starts by guiding managers through project preparation and understanding what applications of BIM will provide value. Other highlights of the volume are BIM-centric workflows and how they differ from traditional practice and common approaches and issues with the execution and management of the BIM portions of projects.

The practice manual stresses the importance of creating and following a BIM Execution plan, but only if the plan is going to be followed, and not be "shelfware." In the execution plan, it is also critical for project participants to document and understand information exchanges and expectations. Instead of signing off on requirements documents, assuming that the project is business as usual, practitioners should use the planning exercise as an opportunity to ensure that they will be receiving what they need and not over-committing to what they are able to provide.

The practice manual will be available in both print and digital forms with English and French editions from buildingSMART Canada in early 2017. The print version is a bound copy of all three volumes. The digital version is available as PDFs and can be acquired individually or as a set of all three. In addition, for a limited time, Volume one: BIM a Primer, will be available in digital form at no cost to practitioners who join buildingSMART Canada.

Further details are available at www.buildingsmartcanada.ca. **CCE**

Paul Woodard, Ph.D., founder and vp with Advanced BIM Solutions Inc., specializes in working with the construction sector to develop and adopt plans and processes in the shift towards innovation.

By William Kuffner, P.Eng.

Getty Images/iStockphoto

What is FIRESTOPPING

Exploring the materials and systems used, where they're required and who should be looking after its use.

Firestopping is a term used to describe the materials and systems used to fill the void space in an opening in a fire separation to maintain the required performance of the fire separation. It means different things to different people, and this article will attempt to present some ideas to help normalize that range of understanding and explain how firestopping fits into construction projects.

Let's start with what firestopping is not. It is not red silicone sealant slopped into a hole installed by untrained personnel; it is not fibreglass insulation stuffed into a hole in a floor; nor is it a block of polystyrene foam painted grey to look like concrete—all of which have been tried on more than one occasion.

"What you see is what you get" just doesn't work when it comes to firestopping. The amount and type of material, its compression, layer thickness, the ability for the system to move with the building, the orientation of the fill material and several other factors all go into determining whether a firestop system has been implemented correctly. A firestop system needs to remain in place for the life of the building and be able to perform when a fire occurs.

Every wall, floor or roof that is required to be constructed as a fire separation, and which is allowed to be penetrated by a building service or that is constructed with joints, needs to be sealed with a system of materials that has been tested and listed to maintain the fire resistance rating of the fire separation.

Table 1 – Fire Stop Ratings

Fire Stop Rating	ULC-S115 Acceptance Criteria
F	System remains in the opening during the fire test without permitting the passage of flame through the opening or the occurrence of flaming on any element on the unexposed side of the system.
FT	Passes F rating criteria and does not permit the unexposed side temperature to rise in excess of 181°C.
FH	Passes F rating criteria and does not permit develop an opening that would permit a projection of water from the hose stream test beyond the unexposed side.
FTH	Passes both FT and FH rating criteria.
L	The leakage rate (L/s) of the largest test specimen determined from the air leakage tests. Separate ratings may be identified for each individual air pressure and temperature exposure, or both.

Listed for use in Canada means the system has been tested to the requirements of CAN/ULC S115 "Standard Method of Fire Tests of Firestop Systems", and assigned one of five rating types (see Table 1) that indicate the duration of time the system maintained the minimum acceptance criteria.

Some systems are simple enough they only require the application of fire stopping sealant to fulfill installation requirements. However some are much more complicated, requiring the installation of multiple components with very specific installation instructions and multiple layers. The application of a system depends on the construction of the fire separation, the size of the opening made in the fire separation, what specific penetrants are inserted in the openings and the space remaining after the penetrant is installed (commonly referred to as the annular space).

Why firestop systems are important

Fire separations are mandated in buildings to prevent the spread of a fire beyond the room or compartment of origin and are designed using listed systems that are proven to achieve the required result. Likewise, firestop systems are also tested to ensure they achieve the same result as fire separations, which is the prevention of fire effects being measurable on the unexposed side of a system under test in a laboratory setting.

Deserving more attention

Perhaps firestop systems don't get the professional attention they deserve because of the complexity in managing firestopping projects due to the amount of detail to review, or perhaps it is because conducting review work after systems have been completely installed provides little extra quality assurance. Maybe we just miss the boat altogether as engineers or architects when it comes to taking or assigning responsibility for review of these systems. After all, firestopping isn't required for a wall until an opening is made to allow electrical or mechanical systems to pass through it. Well, that isn't exactly true because most walls have joints, and many walls are incorporated into ceiling systems that are part of the original design and can have a combination of professional responsibility. One thing is for certain, if these systems were getting the amount of attention they require to be properly done there would be a lot more complaining about them than I hear about from construction projects.

Which trade should install?

Most construction projects receive firestopping treatments by several trades. Electrical contractors firestop electrical boxes, conduit and the like. Mechanical contractors firestop ductwork, plumbing penetrations, etc. General contractors or drywall contractors firestop construction joints and so on. Each type of penetration in a fire separation comes with its own set of acceptable solutions and products. Any conscientious contractor that understands the application requirements and installation techniques is more than capable of installing firestopping systems. However, there is something to be said for obtaining the services of a firestopping contractor as a specialty trade.

These professionals have a better understanding of what systems can and should be applied to firestop penetrations in fire separations because it is all they do. One of the problems with employing this type of trade on a project is the coordination with other trades. Like a painting contractor that often has to revisit the same wall over and over again as other contractors complete work, the firestopping contractor can't be expected to know ahead of time how may or what types of systems will need to get installed, because the installing contractor creates openings as work is being completed. The selection of a dedicated firestopping contractor can improve project delivery overall because it offers a more robust method of ensuring quality of workmanship.

Who should specify firestopping

Firestopping is usually specified by the project architect, but if there is no architect, then the engineer or other designer in charge of creating or causing an opening to be created in a fire separation should specify the work. In principal, the task is simple: apply listed systems using listed materials in the way specified in the listing document with a fire resistance rating applicable to the rating of the fire separation within which the opening is created.

Specifying firestopping

To do this properly, the specifying professional must understand the construction of the fire separation, the quantity, type and physical characteristics of the materials penetrating the fire separation and the annular space that will remain once the trade is finished the opening.

The specifier must then determine if the planned penetrations are permitted by the code. This is done by finding out if the penetrant is allowed in the building and occupancy type—answering questions about the combustibility, smoke developing and flame spread characteristics. Once it has been determined the penetrant is allowed in the building, the quantity and arrangement of elements is needed to begin the selection process of finding a system or systems that are listed with sufficient fire resistance ratings to meet the building code requirements.

This requires an understanding of the construction of the fire separation and the geometry of the penetrating material arrangement, which includes the space left over. In a modest-sized construction project this could lead to hundreds, if not thousands, of unique situations that each requires separate consideration to select the appropriate firestop system. With that many unique situations, there are bound to be a number with no listed system in place to rely on. For those situations, an engineering opinion is required that seeks to evaluate the situation and apply fundamental heat transfer principles to as well as knowledge of the past performance of the materials and systems being considered.

Two of the databases available for finding firestopping systems are the ULC and UL databases. Both managed by the same organization, the primary difference is that the ULC database contains listings for systems that have been tested according to the ULC standard, while the UL database contains listings that are tested to ASTM standards as well as ULC. In order to ensure that a UL listing meets the requirements for use in Canada, the listing document will contain the statement "Certified for Canada" and have the characters XHEZ7 in front of the listing document.

Planning projects

Coordination of the firestopping effort starts with communication. Each of the trades have to be made aware of the firestopping plan and understand their role. If the major trades are tasked with firestopping individually it gives them the freedom to plan without coordination with other trades, but it also means they need extra training to ensure they understand the firestopping requirements and that they apply them correctly. The specifying engineer or architect has a duty to ensure the firestopping is conducted to preserve the fire resistance ratings of fire separations on the project.

Inspection at key stages

Firestop systems are sometimes part of the construction of the fire separation. As an example, electrical switch boxes or power receptacle boxes are permitted to be installed in fire separations so long they are separated sufficiently and have intumescent putty pads or other sealant applied to the box. The only way to inspect the fire separation wall with the electrical installation is before the final layers of gypsum are applied to close the fire separation.

At other times, firestopping can be applied after the fire separation is completed and then a penetration opening is made, and there are suggested methodologies for conducting professional review of these types of systems. ASTM standards E2174 "Standard Practice for On-Site Inspection of Installed Firestops" and E2393 "Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers" offer suggested review strategies, including selective destructive testing and installation supervision as acceptable options. **CCE**

William Kuffner, P.Eng. is Senior Fire Protection Engineer, Infrastructure Engineering with SNC-Lavalin.

By Dražen Bulat, Miller Thomson LLP

Tendering and the new Ontario condo act

Condominiums are big business. In recent years the Toronto skyline has been crowded with cranes reaching ever higher into the sky as developers race to build towers to meet the growing demand for affordable home ownership.

As a condominium building ages, it will need repair and renovation work. The building may need new windows, new elevators or a new roof; the underground parking garage may need waterproofing; or the lobby and the corridors may need to be renovated. These are just a few examples of work that is taking place every day, and should be multiplied by the thousands of condominium buildings that have been and are being constructed. Big business indeed.

Usually, when work needs to be done on a condominium building the condominium board will hire an engineer or other consultant to develop a set of specifications and drawings for the work. The work will then be tendered, usually based on tender documents prepared by the engineer. However, as a result of new legislation in Ontario, tendering by condominium corporations will soon undergo a change. Engineers and consultants who currently work, or who intend to work, for condominium corporations in Ontario need to be aware of the changes that are coming.

In May, 2015, the Ontario Government introduced Bill 106, the *Protecting Condominium Owners Act*, which substantially amended the Ontario Condominium Act. In the debates that followed in the Ontario Legislature, a number of MPPs highlighted that one of the key features of the new legislation was that it puts into place:

> appropriate financial controls … when condo corporations spend the owners' money. … If passed, the legislation would strengthen financial management requirements for condo corporations and help prevent fraud and mismanagement. For example, it would forbid condo corporations from finalizing some contracts until they had fulfilled certain procurement rules, ensuring better management in the interests of condo owners.

Other MPPs commented that the intent of the legislation is to make sure that procurement (tendering) decisions "are made in an accountable and transparent way to the owners" and to ensure "there's fairness and transparency" in the tender process.

The amending legislation received Royal Assent on December 3, 2015. It includes a new section 39.1 (which is not yet in force):

> **39.1** A corporation shall not enter into a prescribed contract or transaction unless the procurement process and other contracts or arrangements that the corporation entered into in relation to the contract or transaction meet the prescribed requirements.

A few months later, the T*oronto Star* and *The Globe and Mail* reported that Canada's Competition Bureau was investigating "allegations of bid-rigging and conspiracy involving the multimillion-dollar condo renovation industry." The Bureau's investigation suggests there may be good reason to introduce some form of "ground rules" for tendering in the condominium sector.

There is no question that the condominium renovation industry has grown, and that renovation projects can significantly deplete a corporation's reserve fund. At the same time, many corporations tender projects and sign contracts with little regard or attention to their legal obligations or risks.

The proposed new Section 39.1 deals with the issue by forbidding condominium corporations from entering into a "prescribed contract or transaction" unless the tender process and other contracts or arrangements "meet the prescribed requirements." But, what are the "prescribed contract[s] and transaction[s]"? What are the "prescribed requirements" that the tender process will have to meet? We don't know yet. As they say, the "devil is in the details" or, in this case, in the Regulations that will be issued. At the same time, we can make an educated guess about the pending changes by looking at what the Ontario Government did a few years ago with tendering in the broader public sector.

In October, 2010, the Office of the Auditor General of Ontario issued a Special Report which highlighted concerns related to procurement activities of hospitals (and other public sector organizations). The result was the introduction of new legislation, the Ontario *Broader Public Sector Accountability Act, 2010* ("BPSAA"), which was described in the Ontario Legislature as "raising the bar for accountability and transparency for the broader public sector." The Ontario Government also issued a "Procurement Directive," the purpose of which is to ensure that broader public sector organizations acquire goods and services "through a process that is open, fair and transparent."

Note the use of the words "accountability", "transparency" and "fairness" in 2010—the same words that were used in 2015 to refer to the new Section 39.1 and the amendments relating to procurement by condominium corporations.

The Ontario Legislature's goals in enacting the amendments to the *Condominium Act* relating to tendering, and

continued on page 33

Specifier's Literature Review

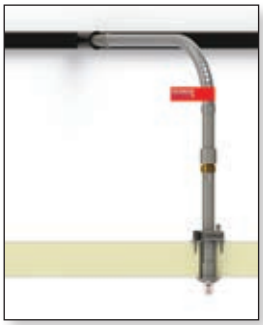
ESSENTIAL TOOLS FOR WOOD ENGINEERS

WoodWorks® software enables quick design of beams, columns, joists, wall studs, seismic/wind resisting shearwalls, and connections such as screws, nails, and bolts. For Canada and US.

Wood Design Manual 2015, includes the "Engineering design in wood" standard (CSA O86-14). This is the most important publication in Canada for designing wood.

Wall Thermal Design calculator, a free online energy code compliance tool, includes Effective R value and durability assessment. Learn more, visit cwc.ca.

SUPPLIER: CWC



FLEXHEAD® INTRODUCES NEW PRODUCT FOR FREEZER AND COLD STORAGE APPLICATIONS

The FlexHead® product, DPS-UHO-1, provides the fire sprinkler contractor a system that is quick and economical to install saving time and money. Perfect for new installs or repairs to existing hard pipe applications. This system is designed for wet sprinkler systems and is installed with a dry pendant sprinkler head. The DPS-UHO-1 system is FM approved to accommodate multiple dry pendant sprinkler manufacturers.

To learn more, visit www.flexhead.com.

SUPPLIER: FLEXHEAD

EXCLUSIVE TO YOU

You get typically lower fees on RRSP, non-registered savings plan, TFSA and retirement income products, which can add up to more future savings and more income in retirement. Plus, you get free investment guidance.

Contact Angela Harvey at 1-866-788-1293 ext. 5786 or angela.harvey@gwl.ca, or visit www.engineerscanadafsp.grsaccess.com for more information on the financial security program sponsored by Engineers Canada.

SUPPLIER: Great-West Life

MACH-PROAIR™: ENERGY CONSCIOUS, VERSATILE VAV

Engineered to exceed the specifications for a wide variety of Variable Air Volume (VAV) applications, the Reliable Controls® MACH-ProAir™ is a fully programmable BACnet Building Controller (B-BC) with numerous downloadable standard codes and flexible I/O options, all priced to meet a modest budget, as it continues the Reliable Controls® tradition of intrinsic simplicity, flexibility, and cost-effectiveness.

www.reliablecontrols.com/products/controllers/MPA

SUPPLIER: RELIABLE CONTROLS CORPORATION

ROSENBERG'S UNOBOX IS A MODULAR, SILENT AND ROBUST FAN-CUBE THAT ALLOWS AN EASY SOLUTION FOR A FAN GRID IN ALMOST ANY POSSIBLE CONFIGURATION

Delivered complete and ready to stack, Rosenberg Fans offers a comprehensive range of **UNOBOX** fans that are available with the energy efficient and easy to control EC MOTOR technology. **UNOBOX** is a flexible, solid and convenient concept that is ideal for your next ventilation retro-fit project.

Contact us at (905)565-1038 or info@rosenbergcanada.com

For more information visit our website www.rosenbergcanada.com

SUPPLIER: ROSENBERG FANS CANADA LTD.

WORLD'S FIRST GROOVED PIPING SYSTEM FOR SATURATED STEAM

Featuring the Style 870 rigid coupling and line of fittings, the Victaulic Steam System eliminates the need to weld steam piping with pressures up to 150 psi (1,034 kPa) and temperatures up to 366°F (186°C). Offers quick, simple installation and maintenance while maintaining a safe worksite. To learn more, visit victaulicsteam.com.

Please contact viccanada@victaulic.com with any questions.

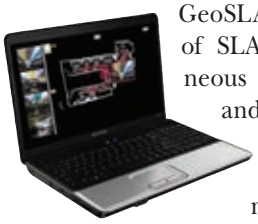
SUPPLIER: VICTAULIC

CANADIAN CONSULTING ENGINEER 2017 MEDIA KIT

Canadian Consulting Engineer magazine provides high quality editorial coverage of the most pertinent and timely issues that affect engineers across Canada. The magazine reaches the consulting engineers who make the critical decisions on building and construction projects. This is exactly the audience you need to reach. Advertise your product or service with us. Be seen and be specified! To order your 2017 media kit, please send along your request to Maureen Levy at (416) 510-5111, email: mlevy@ccemag.com or visit www.canadianconsultingengineer.com

Tyco Mechanical Products has released GRINNELL Mechanical Suite for Revit, allowing users design grooved piping systems using GRINNELL product creating realistic designs and accurate bill of materials. grinnell.com

Designed for the light commercial market, Johnson Controls has introduced Verasys, a control system that integrates heating, ventilation, air-conditioning and refrigeration (HVACR) equipment and controls. The system communicates using BACnet MSTP, so it integrates with Metasys or any third-party BACnet system. www.verasyscontrols.com



GeoSLAM, maker of SLAM (simultaneous localization and mapping)-based mobile indoor mapping systems, has announced the launch of Desktop V3, providing users with increased functionality to view, edit, and define results. www.geoslam.com

professional directory

Need more Info? Contact Our Advertisers Listed Below

Janaray/February 2017

Advertiser	Pg#	Email	Telephone	Website
BB Ste-Croix	5	g.blanchet@bibby-ste-croix.com	1-418-926-3262	Bibby-Ste-Croix.com
Canadian Wood Council/ WoodWorks Software	27	sales@woodworks-software.com	1-613-747-5544 / 1-800-844-1275	www.cwc.ca/ www.woodworks-software.com
Great-West Life Assurance Company	35	angela.harvey@gwl.ca	1-866-788-1293 ext 5786	www.greatwestlife.com
Reliable Control Corporation	13	info@reliablecontrols.com	1-250-475-2036	www.reliablecontrols.com
Rosenberg Fans Canada Ltd.	7	info@rosenbergcanada.com	905-565-1038	
SimplexGrinnell	2	ChWoodcock@simplexgrinnell.com	1-978-731-7052	www.simplexgrinnell.com
Tetra Tech	36	charlie.macpherson@tetratech.com	1-626-470-2439	www.tetratech.com
Victaulic Canada	19	viccanada@victaulic.com	1-905-884-7444	www.victaulic.com

Tendering and the new Ontario condo act

continued from page 30

the goals in enacting the BPSAA are very similar. It would not be surprising, therefore, if the Regulations that will be issued to govern tendering by Ontario condominium corporations will be similar to the requirements under the BPSAA and the Procurement Directive.

As an example, the Procurement Directive includes 25 Mandatory Requirements that must be implemented and incorporated in an organization's tender process. It would not be surprising to find some of them embodied in the new *Condominium Act* Regulations such as, for example:

- use of formal contractor prequalification process;
- minimum response time for the submission of bids and for issuing addenda;
- requiring tender documents to include and clearly describe evaluation criteria, along with the weight allocated to each criterion;
- requiring the disclosure of evaluation methodology and process for award of contract;
- including a contractor debriefing process;
- including a bid dispute resolution procedure.

There is no doubt that the enactment of Section 39.1, along with the new Regulations, will lead to changes in how condominium corporations in Ontario procure goods and services, and engineers and other consultants working in the condominium industry in Ontario will need to stay on top of the changes. For some corporations, and engineers, it could be a steep learning curve. CCE

Dražen Bulat, partner with Miller Thomson in Toronto, is a national leader in construction and infrastructure law. dbulat@millerthomson.com

by Rosalind Cairncross, P.Eng.

URSULA FRANKLIN
A rare and insightful mind

In Memoriam: Dr. Ursula Franklin was an inspirational female leader in Canadian science, but she also asked the questions we seldom ask about technology, and where it is leading us.

Technology comes at us at warp speed ringing, pinging, rushing, leaving most of us without a moment to think about the impact of the changes constantly bombarding us. Dr. Ursula Franklin asked the questions we seldom ask: Where is all this technology taking us? What does it give and what does it take away? How does it affect the society we live in?

She asked questions not only about technology but about fairness, justice, the environment, and peace. She not only thought, but acted. And she gave those of us privileged to meet her much to think about. Ursula Franklin was one of the rare insightful minds thinking about the things we often don't think about—about how the real world really works.

L. Ursula Franklin at the Ontario Research Foundation in 1953. (Image courtesy Monica Franklin). R. Ursula Franklin. (Photo courtesy Martin Franklin/Ursula Franklin Academy.)

Dr. Ursula Franklin joined the Department of Metallurgy and Materials Science of the University of Toronto's Faculty of Engineering as a researcher and associate professor in 1967. She was professor of metallurgy, research physicist, the first woman to be named full professor at U of T, fellow of Massey College, winner of numerous awards and staunch supporter of women in science and engineering. Dr. Franklin died on July 22, 2016 at the age of 94.

The honours and awards reflect her wide range of interests. They include the Governor General's Award, the Pearson Medal of Peace, Elsie Gregory McGill memorial award, and the Wiegand Award for significant contributions to the understanding of the human dimensions of science and technology. She was inducted into the Canadian Science and Engineering Hall of Fame in 2012.

Dr. Franklin arrived in Canada in 1949 to take up a postdoctoral fellowship at U of T and spent the next 15 years at the Ontario Research Foundation. She had survived the Holocaust in her native Germany and had obtained a Ph.D. from the Technical University of Berlin. She married fellow engineer and fellow Quaker, Fred Franklin, in 1952. Their two children survive them.

One of Dr. Franklin's most important contributions grew from her keen interest in the affect of technology on people. This was visible in her earliest work. In the 1960s she was one of a group of scientists monitoring the levels of the radioactive isotope strontium 90 in babies' teeth. The findings eventually helped stop atmospheric weapons testing.

Later in her book, The Real World of Technology, and in other writings, Dr. Franklin explored the role of technology in society—how technologies influence the structure of societies and influence the kinds of technologies they produce. To her, technology was not just a set of gadgets or machines, but rather "organization, procedures, symbols, new words, equations and most of all mindset."

She divided tasks into holistic and prescriptive technologies. The former, where the producer is in charge of the whole process, as were craftspeople, is probably lost to most of us now. The prescriptive technologies where processes are divided into bits with groups of practitioners each doing one part of the process is the norm now. These technologies need managers to organize the parts and compliance from the people doing the tasks. In other words, they result in greater control of one group over the other.

She could challenge and encourage. With her vast knowledge she could sharply test industry executives trying to argue their way out of environmental regulations. She would also mentor and encourage young people.

Her spirit lives on for the engineers who passed through her life, the women who benefited from her example, the people who struggle for peace and justice, and especially for the students attending the Ursula Franklin Academy in Toronto. Ursula Franklin's keen analytical mind which helped us understand the real world of technology is now at rest, but her brilliance and humanity lives on.

"Peace is not the absence of war—peace is the absence of fear" —Dr. Ursula Franklin. **CCE**

Rosalind Cairncross, P.Eng. is an editorial advisor to Canadian Consulting Engineer magazine.

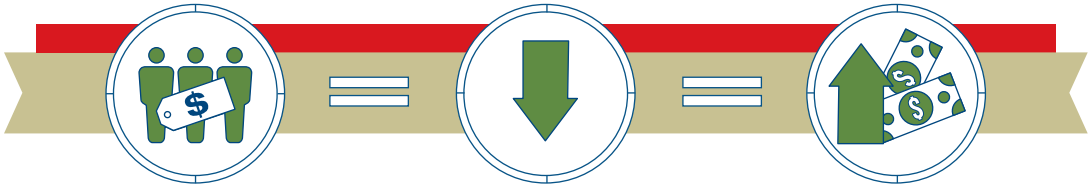
EXCLUSIVE

FINANCIAL SECURITY PROGRAM

for engineers, geoscientists, students and their families

RRSP, non-registered savings plan, TFSA, RRIF, LIF or annuities

Sponsored by Engineers Canada



Get group pricing

Lower fees

More future savings and **more** income in retirement

How much more?

$35,526 more*

with an Engineers Canada-sponsored RRSP

Program participants get free investment guidance

Start today – contact Angela Harvey at 1-866-788-1293 ext. 5786 or angela.harvey@gwl.ca, or visit www.infosite.grs.grsaccess.com/engineers-canada

Sponsored by:

engineerscanada ingénieurscanada

THE Great-West Life ASSURANCE COMPANY

*Assumes no further contributions for ease of calculation, interest on the initial $25,000 investment compounded annually. Based on a 25-year investment at a group plan rate of return (which includes fees) of eight per cent and a bank rate of return (which includes fees) of seven per cent. / Great-West Life and key design are trademarks of The Great-West Life Assurance Company (Great-West Life), used under licence by its subsidiaries, London Life Insurance Company (London Life) and The Canada Life Assurance Company (Canada Life). As described in this advertisement, group retirement, savings and income products are issued by London Life and payout annuity products are issued by Canada Life.