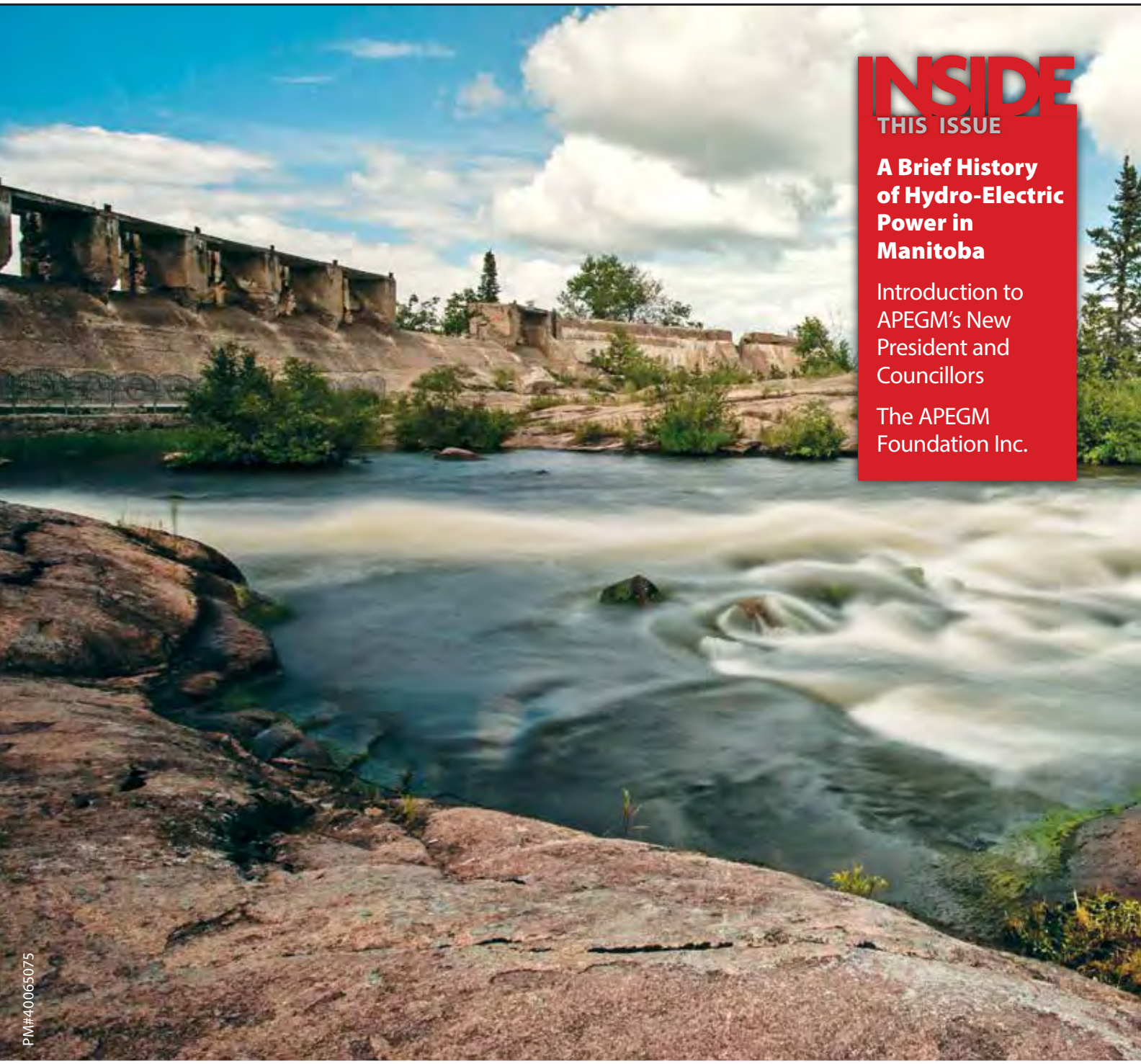
The official publication of the Association of Professional Engineers and Geoscientists of Manitoba

THE KEYSTONE PROFESSIONAL

SPRING 2015



INSIDE THIS ISSUE

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APEGM

4 questions to ask about critical illness

The financial impact can be as devastating as the disease itself. Because of medical advances, Canadians are more confident about physically surviving cancer or other critical illnesses than surviving the impact on their net worth. Find out if you're financially prepared for a critical illness.

1 Are you at risk for a critical illness?

About **2 in 5 Canadians** will develop cancer in their lifetimes. In 2013, it was estimated that:[1]

- **96,200 Canadian men** will be diagnosed with cancer
- **91,400 Canadian women** will be diagnosed with cancer
- **Over 500 Canadians** will be diagnosed with cancer every day

About **9 in 10 Canadians** already have at least one risk factor for heart disease and stroke. In Canada, there is:[2]

- 1 stroke every **10 minutes**
- 1 heart attack every **7 minutes**

2 What are your chances of surviving it?

- **63% of Canadians** diagnosed with cancer are expected to survive for **5 years or more** after diagnosis[1]
- The cardiovascular death rate in Canada has **declined by nearly 40%** in the last decade[2]
- **1.3 million Canadians** are living with the effects of heart disease, and **315,000** are living with the effects of stroke[2]

3 Can you afford the financial impact?

- Cancer drugs taken outside the hospital – and not automatically covered by the government – cost about **$20,000** for a course of treatment. Newer drugs cost **over $65,000**.[1]
- Recovery from heart disease and stroke can **continue for years**, resulting in more medical bills and lost income and productivity[2]
- Family caregivers also have to deal with **wage loss** and the real potential of a **decreased standard of living**[3]

4 How can critical illness insurance help?

The **Engineers Canada-sponsored Critical Illness Plan** pays a lump sum upon diagnosis of a covered condition. You and your spouse may apply for benefit amounts **between $25,000 and $1 million** to help meet the costs associated with surviving a serious illness, including cancer, heart attack and stroke.

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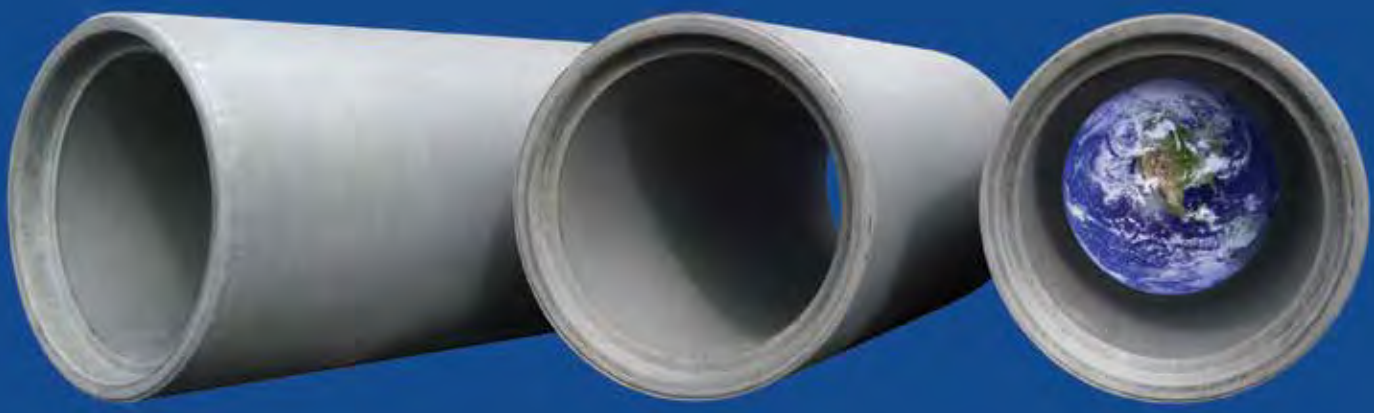
Sources: [1]Canadian Cancer Statistics, 2013. [2]Heart & Stroke Foundation Statistics, 2013.
[3]Colleen Nelson B.Ed, PBCE, "The Financial Hardship of Cancer in Canada: A Literature Review," Canadian Cancer Society, 2010.

Look at it this way



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Spring 2015
Published by the Association of Professional Engineers and Geoscientists of Manitoba
870 Pembina Highway, Winnipeg, Manitoba R3M 2M7
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E-Mail: *apegm@apegm.mb.ca*

The Keystone Professional Committee would like to hear from you. Comments can be forwarded to us by email: *amoore@apegm.mb.ca*. Members are also encouraged to submit articles and photos on topics that would be of interest to the membership.

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

SPRING 2015

FEATURES

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Send change of address to:
The Keystone Professional, APEGM,
870 Pembina Hwy, Winnipeg, MB, R3M 2M7
e-mail: apegm@apegm.mb.ca
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Publications Mail Agreement #40065075 Return undeliverable copies to: lauren@kelman.ca

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Howard Procyshyn, P.Eng., President 2014-2015

The Goal of **Rebranding**

Greetings and best wishes

for the New Year. We have had two Council meetings since the AGM and have elected councillors to new positions. Congratulations to Lesley McFarlane for being elected Vice President. She now becomes President Elect.

I had the honor and pleasure to present medals for the very first time to all living Past Presidents in the history of the Association, at a function at the Niakwa Golf and Country Club in December 2014. In attendance amongst the many distinguished guests were Past President Len Bateman (President 1958) who just turned 96 and Past President Les Wardrop (President 1959 +1960) who just turned 99. Almost 75% of the living Past Presidents were in attendance. Some of the stories and reminiscing clearly indicated that "once an engineer, always an engineer."

At this and other functions, I've had the opportunity to talk to several Past Presidents and they've all remarked on how the Association has changed and how the role of President and all the duties and responsibilities have changed, largely due to the increased membership requiring more full time staff and more work at the committee levels.

As part of the 2013-2017 strategic plan, Council gave the CEO a mandate to work on the development of the three initiatives as selected by the Council, being: government relations, attraction and retention, and public perception. These initiatives are a long term endeavour. The CEO reports to Council on the actions towards achieving these ends. Of these initiatives, public perception is the one that we are most commonly impacted by as this in turn, influences the other initiatives.

As engineers we *still* hear the confusion between those engineers who drive a train and those who practice engineering. There is also some use of the word engineer referring to a stationary engineer and not to be confused with professional engineer. Whether made in jest or ignorance, it's a perception.

Is this the fault of our branding? Do we need to rebrand?

We imagine the social influence from parents who counsel their daughters who may want to enter the engineering program, and we often wonder if parents encourage or discourage daughters about an engineering career. It's perception.

We see engineers are not respected in the same way as other more high profile occupations, particularly those that have a masters or PhD., even though the engineer may possess a masters or PhD. It's perception. So can this perception be impacted on by rebranding who we are? How will we measure the results?

On the social interaction side of the equation, engineers lack a movie or TV series advocate such as exists in the medical field, or the law, or accounting to show and tell problems and solutions with day to day situation. Our closest advocate may very well be *"The Big Bang Theory"* at best, so we are not getting much help from Hollywood. Media wise, engineers do not have a weekly column in the *Winnipeg Free Press* such as what the Architects do. This regular column raises the bar for linkage with the public on the many great architectural contributions made in the community by architects. Also, perhaps active use of a Public Interest Review Committee to connect the public on important engineering issues related to current hot topics and their potential impact in our community could also be a factor in increasing public awareness and the value of the engineering and geoscientist community.

> Engineers touch every aspect of life and are valued members of our society. Engineers as applied scientists participate as problem solvers. Are we a commodity? Or, can we leverage this to elevate the profession and improve government relations, improve the perception of society and attract and retain professionals to the practice of engineering?

Engineering is one of the most diverse professions in the world having the widest range of job opportunities with the same university degree. We have engineers who are CEOs of companies, ones who work in the field with test equipment, ones who work in manufacturing, ones who work as manufacturers agents, engineers working for the Utilities, in the medical field, in communications, consulting engineers, in oil and gas, in mining, engineers in many water resources areas, roads, geoscientists, in government. Is there one brand applicable to all facets? Will this change the perception?

Engineers touch every aspect of life and are valued members of our society. Engineers as applied scientists participate as problem solvers. Are we a commodity? Or, can we leverage this to elevate the profession and improve government relations, improve the perception of society and attract and retain professionals to the practice of engineering?

The common thread in these initiatives could be the rebranding of the Association and its members. Engineers Canada is seeking a formal endorsement from Council for the goal that "Thirty percent of newly licensed engineers are women by the year 2030 (hence the name 30 by 30). Our engineering brand will need to change in order to achieve this goal, as the current enrolment of female engineers has remained reasonably consistent at ten percent.

Now some may say that we are not a business that sells a product and why do we have to rebrand? Yet we are constantly selling ourselves in essence to deal with government relations, boasting of our attributes to attract and retain and continuing to distinguish ourselves in the community to improve public relations. It is my belief that rebranding will assist in all the strategic initiatives for the near future and beyond. Rebranding is part of an ongoing strategy that informs engineering activities, and strengthens and supports all initiatives that will follow from this.

Engineers build things and these things build people. We should all be proud of how our work as engineers contributes to the society we live in. The goal of rebranding is to assist in taking our rightful place in leading the successes of our society and contributing to all of our strategic initiatives.


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Grant Koropatnick, P.Eng., CEO & Registrar

Perspective is **Everything**

I had the opportunity recently to spend some time with an Olympic gold medalist and a world champion. These two individuals have tremendous focus and determination in sport and life. I admire their accomplishments.

Focus

Top athletes and accomplished business leaders have the ability to focus on their goals and dismiss all other interests and distractions. They achieve great success because they "keep their eyes on the prize!" However, this sharp vision and passionate attention to details can sometimes cause blindness. It reminds me of a news story about a prominent Canadian businessman who was convicted of fraud and a few other charges and spent time in a USA prison. He was so focused on making his company profitable that he failed to see the illegal acts he was committing (there was a video surveillance recording of him loading boxes of files into his limousine). He shredded those files and did other illegal activities and was found guilty, because his strong focus made him blind to the reality of what he was doing. Can this happen to engineers and geoscientists?

> Those best able to focus under pressure seem to have perspective and enjoy the upcoming challenges as opposed to questioning their self-worth.

In his book *"Perspective: The Key to Life"*, sports psychologist and fellow citizen of Manitoba, Cal Botterill says: *"Those best able to focus under pressure seem to have perspective and enjoy the upcoming challenges as opposed to questioning their self-worth."* Botterill goes on to say: *"Perspective, by definition helps prevent emotional over-reaction. People with perspective are seen as leaders. Their ability to see the "big picture" and their healthy view of themselves and the world provide a basis for more functional feelings, perceptions and processing."*

Your Perspective

I think this applies to the ProDev program. Some members complain about it. They argue that it is an insult to them as a professional. "How dare the Association question my skill and ethics?!" Is the ProDev program a bad idea that places hardship on members? It depends on your perspective. Do the members overseeing the ProDev Program want to discipline members for non-compliance? Not really, but our current mandate requires the Continuing Competency Committee to forward cases of non-compliance to the Investigation Committee, regardless of an individual's personal opinion. To simplify the administration of the ProDev Program the Association

through its Act amendment proposal is attempting to put in place a policy that will show the public of Manitoba that members are keeping up. This exists for doctors, nurses, lawyers, accountants, pharmacists and most other self-regulated professions. The public expectation is high and they want to see a minimum standard for all licensed professionals – including engineers and geoscientists!

ProDev

The ProDev program has been created for the public good. It is important for engineers and geoscientists to have a system for proving their competency. The Association can't risk waiting for the moment when the public asks "What were you doing to make sure that engineer was competent?" We need to have a good answer ready in advance. The ProDev program is that answer. It provides a rational, reasonable, thorough response: "Our members input a minimum of 240 professional development hours into 6 categories over a three year period to keep up their competency." The fact is, most members do way more than the minimum. So let`s be ready to show the public that we`re keeping up.

The Association is seeking important changes to its governing legislation and some say these changes are overdue. For example, the western provinces of BC, Alberta, Saskatchewan, and our eastern neighbour Ontario all have licensee categories of membership to register professionals from outside their borders. Manitoba does not. However, the government expects that we support The Mobility Act and the Agreement on Internal Trade which ensures the fair movement of professionals from province-to-province. Unless the Association moves to adopt changes to the Act, our profession will be negligent in responding to the context around us. As a result, it is necessary to seek amendments to support a licensee category similar to these other provinces. I invite you to attend one of the member information sessions. See the website 'Events' tab for more details.

Lapel Pin Offer

In the winter issue of the Keystone Professional Magazine, I wrote about branding and marketing in the article titled *"This is Your Brand."* Near the bottom, I spoke about the new lapel pins. Many readers sent me an email requesting a pin. We still have more pins, so 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.

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.*

Engineering PHILOSOPHY 101

Looking at Our Origins

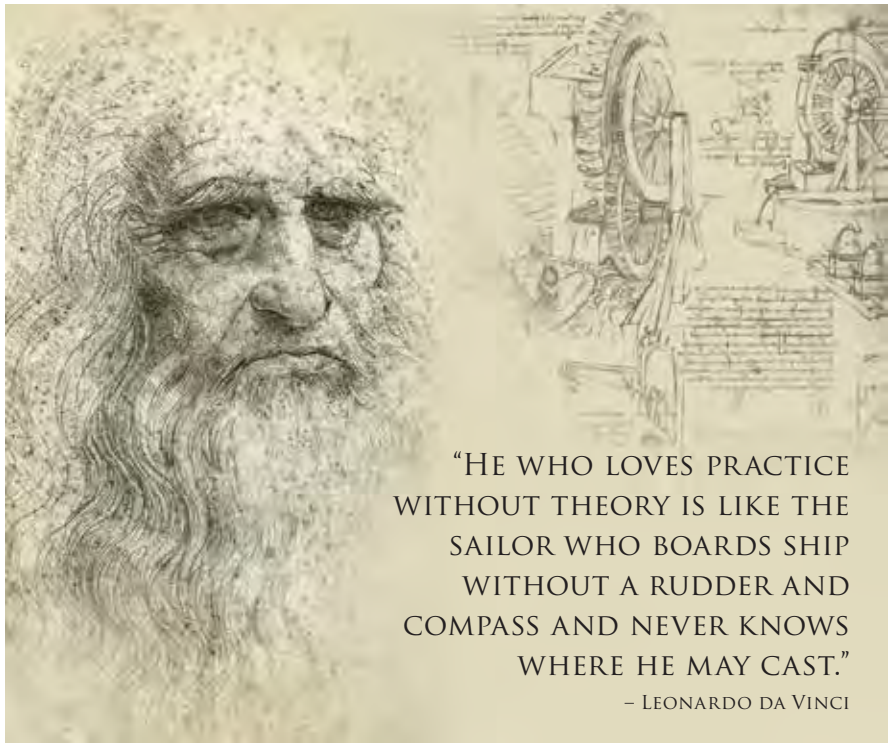
M.G.(Ron) Britton, P.Eng.

Archeologists, through the recovery of artifacts, have provided us with glimpses of history. The remains of shelters and monuments give clues to the social structure that dominated in specific areas at specific times. 'Progress', as we define it today, has typically been defined by the 'improvement' of the 'made' artifacts that have been recovered. Change happened over time. Clearly, there have always been individuals who have found ways to 'make it better.' If, as Henry Petroski once observed, "Engineering is the rearrangement of what is", then people have been practising engineering since prehistoric times.

The accomplishments of Egyptian 'engineers', particularly, but not limited to, the pyramids, demonstrated significant engineering input. Documentation, in many different forms, provides more than artifacts to study.

By the time Greek and Roman societies dominated the 'known' world, 'engineering' input had become obvious. Significant structures and systems still exist that speak to the skills of the 'engineers' of the day. This age also provided written information that identifies many of the individuals and records the beginnings of 'regulation' and 'standards'. Unfortunately, the fall of the Roman Empire seems to have caused a slowdown in engineering advances.

In the late 15th and early 16th century, Leonardo da Vinci emerged as an artist, author, scientist, and engineer. His accomplishments are legendary. He also left an observation that is, in my opinion, one of the earliest definitions of engineering. He stated, "He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast." The 'practice' he refers to is probably what we would consider to be 'design.'



Not withstanding the general lack of attention to those who were responsible, individuals continued to rearrange what was. Things began to change when the Industrial Revolution began.

Dr. P.N. Allitt, a Professor at Emory University *(1)*, makes a convincing case to explain why the Industrial Revolution began in Britain. By the middle of the 18th century, unlike most of Europe, Britain enjoyed a stable government and a developing banking system. Earlier that century Britain had undergone an Agricultural Revolution that provided more food with less labour. This revolution accelerated deforestation throughout much of Britain as land was cleared for agricultural production. The twin unintended impacts of that revolution were the need to seek a new source of fuel to replace wood, and an available workforce who were no longer tied to the land. Entrepreneurs realized they could utilize the developing political, financial, and social environment to exploit inventions, or simple improvements in processes, in order to produce more goods at lower cost. Machines and workers became concentrated in factories, efficiencies were realized, and change became the norm.

Industries developed to serve the needs of related industries. Textile and pottery production were among the first cottage industries to change because of new inventions. Coal mining expanded to provide the fuel needed to produce iron and steel, to heat homes, as well as to power steam engines. Improved roads, canals, bridges, and railways developed to deliver raw materials and finished goods. Steam engines were initially developed to pump

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water out of coal mines, and then improved to provide stationary power in factories and mobile power for railways. Precision metal working developed to improve the efficiency of steam engines, machine tools, and military hardware. The culture of ". . . improving what is" became ingrained in the British workplace.

Typically the entrepreneurs were the people who either developed the inventions or improved on them. Those who made the changes were no longer anonymous. Initially new industries grew out of improvements to traditional cottage industries like weaving and pottery. Additional opportunities developed in response to the need to serve the growing number of factories and the increasing transportation demands that came from increased production. People like Watt, Newcomen, Wedgwood, Darby, Brindley, Wilkinson, Stephenson, Brunel, and many others found their way into the history books. They were considered to be the 'engineers' behind the changes.

Interestingly, most of these 'engineer/entrepreneurs' came from humble beginnings. Few had more than a fundamental education. Many, in fact, were functionally illiterate. They came to their positions through a system that was more like an apprenticeship than an education. For example, Brunel gained his engineering 'education' working for his father, who had been an engineering officer in the French Navy. George Stephenson began as a 'mining engineer' in charge of the pumping engines at a mine. Robert Stephenson, his son, got his training working with his father. Science became a part of some university offerings, but not engineering. In general, da Vinci's observation regarding the need to understand 'practice' and 'theory' was ignored. These engineers focussed on the knowledge "how" not the knowledge 'that'. By the middle of the 19th century, engineering schools were beginning to develop in France and Germany, but not in Britain.

Many of the 'engineer/entrepreneurs' became wealthy men. Their fortunes were built using capital that was borrowed from the 'landed gentry' and knowledge that they exploited. Some attempted to gain social status through marriage, but the British aristocracy looked down on those who worked for a living, in spite of their financial success. Notwithstanding their contributions to the British economy, engineers were not a part of the social elite. They were, and some would argue still are, considered to be a 'blue collar' profession.

If we fast forward to 1971, Daniel C. Drucker observed that "Engineers view themselves, on the whole, as servants of society". Clearly our British forerunners functioned under a sort of servitude and, at the same time delivered significant change to the industrial world. Is their historic condition relevant today on this side of the Atlantic? Or is that just history?

It is clear that engineering has a proud history of 'rearranging' but a less visible history of recognition. Are we truly, as we so often lament, hidden in plain view? And is the social status of engineers that developed during the British Industrial Revolution an underlying cause of engineering being 'hidden' today?

P.N. Allitt, The Industrial Revolution, The Great Courses www.thegreatcourses.com

Thoughts on Engineering Design
...and hunting for definitions

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

I recently stumbled on a 1947 book entitled "Thoughts on Design". The author, a graphic designer named Paul Rand, offered an interesting definition of design. He stated that: "Design is the method of putting form and content together. Design, just as art, has multiple definitions; there is no single definition. Design can be art. Design can be aesthetics. Design is so simple, that's why it is so complicated." While he was looking at the process from an artist's perspective rather than an engineer's, his definition has a broad and understandable appeal.

I was tracing a paper trail of design definitions when I ran across Rand's book. My search produced material that caused me to reflect on how design has been viewed by all types of people who claim ownership of the process. I came to realize that many of the more interesting definitions came from outside the engineering community. I hope this abbreviated history of my findings will cause you to look at 'our' process in a different light.

In 1988 Michael Cooley, an engineer, presented a paper in which he confirmed that: "Around the sixteenth century, there emerged in most of the European languages the term 'design' or its equivalent . . . Above all, the term indicated that designing was to be separated from doing". Cooley's finding indicates that "design", and the idea that it is an intellectual rather than physical process, had at least been articulated and apparently accepted. One cannot help but wonder why we are still trying to clarify our understanding given the apparent simplicity of this historic definition.

About 300 years later, on January 2, 1818, Henry Palmer gave the Inaugural Address to the newly created Institution of Civil Engineers in London. He stated that "The Engineer is a Mediator between the Philosopher and the Working Mechanic, and like an interpreter between two foreigners, must understand the language of both, hence the absolute necessity of possessing both practical and theoretical knowledge." I must admit that I had never thought of engineers as 'mediators' between practice and theory, nor of design as 'mediation.' However, if you ignore the flowery language, Palmer's statement does have a lot in common with the concept behind Engineers Canada's Accreditation requirements.

Quick on the heels of Palmer's presentation, Thomas Tredgold, a British civil engineer, was credited with the first formal definition of engineering. His 1828 offering suggested that engineering is "the art of directing the great sources of power in nature for the use and convenience of man." It is interesting that he used the word 'art', because that suggests something very different from the "practical and theoretical knowledge" Palmer had referred to.

As the Industrial Revolution progressed, design seemed to broaden from the almost instinctive improvement of existing processes to analysis based on a clearer understanding of the underlying theory.

> "Design is the method of putting form and content together. Design, just as art, has multiple definitions; there is no single definition. Design can be art. Design can be aesthetics. Design is so simple, that's why it is so complicated."
> *– Paul Rand*

French and German schools of engineering led the way in incorporating scientific understanding into the design process. Design offices were still dominated by slide rule calculations and graphic analysis well into the mid twentieth century, but as computers developed, design based on theoretical analysis became commonplace.

Entry into the 'space age', and its increased emphasis on science, accelerated the computer-based modelling trend. The use of 'knowledge that' rapidly became more important than 'knowledge how'. It seemed that the engineering design community had chosen to ignore Einstein's cautionary advice: "Inasmuch as the mathematical theorems are related to reality, they are not sure; inasmuch as they are sure, they are not related to reality."

People like Michael Kapor, from the computing side of the design operation, began to recognize problems in the design process. He once responded to a question on design by saying: "What is design? It's where you stand with a foot in two worlds - the world of technology and the world of people and human purposes - and you try to bring the two together." So, a leader in the development of software was reminding engineers that design is more than just calculations.

If design is what engineers do, we are at the heart of making the world livable. As the tag line on the APEGM Home page says, "My life's work makes life work better."

Does any of this make sense? In the specific quotations I have cited, we are told that designing was to be separated from doing; we are likened to an ". . . interpreter between . . . practical and theoretical knowledge", and we are reminded that design is more than scientific theory and computer modelling. Design is also identified as an 'art', with the ultimate purpose of making the product work.

It seems to me that the quotes suggest design is an intellectual exercise in which we should use a combination of experience and theory to create something that meets a need. It becomes more of an art as the gap between understanding and theory increases. It is implied that design will result in something 'new'. The question remains, how do these parts fit together?

As old fashioned as it might sound, design is not required until a need has been identified. At that point the constraints of the project must be identified. Some of these constraints will be clearly identified, some will be ignored, and others will require one or more assumptions. Typically these assumptions will be based on knowledge gained from experience and backed by theory or 'rule of thumb'. But they are assumptions, not facts. At this point Peter Rice's suggestion that "the role of an engineer is to imagine" kicks in.

Douglas Coupland seems to have summed it up when he noted that "Art is how you look at the world. Design is how you live in the world." If design is what engineers do, we are at the heart of making the world livable. As the tag line on the APEGM home page says, "My life's work makes life work better."

Howard Procyshyn, P.Eng. FEC

By C. Hanlon

Over his 35-year career as a consulting engineer, the University of Saskatchewan graduate has worked across Canada, the US, Asia and Europe, including on several projects recognized by Illuminating Engineer Society (IES) design awards. One of the latest is his own workplace, Architecture 49/WSP Canada's Winnipeg office, recognized by the Consulting Engineers of Manitoba with its Keystone Award for the 'Best Building in Manitoba in 2005.' A long-time member of APEGM, Howard has also served with IES of North America's Winnipeg Chapter since 1977, as board member and co-lecturer, and was President of the local Chapter in 1980.

Why did you decide to pursue a career in electrical engineering?

For Christmas one year, I received a kit to assemble some simple electrical devices. Dealing with elements that could not be seen was like working with magic. This was very interesting to a young mind. In grade nine when my picture appeared in the local small town paper as paperboy of the week, the interviewer asked what I wanted to do when I grew up, and I replied: "I want to be an electrical engineer." It was truly a destiny and not an accident. My fascination with miniaturization of products and components continued to fuel my interest in this area of engineering.

How has your prior experience working in the lighting industry influenced your engineering practice?

Most electrical solutions, albeit important, are not seen by the public. One exception is lighting. Electric lighting design enables the creative side of our minds to interface with the engineering side. Lighting design is not about selecting luminaries from a store or catalogue but rather about applying solutions to suit a 'seeing task' in an architectural environment. This small area of electrical engineering enables innovative use of products and solutions for many different purposes: to motivate and sparkle, to highlight for attention, to conceal the location of the luminaire, or to satisfy specific visual needs in challenging or important areas such as healthcare or education. Working within a building structure requires finding architectural solutions in conjunction with design professionals. Diligently keeping up with ever-changing lamp and luminaire solutions is necessary in order to create effective, efficient solutions that are customized to every space. Daylighting follows the rules of electric lighting and plays a prominent role in conserving

Judging the 2014 Spaghetti Bridge Design Competition held during Provincial Engineering and Geoscience Week activities.

energy and creating pleasant work environments. Lighting design connects engineers with architects to respect how it looks, since as engineers we are often focused on how it works.

You were involved in designing the award-winning building in which you work. Please tell us about this experience.

The opportunity to work with a team of architects and engineers to build our own livable workspace was very exciting and rewarding. The team continually challenged each other, interrogating every concept, weighing costs, and optimizing energy solutions. It not only had to work well but also look good. It was very challenging to assemble a highly technical, automatic, and innovative space within a difficult time line. No stone was left unturned, with every system challenged and detailed to produce a deliberately coordinated engineering and architectural space that would attract and retain professionals in a motivationally rich environment. We took the opportunity to explore solutions in order to gain application engineering knowledge of products and technology. Not all the solutions worked. The design of this workspace helped make us better designers, as we now fully understand and appreciate what we put our clients through in living with and working through product failures and limitations, warranty, maintenance and even building upkeep. It's continued to serve as a beta site for evaluating solutions and an inspirational space to work in every day.

What has been your involvement with APEGM to date?

I worked on the Experience Review Committee for approximately 11 years and interfaced with engineers from all disciplines, while watching the development of an online reporting system that is second to none in Canada. Reading hundreds of reports from Members in Training helps me realize the depth and breadth of engineers in Manitoba and how hard both home grown and foreign trained members work toward becoming registered. It's like watching a family grow and flourish. It helps to realize that as senior engineers, we have a responsibility to pass on knowledge, enabling talented youth – who are already highly skilled and quick to learn the tools of the trade – grow into competent, meaningful engineers and geoscientists.

What challenges do you see APEGM facing and how do you see your role in addressing these challenges?

There are several major challenges. One is to provide and retain qualified engineers and geoscientists in Manitoba to satisfy demand in hundreds of different sectors and positions. Another is for the Association to continue actively dealing with changes in the Bylaws in order to address such issues as enforcement of continuing professional development, limited licenses, and mobility of members. At the same time, connecting government with the owners of the Association remains an ongoing long-term challenge. The fact that we are still continually asked about the relationship of engineers with architects speaks to how the Association is viewed in the eyes of stakeholders, government and even other members. We need to rebrand and refresh our image. There is much work to be done, and, although many goals will take years to fulfill, we need to do our part to move these issues forward.

What other goals do you have for your term as president?

With all of the initiatives Council has dealt with in the last 10 years, attention has fallen away from ownership linkage and connecting with the stakeholders of the Association, namely the general public. We hope to establish a framework for enhancing, in future years, our connection with the community we serve.

Fred Cross, B.Sc., P.Eng.

By M. Doyle

Fred Cross is new to the APEGM Council this year. When the Nominating Committee contacted him, he knew that the time was right to take on the role of Councillor. He retired in the spring of 2012 and is ready to donate his time and energy back to the professional industry.

Fred is excited to bring many years of work, management, and life experiences to this role. He sees himself as "raw material," a resource to be used where his skills will fit best within a well-run organization like APEGM. As an older professional, he will respond to Council needs and provide leadership and support wherever he can. "I'm open to whatever they need me for," says Fred.

Of particular interest to Fred is the public perception of engineers and geoscientists. "What we do affects almost every aspect of modern living. But the reality is I don't think many people stop to think about our role in society," he explains. He supports the Association's efforts to raise public awareness through programs such as the Provincial Engineering and Geoscience Week.

Fred brings a variety and interesting balance of experiences to his new role on Council. "I divided my working life roughly 50/50 between the private and public sectors. It's very interesting to have experienced both to see their differences and similarities," he says. This gives him a unique insight into the two sectors. In fact, says Fred, in some respects the private and public sectors have greater similarity than most people might think.

Although his work in telecommunications had him dealing mostly with business customers, some of the highlights of Fred's career have been projects dealing with distance education and telemedicine, two areas that directly benefit the general public. In the 1990s, Fred was involved in projects that helped to deliver distance education to high school classrooms in rural communities. If there were insufficient numbers of students in each school in a school division to support a certain course, the practice had been to bus the students to other schools to produce a large enough class size to be practical. With interactive two-way video, they could avoid the need for bussing and yet give all the students the experience of participating in a larger classroom. Twenty-five years ago, this was a significant challenge with the technology available at the time.

Fred also appreciated opportunities to apply telecommunications engineering to telemedicine applications that extended specialized health care services to remote communities. Telemedicine extends the presence of health care professionals and avoids the delay and potential risk of transporting patients to large hospitals, explains Fred. He says, "It was satisfying to be a part of these projects that directly benefited the people of Manitoba."

A native Manitoban who has lived in Winnipeg all his life, Fred attended the University of Manitoba, where he studied electrical engineering, focussing on electronics and telecommunications. As a professional engineer for nearly 40 years, he has witnessed huge changes in the telecommunications industry, including the widespread use of fiber optics. When he began working as an engineer, it was strictly businesses that were using telecommunications for anything other than telephony. The year Fred graduated, the first home/personal computer, the Commodore PET, was launched and was considered a novelty. "There were few digital telecommunications specialists back then. Now it's all mainstream – literally everyone today is a user of voice, data, and video telecommunications."

As a child who lived a block away from a fire hall, Fred first wanted to be a firefighter. From a young age, though, he was fascinated with science and engineering. His father was a professional engineer and a great role model to Fred. He was highly supportive of his son's interest in studying engineering, yet insistent that the decision to pursue an engineering career had to be Fred's alone. Years later, there was no one prouder than Fred's own father when he presented Fred with his Iron Ring.

Fred's advice to students considering engineering today is this: "If you are passionate about the field, really apply yourself and go for it – see where it takes you." In addition, remember to be flexible. The industry and the technologies are changing so rapidly, "you will

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The industry and the technologies are changing so rapidly, "you will be continually processing new information in the span of a career but it is an exciting life-long learning process,"

be continually processing new information in the span of a career but it is an exciting life-long learning process," Fred explains.

Fred is keenly interested in public awareness of the profession, the public safety aspects of our profession, and the importance of managing self-regulation. As Fred points out, self-regulation must be taken very seriously so that it can be maintained. "We are trusted by government to manage ourselves; we must carry out that responsibility at the highest standard."

Another important consideration regarding public safety is that the general public probably does not think much about engineering or the science behind it until something goes wrong. We expect all the technology around us to function correctly – every time. That is why it is important to help ensure that everything works and that it works safely. What engineers and geoscientists do touches virtually everyone; there is a need for more public awareness of that.

Now serving on three volunteer boards and very active in a number of other things he enjoys, Fred is enjoying an active retirement. When Fred is not busy with committee work, there is music. One of his favourite musical pursuits is performing on stage in the Gilbert & Sullivan Society of Winnipeg's annual musical productions. Fred also enjoys photography (traditional, stereoscopic, and video) and hopes to eventually construct a model railroad in his basement.

Ruth Eden, P.Eng.

By C. Hanlon

Ruth Eden still fondly remembers the time she worked on the Taylor Bridge in Headingley – also commonly referred to as the "Smart Bridge". The project was the first in Manitoba to incorporate fibre reinforced polymer (FRP) materials and structural health monitoring. "It tells us how it's feeling," says Ruth, adding that the bridge put the province on the map as a leader in these innovative technologies. Sensors in the bridge relay information to a computer at the University of Manitoba.

Working on the project was an experience that changed the course of Ruth's career. "My exposure during the construction of that bridge interested me enough to go back and take my master's in structural engineering," she explains, "with a focus on FRP materials." Her thesis on strengthening timber bridges with GFRP became the basis for the standards that are still used today.

Until then, she had spent the first 13 years of her career as a construction engineer with the government, overseeing the construction of bridges all across the province. Growing up with a father who was a contractor and a love for science and math, it felt natural for Ruth to pursue a degree in civil engineering, which she completed in 1988 at the University of Manitoba, later returning for her master's.

When Ruth finished her master's degree, she accepted a position with the government of Manitoba as a research materials and standards engineer. "That allowed me to leverage what I had learned during the master's program," she points out, adding that she then had the opportunity to become the Manager, Bridges and Roads, with the Manitoba Floodway Authority (MFA).

She enjoyed the intensity and fast pace of the project. Accelerated timelines meant that decisions had to be made very quickly. "We were inventing processes and procedures as we went," she recalls. "It was a great experience."

Near the end of the project, she was given the opportunity to return to Manitoba Infrastructure and Transportation as the Director of Structures Design and Construction. As a result of a recent reorganization, she is now the Director of Structures within the Water Management and Structures Division. In this new position, she will once again have exposure to issues of flood operations, protection, and forecasting, tying in her previous experience with MFA.

She has also shared her multi-faceted experience via her involvement in various professional associations. In 1990, after completing her undergraduate degree, she became an active member of APEGM and sat on various committees including the Women in Engineering Committee and the Public Awareness Committee. Then, after a brief hiatus during her graduate studies and MFA experience, she came back to the association and is now serving as a councillor.

"I think it's important for the membership to be active in the association," says Ruth. "I want to be involved in charting the future direction."

She believes in the importance of increasing the profession's profile in society. "In order to build and maintain a relationship of trust and credibility, the public has to be aware of what we do," she elaborates.

Ruth plans to spend her first year as a councillor learning how the Association works and what priorities have been identified by the council. She is also looking forward to the opportunity of serving on the new Continuing Competency Committee and helping to oversee mandatory reporting within the professional development program.

It is not the first time that she has had the chance to influence the development and implementation of design codes and regulations. As a member of CSA S6 and CSA S9 Technical Committees, she has long been involved in developing and updating specific aspects of the Canadian Highway Bridge Design Code. Part of the process includes reflecting safety and redundancy provisions in the code. These committees are comprised of a cross-section of professionals involved in bridge design and construction, including researchers, practitioners, consultants, suppliers, and owners.

By having the capability to design, construct, inspect, and maintain its bridge infrastructure, the Government of Manitoba prides itself on being a 'knowledgeable' owner. Not all jurisdictions qualify for this designation, Ruth points out. "We hire consultants to add and support our activities," she notes, "but we have the in-house expertise to maintain our knowledgeable-owner status. Being a knowledgeable owner ensures that the stewardship of provincial infrastructure is as effective as it can be. We have the in-house expertise to make decisions and solve problems quickly."

This has been particularly important during recent flood events. In 2011 and 2014, Government of Manitoba staff members were in the field, with the authority to assess and perform what needed to be done to protect the safety of infrastructure. Ruth recalls spending many long days and nights at work during the floods, sometimes revisiting the very bridges with which she was involved at the beginning of her career. During her many years as a bridge engineer, Ruth has also been involved with the Transport Association of Canada and now serves as the vice-chair of its Structures Standing Committee.

Despite a very busy schedule, she still finds time to golf and participate in a curling league. Ruth is also a big fan of the Winnipeg Jets and shares a set of season tickets with her family. In the future, she also hopes to teach a master's course in bridge engineering at the University of Manitoba.

Pamela Fulton-Regula, P.Geo.

By M. Doyle

The timing was right for Pamela Fulton-Regula to run as Councillor for APEGM in 2014. Pamela was interested in becoming more active in the community and she was inspired by her family, friends, and the Winnipeg chapter of Women in Mining to get more involved. She is excited and honoured to have been elected as Councillor.

In her role on the Council, Pamela hopes to increase the profile of women geoscientists, to set the example that women can work within geoscience professions, and to demonstrate that this is possible while still maintaining an active family life. "I hope to be able to contribute to levelling the gender playing field through equal rights for all, not just for women," says Pamela. Another priority she identifies is the inclusion of more geoscientists into APEGM.

Pamela was born, raised, and educated in Scotland, in the United Kingdom. Of this experience, Pamela says, "I can relate to many of the cultural, gender, and educational challenges many foreign members face and I will endeavour to represent those differing ideals."

She grew up in a mining area and enjoyed a variety of outdoor pursuits including horse riding, mountaineering, skiing, and the physical side of geography in school. Says Pamela, "My passion was riding my horse through the local forests and across the moors; it's where I learned to love the wind and rain. We lived in a 200-year-old, locally quarried sandstone house with 13-foot-high ceilings, a fireplace in every room, ice on the inside of windows in winter and great views over the valley, sand processing operations and the residual slag heaps from coal and lead mining." This experience definitely influenced her decision to try geology in her first year at Glasgow University. "My department at the time was an amalgamation of a number of different geology departments from across Scotland. As such there was a very low student to teacher ratio and we went on fieldtrips every second weekend and most major holidays. I feel privileged to have benefitted from this program," she says.

Another strength that Pamela brings to her new role is a balance of private and public sector work experience. "I grew up the daughter of an entrepreneur, my first job was selling products door to door at age 8, and I married an entrepreneur who owns his own small business in Winnipeg," Pamela explains. She worked for private industry for eight years after receiving her M.Sc. in geology, and then made the switch to government after starting a family. "As such, I have seen success and failure and understand the many challenges of running a small business, working within larger organizations, and as a public servant," says Pamela.

In her current position with the Province of Manitoba, Pamela is responsible for proposing and reviewing standards, agreements, and applications on various regulatory functions of the Petroleum Branch. She is also involved in creating, revising, and compiling field and pool boundaries and offering geological support to the Petroleum Branch's Engineering and Administration sections as well as to the Director of Petroleum.

She lists the following as the highlights of her career so far: "Completing my six-week independent mapping project in Zambia, Africa with Rio Tinto Zinc, completing my master's degree on the New Britannia Gold Mine in Snow Lake, Manitoba and being chosen to represent my peers for APEGM."

Pamela has been appointed to the Nominating Committee and is particularly excited to have been appointed the Geology Student Liaison for 2014–2015. Pamela says, "I look forward to getting to know and having discussions with undergraduate and professional geoscientists, and to encourage them to be engaged in APEGM."

In helping to safeguard the environment and the economy for future generations, Pamela sees her role as part of the big picture. "Every day at work, I make decisions which impact the environment and economy in some small way. I am just one person, but collectively engineers and geoscientists shape our world. It is APEGM's role to ensure the people in these positions of power maintain their competency and hold the public's interest above their own."

Another important issue she recognizes is a lack in public trust of the regulations and practices for professional engineers and geoscientists. Pamela explains: "I think we need to help the public separate the truth from conjecture, to gain perspective, and to help them realize that:

Their provincial regulations are best practices and professional standards put in place to protect them;

The professionals behind those regulations are working hard to enforce those regulations through their practices;

Government and professionals are constantly looking for ways to improve our regulations, policies and practices; and,

We are listening to public concerns."

Pamela is also passionate about good design and living well but with less long-term energy demands. "My current personal pet project is designing an affordable earth-sheltered net-zero home with passive solar, geothermal heating, a solar chimney, and solar electricity while still incorporating a traditional and symmetrical look and feel. I believe good design and engineering with smart material choices will form the foundation of our future, " she explains.

Roger Rempel, P.Eng., FEC

By C. Hanlon

Last Christmas Eve, when an intense storm washed out telecommunications, water distribution and roads in a small Caribbean community, Roger Rempel and his Stantec colleagues were already working to design new infrastructure for St. Lucia that would be more resilient to climate extremes. As part of his work, the senior managing associate and environmental engineer spends considerable time helping communities across the globe assess the impact of climate change on their infrastructure and engage in resiliency planning to meet those challenges.

"It's a very satisfying thing to know that you are making infrastructure safer and more reliable for people," says Roger. In fact, he points out, the public needs to be aware that this mission is at the core of what all engineers do.

It was a message he was pleased to see enunciated when he chaired APEGM's Advocacy Task Force (ATF) in 2014. "I think it was a very educational process for everyone," he notes. "It revealed a lot about our Act, including affirming the need for expressing our voice to protect the public interest when it's at risk." Currently serving his third term as Councillor, he is now involved in the Public Interest Review Committee that resulted from the ATF Process.

With more than 20 years of experience in environmental assessment and quantitative risk assessment, Roger has long been passionate about both engineering and the environment. The son of an environmental engineer, he recalls exploring ecology from a young age, performing experiments with a science kit, received as a gift.

"I had a voracious appetite for science in every discipline," he explains. "So I decided to go into engineering and do environmental work."

During his final year of his degree, Roger worked for TetrES, a Manitoba-based environmental engineering and science firm. "We were a small boutique firm, growing organically as our business grew," says Roger, adding that TetrES focused on attracting and developing niche experts. "For a small shop of less than 40 people, we were able to develop a very strong reputation as a leader in environmental engineering in Manitoba." TetrES took on much of Manitoba Hydro's and The City of Winnipeg's environmental engineering work and was recognized with numerous awards by the Association of Consulting Engineers of Manitoba, both for work conducted in Manitoba and internationally.

But his priorities started to change when Engineers Canada developed a committee to look at the impact of climate change on critical public infrastructure in the early 2000s. Up to that point, all codes and standards in engineering were based on historical climate, with nobody taking into account the projected shifts of local climate in their designs. In 2006, Roger was involved in the first public infrastructure project to be assessed using Engineer Canada's Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol: a water treatment plant and distribution system in Portage La Prairie, MB. "It was the start of my formal involvement with climate resiliency and vulnerability assessments," says Roger. Since then, the protocol has been refined on an ongoing basis and there have been well over 40 projects completed across Canada.

Meanwhile, Roger has continued to be involved with the team that periodically revises the PIEVC protocol. "PIEVC undergoes regular revision and updates on an ongoing basis," he explains, adding that he is also part of a team of PIEVC instructors, established in partnership with Engineering Canada. "We have been teaching workshops across the country to help professionals in the design and asset management industries deal with risks induced by climate change."

Because the team cannot visit all remote communities affected by climate change, Engineers Canada asked that a Faculty of Instructors be established

"I had a voracious appetite for science in every discipline. So I decided to go into engineering and do environmental work."

"I really do think it's important for people to be involved in the Associations that are key to the profession. More than ever we need public support in order to tackle the challenging issues we face. In my experience, the best way to generate that support is by building awareness."

to teach the workshop by webinar. Last December, Roger and his colleagues conducted a climate and infrastructure risk webinar for Ontario engineers, hosted by the Ontario Climate Change Consortium. The response filled the 'electronic' room to the webinar platform's capacity. "People want to learn about this," says Roger.

In his role with Stantec, he has travelled to communities far and wide to work on climate resiliency and vulnerability assessments, including St. Lucia, Costa Rica, Honduras, Brazil, and the US. Last year in Maryland, his Stantec team completed a large study assessing the impact of coastal sea level rise and storm surge on state highway transportation infrastructure. This past January, he was involved in workshops focusing on public infrastructure climate resiliency for Manitoba's public infrastructure.

Despite a busy work schedule, Roger continues to be very active with APEGM and is currently serving on the Executive Committee as well as the Council. In the past, he served on the Public Awareness Committee as well as on the Liaison Committee (when he was president of ACEC Manitoba). "I really do think it's important for people to be involved in the Associations that are key to the profession," he says, "More than ever we need public support in order to tackle the challenging issues we face. In my experience, the best way to generate that support is by building awareness."

Brett Todd, P. Eng.

By C. Hanlon

Throughout his career, Brett Todd has seen many instances when, upon receiving a new work order or project, the engineering team would be tempted to start with a blank slate when crafting the solution. "When you're in school, you are taught it's bad to copy and you shouldn't do it," he notes. "In the real world, if something has worked well in the past, you might have to tweak it, but there is nothing wrong with doing it again." The point is to start with what works and then go from there, he adds, and continue to improve.

It is a philosophy that guides everything he has done so far, from his work as an engineer to his volunteering with APEGM, where Brett was recently elected as Councillor. "I'm interested in understanding how the Association works," he says, adding that last November's retreat for Councillors and their spouses was a wonderful starting point for him. "I plan to keep my ears open."

From the very beginning, Brett was always interested in learning how things work. But in contrast to other University of Manitoba students who were lured by computer engineering, he was more interested in the power systems courses. "My professors pointed out that no matter what happens with computers, there will always be a need for the generation and transmission of power," he recalls.

Consequently, when Brett graduated from electrical engineering in 1986, he went to work for Manitoba Hydro. At the time, the company offered graduates several six-month assignments in a variety of areas to help them meet their requirements for professional certification. The agreement was that the EITs would then continue in a permanent position with the company.

"I completed the training, but after a few months in my permanent job with Hydro, I was ready to move on," notes Brett. He then accepted a position with Wardrop Engineering, eventually becoming a partner with the firm in 1998.

From Wardrop, he moved onto Pauwels, a local power transformer manufacturer. The general manager there, who had previously worked for legendary General Electric (GE) executive Jack Welch, tried to incorporate GE's successful approach to business. Brett enjoyed the team building that broke down silos between sales, purchasing, engineering and manufacturing, using the experience as an opportunity to learn about all these facets of the transformer industry.

A few years later, Pauwels was purchased by CG Power Systems, a company from India. "It was interesting to go through that transition," recalls Brett. "It was around that time that I got much more involved with sales and with customers. With technical sales, it's important to have someone who fully knows the product." He likens the design and construction of a power transformer to shipbuilding, creating products that are engineered to order, with low volumes and long lead times.

Then in 2009, Brett decided to return to consulting engineering, accepting a position as Hatch's Electrical Department Head. The role required a combination of all the skills he had built to date.

He has continued to build on his knowledge base to explore even more areas of the power industry. Today, as ABB's Transformer Services Business Development Manager, he focuses on the service side of the power transformer business, including upgrades, retrofits and warranty work. "I don't really sell the new products like I have done in the past," he explains, adding that he looks after transformer service sales in Canada, for the area west of the Quebec/Ontario border. "It's really a hybrid of transformer sales and consulting."

Although he still travels significantly for business, he feels the time is right to dedicate more time to volunteer work. Over the years, Brett has been involved with the IEEE and the Canadian Institution of Management (CIM). A member of APEGM since 1986, he has served as a member of the Salary Review Committee and as a company representative at the Engineering Students' Dinner.

Now, as a Councillor, Brett is looking forward to seeing what people say when they write to the Association. "I think there are always ways to improve things," he says. "I'm looking forward to working on this council and seeing in what areas I can best contribute to the Association."

"I think there are always ways to improve things. I'm looking forward to working on this council and seeing in what areas I can best contribute to the Association."

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What Engineers Do:
A PROFILE

By A. Kempan, P.Eng., FEC

When meeting engineers many of us have preconceptions around pocket protectors and a penchant for details. However, Martin Petrak is an engineer who shatters all those preconceptions. He is in an unusual type of engineering practice and has a capacity for big ideas while staying true to engineering principles and thinking.

Martin began his EIT career when he was recruited in 2003 to work with the University of Manitoba Joint Replacement Group as a Biomedical Engineer. This suited him because he was always interested in the biological sciences. He worked in the Radiosteriometric Analysis Program (RSA) at St. Boniface Hospital. RSA is all about measuring the migration patterns of joint replacements using tiny embedded reference points.

Success led to success. Next year the Winnipeg Regional Health Authority asked Martin to consult on the development of the Concordia Hip and Knee Institute. This was a ground up effort... Martin participated in everything from floor planning to technology planning. Around the same time the Concordia Foundation retained him to spearhead a $10 million fund-raising program to create a parallel organization, an orthopaedic research centre and associated laboratories. Both endeavors were successful so now the province had the capability to provide hip and knee transplants to patients, and also had the means to advance the science of prosthetic implantation, in large part because of Martin's vision and dedication.

Next on the agenda, in 2009, was the staffing of the Concordia Joint Replacement Group. As Director of Research, Martin searched at the University of Manitoba and abroad for biomedical engineers to staff the facility.

Martin continues to advance and promote orthopaedic research and development in the province as VP, Industry, for the Canadian RSA Network (CRSAN) a non-profit company dedicated to coordinating orthopaedic research in Canada. Presently implant hardware is provided by several large international companies. Martin thinks it is possible that some day, using new technologies like 3-D printing, it will be possible to make custom orthopaedic devices locally. He also has some interesting ideas on how engineers can help the medical community. Medical people, as they should be, are focused on delivering medical services. Where engineers can help is to analyze systems and processes to improve work flow and procedures and to develop energy saving methods and lean practices, areas in which engineers excel. Martin goes so far as to say that hospitals should have a mandate to hire engineers for just those situations.

Away from his professional duties, Martin and his family enjoy the great outdoors. His family has a long history in the Rushing River area near Kenora. The outdoors and his family are also good subjects for his other passion, photography, another interest passed down from his father. Martin's family immigrated from Czechoslovakia in the 1960s and they have prospered in their new environment. Martin is proud of his heritage and part of his education included a stint at Charles University in Prague.

> "Martin Petrak is in an unusual type of engineering practice and has a capacity for big ideas while staying true to engineering principles and thinking."

THE APEGM FOUNDATION INC.

– your vehicle to support engineering and geoscience education in Manitoba.

By W. Boyce

The APEGM Foundation Inc. was established by the Association of Professional Engineers and Geoscientists of Manitoba (APEGM) in 2003, to support the education of engineers and geoscience students in Manitoba through financial assistance for capital acquisitions and improvements, development and support of library facilities, and facilitating the establishment of scholarships and bursaries.

Since its establishment, the APEGM Foundation has worked with its main benefactor the APEGM Council on a number of initiatives, the first being a commitment of $350,000 toward the 2005 Engineering and Information Technology Centre (EITC) on the University of Manitoba Fort Garry campus. For this contribution to the building construction cost, the University named Room 229 in the new building *"The APEGM Design Studio"* with the objective of exposing engineering students to the Association throughout their education at the Faculty of Engineering. The APEGM Foundation fulfilled the pledge of funding of the EITC with a final payment of $40,000 in December of 2008.

With the major commitment to the EITC completed, early in 2009 the APEGM Council decided to commit $250,000 of support to the Foundation over a five-year period, requesting that the Foundation develop an endowment program to provide long-term funding from investment returns for engineering and geoscience educational support and to establish a systematic vehicle for support from other donors. Towards this end, over a three-year period, members of the APEGM Foundation board worked with charitable program consultants and representatives of The Winnipeg Foundation to establish an endowment fund with The Winnipeg Foundation, the first community foundation in Canada.

"Since its establishment, the APEGM Foundation has worked with its main benefactor the APEGM Council on a number of initiatives."

The *"APEGM Foundation Fund"* was established within The Winnipeg Foundation in September 2013 with an initial contribution of $20,000 (half of which was donated by Alan Pollard, FEC, P.Eng.), to provide funding to the APEGM Foundation for capital and facility improvement projects. This initial contribution received $15,000 in a matching grant from The Winnipeg Foundation in December 2013. In 2014, the APEGM Foundation made an additional contribution of $74,198 to the fund, which was accompanied by an additional $15,000 grant from The Winnipeg Foundation, bringing the total value of this endowment fund to approximately $125,000 today. Return on investment from these funds will enable annual contributions in perpetuity. (*http://www.wpgfdn.org*)

This past year, under the leadership of Dr. Ganpat Lodha, FGC, P.Geo., the APEGM Foundation also established an endowment fund with the University of Manitoba. The *"APEGM Foundation Inc. (AFI) Bursaries for IEEQ Students"* was established with a $100,000 contribution from the APEGM Foundation and a matching grant of $100,000 from the Manitoba Scholarship and Bursary Initiative. This endowed fund will provide at least five bursaries annually of up to $2,000 for qualifying foreign trained engineers in the Internationally-Educated Engineers Qualifications Program (IEEQ) starting in 2016. (*http://umanitoba.ca/faculties/engineering/programs/ieeq/index.html*)

Other significant projects funded by the APEGM Foundation over the years have been:

- The *"APEGM Geoscience Gallery"*, Department of Geology, Brandon University, contribution of $15,000 in 2008 with a matching grant from the Province of Manitoba. *http://www.apegm.mb.ca/pdf/Foundation/BU_GeoGallery.pdf*
- U of M Faculty of Engineering's centennial book "Grinding Geers for 100 Years" received a Foundation contribution of $5,000 to assist in publication of the book in 2008.
- University of Manitoba, Department of Geological Sciences' centennial *"History Wall"* project received a contribution of $7,500 in 2009.
- The U of M Department of Geological Sciences received a contribution of $15,000 in 2010 for upgrades to the facilities at its Star Lake Field Station, which triggered substantial renovations to the station facilities. *http://umanitoba.ca/faculties/environment/departments/geo_sciences/research_facilities/starlake.html*

If you are interested in learning more about the APEGM Foundation, or wish to make a donation, please visit the Foundation page on the Association website *(http://www.apegm.mb.ca/Foundation.html),* or contact the Foundation via email: *foundation@apegm.mb.ca* or telephone (204) 474-2736 Ext 231.

Increase our Enrollment:

AN UPDATE FROM THE DEAN

By: Dr. J. Beddoes, P.Eng., Dean of Engineering, University of Manitoba

Certainly youth today clearly see the value of an engineering education; with the competition to enter engineering programs continuously increasing, all our engineering programs are filled to capacity, if not a bit beyond. The students coming into our engineering programs are top-notch and this bodes well for the future of our profession. Consider that for the 2013/14 academic year the average entering grade of all incoming first-year engineering students who applied directly from secondary school was more than 91% and I anticipate a higher average this year! While on the surface this appears to be a good news story, at the same time, we have faced many difficult decisions as many academically able students that would surely develop into excellent engineers cannot be accepted. All of us in the Faculty empathize with those able students that we cannot accommodate and likewise, we fear what the loss of these students may mean to our profession and society.

If a country, province or region does not have enough engineers, the overall wealth and well-being of that society suffers. Here in the province of Manitoba we are facing this reality. In short, the current challenge for the Faculty of Engineering is to produce more graduates! Addressing this challenge and getting this balance right is central to the Faculty achieving its mission to "graduate students ready for positions of leadership for a world in which engineering is central to improving the well-being of society and the creation of new wealth that benefits society in Manitoba, Canada and globally" (available at *http://umanitoba.ca/faculties/engineering/welcome/index.html).*

> The students coming into our engineering programs are top-notch and this bodes well for the future of our profession.

To this end, I am pleased that engineering enrolment has increased 48% since 2009 and all engineering programs are operating at or beyond their maximum enrolment capacity. However, we are still not serving potential students or society to the extent we should be. Being engineers we tend to like numbers, so here are a few: in 2014, there were 340 proud graduates from the Faculty of Engineering and we take pride in each and every one. Of these, 242 are graduates from the BSc Engineering or Internationally Education Engineers Qualification Program; which is an impressive number until it is compared to the maximum of 260 such graduates that occurred nearly 30 years ago in 1986. I anticipate we will exceed 260 graduates for the first time in 2015.

Some more numbers: in 2013 and 2014, enrolment in engineering exceeded for the first time the previous peak enrolment that occurred 40 years ago in 1974! These numbers highlight a lack of overall growth and investment in engineering programs in Manitoba over a 30 to 40 year time period. Put another way, to have the same per capita participation in engineering programs in Manitoba as occurred in the mid-1970s requires 18% more engineering students; more sobering is that to have Manitoba per capita participation in engineering programs equivalent to the Canadian average would require 56% more engineering students.

In response this past year we increased the intake to civil engineering by 16% and aim to increase our intake capacity further in the upcoming years. The Faculty of Engineering would be delighted to increase our enrolment to accept more of those applying and likewise generate more graduates. Indeed, we have proposals and are developing plans to do so, but these proposals and plans need resources so that growth does not jeopardize the calibre of our programs. Support from you, our engineering community, will be critical to helping secure the needed resources. If you believe you can contribute to this support, in whatever way and to whatever extent, please do not hesitate to contact me; I will be pleased to team with you to create future opportunities for engineering students who are essential for a more prosperous future for Manitoba and Canada.

A Brief History of Hydro-Electric Power in Manitoba

APEGM Heritage Committee

While there were several earlier instances of electricity generation in Manitoba, the first hydro-electric dam in the form we now know was on the Little Saskatchewan River, now called the Minnedosa River. Beginning operation in 1900, it served the City of Brandon (Sorry Winnipeg, the Wheat City gets the honours here) with 600 kilowatts of power via a 14 kilometre transmission line. The dam was made of wood filled with rocks and seems to have only operated in the summer months. Two 300 kilowatt units each provided the current which was stepped up to 11kV for transmission along wooden poles to Brandon. There it was brought in to the existing steam generating facility to augment generation in summer. The Little Saskatchewan plant was the brainchild of three men who formed Brandon Electric Light Company Ltd. to provide steam generated power to Brandon around 1889. To increase capacity in summer and keep the costs down, they built the hydro-electric station. The site was decommissioned in 1924 and was probably damaged by the failure of an upstream dam in Minnedosa on May 4, 1948.

Winnipeg River Development

The Pinawa Generating Station on the Winnipeg River started operation in 1906 by the Winnipeg Electric Railway Company, which held a monopoly on transit service, electric power and gas distribution for the City of Winnipeg. The first publicly owned generating station was Pointe Du Bois, upstream from Pinawa. It was completed in 1911 and is still in service today. In the 1920s and 1930s, three more generating stations were built on the Winnipeg River: Great Falls, Seven Sisters and Slave Falls. The four Winnipeg River stations would ultimately produce a total of 445 megawatts.

Depression, War, and Farm Electrification

The boom of hydro-electric development came to an end with the Great Depression.

click HERE to return to table of contents

Pinawa Dam Provincial Heritage Park.

In the early 1930s, power to municipalities in Manitoba was a patchwork quilt of contracts with differing rates and terms. The passing of the Municipal Power Commission (MPC) Act in 1931 started the process of bringing uniformity to power service and the MPC was supplying 139 communities by the end of the decade. Under the Act, the MPC sold power directly to end customers rather than to municipalities. City Hydro in Winnipeg remained as a municipal utility.

World War II caused a shortage of available farm hands and farmers petitioned the MPC for access to electricity. As a result, a farm electrification program started in 1945 with the aim of connecting 90% of Manitoba farms to the electric grid. In 1954 when the program ended, Manitoba was the most electrified of the western provinces with 75% of farms connected and a total of 100,000 customers. This was accomplished by careful attention to the economics of farming. Power line extensions were free and the farmer only paid for the in-building wiring and the power consumed.

The Manitoba Hydro-Electric Board

The success of the Farm Electrification program combined with the post-war boom brought new challenges in the early 1950s. Existing generation capacity would not support the new demand. Three of the largest players, City Hydro, the Winnipeg Electric Company (formerly the Winnipeg Electric Railway Company) and the Manitoba Power Commission along with the provincial government agreed to the creation of the Manitoba Hydro-Electric Board (MHEB) in 1949 to coordinate generation and distribution of power in Manitoba. The first MHEB generating station, Pine Falls entered service in 1951 adding 82 megawatts to the generating capacity of the Winnipeg River. In 1952, Seven Sisters was expanded to 150 megawatts which required the retirement of the first Winnipeg River station at Pinawa. The last station on the Winnipeg River, McArthur Falls, went into service in 1954.

In 1952 and 1953, reorganizations took place which separated the Winnipeg Electric Company's gas and transit operations into the Greater Winnipeg Gas and Greater Winnipeg Transit companies respectively. The remaining electricity operations and assets were amalgamated with the Manitoba Hydro-Electric Board. City Hydro and the Manitoba Power Commission split the distribution components between the City of Winnipeg and the suburbs along the 1955, pre-Unicity boundaries. City Hydro was renamed Winnipeg Hydro in 1964 and was purchased by Manitoba Hydro in 2002.

Private Generating Stations

There were several private generating stations built in Manitoba, some of which would become part of the provincial power grid. In 1913, the Minnedosa Hydro Plant was built just north of the town supplying power until 1933. A station was built in 1934-1935 at Kanuchuan Rapids on the Island Lake River to supply power for the new gold mines at Elk Island in God's Lake. The mine closed in 1943 but the generating

The first hydro-electric dam in the form we now know was on the Little Saskatchewan River, now called the Minnedosa River. Beginning operation in 1900, it served the City of Brandon.

station continued to supply power until at least 1966. There were also two stations built on the Laurie River north of Flin Flon by Sherritt Gordon Mines Limited. They provided power for mining operations in the 1950s and 1960s. They were transferred to Manitoba Hydro in 1970 and are still in service.

Nelson River Development

In 1960, the MHEB started operating the Kelsey Generating Station, the first one on the Nelson River, to supply power to the newly developed City of Thompson and the International Nickel Company's operations there. It was followed in 1965 by the Grand Rapids Station on the Saskatchewan River. Both were connected to the provincial power grid in 1967 via a 230-kV line that ran between the two. The same line also furnished power to International Nickels' new Soab Lake mine.

Between the times of these two stations, the Manitoba Hydro-Electric Board and the Manitoba Power Commission merged to form Manitoba Hydro. The new utility began to work with power utility companies in the United States through the Mid-Continent Area Power Planners (MAPP) on power exchanges with the 22 power utilities in the MAPP. In 1963, the Nelson River Programming Board was created by the Governments of Manitoba and Canada to investigate power development on the Nelson River and transmission of power to southern Manitoba by High Voltage Direct Current (HVdc) transmission. This work came to fruition in 1970 and 1971 with the commissioning of the Kettle Generating station and the first HVdc line from the Nelson River to Winnipeg. Two converter stations, Radisson near Gillam and Dorsey north-west of Winnipeg were built to support the connection of the direct current transmission line to the alternating current power grid. A 230kV AC transmission line was completed between Winnipeg and Grand Forks to allow power to be exchanged with utilities in North Dakota and Minnesota.

Churchill River Diversion and Lake Winnipeg Regulation

Rather than develop both the Churchill and Nelson Rivers for hydro-electric power, it was more economical to divert some of the water from the Churchill River into the Nelson and place the generating stations on the Nelson River system, comprised of the Rat, Burntwood and Nelson Rivers. Two control structures at Missi Falls and Notigi and a channel from the Churchill River to the Rat River allow water from the Churchill River to be routed into the Nelson River system.

To complete the development of the Nelson River, it was necessary to manage the historical fluctuations in the level of Lake Winnipeg to ensure adequate minimum water flows in the river. The Jenpeg Generating Station and associated Control Structure began operation in 1976 and are used along with three man-made channels to stabilize the level of Lake Winnipeg.

This made possible the operation of the 980 megawatt Long Spruce Generating Station, completed in 1979. During the same period, the second HVdc line was completed from the Nelson River to Winnipeg. Another generating station was planned at Limestone but it was deferred due to low electricity demands and finally started producing power in 1990.

The Limestone Generating Station was to be the last one to be built in the 20th century. Only one hydro-electric installation, the 200 megawatt Wuskwatim Generating Station on the Burntwood River, has been built since then in Manitoba. Completed in 2012, it is a joint venture between the Nisichawayasihk Cree Nation and Manitoba Hydro.

In July of 2014, construction began on Keeyask Generating Station near Gull Lake on the Nelson River. The 696 Megawatt station is a collaborative effort between Manitoba Hydro and four Manitoba First Nations; Tataskweyak Cree Nation, War Lake First Nation, York Factory First Nation and Fox Lake Cree First Nation.

This article is available on the APEGM Heritage Committee Wiki site at: *http://heritage.apegm.mb.ca/index.php/History_Of_Electric_Power_In_Manitoba* where it will be revised and updated.

Acknowledgments:
Manitoba Hydro and the Manitoba Historical Society

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Date: Thursday, June 18, 2015

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TASK GROUP MODEL
FOR COMMITTEES

by Grant Koropatnick, P.Eng., FEC
CEO & Registrar

The operating policy handbook of the Association makes the distinction between two types of committees: Council Committees and CEO Committees. Essentially, Council Committees are to help the Council do its' job. A Council committee will ordinarily assist the Council by preparing policy alternatives and implications for Council deliberation. Usually, they have a legislated mandate. For example, the Registration Committee is formed by Council and is authorized in Section 14 of the *Engineering & Geoscientific Professions Act*. In keeping with the Council's broader focus, Council committees normally do not have direct dealings with daily business operations.

In contrast, CEO Committees are formed to assist the CEO in getting the daily business done. Examples of a CEO committee include: the ERC – Experience Review Committee, the ARC – Academic Review Committee, Keystone Professional Committee and Heritage Committee. Go to the web site ("ABOUT/Committees" tab on the home page) to see a combined list of Council and CEO committees.

HOTEL CALIFORNIA

Lately, Volunteer Coordinator Diana Vander Aa and I have been strategizing ways to get more members involved in committee service. One factor which scares off some volunteers is the myth that joining a committee is a life sentence. Although, some volunteers serve on a committee for years, we certainly don't want to send the message that a committee is like the last line in the hit song "Hotel California." You know the one:

"You can check out anytime you like, but you can never leave."

In order to present volunteer opportunities with a timely purpose, I am switching to a task group model for CEO committees. Council has already used this model effectively on initiatives like the PIRC By-Law, Licensee category and the ProDev program. The task group model assembles a group of members to work on a specific task. Once the task is completed, the group disbands. I anticipate that tasks may be 6 months to a year in duration; depending on the project or scope of work to be done. No longer will committees sit year-by-year, plugging along with a purpose that seems current but perhaps lacks focus and energy. I believe the task group model will allow more people to participate, more often, on timely tasks that will have immediate application.

CODE OF ETHICS

The first task group that Diana will soon send out a volunteer call for is the *Code of Ethics Review Task Group*. The Code was last reviewed in 2000. Although the application of the old version is still valid, it's important for a group of practicing members to undertake a thorough review of this important document. Director of Professional Standards Mike Gregoire, P.Eng., FEC will lead the project. We already have good research and background information from Engineers Canada and the other provincial regulators, so the project will not require a long timeline. Watch your inbox for an email soon.

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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In Memoriam

Lindsay Ingram
Amjad Mian
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George Sagi

MLA Wine & Cheese

Thursday evening, January 15, 2015, the Association held its first MLA Wine & Cheese at the Fort Garry Hotel. The event gave Council, committee chairs and Association staff the opportunity to mingle and introduce themselves to government officials in a relaxed setting. The food and friendly hospitality was warmly received by all. Planning is underway to host the event again next year; inviting the Premier, MLAs, Deputy Ministers and other government officials to "meet the engineers and geoscientists."

President's Medal

On December 1, 2014, the Association awarded the new President's Medal to former Past Presidents of the Association. The event was held at the Niakwa Country Club with 18 Past Presidents in attendance, from Leonard Bateman, P.Eng., FEC to Marcia Friesen, P.Eng., FEC were honoured.

The idea for the President's Medal is to have a tradition to honour the President of the Association. The President's Medal has two sides: the front shows a bison, the symbol of Manitoba; the back has the name of the President engraved, along with the year of presidency and name of the Association at the time. The ribbon of the medal is the official Manitoba tartan and the pin clasp at the top boldly shows the name of our province – Manitoba. Overall, the medal is a true symbol of this great province in which we live and serve.

Current President Howard Procyshyn, P.Eng., FEC, with Past President (1957-1958) Leonard Bateman, P.Eng. FEC

DIMENSIONS
ENGAGE EMPOWER RECOGNIZE

MCWESTT 2015

May 8, 2015 | Fort Garry Hotel | 7:15 am – 4:30 pm



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You'll hear from powerful speakers who will share their thoughts and experiences on everything from Women in Leadership to Life-Profession Balance.

Dimensions aims to bring together professionals, leaders, academics and students to come together to share and learn from each other.

Early Bird $125
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Includes conference pass, breakfast, lunch, and snacks (featuring the Fort Garry's famous chocolate fountain!)

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"Speakers were great and full of useful information for women."

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2015 Speakers will include:

- Betty-Ann Heggie, former VP of Potash Corporation of Saskatchewan
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- Jennifer Jones, Canadian Curling Olympic Gold Medalist
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Breakout Sessions will include:

Changing the Game for Women in Leadership, Speed Mentoring, The Great Canadian Corporate Melting Pot, Family Balance Panel Discussion, When She Brings Home the Job Status, Communications Workshop, Networking Workshop, Crucial Conversations, and back by popular demand, Negotiation Skills.

Sponsorship opportunities still available!

For more information and to register: *http://www.apegm.mb.ca/MCWESTT/.*

Nominations for Election to the APEGM Council

The Nominating Committee of APEGM requests recommendations from members and members-in-training, for nominees whom they consider to be qualified to participate in the governance of the Association and who are willing to so serve the engineering and geoscience professions in Manitoba. There will be four professional engineer positions, one professional geoscientist position, and one member-in-training position to be filled as of October 2015.

The Committee will consider recommendations for all positions received by the secretary up to the close of business on Friday, September 11, 2015. In the event insufficient recommendations are received, the Committee may exercise its prerogative to put forward a slate of candidates for election that is equal to the number of positions to be filled. Persons submitting a recommendation are required to obtain the consent of the professional member being recommended and to provide a curriculum vitae or biographical sketch.

Members can also be nominated directly and be on the ballot for the 2015 election by the completion of the prescribed nomination form. Nomination forms may be downloaded from the Association website or may be obtained from the APEGM office.

Please send your nominees to the APEGM office by mail, by fax to (204) 474-5960, or by email to *apegm@apegm.mb.ca*. Persons submitting a recommendation are required to obtain the consent of the nominee.

By Michael Gregoire, P.Eng.

Positional Bargaining

I recently started a course in negotiations. It was a class that I was looking forward to taking, as I expected that the skills I would learn would be applicable in nearly all aspects of my professional and personal life. It was no surprise, then, that this was the message in the first chapter of both of the required readings; negotiations take place every day in all aspects of our lives.

One of the required readings is a book called *Getting to Yes*. This book is structured less like a textbook and more like a popular self-help book. This is a text that many of you may have read before, or at least heard of before, as it has been a suggested reading for more than 30 years.

In the opening chapter, the authors suggest that many negotiators make the mistake of bargaining over a position. In this context, a position is described as a principled point of view from which any deviation represents a 'loss'. An example of a negotiation over a position might involve one individual saying to their group of friends, "I will only go out tonight if we go to see the Star Wars movie at 7:00." Aside from the off-chance that everyone in the group wants to see the same movie at the same time AND that there are enough tickets for the group, then somebody will end the evening with disappointment; they will consider the evening a 'loss.'

"I expected that the skills I would learn would be applicable in nearly all aspects of my professional and personal life. It was no surprise, then, that this was the message in the first chapter of both of the required readings; negotiations take place every day in all aspects of our lives."

The reason that bargaining based on positions almost invariably leads to a 'loss' for one of the parties involved (if not all of the parties) is that the negotiator has erroneously determined that their desires or needs can only be met by a particular outcome. These negotiators ignore the principles upon which their desires and needs have been formed. In the example above, the essence of the negotiator's desires is that of receiving entertainment. Although the person believes that the 7:00 showing of Star Wars is the best way to achieve entertainment, a simple re-evaluation would indicate that there are many other ways to for them to achieve their goals for the evening.

It appears that, for some of our members who are still grappling with the concept of professional development reporting (ProDev), they are negotiating

from a position. In mid-January, registered letters were sent to every member who had failed to report any professional development hours over the last three years. The letter indicated that the member must submit their report in ten days or else the failure to report would be considered professional misconduct and the matter would be forwarded to the Investigation Committee.

This result of non-compliance was spelled out quite clearly in the Professional Development Reporting Program documentation, which was approved by the general membership in 2011. However, some of our members were not aware of this mandate because they've never read the documentation. Regardless of the fact that they don't understand what is entailed in the ProDev Program, they have contacted me with a fiery determination to explain why they should not have to report their hours.

The conversations with each of these members have some distinct similarities. One, as described above, is that they have not read the ProDev documentation and do not understand it. A second is that they are under the false impression that they must take courses in order to comply with the program. A third similarity is that they have been a paying member for a long time and that, ipso facto, they should be exempt from reporting.

Inevitably, the conversation reveals the actual principle that motivates these individuals; they believe that the ProDev program is a waste of time. Ironically, instead of taking the time to report their hours, they choose to waste time arguing the merits of the program with me (as though I am personally responsible for the program and could grant exemption as I please if they were to present a sufficiently convincing argument). I am certain that the time that they've spent on the phone with me would be equal to the time it would take them to fill out their report of activities.

As described in *Getting to Yes*, bargaining based on positions dooms the negotiator to make an ultimatum. In the case of some of our members, the ultimatum is that they will resign from APEGM. In an attempt to justify this ultimatum (likely more to themselves) they indicate that they cannot see what 'value' there is maintaining a membership with APEGM. They usually go so far as to ask me to justify the value of membership.

I find this tactic quite fascinating. For our practising members, there is no choice about membership, as the Engineering and Geoscientific Act mandates that they must be a member in order to practice. For our non-practicing members, they have the option of choosing the Retired Member category, which would eliminate the need to report professional development activities. This value proposition would not be different from what has previously motivated these individuals to renew their membership for many years. However, when I present this latter option to the member, they refuse it. I can only assume that this is because they feel that their 'position' would be compromised.

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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