civil
CANADIAN CIVIL ENGINEER
L'INGÉNIEUR CIVIL CANADIEN
2016 | MAY/MAI

- London's master plan for cycling
- Sustainable infrastructure: CSCE's plans
- Innovative design at Queen Richmond Centre West
- Evaluation of extreme wind loads

CSCE Annual Conference – London

RESILIENT INFRASTRUCTURE | INFRASTRUCTURES RÉSILIENTES

Congrès annuel de la SCGC – London

www.csce.ca

CANADIAN INSTITUTE OF STEEL CONSTRUCTION
INSTITUT CANADIEN DE LA CONSTRUCTION EN ACIER

STEEL VS. CONCRETE:

Which is the better, greener and more cost efficient choice for commercial building construction?

Review the results of an independently conducted research study that outlines the impacts on design, construction costs, project schedules, and sustainability of steel vs. concrete framing alternatives.

Download the case study flyer today at

cisc-icca.ca



CANADIAN CIVIL ENGINEER
L'INGÉNIEUR CIVIL CANADIEN

contents

MAY 2016/MAI 2016 | VOLUME 33.2

HISTORIC CIVIL ENGINEERING SITES

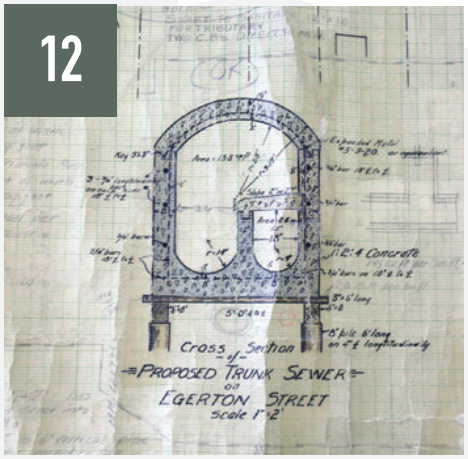
FORUM ON SUSTAINABLE INFRASTRUCTURE/ FORUM SUR LES INFRASTRUCTURES DURABLES

CSCE CONFERENCE/CONGRÈS SCGC – LONDON 2016

TECHNICAL: 2016 ANNUAL CONFERENCE PREVIEW/PAGES TECHNIQUES: CONGRÈS ANNUEL 2016 - UN APERÇU

NEWS, VIEWS & DEPARTMENTS

NOUVELLES, POINTS DE VUE ETRUBRIQUES



On the cover: Trail riding courtesy of City of London

civil
CANADIAN CIVIL ENGINEER
L'INGÉNIEUR CIVIL CANADIEN

CSCE/SCGC
521-300, rue St-Sacrement
Montreal, Québec H2Y 1X4
Tel.: 514-933-2634, Fax: 514-933-3504
E-mail: mahmoud.lardjane@csce.ca
www.csce.ca

PRESIDENT/PRÉSIDENT
Tony Bégin, P.Eng., CDP, M.A.Sc., MCSCE

CANADIAN CIVIL ENGINEER/L'INGÉNIEUR CIVIL CANADIEN

EDITOR/RÉDACTEUR
Doug Salloum, CSCE Executive Director
514-933-2634 ext. 1, doug.salloum@csce.ca

MANAGING EDITOR/
DIRECTEUR DE LA RÉDACTION
Cindy Macdonald
Tel.: 416-510-6755
cmacdonald@annexnewcom.ca

ASSOCIATE EDITOR/
RÉDACTEUR EN CHEF ADJOINT
Bronwen Parsons
Tel.: 416-510-5119
bparsons@ccemag.com

ADVERTISING SALES/
PUBLICITÉ
Maureen Levy
Tel: 416-510-5111
mlevy@ccemag.com

ART DIRECTOR/
COMPOSITION ARTISTIQUE
Lisa Zambri
Tel: 416-510-5600 x3595

Annual Subscription Rates/Abonnement annuel
Canada & U.S./E.U. $35.00, Other countries/Autres pays $45.00; Single copy/Un numéro $7.50; Agency discount/Rabais au distributeurs 10%

PUBLICATION ISSN 9825-7515

RETURN ADDRESS/ADRESSE DE RETOUR :
The Canadian Society for Civil Engineering
La Société Canadienne de Génie Civil
521-300, rue St-Sacrement Montreal, Québec H2Y 1X4

Canadian Civil Engineer (CCE) is published five times per year by the Canadian Society for Civil Engineering (CSCE). L'ingénieur Civil Canadien (ICC) est publié cinq fois par année par la Société Canadienne de Génie Civil (SCGC).

CIVIL Magazine is produced by the publishers of Canadian Consulting Engineer Magazine, published by Annex Publishing & Printing Inc.
Le magazine Civil est produit par l'editeur de la publication Canadian Consulting Engineer qui est publie par Annex Publishing & Printing Inc.

Annex Publishing & Printing Inc.,
80 Valleybrook Drive,
Toronto, Ontario M3B 2S9
Tel.: 416-442-5600; Fax: 416-510-5140

PUBLICATIONS MAIL AGREEMENT/POSTES CANADA ENREGISTREMENT #40065710

Tony Bégin, P.Eng., CDP, M.A.Sc., MCSCE
PRESIDENT, CSCE/PRÉSIDENT SCGC
PRESIDENT@CSCE.CA

Keep on growing

During the course of last year, we have worked as a team under my presidency to carry out many projects in line with our growth strategy. We can be proud of what we have accomplished and it is just the beginning of our journey to make CSCE stronger.

The individual membership increased from 3,463 to 5,174 total members in the course of 2015. This represents a growth rate of close to 50 per cent, the highest increase of the last few years. This momentum has to be kept at a minimum annual increase of 25 per cent in coming years in order to reach our goal of 10,000 members by the year 2020.

The corporate membership went from 26 to 32 business partners in one year, which represents a growth of more than 20 per cent. We acknowledge all the firms that support us and associate their name with CSCE.

More results are expected in the recruitment of new corporate members. We have hired a new staff member to achieve this objective, Latifa El Ayachi, as marketing director (latifa.elayachi@csce.ca). We are working on a new set of benefits for the corporate members. This initiative will help us increase our financial strength in order to provide our technical divisions, programs and committees the resources required to enhance the CSCE learning experience for all members.

CSCE gaining recognition

The reputation of CSCE has been taken to a new level over the last few months. The publication of the second edition of the Canadian Infrastructure Report Card (www.canadainfrastructure.ca) in January, an article on CSCE published in the Canadian Business Journal (www.cbj.ca) in February, an invitation to speak at the 98th annual conference of the Canadian Construction Association (www.cca-acc.com) in March, the National Tour on the Infrastructure Report Card in April and May, and a keynote address I will deliver at the Canadian Network of Asset Managers (www.cnam.ca) in Halifax in May, have all been great opportunities to affirm CSCE's leadership in building sustainable infrastructure.

Your new president, Jim Gilliland, and new president-elect, Susan L. Tighe, are ready to pursue our growth. In collaboration with the national office staff, they will guide us towards more success. Your valuable input and feedback as a CSCE member is more than welcome at any time. As the best way to interact is in person, we invite you to come meet with us in London, Ont., from June 1 to 4.

Au revoir to all of you my friends and CSCE family members. It has been an honour to serve you and I thank you very much for your trust. ■

Tony Bégin is senior director of integrated project delivery at Canam Group Inc.

Continuons notre croissance

Au cours de l'année dernière, nous avons travaillé en équipe et, sous ma présidence, nous avons entrepris des actions en lien avec notre stratégie de croissance. Nous pouvons être fiers de ce que nous avons accompli et ce n'est que le début de notre expédition pour renforcer la SCGC.

Le nombre d'adhésions individuelles est passé de 3 463 à 5 174 au cours de l'année 2015. Ceci représente une augmentation de près de 50%, la plus importante des dernières années. Cet élan de croissance doit être maintenu à un taux minimum annuel de 25% au cours des prochaines années afin d'atteindre et même dépasser notre objectif de 10 000 membres en 2020.

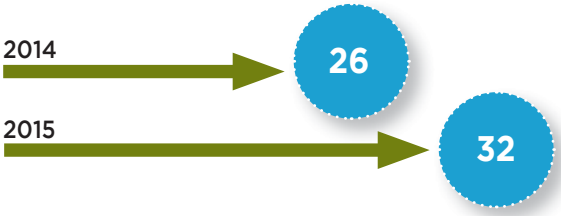
Le nombre de membres d'entreprise est passé de 26 à 32 partenaires en un an, soit plus de 20% d'augmentation. Nous remercions toutes les firmes qui nous apportent leur appui et associent leur nom à la SCGC.

Plus de résultats sont en perspective avec le recrutement de nouveaux membres d'entreprise. Nous avons engagé une nouvelle personne dédiée à l'atteinte de cet objectif, madame Latifa El Ayachi, Directrice Marketing SCGC (latifa.elayachi@csce.ca). Nous travaillons sur une nouvelle série de privilèges pour nos membres d'entreprise. Cette initiative nous aidera à atteindre la santé financière qui nous permettra de fournir les ressources requises aux divisions techniques, programmes et comités pour améliorer l'expérience d'apprentissage de la SCGC de tous les membres.

La réputation de la SCGC se consolide de plus en plus et a atteint un niveau de reconnaissance significatif au cours des derniers mois. La publication de la 2e édition du Bulletin de rendement des infrastructures canadiennes (www.canadainfrastructure.ca) en janvier dernier, l'article sur la SCGC paru dans le "Canadian Business Journal" (www.cbj.ca) en février, l'invitation qui m'a été faite d'être conférencier à la 98e Conférence annuelle de l'Association canadienne de la construction (www.cca-acc.com) en mars, la tournée de présentations sur le bulletin de rendement des infrastructures en avril et mai et le discours d'ouverture à la conférence du Canadian Network of Asset Managers (www.cnam.ca) à Halifax le 10 mai sont des événements qui le démontrent. Ils ont tous été d'excellentes opportunités d'affirmer le leadership de la SCGC pour la construction d'infrastructures durables.

CSCE individual members/nombre d'adhésions individuelles, SCGC

CSCE corporate members/nombre de membres d'entreprise, SCGC



Votre prochain président, Jim Gilliland et la nouvelle présidente-désignée, Susan L. Tighe, sont prêts à poursuivre notre croissance. En collaboration avec l'équipe du Bureau national, ils sauront nous guider sur le chemin de la réussite. Vos précieux commentaires et réactions sont les bienvenus en tout temps. Et la meilleure façon de les présenter étant de le faire en personne, nous vous invitons à venir nous rencontrer à London, ON du 1er au 4 juin. Au revoir à tous mes amis et membres de la famille de la SCGC. Ce fût un honneur de vous servir et je vous remercie pour votre confiance. ■

Tony Bégin est directeur principal, réalisation de projets intégrés chez Groupe Canam Inc.

Atlantic Region: Busy season coming up

Jeff H. Rankin, PhD, P.Eng, FCSCE
VICE-PRESIDENT, ATLANTIC REGION, CSCE

All Sections of the Atlantic Region have been quite active this year in providing programming to support their local members and reaching out to the broader civil engineering community.

The last few months were particularly busy as the Atlantic Region Sections played host to four stops of the National Lecture Tour (NLT) on the National Infrastructure Report Card and three workshops on the new edition of the Canadian Highway Bridge Design Code. The NLT in particular is providing an excellent opportunity to partner with local municipalities and industry associations on the topic of sustainable infrastructure.

Some additional highlights of this current year include an emphasis on growing through youth by fostering the strong relationships that each Section has with the Student Chapters at Memorial University, Dalhousie University, Université du Moncton and University of New Brunswick. Joint events between the Sections and Chapters include organizing job shadowing opportunities and local project site tours (Eastern NB and PEI), as well as industry-student dinner meetings with keynote addresses and networking opportunities (Western NB). Of particular note is the re-emergence of the Nova Scotia Section under the leadership of Haibo Niu (Dalhousie University) and the strong growth of the UNB Student Chapter.

Members of the New Brunswick East and Prince Edward Island Section were invited to the Faculty of Engineering at the Université de Moncton last fall for a presentation that was part of an engineering course. Angèle Spencer, P.Eng., project engineer with the City of Dieppe, gave a presentation on the Acadie Avenue/Amirault Street refurbishing project. This event proved to be very popular in our region with participation exceeding 45 people.

This section also created an on-site kiosk to commemorate the historic Aboiteaux infrastructures located in Aulac, N.B. Two bronze plaques were fabricated and installed at the on-site kiosk as well as at the Faculty of Engineering (Université de Moncton). This project was planned, organized and completed with the help and the collaboration of the Department of Agriculture, Aquaculture and Fisheries. The CSCE section provided funding for the plaque at the kiosk. Special thanks goes to Gilles Hebert, P.Eng. and Claude Robichaud, P.Eng. who coordinated the project. An official opening is planned for the fall of 2016. ■

The CSCE Section supported the development of a plaque commemorating the Aboiteaux (dyke) structures at Fort Beauséjour National Historic Site. La section de la SCGC a apporté son appui à l'installation d'une plaque commémorant les structures Aboiteaux (digue) sur le site historique national de Fort Beauséjour.

Région de l'Atlantique : une saison très occupée en vue

Jeff H. Rankin, PhD, P.Eng, FCSCE
VICE-PRÉSIDENT, RÉGION DE L'ATLANTIQUE, SCGC

Toutes les sections de la région atlantique ont été passablement occupées cette année à offrir différentes activités visant à soutenir les membres au niveau local et à rejoindre la communauté plus large des ingénieurs civils.

Les prochains mois seront particulièrement occupés car les sections de la région atlantique accueilleront quatre sessions de la Tournée nationale de conférences (TNC) portant sur le Bulletin de rendement des infrastructures canadiennes et trois formations sur la nouvelle édition du Code canadien sur le calcul des ponts routiers. Les TNC, en particulier, procurent une excellente opportunité de créer des partenariats avec les municipalités locales et les associations de l'industrie sur le sujet des infrastructures durables.

Certains autres faits marquants de cette année incluent l'accent mis sur une croissance avec les jeunes en encourageant les relations solides que chaque section entretient avec les chapitres étudiants de l'Université Memorial, l'Université Dalhousie, l'Université de Moncton et l'Université du Nouveau-Brunswick. Les événements organisés conjointement par les sections et les chapitres incluent l'organisation d'opportunités de jumelage et des visites de sites de projets locaux (est du N.-B. et I.-P.-E), ainsi que des soupers-rencontres entre l'industrie et les étudiants impliquant des conférenciers et des opportunités de réseautage (ouest du N.-B.). Un fait particulier à noter est la réémergence de la section de la Nouvelle-Écosse sous le leadership de Haibo Niu (Université Dalhousie) et la forte croissance du chapitre étudiant de l'UNB.

Les membres des sections de la région Nouveau-Brunswick-Est et de l'Île-du-Prince-Édouard ont été invités à la faculté de génie de l'Université de Moncton l'automne dernier pour assister à une présentation dans le cadre d'un cours d'ingénierie. Angèle Spencer, P.Eng., ingénieure de projet pour la ville de Dieppe, a fait une présentation portant sur le projet de réhabilitation de l'intersection de l'avenue Acadie et de la rue Amirault. Cet événement s'est avéré très populaire dans notre région avec la participation de plus de 45 personnes.

Cette section a également monté un kiosque sur place afin de commémorer les infrastructures historiques Aboiteaux au site historique national de Fort Beauséjour à Aulac (N.-B.). Deux plaques de bronze ont été fabriquées et installées au kiosque du site, ainsi qu'à la faculté d'ingénierie de l'Université de Moncton. Ce projet a été planifié et organisé avec l'aide et la collaboration du ministère de l'Agriculture, de l'Aquaculture et des Pêches. La section de la SCGC a fourni les fonds pour la plaque et le kiosque. Des remerciements particuliers sont adressés à Gilles Hébert, P.Eng. et Claude Robichaud, P.Eng., qui ont coordonné le projet. Une ouverture officielle est prévue pour l'automne 2016. ■

Showcasing Student Talent through Competitions

Charles-Darwin Annan, Ph.D., P.Eng.
CHAIR, STUDENT AFFAIRS COMMITTEE, CSCE

Student competitions are a fantastic way for students to challenge themselves and apply their knowledge to projects outside the classroom. The CSCE Student Affairs Committee is proud to support different student competitions across the country that provide opportunities which suit different interests and ambitions.

In late January, the University of Ottawa hosted more than 500 engineering students for the 2016 Great Northern Concrete Toboggan Race (GNCTR). After months of hard work, 21 competing teams and 3 alumni teams tasked with designing, building and racing a toboggan gathered in Ottawa to compete. Congratulations to the team from Western University in London, Ont., who were crowned overall champions for presenting a superior mix of ingenuity and technical competence. The 2017 GNCTR takes place in Winnipeg, Man. (http://gnctr2017.com).

For the 31st time, the Troitsky Bridge Building competition was held at Concordia University, Montreal, in March. Overall, there were 38 bridge entries subjected to the crushing ceremony, and the Tronald Dumps Bridge from McMaster University came out tops.

Watch for some epic upcoming student competitions and events. This year, CSCE, in partnership with the Canadian Institute of Steel Construction (CISC), will hold the first Canadian National Steel Bridge Competition (http://steelbridge.csce.ca/home/) on May 13-15, 2016. McGill University is proud to host this competition, which will run simultaneously with the 22nd Canadian National Concrete Canoe Competition (http://concretecanoe.csce.ca).

I also invite you to come and participate in the many stimulating student events at the CSCE Annual Conference in London, Ont., on June 1-4, 2016. Notably, the 4th Annual CSCE National Student Capstone Design competition will be held on June 3, 2016. The Annual Student Chapter Leaders Workshop will also be held during the conference.

Winners of all the competitions will be invited to receive their awards during the student luncheon at the conference.

Don't hesitate to contact me for information on how to participate in these competitions and events.

Prof. Annan can be reached at Charles-darwin.annan@gci.ulaval.ca ■

Mettre en évidence le talent des étudiants grâce aux concours

Par Charles-Darwin Annan, Ph.D., P.Eng
PRÉSIDENT, COMITÉ DES AFFAIRES ÉTUDIANTES DE LA SCGC

Les concours étudiants constituent une magnifique occasion pour les étudiants et étudiantes de relever des défis et de mettre en pratique leurs connaissances à des projets à l'extérieur de la salle de classe. Le comité des affaires étudiantes de la SCGC est fier d'apporter son appui aux différents concours étudiants à travers le pays qui procurent des opportunités permettant de rejoindre divers intérêts et ambitions.

À la fin de janvier 2016, l'Université d'Ottawa a accueilli plus de 500 étudiants et étudiantes en génie de partout au Canada venus assister à la Grande course nordique de toboggan de béton (GNCTR). Après des mois de dur labeur, 21 équipes en compétition et 3 équipes d›anciens qui avaient la tâche de concevoir, construire et mettre en course un toboggan se sont réunies à Ottawa pour concourir. Félicitations à l'équipe de l'Université Western, de London, en Ontario, qui a été couronnée championne toute catégorie pour avoir présenté un mélange inégalé d'ingéniosité et de compétence technique. Le GNCTR 2017 se tiendra à Winnipeg (Manitoba). (http://gnctr2017.com/).

La 31e édition du concours de construction de ponts Troitsky s'est déroulée à l'Université Concordia (Montréal) en mars 2016. En tout, 38 ponts ont été inscrits au test du compresseur « The Crusher ». Le pont Tronald Dumps, de l'Université McMaster en est sorti gagnant.

D'autres concours et événements étudiants mémorables sont encore à venir. Cette année, la SCGC, en collaboration avec l'Institut canadien de la construction en acier (ICCA), organisera du 13 au 15 mai 2016 le premier concours national canadien de pont d'acier (http://steelbridge.csce.ca/home/). L'Université McGill est fière d'accueillir ce concours, qui se tiendra en même temps que le 22e concours national canadien de canoë de béton (http://concretecanoe.csce.ca).

Je vous invite également à venir assister et à participer aux diverses activités étudiantes passionnantes qui se dérouleront lors du congrès annuel de la SCGC, à London (Ontario) du 1er au 4 juin 2016. En particulier, le 4e concours national de conception Capstone qui se tiendra le 3 juin 2016. L'atelier annuel destiné aux dirigeants des chapitres étudiants se déroulera également au cours du congrès.

Les lauréats de tous les concours seront invités à recevoir leurs prix au cours du dîner étudiant du congrès.

N'hésitez pas à communiquer avec moi pour plus d'informations sur la manière de participer à ces concours et événements.

Le professeur Annan peut être joint à Charles-darwin.annan@gci.ulaval.ca. ■

Spring at the YP Committee

Bernard Moulins
CHAIR, YOUNG PROFESSIONALS COMMITTEE, CSCE

With the arrival of spring, fresh ideas and endeavours abound, especially at the CSCE YP Committee. During the first quarter of 2016 each region contributed feedback, recommendations, and thoughts in order to establish national goals for the rest of the year. The committee set a CSCE YP 2016 direction, which is in line with the CSCE 2020 Vision: growing with youth, and enhancing member services. Evidently, both these elements were important to the CSCE YP Committee, as it wanted to offer better services to YP members and attract more members across the country.

In order to fulfil this direction, the committee selected tangible goals for 2016. Each region was invited to focus on three event types during the year: mentorship events, YP networking events and student outreach events. Financial resources were also at each region's disposal to help accomplish these goals, which were born from the individual round-table discussions with the representatives of each region. Mentorship, network and student-YP events were repeatedly pinpointed as the three most attended, thought-provoking and fun. Therefore, setting all three as the 2016 goals seemed like an easy way to add value for existing CSCE members, while attracting new ones.

Obviously, there are numerous advantages to this common direction, which has been framed by these three tangible, short-term goals. First, regions can share event ideas and provide feedback on the different formats. Second, regions can create synergies by also sharing resources and contacts. Finally, the most successful nation-wide events can be brought to the attention of different CSCE committees and replicated.

The CSCE YP Committee is excited about this clear direction and the 2016 goals. In our next article, we hope to discuss the most recent YP events across the nation.

If you'd like to join the CSCE YP Committee, please contact me at bernard.moulins@enercon.de ■

Ce printemps, au sein du Comité des jeunes professionnels

Bernard Moulins
PRÉSIDENT, COMITÉ DES JEUNES PROFESSIONNELS, SCGC

Avec l'arrivée du printemps, des idées fraîches et des initiatives nouvelles foisonnent, spécialement au sein du comité JP de la SCGC. Au cours du premier trimestre 2016, chaque région a apporté sa contribution par de la rétroaction, des recommandations et des idées afin d'établir des objectifs nationaux pour le reste de l'année. Le comité a établi l'orientation 2016 des jeunes professionnels de la SCGC, laquelle rejoint la Vision 2020 de la SCGC : croître avec les jeunes, et la bonification des services aux membres. De manière évidente, ces deux éléments étaient importants pour le comité JP, étant donné que ce dernier souhaitait offrir de meilleurs services aux membres JP et attirer plus de membres à travers le pays.

Afin de respecter cette orientation, le comité a sélectionné des objectifs tangibles pour 2016. Chaque région a été invitée à se concentrer sur trois types d'activités au cours de l'année : le mentorat, le réseautage JP et des activités destinées aux étudiants. Des ressources financières furent également mises à la disposition de chaque région afin de contribuer à la réalisation de ces objectifs émanant des diverses tables rondes impliquant les représentants de chacune des régions. Les activités JP de mentorat, de réseautage et celles destinées aux étudiants furent identifiées, et ce de manière répétée, comme étant les trois activités attirant la plus grande participation, stimulant le plus les échanges et la réflexion, et surtout comme étant les plus amusantes. Par conséquent, insérer ces trois activités parmi les objectifs 2016 semblait une façon aisée et naturelle d'offrir plus d'avantages aux membres existants de la SCGC, tout en attirant de nouveaux membres.

Il est clair qu'il y a de nombreux avantages à cette orientation commune qui a été élaborée en grande partie sur la base de ces trois objectifs tangibles à court terme. Premièrement, les régions peuvent partager des idées d'activités et de la rétroaction sur les différents formats. Deuxièmement, les régions peuvent créer des synergies en partageant également leurs ressources et leurs contacts. Finalement, les activités d'envergure nationale ayant le plus de succès peuvent être portées à l'attention des différents comités de la SCGC et être reproduites.

Le comité JP de la SCGC est stimulé par cette orientation claire et les objectifs 2016. Dans notre prochain article, nous discuterons des événements JP les plus récents qui se sont déroulés partout au Canada.

Si vous souhaitez vous joindre au comité JP de la SCGC, veuillez me contacter à bernard.moulins@enercon.de ■

CSCE Advocating to Encourage the Development of Sustainable Infrastructure Systems

Nick Larson, MEPP, P.Eng.
CHAIR, INFRASTRUCTURE RENEWAL COMMITTEE, CSCE

Over the past few years CSCE has been slowly finding its voice for the 21st century. It started with a basic concept – that as stewards of our infrastructure systems we have an important role to play to address the infrastructure challenges of our society. And with the adoption of our strategic direction of "Leadership in Sustainable Infrastructure," our sights were collectively focused on helping our world solve one of the largest problems of our time: how to transition to a sustainable future. We have some of the greatest infrastructure minds across Canada among our ranks and thought it was about time that we help our society solve a piece of this large problem: how to engineer our infrastructure systems to be more sustainable.

What you will hear from the CSCE over the coming years is a continued crescendo of ideas, opinions and solutions to make our infrastructure systems more sustainable. Below you will find a few ideas from the CSCE's Infrastructure Renewal Committee about what we feel needs to be done to, first, address our infrastructure challenges that are outlined in the 2015 Canadian Infrastructure Report Card, and second, to prepare for the opportunity that is on our doorstep as governments at all levels begin to make large-scale investments to renew our infrastructure systems. We will be advocating for these ideas in a multitude of venues across Canada. Over time, each of these broad ideas will become more granular and detailed as we collectively work together to achieve our common goal of a sustainable future supported by sustainable infrastructure systems.

Canadian Infrastructure Report Card

The second iteration of the Canadian Infrastructure Report Card (CIRC) was released in early 2016. This edition has been expanded to include bridges, municipal buildings and transit, in addition to the original asset groups of roads, water, wastewater and stormwater systems.

The CSCE sits on the project steering committee and has been a proud partner of the initiative since the original planning for the first CIRC began back in 2010. The CIRC is firmly positioned as a fact-based document that presents information that was collected directly from municipalities on the state of their infrastructure systems and the state of their asset management practices. The CIRC does not include any advocacy positions about what should be done to address the survey results.

What the CIRC tells us about our infrastructure systems

The CIRC tells us that a large proportion of our infrastructure systems will need to be renewed over the short to medium term in order to prevent a decline in the quality of life that is supported by the systems. Some $388 billion worth of infrastructure is in fair condition or worse, equating to approximately $28,000 per Canadian household. Governments at all levels in Canada recognize this problem and are taking steps to increase their financial investment in our infrastructure.

But, equally as important as financial concerns, the CIRC tells us that there is a widespread lack of maturity in infrastructure asset management-related processes that support informed decision-making related to how our infrastructure systems are renewed. Infrastructure asset management processes provide the tools that will ensure our communities develop sustainable infrastructure systems.

Sustainable infrastructure systems will be the foundation

In 2015, the CSCE Board approved Policy Statement 2015-01: Development of Sustainable Infrastructure. This policy statement was based on the recognition that the civil engineering profession is the steward of Canada's core infrastructure systems. The availability, condition and functionality of public infrastructure systems are widely acknowledged as having a direct impact on the quality of life for all Canadians. The quality of life issues encompass the triple bottom line definition of sustainability, namely the economic, environmental and social values for current and future needs of society. We will not have a sustainable future without sustainable infrastructure systems.

What should be done?

What does CSCE feel should be done to address the infrastructure challenges that are identified in the 2015 CIRC? In short, our

infrastructure systems are not sustainable because we have not engineered them to be sustainable. We have engineered them with other purposes in mind, such as to be cheaper or faster to construct.

Civil engineers have the ability to turn our infrastructure challenges into an opportunity – to bring innovation into the next generation of infrastructure systems that will support our future society. And CSCE is well positioned to provide leadership in the collection of different areas that will need to work together to build the next generation of infrastructure systems: academia, government and the private sector in the disciplines of engineering, public policy and finance.

Here are some areas where the CSCE, and our members, will be working together to make our infrastructure systems more sustainable:

• We will make sure that innovative ideas and techniques around the planning, design, construction, financing and management of infrastructure are encouraged. At the same time, we will work with our partners to redesign how our infrastructure systems are procured by their owners to remove the barriers to innovation that currently exist within our municipal/provincial/federal bureaucracies.

• We will work with other infrastructure stakeholders to develop a long-term investment strategy to ensure that the financial needs of our infrastructure systems do not continue to be passed along to future generations.

• We will provide leadership to implement a Canadian Sustainable Infrastructure Rating System that supports the ability to quantify the sustainable performance of infrastructure projects. This will enable all infrastructure stakeholders to make better informed decisions to ensure that we are first building the right project, and then building the project right.

• We will advance the skills, knowledge and information necessary to achieve our vision for sustainable infrastructure through research, education and technological innovation. This will include working with post-secondary institutions to bring the concepts of sustainable infrastructure into our classrooms at an early stage. This will also include working with research groups in our university network to increase the ability to bring new products or construction techniques to our infrastructure systems.

In short, our infrastructure systems are not sustainable because we have not engineered them to be sustainable.

• We will encourage municipalities to further advance their internal infrastructure asset management processes and demonstrate how these processes will be fundamental to quantifying the sustainable performance of their own infrastructure systems. The CSCE believes that infrastructure asset management processes should have the ability to quantify greenhouse gas emissions of an infrastructure system, be able to justify the adoption of a new product/construction technique that would result in lower GHG emissions, and be used to understand the resiliency of an infrastructure system to climate change.

• Finally, we will partner with national organizations and government agencies to bring the American Society for Civil Engineering 2018 International Conference for Sustainable Infrastructure to Canada.

All members have a role to play

CSCE is looking inward toward our members to help in our advocacy efforts. Members from across the organization are in the process of developing white papers to inform the preparation of additional policy statements for board approval. Once a policy statement is approved by the board, then it becomes a formal advocacy position for CSCE.

If you have an idea for how you can help, please contact Nick Larson or Doug Salloum to share your thoughts. ■

Nick Larson, MEPP, P.Eng., works in infrastructure planning and asset management with GM BluePlan Engineering Ltd.

National Historic Civil Engineering Sites

Each year at the CSCE annual conference, the society's National History Committee selects a site or project from the region in which the conference is being held as a National Historic Civil Engineering Site.

Through this program the committee aims to make the general public and engineers themselves more aware of the rich history and heritage of Civil Engineering in Canada. A commemoration ceremony is held during the CSCE conference, and a plaque is placed on the chosen site, in a place where it is readily visible to the public.

Since the program began in 1983, 66 national, international and regional sites have been designated.

In 2016 two sites are being designated as National Historic Civil Engineering Sites, both in London, Ontario. One is the Egerton Street Double Sewer (see article this page). The other is Blackfriars Bridge (see article page 16).

EGERTON STREET DOUBLE SEWER

A century ago, concern about public health in London, Ontario caused Willis A. Chipman to champion the construction of a sewer system. This year the sewer is designated as one of two 2016 CSCE National Historic Civil Engineering Sites.

By John V. Lucas, P. Eng., MCSCE
CSCE/SCGE CONFERENCE HISTORIC SITE CHAIR

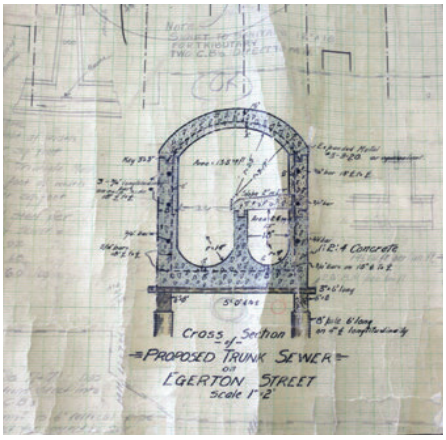
Civil engineers continue to serve the public health of Canadians. In London, Ontario, this understated role will be celebrated by designating the 100-year-old Egerton Double Sewer as a Canadian Society for Civil Engineering National Historic Civil Engineering Site at the 2016 CSCE Annual Conference. The historic site designation also commemorates the role of Willis Chipman, C.E., a national figure in Canadian civil engineering who rose to meet a public health challenge by promoting and helping to design the sewer.

In the mid-19th century, London was a frontier oil town, with its water supply coming from private wells. Poor sanitation caused many cases of typhoid in settlers. The Thames River was the city's unofficial sewer. Open drains, human waste deposits in the river, and the milking of cows on public sidewalks created concern about public health. In 1877, the city built a drinking water system, but its combined sewers were in extremely poor condition, leading Willis Chipman, in his 1892 report to condemn and warn the city council that "your sewers

London Engineering Department

Above: View inside the sewer, with storm flow on the right and sanitary flow under cover on the left .Built during WWI, the sewer was constructed at the rate of up to 25 feet per day.

London Engineering Department



Left: The City of London maintains the original single roll linen design drawing of the 7,400-ft. long sewer. The smaller photos show details.

in the present condition are a menace to the health of your city." He also noted the haphazard way they had been built without an overall plan in mind. He proposed that interceptor sewers be built to direct sewage to a new filter farm.

In 1896, the London Board of Health noted a death rate of 12.3 per 1,000, including: 65 cases of typhoid with 12 deaths; 141 cases of diphtheria with 12 deaths; 6 deaths from cholera; nine deaths from dysentery; and nine deaths from diarrhea; all within a population of 36,200. Concern about public health impacts was summed up in this way: "Typhoid fever is one of the diseases for which defective sewerage is blamed. Now, the death rate from typhoid in London is about three times higher than it is in the crowded cities of the continent of Europe.... Twenty-five years ago when these cities had no sewerage, their death rate from this disease was two or three times greater than ours is now; today with improved systems of sewerage, their death rate is only one third of ours."

Notwithstanding the obvious waterborne disease public health problem, it is interesting to note that the city fathers of the day promoted the sewer work (and the expenditures) on the basis of economic prosperity — car shops were coming! The mayor also wanted to resolve a number of Supreme Court nuisance verdicts about depositing sewage in the river. On this, a lawyer quipped at a public meeting: "The natural place for the sewage of any city is a river, God Almighty gave us rivers to drain the country."

Fortunately, this position was not held by the public and politicians. Approvals and funding soon flowed and construction commenced. Some of the pipes installed in 1896-7 as part of the interceptor system remain in service today. The filter farm is the site of London's Greenway Pollution Control Centre, which now services 60% of London's 381,000 people.

Two separated systems within one structure

Another recommendation by Chipman was that all new sewers were to be built as separated systems because "it is important that the volume of sewage be a minimum and that it be a constant quality" for sewage treatment. Also, separated systems would be "much better from a sanitary standpoint." He was brought in to design the "East End" system, the backbone being the Egerton Street Double Sewer. This rare format of two separated sewers within one structure has been reported in only a few other instances across Canada.

The City of London maintains the original single roll linen design drawing of this 7,400-ft. long sewer, including hand notations and on-site design details by the site engineers. Also on record are the East End Sewerage System as-built drawings on original linen, and copies of Chipman's reports.

It took two years to build the sewer (1914-16) during WWI, often advancing at a rate of 25 feet per day and using construction methods never used in London before. Since the sewer is 25 feet below grade, the contractor used new mechanized equipment: buckets of excavated soil attached to a cable operated by a windlass were drawn backwards to fill in sections already completed, or they were emptied into wagons. The concrete structure was built in five separate pours, most in an open cut trench, some by tunnel.

Willis Chipman, C.E. (1855 – 1929)

Willis Chipman was born in Elgin, Ontario. After graduating from McGill University in 1876 with first rank honors in civil and mechanical engineering, he worked on the construction of the Toronto waterworks. During the 1880s he was engaged in both engineering and land surveying throughout Canada. He founded the Association of Provincial Land Surveyors and served as president. In engineering, he acquired a successful reputation in waterworks and sewerage systems in 41 Canadian cities from Halifax to Victoria.

Concerned with public health, Chipman served as president of the Association of Health Officers of Ontario in 1893. He frequently traveled to the U.S. and England to study sewerage innovations in order to design the most advanced solutions possible.

Chipman was also instrumental in the creation of the Association of Professional Engineers of Ontario, and was its second president. He shared his technical knowledge through publications on his designs, including "London Sewerage System" (*Civil Engineer*), and "The Separated System of Sewerage and Storm Water Drainage" (*Proceedings - Canadian Society of Civil Engineers*). ■

Commemorative Plaque

To mark the designation as a National Historic Civil Engineering Site, a plaque will be installed near the sewer alignment, as follows:

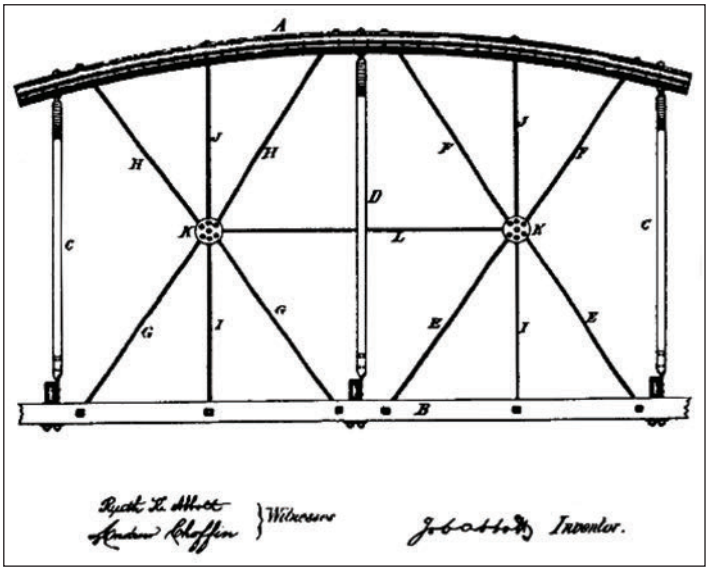
EGERTON STREET DOUBLE SEWER

A tribute to the civil engineers, contractors and workers who designed, built and operated this separated sewer system, achieving a major advancement in the cause of public health. Its workmanship and methods of construction have met the test of time, having served Londoners for 100 years. The double sewer configuration designed by Willis Chipman, C.E., is rare and efficient. It combined a separate sanitary sewer within a larger storm sewer. There is no doubt that this sewer system and those built in the same era across Canada have saved countless lives from waterborne diseases. Owner and Operator: City of London. Engineering Firm: Chipman and Power.

LONDON'S BLACKFRIARS BRIDGE

The second structure in London, Ontario to be designated by CSCE in 2016 as a National Historic Civil Engineering Site dates from an era when wood bridges were frequently replaced by wrought iron structures.

By F. Michael Bartlett, F.CSCE



United States Patent Office

Stanford University Libraries, Department of Special Collections

Dominion Bridge Company Ltd. Library (Archives Canada)

The present Blackfriars Bridge constructed in 1875 is the third structure erected to link the City of London to what was then known as the Village of Petersville. The previous two bridges were of wood construction, whereas the present bridge is a wrought iron bowstring through arch-truss with a 68.4-m span. It was designed and built by the Wrought Iron Bridge Company (WIBC) of Canton, Ohio. The photograph below left must have been taken soon after the new bridge was erected, as the pier foundation for the previous structure is still visible in the middle of the Thames River.

Blackfriars Bridge is indicative of an era in Ontario when wood bridges were replaced by metal bridges. Cuming (1983) reports that "towns such as Brantford, Peterborough, London and Paris all had wrought iron bridges constructed in the seventies.... Wrought iron bridges proliferated in the United States and in some cases appear to have made significant inroads into southwestern Ontario towns. London for instance had seven iron bridges."

1870s-era structural innovations

Blackfriars Bridge is a product of an era of intense competition amongst wrought-iron bridge fabricators and represents the zenith of wrought-iron bowstring arch-truss technology. This is reflected in the Wrought Iron Bridge Company 1874 book of designs (WIBC 1874), which contains technically credible information that is consistent with modern bridge design standards. For example, it recognizes that pedestrians are the governing live load, and, based on credible literature reviews, specifies pedestrian loadings that are consistent with those in modern codes. It also contains other information that clearly

Above left: Double-panel diagonal arrangement from Abbott's 1876 patent (Abbott 1876). Left: Photograph of 1875 Blackfriars Bridge taken shortly after it was erected, with piers of the previous bridge still visible in the Thames River.

distorts engineering science, perhaps to ensure the economy of WIBC products in a very competitive market.

Blackfriars contains, or contained before renovations in 1950, eight features of 20 included in WIBC's most significant U.S. patent, dated 11 February, 1873.

wikipedia.org. 2015.

Above: Three of a series of stained glass images of the bridge created by local artist Ted Goodden.

Blackfriars Bridge also features a double-panel web diagonal arrangement that was patented in America (see drawing) by Job Abbott (Abbott, 1876). The web diagonals at midspan each cross two panels at an angle of approximately 45 degrees to the horizontal, making the diagonal structurally more efficient and so reducing its volume by 20%. The patent was filed 10 months after Blackfriars opened to traffic, perhaps because the state of structural analysis in the 1870s was insufficient to determine the web member forces accurately. Each bowstring arch-truss is statically indeterminate to the 13th degree, requiring the original structural analysts to make simplifying assumptions because the solution of statically indeterminate structures was not understood in the 1870s. Procedures can be envisaged to identify essential load paths and so demonstrate that the double-diagonal system is safe, even though such procedures would not be sufficient to quantify precisely the loads in the web members (Bartlett et al, 2009).

Job Abbott and Dominion Bridge

Sir John A. Macdonald's National Policy created tariffs that prevented WIBC from selling bridges in Canada. With a new Canadian railway to the Pacific Ocean proposed, Job Abbott created a branch plant of the firm in Toronto named the Toronto Bridge Company in 1878. "This company was a small concern and only fairly successful, since its very first contract, a 180-foot span of 42 tons, for London, Ontario, (at the price of $4,000) was dropped into the river during erection, and the company was held liable for its repair and replacement" (Shearwood, n.d.). In 1882, Abbott, as president, secured funding from three Scottish investors for a new venture titled the "Dominion Bridge Company" to be sited in the vicinity of Montreal, which subsequently became the most significant Canadian steel bridge company in the 20th century.

Contribution to London's cultural fabric

Blackfriars Bridge is a key piece of the cultural fabric of London. It has been widely photographed, drawn, and painted, and in the early 1980s a series of stained glass images were created by London artist Ted Goodden that are exhibited in Centennial Hall in London. Three of the images are shown above (wikipedia.org, 2015).

Commemorative Plaque

To mark the designation by CSCE as a National Historic Civil Engineering Site, a plaque will be installed at the bridge site, as follows:

BLACKFRIARS BRIDGE

A tribute to the civil engineers, contractors, and workers who designed, fabricated and erected this bridge to maintain an important social, political, and economic link between London and Petersville. The bridge is a rare survivor of the through arch-truss form fabricated by the Wrought Iron Bridge Company of Canton, Ohio. The original pedestrian design loadings are consistent with those specified in modern codes. The centre four truss panels feature a double-panel diagonal configuration that was patented in America one year after the bridge opened on 27 September, 1875. Blackfriars Bridge has also been woven into the cultural fabric of London.

References

Abbott, J., 1876. Improvement in metallic arch-bridges. United States Patent 184490, November.

Bartlett, F. M., Graham, J. M., and Camiletti, J., 2009. "1870s Innovation in London Canada's Blackfriars Bridge." *Proc. ICE – Eng. History & Heritage*, 162 (2): 111-117.

Cuming, D.J., 1983. *Discovering Heritage Bridges on Ontario's Roads*. Boston Mills Press, Erin Ont., 96 pp.

Wikipedia 2015. Blackfriars Street Bridge. <https://en.wikipedia.org/wiki/Blackfriars_Street_Bridge> [Last accessed 31 Jan 2016]

Shearwood, M.H., n.d. (mid 1930s?). *Whence Came this Dominion Bridge that Spans the Dominion of Canada*. Publisher and place of publication unknown. 57 pp.

Wrought Iron Bridge Company, 1874. *Designs of Wrought Iron Bridges Built by the Wrought Iron Bridge Company of Canton Ohio*. Hartzell & Saxton Printers, Canton, Ohio. ■

Resilient Infrastructure

June 1–4, 2016 | Le 1–4 juin 2016 | London, Ont.

Welcome to CSCE 2016 London!

We are delighted to invite you to register for the CSCE 2016 Annual Conference with the theme Resilient Infrastructure. Additional specialty conferences on environmental, materials, structural and transportation engineering, as well as natural disaster mitigation, will create the perfect forum for interaction between industry professionals, academics and government delegates. The presentations of peer-reviewed papers and innovative case studies will inform practising Canadian civil engineers of new developments in infrastructure resilience.

We are delighted by the response to date: more than 640 abstracts have been received including 120 for project-profile presentations. We are very excited about the internationally-known speakers who will be making keynote presentations at the conference. We will be supplementing the technical sessions with an informal off-site event, where old friendships can be renewed and new ones germinated, and optional trips to tour Western University's unique wind engineering laboratory and to celebrate two new National Historic Civil Engineering Sites.

London is proud to host the conference at the London Convention Centre with accommodation available at the nearby Delta Armouries Hotel. Early June is a lovely season to explore our beautiful and diverse city and the surrounding communities.

The London 2016 Conference Organizing Committee looks forward to hosting you in London from June 1 to 4.

Mike Bartlett, Chair

TOP PARTNERS

AUTODESK.

Ontario

WSP

London CANADA

Responsible Choice | Choix Responsable

Technical Tours

Wind Engineering, Energy and Environment Dome (WindEEE)

Tour Date: Thursday, June 2, morning (2 hours)

WindEEE is the world's first hexagonal wind tunnel. It generates realistic tornadoes and other three-dimensional wind phenomena. Building upon Western University's strong legacy of wind research infrastructure, this unique structure has an inner diameter of 25 meters with 106 fans unevenly distributed, to allow wind simulations over extended areas and complex terrain.

This tour will give the dynamics of real wind environment and conditions. The main topics of research at WindEEE relate to: impact of non-synoptic wind systems (such as tornadoes and downbursts) on buildings and structures, optimization of wind farms and wind turbines, and physical modelling of flow over rough surfaces, urban canopies, and complex topography.

There are limited spots available so register early, at the conference info desk. Transportation is provided. Cost included with conference registration. ■

The London Wastewater Facility allows testing and demonstration with flows up to 4500 m^3/day.

London Wastewater Facility

Tour Date: Thursday, June 2, afternoon (2 hours)

The London Wastewater Facility (LWF) is a dedicated technology demonstration facility enabling the development and testing of treatment technologies and systems from pilot scale up to full municipal scale. The City of London provided half of funding for the $8-million facility that is located within the Greenway Wastewater Treatment Centre.

LWF has local and regional partners in Western University and the Southern Ontario Water Consortium and is a hub that is linked to other university researchers and platforms in water research. The LWF offers unprecedented capacity for testing and demonstration of technologies, enabling access to full scale municipal flows up to 4500 m^3/day, drawing effluent from all stages of the sewage treatment process, including sludge.

This tour will show the inside of the new facility and include discussions with one of its clients. There are limited seats available, so register early at the conference info desk. Transportation is provided. Cost is included with your registration. ■

Social Evening at Palasad

Thursday, June 2

After a couple days of catching up on the latest papers and technologies, we hope you'll join us for some fun down time to connect with your Canadian and international colleagues. This year's social night is ramping up the fun with an evening at London's premier entertainment hot spot, Palasad. There's something for everyone – bowling, billiards, ping pong, arcade games.

Palasad's comfortable retro-fusion lounge offers plenty of space to kick back and relax with friends, old and new. The entertainment attractions will be available all evening to enjoy casually or to engage your competitive spirit through the organized games and challenges scheduled throughout the night.

The cuisine at Palasad will not disappoint. The evening's menu will offer their famous slow roasted prime rib buffet featuring locally sourced Ontario beef. Palasad also carries a wide selection of domestic and craft beers on tap as well as international and Ontario wines.

Just read the reviews to know you are in for a good time… "so much fun", "fabulous", "great food" (Tripadvisor, 2015). Check out our video featuring Palasad at www.csce2016.ca.

Shuttle service will be provided so your only worry should be warming up your throwing arm. The CSCE London 2016 organizing committee and our sponsor for the evening, Canam Group, look forward to seeing you for a great night out. ■

There's something for everyone at Palasad: bowling, billiards, beer and a roast beef buffet.

Conference Schedule Overview

Wednesday, June 1
- Registration opens
- CSCE committee meetings
- Trade show set-up and opening
- Conference technical sessions begin
- Companion luncheon
- Young professionals reception
- President's welcome reception

Thursday, June 2
- Opening ceremony breakfast and keynote
- Conference technical sessions continue
- Technical tours
- Companion event
- Luncheon keynote
- Social night and dinner

Friday, June 3
- Breakfast and keynote
- Conference technical sessions continue
- Luncheon keynote and student awards
- Historic site dedication
- Trade show closing
- Annual awards banquet
- Young professionals outing

Saturday, June 4
- Breakfast and keynote
- Conference technical sessions conclude
- Luncheon keynote and closing ceremony
- CSCE annual general meeting
- Fellows dinner and young professionals event

Young Professionals Program

Resilient Infrastructure Workshop, Technical Sessions, Tours and an Escape Room on the Agenda

The annual conference is fast approaching, and with it, another exciting young professionals program. Although this program is targeted at young professionals and students, it is open to all conference attendees.

There are lots of exciting things on the program. One highlight is the Resilient Infrastructure workshop, where industry professionals will be hosting a panel to discuss what young professionals and students need to keep in mind about resilient infrastructure in industry practice. On top of that, there will also be our annual Student Leaders Workshop for the members of student chapters across Canada to get together and talk about important issues.

In addition to the technical sessions, there will be several networking and social events including the president's reception, a tour of the Labatt brewery, an escape room, and visits to some downtown establishments.

I encourage you to check out www.csce2016.ca to see all of the seminars, social events, and networking opportunities that are being held specifically for the YP program. Remember that some of these events require pre-registration and additional fees. ■

Keynote

Denis Millette: Lac-Mégantic Emergency Remediation

Dr. Denis Millette

Dr. Denis Millette, ing., P.Eng., Agr., Ph.D., is the principal and senior hydrogeologist at Golder Associates in Montreal, where he leads various contaminated site management projects, as well as hydrogeology and hydrology studies at national and international levels. His field of expertise includes contaminated site management, contaminant hydrogeology, emergency response, hydrogeology, soil salinity, soil and water conservation engineering, international consulting and training.

Dr. Millette was the project director in charge of a team of Golder specialists involved in the clean-up of the Lac-Mégantic train derailment that occurred on July 6, 2013. The derailment resulted in a spill of approximately 6 million litres of light crude oil, destroyed the downtown area of the city, contaminated the Chaudière River over some 120 km and killed 47 residents.

Golder Associates acted as the environmental consultant to support the emergency operations in Lac-Mégantic and to assist with clean-up operations on the Chaudière River and Lake Mégantic. Dr. Millette spent almost five months in the field and was actively involved in planning all aspects of the emergency operations. He interacted with authorities and the various contractors involved in the clean-up.

Dr. Millette's keynote address will focus on the emergency remediation work that Golder conducted at Lac-Mégantic in response to the train derailment. ■

Keynote

Ian Burgess: Connection Behaviour and the Robustness of Steel-framed Structures in Fire

Ian Burgess, B.A., Ph.D., CEng, MIStrucE

Ian Burgess, B.A., PhD, CEng, MIStrucE, studied as an undergraduate at the University of Cambridge and gained his doctorate at University College London, carried out in the structural stability research group led by Professor Henry Chilver. Dr. Burgess also completed a two-year NRC fellowship at McMaster University working in the general theory of flutter in aeroelastic systems. Ian is currently a professor of structural engineering at the University of Sheffield.

In the mid-1980s, Dr. Burgess began a fruitful and enduring collaboration with Roger Plank (now retired as head of architecture at Sheffield) developing numerical techniques for modeling the behaviour of steel and composite elements in fire. After much development, the Vulcan software which emerged from this collaboration is now capable of non-linear modelling of three-dimensional composite buildings as temperature distributions develop through the cross-sections of both beam-columns and slabs.

The full-scale fire tests on the multi-storey building at Cardington were a vital ingredient in the development of the software, and in understanding the complex structural interactions which take place in fire.

Vulcan was the winner of two British Computer Society national awards in 2005.

The main thrust of Dr. Burgess' research remains in numerical modeling, but some very successful experimental work has been done at Sheffield in developing a component approach to connection modeling for fire conditions.

Dr. Burgess' keynote address will focus on the most important current theme – after the tragic events of September 11, 2001 – concerning the robustness of connections in fire and the avoidance of a consequent progressive collapse of buildings. ■

Keynote

Therese McAllister: Tools and Guidance for Resilient Infrastructure

Terri McAllister, Ph.D, P.E., FASCE

Terri McAllister, PhD, P.E., FASCE, leads the community resilience group at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD, and is the federal program officer for the Center for Risk-Based Community Resilience Planning, a NIST-sponsored Center of Excellence. She leads research on resilience at the community scale, focusing on the performance of physical infrastructure systems and how they support social and economic systems.

Her expertise in structural reliability, risk assessment and failure analysis has been informed by disaster and failure studies, including the World Trade Center disaster, Hurricane Katrina flooding in New Orleans, and Hurricane Sandy flood effects on infrastructure systems. Dr. McAllister is also active in code and standard development, including the ASCE 7 Standard on minimum loads and the IBC 2016 Structural Code Committee.

Communities face an abundance of natural, technological and human-caused hazards which sometimes become disasters. The consequences and costs of recovering from disasters can be effectively reduced through improving the resilience of infrastructure systems.

NIST is conducting research to advance infrastructure and community resilience in collaboration with a NIST-sponsored Center of Excellence. Major objectives include the development of community-level performance goals, quantitative science-based resilience assessment tools based on modern principles of reliability and risk analysis, meaningful measures of resilience, and documents that can guide communities and support rational public policies for mitigating risk to communities. Methods to assess the performance of the built environment, and its impact on social and economic systems, are being developed, including performance goals, loss and recovery of community functions, and economic impacts.

To better inform the research, NIST is also engaging with communities to better define resilience needs.

An update on current progress and challenges will be presented, as well as the contributions that engineers can make to help communities become more resilient. ■

Resilient Infrastructure in Canada's Severe and Diverse Environments

On behalf of the technical program committee, we invite you to attend the CSCE Annual Conference in London, taking place from June 1-4. Our theme of "Resilient Infrastructure" is to recognize Canada's leadership in the design of infrastructure within one of the world's most severe and diverse environments. We accepted more than 650 abstracts for paper submissions in various disciplines of civil engineering, including 118 project profiles presentations. We have five specialty conferences presenting state-of-the-art innovations and case studies presenting real life engineering projects.

• CSCE 2016 Annual General Conference
Antony Fediw, co-chair
Aaron Rozentals, co-chair
Scott Mathers, co-chair
Trevor Scott, technical secretary

• The 11th International Transportation Specialty Conference has invited more than 60 authors to submit papers, covering many innovations in design and construction of highways, rapid transit and active transportation facilities. Highlighted papers this year include the City of London's Cycling Master Plan and construction of the Region of Waterloo's rapid transit system.
Jeff Matthews, co-chair
Ryan Vanderputten, co-chair

• The 5th International Structural Specialty Conference has invited 180 authors to submit papers which cover both industry project cases and novel research studies. Highlighted topics are: bridge design, construction, rehabilitation and management, composite behaviour between construction materials including FRP, structural behaviour under blast loads, structural fire engineering, and innovative and accelerated construction techniques.
Maged Youssef, co-chair
Brad Schmidt, co-chair

•The 5th International Materials Specialty Conference has invited more than 50 authors to submit papers. In chorus with the main conference theme, resilience, a substantial number of the papers deal with the sustainability and durability of civil infrastructure materials, emerging composites and ultra-high performance materials, along with innovative fields such as nano materials, self-healing materials and various topics that bridge materials applications and various branches of civil engineering.
Moncef Nehdi, chair

• The 5th International Natural Disaster Mitigation Specialty Conference has invited more than 60 authors to submit papers which cover recent research and technological advances concerning the assessment of extreme wind effects on buildings, bridges and other civil infrastructure. The topics present new developments on wind, load evaluation, physical testing and computational methods, and wind- and earthquake-induced building motion mitigation through novel damping technology.
Girma Bitsuamlak, chair

• The 14th Environmental Specialty Conference has invited 50 authors to submit papers covering recent research and technological advances concerning the assessment and sustainable management/remediation of environmental impacts to soil, air and water. Interesting topics include emerging contaminants in the environment, including pharmaceuticals, and risk-based performance of storm water drainage networks under climate change.
Sandra Carrelas, chair ■

The following articles, in the form of extended abstracts (beginning on page 24), are selected from papers that are to be presented at the CSCE 2016 Annual Conference. For more information, go to: http://www.csce2016.ca/technical-program/

I AM CIVIL ENGINEERING

GLEN CARLIN
CEO, The Jacques Cartier and Champlain Bridges Inc.

What is my job?

As Chief Executive Officer of The Jacques Cartier and Champlain Bridges Incorporated (JCCBI), my role is to ensure that the major infrastructure managed by the Corporation, which is crucial to public transportation and the Canadian economy, remains safe, fully functional and aesthetically pleasing, today and in the future. I lead a big team of engineering, planning, construction and structural maintenance professionals who oversee the regular inspections of our infrastructure and the planning and execution of cutting-edge engineering work. I use my technical expertise, structural knowledge, and all of my in-the-field experience to guide our teams through these large-scale projects.

Why I am a civil engineer?

As a civil engineer, I get to actively participate in building and repairing major and crucial infrastructure that helps people get where they need to go. This work is incredibly stimulating! When you have the opportunity to get involved in projects with very complex technical challenges that required innovative solutions, you have to seize it without hesitating. It's important for engineers to find the best possible solutions to our challenges—and then dare to implement them.

The project I worked on that I think best represents sustainable infrastructure?

In 2016, we are finishing the redecking of the Honoré Mercier Bridge, which is a large-scale project with multiple challenges. Through the replacement of the original reinforced concrete deck, from 1959, with one made from high-performance precast concrete with galvanized reinforcement, this 8-year project will extend the bridge's service life by 75 years. This project, which is in collaboration with the Mohawk community of Kahnawake, is a great example of technical success, collaboration and sustainable development.

Using Laser Induced Fluorescence (LIF) to Establish Monitoring Well Network of Migrating LNAPL Plume in the Vicinity of Surface Water

By Laura Jones, Golder Associates Ltd.

The former Michigan Avenue Landfill (now Canatara Park) was used by the City of Sarnia for disposal of municipal waste between approximately 1930 and 1967. Between approximately 1930 and 1944, oily waste was reportedly disposed of at the site from one of the local refineries. This waste material was reportedly a by-product of a process that used clay to remove colour impurities during the production of automobile lubricating oil.

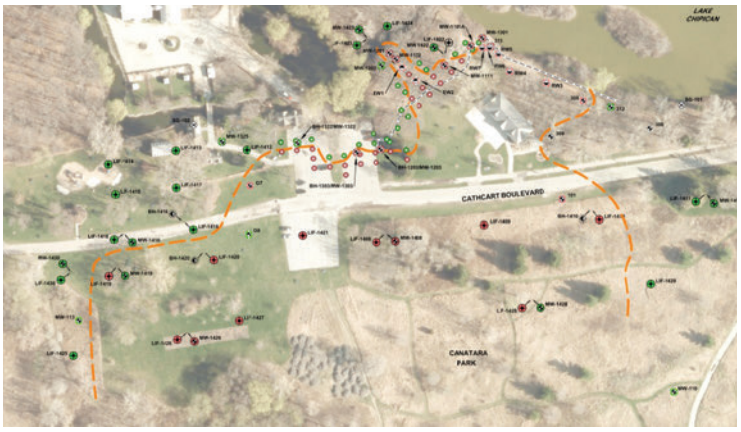
In 1997, light non-aqueous phase liquid (LNAPL) was discovered at the southwest shore of Lake Chipican, north of the former landfill. In response, temporary measures were taken by the city to contain and collect the oil film at the lake. In 2000, remedial measures were developed to mitigate the discharges from former Michigan Avenue Landfill including installation of a 70-metre-long sheet-pile barrier wall along the south shore of Lake Chipican and installation of two oil recovery wells south of the barrier wall.

Monitoring program

An annual monitoring program commenced in 2000 to detect LNAPL at monitoring locations prior to potential migration to Lake Chipican. During routine monitoring in October 2011, LNAPL was detected in a sentry well located near the west end of the barrier wall which prompted additional remedial measures.

Since LNAPL was discovered in a sentry well, a subsurface investigation was undertaken to determine the current extent of LNAPL in the vicinity of Lake Chipican. The subsurface investigation used Laser Induced Fluorescence (LIF) to delineate the extent of the LNAPL plume and to determine locations for additional monitoring wells to provide advance warning of plume migration prior to encountering sensitive receptors.

LIF uses a built-in laser to emit short pulses of light of a certain wavelength range. Polycyclic aromatic hydrocarbons (PAHs), present in the automobile lubricating oil, fluoresce when excited by light of a known wavelength and emit light of a specific wavelength range. LIF provides rapid semi-quantitative results in the field to allow for quick decision-making regarding the progress of the investigation.



An LIF investigation was completed at 49 locations and monitoring wells were installed at nine locations near Lake Chipican.

In April 2012 and April 2013, an LIF investigation was completed at 49 locations and monitoring wells were installed at nine locations near Lake Chipican and associated surface water bodies to provide advanced warning of LNAPL plume migration. The LIF program was able to identify a narrow band of migrating LNAPL. Monitoring wells were installed in locations beyond the migrating LNAPL plume to provide advance warning of further migration of LNAPL towards surface water bodies.

The LIF program was able to achieve high resolution data in the field which allowed the investigation to proceed in a systematic way and allow for cost effective delineation of the LNAPL in one mobilization using a finer spacing between locations than would be used using monitoring wells.

The additional wells were incorporated into the annual groundwater monitoring program and have been included as trigger wells in the "trigger and contingency plan" for the former landfill. Since the start of the LIF investigation program, additional LNAPL migration has been discovered based on the network of monitoring wells installed and results of the LIF investigations. ■

Queen Richmond Centre West – Innovation in Practice

Zoran Tanasijevic, P.Eng.
Sobhy Masoud, PhD, P.Eng.
Stephenson Engineering Ltd.

In 2015, Queen Richmond Centre West (QRCW) opened its doors to the first wave of eager tenants. By that time Toronto as a whole had fallen in love with QRCW and its innovative revitalization of two existing heritage buildings.

The history of QRCW begins in 1910 when Weston Bakery originally constructed the Peter Street location to serve as a biscuit factory. By the 1970s the factory was transformed into an office and fashion showroom. In 1998 Allied Properties REIT (the owner) acquired the property; tenants at the time were nightclubs such as Distrikt and the Light Lounge.

In 2010, the owner commissioned Sweeny &Co Architects (the architect) to design a landmark mixed-use development in Toronto's entertainment district. Given the positioning of the two existing heritage structures on the site, the architect engaged Stephenson Engineering (the engineer) and presented the structural engineering firm with the challenge of suspending an office building above the two existing structures. This configuration would form a large L-shaped, glass-enclosed atrium with direct access from streets to the east and south of the complex and to a mid-block public lane to the north. The architect's desire to offer office space with clean, unobstructed ceilings drove their selection of an exposed reinforced concrete structural system for the 11-storey tower.

Tabletop platform is the solution

The engineer developed a solution which called for the creation of a "tabletop" platform seven stories in the air, from which the office building could be constructed. The tabletop's supporting structure was a significant challenge considering the enormous loads involved; the need for lateral stiffness given the eccentric location of the elevator core; the unbraced height from the top of the foundation level to the underside of the tabletop (more than 75 feet); and the architectural desire to support the building above with a structure that wouldn't clutter the atrium.

The engineer and architect were part of a design charrette, which resulted in the design of the Mega Delta-Frame system that was ultimately employed in the design and construction of the building.

Each of the three frames is an hourglass space frame configuration formed from two stacked rectangular-based space frame pyramids – the top pyramid being inverted such that the apexes of both pyramids meet at one central node 40 feet in the air.

The Mega Delta-Frames also form a major part of the lateral system – the only other effectual lateral support through the atrium space is provided by reinforced concrete stairs and an elevator core. Each Mega Delta-Frame is capable of supporting forces of 80,000 kN, which is approximately equivalent to the weight of 400 transport trucks.

Each frame is comprised of 39-inch diameter steel legs with a steel thickness of two inches, pressure-filled concrete and a 17-ton cast steel node engineered by Cast Connex. The result is a soaring open air atrium that sets the development apart from any other.

Sustainable features of the building include a cistern for collection and re-use of rainwater; daylight harvesting with solar shading and light shelves; exterior shading for reduced solar heat gain; advanced coated glazing for optimized light penetration; operable windows and individually controlled ventilation; raised flooring with pressurized underfloor air distribution; and water-efficient plumbing fixtures.

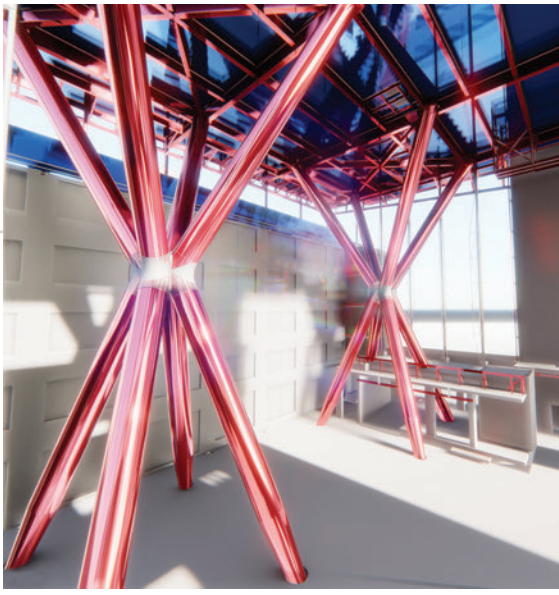


Photo by Enscape TM

BIM rendering showcasing the innovative tabletop design.

Award-winning design

The development as a whole accommodates urban intensification, which is an important aspect of sustainable development given its impact on a wide range of important environmental issues, including travel behaviour and transport provision, resource efficiency, social equity, accessibility and economic viability.

For its structural design the engineer has received numerous awards including: the 2015 Canadian Consulting Engineering Schreyer Award, the 2013 Innovation Award from the Toronto Construction Association, and the 2015 Award of Excellence in Engineering from the CISC Ontario Steel Design Awards.

QRCW emerges as a great example of multiple teams working together to come up with a desired outcome. The team used design workshops to explore and develop an incredible building design while maintaining a collaborative, mutually beneficial approach. ■

Towards a Robust Wind Tunnel–based Evaluation of Extreme Wind Loads

Haitham Aboshosha, PhD, P.Eng., M.CSCE, M.ASCE
BOUNDARY LAYER WIND TUNNEL LABORATORY (BLWTL), WESTERN UNIVERSITY, LONDON, ONTARIO

Proper modeling of the boundary layer flow is essential for wind load evaluation under extreme events such as hurricanes. This layer is formed due to the interaction of wind with natural or man-made obstacles over the surface of the earth. Such interactions generate drag forces proportional to the roughness of the ground which shape the characteristics of the boundary layer, including mean velocity and turbulence intensity profiles, as well as the spectral contents and correlations. In the current study, a robust technique for evaluating extreme wind loads using wind tunnels is proposed and validated. The technique is based on automatic identification of effective ground roughness at a site of interest using aerial Google images and reproduction through automated roughness blocks mounted on the wind tunnel floor, a dynamic turntable to recreate the wind direction effects, and high-resolution pressure and load measurements. In addition to enhancing efficiency, these automations limit the subjectivity involved in this type of study.

The main steps are summarized as follows (also shown in the accompanying flowchart, p. 27).

1. Site location is identified using longitude and latitude. Then, Google images at the site location are downloaded and combined to form two maps: a large scale map covering distances ± 10 km (to characterize close details to the site) and a small scale map covering distances of ±100 km (to characterize far details from the site). Information such as angle of the illumination and time of image capture are also considered.

2. The two maps are segmented into zones based on the gradient of the grey-scale image. Then each zone is classified into a water, vegetation, building or non-building zone and roughness of each zone is estimated.

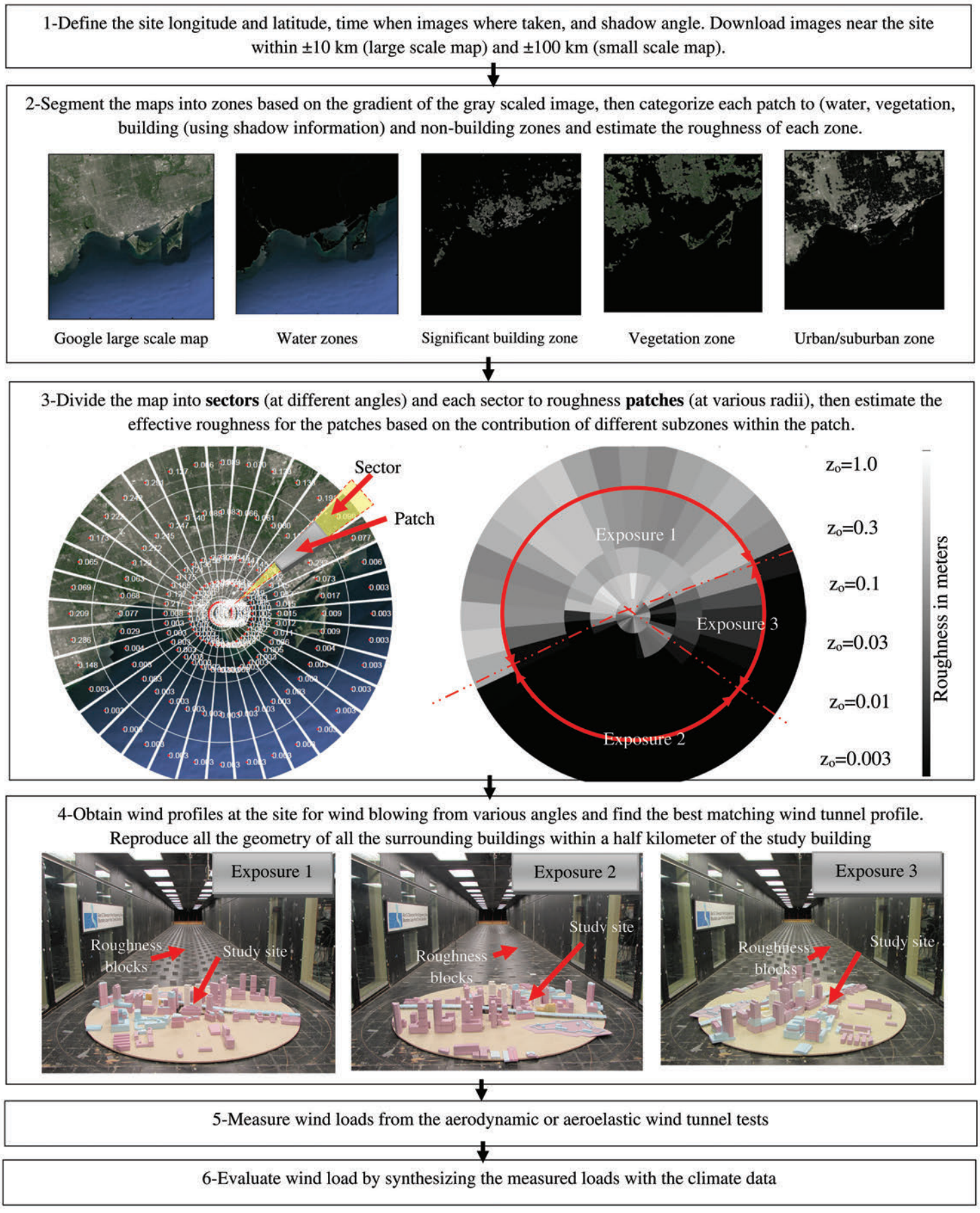
3. Each map is divided into roughness sectors, to represent various wind directions approaching the site, and each sector is divided into roughness patches. Effective roughness within each patch is estimated based on the roughness of all subzones identified in Step 2.

4. Applying the Engineering Standard Data Unit (ESDU) methodology (based on the Harris-Deaves atmospheric boundary layer model), the target boundary layer characteristics at the site are identified for wind approaching from each direction. An automatic selection routine is developed and used to find the best match between the expected full-scale and simulated boundary layer profiles. This technique reduces the subjectivity involved with characterizing ground roughness. Consideration of the quality and completeness of the location-specific satellite imagery remains an important component of this process. Also, detailed models of surrounding buildings are included to simulate the local effects due to adjacent structures.

5. Wind load is measured either using aerodynamic (e.g. pressure taps, force balance) or aero-elastic models for wind approaching from a full range of directions.

6. The measured loads are combined with the local climate data to evaluate the predicted load or response corresponding to the nominal return period of the extreme event. ■

Figure 1. Proposed technique for evaluating extreme wind loads using wind tunnels



London On Bikes – London's Cycling Master Plan

Claire Basinski, B. ES, MCIP, RPP
MMM | WSP
Doug MacRae, P.Eng.
CITY OF LONDON

The City of London has been implementing cycling infrastructure since the 1980s. The city's formal planning efforts to improve the cycling culture within the city were successfully "launched" in 2005 with the development and adoption of the city's first cycling master plan. The first master plan was followed by a strategic implementation plan which was completed in 2007 and used to guide planning, design and engineering efforts by city staff. The completion and adoption of both of these plans has led to the development of a comprehensive off-road network of cycling facilities along the city's Thames River Valley.

Though the city has experienced substantial success in the areas of cycling planning, design and engineering, in recent years there has been increasing support by local residents, stakeholders and staff for a system of cycling facilities that: connects all of the major destinations, communities and neighbourhoods; provides cyclists with a continuous system of on- and off-road facilities; allows for cyclists to feel comfortable when cycling in all areas throughout the city; and provides cyclists with facilities that are considered the most appropriate and safe for the condition in which they are implemented.

Since the development of the original planning, design and implementation master plans, design guidelines, standards and best practices related to the design of cycling facilities have emerged over the past five to 10 years, e.g. Ontario Traffic Manual (OTM) Book 18: Cycling Facilities, Ministry of Transportation Ontario (MTO) Bikeways Design Guidelines, National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guidelines and American Association of State Highway and Transportation Officials (AASHTO) Bike Guide, among others. In order to create a city-wide network of modern cycling facilities that reflect sound engineering and planning judgment, an updated approach to cycling master planning was needed.

Top, London has a mix of on- and off-road bicycle routes. Above, Gibbons Park Bridge.

An updated plan

In 2015, city staff embarked on a project to update the cycling master plan with the help of the consulting team at MMM Group. The master plan was developed as a collaborative effort between the consultant team, staff from various city departments, stakeholders, members of the public and politicians.

The policies, strategies and recommendations contained within the master plan were developed with the goal of achieving five key objectives:

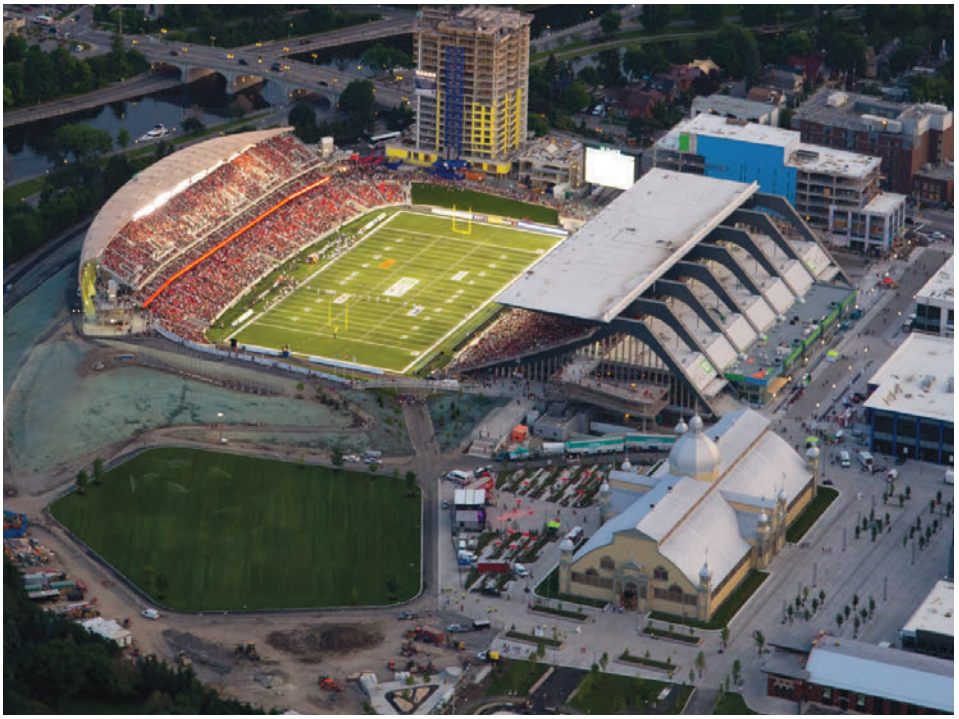
1. Identify a network of new routes, enhancements to existing routes and transitions between on- and off-road routes.
2. Provide facilities that are considered connected, comfortable and

JE SUIS LE GÉNIE CIVIL

TONY BÉGIN, ING., CDP, M.SC.A., MSCGC
Président 2015-2016, Société canadienne de génie civil (SCGC)
Directeur sénior, Réalisation intégrée de projets, Groupe Canam Inc.
St-Georges de Beauce, QC

En quoi consiste mon travail :

Chez Groupe Canam Inc., mon rôle est de promouvoir l'expertise en ingénierie du service de pré-construction de l'entreprise auprès des propriétaires et des développeurs de nouveaux projets de bâtiment. Je travaille en collaboration avec les bureaux d'ingénieurs conseils et d'architectes responsables de la conception. Je participe à l'élaboration des plans et devis avec l'expérience de Groupe Canam en matière de fabrication et de montage de composantes structurales et de l'enveloppe de bâtiment en interaction avec l'architecture et la mécanique du bâtiment. Cette méthode de conception assistée est reconnue dans l'industrie de la construction sous l'appellation de la réalisation intégrée de projets.



Pourquoi j'ai choisi le génie civil:

Quand j'étais enfant, mon père exerçait le métier d'opérateur de machineries lourdes sur plusieurs chantiers de construction à travers la province du Québec. Il m'emmenait souvent visiter ces réalisations et m'expliquait les travaux qu'il avait eu à exécuter. Ses récits, avec des exemples concrets que je pouvais bien visualiser et comprendre, m'ont inspiré à choisir la profession d'ingénieur civil.

Projet sur lequel j'ai travaillé en lien avec la construction d'infrastructures durables:

La réhabilitation et le redéveloppement du complexe commercial du "Lansdowne Park" à Ottawa, ON a été un projet marquant en matière de développement durable auquel j'ai participé. Le client, Trinity Development, a choisi de travailler directement avec Groupe Canam selon une approche innovatrice et collaborative pour la fourniture et l'installation de la charpente d'acier de tous les bâtiments commerciaux sur le site dans le but d'obtenir une certification LEED de niveau Argent.

La performance de montage de la charpente des bâtiments fût 20% à 25% plus rapide que la méthode d'installation traditionnelle. La réduction des manipulations au chantier et des pertes de temps avec l'application de principes "LEAN CONSTRUCTION", connu sous la marque de commerce BuildMaster™ chez Groupe Canam, est à l'origine de cette réussite. La réduction du temps de travail des équipements à moteur a automatiquement réduit l'émission de gaz à effet de serre durant la période de construction pour le bien-être de l'écosystème. C'est un projet auquel je suis très fier d'avoir été associé.

safe for all types of cyclists.

3. Identify route and facility maintenance practices.

4. Identify priorities for implementation to improve connectivity and the overall sustainability of city infrastructure and monies.

5. Build upon programs and initiatives to increase awareness and interest.

The master plan was completed using a four-phase process which was completed during 2015 and early 2016. One of the key components of the master plan is the comprehensive cycling network made up of on- and off-road facilities linking all corners of the city. The network was developed using an eight-stage network development process which is founded on the steps and principles outlined in Ontario Traffic Manual Book 18.

The result of the master planning and network development process is a comprehensive, tool-based master plan that is intended to guide decision-making across various city departments over the next 20-plus years. Included in the master plan are the innovative strategies and recommendations including:

• A phased (short-, medium- and long-term) approach to implementing the cycling network, coordinated with other infrastructure/construction (e.g. EAs, scheduled capital projects, future rapid transit connections, etc.). Implementation is further guided by strategic costing and funding assumptions based on available budgets and economies of scale.

• A strategy for maintaining cycling infrastructure year-round. The strategy takes into consideration the different types of maintenance that are required for various types of cycling infrastructure and includes a proposed approach for maintaining cycling infrastructure during winter months based on available budgets and public expectations.

• An approach to signing the cycling network including both regulatory signage as well as promotional wayfinding to help improve both commuter and recreational cycling and cycle tourism, and to create a clearer and more comfortable transition between on- and off-road facilities.

• Promotion and education initiatives based on past successes and best practices to help promote and encourage local residents to cycle for various trip types and purposes.

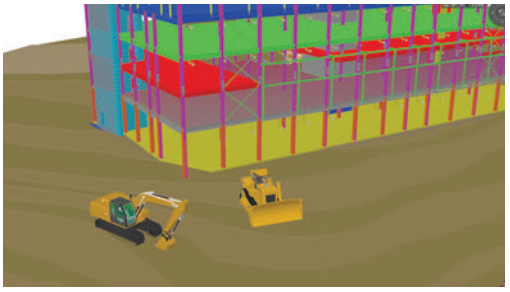
The master plan is not just an update but a revised vision for cycling that is reflective of the cultural change that is so desired by staff, Council, stakeholders and the public. The content has been developed to address the unique conditions found throughout the city while also considering the need for greater environmental, cultural and social change. ■

LIFELONG LEARNING | FORMATION CONTINUE

Using BIM to standardize information flow in design and construction

Mahmoud Lardjane,
PROGRAMS MANAGER, CSCE

June 1, London, Ont.



Traditional ways of delivering projects are being replaced with evolving collaborative processes for design, construction and operations. Digital information helps designers, engineers, contractors, owners and operators to reduce risk on civil projects, increase productivity and realize better quality results.

The presentation is aimed at helping professionals understand and adopt standard approaches for managing model deliverables, communicating model reliability, and planning BIM practices to put them in an advantageous position.

The course is presented by John Dickinson, Ph.D., P.Eng., and Paul Woodard, Ph.D., respectively president and vice-president of Advanced BIM Solutions. Both have extensive experience in BIM planning and standards, and have played a leading role in the development and promotion of BIM in Canada. ■

This course is offered in conjunction with CSCE's Annual Conference.
Formation offerte en anglais au Congrès annuel de la SCGC.

REPORT OF THE NOMINATING COMMITTEE (2016–2017)

The Nominating Committee of the Board of Directors of the Canadian Society for Civil Engineering hereby provides for approval by the members the following nominations to the Board of Directors, as follows:

Position	Incumbent	Proposed	Term
President	Tony Bégin, finishing term	Jim Gilliland	1 yr
President-Elect	Jim Gilliland, finishing term	Susan Tighe	1 yr
Senior Vice-President and Chair, Regional Coordinating Committee	Susan Tighe, finishing term	Darrel Danyluk	1 yr
Past President	Reg Andres, finishing term	Tony Bégin	1 yr
Honorary Treasurer	Glen Hewus, finishing 2nd yr	Glenn Hewus	2 yrs
Vice-President, Administration Coordinating Committee	Wade Zwicker, finishing 1st yr	Wade Zwicker	1 yr
Vice-President, Technical Divisions and Committees	Gopal Achari, finishing 1st yr	Gopal Achari	1 yr
Vice-President Technical Programs	Todd Chan, finishing 2nd yr	John Newhook	2 yrs
Vice-President, Atlantic Region	Jeff Rankin, finishing 1st yr	Jeff Rankin	1 yr
Vice-President, Quebec Region	Jean-Luc Martel, finishing 1st yr	Jean-Luc Martel	1 yr
Vice-President, Ontario Region	Adrian Munteanu, finishing 2nd yr	Adrian Munteanu	2 yrs
Vice-President, Prairie Region	Mike Hnatiuk, finishing 1st yr	Mike Hnatiuk	1 yr
Vice-President, Western Region	Philip Alex, finishing 3rd yr	Philip Alex	1 yr
Vice-President, International Region	Brian Burrell, finishing 2nd yr	Brian Burrell	2 yrs
Member at Large representing Corporate Members	Jean-Pierre Pilon, finishing 2nd yr	Peter Langan	2 yrs
Member at Large representing Heads and Chairs	Ashraf El Damatty, finishing 2nd yr	TBD	

In addition to the above elected Director positions, which are voting positions on the Board, there are two non-voting positions on the Board appointed by others:

Position	Incumbent	Proposed	Term
Representative – Canadian Geotechnical Society (non-voting)	Catharine Mulligan, finishing 1st yr	Catharine Mulligan	1 yr
Representative – Hong Kong Branch (non-voting)	Kelvin Cheung, finishing 1st yr	Kelvin Cheung	1 yr

The Chairs of the Divisions, Committees and Programs of CSCE are also elected or re-elected by the members of the Divisions, Committees and Programs, as follows:

Position	Incumbent	Proposed	Term
ADMINISTRATION COORDINATING COMMITTEE			
Chair, Communications Committee	Seibert, finishing 1st yr	Peter Seibert	1 yr
Chair, History Committee	Sexsmith, finishing 5th yr	TBD	2 yrs
Chair, Business Development Committee	Ghoneim, finishing 2nd yr	TBD	2 yrs
Chair, Membership Services Committee	Calcetas , finishing 4th yr	Peter Calcetas	1 yr
Chair, Honours and Awards Committee	Pickle, finishing 3rd yr	Randy Pickle	1 yr
Chair, Student Affairs Committee	Annan, finishing 3rd yr	Charles–Darwin Annan	1 yr
Chair, Life Members Committee	Wright, finishing 2nd yr	TBD	2 yrs
Chair, Young Professionals Group	Moulins, finishing 1st yr	Bernard Moulins	1 yr
Chair, Conference Committee	Sterparn, finishing 1st yr	Graham Sterparn	1 yr

Position	Incubent	Proposed	Term
PROGRAMS COORDINATING COMMITTEE — Technical Divisions & Committees			
Chair, Cold Regions Division	Burrell, interim	Mathew Follett	2 yrs
Chair, Construction Division	Sadeghpour, finishing 3rd yr	Farnaz Sadeghpour	1 yr
Chair, Engineering Mechanics/Materials Division	Palermo, finishing 3rd yr	Dan Palermo	1 yr
Chair, Hydrotechnical Division	Bender, finishing 4th yr	Kerry Mazurek	2 yrs
Chair, Environmental Division	Mulligan, finishing 1st yr	Catherine Mulligan	1 yr
Chair, Structures Division	Zaki, finishing 2nd yr	TBD	2 yrs
Chair, Transportation Division	Qiu, finishing 2nd yr	Tony Qiu	2 yrs
Chair, Sustainable Development Committee	Tam, finishing 3rd yr	Gordon Lovegrove	2 yrs
Chair, Innovation and IT Committee	Akhras, finishing 1st yr	George Akhras	1 yr
Chair, Engineering Management Committee	Katsanis, finishing 2nd t yr	TBD	2 yrs
PROGRAMS COORDINATING COMMITTEE —Technical Programs			
Chair, Infrastructure Renewal Committee	Larson, finishing 4th yr	Guy Felio	2 yrs
Chair, Engineering Practice Committee	Devkota, finishing 5th yr	Mark Scanlon	2 yrs
Chair, International Affairs Committee	Gupta, finishing 1st yr	Rishi Gupta	1 yr
Chair, Education and Research Committee	Dragomirescu, finishing 2nd	Elena Dragomirescu	2 yrs
Chair, Technical Publications Committee	Newton, finishing 2nd yr	Linda Newton	2 yrs
NLT Coordinator	Garland, finishing 2nd yr	James Garland	2 yrs
Editor, CJCE	Biswas, finishing 1st yr Bartlett, finishing 6th	Nihar Biswas	4 yr

RAPPORT DU COMITÉ DES CANDIDATURES (2016–2017)

Le Comité des candidatures du conseil d'administration de la Société canadienne de génie civil a soumis les candidatures suivantes au conseil d'administration, pour approbation par ses membres.

Poste	Titulaire	Candidat	Durée
Président	Bégin, fin de mandat	Jim Gilliland	1 an
Président désigné	Gilliland, fin de manat	Susan Tighe	1 an
Premier vice-président et Président, Comité des régions	Tighe, find de mandat	Darrel Danyluk	1 an
Ancien président	Andres, fin de mandat	Tony Bégin	1 an
Trésorier honoraire	Hewus, fin de la 2 e année	Glenn Hewus	2 ans
Vice-président, Comité de coordination de l'administration	Zwicker, fin de la 1 ère année	Wade Zwicker	1 an
Vice-président, Divisions techniques et comités	Achari, fin de la 1 ère année	Gopal Achari	1 an
Vice-président, Programmes techniques	Chan, fin de la 2 e année	John Newhook	2 ans
Vice-président, Atlantique	Rankin, fin de la 1 ère année	Jeff Rankin	1 an
Vice-président, Québec	Martel, fin de la 1 ère année	Jean-Luc Martel	1 an
Vice-président, Ontario	Munteanu, fin de la 2 e année	Adrian Munteanu	2 ans
Vice-président, Prairies	Hnatiuk, fin de la 1 ère année	Mike Hnatiuk	1 an
Vice-président, Ouest	Philip Alex, fin de la 3e année	Philip Alex	1 an
Vice-président, International	Burrell, fin de la 2 e année	Brian Burrell	2 ans
Représentant les entreprises membres	Pilon, fin de mandat	Peter Langan	2 ans
Représentant le Conseil des chefs de départements de génie civil canadiens	El Damatty, fin de mandat	TBD	

En plus des administrateurs élus ci-dessus, des candidats sont nommés par d'autres organismes pour les deux postes suivants (sans droit de vote):

Poste	Titulaire	Candidat	Durée
Représentant la Société canadienne de géotechnique (sans vote)	Mulligan, fin de la 1 ère année	Catherine Mulligan	1 an
Représentant la succursale de Hong Kong (sans vote)	Kelvin Cheung, fin de la 1ère année	Kelvin Cheung	1 an

Les présidents des divers divisions, comités et programmes de la SCGC sont également élus ou réélus par les membres des divisions, comités et programmes :

Poste	Titulaire	Candidat	Durée
COMITÉ DE COORDINATION DE L'ADMINISTRATION			
Président, Comité des communications	Peter Seibert, fin de la 1ère année	Peter Seibert	1 an
Président, Comité histoire	Sexsmith, fin de la 5e année	TBD	2 ans
Président, Comité de développement des affaires	Ghoneim, fin de la 2e année	TBD	2 ans
Président, Comité des services aux membres	Calcetas , fin de la 4e année	Peter Calcetas	1 an
Président, Comité des distinctions honorifiques et fellows	Pickle, fin de la 3e année	Randy Pickle	1 ans
Président, Comité des ffaires étudiantes	Annan, fin de la 3e année	Charles–Darwin Annan	1 an
Président, Comité des membres à vie	Wright, fin de la 2e année	TBD	2 ans
Président, Groupe des jeunes professionnels	Moulins, fin de la 1ère année	Bernard Moulins	1 an
Président, Comité des congrès	Sterparn, fin de la 1ère année	Graham Sterparn	1 an
COMITÉ DE COORDINATION DES PROGRAMMES —Divisions et comités techniques			
Président, Division des régions froides	Burrell, interim	Mathew Follett	2 ans
Président, Division de la construction	Sadeghpour, fin de la 3e année	Farnaz Sadeghpour	1 an
Président, Division de la mécanique appliquée et génie des matériaux	Palermo, fin de la 3e année	Dan Palermo	1 an
Président, Division hydrotechnique	Bender, fin de la 4e année	Kerry Mazurek	2 ans
Président, Division de l'environnement	Mulligan, fin de la 1ère année	Catherine Mulligan	1 an
Président, Division des structures	Zaki, fin de la 2e année	TBD	2 ans
Président, Division des transports	Qiu, fin de la 2e année	Tony Qiu	2 ans
Président, Comité du développement durable	Tam, fin de la 3e année	Gordon Lovegrove	2 ans
Président, Comité de l'innovation et des TI	Akhras, fin de la 1ère année	George Akhras	1 an
Président, Comité de la gestion de l'ingénierie	Katsanis, fin de la 2e année	TBD	2 ans
COMITÉ DE COORDINATION DES PROGRAMMES —Programmes techniques			
Président, Comité du renouvellement des infrastructures	Larson, fin de la 4e année	Guy Felio	2 ans
Président, Comité du développement professionnel	Devkota, fin de la 5e année	Mark Scanlon	2 ans
Président, Comité des affaires internationales	Rishi Gupta, fin de la 1ère année	Rishi Gupta	1 an
Président, Comité de l'éducation et de la recherche	Dragomirescu, fin de la 2e année	Elena Dragomirescu	2 ans
Président, Comité des publications techniques	Newton, fin de la 2e année	Linda Newton	2 ans
Coordonnateur, Tournée nationale de conférences	Garland, fin de la 2e année	James Garland	2 ans
Rédacteur, RCGC	Biswas, fin de la 1ère année Bartlett, fin de la 6e année	Nihar Biswas	4 ans

MAJOR PARTNERS / ASSOCIÉS PRINCIPAUX

PARTNERS / ASSOCIÉS

AFFILIATES / AFFILIÉS

CSCE SECTIONS SCGC

Newfoundland
Contact: Bing Chen, MCSCE
T. 709-864-8958,
E-mail: bchen@mun.ca

Nova Scotia
Contact: Haibo Niu
E-mail: haibo.niu@dal.ca

East New Brunswick and P.E.I. (Moncton)
Contact: Samuel Richard
T. 506-857-3164
E-mail: samuel.richard@canamgroupinc.com

West New Brunswick
Contact: Brandon Searle
T. 506-260-3947
E-mail: Brandon.searle@opusinternational.ca

Montréal
Contact: Jean-Luc Martel, AMCSCE
T. 514-918-3249
E-mail: president@scgcmontreal.com

Sherbrooke
Contact: Jean-Gabriel Lebel
T. 514-502-7368,
Courriel: jg.lebel@usherbrooke.ca

Québec
Contact: Kim Lajoie
T. 418-650-7193
Courriel: klajoie@cecobois.com

Capital Section (Ottawa-Gatineau)
Contact: Kevin Alemany
T. 613-724-4091
E-mail: kevin.alemany@stantec.com

Toronto
Contact: Nigel Parker, AMCSCE
T. 647-463-5002
E-mail: nparker@rjc.ca

Hamilton/Niagara
Contact: Ben Hunter, MCSCE
T. 905-335-2353 x 269
E-mail: ben.hunter@amec.com

Northwestern Ontario
Contact: Gerry Buckrell, MCSCE
T. 807-625-8705/807-623-3449
E-mail: gerald.buckrell@hatchmott.com

Durham/Northumberland
Contact: Robbie Larocque
T. 905-576-8500
E-mail: robbie.larocque@dgbiddle.com

London & District
Contact: Patricia Wilbur
T. 226-268-7778
E-mail: trisha.wilbur@csce-cgs-london.org

Manitoba
Contact: Vaibhav Banthia
T. 204-226-4875/204-988-0546
E-mail: vaibhav.banthia@tetratech.com

South Saskatchewan
Contact: Harold Retzlaff, MCSCE
T. 306-787-4758
E-mail: harold.retzlaff@gov.sk.ca

Saskatoon
Contact: Karleigh Pihowich
T. 306-203-6463
E-mail: karleighp@graham.ca

Calgary
Contact: Kris Karvinen
T. 403-716-1489
E-mail: cscecalgarychapter@gmail.com

Edmonton
Contact: Mark A. Scanlon, MCSCE
T. 780-451-7666 x3448
E-mail: scanlonm@ae.ca

Vancouver
Contact: Stanley Chan, AMCSCE
E-mail: csce.vancouver@gmail.com

Vancouver Island
Contact: Jonathan Reiter
T. 250-590-4133
E-mail: jreiter@seng.ca

CSCE Hong Kong Branch
Contact: Kelvin Cheung, MCSCE
T. 011-852-9225-0304
E-mail: kelvin_cheung@wanchung.com

THE PIPE THAT FITS IN SO MANY WAYS.

NovaForm™ PVC Liner

The sewer & culvert rehabilitation solution in the sizes you need.

Aging sewer and water infrastructure has led to ever increasing maintenance costs for municipalities. The engineers at IPEX recognized this development and responded with NovaForm PVC Liner, a product that brings the benefits of factory-made PVC pipe to the North American trenchless pipe rehabilitation industry.

A Size for Every Job

Available in the sizes you need: 6" to 30" and industry-standard dimension ratios DR 35 and DR 41.

Durability of PVC

Useful life of 100 years, plus excellent chemical resistance properties.

Consistent Production

Factory-made, quality-controlled and tested to stringent ASTM standards.

Peace of Mind

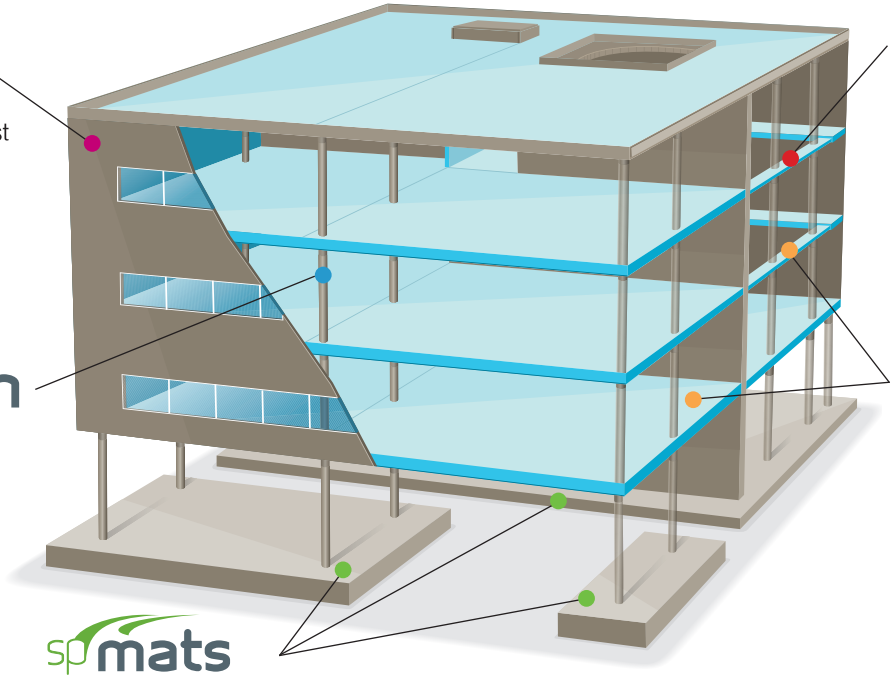
IPEX has been a leading manufacturer of PVC piping systems for more than 50 years and developing trenchless PVC solutions for the past 20 years. Plus, we back everything we sell with in-field technical support throughout North America.

To learn more, call us toll free at **1-866-473-9462** or visit **www.ipexna.com**

IPEX NOVAFORM™ PVC LINER

Work quickly.
Work simply.
Work accurately.

StructurePoint's Productivity Suite of powerful software tools for reinforced concrete analysis & design



spwall

Finite element analysis & design of reinforced, precast ICF & tilt-up concrete walls

spbeam

Analysis, design & investigation of reinforced concrete beams & one-way slab systems

spcolumn

Design & investigation of rectangular, round & irregularly shaped concrete column sections

spslab

Analysis, design & investigation of reinforced concrete beams & slab systems

spmats

Finite element analysis & design of reinforced concrete foundations, combined footings or slabs on grade

StructurePoint's suite of productivity tools are so easy to learn and simple to use that you'll be able to start saving time and money almost immediately. And when you use StructurePoint software, you're also taking advantage of the Portland Cement Association's more than 90 years of experience, expertise, and technical support in concrete design and construction.

Visit StructurePoint.org to download your trial copy of our software products.

For more information on licensing and pricing options please call 847.966.4357 or e-mail info@StructurePoint.org.

StructurePoint
CONCRETE SOFTWARE SOLUTIONS