

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

# THE KEYSTONE PROFESSIONAL

SUMMER 2014

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Practices and Innovative Solutions for Design, Construction, Maintaining, Upgrading and of Instrumentation Dams and Dikes	05-1118-2297	Winnipeg, MB	November 12-14	21
Design of Sanitary Sewer and Storm Water Drainage Systems - Workshop	05-1119-2297	Winnipeg, MB	November 24-27	28
<b>ELECTRICAL</b>				
Grounding and Bonding of Electrical Systems	04-1027-2280	Regina, SK	July 22-23	14
<b>ENVIRONMENTAL</b>				
Environmental Site Assessment and Remediation	05-0803-2291	Regina, SK	August 11-12	14
Risk Assessment of Contaminated Sites	05-1021-2297	Regina, SK	October 6-8	21
<b>CONSTRUCTION</b>				
Successful Construction Project to Administration - From Start Completion	05-0912-2297	Regina, SK	September 24-26	21
Avoiding Construction Claims by Improving the Drawings, Quality of Specifications and Bidding Documents Prepared by Owners and Consultants	05-1023-2297	Winnipeg, MB	October 15-17	21
<b>MECHANICAL</b>				
Fundamentals, Sizing, Selection, and Operation of HVAC Systems	05-0509-2291	Winnipeg, MB	August 12-14	21
Practical Understanding of In-Plant Cranes and Lifting Equipment	05-0913-2297	Winnipeg, MB	September 18-19	14
Pumps: Selection, Operation and Maintenance	05-1022-2297	Winnipeg, MB	October 14-16	21
A Practical Understanding of Industrial Piping and Associated Equipment	05-1205-2297	Regina, SK	December 3-5	21
<b>WEBINARS (All times are in EST)</b>		<b>TIME</b>		
Electrical Engineering Fundamentals for Non-Electrical Engineers	0701-WEB14	12:00 - 2:00 pm	July 8-11	8
How to Plan Your Projects More Effectively	0702-WEB14	12:30 - 2:00 pm	July 14-15	3
Impact & Control of RFIs in Construction	0703-WEB14	12:30 - 2:00 pm	July 23	1.5
Time Management	0801-WEB14	12:30 - 2:00 pm	August 13	1.5
Schedule Delay Analysis – choosing a Method	0902-WEB14	12:30 - 2:00 pm	September 24	1.5



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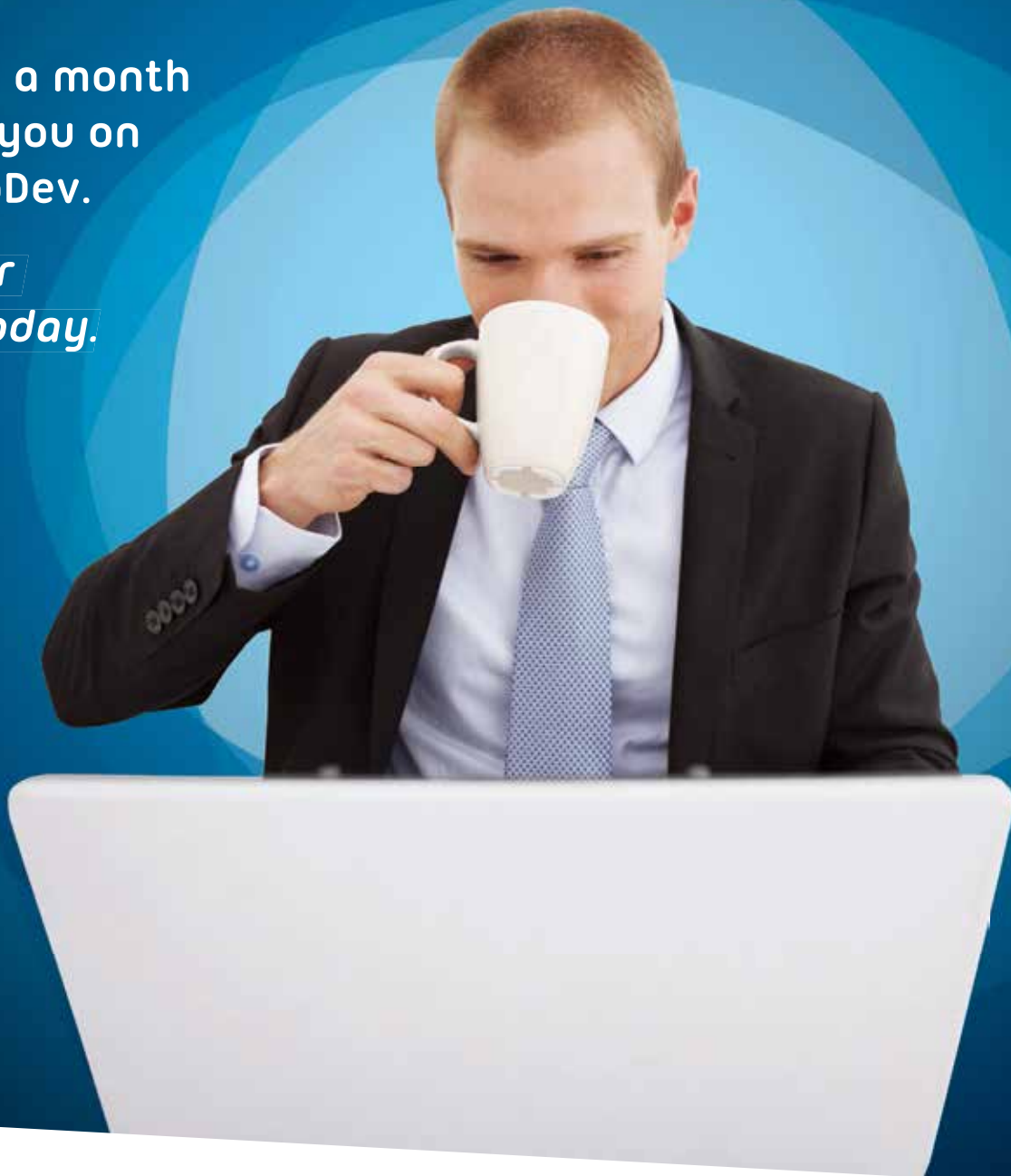
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# THE KEYSTONE PROFESSIONAL

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



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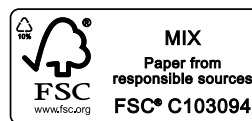


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## Doing Good Engineering vs. Doing Engineering Well

**Hacking Health**<sup>1</sup> is a collaborative effort to see how IT can help solve long-standing issues in healthcare. It brings together medical professionals, software developers, investors, and entrepreneurs in clinics, 'hackathons', and pitch nights across Canada. Joe Cafazzo, P.Eng. of the Centre for Global eHealth Innovation in Toronto opened a recent Hacking Health event with a brief welcome in which he said, "As an engineering professor, I get frustrated with seeing people walk right by the hospital and go to some start-up that's doing another photo-sharing app."<sup>2</sup>

full range of our expertise is not recognized by the public, and that we are not actively sought out on issues of public concern where we have lots to offer. Whether it is as local as the Sherbrooke pool structural rehabilitation or as distant as the Fukushima nuclear crisis, we perceive that our professions are seen primarily in technical terms, as responders after the fact, or as back-room implementers of the decisions that others make.

Yet, we know that many projects managed and executed by our professions represent among the largest

Public perception and government relations share a lot of common objectives. When thinking about the public's perception of our professions, a priority is to build an image of engineering and geoscience as vibrant, diverse, rewarding, ethical, and equitable career domains. In order to not be 'invisible in plain sight', we want to support the visibility of the professions and its practitioners to the general public, or in another's words, "to show that engineering is much more than, and much more interesting than, the straightforward application of sciences to technological design."<sup>3</sup>

"We know that many projects managed and executed by our professions represent among the largest budget expenditures made by levels of government on behalf of the general public."

I wondered what he meant. That engineers' talent is being wasted? That engineers are making irresponsible choices in how we use our skills? That photo-sharing is ridiculous? Perhaps he was saying that in society, we have serious problems that need solving and for which engineers' expertise is needed and desired.

My experience with engineers and geoscientists is that we are indeed innovative and socially engaged, practical and results-oriented. However, we do seem to complain that we are 'invisible in plain sight.' We know that engineers and geoscientists enjoy a consistently high level of public trust, but we perceive that we are not necessarily seen as leaders in society, and that we are not necessarily seen as holding broad perspectives on issues in the public sphere that would readily engage non-technical stakeholders. I've heard engineers and geoscientists muse that the

budget expenditures made by levels of government on behalf of the general public, and engineers and geoscientists can and do offer leadership in complex, multi-faceted domains that require social, economic, historical, legal, and environmental considerations.

In the last issue of this magazine, I wrote about one of the three strategic priorities that the APEGM Council has identified and affirmed. The three priorities areas are:

- \* Recruitment and Retention: How do we recruit and retain our engineers and geoscientists to studies and in practice, and do so in a way that reflects the diversity of broader society?
- \* Public Perception: How do we broaden and enhance the public image of engineers and geoscientists?
- \* Government Relations: How do we broaden and enhance our relationship with all levels of government?

In government relations, a priority is to similarly build awareness with government of the range of expertise inherent in the engineering and geoscience professions and in our members, and to build a role for the professions as trusted advisors to government on a wide range of issues in the public sphere. In this, we wish to promote the reliability of engineering and geoscience expertise in ways that are non-partisan, easily-understood, prudent, and future-oriented.

The APEGM Council has considered many potential actions that it can initiate and support to advance these priorities in Public Perception and Government Relations, including ensuring coordination between the efforts of APEGM's various committees, supporting and partnering with initiatives led by external groups (e.g. ACEC-MB, CTTAM, MAA, etc.), developing new communication initiatives and events



that engage the government and the public directly, and paying careful attention to the opportunities of new and social media. Inherent in the discussion is how we can engage not only the APEGM Council, but the other committees and volunteers of the Association, and indeed the membership at large in taking some time to think about the contributions that all of us can make in this big picture.

When you dig deeply - really deeply - below the surface of these objectives and the proposed actions related to Public Perception and Government Relations,

perhaps we are talking about the difference between “doing engineering well” and “doing good engineering.” These are two different but complementary ways of looking at professional practice.

‘Doing engineering well’ emphasizes technical competence without explicit or deliberate consideration of whether projects in which we are involved are really good projects. The ethical guidance for engineers and geoscientists is assumed to come from the public and not from within the engineering and geoscience professions. The public (or the public

represented by government) decides whether the project is worthwhile. In matters of public interest – be it infrastructure choices, energy options, environmental strategies, or other domains – the decisions come from the outside. Engineers and geoscientists receive these mandates, bid on work, and carry them out according to best technical, economic, environmental, and social principles.

‘Doing good engineering’ places an emphasis on ethical consciousness and ethical consideration within the engineering and geoscience professions. We take a leading role, deciding with a community voice on where and how to apply one’s technical expertise. The emphasis is on responsible conduct to all stakeholders. In the big picture, climate shifts, extreme poverty, a world going to 9B people in our lifetime, and other factors present us with the challenges of clean water, energy sustainability, sustainable food production and distribution, sustainable housing and transportation, and much more. These are not issues that can be solved only through technical input. They all require deep social, legal, economic, and historical consideration and action. Yet, they are all issues that require technical intervention by engineers and geoscientists who are seen as trusted professionals.

‘Doing engineering well’ and ‘doing good engineering’ are both solid, commendable objectives. One person told me that ideally, we want to be ‘doing good engineering well’, and in doing so, the public and governments will start to notice. As professional engineers and geoscientists, our life’s work makes life work better! ⊕

<sup>1</sup> [www.hackinghealth.ca](http://www.hackinghealth.ca)

<sup>2</sup> CBC Radio, White Coat Black Art, Episode: The Guru and the Hackers, Dec. 7, 2013, available on podcast.

<sup>3</sup> Downey, G.L., 2014, “Forward”, in Engineering Practice in a Global Context, edited by B. Williams, J. Figuerido, and J. Trevelyan. Leiden, The Netherlands: CRC Press.

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Design Project

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PGEO MANITOBA

Engineers are good at design. It takes an intuitive mind, keen eye and steady pencil to make a good design. Forgive me for not using AutoCAD, but I like using a pencil and paper when I start one of my "wild-eyed designs." In my leisure time, I've designed various projects over the years from small widgets, wood sculptures to full-blown home layouts. I know one engineer who has a plasma cutter and 3D printer in his garage work shop. With the right equipment, you can design and build just about anything.

Sometimes good designs are born out of pure imagination; those ideas that come late at night when you're relaxed, with your feet on the coffee table, and holding a glass of something special. Has that ever happened to you? Other times, good designs come from a basic idea followed by hours of rigorous testing, ongoing refinement and re-engineering until its done. Not everyone has the same interests or capacity for creative design. It requires a strong sense of intuition; that ability to visualize something before it exists in reality. Some engineers are good at this while others are better at optimizing an existing design. Focusing on a crazy thought and following it through to the finished product or concept takes energy, interest, and creative intuition.

Artists and Engineers

Do you remember the old jokes about "artsies" and engineers? Fine Arts students were often ridiculed by engineering students because of a perceived simplicity and lack of rigor of a BFA degree compared to engineering. The two groups sometimes exchanged insults leading to nasty pranks. This is not fair; because the two are actually closely aligned when you consider the thought processes required for creative design. I believe artists and engineers share many similar qualities and in particular the common attribute of creative intuition.

A few issues back I talked about a new name for the Association - **Engineers Geoscientists Manitoba**. These three simple words describe us, but what about

a logo? According to the Oxford Dictionary a logo is "a symbol or other small design adopted by an organization to identify itself." I don't know about you, but I think our most visible symbol for engineering is the iron ring (and similarly the earth ring for geoscience). However, the Association cannot use this symbol because it is the property of the Corporation of the Seven Wardens Inc. (the legal entity overseeing the iron ring ceremony properly known as "The Ritual of the Calling of an Engineer"). Another equally visible symbol of engineering is the legal designation P-E-N-G. PENG and PGEO are both legally conferred on members by the council of the Association. It is our right as an Association to use these designations as our own distinct logo.

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**Word Puzzles**

Do you like word puzzles? How about Scrabble, Boggle or other word games? Have you tried the big holiday cross-word puzzle in The Globe & Mail? Yes? Well, if you like words and consider yourself a

creative type, then I'd like to get your help with a design project. Can you design a graphic using only the letters P, E, N and G? Or P, G, E and O? I want the designations PENG and PGEO to become highly recognizable symbols in the eyes of the

citizens of Manitoba, so it makes sense to use them visibly in a graphic.

**Send Me Your Logo**

Send me your logo design. I welcome your "wild-eyed" ideas. Perhaps simplicity is the best approach. See the letters PENG and PGEO arranged inside a simple border of our province shown above. That could work, no? Consider adding some colour too. Get your creative intuition fired-up and send me your logo design right away.

Oh and one more thing, remember our slogan: "My Life's Work, Makes Life Work Better." As always, your feedback is invited and welcomed. If you have any thoughts on anything you read in the KP, please send me an email [gkoropatnick@apegm.mb.ca](mailto:gkoropatnick@apegm.mb.ca). ☎

“ I believe artists and engineers share many similar qualities and in particular the common attribute of creative intuition. ”



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M.G.(Ron)  
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## Life in the Corporate World.

**H**istorically professions were established to recognize those persons who, by virtue of their education, training, and knowledge were uniquely qualified to contribute to society. As professions emerged, practitioners were granted the privilege and the responsibility of regulating their specific professions. A part of the regulation process was the imposition of a code of conduct; in which members were expected to comply. An integral part of that code of conduct required the professional to accept responsibility for the work that was done. Legislation under which professions operate today is, for the most part, a reflection of those original concepts. This historical concept with its focus on individual practitioners is still workable for those who deal directly with clients. It even works for privately owned companies because the owners and managers are usually responsible for the operation of the company. However, publicly traded corporations are owned shareholders who invest in order to make a profit and are operated by employees who are responsible to the shareholders.

Corporations, whether public or private, are, by legal definition, “pseudo persons.” Therefore, from a legal perspective, they “speak” with a corporate, not an individual, voice. This is just a technicality for a private corporation where the owner is also the operator, but it is not that simple for the publicly traded (or publicly held) corporations that account for the majority of businesses in today’s commercial world. The prime purpose of the publicly traded corporation, from the shareholder’s perspective, is to focus on the “profitability” and the “return on investment.” Technical/professional capabilities required to manage and operate the corporations are, for the most part, provided by

employees, few of whom are major shareholders. If those employees are licensed professionals, they have the same professional responsibilities as all others in that specific profession. However, in their case the “client” is the corporation, not the customers of the corporation.

In spite of their “pseudo person” legal status, corporations do not make decisions, individuals, and/or groups of individuals do. Within the corporate structure, individuals, including engineers, have input to decisions but do not normally have veto powers. Given that the corporation does not have the constraints of a licensed professional, the ultimate corporate decisions will probably be more driven by profit potential than the “contribution to society” that was/is the intended role of “professionals.” The real question is, can/do individuals hide behind the veil of corporations when it comes to accepting responsibility for decisions? More specifically, can/do engineers hide behind the corporate veil when decisions that clearly violate their professional responsibilities are advanced as corporate policy or corporate products?

In a recent United States Senate hearing relating to unsafe design by General Motors, the CEO of that corporation was

chastised, and the corporation fined, for “knowingly” specifying a faulty part in the ignition system of some of their cars. As a result, General Motors has issued a “recall” in which it will replace the part in question. So the “pseudo person” that is General Motors has accepted responsibility for, and borne the cost of, their “unsafe” design. But, the corporation has also suspended two engineers who were involved with the original design. Does that mean, from the corporation’s perspective, that those engineers “. . . knew, or ought to have known . . .” that the part was faulty and taken steps to stop its use?

As this “story” has unfolded, it turns out that the faulty part had been used since 2001.

Subsequently it was determined that there had been two options examined by “Engineering” during the early design stage. The part that was chosen by the corporation was not the part that was recommended by “Engineering.” It was, however, the lower cost option.

It is highly unlikely that all the “facts” will ever become public information. It does seem, however, that within the corporation, engineers are being blamed, even though their recommendation was not

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accepted. Given that engineers in most manufacturing companies in the United States (and in Ontario) operate under the "industrial exemption", it is highly unlikely that they were/are registered professional engineers. They do not, therefore, have responsibilities to the public that are imposed through licensure. They were/are, in a sense, hiding "behind the corporate veil" from a professional perspective. One can argue that this means their responsibility was/is to the company.

"Can a registered professional engineer meet the demands of both a professional licensing body and a corporation's board of directors?"

In the world of licensed engineers, when the Association receives a complaint relating to the competence of a member, it is reviewed by the Investigation Committee to determine if it has merit. If a charge is recommended, the usual introduction to that charge states that the defendant "... knew or ought to have known ...". This is a charge against an individual based on something he or she did. As in the historic origins of the concept of professionalism, this is a personal thing.

But is it fair to say that things are different "behind the corporate veil" and under the "industrial exemption"? Maybe the real difference is that engineers working in this environment as seen to be "responsible" even if their advice was ignored. In that world the corporation is both the "client" and the "investigation committee". One cannot help but wonder if this type of "investigation", at least in the General Motors case we have been considering, is driven by a need to lay blame, not find fault.

And that, in turn, opens the question - can a registered professional engineer meet the demands of both a professional licensing body and a corporation's board of directors? Like most philosophical questions, it would seem that the response to this question is to ask more questions. ☺



# Building a Better Car



*On display at Ingenium 2013, the URBEE encapsulates the potential for design, ingenuity and engineering to address the world's most pressing problems.*

According to the US Environmental Protection Agency, about a third of carbon emissions are currently the result of transportation. If the common car continues to be the fossil fuel-burning type it is today, that number is only going to rise as worldwide demand for the automobile increases from 1 billion users to a projected 2.5 billion by 2050. Meanwhile, slow adoption of electric and hybrid cars is proving that they are unlikely to be the solution.

Enter the URBEE (Urban electric with ethanol as backup), a two-seat, three-wheeled, aerodynamic, hybrid vehicle built around a 7 hp engine. The Urbee 1 is capable of achieving 1.18 litres/100km (200 miles/US gallon), while the goal for the URBEE 2, on the highway, is 0.81 litres/100km (290 miles/US gallon).

"We came to the conclusion that cars which store their energy only in batteries are severely limited in their range," says Jim Kor, President of the company that created the Urbee 1 prototype, "and cars that burn liquid fuel to create electricity to run electric motors are not as efficient as they should be, even with regenerative braking." In response, KOR EcoLogic Inc. is developing a 'series-parallel hybrid drive' to maximize energy efficiency both in the city and on the highway, while ensuring a reasonable range.

The URBEE project began in Winnipeg in 1996 with a sketch on a napkin at a café on Portage Avenue, across from the Assiniboine Park footbridge. Most of the designers and engineers who have donated their time and resources to the project have known one another for more than 30 years. With a background in production

# Building a Better Car

design of farm equipment and buses, they have lived and worked in Winnipeg all their lives.

From the beginning, the focus of the design and engineering team has been to create a vehicle that uses the least energy for movement while being practical, safe and roadworthy. "We only had one rule," explains Kor, "If it takes a lot of energy, you cannot have it on the car. This approach made us rethink the automobile from a very fundamental level."

Using their understanding of physics and thermodynamics, members of the team determined that the key was to reduce platform power, i.e., the power needed to push the car through the air, on existing roads, within existing traffic conditions, during typical daily trips. This involved designing the car to be as aerodynamic as possible, reducing the frontal area of the vehicle, reducing the rolling resistance of the tires and making the vehicle as light as feasible, without compromising safety.

The team conducted independent aerodynamic simulations by CD-Adapco and Autodesk. The result was a Coefficient of Drag (Cd) of 0.15. "We also simulated trip scenarios and energy used," adds Kor, adding that the team used its own computer program designed by team member and professional mechanical engineer, Andrew Warren. "We also did initial crash testing simulation, with the assistance of Roush in Detroit."

Once team members had determined the lowest possible platform power needed for the URBEE, they turned their attention to the power train. "Our emphasis in the power train was to minimize energy losses along the energy path or paths, from the energy storage device to the powered wheels," explains Kor. "Moving energy around inside the power train is like carrying a bucket full of water, with holes in the bottom of the bucket. Water is continually leaking out, and you never deliver the water you started with."

He adds that because renewable energy can be thought of as roughly 100 times less potent than fossil fuel energy, managing these losses is key. The first step to minimizing loss was to analyze typical car trips taken by automobiles. The team concluded that for short city trips that involve many decelerations,

stops and accelerations, the most energy efficient power train is a purely electric one. URBEES have electric motors powered by a combination of batteries and ultracapacitors, electrically connected in parallel. From a depleted state, the on-board storage battery is completely charged by plugging the car into a standard wall outlet (110 Volt, 15 Amp) for six hours. "Some electric cars now available for sale do not plug into an ordinary wall outlet and, if they do, it takes them a very long time to charge their batteries from a fully depleted state," notes Kor.

The URBEE's electric motors provide the initial acceleration for the vehicle while an IC engine extends the range of travel. For highway trips, which typically involve steady speeds of approximately 100 km per hour, the most energy efficient power train is the internal combustion engine (IC) powered by liquid fuel – ideally, pure ethanol. However, because the ratio of energy needed for acceleration compared to that needed for cruising is 10:1, this hybrid arrangement requires a dramatically smaller IC engine (10 times smaller than in a traditional automobile).

Designing the IC engine to charge the on-board batteries, although energy inefficient, significantly extends the car's range at city speeds, and eliminates range anxiety. Kor cautions, however, that this mode should be reserved for emergencies, so that energy is not wasted needlessly. Energy captured from regenerative braking and utilized for acceleration is largely handled by the ultracapacitors, which extends the life of the batteries.

Once the team had completed the design of the power train and the platform, it was time to produce a prototype. Explains Kor: "We decided to 3-D print the body because, as our URBEE research and development program progressed, we already had the design in the computer – in CAD – and it seemed technically possible to 'rapid prototype' panels this big."

Thanks to the latest Autodesk software (Inventor Pro, Alias and Showcase), KOR EcoLogic had the Urbee 1 body in its computers. In 2011, the company partnered with 3D printing manufacturer RedEye and its parent company Stratasys, both in Minneapolis, to manufacture a prototype of the Urbee 1 body.



'Rapid prototyping' had the advantage of being not only faster but also more accurate than using fiberglass, which required tooling and lengthy manual work. The Fused Deposition Model (FDM) method of 3D printing starts with a continuous roll of plastic, about the diameter of a strand of spaghetti. The roll is then fed into the 3D printer that extrudes a plastic string the width of a human hair.

"Think of this process as a very sophisticated computer-controlled glue gun that creates the part, layer by layer, from the bottom to the top," explains Kor. "Amazing detail can be built into the 3D printed part, along with amazing accuracy."

The process involved first creating a 1/6th scale model in the same 20 separate panels and window templates that would be used for the real car body. Once it was confirmed that all the pieces of the model fit perfectly, the files were scaled up to actual size. The team at KOR EcoLogic then mounted the full-size body panels onto the Urbee 1 prototype chassis and used the solid plastic 3D printed window panels as templates for making the glass and plastic windows.

Kor now believes that 3D-printers could be used to make production parts, not just prototypes. The KOR EcoLogic team has embraced the idea of 'Additive Manufacturing' and wants to

demonstrate this technology within URBEE 2, where the plan is to have more than 60% of the car manufactured in this way.

"Additive Manufacturing shows enormous promise in its ability to make lighter and stronger parts," says Kor. "This process is so flexible, that the designer is liberated to put the molecules of material only where they are needed. In the long run, we see Additive Manufacturing as a viable and potentially economic way to mass produce many components within a car such as URBEE."

With URBEE 2, KOR EcoLogic will not only be bringing the weight of the car body down from its current 725 kg (1600 lbs), but also making changes to the drivetrain. The Urbee 1 featured a single cylinder engine with overhead valves – originally a 5hp lawnmower motor and later a 7hp engine. The likely engine for the URBEE 2 will be a modified Hatz Diesel.

Whatever engine the team ultimately decides to use, it must be able to run on pure ethanol. KOR EcoLogic has always been committed to creating a car that runs solely on renewable energy. As such, the team has also designed a 'solar garage' as an alternative to charging the battery by plugging the car into a standard wall outlet connected to the electrical grid. Small panels on the garage roof would generate enough electricity to run the URBEE up to 50 km per day.





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# Building a Better Car

**“We need to learn to use less energy and design a better tomorrow.”**

“Our goal was and remains to design the greenest practical car in the world,” says Kor, adding that the URBEE also needs to have universal appeal in order to find a global market. In 2015, he plans to demonstrate one of the car’s great strengths – its superior energy efficiency and range – by driving the URBEE 2 from New York to San Francisco on one tank of fuel.

Kor EcoLogic is seeking \$3,000,000 in financial support in order to design, build and test URBEE 2 over the next two years. Attracting attention to the vehicle and getting people thinking about an alternative to the traditional gasoline-guzzling car is an important part of the trip across the US. “We cannot continue increasing our use of energy as we have in the past 300 years,” says Kor. “As an emerging, technologically advanced, global civilization, we need to be aware that we are indeed doing irreversible harm. We need to learn to use less energy and design a better tomorrow.” At KOR EcoLogic, that work has already begun.

To learn more about this project, visit [www.URBEE.net](http://www.URBEE.net) or contact Team Leader Jim Kor at [jimkor@urbee.net](mailto:jimkor@urbee.net). To review the global attention this project is receiving, Google ‘URBEE’. [+](#)



**www.URBEE.net**



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Brandon — July 10, 2014

Winkler and Morden — July 17, 2014

Winnipeg — July 24, 2014

All seminars will be held at BDO offices from 9:30 AM to 12:00 PM.

Lunch will be provided. Dates and locations are subject to change.

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# 2014 SPAGHETTI BRIDGE COMPETITION a Success

The 2014 Spaghetti Bridge Competition was held on March 15, 2014 at Kildonan Place Shopping Centre. Based on the bridges that all the students built, the combined weight held was 15,618lbs. APEGM donated that to Winnipeg Harvest

\$1/lb and they turn it around 20x with their buying power. With matching donations from Peak of the Market and Canada Safeway, Winnipeg Harvest received a donation of over 343,500 lbs of food from the students bridges! ☘



**APEGM** Date: *March 15th, 2014*  
Pay to the Order of: *Winnipeg Harvest* | *15,618.70 lbs.*  
*Fifteen thousand six hundred eighteen 79 lbs of Pasta*  
Memo: *Spaghetti Bridge Competition* Association of Professional Engineers and Geoscientists







# ProDev Common

**I**n 2011, APEGM's members voted in favour of implementing the ProDev Program. The implementation of this program allows APEGM to meet the standard established by most of the other regulators, in that it requires members to report their professional development activities. This reporting not only serves to demonstrate to the public that we are honouring the responsibilities bestowed on us through self-regulation, it also provides a benchmark by which members can validate the quality and quantity of their activities. Furthermore, it can serve as a tool for members who actively seek to direct their progression as a professional.

There are many members who still have questions and/or misunderstandings about how the ProDev Program operates. The purpose of this article is to address some of these issues in the hopes of spreading

### Did you know?

Volunteerism is encouraged and recognized by the ProDev Program. For example, time spent mentoring is extremely valuable to maintaining the competency of individuals as well as the professions in general. Serving on a board or coaching a sports team are also valued by the ProDev Program.

greater awareness about this relatively new program. The first round of reporting is due this year and hopefully all of you will be able to jump on board once you understand the clarifications made below.

### MYTH #1

#### [ProDev requires me to go back to school](#)

Examination of the ProDev framework clearly shows this to be false. Attending academic studies would be classified as Formal Training. Formal Training is one of six categories from which member may choose to participate. Members can easily achieve the targets of the program without attending school. In fact, it is expected that most members will not report Formal Activity every year.

### MYTH #2

#### [I'm semi-retired and can't meet the targets of the ProDev Program, so I'm forced to resign.](#)

Many members have already asked this question and have had their fears allayed by the options presented to them. The concern arises from members who only practise a limited number of hours each year. They likely find themselves in this scenario after having practised for several decades and now only take on a limited number of projects each year. For example, one member indicated that they only practise for approximately 40 hours per year.

Since the Professional Practice category recognizes this activity at a 15:1 ratio, members that are in a semi-retired mode may only get credit for as little as three hours per year, or nine over three-year reporting period. This stands in stark contrast to a fully employed member who can claim as many as 150 hours in each three-year window. Therefore, using the normal targets of the ProDev Program, semi-retired members would fall short of the requirements.

However, the option for abatement exists and is applicable for these members. The Continuing Competency Committee (CCC) has, in fact, already published an interpretation on this matter. Effectively, the CCC determined that over a three-year period all members are expected to acquire 90 hours in the five categories other than Professional Practice. In other words, every APEGM member's tally of Informal Activity, Formal Activity, Participation, Presentations, and Contributions to Knowledge should exceed 90 hours. The CCC has decided that members who are 'semi-retired' should have targets based around this fact. Abatement is therefore granted to semi-retired members and their target is set to 90 hours in the five categories other than Professional Practice.

### MYTH #3

#### [Since I don't need to be an engineer/geoscientist to perform my work, I cannot claim hours in the Professional Practice category](#)



# Myths

This has been another common issue to date for the CCC. Several members have applied for abatement because they are worried that they will not meet the targets of the ProDev program. They reason that, since their work does not meet the definitions of the Practice of Professional Engineering or Professional Geoscience as defined in the Act, they cannot claim hours in the Professional Practice category.

In order to become a member of APEGM, individuals must demonstrate experience in work that the Act restricts to Professional Engineers and Geoscientists. Some individuals, after becoming members of APEGM, move into an area of practice that could be performed by people that are not registered with APEGM. A prime example is project management; many construction firms employ Professional Engineers alongside non-members to execute the same function.

However, members working in a field such as project management are not precluded from reporting their work under the Professional Practice category. As stated in the ProDev Program documentation:

“Active professional practice is a significant factor in maintaining and improving your skills, either where you are actually practising according to the legal definition or “influencing” the practice of the professions. “Influencing” means having some effect on how the professions are practiced without necessarily performing technical work”.

The CCC has upheld this description by approving work that doesn't meet the definition of the Practice of Professional Engineering as long as the work influences the profession. One example is the teaching of technology courses at Red River College. Another example is the management of an engineering or geoscience department even if the manager is not practising professional engineering or geoscience.

#### **MYTH #4**

*Since I got paid to do a specific activity as a part of my employment, I must record it in the Professional Practice category*

The Professional Practice category recognizes that the work a member performs is beneficial in maintaining their competency. This recognition holds even where the work is perceived by the member to be repetitive. However, the existence of the Professional Practice category does not preclude from counting an activity in another category simply because the member was financially compensated for the activity.

#### **Did you know?**

The CCC published its interpretations online. See them at: <http://www.apegm.mb.ca/CCCInterpretations.html>

#### **MYTH #5**

*I will be on parental leave for a year, so I need to cram ProDev hours into the months immediately before and after the time I am away from work*

The CCC has reviewed the scenario where a member will be on parental leave for a year and has published an interpretation around the question. It was decided that members who are on parental leave will be approved for abatement proportional to the time spent away from work. For example, a member who is on parental leave for 12 months (over a three-year reporting period) will be given an overall target of  $24/36 * 240 = 160$  hours for the three-year reporting period.

In addition, if the parental leave coincides with a calendar year, the member is not required to meet the three-category target for that calendar year. In the interest of balance, the member's Professional Practice category will also be capped accordingly. For example, a one-year parental leave will result in a cap of 100 hours in the Professional Practice category.

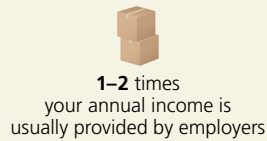
As always, if you have any questions about the ProDev Program, do not hesitate to contact APEGM. Lorraine Dupas or Michael Gregoire will be happy to answer any question you have. Remember, the TIME IS NOW to report your ProDev activities. Log in at [apegm.mb.ca](http://apegm.mb.ca) and bring your records up to date. ☺

# 5 not-so-true ideas about life insurance

(and how to get your facts straight)

## 1 Employer benefits are enough

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



## 2 Optimists need not worry

Plan like a pessimist — hope for the best but prepare for the worst — especially when going through a life-changing event.

Marriage

Mortgage

Children

New job

## 4 They're all the same

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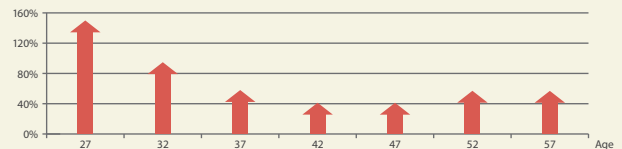
How much insurance is right for you? It depends on your situation. Here's a formula you can use to figure it out:<sup>2</sup>

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

- A** = Your family's **assets** and income
- B** = Your family's monthly **budget** needs
- C** = **Costs** associated with your death
- D** = **Debts** to be paid off
- E** = **Exceptional expenses** (e.g., education costs)

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Many advertised rates may seem low at first. But see how the average rate of our 3 lowest-priced competitors **exceeds** our rates over 15 years.<sup>3</sup> For example, a 32-year-old male non-smoker who buys \$100,000 coverage from them would end up paying **95% MORE** over 15 years.



<sup>1</sup> [http://money.cnn.com/retirement/guide/insurance\\_life.moneymag/index11.htm](http://money.cnn.com/retirement/guide/insurance_life.moneymag/index11.htm)

<sup>2</sup> [www.gailvazoxlade.com/articles/just\\_in\\_case/how\\_much\\_insurance.html](http://www.gailvazoxlade.com/articles/just_in_case/how_much_insurance.html)

<sup>3</sup> LifeGuide® Release 2013.7A



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# The Threat to Our Waters: Invasive Freshwater Mussels and Their Impact on Water Infrastructure



By Megan Levy and Felicia Muncaster, Pacific NorthWest Economic Region

**T**he Pacific Northwest is rich with water - our lakes are a huge draw for recreation, hydropower provides clean and affordable energy for many of the region's households, and our fertile land blooms with rich agriculture supported by vast irrigation channels. The waters of the region face grave threats by aquatic invasive species, particularly quagga and zebra mussels, which leave a lasting impact on water quality, the environment, and the economy.

The zebra mussel and quagga mussel are both small freshwater mussels found in the family Dreissena. Originally native to the lakes of Southern Russia, these mussels have since invaded many different areas of the world, particularly North America, and caused a large amount of damage to the environment and infrastructure. Spread to North America in the ballast water of ships, these invasive mussels can survive 30 days out of the water in cool moist environments, and are easily spread between disjointed bodies of water by contaminated boats.

Zebra and quagga mussels are extremely successful at colonizing large areas in North America due to lack of competition, calcium levels in our region's waters, and prolific reproduction. As filter feeders, both species change water content and clarity, damaging fish habitats. They can also attach onto almost anything which can be detrimental for facilities that use raw surface water such as utility plants, factories,

and water treatment plants. These mussels can also infiltrate water intake pipes, wells and pump valves which can lead to the failure of vital plant components.

This was seen at the Monroe Waterworks Plant on Lake Erie in the early 1990s when an infestation of zebra mussels cost the state hundreds of thousands of dollars in damages. The mussels made their way into the interior piping of the plant causing multiple outages from 1989-1991<sup>1</sup>. At the time, the true severity of a zebra mussel infestation was unknown and it took many years to manage them. During this time, many residents of Monroe, Michigan experienced outages and were left without water. In the end, the estimated cost of removing the mussels from the plant was approximately USD\$300,000<sup>2</sup>. These costs continue to tally each year, as eradication of these mussels is not possible.

The economic threat is significant. The state of Idaho conservatively estimated the annual statewide costs of a quagga and zebra mussel infestation would be USD\$94 million annually according to the "Quagga-Zebra Mussel Action Plan for Western U.S. Waters" of February 2010<sup>3</sup>. An economic impact assessment recently completed by the province of Alberta estimated that an infestation would cost the province upwards of CAD\$75 million each year<sup>4</sup>. In an effort to prevent the spread of freshwater mussels into

the Pacific Northwest, many states and provinces have taken preventative actions, including implementing vessel inspection and decontamination check points, and advocating for greater awareness among boaters and other water users. Manitoba has an extensive invasive species protection program and just installed two new high-heat, high-pressure decontamination units that will purge invasive species from boats during the summer boating seasons. With the recent discovery of established adult zebra mussels in Lake Winnipeg, potential spread into Western Canada is a greater threat than ever before. Manitoba hopes to stop this spread and protect the biodiversity of the province's lakes, rivers, and other waterways.

These measures are effective, but significantly underfunded and leave many potential gaps. In the province of Alberta, inspection stations for boats moving across the province are optional, and only open during the summer boating season. Gaps such as these are due to lapses in funding and lack of legislation. Improving inspection and decontamination protocol and expanding education programs are essential to preventing the spread of mussels into the region. Once they are here, the mussels and their annual costs will continue to multiply. Every year we delay their arrival saves the states and provinces of the Pacific Northwest millions of dollars. ☕



Figure 1: A cooler unit from Ontario Power Generation infested by zebra mussels. (Source: Ontario Power Generation)



Figure 2: A trash rack from Parker Dam after 7 months in the Colorado River. (Source: Bureau of Reclamation)

<sup>1</sup> Jamie Knotts. "Zebra Mussels Invade Eastern U.S. Waterways," On Tap. Volume 9, Issue 2. Summer 2000

<sup>2</sup> Ibid.

<sup>3</sup> "Quagga-Zebra Mussel Action Plan for Western U.S. Waters," Western Regional Panel on Aquatic Nuisance Species. Feb. 2010.

<sup>4</sup> Wesley Loy. "Watchdog Wants to Zap Tanker Stowaways," Petroleum News. Volume 14, No. 52 Dec. 27, 2009



# Make Your Move Engineers mentor teens in science

**O**n International Women's Day, March 8, 2014, 20 female engineers and almost 50 young women in grades 8-9 took part in the "Make Your Move" day-long event, offered by the non-profit organization *WISE Kid-Netic Energy*. The first time event introduced girls in grades 8-9 to possible future careers in engineering. The young women were chosen by local school divisions for their demonstrated leadership in community service, sports and academics. The aim of the event was to attract girls who had not previously considered engineering into the field and make sure they were aware of the high school courses they would need in order to be considered for the Faculty of Engineering. After the day-long event, the young leaders felt encouraged to make their move to Engineering.

*WISE Kid-Netic Energy* is a non-profit organization that was established in 1990. The organization offers hands on, Manitoba curriculum based science, technology engineering and math (STEM) deliverables for youth in Kindergarten through grade 12. This community outreach program offers programs and services for over 20,000

youth annually all over the province of Manitoba including northern communities, First Nations reservations and southern farming communities. The organization also serves Winnipeg, particularly the inner-city. The group strives to attract all Manitoba youth to careers in STEM but particularly underrepresented groups like women, Indigenous, visible minorities and socio-economically challenged.



Shot from above: "Make Your Move" Teams working on the first challenge: building the slowest marble run possible in a given time frame. The APEGM team is on the bottom right.

APEGM's own **Dawn Nedohin-Macek**, P.Eng, FEC, (Past President) was chosen by *WISE Kid-Netic Energy* as one of the

representatives in her field to lead and mentor the girls through a day of performing engineering design-build-test challenges.

The students were split into groups of three and each group had a female Engineer to mentor them. The event featured two projects; one project was to create a marble board that allowed the marble to roll down a board at the slowest possible speed. The other project was to make a boat that would float across a pool as fast as possible. Local Engineering companies and organizations sponsored teams, provided mentors and subsidized costs. Support came from KGS Group, Magellan, Price, Hatch, MTS, Standard Aero, University of Manitoba Faculty of Engineering, APEGM, NSERC-CWSE, Friends of Engineering, Manitoba Hydro, Bockstael and Maple Leaf Construction.

The day was a strategic success, "For us as mentors, it allowed us to start conversations with the girls about engineering and what an engineering career entails and what courses they need to take to get into that career path," said Tanis Guyot, P.Eng. "Afterwards, I asked the girls that I worked with if they had ever thought about going into engineering or science, and they said they hadn't until that day."

Survey results taken post-event back up the feedback the students and mentors gave throughout the day, the most telling being the following:

7) Before coming to the "Make Your Move" event, have you ever considered becoming an engineer?

Answer Choices	Responses
Yes	45.83% (22)
No	54.17% (26)

8) Now that you have attended the "Make Your Move" event, would you ever consider becoming an engineer?

Answer Choices	Responses
Yes	93.62% (44)
No	6.38% (3)

"Women in technical careers tend to be under represented in Canada. Make Your Move introduces young women to the opportunities available in the technical fields and then helps them to choose the right math and science courses in high school in order to pursue those kinds of careers," said Dawn Nedohin-Macek.

When asked via survey, what one thing they learned from their mentor was, one response was, "I learned what APEGM does and why it is important and I also learned what courses I need in order to have/apply for a job in the sciences."



All of the participants. Green t-shirts indicated WISE staff.



Students, mentors and staff were encouraged to tweet (#MYM2014) and instagram throughout the day. Dawn reads out her tweet to the group. Comedian Aisha Alfa, shown here with Dawn, was the emcee for the day.

**Nusraat Masood**, the program administrator for WISE Kid-Netic Energy was impressed with the overall level of participation of both the mentors and the girls, "I was encouraged by the enthusiasm and creativity the participants showed," she said, "The girls really got into the design and brought forth their own suggestions and ideas. The mentors did an excellent job including them and making it fun while teaching their assigned girls about engineering"



Along with APEGM, the Faculty of Engineering, CWSE (NSERC Chair for Women in Science and Engineering), KGS Group, Magellan, Price, Hatch, Standard Aero and MTS sponsored and sent volunteer mentors. Manitoba Hydro was the largest group, with these seven engineers and EITs as mentors.



There were many moments of intense concentration and study, as designs were discussed and built.



Team APEGM – the students



The first challenge was to make the slowest marble run possible. After passing testing with flying colours, we were disappointed when our marble got stuck twice during judging.



The second challenge was to make a boat that could go the fastest across the indoor kiddie pool. The APEGM team was very proud of our 6 second run!

Nusraat Masood, and the entire WISE Kid-Netic team thanked each of the mentors and volunteers for their time and energy, and hope to carry on holding this event in future years, with support in both financial donations and mentorship from the various engineering companies and organizations here in Manitoba. ☺



# THE BUSINESS CASE: Management Training for Engineers & Geoscientists

By Martin Charlton Communications

**M**any of today's professionals seek to gain an edge in the workplace by pursuing various degrees and certifications. For engineers and geoscientists, some of the most attractive career-advancing education options are the ones that promise greater skill in business and management practices. At the end of these paths lies the dream of moving one's career beyond basic engineering or geoscience work and into the realm of

managing larger projects and larger teams, or perhaps even running one's own business but is this dream a reality? And if it is, which path is the best?

## The Options

One of the first lessons one learns in business or economics is the value of competition, so it's appropriate that there is a certain level of competition among the management-oriented education options.

The Master of business Administration (MBA) likely holds the highest level of prestige in society but this prestige comes at a cost. Tuition at a respected program can cost over \$90,000 – and that's not including the opportunity cost of lost wages while at school. Accelerated full-time study can take a year and a half to complete while part-time study can soak up much of a working student's free time and holidays for over three years.



## ***"When asked why they pursued managerial education upgrades, APEGS members who have pursued those paths gave a near unanimous response: to further their careers."***

A popular alternative that requires less personal investment is the Project Management Professional (PMP) certification. A professional with a post-secondary degree can sit for the PMP exam after completing 4,500 hours of work experience ("leading and directing projects"), putting in 35 hours of course work and paying a few hundred dollars for the exam fee. Employers often provide the coursework for free as part of employee professional development programs but even if the student has to pay for it, the course seldom costs more than \$3,000. However, the designation must be maintained by logging in a specified amount of professional development time every three years.

Although not as widespread as PMP and MBA, Six Sigma is also gaining in popularity in engineering circles. The designation – which has several martial arts-style levels from yellow belt to master black belt – involves a set of tools and strategies for managing and improving processes, particularly in industrial settings. In recent years, Six Sigma has also come to incorporate the so-called Lean workplace concepts. The designation can be acquired through either six to eight months of part-time online study or through more intensive full-time classroom study.

As with PMP, many companies offer Six Sigma training on site for qualified employees. If pursuing it on one's own, the course costs \$25,000-\$30,000.

### **Why Do It?**

When asked why they pursued managerial education upgrades, APEGS members who have pursued those paths gave a near unanimous response: to further their careers.

Shelley Pappas, P.Eng., an electrical systems engineer working as a senior project manager at SaskTel International, has a diploma in business administration, her PMP certification and will soon be receiving her MBA.

"The simple answer is that I'm ambitious. I always knew that I didn't want to be working on small teams in a lab my entire life. Even when I was studying

engineering in university, I was more socially oriented and more prone to want to manage things on a large scale.

I always wanted to apply my engineering knowledge in a way that allowed me to work with large and varied groups of people," Pappas says.

Rajeev Chadha, P.Eng., a Continuous Improvement Lead at Mosaic Potash Colonsay had similar goals for his Six Sigma designation.

"My field is process engineering but I wanted to move on to operations management. As a senior engineer, I found I was increasingly dealing with broader functional groups including units from sales, marketing, human resources and so forth. The Six Sigma training allows me to help improve the processes for basically any unit within the company. That's the strength of it – when you get right down to it, anything is a process so process analysis is useful in any branch of a business," Chadha says.

Joe Toth, P.Eng., senior innovation officer at Springboard West Innovation, set his sights even higher when he completed his Executive MBA at the Kenneth Levene Graduate School of business at the University of Regina.

"Even at the senior management level, there are many positions that require an MBA. My sights have always been set on what are called the 'C' level jobs – CEO, CFO and the like – and the fact is that an MBA is an absolute must for that level," Toth says.

But it's not all about money or career advancement. Management-bound APEGS members typically give a range of additional reasons for their choices.

"I have always considered myself a lifelong learner. It's just part of my nature. I had already taken M.Sc. in engineering and had been certified under the Canadian Securities Course so the MBA just seemed like the next logical step in improving my understanding of business and management," Toth says.

Pappas was looking to use her training to help her colleagues and employer as much as herself.

"The engineering department at SaskTel International tended to have more ideas flowing out of it than it had employees able to drive them to completion. Other departments had project managers but not ours, so my initial motivation was that if I acquired the project management skills I would be in a position to help bring these ideas to fruition."

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## Which Is Better?

Although there is little doubt that the MBA is more prestigious than other managerial education paths, is it really the best in terms of career development and skills? The answer isn't perfectly clear-cut.

John Reiling, PMP, MBA, a US-based columnist who runs a PMP coaching business, does not believe it's relevant to compare MBAs with certification programs like PMP or Six Sigma.

"I think they serve two different purposes, but there is great value in each," Reiling says.

A common saying about university education in general – even liberal arts education – is that it helps train people to think. To Reiling, this is the core value of the MBA but on an enhanced level.

"It helps to teach us how to think about a broad set of situations. This provides exposure to different ways of thinking in many situations and crosses virtually all business functions. It also builds skill in areas such as finance, marketing, operations, and more."

On the other hand, certifications are all about acquiring a skill, Reiling says. "They provide a framework for handling certain common problem sets. They provide a clear skill for the workplace but this is where they diverge from the education provided by an MBA."

As Reiling defines it, an education does not necessarily provide specific skills but instead provides a person with a background

to do a range of things better. Toth agrees with this assessment.

"You can't really compare a PMP and an MBA at all. A PMP teaches you how to manage projects. An MBA teaches you how to manage a business and gives you a much deeper understanding of a broader range of business and management principles."

Pappas likewise saw an MBA as a step up to the next level.

"After having managed projects for a while, I became more involved in developing other aspects of the business. I found in meetings that the CEO and CFO were often using concepts and terminology with which they were more familiar so I thought an MBA would take me up to that level."

This doesn't mean that an MBA is the right choice for everyone. The workload, cost and commitment required to achieve an MBA may not suit everyone's goals.

"This becomes a very personal decision. Different people have different learning styles. It may be that one person would be better off getting a certification like the PMP, work in project management for a time, and gain exposure and experience, then advance their career from there. Some people learn much better by doing and could be wasting their time in school," Reiling says.

Chadha agrees with that assessment and his personal choice is clear.

"Six Sigma to me is definitely superior to PMP. The latter is focused on managing the

project; in Six Sigma you are managing the results. In some ways, I think Six Sigma can be better than an MBA, depending on what you are looking for. An MBA leads you to an open area where you can choose your path whereas Six Sigma is very focused."

## Is It Worth It?

No matter which managerial education path one takes, it requires considerable time, money, effort and sacrifice. Is it all worth it? Those who have been down the paths agree that it is, even if there isn't an immediate financial payoff.

Although his Six Sigma designation has not yet led to career opportunities, Chadha feels it is already making his current work better.

"In my job as continuous improvement lead, Six Sigma has been very important in helping me improve processes for many groups in the company."

While not yet at his goal of a 'C'-level job, Toth feels that his EMBA is providing him with an increasing range of management and entrepreneurial opportunities. More importantly, it has given him a deeper understanding of how enterprises function.

In Pappas's case, her PMP brought her an almost immediate monetary benefit.

"There is no doubt that I'm making more as a PMP than I would have with just my engineering degree. That's just a function of how the pay bands at SaskTel recognize different sets of qualifications."

Although she won't be receiving her MBA until next April, Pappas believes that it has already given her perhaps the most important benefit of all – the confidence to follow her dreams and the assurance that it will help her attain her goals.

"While I don't know what my eventual ideal job would be, I would not want to think that perhaps some day my dream job would come along and it would pass me by because I wasn't qualified for it on paper," Pappas says.

"For many high-level positions, they won't even look at you unless you have an MBA. It doesn't matter how strong of an engineer you are or how much practical management experience you have; you have to have those letters after your name. So for me part of getting an MBA is future-proofing – making sure that I have my options open no matter what opportunity arises." ⊕

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# Masters of Their Domain

By Martin Charlton Communications

**N**o matter what the context, there is something innately appealing about being called a master. No doubt that is part of the reason why many engineers and geoscientists from time to time ponder going back to school to seek their master's degree.

Is it worth it? The simple answer appears to be yes. There are many compelling reasons to advance one's education. Those who have been through the process typically describe it as a worthwhile and rewarding experience.

## Not Just For the Dollars

Ben Deaton, Ph.D., a structural engineering researcher at the Georgia Institute of Technology, runs a popular blog called Only A Model that focuses on engineering

professional development and education issues. Deaton is a strong advocate of master's programs.

"I think every undergraduate engineering student should seriously consider pursuing a master's degree. A graduate degree hasn't always been necessary for engineers, but the evolution of engineering education over the past decades has changed the professional outlook."

Deaton's main rationale is that the advanced degree dramatically increases an engineer's level of knowledge.

"A master's degree will significantly increase your technical background. An aspiring structural engineer will graduate with a bachelor's in civil engineering having taken roughly five to six courses covering the very basics of structural analysis and design.

A master's degree will add 10 courses precisely in your focus area."

Saskatchewan engineers likewise cite intellectual reasons among their top motivations in seeking a post-graduate degree.

"I might have had hopes for advancement or better jobs in the back of my mind but that really wasn't my main motivation. While advanced degrees can certainly help you get better pay or better jobs, they don't guarantee it. I was attracted more by the learning opportunities – the chance to get more in depth into an area in which I was interested," says Lisa White, P.Eng., a consultant at Clifton Associates.

Chris Richards, P.Eng., a mechanical engineer with environmental services at the City of Saskatoon, echoes that sentiment.



"I felt that my master's degree essentially completed my education. In undergrad studies, I was focused on writing a test. In master's studies, I was focused on results. My graduate studies helped me to more fully understand the concepts I'd learned in undergrad."

Still, having a postgraduate degree in one's pocket definitely doesn't hurt in the job scene.

"The APEGS salary survey says that engineers with master's degrees on average earn 13 per cent more. That's a statistic that I bring up whenever I'm in a wage negotiation," Richards says.

### A World of Opportunity

Another commonly noted benefit of a master's degree is improved professional mobility.

For White, going back to school led quickly to overseas work.

"It was in graduate school that I connected with the Engineers Without borders (EWB) group on campus that led to my work in the Philippines. It also started my ongoing interest in EWB and international development work," White says.

Richards - another EWB alumnus - also saw the advanced degree as providing him with more international options.

"I have a keen interest in travel and working overseas so that was another of my reasons for securing a master's. If, down the road, I was going to look at getting a job in Europe, I would likely need the advanced

degree as that has become a more and more common requirement for engineering jobs there," says Richards.

The US may be on the brink of going even further. The number of course hours required for the American Professional Engineer designation has crept up over the years so that Canadian engineers already have to consider taking extra classes to achieve full cross-border mobility, but according to Deaton, the American Society of Civil Engineers (ASCE) may take things one step further and make a graduate degree mandatory. Deaton cites ASCE Policy Statement 465 - "Academic Prerequisites for Licensure and Professional Practice" that states:

"There are diametrically opposed forces trying to squeeze more content into the baccalaureate curriculum while at the same time reducing the credit hours necessary for the baccalaureate degree. The result is a baccalaureate civil engineering degree satisfactory for an entry-level position, but becoming inadequate for the professional practice of civil engineering."

In addition to this formal push, Deaton describes an equally important informal push from US engineering firms.

"Many high-level engineering firms are only interested in candidates with a master's - not only because of better technical qualifications, but also because these positions are highly competitive. Why should they settle for a candidate with limited advanced training?"

### Big Picture Thinking

According to White - who not only has her master's but is also close to completing her Ph.D. - a common concern engineers have about graduate studies is that it will make them too specialized. Whereas many engineers and geoscientists work as generalists within their field of competence, graduate students focus on very specific research topics.

"I always encounter people who think that a master's or Ph.D. will narrow them down too much but really the opposite is true. Graduate studies give you the ability to think more strategically, to understand things in greater depth and see the bigger picture. Those are tremendous assets, especially in consulting engineering when you have to consider a number of connected projects and provide a broader vision for them," White says.

Deaton agrees that a master's degree provides numerous opportunities to enhance one's intellectual skills.

"For many, a master's degree will be a once-in-a-lifetime opportunity to conduct research and publish a thesis. Completing a research project and publishing it demonstrates a level of proactivity that will distinguish you. You will gain valuable analytical skills as well as the technical ability to understand research articles," Deaton says.

Richards' experience mirrored that description. His graduate studies, which



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involved working with the Saskatchewan Research Council, exposed him to research, information and mentoring that he wouldn't have had otherwise.

"I certainly learned how to deliver a big project with grey boundaries of when it would be considered complete. I now have a better ability to assess large-scale, open-ended projects and how much work they will involve. The experience also improved my writing since I basically had to write a book and then have it reviewed and edited."

## Eyes Open

While there are many benefits to a master's degree, there are also sacrifices and challenges. At the top of the list for many graduate students is readjusting to an academic environment.

"It was interesting because I thought I was a pretty smart person and didn't think it would be much of a challenge to get back into the university mindset. but it was a tough adjustment. In fact, it was one of the most difficult things I've done in my life. It took a good while to get back into the swing of things," says White.

For working professionals, graduate studies can also bring financial and opportunity challenges since advanced science degrees typically involve full-time study. There are, however, many scholarships available as well as programs that pay a stipend for students contributing to larger research projects. Many employers also provide support for staff seeking advanced education.

"In my case, I had both an industry partner and a scholarship. basically, SRC was my employer for that period and the NSERC scholarship was quite good. but if it hadn't been for that funding, I probably wouldn't have pursued a master's degree or else I would have had to drop out. I feel very lucky to have the support I needed," says Richards.

Despite the challenges, master's program graduates are unequivocal in their enthusiasm.

"I'm very thankful for educational opportunities I've had. They've been good for me and have given me many opportunities – career and otherwise – that I otherwise would never have had in my life. I'm very thankful to have been able to go back to school without any sacrifices to my quality of life," says White. ☺

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*Hoover Dam - view from above the dam; an engineering marvel.  
Ben Jablonski, EIT*



*Ness & Century - Aerial View - construction at the intersection of Ness & Century.  
Ben Jablonski, EIT*

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  - (c) Provide a title if you have one





*A construction site in Kigali, Rwanda.  
Jaimee Schmidt, P.Eng.*



*A Photo of some earthquake destruction in Grande Goave Haiti.  
Jaimee Schmidt, P.Eng.*



*Ribbon of Asphalt - black asphalt winding through the Valley of Fire State Park in Nevada.  
Ben Jablonski, EIT*

## Welcome New Members

C.D. Andreas	M. Cote	D.J. Kelly	R.B. Pollard	M.B. Surendran
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L. Bachu	R.M. Dimaano	G.N. Khiani	P. Prioletta	K.A. Tee
E.M. Ballarin	K.E. Dow	A.H. Kosie	P. Radoja	T.T. Terich
J.F. Barbeau	J.G. Dueck	J. Kulchisky	G.J. Raynard	L.N. Thomas
N.W. Barmeier	K.O. Emeruwa	G.M. Kuntz	M.J. Robert	N. Tiffany
B.A. Barrett	F. Fawal	S.H. Ladouceur	K.D. Rogers	J. Tolovski
J.E.E. Bartz	R.J. Frenette	R.C.Y. Lam	R. Rouhana	D.A. Tretter
P.A. Berg	S.P. Frenette	P.R. Lamont	S. Rousseau	D.P.J. Turner
S.C. Bernauer	J.J. Friesen	D.H.H. Lim	M. Safari	S. Upadhyay
M. Bijeljanin	D.D. Froese	S.L.E. Lui	B.P. Schattner	A.M. Villegas
A.N. Blue	Y. Fu	X.F. Ma	L.E. Seaman	C. Vo
R. Bogdanov	L. Gao	B.E. MacTavish	T.W. Sedore	J.L. Wainwright
J.D. Bowick	P.A. Gilhuly	H. Mahony	A.H. Shahin	I.L. Walters
K.R. Briggs	B.A. Gordon	G. Malhotra	R.N. Shakirov	C. Wang
D.C. Buck	G.M. Haddad	L.P. McLeod	D.D. Sheppard	R.J. Weston
O.J. Bueckert	S.P. Hart	P.R. McMechan	Z. Shi	S.J. Wightman
M.S. Buksowicz	J.S. Hayer	C. Meagher	E.J. Shomali	K.A. Wilson
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M.A. Calpito	J.G. Holt	F. Mosallat	D. Singh	S.F.W. Yeske
J.F. Chapman	W.W. Jackson	K.J. Mozdzen	S.J.P. Sirard	L.J. Zhang
G.P. Chen	M.C. Janes	A.A. Person	D.M. Sorochuk	P. Zhang
A.G. Clegg	J.W. Jeske	L.M. Pettit	R.C. Standing	W. Zhang
E.C. Codispodi	A.T. Kaita	E. Pianim	B.M. Stang	Y. Zhao
E.A. Collet	K.B. Kaleta	D.K. Pickell	M.J. Stusick	

## Members-in-Training

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E.K. Apostle	T.J. Dyck	E.A.R. Hornby	G.M. Messier	A.L. Samson
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## Steven Fletcher Receives His P.Eng. Certificate



Steven Fletcher receives his P.Eng. certificate from Executive Director & Registrar Grant Koropatnick, P.Eng.



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## NOTICE TO MEMBERS

### Annual General Meeting

The 2014 Annual General Meeting of the Association of Professional Engineers and Geoscientists of Manitoba will be held on Friday, October 24, 2014 at the Fort Garry Hotel, 222 Broadway, Winnipeg, MB.

### 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 four professional engineer positions, and one professional geoscientist position to be filled as of October 2014.

The Committee will consider recommendations 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. Persons submitting a recommendation are required to obtain the consent of the nominee.

### By-Law Changes

By-Law 17.1 prescribes that any proposal to introduce new By-laws, or to repeal or amend existing By-Laws, must, unless initiated by the Council, be signed by not fewer than six members. Proposals must be given to the secretary at least 42 days before the meeting. In this case, the date for the receipt of a proposal is Friday, September 12, 2014.

### Resolutions

By-law 5.1.4 prescribes that resolutions put forward at an Annual General Meeting must be in writing, signed by the mover and seconder, and received by the Secretary no less than 48 hours prior to the commencement of the meeting. Either the mover or the seconder must be present in person or by distance conferencing at the meeting for the resolution to be considered.

Grant Koropatnick, P.Eng.  
Secretary

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## Please Don't Forget Me

*Please Don't Forget Me* by Tom Pearson



(nonfiction book) is inspiring, heartbreaking, beautiful, and real; Above all, this memoir is a deeply compelling love story that illustrates the tremendous

power and beauty of love, loyalty, and commitment. It also insightfully describes the tragic realities that caregivers face while caring for a loved one through the various stages of Alzheimer's disease, until death; and the difficult choices and challenges that caregivers must face along the way.

### Author Biography

Before retiring a couple of years ago at the age of fifty-nine, I was an executive in the water industry. I hold a degree in mechanical engineering and a master's degree in civil engineering. I had a rewarding career providing safe drinking water to the citizens of Winnipeg, as well as serving

on the boards of the American Water Works Association and the Water Research Foundation. I am proud to have been one of the founding directors of Water For People Canada, a charitable organization dedicated to raising funds and constructing safe water supplies in developing countries. Before this book, my writing projects were limited to articles in trade journals, conference publications, lectures and a wide array of reports.

But these things in no way define me. They are ancillary to most important undertaking in my life thus far; my role as caregiver to my late wife Lynne. Lynne was diagnosed with early on-set Alzheimer's disease and it was my privilege to care for her from the time that she became ill at age 50 until her passing at age 63 in 2011. This front-line perspective has allowed me to chronicle our lives from inception until Lynne's passing and beyond.

I hope that Lynne's story will inspire you and that in sharing our journey, you find a bit of hope. I can be reached at [topleasedontforgetme@gmail.com](mailto:topleasedontforgetme@gmail.com) and would love to hear your commentary on the book.

*Photo by Kelly Bik Photography*

## Welcome Chinese Members Chapter

The Association of Professional Engineers and Geoscientists of Manitoba (APEGM) would like to introduce the Chinese Members Chapter, which was officially approved by Council on March 13, 2014.

The Chinese Members Chapter is a non-profit organization, consisting of professionals and members-in-training with Chinese origin and registered with APEGM.

Students, technologists, technicians and others in the engineering-related fields are also welcome to join the Chapter. All members will receive free membership once registered with the Chinese Members Chapter.

The objectives of the Chinese Members Chapter are to encourage and facilitate the study, discussion, networking and exchange of ideas and information among the members; to provide mentorship for members applying to become a registered professional engineer or geoscientist; to create a forum to connect engineering, geoscience and technical communities in Manitoba, other provinces of Canada and internationally; to facilitate the integration of internationally-trained Chinese engineers into the local engineering community; to promote positive awareness of the high degree of contribution of from the Chinese-Canadian engineering community.

To find out more about the Chinese Members Chapter or to join the chapter, please contact Steven Wu, P.Eng., at [steven.w@ckpeng.com](mailto:steven.w@ckpeng.com) or Wing-Keat (Wayne) Wong, P.Eng. at [wingkeat.wong@amec.com](mailto:wingkeat.wong@amec.com).

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## Correction

In the Spring 2014 issue we published the names of several APEGM members who received QE Diamond Jubilee Medals. Please note that the following recipients are not APEGM members, but rather hold the same name as one of our members:

- F. Berard
- C. Reimer
- C. Boulet
- R. Stark
- M. Klassen

Congratulations once again to all QE Diamond Jubilee Medal recipients.



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# The Time is Now

If you're like me, the past few years have gone by in a blink. We all keep busy with work, family and the occasional recreational outing. During our busy life, it is easy to forget about keeping up with the things that we don't feel affect us in the short term, especially if they're not immediately in one of the circles above. However, for many APEGM members, there is an element that has been neglected for too long.

At the end of this year, it will have been three full calendar years since APEGM's Professional Development Program was implemented. For those of us who have been members of APEGM since 2011 or earlier, that means that our first report is due. To be clear, though, this does not mean that members should wait until the end of this year to gather the information for their reports.

For a considerably large portion of our members, reporting of professional development activities has gone unattended for an unhealthy period of time. Although it is understandable that a member may choose to update their ProDev reporting occasionally (as opposed to on a daily basis), updating our records needs to be done annually, as a bare minimum. Overview numbers generated by our database indicate that there are hundreds of members who have never even logged into the APEGM website.

If you are a member of APEGM, you are likely in one of three camps. The first camp is those that have been diligently keeping their records up to date. The second camp is comprised of members that have plugged some hours at some point in the past, but have yet to even update their records for this year. The third have not bothered to report activities at all yet.

It's possible that you have some niggling questions about the ProDev Program that you feel are preventing you from starting your reporting. If that's the case, call me right now: 204-474-2736 ext. 225.

For those of you in the first category, I commend you for keeping up to date. I also ask a favour of you. Talk about the ProDev

Program with other members that you know. If they aren't in the same category as you, tell them just how easy it is.

It's worth pointing out that a detailed record does NOT need to be submitted by every member. I say this because some people have expressed concern about how much time they would need to spend in order to report their activities. I'm here to tell you that you do not need to submit a report that describes every hour of professional development activity that you've undertaken. I'll use my own reporting as an example.

For the Professional Practice category, I have entered two lines for each year. The lines simply say, for example, "Jan-Jun, Professional Standards, APEGM, 40". Did I precisely monitor and tabulate that 40? Definitely not. I tell myself, "Approximately 20 weeks at a minimum of 30 hours per week spent on Professional Practice gives me 600 bulk hours, which translates to 40 using the 15:1 ratio."

In the Informal Activity category, I estimate that I spend at least three hours each month reading regulatory trade journals like PEO's Engineering Dimensions. So, I have a line that says "Jan-Jun, Reading Regulatory trade journals, various, 18". Do I spend more time doing informal activities? Definitely. But I know that I am capped at 90 hours over the three year window, so it isn't worth tabulating every single activity I do in this category.

Under Participation, I have a line that says "May-Jun, Coaching Soccer, Corydon Community Club, 6". Again, I know I spent more hours participating but I can say with certainty that my team played six one-hour games during that season. However, I also know I don't need to log all of my hours to meet the targets of the program.

All in all, the amount of time it takes me to plug in my ProDev report is in the order of minutes. Oh, and by the way, there will be an app for that. ☺





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