

The official
publication of
the Association
of Professional
Engineers and
Geoscientists
of Manitoba

THE KEYSTONE PROFESSIONAL

WINTER 2014



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New President**
Howard Procyshyn

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Structural Engineering for Non-Structural Engineers	05-0224-2305	Winnipeg, MB	February 23-26	28
Flood Control, Land Drainage and Stormwater Management	05-0326-2305	Regina, SK	March 19-20	14
Asphalt Mix Design	05-0420-2305	Winnipeg, MB	April 9-10	14
Evaluation and Rehabilitation of Pavements	05-0422-2305	Regina, SK	April 23-24	14
ELECTRICAL				
Modern Power System Protective Relaying	05-0222-2305	Regina, SK	February 2-4	21
Grounding and Bonding of Electrical Systems	05-0423-2305	Winnipeg, MB	April 29-30	14
ENVIRONMENTAL				
Understanding Environmental Regulations	05-0114-2305	Winnipeg, MB	January 28-30	19
Risk Assessment of Contaminated Sites	05-0225-2305	Winnipeg, MB	February 25-27	21
CONSTRUCTION				
Avoiding Construction Claims by Improving the Quality of Drawings, Specifications and Bidding Documents Prepared by Owners and Consultants	05-1023-2297	Winnipeg, MB	January 22-23	14
MECHANICAL				
Mechanical Engineering for Non-Mechanical Engineers	05-0223-2305	Regina, SK	February 9-13	35
Optimizing Equipment and Facilities Maintenance Programs	05-0319-2305	Regina, SK	March 9-10	14
Practical Understanding of In-Plant Cranes and Lifting Equipment	05-0320-2305	Regina, SK	March 11-12	14
A Practical Understanding of Industrial Piping and Associated Equipment	05-0419-2305	Winnipeg, MB	April 8-10	21
Mechanical Engineering for Non-Mechanical Engineers	05-0421-2305	Winnipeg, MB	April 13-17	35



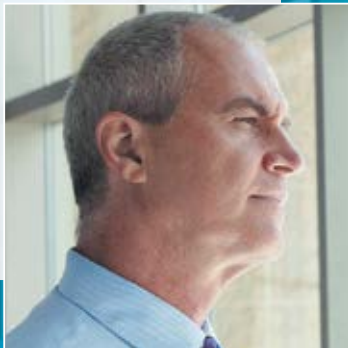
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The Value in Engineers and Geoscientists Cannot Be Understated

Greetings. It is my honor and pleasure to assume the duties of the President of the Association of Professional Engineers and Geoscientists of Manitoba for the next 12 months. I look forward to making a difference in the Association to which we are all connected.

I've spent almost 11 years on the ERC committee and learned the inner workings of the Association, its skills and leadership from the era of Dave Ennis and transition to our current CEO, Grant Koropatnick. From the last two years on Council, I have watched the support staff under Grant's leadership, operate like a well oiled machine. In addition, I have observed countless, dedicated volunteers on various committees working diligently to make our Association a collective success. I've witnessed the continued involvement of Past Presidents in this Association and believe this is truly a credit to the passion and dedication that surround us in this profession and Association.

On Council, I have seen three different Presidents/Past Presidents from Adam Pawlikewich, Dawn Nedohin-Macek and Marcia Friesen, each with a different leadership skill and each bring the style that was unique to their experience as successful engineers. I am now following in the footsteps of Marcia Friesen and want to thank her for her many duties as President in the last year. She represented us graciously and we

“ I look forward to making a difference in the Association to which we are all connected. ”

are truly grateful for her devotion and leadership and look forward to having her support as Past President in the following year.

I congratulate and welcome recently elected Councillors Fred Cross, Ruth Eden, Pamela Fulton – Regula, Roger Rempel, Brett Todd, and look forward to working with you.

I would also like to extend my gratitude and appreciation for the many years of service of retiring counselors Rick Lemoine with six years of service, Dawn Nedohin-Macek with four years of service, Don Spangelo, with six years of service and Guenter Schaub with two years of service. Their contributions have made a significant difference in this Association.

I have spent my entire career in the services consulting business. I have had the opportunity to travel to projects across Canada, USA, Central America, Europe, and Asia. I have worked mostly with architects and have learned a great many things about business, proposals, client and employee engagement, and the importance of not only how it works, but how it looks. I have also

seen the transition of technologies in so many areas of engineering, going back to the software like DOS 1.01 and the evolution of the delivery of services provided by engineers in many capacities.

The value and importance of Engineers and Geoscientists in our society today cannot be understated. We help to craft and shape how people work, and live and how we all move forward in our earthly human journey. As engineers we build things, and these things help to build people. *"My life's work makes life work better."*

There is a recognized need for more engineers at each and every level and as an Association, we recognize the importance of the attraction and retention of engineers in our community, as this is one of the strategic priorities.

I am taking over as President in the evening of my career time, at a time when the Association is vibrant with over 7,200 members, healthy, sound and I look forward to continuing the tradition in one of the greatest professions on earth. I pledge my commitment to represent the Association in the capacity as President for the next 12 months. ☺

“ We help to craft and shape how people work, and live and how we all move forward in our earthly human journey. ”

5 not-so-true ideas about life insurance

(and how to get your facts straight)

1

Employer benefits are enough

Employers usually provide life insurance that's 1–2 times your salary. Is that enough for your family? If you change jobs, will you be able to take your coverage with you?



1–2 times your annual income is usually provided by employers



7–10 times your annual income is often cited as the rule of thumb for coverage amount¹

2

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4

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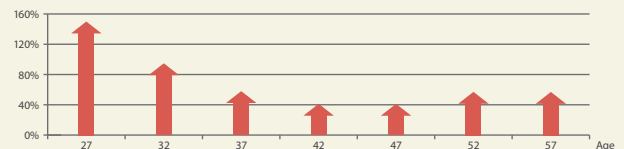
A - (B + C + D + E) = Insurance amount

- A** = Your family's **assets** and income
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¹ http://money.cnn.com/retirement/guide/insurance_life.moneymag/index11.htm

² www.gailvazoxlade.com/articles/just_in_case/how_much_insurance.html

³ LifeGuide® Release 2013.7A



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This is **Your Brand**

I've done a lot of thinking

about branding this year. Perhaps you have too. It seems to be the buzz word of the internet generation. Do you have a personal web page? Blog? Instagram account? If you do, you're likely promoting a specific image or brand.

Do You Have a Brand?

Marketing experts talk about having a "personal brand." Wiki tells me that this term was thought to have been first used in 1997 by author Tom Peters. Do you have a brand? I'm not so sure about me. Is a pressed shirt, good haircut, clean fingernails and shiny shoes a brand? Conversely, some guys shun the business suit and opt for the rumpled t-shirt, jeans and leather jacket look. That too could be a brand for someone. Personal branding is more than clothing choices, it includes other things: names, logos, attitudes, personal values and slogans.

We all recognize the giants of the retail and fast food markets. The golden arches appear all over the world and when you see them you immediately know it's

"McDonald's." The black swoosh and the slogan "just do it" and you've got Nike. Coca Cola, IKEA, Walmart and Apple are examples of business names that have been burned into our collective memories and won't easily be erased or replaced. Why? It's because these corporations spend millions to make sure we know they are present in everyday life; right around the corner. Is it worth their advertising dollars? You tell me.

P.Eng. is Our Brand

Does our profession have an image or brand? Some might say engineers have Dilbert, pocket protectors, calculators and geeky glasses as our brand. I disagree. We have a strong education, mental powers of analysis, propensity for logical processing and a classic fashion sense. Okay, maybe not that last one. When you boil it all down, what have we got? We're left with the defining initials P-E-N-G and P-G-E-O. We all know what these initials stand for. I think the majority of the public recognize them too. However, we need to step-up as proud engineers and geoscientists

and put our brand out there as much as possible. That's why we hope to begin a campaign of strategic advertising. If you were at the AGM last week, you would've seen an item in the budget pertaining to advertising. The amount is \$150,000. Some think this is a lot of money, but I don't. This amount is just a starter amount – seed money. Advertising can cost millions. I assure you, we won't spend millions to get our brand out there, but we will spend thousands. Realistically, it will take \$250-\$300,000 per year to make a difference in brand recognition by the public. Are you with me?

30 Second Pitch

Have you got a 30 second "elevator pitch"? You know, that brief blurb about yourself that you can say quickly while riding up the elevator to your floor. Your pitch should quickly and confidently say who you are, where you're from and what you can do.

Sadly, many of us don't have a pitch. We stumble to say who we are, what we



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do and sometimes incorrectly conclude that “no one really wants to know.” We’ve hired an ad agency to produce a video commercial that we can upload to YouTube and place on commercial television. Hopefully it will be our 30 second pitch that will tell the viewers who we are, where we’re from and what we do for the public of Manitoba. Watch for it coming soon.

Lapel Pin Offer

I have a lapel pin on every suit jacket. As a member, you’re likely to recognize the little gold letters A-P-E-G-M. I’m glad to wear them; after all, I represent the Association wherever I go. However, most people I meet from the general public don’t recognize the letters and ask me “who are you with?” I try to explain the acronym and they lose interest. I end up saying “I’m with the engineers.” As a result, I had some lapel pins made that simply show the letters P-E-N-G. I’ve had them for about 3 months. Now when I say I’m with the engineers, most people get it. They’ll say, I thought you were an engineer from your lapel pin. BINGO! They’re beginning to recognize our brand.

Would you like to wear a pin that proudly says “I’m an engineer”? If you would like one of our new lapel pins, just send me an email and I will send you one. We have stainless steel P.Eng. pins for engineers and brass P.Geo. pins for geoscientists.



Welcome New Councillors

Welcome to our recently elected new councillors Fred Cross, Ruth Eden, Pamela Fulton-Regula and Brett Todd. Watch for stories about these members in the pages of the KP.

Remember our slogan and tell others that... **“My life’s work, makes life work better.”** Your feedback is important. If you have any thoughts on anything, please email me at gkoropatnick@apegm.mb.ca. ☎

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M.G.(Ron)
Britton, P.Eng.

Regulation Beyond the Individual

In Canada, professions are regulated under provincial/territorial law. In turn, provincial/territorial responsibility is accomplished by enacting laws that create profession specific Associations that are assigned the right/responsibility of self regulation. In the case of Engineering, individual provincial/territorial Acts vary in detail, but the rationale behind their existence and their fundamental principles are reasonably consistent across jurisdictions. There is enough consistency that Engineers Canada and their Constituent Associations have been able to develop a mobility agreement that facilitates membership transfer between provincial associations.

This national/provincial/territorial approach to regulation is rationalized on the basis of the assumption that those who practice a specific profession are best qualified to understand, and

“This national/provincial/territorial approach to regulation is rationalized on the basis of the assumption that those who practice a specific profession are best qualified to understand, and therefore to regulate, that profession.”

therefore to regulate, that profession. Typically, Acts relating to professions contain a definition of the scope of practice for which each Association is responsible and with which members must comply. Membership in each Association is restricted to those who are deemed, by that profession, to be “qualified” to practice that profession.

Clearly, the intention of this approach to self regulation is to

assure the public that those who claim to be qualified are, in fact, qualified. If you look at the definition of the practice of professional engineering contained in the definitions section of The Engineering and Geoscientific Professions Act here in Manitoba, that intention becomes very clear. The Act states that the “*practice of professional engineering*’ means any act of planning, designing, composing, measuring, evaluating, inspecting, advising, reporting, directing or supervising, or managing any of the foregoing, that requires the application of engineering principles and that concerns the safeguarding of life, health, property, economic interests, the public interest or the environment”.

So, individually, and collectively, we professional engineers are charged with the responsibility of protecting the public when it comes to “...the application of engineering principles...”.

But wait a minute, what constitutes “...the application of engineering principles...” and what control do engineers have? For example, would it be reasonable to assume that the design and/or selection of rail cars used to transport crude oil is, or should be, “...the application of engineering principles...”?

There have been a number of explosions associated with rail

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transportation of crude oil in Canada recently. With each new incident, almost everyone in authority, public and private, has expressed their concern for public safety. We are told that the technical "culprit" is the DOT-111 tanker car. We are told that this particular piece of "hardware" has long been known to be subject to explosion if/when it is loaded with a flammable liquid and involved in a derailment. Further, we are told that this particular piece of "hardware" still makes up the majority of the oil transportation fleet. We are assured that new, more rigorous regulations governing rail transportation of dangerous substances are being, and/or have been, introduced on both sides of the 49th parallel. But...

There is no question that rail transportation of crude oil is a critical component of the energy sector of the Canadian and American economies. There is no question that the cost of replacing/modifying all DOT-111 rail cars is significant. There is no question that it will take time to replace/modify all DOT-111 rail cars in the system. But...

Would it be fair to suggest that the rail lines are knowingly putting the public at risk based on the fact that they continue to employ equipment that they know to be unsafe? Would it be fair to suggest that government regulators have either been unable or unwilling to intervene on behalf of the public? Would it be reasonable to look at the Manitoba definition of the "practice of professional engineering", and conclude that these corporations/organizations might be practising engineering?

Within our profession, an individual's responsibility is clear. In our Association the charge associated with a member's discipline hearing usually includes the statement that Engineer X "...knew or ought to have known...". Can you imagine the outcome if Engineer X was faced with a charge that read... knew, or ought to have known, when he/she authorized their use, that DOT-111 rail cars loaded with crude oil have a high probability of exploding when involved in a derailment?

If one steps back from the incident specific claims and counter claims that

the media have reported following each accident, there is a deeper question relating to public safety. Engineering legislation/regulation places responsibility on individual engineers, or engineering groups practising under a "certificate of authorization". Apparently, however, corporate entities that create and operate systems that place the public at risk are not held to this same level of responsibility. One can argue that

the Railway Safety Act speaks to responsibility for the safe operation of rail transportation systems, but there seem to be gaps in either enforcement or application.

Given that corporations are, in the eyes of the law, "pseudo persons", does it not make sense to require that they, or the persons within their structure, be held accountable for consequences arising from "...the application of engineering principles..."? ⚡



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Thoughts on Design

...and causes of a failure.

M.G. (Ron) Britton, P.Eng.

Commissioner Paul Bélanger's report on the 2012 partial collapse at the Algo Centre Mall in Elliot Lake, Ontario, has been released to the public. The Inquiry was established "to inquire into and report on events..." relating to the persons and properties associated with this unfortunate incident. The report, that can be found at www.elliottlakeinquiry.ca, represents the complete written record of the process, the findings, and the recommendations.

Given the event that prompted the creation of the inquiry, the report has, as one would expect, a structures/buildings focus. It is based on the facts and submissions that the Commissioner was able to gather. It does not provide conclusions with respect to either civil or criminal liability. It does, however, provide valuable, unbiased, insights. Notwithstanding the value of those insights, given that the English version of the report is 1394 pages long and the French version runs to 1509 pages, only those most directly connected with the buildings industry are likely to comply with the Commissioner's wish that "everyone" read the full report. A 140 page bilingual Executive summary is offered as an alternative.

Those in the buildings/structures industry will, no doubt, see impacts that arise from this Inquiry well into the future. Beyond that, however, one is tempted to wonder if it will have any broader impact.

In this particular case, Commissioner Bélanger submitted a cover letter along with the formal Report. He entitled this letter "REMARKS BY COMMISSIONER PAUL R. BÉLANGER ON RELEASE OF REPORT OF THE ELLIOT LAKE COMMISSION OF INQUIRY". Because this was outside of the constraints of the formal Inquiry report he was able

to express opinions he developed during the hearings. Two paragraphs (reproduced below) from the 19 pages of his bilingual letter strike me as worthy of consideration for all those who are involved in the design process, regardless of the end product.

"Although it was rust that defeated the structure of the Algo Mall, the real story behind the collapse is one of human, not material, failure. Many of those whose calling or occupation touched the Mall displayed failings – its designers and builders, its owners, some architects and engineers, as well as the municipal and provincial officials charged with the duty of protecting the public. Some of these failings were minor; some were not. They ranged from apathy, neglect, and indifference through mediocrity, ineptitude, and incompetence to outright greed, obfuscation, and duplicity. Occasional voices of alarm blew by deaf and callous ears. Warning signs went unseen by eyes likely averted for fear of jeopardizing the continuing existence of the Mall – the social and economic hub in Elliot Lake."

Clearly Commissioner Bélanger was horrified by the picture that emerged during the hearings. He could not include his observations in his formal report. Fortunately he chose to share those observations in his "Remarks". Hopefully his personal opinion will resonate beyond the constraints of his Inquiry Report and beyond the structures/buildings industry. How many projects in how many industries have this same list of potential "villains"? The list goes well beyond, but does not exclude, our profession.

He follows up with a direct shot at the engineers involved in the 30 plus years of the project and its ultimate fate.

"Some engineers forgot the moral and ethical foundation of their vocation and profession – to hold paramount the safety, health, and welfare of the public. They occasionally pandered more to their clients' sensitivities than to their professional obligation to expose the logical and scientific consequences of their observations. Some of their inspections were so cursory and incomplete as to be essentially meaningless. Others were fundamentally flawed because they were based on false assumptions or calculations."

This is a damning condemnation. Hopefully the engineers the Commissioner refers to, the ones whose actions prompted him to write that paragraph, are the exception not the rule. Hopefully, each of us will remember, as we make our assumptions and review our designs, that the public is trusting us to protect them. Hopefully, when we encounter unsafe situations that are none of our d*** business, we will remember "...the moral and ethical foundation..." we all claim to adhere to and take action to intervene.

If we all comply with the codes of conduct that form a part of our respective Engineering Acts, we can then look to specialized training, education and regulation to guard against specific problems. If we, individually or collectively, choose not to comply, then training, education and regulation will be a waste of time. ⊕

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PROVIDING EMERGENCY RELIEF WITH MSF IN SOUTH SUDAN

By L. Robinson, P.Eng.



Diana in the Bentiu POC Camp

APEGM member Diana Nicholson was inspired early in life to work in the field of water and sanitation as a means to help those burdened by extreme poverty and conflict. With this type of career in mind, she completed a B.Sc. in Biosystems Engineering at the University of Manitoba and a M.Sc. in Environmental Engineering and International Development Studies at the University of Guelph. Between her studies, Diana worked at Samson Engineering in Brandon and AECOM in Winnipeg. She is now a water and sanitation (Watsan) specialist with Médecins Sans Frontières/Doctors Without Borders (MSF) and has worked in that capacity in Chad, the Central African Republic and most recently South Sudan. The *Keystone Professional* was able to talk with Diana briefly about her career and what it's like working with MSF.

Can you tell us a bit about how you came to be working with MSF?

I have admired MSF and the work that they do for quite some time. MSF is one of the world's leading independent international medical relief organizations. For more than 40 years MSF has been providing medical help in many kinds of catastrophes including armed conflicts, natural disasters, epidemics of disease,

and malnutrition crises. Action taken can include, but is not limited to, emergency healthcare, mass vaccination campaigns, water and sanitation systems, therapeutic and supplementary nutrition, distribution of drugs and supplies, training and health education, etc. What sets MSF apart is the ability to respond quickly, efficiently, and effectively. MSF observes impartiality and neutrality in the name of medical ethics

and the right to humanitarian assistance. Additionally, in providing humanitarian assistance, MSF acts as a witness and speaks out as appropriate, privately or publicly, regarding the critical needs of the beneficiaries. When I finished my master's degree I applied to MSF alone as they were my first choice of humanitarian organization to work for. Luckily I was accepted!



Moving a latrine superstructure in the MSF health centre in the Bentiu POC Camp

Did you find your master’s degree studies to have focused or otherwise altered your work interest?

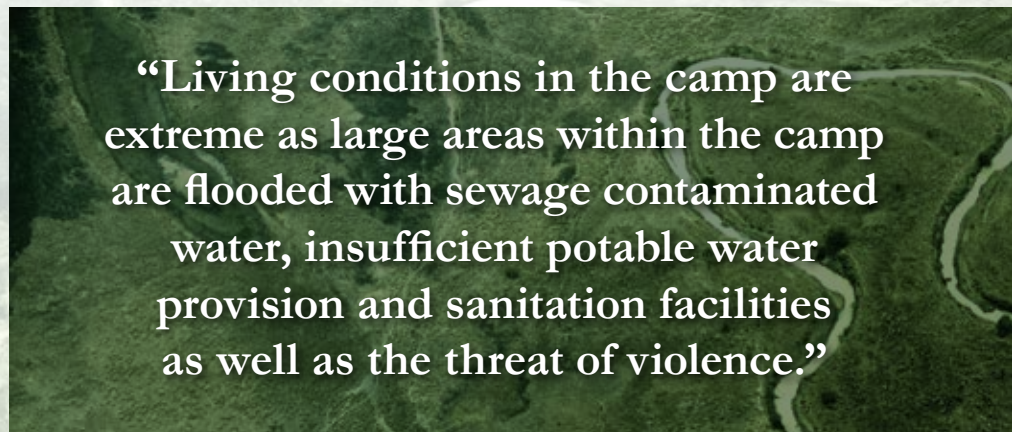
I decided I wanted to do water and sanitation work in underdeveloped countries in high school. In Grade 10 my school sponsored me to go to a conference to encourage women to study engineering. One of the speakers talked about this type of work and it piqued my interest. Prior to that conference I was interested in studying medicine and after I completely shifted gears. So, I tailored my education and work experience to this end goal. One way my master's altered my work interest was by steering me in the direction of emergency relief and away from development work.

Where in South Sudan were you working and what kind of project(s) did you work on?

For this mission I spent about four months in Bentiu, South Sudan (June – September, 2014) which is in northern

Unity state near the border with Sudan. Fierce fighting around the town of Bentiu has led to approximately 40,000 people to seek shelter in a UN "protection of civilians" (POC) camp. The area is very unstable with the town frequently changing between government and rebel rule leading to insecurity for the town and surrounding area inhabitants. Living conditions in the camp are

extreme as large areas within the camp are flooded with sewage contaminated water, insufficient potable water provision and sanitation facilities as well as the threat of violence. While MSF programming has adapted to the changing needs of the population, currently (as of September 24, 2014) we are operating a secondary health care facility within the POC, a mobile clinic



“Living conditions in the camp are extreme as large areas within the camp are flooded with sewage contaminated water, insufficient potable water provision and sanitation facilities as well as the threat of violence.”

in Bentiu town, as well as water provision and sanitation facility construction. Watsan work involves hygiene and infection control at the hospital and mobile clinic as well as medical waste management and the provision of water and sanitation facilities within the health structures. In the camp we are building latrines for the population, operating a surface water treatment plant and three water distribution sites. We also monitor the work being done by other actors and collaborate to ensure that work is being completed to a high standard and that progress happens as fast as possible. I was acting as Watsan Coordinator of an expatriate team that fluctuated from four to seven people.

Is there such thing as a typical day, could you describe it?

A typical day is difficult to describe but here goes: First thing in the morning we would have a general meeting to discuss any security issues or context updates that could potentially impact our ability to work. Then I would have a meeting with my Watsan team specifically to discuss the main goals for the day and assign tasks. From there the team coordinates similarly with their national staff teams, organizes daily labour and materials needed for the day and begins the work! This can include the technical design of water and



MSF constructed latrines and hand washing points in the Bentiu POC Camp

sanitation infrastructure, construction (latrines, water distribution points, etc. in the camp or water and sanitation infrastructure in the MSF health centre), monitoring and maintenance of existing systems, co-ordination meetings with other NGOs, training of national staff, ordering of materials and supply management, reporting at various levels, etc. What normally happens is

you make a plan of how you think your day will look and what you hope to accomplish and then you spend most of the day troubleshooting and adapting and by the end of the day you have an entirely new "to do" list on top of the previous one! It's a challenging work environment that requires flexibility and a sense of humour.

What sorts of challenges have you encountered in the effort to provide access to water and sanitation for displaced people?

This mission was particularly challenging for a variety of reasons. No materials are available to be purchased locally – everything (and I mean everything! from food to construction materials to toilet paper) must be bought either in Juba, the capital, or Kenya and flown in using small planes. Road access is very difficult due to the security context as well as the bad quality of roads. Even the ability to land planes with an earthen airstrip in the rainy season and insecure context is difficult. With limited cargo space on irregular planes priority goes to lifesaving medications so our construction materials would frequently be bumped. Access within the camp is also very difficult as there are no roads and extremely crowded conditions



Queue at a water point in Bentiu POC Camp

“I have seen human suffering on an extreme level. But what I have also seen is the amazing ability that people have to survive and keep going in the face of seemingly hopeless situations.”

exacerbated by the flooding. It is almost impossible to drive in heavy materials and equipment (frequently things must be stripped down as much as possible and carried in by hand) or excavators and other machinery to conduct earthworks. The insecurity would also impact our work. Our workdays are frequently interrupted by gunfire or shelling, the threat of attack, fighting within the camp itself, etc. Leaving work sites suddenly to go to the bunker would mean the loss of precious materials as well as time. This soil type in this area of South Sudan is also the dreaded "black cotton soil" making latrine construction difficult due to swelling and shrinkage of the soil leading to collapsing pits and unstable foundations.

What aspects of working in international settings and experiencing different cultures have surprised you the most?

I think the thing that surprises me the most is the resilience of people. Having witnessed many of the scenarios mentioned above (armed conflicts, disease epidemics, malnutrition, etc.)



Flooding in the Bentiu POC Camp

I have seen human suffering on an extreme level. But what I have also seen is the amazing ability that people have to survive and keep going in the face of seemingly hopeless situations. It really helps to put things in perspective when I return home.

Is there any advice you'd give to engineering students or young professionals interested in international development and humanitarian relief work?

Advice I would give would be to try and have the most diverse experience possible through volunteering, travel, special interest courses, etc. If you are interested in working for MSF or other organizations you need to be able to demonstrate, on top of professional competence, the ability to live and work in a team, experience in underdeveloped countries, the ability to manage stress, flexibility and adaptability, coaching or training experience, etc. These skills can be gained locally and applied to life in the field. Generally MSF or other organizations are looking for people with at least two years of professional experience. Fluency in other languages such as French, Spanish and Arabic are also very helpful. While challenging, working in the field can be very rewarding. ☺



Flooding in the Bentiu POC Camp

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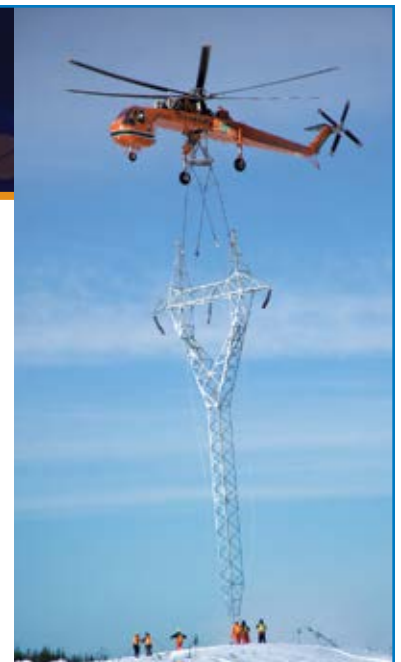
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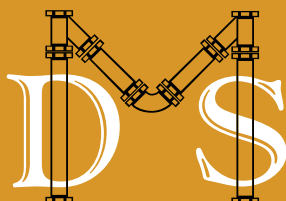
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Ingenium

APEGM CONFERENCE 2014

This year was the third annual Ingenium Conference, October 21 – 24, 2014. Attended by over 500 people, the conference was another success. Thank you to all the staff, volunteers, and sponsors who made the event possible.

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New members pose for a picture with their certificates



Grant Koropatnick, P.Eng., CEO & Registrar giving remarks at Recognition Wine & Cheese



Paul Janzen, P.Eng., Allan Ball, P.Eng. and Lawrence Ferchoff, P.Eng. at the Recognition Wine and Cheese

Tuesday, October 21

New Member Luncheon and Certificate Presentation

This luncheon, held twice a year to recognize new members and formally present them with their official license certificate, was held at the St. Boniface Golf Club.



Past Presidents Dawn Nedohin-Macek, P.Eng., Cathy Stewart, P.Eng., Robyn Koropatnick, P.Eng., and Marcia Friesen, P.Eng. at the Recognition Wine & Cheese



Past Presidents and Council members mingling at the Recognition Wine and Cheese



Paul Amyotte, P.Eng., President of Engineers Canada 2014,
Bob McDonald, P.Eng., APEGS, Margaret Hodges, P.Eng., APEGS



Members Mingling at the Recognition Wine and Cheese

Wednesday, October 22

Recognition Wine and Cheese

Held in the Broadway Room of the Fort Garry Hotel, this reception was held to honour Association Past Presidents, Life Members and Honourary Life Members, and those members receiving their Fellowship from Engineers Canada and Geoscientists Canada.

Thursday, October 23

Professional Development Seminars

The popularity of this well-attended event speaks to its value in supporting the professional development of Association members. Multiple track sessions on Manitoba Leadership through our Profession, in the Workplace, in the Province, and in members' Personal Career was offered at this informative event.

Sessions included:

Leadership As A Profession

- ABC's of P-E-N-G, by Grant Koropatnick, P.Eng.
- Leadership in Canada When it Comes to Dealing with Internationally Educated Engineers and Geoscientists, by Claudia Shymko
- Volunteering: 100 Hours in 365 Days, by Michael Gregoire, P.Eng.
- ProDev – Recent Developments, by James Gunning, P.Eng.

Leadership In Your Workplace

- The Great Canadian Corporate Melting Pot: Part 1 (Being the Chef), by Jitendra Paliwal, P.Eng.
- The Great Canadian Corporate Melting Pot: Part 2 (In the Soup and Loving It), by Jitendra Paliwal, P.Eng.

- Conflict Management: How to Prevent, Contain, and Resolve, by Lisa Moretto
- Emergency Preparedness at Work and Home, by Jay Shaw

Leadership In The Province

- Preparing Engineering Graduates for Leadership Positions in the Profession, by Doug Ruth, P.Eng.
- Communication, Cooperation, and Compromise: Leadership at the Provincial Level in Emergency Preparedness, Response, and Recovery, by Mike Gagne
- Leadership in Strategic Innovation, by Victor Cui
- Indigenous Access to the Engineering Faculty, by Randy Herrmann, P.Eng.

Leadership In Your Personal Career

- Understanding Personalities: Myers Briggs Type Indicator, by Lisa Moretto
- Spiritual Health for Engineers, by Doug Koop, CPE
- Communicate with Confidence, by Ann Christoffersen
- Getting it Done: Time Management Techniques, by Ann Christoffersen

Friday, October 24

Annual General Business Meeting

The Annual General Business Meeting is an opportunity for members to become directly involved in the business of the Association, vote on current matters, and acknowledge Councillors completing or just beginning their terms. President Marcia Friesen, P.Eng., ended her term and passed the gavel to incoming President Howard Procyshyn, P.Eng.

For the first time, registered members of the Association who could not make it to the Business Meeting at the Fort Garry Hotel were able to participate by webinar. Webinar participants were able to get sound and video of the business meeting, vote on motions, and were able to raise questions that would have been asked on their behalf in the room.



President Marcia Friesen, P.Eng., ended her term and passed the gavel to incoming President Howard Procyshyn, P.Eng.

Awards Gala Dinner and Dance

Fine cuisine and highly enjoyable entertainment set the stage for a first-class evening honoring member achievements and corporate contributions to the profession. Almost 300 guests joined representatives from government and industry for dinner followed by an evening of great entertainment and dancing with the Ron Paley Big Band. Congratulations to all 2014 nominees and award winners.

Award Winners:

Team Achievement Award:

Monteris Medical – NeuroBlate System

Member-In-Training Award:

Brianne Bates, EIT

Early Achievement Award:

Janet Wheatley, P.Eng. PhD

Champion of Engineering Education Award:

Douglas Ruth, P.Eng. PhD.

Outstanding Service Award:

Allan Ball, P.Eng., FEC

Leadership Award:

Jeannette Montufar, P.Eng., PhD

Technical Excellence Award:

John Hayles, P.Geo., P.Eng., FEC

Honorary Life Membership:

Myron Britton, P.Eng., PhD, FEC 



Dancing at the Awards Gala Dinner and Dance



MC Anders Boulanger at the Awards Gala and Dance



Singers of the Ron Paley Big Band



The Ron Paley Big Band



TEAM ACHIEVEMENT AWARD

Monteris Medical for the NeuroBlate System

Monteris Medical, Inc. was founded in 1999 with the mission to create new technology that would facilitate neurosurgeons to ablate brain lesions and tumors that may be difficult to treat by traditional means. Monteris has created an ablative device called AutoLITT (NeuroBlate System) by combining the imaging power of Magnetic Resonance Imaging (MRI), Laser Interstitial Thermal Therapy (LITT) and advanced navigation software (M-Vision) to reach virtually any area of the brain. Richard Tyc, P.Eng and Mark Torchia have been the principal scientists at Monteris Medical Inc. to develop and assemble this system.

The NeuroBlate System is a combination of hardware, software and disposable surgical devices used with an existing MRI scanner. The integration of these devices allows the neurosurgeon to precisely direct an MRI compatible, gas cooled laser probe to a desired target, administer laser interstitial thermal therapy and monitor the thermal dose using real time MRI thermometry data. The NeuroBlate directional laser is the preferred tool for contoured ablation of targets while sparing adjacent healthy tissue. The system consists of three components: AtamA Head coil and Stabilization System, AXiiiS Stereotactic Miniframe and M-Vision Software.

The MRI compatible Stereotactic Miniframe is a single use trajectory alignment device that provides stability, flexibility, and visualization for minimally invasive stereotactic procedures. The unique linear leg translation and 360 degree directional interface of the frame which can be attached to the brain by tungsten screws provide the surgeon with over 50 degrees of angulation allowing access to multiple intracranial target points with a simple adjustment. The user friendly software allows the surgeon to generate intended therapy



CEO & Registrar Grant Koropatnick, P.Eng., Mark Grant, EIT, Richard Tyc, P.Eng., Past President Marcia Friesen, P.Eng., and Awards Committee Chair Ganpat Lodha, P.Geo.

plans and monitor the administration of contoured thermal therapy in 3 dimensions during a laser ablation procedure. It allows him to preoperatively plan multiple trajectories to a desired target and supports visualization of the safest, most effective approach to the region of interest. The software also helps surgeon to control the administration of thermal therapy by accurately monitoring temperature changes in and around the target tissue in 3 dimensions. Thermal dose contours generated from live MRI thermometry data helps to identify the boundary of ablated tissue to support clinical decision making. After each sequence of laser therapy the M-Vision software generates cumulative damage contours which surgeons view in anatomically oriented orthogonal planes. This 3D visualization allows the surgeon to ensure adequate therapy to the region of interest and confirm complete ablation.

The technology has been used on more than 230 patients in United States since

receiving regulatory approval in 2009. From a clinical perspective, the NeuroBlate system has allowed patients with superficial lesions to require only a single day stay in ICU, and those with deep grey matter lesions also see reduced ICU stays. The quantitative analysis of outcomes after surgery has shown that recurrence-free survival after this procedure is up to two-times longer than conventional therapy. This System is providing a new option in the treatment, which with traditional surgical methods carries a high likelihood of paralysis, aphasia, and reduced quality of life. The simple fact that patients treated with NeuroBlate technology are typically discharged within 48 hours of the procedure speaks for the benefit it provides to the patients. The Health Canada approved "NeuroBlate System" for commercialization in 2013.

The Association is pleased to recognize the Monteris Medical, Inc with the Team Achievement Award for their excellent work in developing Neuro Blate Technology. ☯

MEMBER-IN-TRAINING AWARD

Brianne Bates, EIT

Brianne Bates graduated from the University of Manitoba in 2011 with a B.Sc. in Mechanical Engineering. She enrolled as a student member of APEGM in 2007 and an Engineer-in-Training (EIT) in April 2011.

Brianne initially worked for Manitoba Hydro as a summer student in the Generation division both at Gillam and in Winnipeg. She has been working for Tolko Manitoba Kraft Papers for last 3.5 years. Her work is focused on major projects and maintenance of existing process equipment systems. She has been the lead design engineer or project manager on most of her projects, including enhancing quality without adverse effects on production.

Brianne is a member of the Project Management Institute (PMI) Manitoba chapter, and is currently working towards her PMP designation. She currently holds a 4th Class Power Engineering License through the Manitoba Office of the Fire Commissioner Inspection and Technical Services office and plans to accumulate firing time toward her 3rd Class Power Engineering License.

Brianne has been actively tutoring high school students in math and sciences and uses those opportunities to promote engineering. As a mentor, she has participated in the Young Women's Conference to promote women in non-traditional fields and has judged various school science fairs. She is a member of



CEO & Registrar Grant Koropatnick, P.Eng., Past President Marcia Friesen, P.Eng., Brianne Bates EIT, and Awards Committee Chair Ganpat Lodha, P.Geo.

the Club Yoga Fit Canada, and is working towards her Yoga Instructor Certification. She has also assisted in sandbagging efforts during times when her local community was under flood advisory.

Brianne has received numerous scholarships and bursaries including the Helen Betty Osborne memorial Scholarship three years in a row, numerous Engineering Access Program (ENGAP) bursaries, Manitoba Hydro Bursaries, Louis Riel Bursaries and the University of Manitoba Engineering faculty Bursary. In her final year of Engineering, the Manitoba Métis Federation provided her sponsorship

support. Brianne has been an honors student throughout her education including 4 years of high school, University1 and numerous times on the Engineering Deans honor list.

With a goal is to inspire the next generation to embrace math and science and to work towards their dreams, Brianne is working against barriers and making a positive difference in her community.

The Association of Professional Engineers and Geoscientists of Manitoba is very pleased to recognize Brianne Bates as the winner of the APEGM Member-In-Training Award for 2014. ⊕

Nominate Your Colleagues for 2015 APEGM Awards

Nominations for deserving Professional Engineers and Geoscientists are open now for seven APEGM Awards for the year 2015.

For details visit website: <http://www.apegm.mb.ca/Awards.html>

Please take time to complete nomination form and forward to the Awards Committee before February 1, 2015. Your initiative and recommendations are essential to recognize and honor deserving professionals from our membership at the next Awards Gala ceremony.

EARLY ACHIEVEMENT AWARD

Janet Wheatley, P.Eng.

Janet Wheatley received her BSc. from the University of Manitoba in 2006 and obtained her P.Eng in 2009. She is presently employed as a Senior Project Manager with Manitoba Hydro and also working on a MSc. in Electrical Engineering.

Since joining Manitoba Hydro after graduation Janet has moved quickly in obtaining positions of greater responsibility, managing a variety of projects and providing technical guidelines to team members. She has balanced her professional and academic commitments with her athletic responsibilities and community volunteer work. Her technical achievements have resulted in improvement of Department Processes. Examples are the Design of a computer program to streamline the tracking of drawing packages and the design of a computer program to distill data pulled from a transformer at Dorsey. Both design programs are used in regular day to day operations.



CEO & Registrar Grant Koropatnick, P.Eng., Past President Marcia Friesen, P.Eng., Janet Wheatley, P.Eng., and Awards Committee Chair Ganpat Lodha, P.Geo.

In her current position, Janet's portfolio of projects require the co-ordination of 30+ internal departments. She maintains positive working

relationships between the groups. Janet is also involved in peer review for the MDPI energies journal on double fed induction generators in wind applications and review of papers for the IEEE Canadian Conference on Electrical and Computer Engineering. Janet has also given several presentations; the most notable is the one for IEEE Power Engineering Society.

Janet is active in promoting Engineering and Geosciences among youth by volunteering her time for Engineering and Geoscience Week, Manitoba Robot Games and judging at local science fairs. She also finds time to tutor Math to High School Students and Mentoring EITs at Manitoba Hydro. Janet has been a long standing member of the MB Hydro Professional Engineering Association [MHPEA] Safety Committee holding various roles.

For relaxation and enjoyment Janet volunteers as a Team Leader at Good life Fitness, and as a Team Captain in "Spin4Kids" which is a group that fund raises to keep children in the community active.

The Association is pleased to recognize Janet Wheatley with the Early Achievement Award. ☺



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CHAMPION OF ENGINEERING EDUCATION AWARD

Douglas Ruth, P.Eng.

In a presentation Doug made when he was a candidate for Dean of the Faculty, he stated that his goal was to create an environment that would make the University of Manitoba's Faculty of Engineering the best engineering program on the planet. In the ensuing years he has worked tirelessly to enable the delivery of that goal.

As Dean, Doug established an environment in which new ideas could grow. He vigorously encouraged people to "take a chance" and do things differently. Among other innovations, he was the driving force behind the application for, and delivery of, the NSERC Design Engineering Chair. This Chair was established to improve the level and quality of design engineering activity within the University of Manitoba and to encourage a multidisciplinary view of design engineering.

Doug was also responsible for facilitating the creation and delivery of the ground-breaking Internationally Educated Engineer Qualification (IEEQ) program, an innovative pathway for internationally-educated engineers to meet academic licensing requirements for professional engineering practice in Manitoba.

Friends of Engineering (Manitoba) Inc., a unique group of Manitoba industry influencers and employers who share the U of M Faculty of Engineering's commitment to excellence in engineering education, was Doug's idea to keep key industry partners and alumni engaged with the faculty



CEO & Registrar Grant Koropatnick, P.Eng., Past President Marcia Friesen, P.Eng., Doug Ruth, P.Eng., and Awards Committee Chair Ganpat Lodha, P.Geo.

following the highly successful "Building on Strengths" capital campaign to build the Engineering & Information Technology Complex. The current mission of Friends is to be the strong, collective voice of Manitoba industry, advocating for the growth and health of the Faculty of Engineering at the University of Manitoba to enable the Faculty to continue to provide the world-class engineering graduates necessary to sustain and grow the wealth of this province.

Doug's latest achievement is the establishment of the Centre for Engineering Professional Practice and

Engineering Education at the University of Manitoba. This is the first non-research Centre on campus. Its mission is to ensure that graduating students, both at the undergraduate and graduate levels, have not only the academic knowledge but also the professional skills to pursue careers in the Profession of Engineering. The Centre will also provide a support system whereby academics can both improve their skills as engineering educators and further the scholarship of engineering education and engineering practice.

A graduate of Mechanical Engineering at the University of Manitoba in 1970, Doug has since been relentless in his commitment to the education of engineers in the province of Manitoba, and for that reason and many others, the Association, together with the Faculty of Engineering, is delighted to present the 2014 Champion of Engineering Education award, to Dr. Douglas Ruth. ☉

“Doug stated that his goal was to create an environment that would make the University of Manitoba's Faculty of Engineering the best engineering program on the planet.”

OUTSTANDING SERVICE AWARD

Allan Ball, P.Eng., FEC

Allan graduated from Red River College with a diploma in Mechanical Engineering Technology in 1974, and worked in the consulting and control businesses for a number of years before enrolling in APEGM's examination program in 1982. After completing 16 exams or their equivalents and submitting a thesis, Allan obtained his professional status in 1990. During these eight years, he spent virtually every year attending one or more engineering courses at the University of Manitoba.

Upon registration with APEGM, Allan became a member of the Communications Committee and was active on that committee until 1997, during which time he wrote numerous articles for the *Keystone Professional*. During the 1990s, Allan was active on ad-hoc committees dealing with the issues of electronic seals and guidelines for the use of the seal. Between 1997 and 2001, he was a member of council and in 2001 was appointed Council representative on the Investigation Committee. In 2006, he accepted the Chair position of the Investigation Committee, and with that role has also been part of the association's Nominations Committee.

Allan has been involved with the ACEC – Manitoba Chapter, sitting on



CEO & Registrar Grant Koropatnick, P.Eng., Past President Marcia Friesen, P.Eng., Allan Ball, P.Eng., and Awards Committee Chair Ganpat Lodha, P.Geo.

the industrial liaison committee in the late 1990s and currently serving on the Energy Committee. For the past eight years, Allan has also sat on, and served as interim chair of, the Mechanical Engineering Technology Advisory Board at Red River College, providing industry input to the College's Mechanical Department. During the last two years, he has

been a member of the Friends of Engineering.

Allan is a senior Project Manager and Associate at Hatch Ltd, a prominent Winnipeg engineering consulting firm. His career at Hatch has spanned 18 years during which time he has held the positions of Mechanical Department Head, Engineering Manager, and Quality Lead.

In the community, Allan has been deeply involved in the operation of his local church, having served in roles such as Board Chair, Trustee member, Trustee Chair, Property Development Taskforce Chair, sound technician, as well as providing project management and safe practice direction for church work projects.

The Association of Professional Engineers and Geoscientists of Manitoba is pleased to continuing meritorious professional service by presenting the 2014 Outstanding Service Award to Mr. Allan Ball. ⊕



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LEADERSHIP AWARD

Jeannette Montufar, P.Eng.

Jeannette Montufar studied at University of Manitoba and obtained her B.Sc in Civil Engineering in 1994. Subsequently she completed her M.Sc and Ph.D (both in Transportation Engineering) in 1997 and 2002 respectively.

Dr. Montufar is now a full Professor of Civil Engineering at the U of M and also a Founding Partner of MORR Transportation Consulting Ltd., a transportation consulting firm specializing in commercial vehicle operations, freight transportation, traffic engineering, vulnerable road user accommodation, traffic information systems and road safety. As an exemplary academic and sought after consultant, Dr. Montufar has worked in Canada, the U.S., and Latin America on both research projects and consulting assignments dealing with a range of transportation engineering topics. She has also been the primary researcher and author of studies and projects for Transport Canada, Environment Canada, the U.S. DOT Federal Highway Administration, Manitoba Infrastructure and Transportation, and the City of Winnipeg.

An active member of numerous professional organizations Dr. Montufar is the immediate Past President of the Canadian Institute of Transportation Engineers (CITE) – an integral part of the Institute of Transportation Engineers (ITE) which consists of over 18,000 transportation professionals in more than 90 countries. She is immediate past Chair (and the only woman ever appointed to this position) of the U.S.



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Transportation Research Board (TRB) Truck Size and Weight Committee, and one of two Canadian representatives on the 26-member Board of Directors of the International Forum for Road Transport Technology (IFRTT).

Dr. Montufar has received numerous national and international awards that recognize her contributions to the profession and the community. In 2004 she was the first Manitoba Engineer to receive the Young Engineer Achievement Award from Engineers Canada; and in 2012, she was awarded the YWCA Woman of Distinction Award for Leadership and Management. Dr. Montufar is also a writer and

philanthropist. Her first book “20 Love Poems and Some Random Thoughts” was published in May 2013.

She relentlessly promotes science and engineering to women in all levels of education and has spent considerable efforts leading the Hummingbird Education Fund that she established to give underprivileged women an opportunity for a post-secondary education in engineering, natural sciences, health sciences, medicine or law. The hope is the Fund will represent an opportunity to obtain a better education and a new tomorrow for those facing tremendous barriers in the community.

In recognition of the outstanding leadership and scientific knowledge applied to her profession of Transportation Engineering and her vision for the benefit of all women The Association of Professional Engineers and Geoscientists of Manitoba is pleased to present the Leadership Award to Dr. Jeannette Montufar. ⊕

“In 2004 she was the first Manitoba Engineer to receive the Young Engineer Achievement Award from Engineers Canada.”

TECHNICAL EXCELLENCE AWARD

John G. Hayles, P.Geo., P.Eng., FEC

John graduated with a B.Sc (Geological Engineering-Geophysics) from Queen's University in 1970 and has an M.A.Sc (Geophysics) from the University of British Columbia in 1973. John has been continuously enhancing his expertise of exploration geophysics in the field of mining exploration, developing technologies for studying fractures in granitic rocks and characterization of sites to evaluate their suitability to host nuclear waste storage repositories. His company, Hayles Geoscience Surveys Ltd, has provided independent contract geophysical surveys for the last 14 years in Manitoba.

During the first 9 years of his professional career John was extensively involved in airborne and ground geophysical surveys covering prospects in the Canadian Arctic. During these years he was a field crew chief supervising up to 20 students. Discovery and delineation of the Polaris mine on Little Cornwallis Island and in subsequent years discovery of additional gold veins in Bissett camp (2005-2010) goes to his credit.

During 19 years of his work with Nuclear Fuel Waste Management Research, he was instrumental in developing and testing a number of borehole and surface geophysical instruments for identifying and mapping fractures from micro to mega scale in granitic rock considered suitable for hosting a safe storage/disposal repository vault. One of John's biggest technical contributions is the development and extensive testing of a high frequency (10-100 kHz) cross-hole imaging mini-CHARTS system. He has demonstrated use of this system to map micro fractures (0.1-1 mm) to assess excavation damage in the walls of underground excavation tunnels. Understanding of the excavation damage in potential repository walls is essential



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to predicting long term (10,000 years and more) safe storage of high level radioactive waste from nuclear power plants. John has completed 33 surveys with these instruments and published the results in refereed scientific journals.

John established Hayles Geoscience Surveys Ltd. in 1999 to provide contract airborne, ground, borehole and underground geophysical surveys in Manitoba. His company has served 55 different clients, completing more than 250 geophysical surveys to support mineral exploration, engineering, environmental and agricultural related projects. In the process, he has established an excellent collection of geophysical algorithms for processing and interpretation of gravity, magnetic, seismic, electromagnetic and electrical survey data. John has published 14 papers and authored over 140 Technical reports and expanded abstracts.

John has been a Professional Engineer registered in Ontario since 1975 and a registered Professional

Geoscientist in Manitoba since 1998. He received his Fellow of Engineers Canada affiliation in 2011 and is also member of many scientific societies.

John has volunteered with the North East Regional Waste Management Committee to provide support on environmental aspects of landfill siting. In the process, John provided two complimentary geophysical surveys and presented the results at the 1997 SWANA (Solid Waste Association of North America) conference in Winnipeg. John contributed to public education in engineering and geoscience by writing several short articles for the Selkirk Journal on climate physics. He also gave a radio interview on CKUW on fracking practices in SW Manitoba.

In recognition of his excellent technical support to various geoscience and engineering projects in Manitoba and promotion of scientific knowledge to the community at large, the Association is pleased to present the Technical Excellence Award to Mr. John Hayles. ☺

HONORARY LIFE MEMBERSHIP AWARD

Myron G. Britton, P.Eng., PhD., FEC

Ron Britton registered with the Association in 1964, and has been a member continuously for 50 years. Dr. Britton obtained his B.E. in Civil Engineering from the University of Saskatchewan in 1962, M.Sc. in Agricultural Engineering from the University of Manitoba in 1969 and a Ph.D. in Agricultural Engineering from Texas A&M University in 1973. Ron has over 45 years experience in engineering education, academia and administration with the University of Manitoba as Professor, Associate Dean and Acting Dean of Faculty of Engineering.

Ron started his career working as a field engineer in various companies for five years starting in 1962. His first job in academia was a Lecturer with Department of Agricultural Engineering, University of Manitoba in 1967. After completion of his Ph.D., he worked as an Assistant Professor at Agricultural Engineering Department, Texas A&M University. He rejoined the Department of Agricultural Engineering, at the U of M as an Assistant Professor in 1973. Ron became a Professor at Department of Civil and Geological Engineering and Associate Dean (Design Engineering) both in 2000. Starting the following year and until his retirement in 2012, Ron held the position of NSERC Chair in Engineering Design.

Ron provided the vision, the drive and the administrative ability in establishing the Internationally Educated Engineers Qualifications Program in Manitoba (IEEQ). He was also instrumental in establishing the first true Engineer in Residence (EiR) program in Canada at the University of Manitoba.

Over the past 50 years, Ron has made significant contributions to the engineering profession through many APEGM committees, and was President for the Association in 1998/99. Dr. Britton is also a past director of Engineers Canada.



CEO & Registrar Grant Koropatnick, P.Eng., Past President Marcia Friesen, P.Eng., Myron Britton, P.Eng., and Awards Committee Chair Ganpat Lodha, P.Geo.

“Ron provided the vision, the drive and the administrative ability in establishing the Internationally Educated Engineers Qualifications Program in Manitoba.”

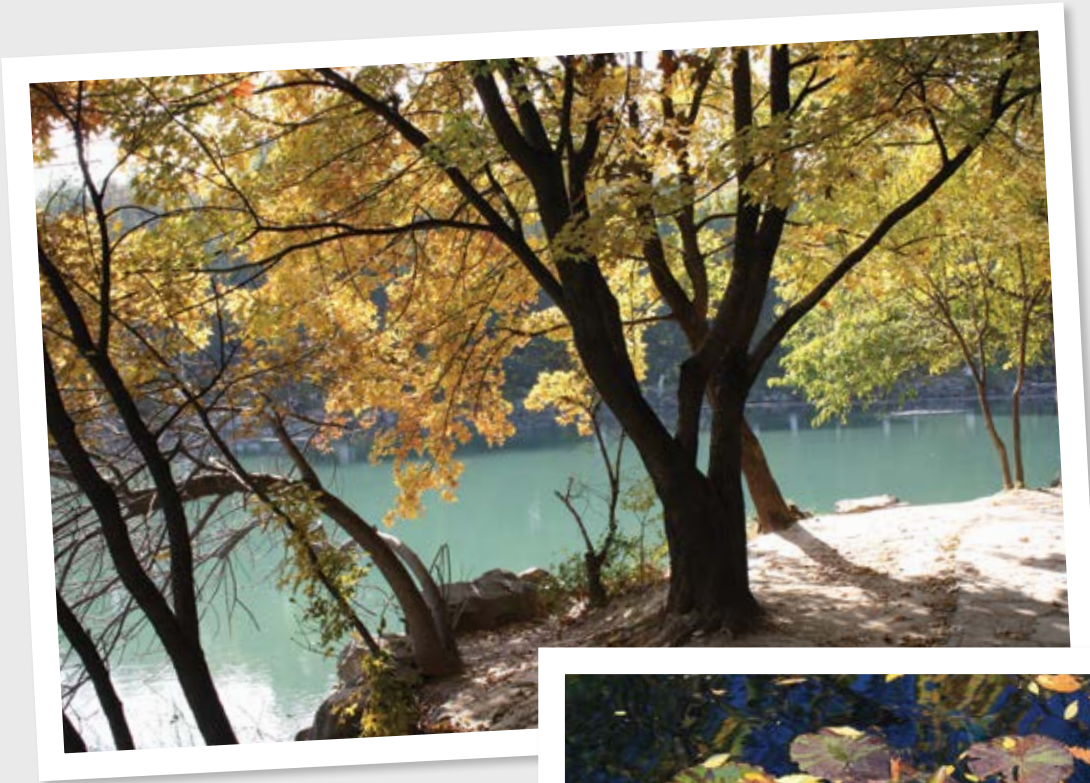
He was selected as one of the first Natural Science and Engineering Research Council (NSERC) Design Chairs in Engineering, and served in that capacity for ten years. He is the joint author of 47 publications in refereed journals and refereed conference proceedings. Ron has received many awards and honours throughout his career from a number of organizations, including the Medal of Distinction in Engineering Education by the Canadian Council of Professional Engineers in 1995. Most recently, he was the recipient

of Meritorious Service Award for Professional Service from Engineers Canada in 2013.

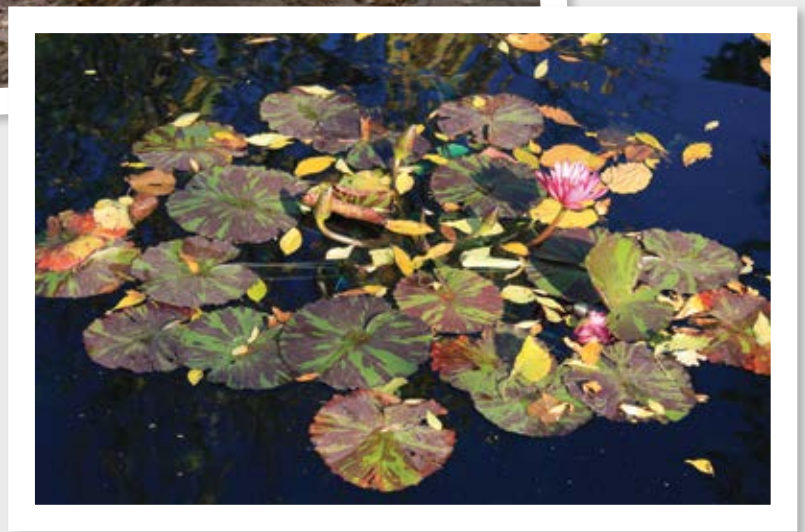
Ron's many years of service to the Association are characterized by his outstanding ability and by his dedication to the engineering profession. The Association of Professional Engineers and Geoscientists of Manitoba is extremely grateful to him for the dedicated service he has rendered in so many areas of the Association's activities, and in appreciation is pleased to confer Honorary Life Membership on Dr. Ron Britton. ☺

Send Us Your Photos!

We want to know what makes our members tick in a digital way when they are not working. The pictures can be engineering or geotechnical based OR they can be photos of anything else that intrigues you.



*Fall foliage at Peking University, Beijing China.
On the bank of Weiming Lake.
A. Kempan, P.Eng.*



*Water Lilies in the fall. - Assinboine Park, Winnipeg MB
A. Kempan, P.Eng.*

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2. The picture should **not** have the time and date embedded by the camera visible on the image.
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4. Note the following in your email submission:
 - (a) Your first and last name
 - (b) Tell us a bit about the photo. Provide one or two sentences describing why the subject really grabs you.
 - (c) Provide a title if you have one



*Polar bears near Churchill, MB.
A. Kempam, P.Eng.*



*Elaborate doorway in Sintra, Portugal.
Sintra is known for its many 19th-century
Romantic architectural monuments,
which has resulted in its classification as
a UNESCO World Heritage Site.
A. Kempam, P.Eng.*



*Canada-France-Hawaii Telescope (CFH). The CFH observatory hosts a world-class, 3.6 meter optical/infrared telescope.
The observatory is located atop the summit of Mauna Kea, a 4200 meter, dormant volcano located on the island of Hawaii.
A. Kempam, P.Eng.*

601 Lexington

Structural and Design Integrity

By C. Cousin, P.Eng.

Engineering failures... the spectacular and often tragic events that grab the headlines on the evening news and the attention of the public are the failures that result in the collapse of a building or bridge, an explosion or damaging mechanical failure. But what of the failures that do occur during the design engineering and construction processes that by some chance of fate or stroke of luck are discovered and addressed without the potential failure event having occurred? Although these may never be exposed publicly, how these failures are addressed by engineering professionals is critical to the outcome of the situation.

The case I have summarized here is one that truly fascinated me by the “could have been” nature of it, in a story which only came to light publicly 20 years after occurring. It is a case study that is now addressed in some university courses on engineering ethics and has been well documented in much greater detail than what is provided here.

In New York City, there is a very distinctive and landmark building located at 601 Lexington Avenue in midtown Manhattan known as the Citicorp Tower. The fifty-nine storey building was completed in 1977, and was the seventh tallest building in the world at the time. A very unique building design was created to accommodate the presence of St. Peter’s Lutheran church, which occupied the northeast corner of the property. Citicorp and the church reached an agreement which led to the company being allowed to construct their tower on the site under the condition that a new church would be built on this same corner and would remain free-standing from the tower, with no column penetrations or other encroachments allowed.

The key architect on the project was Hugh Stubbins, who worked with structural engineer William LeMessurier. The accommodation for the church led to the tower being designed to soar atop nine-storey tall stilts situated at the midpoint of each building face, as well as one central column which housed the elevator banks. Traditional design would have placed the main supports at the corners of the structure. This unusual base and a very lightweight building frame made the building sensitive to wind loading, which LeMessurier addressed by utilizing a very sophisticated tuned

“Although these may never be exposed publicly, how these failures are addressed by engineering professionals is critical to the outcome of the situation.”

mass damper housed in the upper floors of the building, consisting of a 410-ton block of concrete floating on oil and controlled by an automatic system. This damper would significantly reduce any sway of the building by converting kinetic energy into friction. The chevron-style bracing on the building included welded attachments of the diagonal girders to the support columns located at the center of each façade to provide sufficient stiffness to the structure. Building construction was completed and the tower occupied without the engineer realizing that there was an unforeseen problem that had arisen due to a change made

during construction, as well as a gap in the building code whereby designing in accordance with the code did not adequately address the behavior of such a complex and unusual structure.

In 1978 an engineering student at Princeton who was completing her thesis on the Citicorp Tower, Diane Hartley, contacted the engineering firm responsible for the design of the structure. She posed technical questions about the stability of a skyscraper with the support columns placed in the middle of the building faces rather than at the corners as is typical, with particular interest in how the building resisted quartering winds approaching the building from the corners rather than acting on the flat faces of the building facades. The questions she posed led to concern by a design engineer at LeMessurier’s firm, and additional calculations were performed to further assess the effects of quartering winds. The structure had been evaluated for wind loading in accordance with the requirements of applicable building codes, but the unusual position of the main supporting columns made for a case that required special consideration. Concerns were also raised relating to a change made during construction from welded connections to bolted connections at the bracing points which had been approved by LeMessurier’s office but without his knowledge, and how this would modify the behaviour of the structure. To add yet another level of concern, the tuned mass damper relied on electricity and could not be counted on to perform as designed due to the probability of a power outage during a high-wind event. LeMessurier consulted with experts in the field of wind loading and high rise construction, coming to an unfortunate discovery. A critical problem had been exposed; the bolted connections



could fail under seventy-mile-per-hour winds. Winds of this magnitude occur in New York at an approximately 1-in-16 year return period. He now had critical knowledge – what to do?

Mr. LeMessurier informed the building's architect of this problem, and quickly developed a proposed solution of welding two-inch thick steel plates to the bolted joints to provide sufficient reinforcement. Citicorp was contacted to inform them of the problem and proposed retrofit, and along with involvement of lawyers and insurance companies a solution was agreed to. The retrofit would be implemented while the building remained occupied, and undertaken quietly. Work on the repairs began immediately, with welders working at night and carpenters during the day for three months. Midway through the work, a real threat arose with the development of Hurricane Ella, which appeared to be headed towards New York City. The path of the hurricane luckily veered out to sea and the storm

failed to make landfall, sparing the partially strengthened but still vulnerable structure.

Although an evacuation plan for the area surrounding the tower was developed at the time and the structure monitored until completion of the retrofit work, the public did not become aware of the potential threat and the whole thing was kept under wraps. The story did not become widely known until an article appeared in a newspaper in 1995, nearly two decades later. Since then, this story has been held up as an example of the professional integrity of LeMessurier, who took seriously concerns raised by questions from an engineering student unconnected to the project. He worked quickly to develop a solution and act upon it, and the reinforced structure at 601 Lexington is now regarded as very safe and capable of withstanding a 700-year return period storm.

Hopefully this case will inspire discussions between colleagues and peers within our industry, as the lessons learned

are relevant to all design engineers. When a structure or any design ventures beyond the usual or common, it is important to be aware that building codes do not always adequately address these cases and additional analysis may be required. Another very significant consideration is the potential repercussions of approving changes and substitutions during construction. It is common for engineers to experience pressure from contractors and owners to approve cost-saving substitutions, but often the costs are far greater than any potential savings when the full implications of the change are not understood. Luckily in the Citicorp Tower case, the courage of a young student to ask questions, the willingness of an experienced design team to question their own work, and the integrity of the architect and engineer involved allowed for modifications of the structure to be undertaken to address the structural integrity of the tower. This could have been a very different story. ⊕

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Will we hit

30 by 30?



By D. Strang, P.Eng.

In the fall of 2011, Engineers Canada set a goal for our profession that thirty percent of licensed engineers will be women by the year 2030 '(30 by 30)'. So three years in, how are we doing?

Although the regulation of engineering in Canada is done at the provincial level, Engineers Canada is the national organization that brings the provincial regulators together and performs national outreach, standard setting and trend tracking for the profession. While the organization works to promote diversity in the profession (including gender diversity), it has limited resources to actually influence the composition of the profession. Thus, it is an open question how, and if, it can achieve such an ambitious goal.

Undoubtedly, there has been progress over the last decades. From an extreme rarity a century ago, the proportion of females has grown to 11.3% of all licensed professional engineers in Canada (2012 figures from Engineers Canada) and has been recently growing at almost 0.5% per year. A simple projection of this trend could add nine percentage points over the next 18 years, at least getting us close to "20 by 30," if not 30 by 30.

But, even this may be a stretch. All of those new female engineers have to come from somewhere, with the immediate source, along with immigration, being engineers in training (EITs). Nationally, the proportion of female EITs in 2012 was 19.5%. If this rate holds over the long term, one would expect the steady-state proportion of female engineers to level out at around the 20% mark. However, this would take decades. Clearly a bigger "pulse" is needed at the front end. Immigration will not have a big impact. Provincial engineering associations report that less than a fifth of their licensed members received their degree from outside Canada and barely a handful of female engineers come to Canada each year.

If you are wondering about APEGM, only about 10% of members are international engineering graduates (vs. 18% overall for the provincial associations that report a breakdown of their members become accredited). Manitoba is also on the low end in terms of female professional engineers (8% vs. 11.3% national and a high of 13.1% in Quebec) and EITs (15% vs. 19.5% national and a high of 35.8% in Saskatchewan).

All of these figures come from the *Engineers Canada 2012 Membership Survey*, which also provides an insight into the future impact that female EITs might have. Of about 187,000 practicing professional engineers, about 21,000 (11.3%) were female. Assuming the total contingent of

"From an extreme rarity a century ago, the proportion of females has grown to 11.3% of all licensed professional engineers in Canada."

engineers remains at 187,000 (no-growth scenario), an additional 35,000 female engineers will be needed to bring the proportion to 30%. An increase of 2,000 female professional engineers per year (net of those leaving the profession) will be needed to reach 30 by 30. According to Engineers Canada 2011 figures, this is almost exactly the same number of undergraduate engineering degrees awarded annually to females in Canada. So, none can be lost...

On the other side of the equation, an annual net decrease of 2,000 males would be required and it is not clear where the 9,000 yearly male graduates would go. The fact is that only about 18% of Canadian engineering degrees go to females; so no one should expect that university demographics will push enough females into the system.

Maybe things can change. Over the long term, female participation in engineering programs has grown. From a low of near zero, the female proportion rose to 3.6% in 1975 and reached 20.6% by 2001. There are notable pockets of success; for example, the EITs in Saskatchewan. And in the United States, where engineering demographics are broadly similar to Canada, one U.S. college (Harvey Mudd in California) had a majority female graduating class of engineers in 2014.

But, then again, maybe things won't change. Since 2001, female participation has not continued its climb. For whatever

“Only about 18% of Canadian engineering degrees go to females; so no one should expect that university demographics will push enough females into the system.”

reasons and in spite of various initiatives aimed at getting females into engineering, the rate has actually dipped and has settled in stubbornly at around the 18% mark (with Manitoba at around the national average on that score).

The science of demographics lets us predict the composition of the population years ahead of time. It takes about a decade to go from university day 1 to becoming a P.Eng. The mix changes gradually. Demographics suggest that each annual cohort of new engineers will be 18% female for a while to come. This will lift the 11.3% figure, but only ever so slowly. We should expect the needle on the *percent female* gauge to move, but move slowly – creeping toward, but still falling short of, even 18% by 2030.

Getting to 30% in the long term is a monumental task. But, there is hope and we can point to some success. Indeed, some professions, such as medicine, have had success in achieving more of a gender balance. But, in a way, this is part of the problem, too. Engineering must compete

not only with “traditional” female career options, but with other professions, and even general sciences, for the brightest young minds. It is not just a matter of the profession being “open” to females, but actually being female-friendly. There is a need for females to see themselves fitting in to the profession.

It starts at a young age. Where do young girls see themselves fitting in? If a ten-year-old girl aspires to be a doctor, is anyone surprised? But, if she wants to be a mechanical engineer, are we taken aback (noting that within the spectrum of engineering, mechanical tends to have the fewest females and biosystems the most)? It is natural to wonder what makes her think that way. “Does she have a parent (more likely her father) who is an engineer? Perhaps an older sibling who is on track to become an engineer? What is her connection? What gives her an affinity for engineering? How does she fit in?”

Even if we don't think about these things, we can be sure that she is thinking about them. The same thought process would, of course, be true for a ten-year-old boy. And, for an adult. Each of us is continually assessing our “fit” with any group we belong to or seek to belong to. Are there people in the group who are like me? Do they think like me? Look like me? Act like me? Or, will I be a stranger?

Personally, I see this with my own family and my involvement with a local Scout group. Scouting in Canada has been co-ed for decades. But, still the proportion of girls (and women leaders) is quite small. I can see clearly that girls can do anything boys can do, and have just as much fun doing it. But, it is also clear that it is very uncomfortable to be the “only girl” at the meeting. Three other things are clear to me. One is that most girls that join a Scout group do so because they have a pre-existing connection to Scouts – usually an older sibling or parent

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(who is most likely male). On the other hand, boys will often join “out of the blue,” simply based on the idea that this is something that boys do. Another clear thing is that society at large sees Scouting as “Boy Scouts” (as it was when some of us were children). Finally, small clusters of females form strong bonds with each other and when the cluster is broken up (perhaps some of them move on as they get older), it can be lonely, especially for one person.

I think the same is true in our educational and professional lives. It is hard to be different. It is hard to connect with a group that seems strange to you. Does society still see engineering as something for boys? Do the girls who choose engineering do so only because they have connected with the profession, perhaps through a relative? Is it difficult for a female graduate to transition from being one of a handful of female students to being the only female in the firm? Until engineering is seen as something “normal” for women, it will be hard to attract women to the profession. But, until enough women are in the profession, it will be hard to make the case that it is normal. Chicken and egg.

It’s a long grind and it takes time. But, ultimately minds are changed and “connections” made one at a time. As recently noted by Marcia Friesen (2013-2014 APEGM Council President), “recruitment to the profession begins with one’s experiences and interactions with engineers and geoscientists in one’s family of origin and through childhood.” Initiatives that make one-on-one connections, especially with young minds, can have the most impact.

For example, APEGM’s Committee for Increasing the Participation of Women in Engineering supports targeted outreach. On a bigger scale, Manitoba’s own WISE Kid-Netic Energy (WISE KE) outreach program annually connects with 20,000 to 30,000 Manitoba students, allowing girls to explore careers in science and technology. From week-long camps throughout the province to an inner-city girls’ club to the annual *Engineering IS for Girls!* information day, and other initiatives, the group offers over 1,000 events annually. Created in 1990 as a women’s access program, more recently its focus has expanded to include all underrepresented peoples in



science and engineering and envisions a Manitoba where all youth, regardless of background, gender or socio-economic status are enriched in their science, math and technology education.

Finally, WISE KE annually hosts an event called *Make Your Move* for grade 8 girls, a day that includes working in a team of three, plus a mentor, on design-build-test projects. Jill Lautenschlager, WISE KE Program Administrator notes that with food, a DJ, photo booth, and so on, “it’s made to be a party atmosphere, and the goal is to get the girls to realize how important it is to choose the proper math

and science courses in high school, so that they set themselves up for the opportunity to be in a faculty like Engineering.” As the March event approaches, the group is currently looking for industrial partners to sponsor these teams.

Although this comprises a significant enterprise, more can always be done. Programs like these need all of our support, both in time and in funding. ☕

¹ The difference between programs is stunning. See “Analysis of Female Participation in Engineering in Manitoba,” *The Keystone Professional*, Winter 2013




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Legislation Committee

By P. Lacoursiere, P.Eng.

At APEGM we have a wide variety of committees – run by volunteers – which are vital to the functioning of the Association. The Legislation Committee prepares and/or reviews proposed changes to The Engineering and Geoscientific Professions Act, the By-laws

and the Code of Ethics for purpose, consistency and clarity. It also maintains a watch on legislation and legal decisions provincially, nationally and internationally which may affect the practice of engineering in Manitoba. In this way, the committee is engaged in the day-to-day

operation of APEGM and drafts changes that are considered necessary in APEGM's by-laws to adapt to changes in operation or regulatory environment. This work is important as APEGM needs to make changes from time to time to keep up with current events.

In the hierarchy of documents, the Act is on top, followed by the by-laws. The by-laws are needed to extend the work of the Act and add detail or make specific rules about dates, numbers and other items that require changing from time to time. Since it takes a lot of work to change an Act, the Act is written referencing the bylaws instead of providing a higher level of detail. Part 4 of the Act spells out what can be contained in by-laws. Part 4 also speaks to the other document, the Code of Ethics, and amendments to this document are also within the purview of the committee. At present, there is some interest being expressed nationally in creating a Code of Ethics that would apply to any Engineer or Geoscientist in Canada. The Committee has a subcommittee reviewing the national activity.

Every few years the APEGM Council needs to revise the Act, as they did in 1998 to include Geoscientists. While much of the work is done by APEGM's legal counsel and the lawyers for the Province, the Legislation Committee works on these changes to ensure that they are consistent with existing by-laws. In many cases, Act changes need by-law changes to alter specific wording or to add sections.

Last year, one of the key items the committee was engaged on was their work with the Advocacy Task Force (ATF) to draft the by-law change, passed last year, establishing our newest committee: the Public Interest Review Committee. Since Council had tasked ATF to craft the by-law, the Legislation Committee worked together with the ATF to establish the legislative basis for the new PIRC. ⊕

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DIMENSIONS

ENGAGE EMPOWER RECOGNIZE

We are excited to host *Dimensions*, the second biennial conference of the Manitoba Community for Women in Engineering, Science, Technology and Trades! MCWESTT 2015 will be a one day professional development conference held at the Fort Garry Hotel in downtown Winnipeg on May 8, 2015. It is our hope that this conference will be a special opportunity for you to be inspired by keynote speakers, participate in professional development workshops, and to network with professionals from a variety of industries and professions from across Manitoba. Here's what you need to know:

What to Expect?

- Keynote speakers and a panel discussion, featuring Betty-Ann Heggie and Dr. Michelle Alpha!

- Back by popular demand, Aisha Alpha and Dr. Lukas Neville!
- Choose 3 of 15 dynamic breakout sessions
- Hot Breakfast, deluxe lunch, coffee breaks and a chocolate fountain
- Networking opportunities

Who Should Attend?

- Professionals from public and private industries
- Human resources professionals
- Academics and Students
- Entrepreneurs and Business Professionals
- The conference is open to all genders – everyone is welcome!

Why Attend?

- Receive high quality personal, professional and leadership development
- Great networking opportunities
- Be Engaged, Empowered, and Recognized in your career!

When and Where?

- Friday, May 8, 2015
- 7:00 am to 4:30 pm
- The Fort Garry Hotel, 222 Broadway

We are very excited about the energy surrounding women in science, engineering, trades, and technology in Manitoba. We are working hard to ensure that MCWESTT 2015 will not only provide professional growth, but also personal growth by providing you with one day to meet old and new acquaintances over fabulous meals at the Fort Garry Hotel.

Registration opens December 1, 2014 and Early Bird Registration will run until March 1, 2015 and the pricing can be found on our website. For more information about the conference, sponsorship, and registration, please visit our website: www.MCWESTT.com, or contact us at mcwestt@gmail.com. ☎



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CH2M HILL wins Award for Canadian Museum for Human Rights

The Schreyer Award for Technical Excellence and Innovation

Congratulations to CH2M HILL for winning The Schreyer Award for Technical Excellence and Innovation, for their expert structural engineering for the Canadian Museum for Human Rights. The award is presented by the Association of Consulting Engineering Companies-Canada and the *Canadian Consulting Engineer Magazine*. One of the jurors on the awards committee commented, "The Museum is a remarkable achievement, both because of its elegant architecture but also its technical complexity. We selected it for the Schreyer Award recognizing that it was precise engineering and complex computer modelling by the structural engineers that made the building possible". To read more about all the awards please visit: www.canadianconsultingengineer.com. 



Name of project: Canadian Museum for Human Rights, Winnipeg.

Award-winning firm (structural engineer): CH2M HILL (Neb Erakovic, P.Eng., Crispin Howes, P.Eng., Bill Coupe)

Client: Smith Carter Architects

Design architect: Antoine Predock

Other key players: The Mitchell Partnership (mechanical); Mulvey + Banani (electrical); PCL (construction manager); Walters (steel); Joseph Gartner GmbH (glazing), Ralph Applebaum (exhibits).

Issued for Construction

I received a phone call from a member recently. The question they wanted answered was, "What does it mean when a member applies their seal to a document?" As is often the case, a short question can require a complex answer.

The Act is the starting point in seeking direction for how we govern our profession. That provincial piece of legislation does, in fact, have a section dedicated to the seal; Part 8. In that part of our Act, for example, it dictates that members must apply their seal, in accordance with the by-laws, to every engineering and geoscientific document issued by the member.

The By-laws also have a section dealing with the authentication of documents, which includes the application of the seal. This section speaks to the mechanics of the application of the seal. For example, the by-laws indicate that members must apply their signature in the vicinity of the seal.

The Act and the By-laws, therefore, speak to when and how the seal must be applied, but do not indicate directly the meaning behind the application of the seal. The Code of Ethics is where members begin to receive direction on the question posed to me above. The most pertinent canon states that members must seal only those documents for which he or she has assumed professional responsibility.

We therefore begin to understand the picture behind the meaning of the seal. Since members must

- a) apply their seals to every document that they issue, and
- b) seal only documents for which they assume responsibility

the seal therefore means that a member is issuing a document for which they have taken responsibility. Implicit in this is that, in 'issuing' a document, a member is imparting their advice to another party. Furthermore, when considering the whole of the Act, regulations, and guidelines, the member is ensuring to the recipient of the documents that they have applied a level



of diligence appropriate for that stage of the project.

In the realm of building design, we can use this information to understand what it means when an engineer issues drawings. The engineer in question is mandated that they must only issue drawings if they assume responsibility for the drawings. This, in turn, means that they've applied a level of due diligence appropriate for the type of drawings in question.

For example, when a member issues a drawing that is labeled "For Conceptual Review", they are defining the level of due diligence applied. A client can rely on these drawings to determine whether or not the project is proceeding in the intended direction. These drawings would likely not have the level of detail required for the tender process.

By contrast, a member who issues a drawing labeled "For Construction" is expected to have applied a full level of diligence prior to sealing the documents. Clearly, "For Construction" drawings are expected to have the level of diligence such that a contractor could use the

drawings to construct the building. More importantly, if the building were built according to the drawings, they would not fail.

A drawing that is issued "For Construction" should not contain errors. It should also be complete. It should not rely on a third-party, such as the Authority Having Jurisdiction, to provide further details or even to prompt the engineer to fill in missing details or identify deficient elements. It should also not rely on a third-party, such as the contractor, to make an interpretation of the relevant engineering codes and extrapolate an appropriate end result. A drawing that is issued "For Construction" should be sealed with the assumption that no other engineer will review the document for correctness and that all contractors could interpret the design similarly.

As always, I appreciate comments and discussion about standards issues. If you'd like to talk about the above topic or any other area of concern, please do not hesitate to contact me at: mgregoire@apegm.mb.ca. ☎

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