

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

THE KEYSTONE PROFESSIONAL

SPRING 2014

INSIDE

THIS ISSUE

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WEBINARS (All times are in EDT)			Time	
Advanced Internet Research Techniques	0305-WEB14	12:30-2:00pm	Mar 26	1.5
GD&T Overview Session	0303-WEB14	12:30-1:30pm	Mar 31	1
Cost Reduction Applications in Manufacturing	0403-WEB14	12:30-1:30pm	Apr 1	1
Transitioning From a Technical Specialist to a Managerial Position	0405-WEB14	12:30-1:30pm	Apr 3	1
Plant Layout - 5 Essential Tips	0402-WEB14	12:30-1:30pm	Apr 4	1
Mechanical Engineering Fundamentals for Non-Mechanical Engineers	0404-WEB14	12:00-2:00pm	Apr 7-10	8
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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**

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 productivity²
- Family caregivers also have to deal with **wage loss** and the real potential of a **decreased standard of living**³

2 What are your chances of surviving it?

- **63% of Canadians** diagnosed with cancer are expected to survive for **5 years or more** after diagnosis¹
- The cardiovascular death rate in Canada has **declined by nearly 40%** in the last decade²
- **1.3 million Canadians** are living with the effects of heart disease, and **315,000** are living with the effects of stroke²

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: ¹Canadian Cancer Statistics, 2013. ²Heart & Stroke Foundation Statistics, 2013.

³Colleen Nelson B.Ed, PBCE, "The Financial Hardship of Cancer in Canada: A Literature Review," Canadian Cancer Society, 2010.

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THE KEYSTONE PROFESSIONAL

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An Engineer's **Sonder**

Sonder: *n.* the realization that each random passerby is living a life as vivid and complex as your own, populated with their own ambitions, friends, routines, worries and success, their own epic story that continues invisibly around us.

Sonder is a neologism, an emerging word that is not yet a part of mainstream dictionaries but is starting to show up in popular culture. For me, trips by air trigger *sonder*. When I'm in a plane and it is descending for landing, you can see the city below you on a clear day. I am struck by how each house – for miles and miles – is inhabited by people who are just now getting started with their day, who are juggling the daily schedule of getting kids to school or daycare, getting to work on time, taking a parent to the doctor, worrying about finances, looking forward to a vacation, dreading a meeting, hoping for some news, and on it goes. When I see the contrails of an aircraft passing over on a clear day, I imagine that it is full of several hundred people who are the leading characters in the novel of their own lives, travelling with feelings of excitement or dread or tedium, travelling to an adventure, a homecoming, a business meeting, a funeral, a wedding, a new life in another country, and on it goes. We are all so different from one another, with different circumstances, priorities, needs, and goals. That is *sonder*.

The Council of APEGM has identified three priority areas for strategic activity and support in the near and medium term. One of these is the recruitment of individuals to engineering studies and the retention of individuals in professional practice in numbers that reflect the diversity of society. This includes supporting and promoting the

recruitment of more people to university studies as preparation for a career in professional engineering and professional geoscience, and to particularly support the recruitment of under-represented groups, including but not limited to women, Aboriginal people, international engineering graduates (IEGs, also called internationally-educated engineers) for qualifications recognition processes, and individuals re-training after a prior career outside of professional engineering or geoscience (second-career students). The scope of the issue is equally focussed on supporting and promoting the retention of people in rewarding professional engineering and geoscience careers until their natural and desired time of retirement.

“The Council of APEGM has identified three priority areas for strategic activity and support in the near and medium term.”

Women and Aboriginal peoples are under-represented in the profession, IEGs often face considerable challenges during qualifications recognition and career re-entry, and while the profession loses engineers and geoscientists to other careers, we do not necessarily attract the proportional number of individuals who leave their existing careers to join us. There are statistics and research, opinions and

ideas on why these situations occur. I won't repeat them here, but they are available to anyone who truly wishes to listen and understand.

I propose that the situation is a bit like a sandbox. The profession is a sandbox in which certain games are played by a certain set of rules. These rules and the games have worked well in the past. Others are welcome to join the sandbox to play the same games by the same set of rules. If a newcomer to the sandbox proposed another rule set, or another game altogether, the welcome can turn chilly.

What I mean is that strict equality is not equity. Treating everyone the same is not treating everyone fairly. For example, parents will generally recognize that their children each have different interests to foster, are motivated in different ways, and need different supports to achieve – even if the end purpose is the same, such as school achievement. In the profession, we are all diverse. We have diverse personal needs. A simple example is related to caregiving obligations we have toward our children and our parents and perhaps to our partners or ourselves when we experience poor physical or mental health. We also have diverse professional desires. An example is the generational differences between Builders, Boomers, Gen X, and Millennials in terms of our motivators, expectations, and goals in our careers. These needs, expectations, motivators, and goals become the hesitant questions of the players of the game, as to whether there is openness for the rules of the sandbox to change.

In spring 2013, Jonathan Beddoes, P.Eng., Dean of Engineering at the University of Manitoba, addressed the

engineering faculty members at the annual faculty retreat. He pointed out that the engineering professoriate at the University of Manitoba is predominantly made up of men, most of whom have always experienced high academic achievement, and he asked the question, "can we understand those among our faculty and our students who are not of this profile, and do we extend a *true* welcome to people who are different?" The day challenged the attendees to reflect on whether we are really prepared to try to understand the experiences and realities of people different than us, and then to further contemplate how it impacts their goals, motivations, and constraints in their engineering careers.

So, who is responsible for recruitment and retention of people, and in particular underrepresented groups, to engineering and geoscience studies and in professional practice? Recruitment to the profession begins with one's experiences and interactions with engineers and geoscientists in one's family of origin and through childhood. Retention in university studies and in professional practice is shaped most directly by one's experiences in the respective university and employment contexts. APEGM can also play a role in encouraging dialogue, in supporting initiatives both internally and externally such as scholarships, sponsorships, and research agendas, and linking local thinking with the national picture.

Yes, but who is *really* responsible for recruitment and retention? It is both individual and systemic, both a personal and a collective responsibility. The 'target groups' have a role in honestly, and at times sensitively and at times forcefully, but always respectfully expressing the situation and the perceived barriers to becoming engineers & geoscientists. Yet, this cannot fall on deaf ears. If systems are found to be flawed, they must be changed by those that at the levels of power and influence to change them, those that hold the keys to policy change and fostering culture change in the profession.

Finally, it is important to recognize that engineering is a conservative profession. It developed from military roots. Its regulatory mandate to

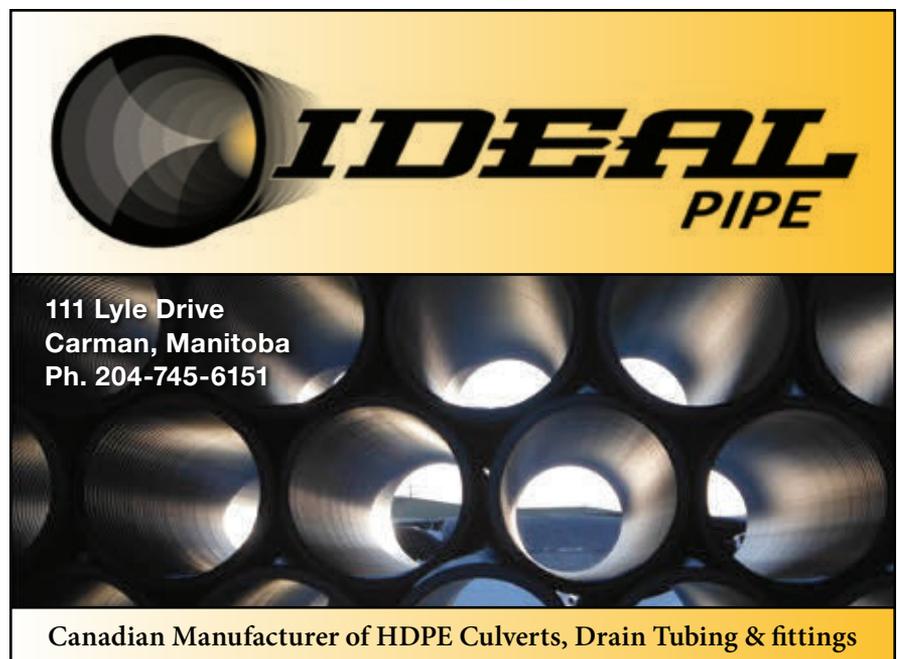
“ Recruitment to the profession begins with one's experiences and interactions with engineers and geoscientists in one's family of origin and through childhood. ”

protect the public interest biases toward conservative approaches and judgements of all kinds. While engineering outcomes are often novel and innovative, the profession's risk orientation demands prescriptive ways of operating that seek to categorize and standardize. This leads to stability and reliability in many technical contexts but can trend toward policies and perspectives that are equal over being equitable. Equity failures may not be intentional, but that doesn't change the fact that the institutions and the long-standing normative practices of conservative professions often embed and perpetuate these failures. The rules of the games of the sandbox are never critically reviewed.

I am not dismissing that the core purpose of an enterprise is to be profitable and competitive. Employers

and industries need to advance their business purposes. In the last decade of engineering labour shortages, employers have started to become innovative in strategies for retaining employees. In that context, what causes people to fall away from the profession, or not to join in the first place? Are we really interested in truly listening to the experiences of under-represented groups in a spirit of openness and non-defensiveness? Are there modes of acting and thinking that are not valued in the profession? Are there practices that are inflexible and alternatives that are dismissed simply because they've never been tried before?

Privilege is when we think that something is not a problem because it is not a problem to us personally. All, or almost all of us live in privilege in some area of our lives, and our challenge is to consciously seek sonder. ☩



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Have an Inspiring 2014

I went to a political event

on the weekend. I have never been to one before and probably won't go to one again any time soon. The candidates were not inspiring. In fact, they seemed fake: fake voices, fake body language, fake words that seemed to come from a "how to" guide on political speeches. Now perhaps I'm being harsh, but what is it that makes people clamber for political office? I don't get it, but I went home and spent the next day musing on the question "how do you inspire people?"

I believe that we all want to be inspired. We want to be motivated to go beyond ourselves and to rise above the ho-hum routine of daily living. I look for inspiring people to lift me up.

Have you ever been asked the question: "If you could have dinner with any person presently alive or from another period of history – who would it be?" When I think of all the inspiring people who have impressed me, many names come to mind. I think of the names and faces of great world leaders, athletes, school teachers, spiritual sages and rock-n-roll stars. But the one whom I would select for a dinner reservation and conversation would be Paul Hewson also known as "Bono". I assume every reader knows about Bono, but perhaps not. Bono is the iconic front man, lead singer of the rock 'n roll band U2. Why

Bono, you ask? Oh, that would take a long paragraph to explain. We're the same age, he married his high school sweetheart and his kids are the same age as mine. He's a rock-n-roll star and I'm not. Okay, good enough?

Let's explore the main question: "What does it take to inspire others?" I spent a day of solitude; puttering around my home doing chores and reflecting on this question. After my day of thinking about how to inspire others, this is the list I jotted down.

Live With Them

In order to inspire others it is often necessary to share a common experience with them. Do you live with the people you are trying to inspire? Neighbours on the same street? Coworkers? Sometimes this is helpful, because you actually know the conditions the others are facing. People with similar interests in parenting, hobbies, hurts, pain? These ones are easier to connect with because of a common experience. Remember the old saying that "misery likes company"? Well, misery likes miserable company. A common experience is very important when trying to inspire others. Look for ways to connect with others.

Vision Bigger Than Yourself

The regular routine of daily life can be draining and de-motivating. It's

important to get out of the "rut" or to "think outside the box". Do you understand what I'm saying? How will you motivate yourself and inspire others to dig deeper, try a little harder, make a difference? You must see a vision or picture of something more than what you're experiencing today. Don't settle for the small stuff; go big or go home! It's important to have a vision bigger than yourself. Do you have a big idea? Do you want to start your own business? Do you want to go back to school? Do you have a problem you want to overcome? What are you waiting for? Find a way to get some help. You can inspire others by describing a picture of them in a new and better situation.

Give Your Time and Resources

Spend one night a week as a volunteer. Give a donation that will make a difference. No spare time? Everyone has the same 24 hours to allocate however you want. No spare cash? Everyone has some small amount that they can give. It's not what you make, it's what you make of it.

Listen to Them

Learn to ask the question "What do you need from me?" Then listen. Get comfortable with quiet. Listening requires that one person shut-up.



I believe that we all want to be inspired. We want to be motivated to go beyond ourselves and to rise above the ho-hum routine of daily living. I look for inspiring people to lift me up.



Repeat a person's words back to them for seeking clarification. This is called "active listening".

Give an Honest Answer

A good, honest answer builds trust. Don't fabricate an answer; it's okay to say "I don't know". Find a way to deliver "bad news" with courtesy, respect and diplomacy. Timing is important.

Place Others First

We are a society of "me first" attitudes. Sometimes it is necessary to place others first and yourself second. I'm not suggesting a self-deprecating posture, but a sincere, temporary deferral of your own needs for the sake of inspiring others. I have learned to enjoy standing in a long line-up because it offers a small bit of time where I can't move or do anything other than demonstrating patience. These moments teach me to slow down, relax, practice patience. I call it enforced leisure. If it helps me to be a more relaxed, calm person, then I accept the small delay caused by a long line-up in traffic or at the shopping mall. Give up your place in line; it only costs a few extra minutes. Pay for the person behind you in the drive thru; random acts of kindness are fun and gives you a boost. Your generosity of spirit will be contagious and may inspire others to do the same.

Let Others Help

People have energy just waiting to be used. Ask for their help and let others help you. It is especially motivating when you let them decide how to do it. Some prefer to be told how to do a certain task, but many derive a boost of energy by using their own ideas and methods. So get out of the way. Do you find it hard to let others be involved? Do you want to be one of those people who get burned-out because you never learned to let others help you?

Happy New Year

I realize that 2014 is well underway, but happy belated New Year! I hope that it is a year full of good things for you, your family and co-workers. Try some of the tips listed above and inspire

“ Try some of the tips listed above and inspire others. Together, we can build a stronger community in Winnipeg, Manitoba and beyond. ”

others. Together, we can build a stronger community in Winnipeg, Manitoba and beyond. Once more, happy new year. As

always, I appreciate your feedback. Send me an email on anything you read in the KP magazine: gkoropatnick@apegm.mb.ca ☎

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Assigning Blame

In June of 2012, a section of the roof over the Algo Centre Mall in Elliot Lake, Ontario collapsed killing two women and injuring a number of other persons. The failure led to both judicial and criminal inquiries. Early in 2014 an engineer was charged with two counts of criminal negligence causing death, and one count of negligence causing bodily harm.

Since June 2012, before and during the inquiry, information provided to the public seems to verify that the building collapse was the result of many years of negligence by many different people with many different levels of responsibility. Apparently problems with the building were long standing, probably dating back as far as the original design/construction. Testimony at the public inquiry was wide ranging and various persons who were directly and indirectly involved cited numerous reasons for their action and/or inaction. But the first legal action, about a year and a half after the building collapse, assigned prime responsibility to the engineer who had inspected the site 10 days before the collapse and certified that the building was safe.

Given the information, and the rumours, that the public has access to, it is easy to rush to judgement. However, the question remains, why is the engineer the only person who has been charged? Is this a case of the unique responsibilities, both historic and current, associated with being a professional?

Professions, according to historians, had their European and British origins during medieval times. Divinity, medicine and law were recognized as "learned professions" each of which was founded on a specific body of knowledge that the practitioners utilized to provide services to others. Those who practised the professions were given the right to define

"If an engineer is found to have violated the specific responsibilities of the Provincial Engineering Act, it is a relatively short step to finding them guilty with respect to the consequences of that violation."

who met their requirements and who could use the title that identified them as members of their specific profession. In exchange for these privileges, practitioners were expected to behave "ethically". We will leave it to historians to debate how close practice came to theory at that time.

Fast forward over half a millennium to our current situation. The number of occupations that are now recognized as professions has expanded greatly. However, fundamentally the requirement for a specialized field of knowledge, the need for the services the professional can deliver, and the requirement for a code of ethics, are still valid points of definition. Today, in Canada, professions "deliver" those fundamentals under the authority of provincial legislation.

Each Provincial Act has its own idiosyncrasies, but the basic right to self governance, right to define entry requirements, and right to title are common to all. The current Acts also assign specific responsibilities that members of the profession must adhere to. Considering the specifics of the Algo Centre Mall collapse there are two Act specified responsibilities that seem to be most critical. First, the engineer must, as it relates to their work, assure that public safety is the prime consideration. This assumes, of course, that the engineer is technically competent. Second, based on the Code of Ethics, the engineer must be fair and honest in his/her dealings with the public.

If an engineer is found to have violated the specific responsibilities of the Provincial Engineering Act, it is a relatively short step to finding them guilty with respect to the consequences of that violation. John Q. Public, on the other hand, is not governed by the Provincial Engineering Act, so the process of finding them guilty with respect to the consequences of their negligence is more difficult.

Looking back at why Provincial Engineers Acts were written in their current manner, one can only speculate with respect to the motivations. However, from mediaeval times until now, professions have been given certain privileges. Privileges can be respected, or abused. Written Codes of Ethics were/are probably an attempt to provide some assurance that we, collectively or individually, do not violate the public trust. Having said that, it is interesting to consider a comment by Professor Patrick Grim, a Philosophy professor at SUNY in Stony Brook, NY., "Ethics and Law are not the same thing. Ethics is deeper than the Law".

It boils down to an assumption that we, as professionals, are, and will continue to be, technically competent and ethical. And failing to meet that professional expectation may explain why the first person to be charged with respect to the Algo Centre Mall collapse was an engineer. ⊕



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Thoughts on Design

...and where can I save things?

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

Design tools have changed since I graduated from the University of Saskatchewan. Slide rules were replaced by calculators and now by computers. Drafting boards, T-squares, triangles, scales, pencils, and pens have been replaced by CAD programs. Prototype testing now happens, in the initial stages at least, using computer modelling. Document revisions that once took significant amounts of time to complete can now happen almost instantly, with assurance that the changes have been made in all files.

There is no doubt that these "modern" tools allow more detailed analysis and more efficient delivery of specifications, drawings, and products. Used properly, the "tools" should enable engineers to design safer, more cost effective end products.

As this change has been happening, educational institutions have cancelled classes like drafting (with those dreaded "lettering books") and descriptive geometry from their course requirements to make room to study "modern" technologies. Some would argue that this process has caused today's graduates to see everything as the output of a computer program rather than the result of a thinking process. Maybe that is linked to the

concern that people no longer see the need for skills like sketching and "back of the envelope" calculations. Maybe "modern" tools can cause us to become too reliant on the precision of the answers they produce. However, used properly, they are a genuine advance.

The debates over the details of how we use technology to improve our design capabilities will, and should, continue. After all, the goal in a design office is to produce the information that is required to provide a solution to a problem.

But wait a minute, what do I do with the design documentation once I am finished? Three separate incidents over the past year have caused me to wonder about this issue.

In 1993, I produced a handout for students in one of my design classes. For convenience I saved that file using the "latest" technology (a Zip drive). As I began clearing out my office, I stumbled on a hard copy of the document and placed it on one of my "save" piles. A student asked me if I would print a copy for them and I suddenly realized my Zip drive had gone into the recycle system. I was able to scan the hard copy, run it through some reformatting and reproduce it in both pdf and hard copy. It is now resident on my hard drive.

About a year ago, the drawings at the old Dominion Bridge offices "resurfaced". They had spent many years in storage in the office building at the old plant site. Efforts to save these drawings that contain the details of a significant part of western Canadian infrastructure development are still under way. Because they physically exist, they can be reviewed, evaluated and moved to an archive facility. In this case, history can be preserved.

Finally, about a month ago, on a whim, I purchased an electronic copy of a book called "How Engineers Create the World". It is a record of Bill Hammack's Public Radio Commentaries. One of those commentaries, Digital Data, mentioned the Department of Special Media Preservation at the National Archives in Washington, D.C. , which is "... a museum of obsolete technology". When I read that line, I thought back to my Zip Drive problem. I had been a small scale victim of obsolete technology.

Dominion Bridge saved all of their drawings so they had a resource to fall back on if something went wrong or if modifications were required in the future. Ink on velum was the production technology of the day so that was the format they used for their storage. Like Dominion Bridge, I stored my notes using the production/storage technology of the day. Fortunately I got "sloppy" and made an extra hard copy.

The question is, how do we deal with the design documents that are produced using current technology? How long will that technology remain functional? What is the useful life of an electronic file/CD/memory stick, even if the hardware is still available? When the adequacy of a design is challenged, is there a "paper" trail to use in defence of the design?

Where can I save things, and in what form? It seems to me this is a valid design question. ⊕



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Jonathan Epp, P.Eng.

By Monique Doyle

While Jonathan Epp's journey to the APEGM Council followed a familiar route of committee work and long-term involvement, his entry into a career with Teshmont Consultants Ltd. was anything but traditional.

It was in high school that Epp first realized he wanted to be an engineer. "I always enjoyed learning and I found school – especially math – easy," he says, adding that he also has a creative side that, for a while, prompted him to consider a career in graphic design. "In the end, I reasoned that the probability of success in engineering was higher because I could prove a solution worked while in graphic design, it would be more subjective. In retrospect, that was a very engineer-like way of looking at it."

Engineering provided the perfect balance, but it was the summer job he accepted at Manitoba Hydro that would prove decisive for his future. At the end of the summer, the utility kept him on. He continued working at Hydro part time right up to graduation, fully expecting to be offered a permanent position once he had his diploma. "But they ended up not hiring me," explains Epp. "They tend to hire electrical engineers and since my degree is in computer engineering so that may be why they didn't offer me a job."

Then, although he had never applied at Teshmont, nor, in fact, even heard of the company at all, he received a call from the power delivery engineering specialist. "I walked into what I thought was a job interview but was actually a project kick-off meeting," recalls Epp. "Essentially, I had already

been hired." He was introduced to the rest of the staff as the new EIT (Engineer In Training), a position he assumed upon his return from the three-month backpacking trip to Europe he had planned before the 'interview.'

His first project with Teshmont involved creating software to track North American Electrical Reliability Corporation (NERC) requirements for Manitoba Hydro. After the blackouts that plagued the eastern side of North America in the early part of the millennium, utilities were mandated to meet new reporting requirements to keep track of system reliability testing. "It is very expensive for them to take their units offline to test," notes Epp. "So the idea was that they would test when a unit was due for maintenance and log the information in a data base. Then when it came to reporting requirements they could tell whether or not the test had occurred within the appropriate window of time."

Because much of this development work was self-directed, Epp's position with Teshmont naturally evolved into a project management role. Today, he is back working for Manitoba Hydro, but this time with Teshmont, which is acting as the Owners' Engineer for the Bipole III Converter Stations Project. He plays a coordination role between the different subject matter experts.

"I really enjoy the flexibility and variety I have at Teshmont," notes Epp, adding that the company allows him to pursue some of his own interests. For instance, he has been doing some graphic design work for the company, helping to develop marketing material

and guiding the evolution of the website. As Information Systems Supervisor since 2008, Epp also leads Teshmont's information technology department.

At the same time, Epp has been volunteering with both APEGM and the Association of Consulting Engineering Companies (ACEC) Manitoba. He was involved in the launch of the magazine and new website for ACEC (Manitoba) as well as a complete rebranding. In 2012, he was awarded ACEC Manitoba's Rising Star Award for his many contributions. "It's all about exercising my creative side in ways that are related to engineering," says Epp. "It's been a lot of fun."

With APEGM, he has been a member of the Public Awareness Committee. Along with giving talks on engineering to local high schools and the Rotary Career Symposium, he has also enjoyed being involved in judging science fairs.

As a Councillor, he hoped to make an impact on the way APEGM provides value to its engineers. "However, after my first Council meeting, I was humbled by the high level that Council operates at," says Epp. "I realized I needed to take a step back to learn how things work so I can be of best use to the Association. I am excited to see what this year will bring."

The Council retreat further challenged the way he thought about his role as Councillor. Says Epp: "I was reminded that while Council represents the membership it also, like its membership, has a greater responsibility to the public. As Councillors, that is where our first loyalty should lie." ⊕

MEET YOUR NEW COUNCILLOR



Kaitlin Fritz, EIT

By Monique Doyle

Kaitlin Fritz is an Engineer-in-Training (EIT) at Manitoba Hydro. She is excited to take on the role of Councillor for APEGM because she recognizes the need for a better relationship and stronger communications between the organization and its members-in-training in engineering and geosciences. When the opportunity with APEGM arose, she realized it was the perfect time for her to get involved. Kaitlin is taking on a new position on the Council this year as MIT Representative, and is looking at how she can best define her role and make a positive difference for other MITs like her.

In her final year at Shaftesbury High School, Kaitlin was not sure what she wanted to do for a living until she heard a classmate describe

"Kaitlin truly enjoys what she does and would encourage other young people to consider pursuing a career in engineering."

a career in engineering. She realized engineering was her calling and immediately registered with the Faculty of Engineering at the University of Manitoba. She earned a Bachelor of Science in Civil Engineering from the University of Manitoba in May 2012. Before graduating, she was heavily involved in the University of Manitoba Engineering Society, and enjoyed exciting student work opportunities in construction that included the Wuskwatim Generating Station and the Disraeli Bridges project.

Always keen on keeping busy, Kaitlin truly enjoys what she does and would encourage other young people to consider pursuing a career in engineering. As a junior transmission line designer at Manitoba Hydro, she is currently working as a member of the design team for the Bipole III Transmission Reliability Project. Kaitlin will use her experience and her professional motivation to become a strong voice for other members-in-training who will someday become professional members of APEGM. ⊕



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Warren Gendzelevich, P.Eng.

By Monique Doyle

“Change is good,” says Warren Gendzelevich, a Project Manager with Hatch Ltd. and one of this year’s new additions to the APEGM Council. After several years of volunteering with the Association of Consulting Engineers (Manitoba), he is looking forward to adding a new challenge to his professional life.

Challenge and change have been constants in a career that has taken the geological engineer full circle, from some of Manitoba’s largest hydroelectric projects and back again. After graduating from the University of Manitoba in 1987, Gendzelevich spent his first four summers drilling and sampling at the sites of various future hydro-stations in the north, first with Manitoba Hydro and then with Acres International Ltd. The investigation work included the Conawapa, and Keeyask hydroelectric projects, as well as a number of hydroelectric sites in northern Ontario. “I spent the first four years of my career outside the city working out of a camp,” recalls Gendzelevich, adding that he was young and single at the time. “The money and experience were great.”

But when the Conawapa Project was shelved in the early 1990s, work at Acres slowed down and a position at Wardrop Engineering proved to be an attractive alternative. For the next seven years, Gendzelevich focused mainly on environmental assessments of gas stations and fuel handling facilities, including their impact on soil and groundwater.

Then in 1998 he returned to Acres, this time as a project engineer. “I wanted to get back into the line of work I started

with,” he explains, “into what I was more trained to do.” Gendzelevich found himself working on some of the same hydroelectric projects on which he had cut his teeth, including the generating station at Keeyask. But this time, while the younger engineers conducted the kind of fieldwork he had done at the beginning of his career, he managed projects and staff.

At the same time, he became increasingly involved in flood protection for southern Manitoba. A combination of floodway expansion and smaller community dike projects would keep him busy for the next 10 years. “I’ve been lucky to be involved with a lot of larger projects,” says Gendzelevich. “At the same time, smaller projects are interesting too because you can get them done and move onto the next one. A lot of the bigger projects I have worked on seem to last forever.”

Conawapa is a case in point. The first project of Gendzelevich’s career has yet to be built. “It will be nice to see

Conawapa completed, hopefully before I retire,” he notes.

Meanwhile, after a stint as office manager for Hatch Ltd., which purchased Acres in 2004, the geological engineer is once again working on the \$6.2 billion Keeyask generation project, currently in the regulatory approval stage.

“You should look at changing what you do about every five years or so, as it keeps you fresh and engaged,” says Gendzelevich. “I’m happy I made the change.”

He is also pleased to join the APEGM Council, where he hopes to contribute some of his experience from the other associations with which he has been involved, including the Association of Consulting Engineers and the United Way. “Right now, I am learning how the Council works,” says Gendzelevich. “This year, I will focus on becoming familiar with the issues that we will be reviewing.” He looks forward to the exciting opportunities that his work as a Councillor will bring. ☕

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Manitoba’s Builder



David Grant, P.Eng., FEC

By Monique Doyle

David Grant has been working in engineering for almost 50 years and believes strongly in being an advocate for it and for APEGM. His own interest in science and engineering began in his preschool years. He scraped for ancient arrowheads as the St. Lawrence Seaway was being built. He had access to a very high-quality microscope and some good books. He fondly recalls one book that told of the discovery and manufacture of dozens of commercial materials and elements. He still has his dad's 2,000-page 1950 edition of Perry's Chemical Engineer's Handbook. Even though he had a bike, board games, and a bow & arrow, he still found discovery of the natural world and of industrial processes to be fascinating.

David did well in every math and science course available in school. He completed a night-school IBM programming course in the same month that IBM first announced their System 360, about 50 years ago. "That one took the U.S. to the moon," he says. After two years of Honours Chemistry study, he switched to Chemical Engineering at the University of Windsor, in Ontario. He earned a Bachelor of Applied Science in 1974. A mindset of continuous learning has certainly applied to his life.

In 1986, after years in chemical manufacturing in Ontario and Michigan, David moved to Manitoba and joined APEGM as a P.Eng. Since then, he has been involved in a variety of association activities, including acting as APEGM judge at the Manitoba Schools Science Symposium. Working with students and youth is important to him. Says David, "I have been following the story of

"I volunteer because it is the right thing to do," David says. "The idea of reward for life-long service is a recent thing for me. It was not my goal when I first helped with a youth group or at a science fair."

recruitment and retention of technical staff for over 50 years. From early stories of how the 'west' stole the best talent from poorer areas, to the way glamorous jobs – like modeling and pro-sports – squandered the dreams of students, I have wanted to make young people realize that science is fun, and very useful." That's why he helped create an APEGM award for the young engineer who best advocates for engineering and geosciences in Manitoba classrooms. This award helped to enhance the Association's image, promote university recruitment, and boost the gender balance within APEGM.

A few years ago, David was honoured with the FEC designation by Engineers Canada. "I volunteer because it is the right thing to do," David says. "The idea of reward for life-long service is a recent thing for me. It was not my goal when I first helped with a youth group or at a science fair."

David has been working as a Chemical/Materials Engineer at Manitoba Hydro since 1986. In the 1990s, he made several discoveries in the field of material science. "These included several rather original test methods, and a commercially-viable process, for the re-use of industrial adsorbents. The

world-wide recognition that followed was probably the highlight of my career," David explains.

David's days are busy but he does fit in some hobbies, such as volunteering in race-track safety and the restoration of his older sports cars. He also applies his photojournalist talents to covering those major auto racing events at which he volunteers. The readers enjoy his insights into the mechanics and design of the cars and their parts.

David is one of five new Councillors for APEGM. "I seldom seek nomination for awards or elected office. While I would much rather make, test, or repair something, I do see that a properly run meeting can be very useful. In the 45 years that I have been involved in engineering, I have been a keen student of its regulation and direction. In committee work, I have found ways to improve the services that the Association offers its members. After many years of listening to members on some controversial issues, I came to believe that I might help as a Councillor," says David. Through the new Advocacy Process, David also wants to help transform how APEGM protects the public, and to enhance the organization's public image. ⊕



Lesley McFarlane, P.Eng., MBA, PMP

By Monique Doyle

Lesley McFarlane brings a task-focused outlook and solid business footing to the role of APEGM Councillor. Lesley has been working for MTS since June 2001 and has taken on a few different roles in the last 12 years. After starting as a Project Manager in the Marketing department, she then held a variety of technical leadership positions in the Network Services department before taking on responsibility for preparing MTS for the sale of the national division, Allstream. In January 2014, Lesley moved into a new position in the Customer Care department, with responsibility for Quality and Scheduling.

Lesley's start in engineering came through a friend's father, a professor of engineering, who described the vocation so well that she and her friends all decided to study engineering. It was an obvious decision for Lesley. She describes it as a wonderful choice for someone who loves both math and science and a practical route to a great career offering diverse job opportunities. After contemplating military college, Lesley completed a Science degree at Mount Allison University and an Electrical Engineering degree from the University of New Brunswick. She spent the first 14 years of her career in the Canadian Forces as a telecommunications officer and enjoyed the challenges, responsibility, and leadership experience the military entrusted her with.

After moving to Manitoba in 1999, Lesley became active in APEGM's Women's Action Committee and the IEEE Women in Engineering group. She

was later Chair of the Winnipeg IEEE Section. In 2001, Lesley earned the PMP designation, and three years later she completed her MBA in Marketing at the University of Manitoba.

In 2009, Lesley was awarded the *Canadian Women in Communications Excellence in Leadership Award* for her role as a mentor to other women in her workplace. This award recognizes the effort Lesley put in to create a mentoring group that meets once a month and now includes almost 70 members. Not only is Lesley recognized as a mentor, but she has also become a female role model in the telecommunications industry. As a career choice, Lesley believes that

engineering can open many doors and is a strong foundation for a variety of business roles.

As a newly elected APEGM Councillor, one of Lesley's goals is to ensure that APEGM continues to consider and address the needs of its diverse membership, including the unique interests of women in the industry. She will also focus on helping APEGM to connect closely with industry and to promote the value and relevance of the P.Eng designation –and the experience that comes with it – especially in larger private sector workplaces. She recognizes that these are long-term goals and results that will happen through gradual changes. ⊕

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ENGINEERS KNOW HOW TO FIX STUFF

By Grant
Koropatnick,
P.Eng.



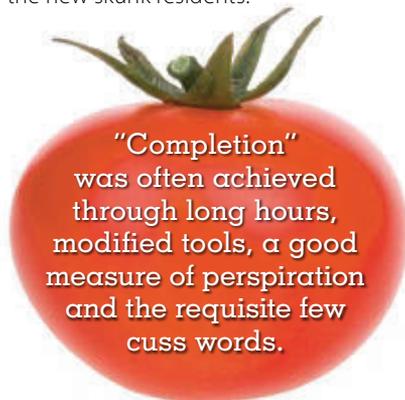
Engineers know how to fix stuff, right? I'm sure each of you have your own story (or stories) about some crazy problem that you've solved at work or at home. I was encouraged recently by a former employee of my father's to write a short story about a problem my dad fixed at home one year when I was a small boy.

Some of you will remember my dad – Andrew Koropatnick, P.Eng. He graduated from the University of Manitoba Civil class of 1950. He was a long service engineer at Manitoba Hydro for 38 years. Like most engineers, he would work at a problem or home project until it was completed. "Completion" was often achieved through long hours, modified tools, a good measure of perspiration and the requisite few cuss words. You know what I mean – don't deny it. LOL

Wild Kingdom

At our home, we had lots of flowers, fruit trees, shrubs, birds, bird feeders, rabbits and other occasional wild life that came in to the yard. We lived near the Red River and there were a few vacant lots in our sub-division where rabbits, raccoons, foxes, hawks and other flora and fauna were seen. One year, a mother rabbit burrowed a den under our front sidewalk slab and had her babies. This was an interesting event for my sisters and I to observe. It was like a "Mutual of Omaha's Wild Kingdom" show right outside our front door. The small baby rabbits were born and we enjoyed watching their growth.

One day, along came a skunk and the family of rabbits were suddenly gone. We suspect that the skunk killed the rabbits and took over the den. Soon after Ms. Skunk moved-in, she had babies of her own. We noticed the absence of the cute, fuzzy bunnies and the increasing scent of the new skunk residents.



"Completion" was often achieved through long hours, modified tools, a good measure of perspiration and the requisite few cuss words.

Honorable Reputation

This was not acceptable to my father; as the smell grew day-by-day. Some neighbors began to talk about the lingering odour and the source of the olfactory annoyance. It became known that the skunk family was living beneath

our sidewalk slab and the source of the smell was indeed coming from our lot. At this point, my father took up the task of attempting to evict the skunk family in order to save his honorable reputation in the neighborhood.

His first attempt was to simply put a garden hose down the hole and flood the varmint out with water. This attempt failed. A second attempt began with a call to the university where he borrowed a bee smoker and tried to smoke-out the unwanted resident. This too failed. It was growing obvious that greater expertise and more sophisticated methodologies were necessary and beyond the scope of practice of this engineer, so his third attempt was facilitated by the Winnipeg Humane Society. A technician came to the house and brought a trap and some bait. The trap was one of those cage style "live traps" where the animal would not be harmed. The bait was a special concoction of rotten fish and other ingredients which apparently skunks could not resist. Now the yard smelled of rotten fish and skunk. This attempt was a colossal failure as night after night

"Mama Skunk" ignored the free meal. Instead, she would leave her den about sunset, stroll casually down the driveway and across the street to the vacant lot. She would return about an hour later; presumably after foraging for food. My father observed this nightly routine. Growing frustrated with his lack of success at solving the problem, he came up with one final method for ridding the street of the noxious smell and restoring his reputation as a "good neighbor."

Side note: When I think back to what he did, I can only conclude that his methodology would surely get a person arrested and charged in today's society.

Back then things weren't so politically correct or socially tense and folks would ignore the occasional indiscretion or two. Some of you won't be shocked by how this story ends... and perhaps, some of you will.

Gunshot

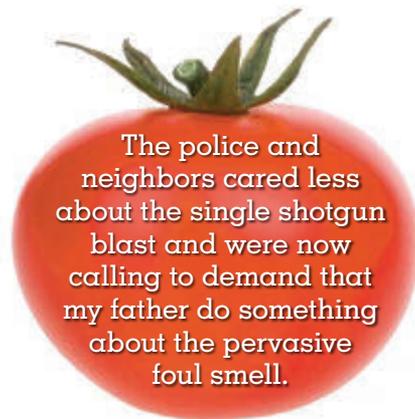
Looking for one more attempt to finally fix the situation, my father decided to shoot the skunk. Sure, it might cause a bit of a stir in the neighborhood, but it would solve the problem once and for all. So he called the Fort Garry Police. I can hear the conversation going something like this: "Good afternoon constable, my name is Andy Koropatnick and I live at 64 Agassiz Drive. Blah, blah, blah skunk. Blah, blah, blah bad smell. Blah, blah, blah my neighbors are angry. Blah, blah, blah I've tried everything. Blah, blah, blah tonight you're going to hear a gunshot about ten o'clock." I can hear the constable replying something like "Okay Mr. Koropatnick, thanks for letting us know."

My dad grew up in the country and spent his youth hunting and fishing in the valley north of town, so he knew how to handle a gun. An avid duck hunter, he owned a reliable Winchester Model 25 and with the right shell could easily dispatch a pesky skunk with one shot. Of course it was vitally important to use the right shell and the right angle for two reasons: (1) you don't want to endanger your neighbors and (2) you want to hit the skunk, but not

too much. Any experienced outdoorsman or farm boy will know what I mean... oh, and the farm girls too.

The fateful night came. I was upstairs in bed reading. It was dark outside and my bedside light should've been out by now. In retrospect, I can picture my dad skulking inside the open garage door with his loaded shotgun waiting for the skunk to appear. Had I have known what he was doing, I'm certain that I would've had my nose pressed-up to the glass of my bedroom window; to see the action below. I was laying there when I heard a muffled bang sound. I actually thought that my sister had slipped in the bath tub – it didn't sound like a gun shot. Not really knowing what was going on below, I fell asleep.

The next morning, I heard the report about what had taken place. My dad's shootin' eye was good for the one shot. The skunk was gone, but the smell wasn't. The pellets were thorough and unforgiving – perforating the skunks hide – releasing a final noxious load of scent. The smell was so strong that our eyes watered on the walk to school. The grass in the front yard turned white and died. The police and neighbors cared less about the single shotgun blast and were now calling to demand that my father do something about the pervasive foul smell.



The police and neighbors cared less about the single shotgun blast and were now calling to demand that my father do something about the pervasive foul smell.

Goodbye Skunk

Once more, the engineer had a problem to fix. The perpetrator was gone, but the smell wasn't. My dad tried to hose the grass;



top-dress it with new soil. He even tried burning the dead sod to terminate the odour. Nothing seemed to work until one day a neighbor across the street delivered a restaurant-sized can of tomato juice and demanded that my father apply the juice to the front lawn. "Tomato juice? That won't work." It's what my dad called an "old wives tale." Out of desperation and respect for the neighbor my dad loaded his herbicide sprayer with tomato juice and carefully applied it to the yard. Within hours relief was achieved and in a few days the smell was completely gone! It was a miracle. A skunk never again caused any problems around our home. Now when I smell that scent, I smile and recall the summer we wondered if the scent would ever go away.

My daughter called last summer and said "Hey Dad, didn't Grandpa get rid of a skunk living under his front step? I think there's one living under my front step." Oh no! History has a funny way of repeating itself sometimes. Yes, engineers know how to fix stuff and although he finally fixed the problem, I didn't recommend my dad's methodology to my daughter and son-in-law. Nope. "Call an exterminator and good luck!" ☺



Is Engineering History Missing in Our Education?

By David Amorim, EIT

Having recently graduated with a Bachelor of Science in Civil Engineering, I look back on those difficult and stressful, yet extremely rewarding five years, with the feeling that something was missing in my education. Ask an architecture student to list who they believe to be the most influential and iconic architects to ever live and the list will surely be lengthy; responses would probably include, among many others, Michelangelo – the great mind of the Renaissance; Antoni Gaudi – the visionary of La Sagrada Familia; the Canadian born Frank Gehry – designer of the Guggenheim Museum; and icon of American architecture, Frank Lloyd Wright – father of many works including the famous Fallingwater. Pose the question to students in other faculties and they will likely be quick to ramble off the most influential individuals of their profession.

Engineering on the other hand appears to be focused so deeply in the technical realm that we forget to recognize the history of this great profession; the individuals and their impressive feats that have helped advance our knowledge and push the profession to new limits. Due to my passion for bridges, I enjoy reading historical literature on some of the greatest bridge engineers the world has ever seen. While you might be able to recognize the Golden Gate Bridge, the Tacoma Narrows Bridge, or the Brooklyn Bridge from photographs, I question, do you know who the engineers responsible for these structures were and the great stories the construction – or failure – of these structures hold?

Do the names James Buchanan Eads, Theodore Cooper, the Roebling Family, John Alexander Low Waddell, Gustav Lindenthal, Othmar Hermann Ammann, Joseph Strauss, Robert Maillart, and David Bernard Steinman sound familiar? How about a more recent icon such as Santiago Calatrava – a personal favorite of mine? These men have built many of the greatest bridges on earth. While my limited knowledge of engineering history is mainly focused on bridges, it would be safe to say that every aspect of engineering has a history filled with individuals achieving great feats; a history that we should all at least have a basic knowledge and appreciation of.

I can't articulate why I feel it important to know the history of our profession, the names and actions of those that have shaped the world before us. Others may even disagree with me; a colleague of mine once asked me "who cares about the history"? Maybe I am one of the few that do? However to advance the field I feel we should be aware of the successes and failures of our past. Henry Petroski, professor of Civil Engineering at Duke University and author of many interesting books on the profession describes the paradox of design – that engineering failures will lead to successful designs while successful designs will lead to failures. To grasp this paradox one must look back at the dramatic failures that have occurred throughout time and examine the effect they had on the profession.

My professor for the Steel Design undergraduate course I took had an

architectural background and also believed in the necessity of knowing the history of one's profession. One of the most interesting assignments I had in university was to research and write a brief essay in his course on the collapse of the Hyatt Regency walkway in 1981 describing the lessons we have learned from the tragedy. Similarly, in another undergraduate course, Geomatics, we were assigned to research a famous surveyor of choice and write a brief essay about his or her accomplishments. While current initiatives such as the American Society of Civil Engineers' *Raise the Bar* attempt to increase the minimum requirements for professional registration – in this case by requiring a Master's degree as a minimum degree – the history is overlooked while the technical aspects are pounded in during our education.

An English credit and a complimentary elective are often core requirements for any engineering degree and serve to make our education well rounded. Why not offer a history course dedicated to the field of engineering? No shortage of essays, magazine articles and books amongst other mediums exist to provide the course material. A look at the profession from the eyes of the public can also be examined as it is frequently discussed that the public doesn't really understand what engineers do. Has that always been the case and if not, why is it now? I'm certain that if such a course were offered, it would be well received by students and would serve for a more complete and well-rounded education. ⊕

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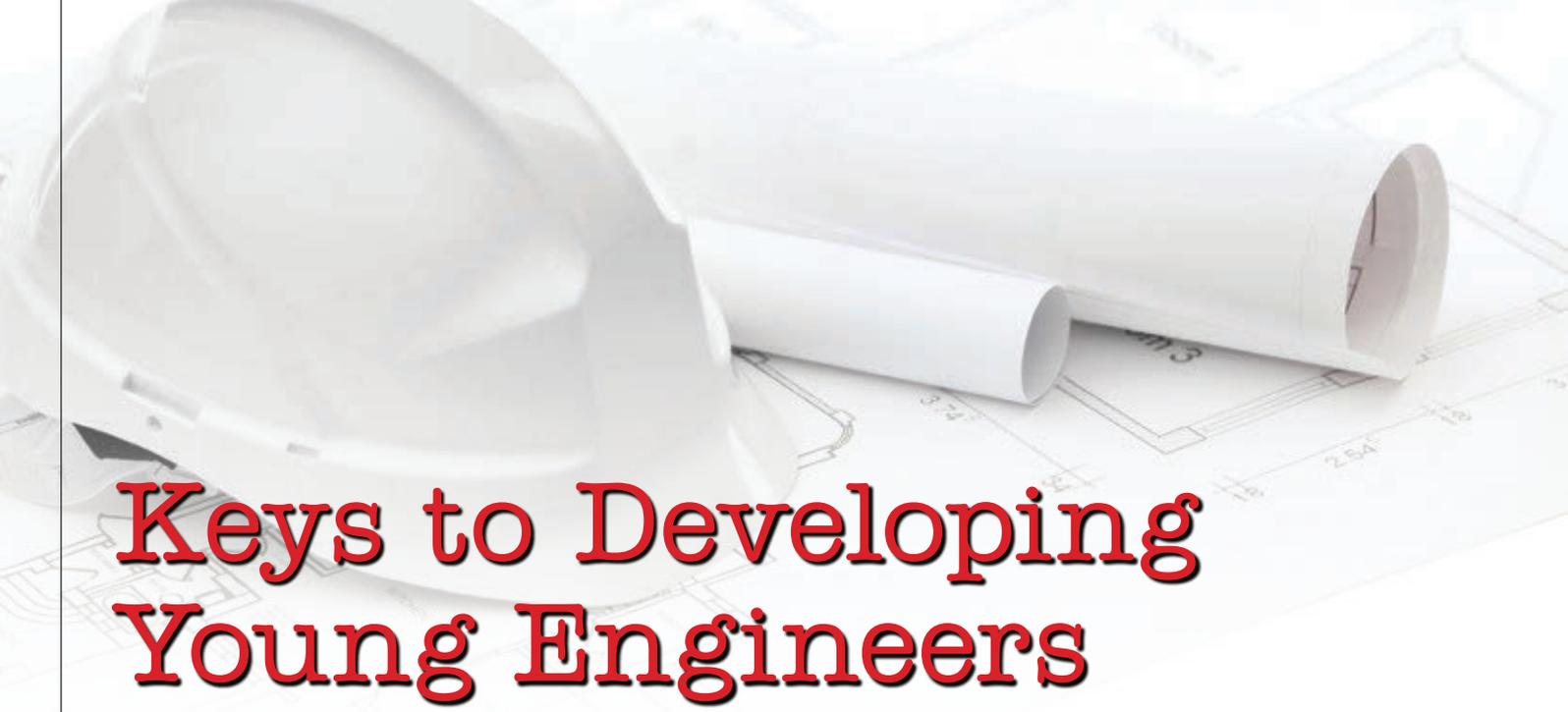
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Keys to Developing Young Engineers

By Owen Van Wallegem, P.Eng., Past-Chair, ACEC-MB Young Professionals Committee

It wasn't all that long ago that a small group of engineers, scientists and technicians accomplished one of the greatest engineering feats of all-time. On July 20, 1969, the world watched in awe as Neil Armstrong stepped out of a spacecraft and on to the surface of the moon. Nothing like this had ever been accomplished before. To complete this unique mission, NASA put together a highly skilled and creative team that

successfully performed an undertaking that many thought was impossible.

Most engineers are already familiar with this story as it is one of few times that engineers have been the focus of glowing positive public attention on a global scale. What most people don't realize, though, is just how young the team working on the Apollo 11 mission actually were. H. David Reed, a flight dynamics officer, took a poll the night

that Apollo 11 splashed down and found that the average age in the control room was only 28.

At that time, there were very few engineers with experience sending people to space, and none with experience landing people on the moon and returning them safely to Earth. Instead, NASA chose to build a team out of young engineers and scientists because they needed team members with new ideas and up-to-the-minute technical know-how to achieve their lofty goal.

This is a lesson that companies should keep in mind while considering ways to stay at the forefront of their respective industries. The young engineers working in these offices are intelligent and capable, but it is important to determine how best to develop them, and leverage their skills. What follows are a few suggestions to consider while developing career growth and succession plans for young engineers.

The first suggestion is simple – take the time to get to know your young workers. Provide opportunities for junior and senior employees to meet and learn more about each other. This can be done through structured mentorship programs, regular performance review discussions, or informally over lunch or coffee. Listen to what they have to say. When you get to know the individual, you will have a greater understanding of the steps that



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you will need to take to help with their development.

Once you know the individual better, the next step is to act on what you have learned. Your company will see immediate benefits if you ensure that each individual is in a role best suited to their talents and interests. Armed with this knowledge, you can then provide learning opportunities to continue developing the skills related to their role. You can also provide early leadership training to those who demonstrate the potential to manage in the future, which can help with succession planning.

Whether an individual is on track to become a technical expert, or leans more toward business development and management, encourage them to participate in one of the many technical and professional organizations related to their interests. Through participation, that individual will be able to find learning opportunities and build lasting relationships that will benefit your company for decades to come.

The task of developing young employees does not sit entirely on the shoulders of the senior members. Young engineers must take responsibility for their own training and career development. As a newer employee, it is important to have a realistic awareness of your own strengths and weaknesses, and to look for opportunities to improve. Take the initiative and talk to your supervisors or decision makers about your development goals to get their input, and then tailor your research to align with your organization's goals. This will make it more likely that you will receive the training you are looking for.

Newer employees may find it difficult to develop leadership skills in their everyday work within a company, but there are lots of external options available to help develop these abilities. Volunteering for non-profit or charitable organizations is a great way to gain this experience. Another option is to start something yourself. Organize a fundraising event for a cause that you believe in, or put a sports team together just for fun. It may sound simple, but in doing so you will develop skills you will need later on as a leader, such as organization, time management and budgeting. You will also develop soft skills such as communication, networking and

persuasion. Once you try to organize a team made up of people with competing schedules and priorities, you will see what a great challenge and learning experience it can be.

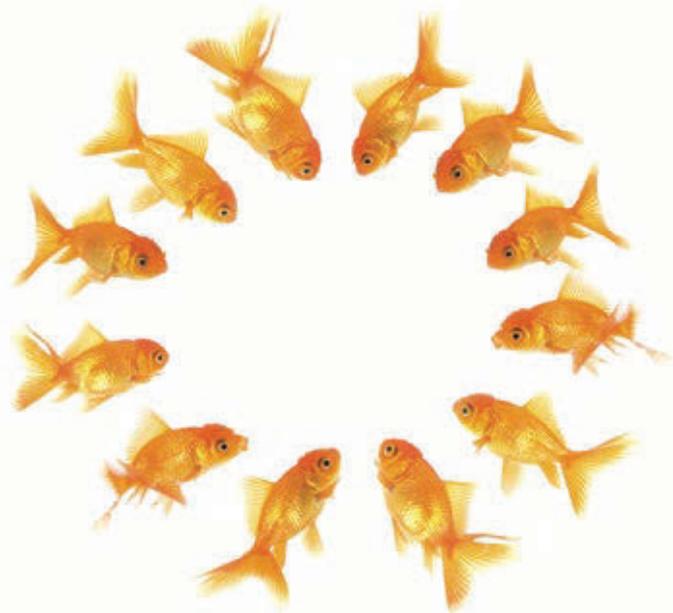
Senior members of your firms are well aware of how important it is to develop the newer generation of workers. As a young engineer, you should not hesitate to take the initiative to develop yourself. You may be surprised at the level of support you will receive.

Most companies in this province are not sending people to the moon.

However, by getting to know their young employees and providing them with support and training at this critical stage in their careers, Manitoban companies will continue to accomplish great things well into the foreseeable future. ☎

Adapted from "Message from the YPC Chair", Van Walleghem O., *Manitoba Consulting Engineer, Volume 3* (2012), reprinted with permission from the Association of Consulting Engineering Companies – Manitoba.

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Boost Grain Preservation Before Production

Better grain storage would save money and feed over a billion, says Digvir S. Jayas. It deserves more attention.

Annually over 2.6 billion tonnes of grains – cereals, oilseeds and pulses – are grown and then stored along the chain from producers to consumers. Most countries do not systematically report how much grain becomes unfit for human consumption during storage, but anecdotal reports suggest it's worryingly high.

In poorly managed storage systems, such as those leaving grain unprotected on the ground or storing grain without drying, losses can routinely reach 30 per cent, whereas in well-managed systems they are less than one per cent.

Let's assume a global loss of 20 per cent – 494 million tonnes of grain could be saved by reducing that to one per cent, meeting the needs of an estimated 1.35 billion people (based on an average consumption for citizens of China, the EU and India of one kilogram of grain per person per day).

This amount of grain saved is equivalent to not seeding 247 million hectares of land (assuming average yields of two tonnes per hectare). Imagine the impact of reforesting that land, and saving the water, fuel and fertilizer used to produce the lost grain.

Cutting losses to 1 per cent could be achieved – using current knowledge

about grain storage, supplemented with further **research and development**.

Shift the goal

Global **policy makers**, politicians and **agricultural** scientists place a very high priority on finding ways to **produce more food** for the growing world population. Huge resources have gone into developing high yielding cultivars, for example, and bringing marginal land into production.

But similar attention has not been paid to *preserving* harvests. If losses are not controlled, 19 per cent more grains would have to be produced to provide the food available currently (allowing for 1 per cent acceptable loss). And preserving harvested grain is generally more cost effective than producing enough to replace losses, even for smallholders, despite costs increasing for smaller storage units.

“Countries should provide proper infrastructure to preserve grains, including appropriately designed systems for handling and storage, aeration and drying, and ongoing grain quality monitoring.”

Digvir S. Jayas, University of Manitoba

One reason that policymakers and politicians are not focusing on reducing losses might be because grains are not treated as a national asset, and wastage is not seen as a national loss. Most of the lost grain belongs to individual farmers – but there are national impacts too.

It is the country, in the end, that imports grain to feed its citizens, and loses the potential to export surplus grain. Therefore, countries should provide proper infrastructure to preserve grains, including appropriately designed systems for handling and storage, aeration and drying, and ongoing grain quality monitoring.

Another reason for neglecting food losses might be that an increase in production is easier to celebrate. Reducing losses does not raise production, but rather only raises *availability* of grains – a less glamorous achievement, perhaps.

Understanding storage ecosystems

Stored grain bulk is effectively an ecosystem, where grain can deteriorate because of either abiotic (physical) variables such as temperature, moisture

content and the gases between the grains, or biotic (living) variables such as insects, mites, fungi, and the grain itself.

By understanding and then properly managing these ecosystems grains can be transformed into nonperishable, stable commodities and preserved for a long time. For example, grains can be stored safely for up to three years if their moisture content is reduced to safe levels (12-13 per cent of wet weight) using proper drying techniques, and grain kept cool (under 15°C) using aeration or chilled aeration.

Sometimes vertebrates such as rodents, birds and other wild animals attack stored grains. However, properly designed systems – such as steel or concrete bins and warehouses on plinths topped with inverted half cylinders – can easily eliminate access.

Because bulk grains are ecosystems, there is a need to train people to understand them. Farmers, for example, must know simple things they can do, like cleaning storage sites of the old grain and debris, which reduces cross contamination of new grain.

Team effort

Engineers, biologists, chemists and economists need to work in multidisciplinary teams to solve grain storage problems. For example, engineers are needed to design systems that manipulate abiotic factors, so that living organisms (for example insects, mites and moulds) are minimized. Chemists and electrical engineers are needed to design sensors for quality monitoring.

Young professionals who will deal with food security should understand the typical issues in grain storage. And students around the world must be challenged to develop appropriate technologies, such as solar drying systems and storage structures using local materials.

Annual loss of grain translates into a great financial loss for farmers, and for countries' GDP. World agriculture could save US\$148.2 billion by preserving just one year's global losses (based on 494 million tonnes at US\$300 per tonne). Good preservation would quickly pay back significant funds invested in design and training for storage systems.

Policymakers, politicians and scientists need the will to make a change – a commitment to prioritize saving grain as much as increasing its production. How can we truly celebrate any increase in grain production if it does not actually make its way to the tables of a hungry world? ☺

Digvir S. Jayas is a grain storage specialist and vice-president (research and international) at the Biosystems Engineering Department, University of Manitoba, Winnipeg, Canada, where he also holds the title of distinguished professor. He can be contacted at digvir.jayas@umanitoba.ca

This article is part of the Spotlight on Ensuring food security for the future

Source: Science Development Network
<http://www.scidev.net/global/food-security/opinion/boost-grain-preservation-before-production.html>



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Who Gets Fed First?

Global Population Boom: 9 Billion Mouths to Feed

By Lindsay Robinson, P.Eng.

"Who Gets Fed First?" was the opening question presented by University of Manitoba President and Vice-Chancellor, Dr. David T. Barnard, to the seated panel: Dr. Digvir Jayas, Dr. Vaclav Smil and Dr. Karin Wittenberg. This deceptively simple, yet exceedingly loaded title introduced the topic of the evening. "Global Population Boom: 9 Billion Mouths to Feed" was the first installment in 2014 Visionary Conversations panel discussion series, an initiative which according to the University's website, "reflects the role the university can and should play in fostering dialogue around emerging issues". To describe the academic and professional backgrounds of Jayas, Smil and Wittenberg could easily consume this entire article, but suffice to say, that they represent perspectives of biosystems engineering, earth science and agricultural science respectively, areas of research that are all highly pertinent to the multitude of factors at the intersection of population growth and food production. Each of the panelists spoke briefly on the topic before opening the forum to the audience for questions and comments.

Dr. Jayas took the podium first and spoke not of novel new ways to produce food for a growing population, but rather why the nations of the world must take steps to reduce food wastage, specifically in the context of storing the 2.6 billion tons of grain which is grown annually. Describing the proportion of stored grain lost each year as ranging between 30% for ineffective systems to 1% in a well-managed scenario, Jayas calculates that if global grain spoilage was reduced from an average of 20% to 1% through widespread use of technology and better management practices, we will have saved 494 million tonnes of grain. Noting that current global policy tends toward efforts to increase production rather than

improve grain storage. Jayas argued that a strategy of preservation and improved utilization was more cost effective overall because it saves the fertilizer, fuel and water required to grow the equivalent amount of grain and avoids the cost of importing grain for countries whose production does not satisfy demand. Concluding his remarks, Jayas advocated for countries with high post-harvest losses to consider the grains it produces as a national asset, and invest in proper infrastructure and training to protect against losses which would otherwise fall entirely upon farmers.

"Approximately 40% of food has been squandered through wastage."

Dr. Wittenberg began by saying that despite population growth, climate change, reduced arable land due to desertification and other factors, global food supply per capita has increased by 30% since 1950, primarily due to the advancements in science, technology and local knowledge integration. An example of such being the impact of increased mobile telecommunications in improving the ability of farmers to communicate effectively with processors, distributors and others in the food supply chain. Following these advancements into the future, she suggested several contributors to further increases in food production, such as improved monitoring and transparency, global communication and product distribution, perennial crops and alternative non-competing livestock feeds. Wittenberg moved on to discuss the roles of individual food ethics, community environmental stewardship, and public-private partnerships

in assisting outcome-based public policy in providing for a rising global population.

Dr. Smil expanded on some of the themes touched on by Dr. Jayas and Dr. Wittenberg, arguing that the problem raised by a population of 9 billion people was not one of food production but rather one of reducing wastage while promoting equitable distribution and access. Smil explained further that the global food production is approximately 2800 kCal/person/day while most need only 2200-2300 kCal/day - indicating a surplus which is being consumed by wastage, overconsumption in developed nations, and unequal access due to economic, political and religious issues. Smil says that by the point of retail, approximately 40% of food has been squandered through wastage and that a global reduction to 20% wastage would yield enough food to feed the rising population.

The following discussion between the audience and panelists featured a wide variety of topics, touching on individual ethics and responsibility within the contexts of consumer food wastage, genetically modified food products and pesticide use. The environmental hurdles of climate change, shifting soil ecology and pollinator collapse were identified with mitigation methods such as alternative cropping systems, improved grassland utilization, and selective breeding. Ongoing social struggle in the form of political and religious wars were also identified as primary hurdles to be overcome. Despite the serious nature of the forum, the evening was not without its levity as Dr. Smil reminded the crowd to examine outcomes for assessing different practices and that "the 100 mile concept means you don't have food nine months of the year in Winnipeg!" The bitter cold weather on this January evening did little to slow the lively and informative dialogue. ☺

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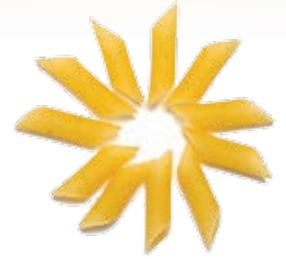
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Provincial Engineering and Geoscience Week



Engineering is more exciting than many think. It is truly all around us. When you drive across a bridge, fly a plane, use a computer or make a cell phone call, you experience the brilliant work of engineers. The results of their work can also be seen in satellites orbiting the Earth, on offshore oil rigs and in tall buildings rising from the world's metropolitan cities. Canadians can work more efficiently, play more safely and enjoy life more fully, thanks to engineers.

Engineers shape our future with forward thinking designs, new technologies and breakthrough developments that haven't been thought up yet. They prove, each and every day, that anything is possible.

Annually, Provincial Engineering and Geoscience Week (PEGW) is held in Manitoba as part of the larger National Engineering Month. During the month of March, the profession strives to reach out to young Canadians to let them know what an exciting and fun career choice engineering really is. It is an opportunity for youth to learn about many disciplines of engineering, and allow them to see where their skill set and interests are best fitted.

In Manitoba, PEGW has the following objectives:

- To promote engineering and geoscience as career choices

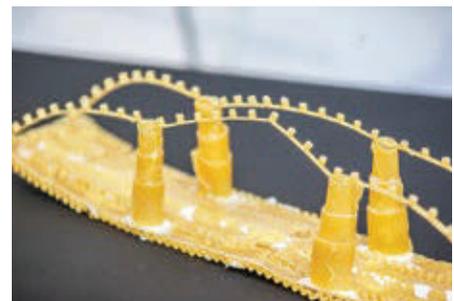


- To celebrate Manitoba's excellence in engineering and geoscience
- To draw attention to the vital role engineering and geoscience play in the daily lives of all Manitobans

In 2014, PEGW activities will take place at Kildonan Place Shopping Centre on Sunday March 9, and Saturday and Sunday, March 15-16: Children's Activities, Pasta Bridge Design Competition and the very popular Spaghetti Bridge Competition.

Spaghetti Bridge Competition

This competition is a vehicle for celebrating and reminding Canadians of the importance of engineering to their lives and as a career choice. It is open to all students, grade 1 - 12 with the goal to see whose bridge will support the heaviest load. In addition to the \$2000 in prize money up for grabs by the students, the Association has expanded the event to be a meaningful charity event for the whole community.





For every pound of weight the bridges hold before fracture, the Association will make a donation to Winnipeg Harvest. In 2013, student bridges held a total of 12,305 lbs. With a matching donation from Canada Safeway and Peak of the Market, a total donation of 36, 915 lbs of food was provided to Winnipeg Harvest.

Pasta Bridge Design Competition

If you find the constraints of the regular Spaghetti Bridge too limiting, you should try the Design Competition. The bridges are larger, and can be made of any kind of pasta. The Bridges are not tested until failure for strength, but are evaluated based on creativity and technical excellence.

Students in grades 1 - 12 can enter both contests and the Design Competition bridges may be dropped off as early as Saturday morning. Judging will take place on Sunday afternoon, March 16.

Children's Activities

Association volunteer will host a variety of engineering and geoscience related activities for children from 12:00 - 4:00 p.m. on both Sundays, March 9 and 16. Children and their parents will have the opportunity to learn how to:

- make floating concrete,



- build a structure of gum-drops,
- build and test the strength of a straw-bridge
- build and test a Balsa wood glider
- build and explore with Snap Circuits
- dig and explore in a mining sand pit

More information on all events can be found through the APEGM website: www.apegm.mb.ca/PEGW.html. Come out to Kildonan Place on March 9, 15 or 16 and help celebrate excellence in Engineering. Don't forget a tin for the bin! ⊕



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Task Group on Global Geoscience Professionalism



BRUSSELS – The Member Organizations of the International Union of Geological Science's new Task Group on Global Geoscience Professionalism (TG-GGP) are pleased to report on its recent progress and to announce the launch of its website at www.tg-ggp.org, as a service to geoscientists and the geoscience profession. The TG-GGP will continue to expand this website to add to its value to the profession, globally.

Geoscientists are relied upon to directly serve the public by providing expert services and opinions on which others rely for key decision-making. As a consequence geoscience is now a recognized profession as well as the scientific discipline it has always been.

Formed by the IUGS at the 34th International Geological Congress in Brisbane, Australia, in August 2012, the Task Group on Global Geoscience Professionalism ("TG-GGP") recognises this transformation and provides a single global forum for interchange on professional affairs in geoscience worldwide.

The Task Group has been set up by a group of national and international professional geoscience organisations from around the world, representatives of which have formed an executive committee.

- European Federation of Geologists
 - Geoscientists Canada
 - American Institute of Professional Geologists
 - Australian Institute of Geoscientists
 - Colegio de Geólogos de Bolivia
 - Geological Society of South Africa
 - South African Council for the Natural Scientific Professions
- The TG-GGP is keen to broaden its network to include other national and international professional geoscience organisations with an interest in participating, especially where new members would broaden its coverage beyond the countries and continents already represented. TG-GGP has already established collaborative links with a number of international organisations with interests relevant to the promotion, regulation and support of professionalism in geoscience (e.g. CRIRSCO, YES,). The involvement of other such organisations would be welcomed.

As a Task Group of the IUGS, TG-GGP offers benefits to society and serves the global geoscience community by facilitating collaboration on professionalism in geoscience at local, national, and international levels by facilitating a more 'joined up' geoscience community through:

- Offering a venue for knowledge transfer;
- Providing information on work permitting, registration and/or licensure requirements for geoscientists in different countries to assist those wishing to work in other jurisdictions;
- Linking geoscientists in all areas of professional practice and at all stages of their careers with sources for practical guidance and support on professional matters;
- Sponsoring symposia and technical sessions to allow exchange and dialogue on professionalism in Earth Science; and
- Acting as a resource to members of the IUGS, and others, of material and speakers to present to geoscientist groups – in particular young Earth scientists – around the world on professional practice matters.

"Geoscientists are relied upon to directly serve the public by providing expert services and opinions on which others rely for key decision-making."

In speaking about the new Task Group and recent accomplishments including the launch of this website, Ruth Allington, Chair of TG-GGP and immediate Past President of The European Federation of Geologists, remarked: "The collaboration that this new Task Group is already achieving is very exciting and timely indeed for geoscience. We aim to develop an agenda

for supporting the global geoscience community informed by addressing the following key questions:

1. Without understanding the skills and expertise needed by 'industry', how can educators in geoscience subjects prepare students for the workplace?
2. Without understanding societal needs, how can researchers design research which is truly relevant to those needs?
3. Without access to high quality graduates and excellent underpinning research, how can geoscientists in 'industry' deliver their expertise effectively?"

With 121 national members, the International Union of Geological Sciences(IUGS) (www.iugs.org) aims to promote development of the Earth sciences through the support of broad-based scientific studies relevant to the entire Earth system; to apply the results of these and other studies to

preserving Earth's natural environment, using all natural resources wisely and improving the prosperity of nations and the quality of human life; and to strengthen public awareness of geology and advance geological education in the widest sense. ⊕

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¹ Currently: Committee for Mineral Reserves International Reporting Standards, CRIRSCO (www.crirSCO.com); African Association of Women in Geosciences, AAWG (www.aawg.org); Young Earth Scientists Network, YES Network (www.networkyes.org); International Association for Promoting Geoethics, IAPG (www.iapg.geoethics.org); International Association for Geoethics, IAGETH (<http://www.icog.es/iageth/>)

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*Butterfly: Boloria selene; photographed at Westhawk Lake in Manitoba's Whiteshell.
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*Twister: Nature's power looms as clouds swirl in threat.
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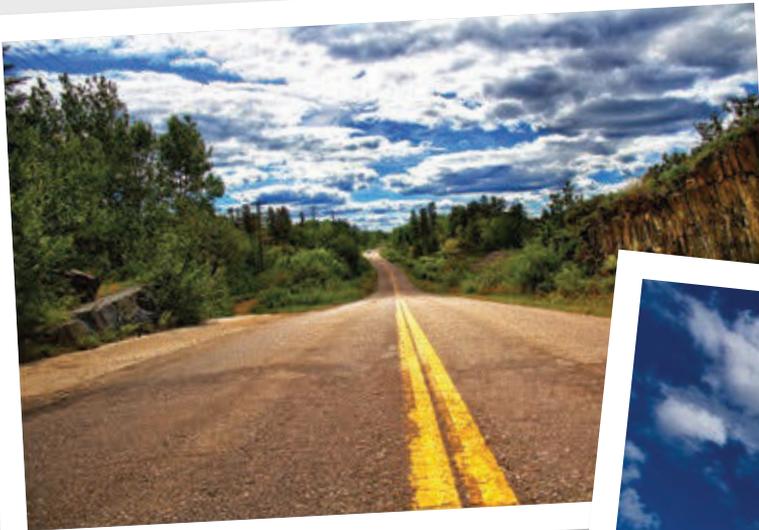
*Ocean Sunrise: Sunrises can be glorious and serene marking the potential of a new day.
E.Hancox, P.Eng.*



*Seagull at the Pool: Refreshed from a sip of fresh water, a seagull stretches to take flight.
E.Hancox, P.Eng.*



*Shadow: Firelight washes a shadow on a post.
E.Hancox, P.Eng.*



*Falcon Road: A back road glimpse of a path engineered through the Canadian Shield.
E.Hancox, P.Eng.*



*Kukulkan: The great Myan pyramid of Chitzen Iza located on the Yucatan Peninsula, Mexico; awe inspiring.
E.Hancox, P.Eng.*

Welcome New Members

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B. Al-Alousi	K.J. Forest	M.S. Layton	D.J. Niven	C.R. Renouf	R.D. Tamaki
A. Aligizakis	T.P. Forrest	R.D. Legaspi	D.B. Normand	S. Ridgway	H.Y. Tang
N.L. Arrison	P. Fronc	S. Levasseur	D.R. Normand	J.J.D. Ringash	T.N. Tatz
G. Beric	J.J. Furgal	A.Y.N. Lim	J. Novota	S.P. Rolland	D.A.R. Taylor
R.R. Blake	A. Garg	C.G. Lipscombe	S.T. O'Brien	Y. Rong	G.D.O. Templeton
M.C.S. Booy	P.L. Gauthier	Y. Liu	D.J. O'Connor	D. Rosoga	D. Tessier
E.G. Bran	F.J. Gemme	P.H. Livingston	A.J. O'Donnell	I.L. Rowbotham	A.K. Thykadavil
R.W. Breivik	R.J. Gillis	J.C. Lopez	M.D. O'Sullivan	B. Safari	D.A. Tingley
D.C. Buchanan	B.A. Gmiterek	Y. Lu	M.E.S. Oberez	B. Sagan	E.D. Tonsaker
K.S. Burcar	L.D. Gordon	J.S. Lueke	N.D. Overell	M. Samiee	B. Torkan
E.R. Burton	M.D. Habib	R.A. Mackie	W.L. Page	R.M. Sanders	J. Vico
A. Byagowi	R.A. Hrycak	H.J. Malik	P.R. Patel	R.D.R. Santos	M.J.F. Vieira
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G. Cauden	A.S. Johnson	M.R.S. Manug	S. Pavlovic	T.L.A. Schmalenberg	C.M. Vitt
A. Chan	J. Ju	S.L.P. Marleau	D.P. Pereira	C.F. Seeley	M.J. Wade
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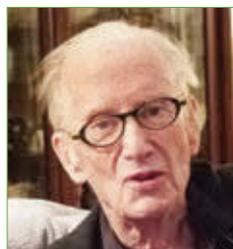
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Member News



William Gordon McKay passed away peacefully on Tuesday, December 17, 2013 at Victoria General Hospital in Winnipeg, Manitoba.

Born in Regina on December 10, 1917, Bill grew up in Portage la Prairie, attending Portage Collegiate Institute. He received a degree in Civil Engineering from Queen's University in 1940. Bill's father, Gordon Finlay McKay, was a traveling fruit and vegetable salesman with the Portage Fruit and Vegetable Company. His mother, Kate McKay (nee Garnier), was one of first graduates of the Victoria Order of Nurses.



From 1945 until 1982 Bill was a partner with Underwood MacLellan & Associates, which later became the UMA group & Spantec. During his career, Bill served as UMA's General Manager and later President, in Saskatoon and later Winnipeg.

During his career, Bill was an active member of the Engineering Institute of Canada and held the Presidency of the Institute in 1969 and 1970. He also served as President for many organizations, including the original Canadian Section of American Water Works Association, the Association of Professional Engineers of Saskatchewan, the Western Canada Water and Sewage Conference, the Association of Consulting Engineers of Manitoba and the Association of the Scientific, Engineering and Technological Community (SCITEC). Bill was the recipient of the Lindsten Award, the Fuller Award and the Bedell Award. He was also a member of the Professional Engineers of Saskatchewan, the Engineering Institute of Canada, and the Federation of the Associations on the Canadian Environment (FACE). In addition, Bill served as Executive Director of the Association of Consulting Engineers of Canada and as director and secretary of many other national, provincial and local organizations and committees.

For full obituary please see the Winnipeg Free Press online or to read the memoir Bill wrote by the request of the Engineering Institute of Canada, which details his career as a pioneer of Engineering in Western Canada <http://www.eic-ici.ca/hawp11.pdf>.

NOTICE TO MEMBERS

Nominations for Election to the APEGM Council

The Nominating Committee of APEGM requests recommendations from members and members-in-training, for nominees who 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 4 professional engineer positions, and 1 professional geoscientist position to be filled as of October 2014. Only professional members shall be eligible to nominate, vote, or be elected to the Council.

The Committee will consider recommendations for all positions received by the secretary up to the close of business on Friday, September 12, 2014. 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 2014 election by the completion of the prescribed nomination form. Nomination and resume forms may be downloaded 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.

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Heritage Wiki

Have you had a look at the APEGM Heritage Wiki web site? There are a few interesting articles at the site but we need more. Tell us your stories – highlight interesting engineering and geoscience work in Manitoba – in the past and ongoing. Tell us about your company. Today’s work is tomorrow’s heritage.

Are you unfamiliar with a wiki? A wiki site is just a web site which makes it easy to submit new material and to modify existing material. There are instructions on the site and help is just a click away with an email to heritage@apegm.mb.ca.

Are you concerned about having to learn all about wikis to be able to submit an article? Don’t worry. If you have some material in a text file or Word file, we will do the rest of the work. Just send it to heritage@apegm.mb.ca and include some contact information in your email, so that we can follow-up with you. We can even use printed or written material – just send it to us at the APEGM office.

Lastly, are you concerned with Continuing Professional Development (CPD) hours? Contributions to the Heritage Committee site count for CPD hours under APEGM code item 4.2.6 enabling “contributions to knowledge.”

We expect our wiki site to be a great resource for our members and the general public – help us get there by contributing your knowledge. It’s painless, and you will be noticed.

QE Diamond Jubilee Medal

Congratulations to all APEGM members who received the Queen Elizabeth II Diamond Jubilee Medal, which was created in 2012 to commemorate the 60th anniversary of the ascension of Her Majesty Queen Elizabeth II to the throne. The medal was awarded by the Governor-General of Canada to those who have made outstanding and exemplary contributions to their communities or to Canada as a whole. The Association was made known of the following members:

- R.L. Barry, P.Eng.
- L.A. Bateman, OM, P.Eng., FEC
- G.M. Bazin, P.Eng.
- F.L.J. Berard, P.Eng.
- N.B. Bhatt, EIT
- J.A. Blatz, P.Eng., FEC
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- B.N. Brown, P.Eng.
- B.K. Chorney, P.Eng.
- T.J. Cornell, P.Eng., FEC
- J.R.C. Doering, P.Eng., FEC
- O. Hawaleshka, P.Eng.
- F.C. Hawthorne, P.Geo.
- D.S. Jayas, P.Eng., FEC
- M. Klassen, P.Eng.
- B. Lee, P.Eng.
- L.R. McGinnis, P.Eng.
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PASKO NG FMC The Filipino Members Chapter-APEGM Christmas Party

By Ramon Buenaventura, EIT and May Jonson, EIT

Winnipeg, Manitoba – The Filipino Members Chapter of the Association of Professional Engineers and Geoscientists of the Province of Manitoba (FMC-APEGM) held its 2013 Christmas Party and Fundraising Event on December 28, 2013 at the Victoria Inn Hotel and Convention Centre. It was aptly themed – “Filipiniana”, and most members came in their best “Barong Tagalog” and “Baro at Saya” attire.

The FMC-APEGM is the first chapter of APEGM created with members from a specific ethnic group. The Chapter represents the interests of Filipino-Canadian members of the Association. The Chapter presently have 48 full members composed of Professional Engineers (P.Eng.), Professional Geoscientist (P.Geo.) and Members-in-Training (E.I.T.). It also has 49 student members composed of students and individuals in various stages of their engineering credential recognition with APEGM, and 44 lay associates.



APEGM Executive Director Grant Koropatnick, P.Eng.



Chapter President Edwin Sapnu, P.Eng.

Normally, the Chapter holds its Christmas Party as one avenue to provide opportunity for its members to meet, network and socialize. This year, with the unfortunate crisis that typhoon Yolanda brought to Central Philippines, the Chapter decided to make its Christmas Party a fundraising event to also fulfill its objective of undertaking projects for the community.

Fundraising activities included silent auctions, 50/50 Draw, donations and sponsorships. Sponsors and donors of the event include Roman Nepomuceno, P.Eng., Ramon Cairo, P.Eng., Ramila B Sapnu CGA, Blue Lake Construction, Sarbit Insurance and Travel Agency, West Alexander Travel, Genesis Tuazon of Pinnacle Wealth Brokers, JOCRI Windows and Doors, C & K Music and Edwin and Luningning Yazon. Funds generated by the event will be donated to a Chapter-chosen Canadian charity to help the typhoon victims in the Philippines.



Filipino Chapter Members

Our concern for the environment



is more than just talk

As we continue to deliver valuable information through the pages of this magazine, in a printed format that is appealing, reader-friendly and not lost in the proliferation of electronic messages that are bombarding our senses, we are also well aware of the need to be respectful of our environment. That is why we are committed to publishing the magazine in the most environmentally-friendly process possible. Here is what we mean:

- We use lighter publication stock that consists of recycled paper. This paper has been certified to meet the environmental and social standards of the Forest Stewardship Council® (FSC®) and comes from responsibly managed forests, and verified recycled sources making this a RENEWABLE and SUSTAINABLE resource.
- Our computer-to-plate technology reduces the amount of chemistry required to create plates for the printing process. The resulting chemistry is neutralized to the extent that it can be safely discharged to the drain.
- We use vegetable oil-based inks to print the magazine. This means that we are not using resource-depleting petroleum-based ink products and that the subsequent recycling of the paper in this magazine is much more environment friendly.
- During the printing process, we use a solvent recycling system that separates the water from the recovered solvents and leaves only about 5% residue. This results in reduced solvent usage, handling and hazardous hauling.
- We ensure that an efficient recycling program is used for all printing plates and all waste paper.
- Within the pages of each issue, we actively encourage our readers to REUSE and RECYCLE.
- In order to reduce our carbon footprint on the planet, we utilize a carbon offset program in conjunction with any air travel we undertake related to our publishing responsibilities for the magazine.

So enjoy this magazine...and KEEP THINKING GREEN.

When Do Piles Matter?

Recently, during my role as staff support to the Investigation Committee, I was introduced to two things that had me scratching my head. One of the fascinating things about ethics is that the 'moral' choice is not always a clear one. This is particularly true in gray areas where there is not necessarily a defined, morally 'right' decision. Ambiguity is even more fascinating to me when the topic is mostly technical in nature.

The first question, a technically related element, was in the realm of residential foundation design. In this scenario, an engineer was engaged by a contractor to seal the structural elements of a preserved wood basement. The engineer had initially designed a spread footing to support the wood basement walls. However, the contractor requested a change.

For this project, the contractor requested that the engineer include 10-foot piles under the footings. The engineer attempted to convince the contractor that piles were unnecessary for this application and, more importantly, a 10-foot pile would not provide significant support. The contractor insisted, however, and the engineer decided to add them to the original design.

“One of the fascinating things about ethics is that the ‘moral’ choice is not always a clear one.”

The engineer expressed to the Investigation Committee representatives that, since the piles were relatively short, they would do little in the way of supporting the structure, and so their contribution was ignored. I was reminded of a story that was told by one of my undergrad structural professors. In that story from ancient Greece, columns were



stored on their side prior to installation at a temple. Usually, the columns were supported at each end, resulting in a simple beam loading. At one point though, it is told that someone decided that three supports must be better than two and so a third support was introduced. However, when one of the end supports subsided, the column was now loaded as a cantilever instead of a simple beam and failed under the stress. A web search for this story proved fruitless. Can anyone confirm this story, or a modified version of it?

If I remember the story right, the lesson to be learned was that assuming additional elements will only ever reduce the structural stresses of a system could lead to unintended failures. In the design of a spread footing with piles underneath it, I am left wondering how high the stresses might be at the transition across the top of the pile when differential movement occurs. Is there anyone out there that has modeled this in the past?

The second question, one that is ethical in nature, followed from this discussion. The question centered on the motivation of the contractor's request. As described

by the design engineer, it was assumed that the contractor insisted on these 10-foot piles strictly so that he could advertise that the residences were built on piles. The engineer's assumption was confirmed when he saw billboards describing the units as such.

So, we have a scenario where the engineer is aware of the contractor's motivation; to install piles in order to benefit from the marketing planned around these elements. Further, we have an engineer who was convinced that these short columnar concrete elements would not contribute to the foundation. Therefore, the engineer was faced with the decision to seal drawings that included 'faux' piles, knowing that the contractor would advertise the homes as 'piled' buildings when, in fact, they were not.

We do not have a canon in our *Code of Ethics* that specifically describes this scenario, but does it seem unethical to any of you? I am aware that I have presented this scenario in a biased fashion, but I have done so partly to motivate those of the opposing view to chime in.

As always, please send comments to me at: mgregoire@apegm.mb.ca. ☺

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