

THE KEYSTONE PROFESSIONAL

Summer 2008

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**2008 CEM AWARDS OF EXCELLENCE IN
CELEBRATION OF CEM'S 30TH ANNIVERSARY**

***DISASTER:* THE DARK SIDE OF ENGINEERING**

2008 *Provincial Engineering and Geoscience Week Activities*

Association of Professional Engineers and
Geoscientists of the Province of Manitoba
www.apegm.mb.ca



THE KEYSTONE PROFESSIONAL

SUMMER 2008

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850A Pembina Highway, Winnipeg, Manitoba R3M 2M7

Ph. (204) 474-2736 Fax (204) 474-5960

E-Mail: apegm@apegm.mb.ca

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 Barry Striemer is a Winnipeg based photographer concentrating on urban, landscape and nature photography in the digital format. Fine art prints are available of Barry's photographs and he can be contacted via E-mail at bstriemer@shaw.ca

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- The Communications Committee would like to hear from you.
- Comments can be forwarded to us by email: commfeedback@apegm.mb.ca. Members are also encouraged to submit articles and photos on topics that would be of interest to the membership.
- Although the information contained in this publication is believed to be correct, no representation or warranty, expressed or implied, is made as to its accuracy and completeness. Opinions expressed are not necessarily those held by APEGM or the APEGM Council.

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Tim Corkery, P. Geo.
President's
Message

HERE'S TO VOLUNTEERS - THE HEART OF SELF REGULATION

I can't really understand why I volunteer and so probably am not the person to pontificate on the in's and out's of the volunteer's psyche. But in this, the season of touring the country, I have come to realize that, supporting the staff of every organization across the country, is a cohort of people giving freely of their limited time to make your, and a multitude of other, organizations possible.

At this point, I want to insert an important point. This praise of the volunteer is in no way meant to be a slight on the hard work of the staff that runs the organizations. I suspect everyone out there knows that they "make is so" for us.

I have noticed that at each Annual General Meeting across Canada, discussions with Directors, staff, and Presidents will always turn to the work of this or that committee. It made me realize

that out there are hundreds of people in each self regulating profession making it work. Not just for engineering but also lawyers, accountants, doctors, nurses . . .

You may remember, in my last note, some discussion of registration and the pluses and minuses of our system. There could not have been any discussion of what I think we should do, or not do, if not for the three dedicated groups working diligently to assess every application.

The Registration Committee, Academic Review Committee, and Experience Review Committee work in tandem with staff to give the fastest response to each and every applicant. These committees exist all across the country and depend on volunteer members to do this work. Now think of how many volunteers were needed in Alberta to assess the 7000 applicants last year!

But these committees are just the tip of the iceberg. I don't even know how many planning, education, and other varieties of committees APEGM has, never mind all the other organizations. At every AGM Liz and I have attended, staff and a finely tuned volunteer group make sure that each function runs smoothly. They don't seem to miss anything. They care for each out of town delegate while apparently effortlessly directing dinners, transportation, and all else that the AGM requires.

So far this year I have worked with several committees and marvel at the dedication in each. Here's another example; in late April every year, a group of APEGM volunteer judges join the large contingent of volunteers that judge at the Manitoba School Science Symposium. Friday night they preview each poster and

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NOTICE

Annual General Meeting

The 2008 Annual General Meeting of the Association of Professional Engineers and Geoscientists of the Province of Manitoba will be held on Friday, October 24, 2008, at the Fort Garry Hotel, 222 Broadway, Winnipeg, MB, R3C 0R3 Ph. 942-8251.

NOMINATIONS FOR ELECTION TO THE COUNCIL

Members of Council whose term of office continues for another year are:

ALAN M. AFTANAZ, P.ENG.; W.C. (BILL) GIRLING, P.ENG.; D.D.J. (DON) HIMBEAULT, P.ENG.; B.R. (BOB) MALENKO, P.ENG.; R.A.S. (RAY) REICHEL, P.GEO.

Members of Council whose term of office expires at the 2008 Annual General Meeting are:

BRENDA J. BILTON, P.GEO.; JAMES A. BLATZ, P.ENG.; M.T. (TIM) CORKERY, P.GEO. (Will continue as Past President); B.J. (JIM) MILLER, P.ENG.; EDWARD M. RYCKOWSKI, P.ENG.; JOHN C. WOODS, P.ENG.

Those nominated for election to the FOUR PROFESSIONAL ENGINEER positions on the Council are:

LINDSAY M.K. MELVIN, P.ENG.; IRENE R. MIKAWOZ, P.ENG.; I.J. (JEANNETTE) MONTUFAR, P.ENG.; EDWARD M. RYCKOWSKI, P.ENG.; DON N. SPANGELO, P.ENG.; JOHN C. WOODS, P.ENG.

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Engineering Philosophy 101

. . . the definition debate.

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

As an academic Engineer, I spend significant amounts of time trying to help students understand the professional world they will one day be a part of. However, a recent discussion with a student who was wondering if he should transfer from Engineering to a Technology program caused me to take a broader look at the players on the design team and the roles they are expected to play.

The functional distinction between Engineers and Technologists on design teams is often less than clear. So how

do you define the “space” occupied by each, and are the “spaces” distinct?

As we spoke about the decision he was struggling with, I began to realize that I, like most of us, tend to use the words Engineer and Engineering interchangeably. That caused me to think back to the last paragraph on my 2007 Winter column in which I stated:

“Being a Professional Engineer does not define what I do, it defines who I am. That is my choice, with or without legislation.”

I wrote that statement in the context of the value of professional registration. I now realize it also suggests that the terms Engineer and Engineering are distinctly different. And that realization took me back to an almost forgotten discussion that addressed this very issue.

Some years ago, the Canadian Engineering Qualifications Board (CEQB) was asked to consider ways to redefine who we, the Engineers, are. The notes I kept during discussions with people involved in that task proved to

be useful to me as I tried to clarify the “picture” for this particular student (and for me).

As memory (and sketchy notes) serves, the proposal began by citing a dictionary definition of “Engineering”, as “the application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and

economical structures, machines, processes, and systems”. So, if this definition is acceptable, “Engineering” is a process that is not restricted to any specific group of people.

It moved on, no longer depending on a dictionary, to define the “Practice of Engineering” as “those components of “Engineering” that either:

1. Requires judgment, based on education, experience and practice in the use and appropriate interpretation of codes, standards, tools, and methods; or,
2. Safeguards the public interest, in all aspects, including economic interest and the environment”

So that implies that the “Practice of Engineering” is more constrained than “Engineering” in general. It also implies that there are people with different skill/judgement/education levels involved within “Engineering”.

Finally, it defined the “Practice of Professional Engineering” to include the “Practice of Engineering”, with the added obligation to accept responsibility for work performed by oneself and/or by others under one’s direct supervision. In other words, we have the “Practice of Professional Engineering” and the “Practice of Engineering”, both of which require a level of education, skill, and

experience, but only one of which, the “Practice of Professional Engineering”, requires accepting professional responsibility. It separates the “what” from the “who”, and further clarifies roles for different persons.

Now, from a legalistic perspective, most of the provincial/territorial Acts under which we “practice” restrict the title “Engineer” to those who are members of one of the Associations and are, therefore, legally entitled to “practice”. Put another way, “Engineers” practice “Professional Engineering”. Technicians, technologists, and others are engaged in the “Practice of Engineering”.

I know that the notes I made following these long past discussions don’t reflect the totality of the CEQB recommendations. I don’t know if the recommendations are still under consideration, if they have been modified, or if they have simply been received for information. Personally, I don’t care, because they create a logical separation of roles that makes sense to me. Within this framework there is room for all the persons with varying skill levels to be recognized as members of the engineering design team. I know this explanation helped the student who first raised the question to better understand the overlap of skill sets, the variation in skill sets and the lines of responsibility. I feel confident he will now make a more informed decision that is appropriate for him.

About a week after the conversation that led to the discussion outlined above, I found myself using the CEQB proposal logic in discussions with a second student. This time it related to the need for a Member-in-Training to gain “engineering experience” if,

“I, like most of us, tend to use the words Engineer and Engineering interchangeably.”



Grant Koropatnick, P.Eng.
Executive
Director's Message

FACEBOOK IS THE NEW MEDIUM

Communication is so important today. Has it ever not been important? The ways of communicating today are numerous and varied. Some are more effective than others. Trends in communication are changing with technology and the rapid development of the internet is changing the way we speak to, relate to, and ultimately how we know and interact with one another.

THE TRANSITION GENERATION

As a parent of teenagers, I find myself starting sentences with the pre-fix "when I was your age". I need to find a new way of front-loading my pearls of wisdom. However, when I was a teenager, the only way someone could locate you was in a telephone book. Most people had a listing and few were unlisted in those days.

If you knew the correct spelling of my surname you could find our family in the book. You didn't actually find me – you found my Dad . . . and it told you that he lived on Agassiz Drive. The assumption was that the rest of us lived there too. No need for individual listings or identity profiles. We weren't worried about someone knowing our telephone number or address. The telephone system kept a database of names, addresses, and phone numbers, but that's all they kept.

I am part of the "transition generation"; that group of late baby-boomers who

can remember time before the personal computer, but who have successfully incorporated the device into daily life. Yes, I can remember Microsoft Mail Version 1.0; that DOS based, text only, messaging software that allowed you to select from two font types: regular or bold. Graphics were non-existent and monochrome grey, green, and orange were the only monitor colour options available.

I bought a PC for my secretary after scraping surplus budget money together for two years. The new unit cost \$5,000 and came with both 5 ¼ inch and 3 ½ inch floppy drives. Seems unbelievable, right? I'm not kidding! If you don't know what a floppy drive is, you're probably a kid.

CONVERGENCE OF MEDIA

Fast forward ahead two decades and computers are everywhere! They are pervasive in developed societies and sometimes you can barely recognize them. Home theatre systems, hand-held GPS navigation, camera phones, wireless entertainment devices, online interactive interfaces for messaging, data-basing, retail shopping; just a few examples of the vast array of computer technology that surrounds us.

The media are converging. There is nothing to separate the information once provided by television, radio, newspapers, books, and magazines. Text, audio, and video are being put together. All forms of information are available on a laptop, cell

phone, iPod, and Blackberry type devices.

FACEBOOK

A good example of this is Facebook. What is it you say? Facebook is an internet based utility for social networking – connecting people with other people. As of May 1, 2008, Facebook reported 70 Million active users worldwide.

What is unique about Facebook is it allows users to communicate in a variety of ways: messaging, chat, sharing of photographs, videos, and email. It offers numerous applications for creating events, groups, sending invitations, managing the events, sending interactive greetings with animated graphics, and many more special features.

APEGM is on Facebook as a professional organization and has 98 members so far. It is my intention of using this new medium as one more form of communication in an ever-expanding universe of communication media. What will be the next form of communication? Will text messaging morph into the preferred means of communicating or will it die out? Who knows?

In the meantime, your feedback is welcomed. If you have any thoughts on anything you read in the Keystone Professional, please email me at apegm@apegm.mb.ca or send me a message through Facebook. ■

“Facebook reported 70 Million active users worldwide.”

Notice to All Applicants who are currently on the APEGM Exam Program:

On May 9, 2008, the APEGM Council unanimously passed revisions to the Academic Review policy. These revisions are intended to streamline the process for engineering applicants applying with Bachelors' degrees from outside of Canada and to make APEGM policies more compatible with the other provincial associations who follow Engineers Canada guidelines.

Similarly, these revisions will streamline the process for both domestically and internationally trained geoscience applicants.

Under the new policy, the academic review process will allow most applicants to have a more timely indication of the requirements that they will have to fulfill.

The tables and the memo which describe the new policy are available on the APEGM website at: <http://www.apegm.mb.ca/register/noaccred/index.html> - click on ARC Policy Changes. More details will be added to this page in the future, so please visit it regularly for updated information.

As noted in the memo, the policy will not only affect new assessment applicants, but also applicants who have already started the exam/assessment process. APEGM staff will review all current examination route files and will be directly notifying those applicants who are affected by the changes. Notification will be by email, rather than hard copy.

Please do NOT call. Use the following email address to send any questions that you have about the policy changes: assessment@apegm.mb.ca. APEGM will endeavour to answer your questions as soon as possible, but please be patient.

We look forward to assisting you with your application questions.

Sincerely,

Sharon Sankar, P.Eng.
Director of Admissions, APEGM

Question:

According to the World Bank and Macquarie Research, how much is estimated to be spent on infrastructure worldwide in the next 12 months?*

- | | | |
|------------------|-------------------|--------------------|
| a. US\$8 Billion | b. US\$80 Billion | c. US\$800 Billion |
|------------------|-------------------|--------------------|



The world is evolving, is your investment solution?

Global spending on infrastructure is projected to skyrocket as population and economic growth around the world requires the creation of new infrastructure. At the same time, existing infrastructure assets are ageing and need to be modernized. Globally, infrastructure investments are projected to total US\$30-35 Trillion between now and 2030.**

For ideas on how to profit from investing in this sector, please call or email for an information package.

The Henderson Kochan Wealth Advisory Group

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For more information contact:
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Source: * World Bank and Macquarie Research

** Foresight Trends and Drivers in Intelligent Infrastructure Systems

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ANSWER: C



M.G. (Ron) Britton, P.Eng.
Thoughts On
Design

THE “NUMBERS” WE USE

Design, by its nature, relies on numbers. Over the years, many of those numbers become imbedded in our memories. We begin to think of them as “givens” or “constants”. They are the stock and trade of our profession.

As students, when we were learning how to use the analysis tools that were current at the time, we worked on constrained problems in which the “variables” were either given or presented as a limited number of choices. Later, when the realities of the working world descended upon us, the need to actually select appropriate “variables” became apparent. Suddenly the need for judgement became obvious. The old saying “good judgement comes from experience, which comes from bad judgement” began to ring true.

But design, in every field, is supported by codes, standards, handbooks, and specifications. Most of the numbers we need are found in print or on line in one of those sources. That is probably why we think of them as “givens” or “constants”. They are “known” and “accepted” as reliable and they are used in the knowledge that they are “correct”. However, every once in a while it seems appropriate to wonder about their origins and their reliability.

When something like the August 2007 collapse of the Interstate 35W Bridge over the Mississippi in Minneapolis happens, it shakes us out of our comfort zone. The numbers become suspect, regardless of how well they have served us in the past. And given that many failures occur in “old” systems, it follows that the numbers that were used to create those systems are also “old”.

If we look at the “state of the art” for the I-35W Bridge, it was designed using analysis systems based on slide rule technology and load predictions based on projected traffic patterns and types of vehicles. At that time, when detailed research relating to structural and material behaviour was still a developing element in engineering, the numbers were, for the most part, educated guesses based on what had worked in the past. It was much more art than science.

The reality is that most of our numbers still come from past performance. They represent the “state of the art” and as long as we stay within the constraints that defined that “state”, they are probably acceptable. But many design situations require us to “push the envelope”. Often that means assessing how reliable the input “numbers” are.

And then there is the problem of knowing how the “numbers” interact. Fulton’s steamboat patent calculations from the early 19th century are an excellent example of this phenomenon. His steamboat was a success, but the design was founded on an overestimate of the drag and an underestimate of the power available from the paddles. Compensating errors in the “numbers” permitted his steamboat to work. It was an interaction that would cause problems for those future designers who attempted to “improve” on either the drag or the power “numbers”.

The way we react to dealing with the effects of new “numbers” depends on the nature of what we are designing. Products for mass production are subjected, during the design/development stage,

to prototype testing. This provides a means of checking the impact of any new “numbers” within the frame of reference of that product’s performance. But the “Fulton effect” is hidden within those prototype tests so the individual inputs are not tested, only their combined effect. Extracting specific numbers from these tests will not necessarily improve the “state of the art”.

On the other hand, designs for major infrastructure units, like bridges, turbines, sewer systems, or buildings, do not lend themselves to prototyping. Each project is, by its nature, unique to the location in which it will be located. So the numbers that are used in this type of design are reflective of past use, and their ultimate use depends of future unknowns; which takes us back to the I-35W Bridge.

Everything we design is made up of “components”. In the more traditional areas of design, these components are usually a variety of materials. The “numbers” that define material behaviour are typically defined by standardized tests. In most cases, the materials are tested to destruction and both the manner of behaviour and ultimate values are recorded, thereby creating our “numbers”. On the production line, random samples are drawn and their performance is compared to the industry standards. We use the untested material and rely on the statistical probability that the test samples were, in fact, representative of the product in general.

Reliance on computer models presents an even more compelling reason to consider the “numbers” we use. As impressive as these models are, they, like

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APEGM Welcomes New Members

H. Buhler, EIT

The April 22, 2008, APEGM New Members Luncheon was an exciting event for those who have finally completed their Professional Engineering or Geoscience requirements. In celebration of their achievement all new members were invited to enjoy a delicious luncheon at the Niakwa Golf and Country Club and accept their Certificates of Registration personally from APEGM's President, Tim Corkery.

Executive Director Grant Koropatnick introduced the APEGM staff members in attendance and gave a description of the three categories of new members joining the association. The first category mentioned were the "Mobility Members": members of Engineering and Geoscience Associations in other

provinces who have applied for membership in Manitoba. Mr. Koropatnick recognized the fact that not all members registered in Manitoba actually reside in Manitoba and gave a special welcome to those who have actually moved permanently to our province.

Next welcomed were the "New Graduates": those who have completed the Member-in-Training program in Manitoba. Mr. Koropatnick sympathized with this group who now has to complete a 48-month program as opposed to the 24-month program he completed after graduation. He also commended this group for their diligence on completing the bi-annual reports which can be arduous and time consuming.



New Members Luncheon group after receiving their certificates

Finally, Mr. Koropatnick welcomed the third group, "New Canadians": foreign-trained members. This group has overcome many barriers in language and culture to have their professional status recognized in Canada.

After the lunch was served, each new member was presented with their Certificate of Registration and photographed receiving their certificate. After all the certificates were distributed, the group assembled for a group photo. The remaining audience members congratulated the collective new members with a hardy round of applause. Altogether, 184 new members joined the Association this year. ■

Those nominated for election to the ONE PROFESSIONAL GEOSCIENTIST position on the Council are:

RICK M. LEMOINE, P.GEO.; BORIS Z. SHEPERTYCKY, P.GEO.

Additional nominations may be made by the membership. Nomination forms are available from the Association office. The consent of the nominee must be obtained, and the nominator and six other members must sign the nomination form.

Nominations must be received in the Association office on or before Friday, September 12, 2008. Each completed nomination form must be accompanied by the nominee's resume, a history of the nominee's Association activities, and the nominee's platform (not to exceed 100 words). Forms for the resume are also available from the Association office.

BY-LAW CHANGES

By-law 17.1 prescribes that any proposal to introduce new By-laws, or to repeal or amend existing By-laws, at a duly convened meeting of the Association must, unless initiated by the Council, be signed by not fewer than six members. Proposals must be given to the secretary at least 45 days before that meeting. In this case, the date for the receipt of a proposal is **Tuesday, September 9, 2008.**

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

continued from page 3, President's Message

then Saturday judge all the Engineering and Geoscience entries. They finish up by grading and collating their marks and determining the prize winners. So for Sunday's awards ceremony, my task as President was to have all the fun – just show up and give out the prizes!

Our Association boasts more than 5,000 members, but it is the smaller group of dedicated volunteers that puts the heart into our professions. For the first time on June 17, 2008, APEGM planned a June barbecue event to show only a small amount of the appreciation that is deserving and to connect the 280 APEGM volunteers with one another in a social context. We hope this successful event will become an annual event that will grow bigger and better each year.

So to all of you who are volunteers – "good on ya" – you make it all possible. And to the rest of you reading this, please come and join us. I'm sure you will find it a more than rewarding experience. ■



Chantal Guay, P.Eng., M.Env.
Engineers Canada
CEO Message

LEADING THROUGH COLLABORATION

On March 10, 2008, I took on the role of Engineers Canada's chief executive officer. It is my belief that the organization works with and for its constituent members, and I will ensure that this continues. It is the collaboration with our members that has enabled the effective implementation of programs that are building a stronger engineering profession in Canada.

Engineers Canada has a lot of depth and history. I aim to get fully apprised on all of the organization's initiatives while working with our Board of Directors, staff, constituent members, partner organizations, and government to benefit the engineering profession and thus society at large.

I look forward to following in the footsteps of my predecessor on the many important Engineers Canada projects currently in operation, which I will report on through regular bi-monthly CEO messages, and I plan

to build on the organization's good direction.

It is important that I get to know both our internal and external stakeholders and build on a positive network of trust; favouring effective communication. I need to get to know our Board, constituent members, staff, and partner organizations in order to serve them and to provide them guidance.

Coming from a consulting engineering background, I know the importance of understanding your clients, their needs, and being able to work in their best interest. I will ensure that I work in the best interest of our profession, our Board, and Canada's professional engineers.

And I will invest myself fully in this task because I am very proud and passionate about our profession. I want society to realize the value our profession brings to everyday life. Engineering's national profile is

very dear to me, which is why I was very pleased to learn that Engineers Canada's Board of Directors created the Engineers Canada Task Force.

The Task Force is working with our constituent members to nationally promote our profession. It has been developing a long-term and sustainable national communications campaign, to commence this fall, which builds on and compliments our members' current extensive work. I look forward to working with our members on this important initiative, and greatly value their input.

My goal is to build on our successes and continue the work that has taken place throughout the years. What I bring is a new perspective. A new view on how we can move Engineers Canada's strategic objectives forward. I am here for our Board, our constituent members, our staff, our partners, and the engineering profession. I am here for you. ■

continued from page 7, Thoughts On Design

all designs, are founded on assumptions and approximations. We need to build these models by defining how we believe the system will work. Then we need to constrain the model to fit the capacity of the computing system we are using. Basically, the program that generates the model will respond as we have told it to. And our "instructions" to the computer depend on our "numbers" and our understanding of how those "numbers" interact.

This later point came home recently when a grad student was doing some full scale testing of fabric-covered buildings. The tests were to be compared to predictions using a widely accepted arch design program. It turned out that the tests showed the fabric-covered arches to be significantly stronger than the design program predicted. It appears that there are interactions occurring that we can only speculate on. We now know that the "numbers" that were being used for the design of fabric-covered arch buildings produced by that company

and for that span are wrong. Fortunately they are too conservative so it is an issue of economics, not safety. But now the question is, what about the other "numbers" in that industry?

As engineers we are always trying to find ways to improve our designs. Because our designs depend on "numbers", it follows that they are the keys to improvement. But they are also very complex values that come from an almost infinite number of sources to be enshrined in the documents we rely on. We need to guard against taking the "numbers" for granted. ■

Professional Development & Networking Events

Business Management Seminar: Beyond Just Do It: Coaching & Mentoring

D. Zinger

Presentation By
David Zinger, M.Ed.

February 25, 2008

I was honored to present a one day workshop on coaching, mentoring, and leadership to the members of APEGM on February 25, 2008, held at the Niakwa Golf and Country Club. Rather than outline everything discussed I offer here a few key concepts and practices.

What's in a name? Coaching and mentoring focus on developing other people and their performance. Worry less about what you call it and focus more on developing caring relationships that will help others develop and achieve results.

First duty. The first duty of a coach or mentor is to listen. Seek first to understand and demonstrate that understanding before seeking to be understood. Listen carefully to content, emotion, and intention. It will help you respond powerfully to the person you are coaching or mentoring.

Be Strong. Good coaching is more about drawing out strengths and resources than putting in advice or ideas. Focus on strengths – challenge first on strengths. Get a strengths assessment with the VIA Strength Inventory, free of charge at: www.authentic happiness.org. Leverage your

top 5 signature strengths in the service of the person you coach or mentor.

Four Coaching Start-Up Questions.

Ask the following four coaching or mentoring questions at the beginning of the relationship:

- What is your primary purpose in being coached?
- If this coaching is successful for you what will you know or be able to do when we are finished? Be specific.
- What do I, as your coach, need to do to make the coaching successful?
- What do you need to do in order to achieve your purpose and make the coaching successful?

Feedback. Own your feedback to the other, avoid telling them what to do – rather frame it as what you would do or have done. Transform coaching into self-coaching by encouraging the other person to use 2 powerful feedback questions:

- What did you like about what you did? (strength)
- What would you do differently if you were to do it again? (strengthening)

Change and gravity. We don't resist change as much as getting pulled back

to what we have always done by the gravity of the familiar. It can be hard for you to change your role into a coach or mentor and it can be hard for the person being coached or mentored to also change.

We gravitate to the familiar so make the new as familiar as possible as quick as possible. If you are interested in coaching don't wait until you are perfect or have read every book on the topic . . . start now!

Crazy Busy. To avoid going crazy busy ensure that you know what performances (things worthy of your attention) matter the most to you and use your time and efforts to stay connected to these key performances.

Be Crucial. Make your conversations crucial. Build mutual respect and mutual purpose with coaching to make it safe for the other person to talk about anything. Work with both relationships and results, not one at the expense of the other. ■

David provides coaching primarily in employee engagement. He also provides coaching on using social media and the tools of WEB 2.0. David is an active mentor and he is still being mentored himself. Visit David's very rich website with over 275 free articles at www.davidzinger.com

A System Approach to Indoor Air Quality

A. Erhardt, EIT

The American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) define acceptable air quality as a situation in which a substantial majority (80% or more) of the people exposed do not express dissatisfaction. The lunch hour presentation by Dr.

Dinko Tuhtar, P.Eng. introduced to the attendees how an environmental firm would approach an investigation into a facility's indoor air quality.

There are three scenarios that commonly occur. The first is Sick Building Syndrome. In this case, the

symptoms are purely subjective, and there has been no clinical confirmation of an illness. The second scenario would be a Building Related Illness. With this, there is a characteristic set of symptoms, which can be confirmed by a physician resulting from exposure

continued on page 11

Presentation By
Dr. Dinko Tuhtar, P.Eng.

March 5, 2008

continued from page 10, A System Approach

to a contaminant. The third scenario would be Mass Psychogenic Illness. This scenario is more social or psychological, and is not related to the building environment itself.

When a potential problem exists, it is important to assess the specific complaints that occupants are experiencing; whether it is dry eyes or throat, headaches or another malady. A detailed analysis must be

performed in order to isolate the cause of the symptoms. Common variables include duration, relation to the location or workplace, and the effect of environmental factors.

At the heart of each investigation is the impact on the occupants' health. The systematic approach can be summarized in a simple flow chart.

There are several potential air contaminants that can exist. From polluted ambient air to tobacco smoke

to particulate matter, a hypothesis for the complaints must be determined and verified. And once the root of the problem has been determined, it must be controlled to ensure no further negative impact upon human health. A final aspect that must be considered is how technical and technological control measures factor in to the entire system. Taking into account all of these factors while continually monitoring air quality allow us to maintain a healthy and productive workplace. ■

Managing Cultural Diversity In the Workplace

M. Friesen, P.Eng.

On April 9, 2008, a group of early risers gathered at the Norwood Hotel in Winnipeg for an APEGM professional development seminar. The morning included breakfast and a presentation on managing cultural diversity in the workplace.

As immigration to Manitoba continues to increase, one of the single largest occupational groups among newcomers is internationally-educated engineers. Increasingly, we are all finding ourselves working in multi-cultural workplaces, and an understanding of cultural diversity needs to be built both with newcomers and with so-called Canadian colleagues and managers.

The seminar began by comparing culture to bread. If you ask five people from five unique cultures to draw a picture of bread, you may well get five different pictures back. One's image of bread may range from flatbreads to braided loaves to dinner rolls to sliced sandwich bread. However, every culture will assert that it indeed does have something called 'bread'.

The same applies to workplace concepts like 'teamwork', 'initiative', and 'communication'. Just as every professional will hold a personal

concept of teamwork, initiative, and professional communication, these concepts vary from culture to culture in terms of what they mean and how they look in day-to-day professional practice. When these meanings are not recognized by others, misunderstanding and conflict can occur.

The seminar continued with a formal, two-part definition of culture, taken from Laroche 1:

"Culture specifies a range of actions, attitudes and behaviours that are considered acceptable in specific situations. It also attaches meaning to specific reactions and behaviours, and enables us to infer people's thoughts and feelings, based on their deeds and words."

It is these meanings, motivations, and values associated with a particular action or behaviour that may vary from culture to culture. For example, the act of a person remaining fairly quiet in a group meeting may be perceived as a sign of respect and deference by some at the same time as it may be perceived as a sign of boredom and disengagement by others in the room. Or, the act of sending an employee to an international conference may be seen as a very positive validation

of that employee's work, or it may be a completely meaningless reward to others.

Three cultural parameters that affect many aspects of workplace interactions were reviewed: power distance, individualism and collectivism, and aspects of communication. Power distance is a measure of hierarchy within a culture, and may range from highly participative cultures to highly hierarchical cultures.

Expectations of hierarchy have direct consequences on how much specific instruction – and conversely, how much latitude – employees expect to receive from their supervisor in day-to-day work. This in turn influences how one demonstrates and perceives initiative in an employee, and support from a manager.

The individualism – collectivism continuum in a culture refers to the relative relationships between the individual and the group. Canada is a highly individualistic culture, although this should not be confused with an implication of entitlement and 'walking over others' to meet individual preferences. Rather, an individualistic culture asserts that rights and responsibilities rest with the

continued on page 12

**Presentation By
Marcia Friesen, P.Eng.**

April 9, 2008

Professional Development & Networking Events

continued from page 11, Managing Cultural

individual and it is when the individual is free to exercise these rights and responsibilities that the interests of the group are also best served. One's cultural experience on this continuum has direct impacts on how one perceives the concept of teamwork, the roles and responsibilities of team members to one another, and how accomplishments are measured.

Finally, communication includes aspects beyond language fluency, and these aspects often have strong

cultural underpinnings. Several of these aspects were briefly reviewed, including body language and personal space, physical and eye contact, and expressiveness or emotion in written documents and in-person conversation. The range of expressiveness and emotion considered appropriate in the workplace tends to be quite narrow in Canada, and can directly impact on how feedback – both positive and negative – is delivered and perceived.

The seminar was delivered by Marcia Friesen, P.Eng., the director of the

Internationally-Educated Engineers Qualification Program (IEEQ) at the University of Manitoba. IEEQ is a program by which foreign-trained engineers can meet requirements for registration with APEGM. IEEQ includes senior-level engineering courses, a co-op work experience in industry, cultural training, language support, and professional networking opportunities for internationally-educated engineers. ■

1. Laroche, L. (2003). *Managing cultural diversity in technical professions*. Butterworth Heinemann.

From Reservoir Routing To Retirement Planning

K. Anderson, P.Geo.

On the evening of April 10, 2008, at the Canad Inns Fort Garry, the Women's Action Committee organized an event that spotlighted Pat Karras Spangelo, Certified Financial Planner, on the topic of from Reservoir Routing to Retirement Planning: The Application to Financial Planning.

Pat transitioned from civil engineering to financial planning in 1999. Pat discussed her background in the water resources field and its similarity to the work she does now to a group of approximately 25 guests.

Pat pointed out that our most valuable asset is not our house, car or savings, but our ability to earn a living. She asked the audience to consider the real cost of becoming disabled or ill. The financial cost of disability and illness may include: lost personal income, medical expenses, child care, home renovation, transportation, and lost spousal income. We can protect ourselves against these costs through disability insurance and/or critical illness insurance.

Disability insurance provides replacement income in the event of temporary or permanent disability.

Critical illness insurance provides a one time lump sum payment upon diagnosis and 30-day survival of a number of predefined critical conditions.

Pat then turned the discussion towards retirement planning. Pat began by talking about Old Age Security (OAS) and Canadian Pension Plan (CPP) as the base of any retirement plan. Pat pointed out tax law tidbits of interest to a professional audience, such as the OAS claw-backs at higher incomes and the CPP child-rearing drop-out provision.

In 2007, partial claw-backs started at an individual income of \$64,718, and full claw-backs started at an individual income of \$104,903. The child-rearing provision allows the primary caregiver of children under the age of seven to exclude those years from their benefit calculation if desired.

While Pat noted the importance of understanding tax law, she made a point of explaining an annual income of \$16,642 is the absolute maximum retirement income anyone received from the federal and provincial governments in 2007. Other sources

of retirement may include: registered pension plans, employer sponsored RRSP/DPSP plans, personal RRSPs, non-registered savings, and personal property.

Pat answered all questions that came her way throughout the talk with competence and good grace. Questions ranged from life insurance for a young healthy individual to the integrity of spousal RRSPs after a divorce. Perhaps the funniest moment of the talk came, after a question on income splitting, when the individual was so pleased with Pat's answer that he exclaimed "I just earned my \$10K back". ■

**Presentation By
Pat Karras Spangelo, P.Eng.**

April 10, 2008

In Memoriam

The Association has received, with deep regret, notification of the death of the following members:

*Derrick Ramdsen
John Shewchuk
Reagan Williams*

Driving Innovation: University-Industry Collaboration is at the Heart of Manitoba's Power Simulation Sector

**Presentation By
Paul Wilson & Ani Gole, P.Eng.**

May 27, 2008

Manitoba has emerged as a world leader in power simulation technologies, thanks in large part to a long-standing collaboration between engineers at the University of Manitoba and the Manitoba HVDC Research Centre.

A key technological milestone for the partnership, which began in the early 1980s, was the development of industry-standard software for modelling high-voltage direct-current (HVDC) lines that carry power over long distances. That innovation, together with others, helped the Manitoba HVDC Research Centre become the world's leading commercial manufacturer of electromagnetic transient simulation software.

The University and the Manitoba HVDC Research Centre also developed the world's first real-time digital power system simulator, allowing electrical utilities and equipment manufacturers to test devices before connecting them to power networks. That technology is now marketed under licence by Manitoba-based RTDS Technologies, which continues to work with the two original partners.

These achievements were honoured in 2005 with the Natural Sciences and Engineering Research Council (NSERC) Synergy Award for Innovation, Canada's foremost tribute for outstanding achievements in university-industry R&D collaboration.

On May 27, APEGM hosted a professional development event that detailed some of this work and highlighted the advantages of university-industry collaboration. The event included presentations by Paul Wilson, Managing Director of the Manitoba HVDC Research Centre, and

electrical and computer engineering professor Ani Gole, NSERC Industrial Research Chair in Power Systems Engineering at the University of Manitoba.

"This partnership has a very long history, and evolved from earlier collaborations between the University and Manitoba Hydro," Gole said. "The Manitoba HVDC Research Centre was established in 1981, as a partnership between Hydro, the University and other industry partners, largely to build on the pioneering work of Dennis Woodford, a Manitoba Hydro engineer who wrote the original algorithm for the EMTDC (Electro-Magnetic Transients including DC) program, and later became Executive Director of the Centre."

Gole teamed up with Woodford and others in the mid 1980s to develop EMTDC, which was being used mainly as a research tool to study HVDC phenomena. The team eventually created a graphical front end to the program, which evolved into PSCAD (Power Systems Computer-Aided Design). In 2000, the Manitoba HVDC Research Centre became a wholly-owned subsidiary of Manitoba Hydro.

"We've enjoyed considerable market success with our simulation software," explained Wilson. "All told, there are more than 30,000 licenses out there right now, supporting work on everything from ships and vehicles, to power generation, transmission and distribution, as well as wind power and alternative energy. There is also a very wide range of users, including students, university researchers, equipment manufacturers, consultants, and power utilities. The breadth of our customer base is one of the reasons

it's been so successful."

Today, the partnership is focused on refining the simulation technology through new optimization methods. The group is also expanding into other areas, including the development of an interface module for connecting small turbine generators to the standard 60 Hz power grid. In addition to Gole and the Centre, this project includes Manitoba Hydro and University of Manitoba professor Eric Bibeau, NSERC/Manitoba Hydro Industrial Research Chair in Alternative Energy. The team is working with a turbine designed to generate electricity from fast-flowing rivers.

One of Gole's graduate students, Farid Mosallat, has made this project the focus of his PhD program.

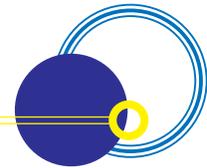
"We do the bulk of the work here at the Centre," Mosallat said. "Dr. Bibeau's team provides us with the mechanical data we need to develop our module, which in turn will help them control their turbine. So far, we have been using the simulation technology to test our interface, and we hope to begin field tests in Manitoba this summer."

In their presentations on May 27, Gole, Wilson and Mosallat underlined the value that collaboration has brought to their work. Irene Mikawoz from the NSERC-Prairies Regional Office was also on hand to answer questions about NSERC programs.

Gole said the partnership has allowed him to build what is now widely considered to be one of the world's leading power simulation research programs. Over the years, his research team has received significant support from NSERC, including

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2008 CEM AWARDS OF EXCELLENCE IN CELEBRATION OF CEM'S 30TH ANNIVERSARY



The efforts of consulting engineering companies and their professional engineers were celebrated in areas including environmental stewardship, use of advanced technologies, and contributions to society's infrastructure at the 9th Annual Manitoba Awards of Excellence in Consulting Engineering hosted at the Winnipeg Convention Centre on April 24th, 2008.

This year's event held special significance to the Consulting Engineers of Manitoba, as the association celebrated its 30th year of operations in conjunction with the Awards Event. Accordingly, this year's event included a retrospective showcase of CEM's rich history of firms, key people and engineering achievements of the past 30 years.

This year's Awards Event was the largest ever held by CEM, and was attended by current CEM members, valued clients, suppliers and guests. Leon Botham, National Chair of the Association of Canadian Engineering Companies (ACEC), was joined by a delegation of CEM Past-Presidents, government representatives and several retired key personnel involved in CEM's success over the past 30 years.

Retrospective photos from CEM members and projects over the past 30 years were displayed upon the venue's multimedia screens throughout the evening, and each guest in attendance received a commemorative CEM 30th

Anniversary Program to celebrate the CEM's first 30 years of operations.

"It is our privilege to serve society in such a meaningful way, but perhaps the depth of our responsibility is not always understood by the general public and we want them to see how we (CEM) help to set the bar high for engineering project standards in Manitoba. Innovation is our business, and we take great pride in adding value to the projects we undertake." said Cheng Wong, P.Eng., Chair of CEM's Awards Committee.

This year, 27 projects (up from 19 last year) were submitted by CEM member firms in one or more of the following award categories: Building Engineering, Infrastructure/Transportation, Environmental, Energy Resource Development, Industrial, and Municipal Water and Technology. The projects were judged by an independent, blue-ribbon panel of leading industry professionals again chaired by Dr. Jay Doering, Professor of Civil Engineering and Dean, Faculty of Graduate Studies, at the University of Manitoba.

The judging panel is allowed to present award(s) of excellence and merit in each category. In keeping with the Awards Program's mandate of fostering and promoting excellence in engineering, projects must meet a minimum standard to be selected for an award. The project with the highest score is declared the overall winner and presented with the prestigious

Keystone Award.

In addition to the CEM Awards of Excellence bestowed upon engineering projects, CEM presented several individual awards to engineers who have contributed above and beyond in service to CEM and the engineering industry.

The Lifetime Achievement Award was presented to CEM Past-President (94-95) Norm Ulyatt, P. Eng. of Dillon Consulting, in recognition of his individual achievements, leadership, and contributions to consulting engineering in Manitoba.

As this year's Lifetime Achievement Award recipient, Mr. Ulyatt served as the honorary presenter of the Keystone Award, which is presented to the best overall project, along with event title sponsors XL Insurance and Oldfield Kirby Esau Inc.

Established in 2005, the Engineering Action Award was presented by the Faculty of Engineering and CEM Past-President (87-88) George Rempel, P.Eng. of TetrES Consultants to his son and CEM Past-President (06-07) Roger Rempel, P.Eng. of TetrES Consultants, an actively practicing engineer who has demonstrated outstanding service and dedication to CEM, the Canadian consulting engineering profession and the community at large.

The final individual award, the Rising Star Award, is a newly established honour in recognition of CEM's 30th anniversary and was also presented



Danny Zaborniak is presented the CEM Rising Star Award.

Roger Rempel is presented the CEM Engineering Action Award.

Norm Ulyatt is presented the CEM Lifetime Achievement Award.

by the Faculty of Engineering, and is intended to recognize engineers, such as Daniel C. Zaborniak, P.Eng. of ACRES Manitoba, who has emerged as a leader in the early stages of his career through outstanding engineering achievements and active involvement with CEM through his work with CEM's many image committee initiatives.

CEM congratulates all firms for their participation in this year's awards. The CEM Awards Event will celebrate its 10th year in 2009, and CEM encourages all member firms to plan now to submit your projects for this special 10th Anniversary of the CEM Awards of Excellence, to be held April 23, 2009 at the Winnipeg Convention Centre.

AWARDS OF EXCELLENCE:

Category: Infrastructure/Transportation
Firm: Stantec Consulting Ltd.
Project: Kenaston Overpass Project

Category: Environmental
Firm: AMEC Earth and Environmental
Project: Federated Cooperatives Limited, Innovative Application of In-Situ Bioremediation Technologies at a Petroleum & Fertilizer Distribution Facility

Category: Building Engineering
Firm: MCW/AGE Consulting
Project: Garden Valley School Division, Emerado Centennial School

Category: Energy Resource Development
Firm: Teshmont Consultants LP
Project: Teck Cominco metals Limited, Waneta Hydro Substation

AWARDS OF MERIT:

Category: Building Engineering
Firm: Tower Engineering Group
Project: Brent Business Services Ltd, 125 Garry Street Energy Efficiency Upgrade

Category: Municipal and Water Technology
Firm: Earth Tech (Canada) Inc.
Project: Stormwater Management for the Winnipeg Airport Authority Development

Category: Building Engineering
Firm: Crosier Kilgour & Partners Ltd.
Project: Edison Parking Structure Assessment and Rehabilitation at 415 Edison Avenue

Category: Building Engineering
Firm: AMEC Earth & Environmental and Crosier Kilgour and Partners Ltd.
Project: Edgewater Group Ltd. Edgewater Condominiums

Category: Infrastructure/Transportation
Firm: Dillon Consulting Ltd.
Project: City of Winnipeg Transit Department, Transit Priority Program

Category: Infrastructure/Transportation
Firm: UMA Engineering Ltd.
Project: CN Overpass on Trans Canada Highway #1 West, Portage la Prairie Bypass

Category: Environmental
Firm: GENIVAR & TetrES Consultants Inc.
Project: Engineers Canada & City of Portage la Prairie, water resource Infrastructure Study to Assess Vulnerability in Response to Climate Change

Category: Industrial
Firm: KGS Group
Project: Inland Aggregates pine Ridge Project

The Keystone Award was awarded to Stantec Consulting Ltd. for their design engineering and completion of the Kenaston Underpass, representing a major advance in the transportation system of Winnipeg. Keeping the trains running and the transfer of rail shipments moving throughout the project was a major challenge, and required seven contracts, two consultants and three construction firms to come in on budget and on time.

CEM thanks all participants and congratulates this year's winners! ■



Stantec is presented the Award of Excellence in Infrastructure/Transportation and the 2008 Keystone Award.



AMEC is presented the Award of Excellence in the Environmental category.



Tower is presented the Award of Merit in the Building Engineering category.



EarthTech is presented the Award of Merit in the Municipal & Water Technology category.



Crosier Kilgour is presented the Award of Merit in the Building Engineering category.



AMEC and Crosier Kilgour & Partners Ltd are presented the Award of Merit in the Building Engineering category.

GOVERNMENT PRESENTATIONS TO APEGM MEMBERS

Hon. Hugh McFadyen Speaks to APEGM Members – Part One

Grant Koropatnick began with some jokes about politicians, lawyers and engineers: “You are an engineer if you have no life, and you can prove it mathematically.” Hugh countered with: “The problem with lawyer jokes is that lawyers do not think they are funny, and the rest of us don’t think they are just jokes.”

The Leader of the Opposition explained the next Bipole transmission line, and the history of our HVDC system. He then went into the details of both primary route choices – east versus west side. Lots of technical issues were explained, such as the amount of forest to be affected, the number of stakeholders in each case, and the amount of line losses.

References were made to the Hydro engineers and where they wanted the line. There is no strong argument against the building of a third line as the ice storm in the 90s took down both Bipoles 1 and 2. Therefore, having a third line is necessary to avoid any future catastrophe.

The figures related to distances, line losses, trees cut, and the impact on the environment are shifting. Building the third line west of Lake Winnipegosis is 1340 km, versus 900 km for Bipoles 1 and 2, and even shorter for the east side route. The west side route cuts through a lot of parkland and provincial forests. Bob Brennan, President and CEO of Manitoba Hydro, was quoted September 25, 2007, “. . . \$1500 million too much to go the long way around.” For all these costs, surely there must be a benefit. At two Legislative Hydro Committee meetings in recent months the Premier gave two different justifications; each one refuted by knowledgeable outsiders.

Three myths were floated by the Media:

Myth 1: The west side is better for the environment. East side trees are worth more.

Only the east side has boreal forests? Even CMC said to the government that the western trees needed protection more urgently. Minister Selinger reportedly replied that the forest to the east has more emotional merit.

Myth 2: The east side would preclude UNESCO designation.

Jim Collinson has UNESCO credibility. He points out that Banff Park has roads and power lines and UNESCO likes Banff.

Myth 3: If we go east we will never get approval. Leaders of the first nations will not agree to a power line.

There are 12 first nations communities and thousands of land owners on the west route. There is no certainty that all west side stakeholders would be in agreement.

Hugh toured three communities by winter road during the week of March 3, 2008. Only Poplar River is on record as opposing Bipole 3. 15 eastern reserves support the east side route.

This last NDP excuse falls apart too. If an east side group sues, the project cannot go ahead. The NDP is wrong on this. If every major project could only go ahead if no one objected, nothing would get done in Manitoba. For example, the Supreme Court of Canada said, in Haida vs. BC: the Crown is not required to reach an agreement. Aboriginal groups do not have a veto in law. If you can make a valid case for an east side line, then it can go ahead. The provincial cabinet has full authority on the use of the land. For the Cabinet to say otherwise is not true.

Hugh questioned the credibility of Robert F. Kennedy, Jr. He is portrayed as a highly visible opponent of the east side route. He claims to be leading the environmental cause, but he is against all hydro power and Cape Cod wind

power, and says the USA has enough coal. Is coal the right decision?

There are many supportive groups and important entities in favour of an east side route.

Questions from the floor:

1. Is government action not limited by the Sustainable-Development and Hydro Acts?

Hugh: Not really. The politicians will artificially put the CEC hearings so far down the road that it will be too late for the CEC Final Report to have any effect on the outcome.

2. This government has shown a pattern of timing CEC reports to suit their political needs. CEC hearings report only comments which support the Government’s agenda. Is there any way to change this?

Hugh: Not really.

There was no time for further questions.

Reporters from the CBC, CJOB and the newspapers were in attendance. A camera crew from CTV taped the speech, the question session, and did several interviews after the presentation. The presentation got coverage on the CTV News at Six. ■

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Hon. Greg Selinger Speaks to APEGM Members – Part Two

It was Council’s goal to have the top political leaders present to APEGM members on the top engineering issue in the province: BiPole III. The Premier was invited to speak to APEGM members on the topic of the east versus west-side transmission line route.

Instead, Finance Minister Greg Selinger gave a broad-based presentation on topics related to Manitoba Hydro and the environment. The Minister’s abstract, sent prior to the lunch date, stressed the attributes

of a successful Manitoba Hydro. To some, this made it seem that the presentation would ignore the issue of why the west side route was the only option Manitoba Hydro was being allowed to consider.

The event, which took place at the Canad Inn Polo Park, was well attended. The introduction by Executive Director Grant Koropatnick stressed that the route the Bipole would take was a political decision and not a technical one. In an attempt to inject some levity into the room, Grant told his favorite engineering joke: "Engineer meets a talking frog." The invited guest speaker chose not to respond to our Executive Director's introductory joke, instead reminding us that politicians make fools of themselves often enough during "question period at the Legislature", so thus, there is no need for a politician joke.

Minister Selinger did spend time telling about the good that Manitoba Hydro does. Among the notable numbers: 5400 MW now installed, 5000 MW to be added in the future, and 2000 MW more to be in place by 2020. All 4 diesel dependent remote communities will be greener soon. Hydro's 5600 employees bring in \$2100 million a year; \$592 million from outside of Manitoba.

While Manitoba exports are small compared to Quebec and BC, and with US consumption, the percentage of Manitoba production used elsewhere is very impressive. All of the numbers and statistics were presented in colourful PowerPoint slides with impressive graphs and charts. The presentation was very well prepared.

Manitoba's Power Smart Program is ranked #1 in Canada, however, the adjudicator and criteria were not explained. Many modern energy buzzwords were mentioned in the presentation: landfill gas, biofuels, petroleum electric hybrid vehicles, solar power, and vehicle-2-grid. Yet the pros and cons of these alternative technologies were also not discussed.

The Minister seeks a quicker approval process for major Manitoba Hydro projects. This will be needed if total

production is to increase on schedule. Future generation will be run-of-river and low head dams only.

Quite a bit of time was given to questions and answers as the Minister seemed open and relaxed as he fielded questions from a wireless microphone that was criss-crossing the room with the help of Events Coordinator Angela Moore.

One engineer questioned the figures for line losses on the screen (\$200 million, not the \$1500 million which had been seen elsewhere). Minister Selinger indicated that the numbers all came from Manitoba Hydro, and that he was not in a position to know which were correct. The questioner was invited to contact Manitoba Hydro for clarification.

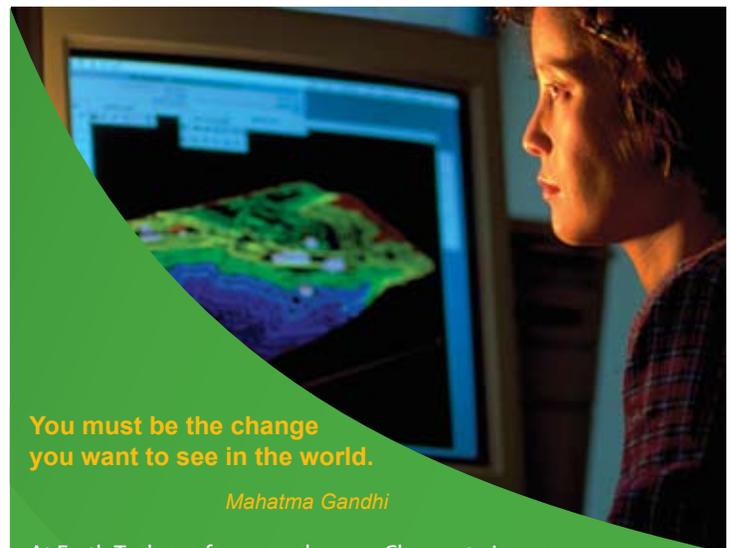
Another questioner put forward the idea that a power line does not prevent designation by UNESCO as a park. Minister Selinger did not agree. Mr. Selinger went on to explain that Bipole III is considered inferior because it serves those outside the 'preserve'. A new paved road or expanded logging and hunting industries would be better if they are done to benefit preserve residents. Previous decisions, by UNESCO, rank a set of wires far overhead as less damaging than a paved road and increased logging and hunting, but that was not reflected in the Minister's answers.

Another asked about drawing the traditional hunting lands on a map, routing the Bipole around those, and designating the land east of that as the 'park'.

Minister Selinger commented that the UNESCO Boreal Forest plan will be primarily an Ontario effort, with a little corner of Manitoba added to it.

Another question: when the world needs far more electricity, will Manitoba Hydro be ready? Answer: that is why we are building a diverse energy economy which includes both hydro power and wind power. This epitomizes a disparity: engineers see the value of water power, which is there when needed, and at reasonable cost. Some politicians seem to value wind more than water because of the trendiness, even though it costs far more to deliver to users.

The Minister and staff stayed around following the formal presentation and spoke with anyone who wanted further conversation. Minister Selinger was very gracious, friendly, and approachable with all unique questions and comments. This event achieved Council's goal of having the top political leaders present their views to the APEGM membership on the topic of Bipole III. ■



**You must be the change
you want to see in the world.**

Mahatma Gandhi

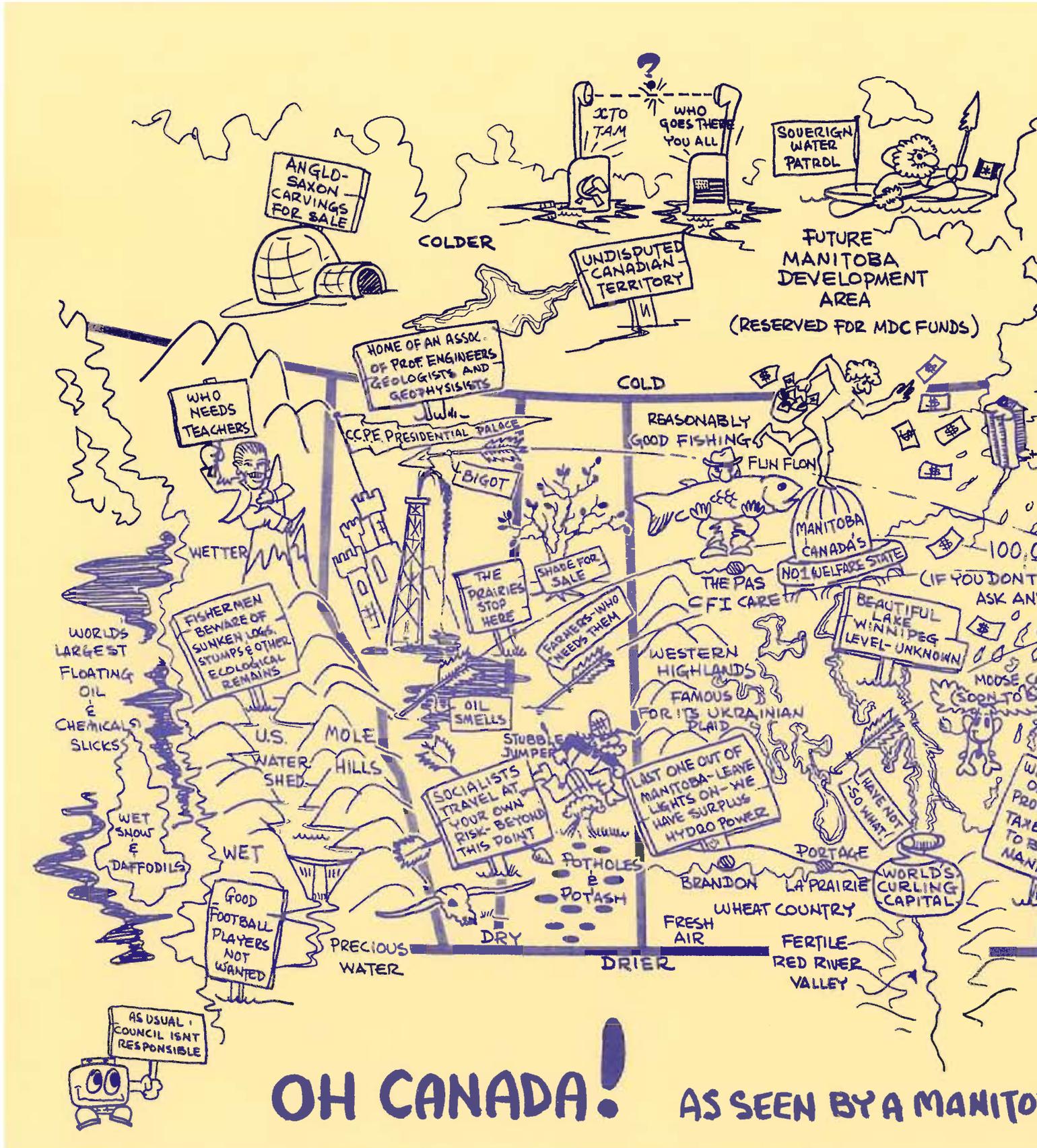
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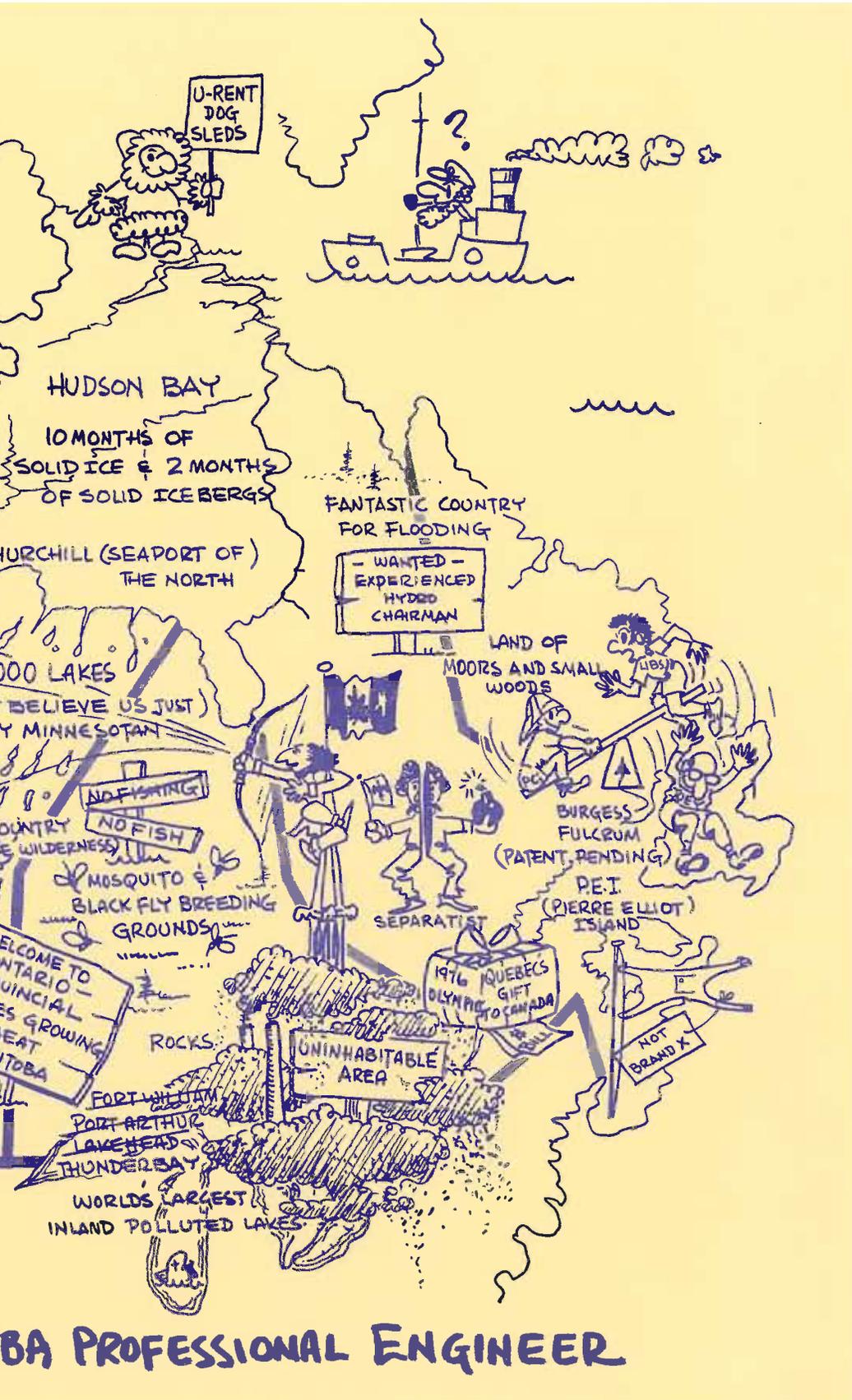
A BETTER TOMORROW made possible





OH CANADA! AS SEEN BY A MANITOBIAN

Placemat for Annual Spring Dinner, 1976 - Found in the archives by the Heritage Committee



This charcoal drawing was found in the archives of the APEGM office. Since then, it has been framed using a special process to preserve its authenticity and protect it from natural deterioration.

Do you recognize this man?

George De Pauw, P.Eng., did and is the winner of an APEGM prize pack valued at over \$100. George is the author of the book, *Pioneering in Highway Bridges for the Province of Manitoba and the Engineering Profession*. Congratulations!

The Mystery Man pictured here, is M. A. Lyons, P.Eng., the first president of the association then called APEM. He was president during the years 1920 and 1921.



Watch for more upcoming challenges and contests brought to you by APEGM for your chance to win more prizes.

Council Reports

Thursday, March 13, 2008

A. Erhardt, EIT

Following a round of introductions, the meeting kicked off shortly after 12:30 p.m. Executive Director Grant Koropatnick began the meeting relating a story where a couple of APEGM applicants had an incredibly difficult time obtaining registration. Executive Director Koropatnick described the scenario and highlighted its consequences: declining member involvement and declining future applications.

This led into a discussion of the Fair Registration Practices in the Regulated Professions Act. Councillor Brian Shortt summarized the issues at hand, and highlighted areas that might be of concern to the association. Councillor John Woods voiced concerns over another act overriding the Engineers/Geoscientists Act, and asked whether APEGM would truly be self-regulating anymore.

An animated discussion ensued over the acts and their interaction. The end result of the debate was that Council suggested that APEGM contact the government and request to be involved in the determination of the Regulated Professions Act regulations. As well, it was noted the Academic Review Committee's revised Manual of Admissions would be tabled at the next meeting.

Admissions Director Sharon Sankar then presented a summary of proposed Academic Review Committee (ARC) procedure changes. The key point to her summary was that the review process is taking a lot more time and resources than it should and a new table would improve efficiency of processing applicant files. Executive Director Koropatnick highlighted examples where policies were not being followed which resulted in years being added to the registration timeline of some applicants. Councillor James Blatz asked that the IEEQ also be addressed in the overview table.

The general consensus is that the proposal was a step in the right direction, but still required some minor revisions. A motion was tabled to approve the document in principle, and develop a policy for consideration for the next meeting.

It was also noted that certain geoscientist issues still needed to be addressed prior to a final draft.

Council then reviewed the exemption policy for geoscientists that was brought forward by the Registration Committee, and put forward a motion to accept the policy. This was followed by a discussion on whether professors of engineering courses at an accredited institution should be registered by the association, and whether teaching qualified as engineering experience. Several other associations recognize teaching as practicing engineering, and therefore professors would be eligible for registration with the association. A motion was tabled for discussion at the next meeting.

The registration discussions continued with a debate over a limited practice designation for technologists. Councillor Jim Miller went over the history of the APEGM/CTTAM joint board, and suggested that resuscitating the board might be beneficial to the relationship. Some councillors suggested that it would be an excellent idea, in order to protect the public from the abuses that could arise from two separate acts. The problem that exists however is that our Act, as it currently stands, does not have a different designation for a limited scope of practice. How would someone differentiate between a full P.Eng designation and one of a limited licensee?

It was mentioned that both Alberta and Saskatchewan have different designations. However, from past experiences, it is known that technologists desire their own designation, independent of APEGM. There are efforts currently on the national level for technologists to develop their own governing body. Executive Director Koropatnick informed Council that CTTAM was not pushing the issue with APEGM; the last joint board meeting had been cancelled out of lack of urgency. Council agreed that to renew the relationship with CTTAM was a good idea.

As the meeting wrapped up and the usual formalities were observed, a special acknowledgement was made to Joan McKinley who was retiring after working for APEGM for 32 years. The meeting was officially adjourned at 4:20 p.m. ■

continued from page 4, Engineering Philosophy 101

in fact, only a Professional Engineer was entitled to "do engineering work". I pointed out that our APEGM documents provided to Members-in-Training note that "it is not necessary to be a professional engineer or geoscientist in order to do engineering/geoscience work in Manitoba. If you are supervised by a professional member registered in Manitoba who takes responsibility for your work, you are allowed to do engineering or geoscience work . . ."

This is consistent with the CEQB proposal and for me it is the only way I could justify the apparent MIT contradiction. It also follows that this allows Technologists to do "Engineering" work.

We often find that our busy lives keep us too occupied to worry about the minor inconsistencies in definitions. Those of us who enjoy the privilege of working with students, however, need to find ways to help students

come to grips with "our" world. Recommendations like the CEQB document I have cited (and probably to some degree misinterpreted) serve to clarify situations. Clarity minimizes disagreements. ■

Thursday, May 8, 2008

A. Kempan, P.Eng.

APEGM's spring meeting was brief as Council meetings go, coming in at a little under 3 ½ hours. Council also experienced an unusual problem, not having sufficient members present for quorum. A few Council meetings in the past were close to the mark, but at start time May 8, 2008, Council was short.

A member was slated to join in at 1:30 p.m. via teleconference, so Council improvised by first beginning with informational agenda items. Councillor Blatz made an interesting observation, geoscientists and engineers were present in equal numbers; the first time that had happened at a Council meeting.

Council heard a presentation by Ms. Kathryn Hearson, the 2008/2009 University of Manitoba Engineering Society (UMES) senior stick. She outlined to the members the structure and function of the UMES organization. They had recently restructured their organization, creating 15 directorships and groups, to better spread the workload. Ms. Hearson went on to explain the workings of the new UMES.

In September 2007, the University of Manitoba engineering faculty passed an important milestone, its 100th anniversary, and UMES played an important role in the celebration. For a future event, UMES had bid on the 2010 Western Engineering Competition, a yearly meeting organized by the Western Engineering Students' Societies Team (WESST). WEC is a five-day event held every January at an engineering school in western Canada. Ms. Hearson ended with an interesting statistic: there were over 1000 students in engineering for the 2008/2009 school year.

After the UMES presentation, President Tim Corkery determined exactly how many councillors were required to form quorum and the math was: seven members plus one. Just when it seemed Council reached an impasse, Past President Digvir Jayas, true to his word, joined the meeting by teleconference and delivered the necessary quorum. The meeting was called to order at 1:30 p.m.

The agenda was swiftly voted on and the minutes of the previous meeting were approved. Council moved on to what

will likely be a very important process in the near future, the Registration of Internationally Educated Graduates. The process for doing this was, in the past, slow and laborious. The March meeting had agreed in principle on streamlining registration for those applicants and a set of comprehensive tables and policies were presented.

The policies would be applied to all applicant and in many cases would reduce the assessment reply time from months to days. The new process would come into affect immediately and be applied to any current assessment file. The new policies would be written into the Academic Review Procedures Manual and published on the APEGM web site as soon as possible.

Council dealt with a pair of items of particular interest to geoscientists: the Renewal of Geoscience Inter-Association Mobility Agreement and the National Geoscience Knowledge Requirements document. APEGM officials would sign the mobility agreement on May 31, 2008, in Winnipeg at the CCPG board meeting.

The knowledge requirement agreement laid out the minimum experience and education necessary for registration across Canada. However, provincial requirements would still apply, in addition to national requirements.

The meeting was winding down and Council turned to a Draft MOU with the APEGM Foundation. Initially created to fund a donation to the Engineering and Information Technology Center at the University of Manitoba, the Foundation was close to fulfilling its monetary commitment to the EITC, leaving it free to seek another worthwhile cause.

The yearly disbursement of funds would be around \$42,000. Although separate from APEGM, the Foundation was seeking guidance from APEGM on future fund raising and promotional activity. Executive Director Grant Koropatnick invited Council to think of possible projects.

Council turned to planning for the next meeting, an evaluation of that day's meeting, and then another meeting was in the bag. ■

continued from page 13, Driving Innovation

discovery funding for fundamental studies, scholarships for students, and partnership funding through NSERC's Collaborative Research and Development and Industrial Research Chair programs.

"It's been a great experience and we've benefited tremendously," he said. "I really think the only way to succeed today is to have this kind of industry-university partnership."

"Being able to tap into the expertise and knowledge at the University has been a huge advantage for us," Wilson said. "Our products are driven by technology, and some of the problems we run into require an extremely high level of understanding, so I rely on the University to fill in some of those gaps."

"Many of the students involved in these projects are also very desirable potential employees for us," Wilson added. "Farid is a good example, and

he is already working here part-time as he finishes his PhD. People look at this partnership and say, 'how did you do that?' or 'I'd love to have something like that'. I think we have a real jewel of a program here." ■

DISASTER: THE DARK SIDE OF ENGINEERING

P.H. Boge, P.Eng.

It's the nemesis of our profession. Failure. The opposite of what was intended. Despite our advances since the dawn of our profession, engineering disasters still occur. Lives are lost. People are injured. Property and resources lost. Why do engineering disasters occur? What can we learn from the recent bridge collapse in Minneapolis? What about TWA Flight 800? And what role can failsafes play in avoiding disasters?

IS IT AN ENGINEERING FAILURE OR DISASTER?

An engineering failure is an engineered system that does not meet the required outcome. It is either unsafe, or it does not perform to the anticipated expectation (or both). An engineering disaster is an engineering failure that is escalated due to loss of life, injury or significant property or resource damage.

CAUSES OF ENGINEERING DISASTERS

The major causes of engineering disasters include:

- human factor (ethical failure)
- design flaws (negligence, insufficient knowledge)
- material failures
- extreme conditions or environmental circumstances
- combination of the above

A study by the Swiss Federal Institute of Technology in Zurich analyzed 800 cases of structural failure which resulted in deaths, injuries and property damage. In cases where engineers were considered to be at

fault, researchers classified the causes of failure as follows:

Insufficient knowledge	36%
Underestimation of influence	16%
Ignorance, carelessness, negligence	14%
Forgetfulness, error	13%
Relying upon others without sufficient control	9%
Objectively unknown situation	7%
Un-precise definition of responsibilities	1%
Choice of bad quality	1%
Other	3%

MINNEAPOLIS BRIDGE COLLAPSE AND QUEBEC BRIDGE COLLAPSE

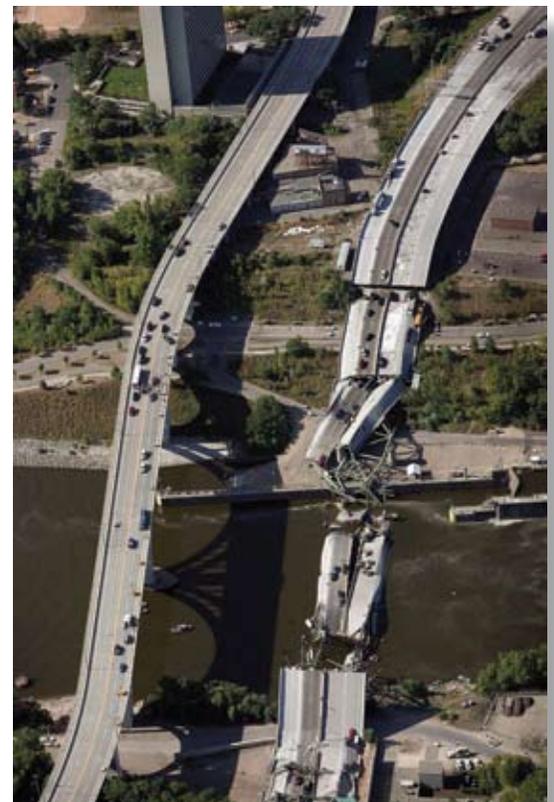
On August 1, 2007, at 6:05 p.m. the I-35W Mississippi River Bridge in Minneapolis collapsed. Thirteen people died. Approximately 100 were injured. The failure of the central span of the deck truss resulted in a collapse of the entire truss structure and some of the approach span. The ongoing investigation by the National Transportation Safety Board (NTSB) indicates a cause of the collapse that few would have anticipated.

Constructed from 1964 to 1967, "Bridge 9340" was 1907 feet in length and consisted of 14 spans. In 2005 the bridge was rated as structurally deficient and in possible need of replacement. A June 15, 2006, inspection found problems of cracking and fatigue.

But a report issued on January 11, 2008, by the Federal Highway Administration, working in conjunction with the NTSB, focused on the original design of the gusset plates on the bridge as being at the core of the disaster. (See Footnote 1)

NTSB Chair Mark Rosenker explained that some two dozen gusset plates located at the south end of the span were the problem. Rosenker indicated that eight joints were particularly weak at the time of the collapse.

Gusset plates are connections. Typically, a number of members will connect to form





a node or joint. Two gusset plates held together the steel members at the joints on the bridge. Unlike airplanes, bridges are unique structures. Multiple airplanes can be built using the same or similar parts. But each member of a bridge is uniquely designed for that particular structure. Each gusset plate was specifically designed, not 'taken off the shelf'. The 1967 construction methodology incorporated rivets to connect the members to the gusset plates. Today, connections are typically welded or bolted. The change is due to ease of installation resulting in a lower cost relative to rivets. Riveted connections were not said to be responsible for the collapse.

Rosenker says the gusset plate discovery came as a shock to investigators. No other bridge disaster has had this type of flaw. Rosenker indicated that investigators searched for the design calculations without success.

"All 16 gusset plates from those eight nodes were fractured. The other gusset plates from the main trusses were intact. Gusset plates are generally designed to be stronger than the beams they connect, and one would not expect to find them fractured," said Rosenker.

NTSB examined the bridge construction materials for a new deck that were on that end of the bridge, as well as the existing bridge materials of concrete and steel. None of the existing material was found

to be deficient. Rosenker said the problem was with the original design of the bridge.

"The investigation has determined the design process led to a serious error in sizing some of the gusset plates in the main trusses. Specifically, the gusset plates at the eight nodes. Basically, those gusset plates were too thin to provide the proper amount of safety in a bridge of this scale."

Rosenker explained that the gusset plates were only ½ inch thick. They should have been approximately 1 inch thick. "It is the undersizing of the design which we believe is the critical factor here. It is the critical factor that began the process of this collapse. That's what failed," Rosenker said.

Sometimes collapses are related to improper maintenance or inspection programs, however, Rosenker does not see that to be the case with the I-35 Bridge. "It is important to understand that the bridge inspections would not have identified the error in the design of the gusset plates." He added that inspections typically examine the condition of members, not whether the members were designed correctly in the first place.

While there are some 465 bridges in the US of similar construction, Rosenker is of the opinion that this particular design flaw is specific to the I-35W Bridge.

This brings up the issue of whether engineers are called to carry out an evaluation of the entire structure when performing an inspection. Typically, engineers are required to do so if the loading on the structure changes. Maintenance and visual reviews typically do not include a complete analysis

of the structure after it has been designed by an engineer.

Rosenker explains: "If you are going to make changes in loads or in additional loads of traffic, higher loads of traffic, then it is prudent to recalculate not just your gusset plates, but the entire composition of the elements of your bridge."

Even though numerous gusset plates on the I-35W Bridge were corroded, according to Rosenker, corrosion was not a factor in the collapse of the bridge.

Engineering consultants for The Minnesota Department of Transportation (MnDOT) recommended that the department should reinforce the gusset plates on the bridge. The plates had rusted away to half their original thickness, already undersized for the bridge's weight. Rosenker didn't say whether reinforcing those gusset plates would have prevented the collapse of the bridge.

"I'm not going to speculate, if it were designed properly, it could. If it were not designed properly, it might not," he said.

Rosenker explained that investigators will take six months to investigate what caused the bridge and the weak gusset plates to fail. Rosenker also indicated that the



additional weight from the construction materials on the bridge for the new decking may have been a factor. It was indicated that the final report on the I-35W bridge collapse will be finished by the fall of 2008.



Remains after the southern span fell in 1907, killing 75 (courtesy NAC/PA-109498).

In Canada, there was an infamous bridge collapse. The Quebec Bridge was part of the National Transcontinental Railway project and sponsored by the federal government.

Construction was underway in 1904 and all seemed to be going well as it neared completion in the summer of 1907. But on August 29, 1907, after four years of construction, the south arm and part of the central section of the bridge collapsed into the St. Lawrence River. 86 workers were on the bridge when it failed near quitting time. 75 were killed. The rest injured.



The twisted steel wreckage of the Quebec Bridge after its collapse August 29, 1907 (courtesy National Archives of Canada).

WHY DID THIS HAPPEN?

Preliminary calculations made in the early stages of planning were never properly reviewed prior to the final design. In reality, the weight of the bridge far exceeded its design capacity. The local engineering team noticed distorted beams and reported this to the supervising engineer, who in turn assumed they must have been bent prior to installation. It was

later determined that the issue was in fact more serious and a telegraph was issued not to load the bridge until the project had been reviewed.

But the message did not arrive in time. That afternoon the bridge collapsed.

The Quebec Bridge was a disaster waiting to happen. A ticking time bomb set by the engineers who designed it.

So what could have prevented the collapse? Design checks would have made a difference. The other contributing factor was that preliminary information was not checked. That information was assumed to be correct.

'Challenge everything' might have been a good motto that, if employed, could have saved the lives of the passengers during rush hour in Minneapolis and those workers close to quitting time on the Quebec Bridge.

TWA FLIGHT 800

On July 17, 1996, at 8:19 p.m. TWA flight 800 took off from JFK International Airport in New York bound for Paris. At approximately 8:31 p.m. the Boeing 747 aircraft crashed into the Atlantic Ocean near East Moriches, New York. All 230 people on board died. The National Transportation Safety Board concluded "that the probable cause of the TWA flight 800 accident was an explosion of the center wing fuel tank (CWT), resulting from ignition of the flammable fuel/air mixture in the tank".

The investigation did not reach a conclusion as to the source of ignition energy for the explosion. However, of the sources evaluated, "the most likely was a short circuit outside of the CWT that allowed excessive voltage to enter it through electrical wiring associated with the fuel quantity indication system".



A National Transportation Safety Board official walks with three family members of TWA Flight 800 victims near the wrecked plane's partially reconstructed fuselage.

Factors that contributed to the "accident" were the design and certification concept that fuel tank explosions could be prevented solely by precluding all ignition sources and the design and certification of the Boeing 747 with heat sources located



Risk is a combination of the severity of an event and the likelihood of it happening.

The car manufacturer may come to the conclusion that the likelihood of disaster (e.g. collision causing fire resulting in death of the occupants) is only one in a hundred thousand. That poses a dilemma. Does the entire fleet of vehicles get recalled for the sake

beneath the CWT with no means to reduce the heat transferred into the CWT or to render the fuel vapour in the tank non-flammable." (See footnote 2)

While efforts were made to examine the entire system, and the possibility of a fuel system explosion in particular, the mode of failure was apparently not adequately accounted for. A more detailed failsafe could have accounted for this.

ENGINEERING, SAFETY, ETHICS... AND THE ALMIGHTY DOLLAR

Take a hypothetical case where a car manufacturer produces a new vehicle. But when the car hits the market a mistake is discovered. Suppose an error in the design points to a probability of killing the occupants of the vehicle under certain conditions, say explosion or sudden fire when involved in a collision.

The person or group responsible for discovering the error would (should) inform management so that corrective action can be taken. Management would then recall the cars and have the corrective measure installed.

Sounds easy.

But recalls are not cheap. And suddenly the problem enters a realm where engineering, safety, ethics, money, and the value of human life intersect. While the car manufacturer is in fact informed about the potential mode of failure, they may be particularly interested in the probability of failure. Namely, they may be as concerned with what happens (death) as with how likely it is to occur.

of (potentially) one serious event? If not, at what probability does corrective action get taken? One death? Five deaths? Ten deaths? And who decides what criteria are used to determine the acceptable level of probability? And who decides on the level of risk?

The point is that it may be cheaper for the manufacturer to deal with the lawsuits of the disastrous event than to correct the problem. Law suits resulting from deceased vehicle occupants may be cheaper to deal with than 100,000 recalls.

But the problem is not with the recalls. It's not with ethics. Not with probability. And it's not with trying to put a price tag on the value of human life (although there are companies who do precisely that).

All of this could be avoided if the car would have been properly designed in the first place and if thorough failsafes would have been conducted throughout the development/production stages of the vehicle.

The more thorough the failsafe, the less likely the probability of failure and/or disaster.

On the issue of recalls, it is reasonable (and perhaps expected) that designers and manufactures should side with the reasoning that says that the right thing should be done regardless of the cost, particularly when human life is at stake.

If a company's failsafe was not adequate and an error passed through the design checks, why should an unsuspecting person in the public have to pay for that

mistake? Not every manufacturer would agree with this logic.

Though the families of the deceased/disabled who suffered as a result of unethical practices probably do.

FAILSAFE

There tends to be two types of failsafes. One is incorporating some feature for automatically counteracting the effect of an anticipated possible source of failure. The other is to ensure the design of a system has no chance of failure. (Merriam-Webster)

If the latter definition is used, then the purpose of a failsafe is to prevent the engineered system from failing. In short, failsafes incorporate action to detect and avoid disaster prior to their implementation.

Failsafes include:

1. The failure event (e.g. death)
2. Analysis of all the modes of failure (e.g. fire as a result of collision)
3. The probability of failure (% chance of the mode of failure occurring).

There are at least three keys to carrying out a failsafe:

1. INVOLVE A WIDE RANGE OF FAILSAFE PARTICIPANTS

Knowledge is based on experience and/or education. Engineers, management, operators, maintenance personnel, assembly line workers, clients, and customers – as many people that can have relevant input into the failsafe should be included in the team.

One of the lessons learned from previous disasters is that there was insufficient knowledge and/or wrong assumptions made about the mode of failure. A critical aspect of project or product safety is the connection between the bodies of knowledge – namely how engineering interacts with the rest of the project – i.e. construction, operations, utilities, maintenance, etc.

By involving people with different points of view on the same subject, a greater depth of understanding of the problem and potential modes of failure can be achieved.

2. DETERMINE THE DISASTROUS EVENTS THAT COULD TAKE PLACE AND THE MEANS BY WHICH THEY COULD TAKE PLACE.

The failsafe team needs to define all of the ways in which a system can fail. They then need to determine what needs to happen to meet those failure criteria, and then check to see that the system has been (should be) designed against those criteria. What can go wrong? How can it go wrong? This essentially means working backward from an event to a (possible) root cause.

This involves asking: what would it take for an explosion to occur? For toxic gas to be released into the atmosphere? For someone to die? To be injured?

3. DESIGN/PRODUCT REVIEWS

The best way to solve a problem is to avoid it in the first place. One of the ways to catch problems before they become problems is for the failsafe and design teams to review designs regularly. A product or project is conceptualized and a design is prepared based on the parameters (scope, schedule, cost, quality). The failsafe team reviews the entire system in depth at numerous stages in the process. For projects this would include:

- Concept
- Preliminary design
- Detailed Design
- Pre-Construction

- Construction
- Commissioning
- Operation
- Maintenance
- Decommissioning

This involves an in-depth review of the entire scope of the project. It incorporates a specific examination of every sub-system and each engineering discipline in and of itself. It then incorporates a macro review of the whole system in terms of how the sub-systems and engineering disciplines related to each other. The goal is to ensure the parts and the sum of the parts have all been carefully evaluated.

CONCLUDING COMMENTS

Engineering disasters should not happen. Proper designs by competent engineers that are reviewed through detailed failsafes and carried out by competent contractors/manufacturers will safeguard the public from disasters related to engineering failure. It's not enough to learn from past mistakes. It's imperative that they are prevented from happening in the first place.

After the loss of life, arguably the most difficult part of engineering disasters is the realization that they could have been avoided.

If more care was taken. If designs would have been reviewed. If all assumptions would have been challenged. If checks

were put in place to reduce or eliminate human error. If detailed failsafes were carried out . . .

Those are a lot of ifs.

But people driving home on a bridge during rush hour, or flying on a plane from New York to Paris, or working on a bridge close to quitting time are counting on us to address every one of them. ■

Paul H. Boge, P.Eng. is an engineer with Boge & Boge (1980) Ltd. He is the author of three books. He is the writer/director of the feature film Among Thieves (www.fregatefilm.com/amongthieves) which is set for release this fall.

Footnote 1

Minnesota Bridge Collapse

<http://www.nts.gov/dockets/Highway/HWY07MH024/383930.pdf>

Footnote 2

TWA Flight

<http://www.nts.gov/Publictn/2000/aar0003.htm>

*Aircraft Accident Report
In-flight Breakup Over the Atlantic Ocean
Trans World Airlines Flight 800
Boeing 747-131, N93119
Near East Moriches, New York
July 17, 1996*

*NTSB Number AAR-00/03
NTIS Number PB2000-910403*

KYOTO

Ever wonder what a Kyoto compliant Canada would be like?

Let's pretend Canada was meeting Jean Chrétien's decade-old Kyoto promise. Would life here be any different? Would half of us be desperate to go back?

If some mythical Draconian power were to get the whole world to drastically reduce its use of fossil fuels, what level would be chosen? Kyoto suggested about 6% less on average. Some advocates now say 85% less GHG. What would such a world be like?

The earth's colder zones, including Canada, would be nearly free of human settlements with such an 85% reduction. Would vacation travel be a distant memory?

See the next issue of the Keystone Professional for an exploration of these issues.

2008 AGM Notice

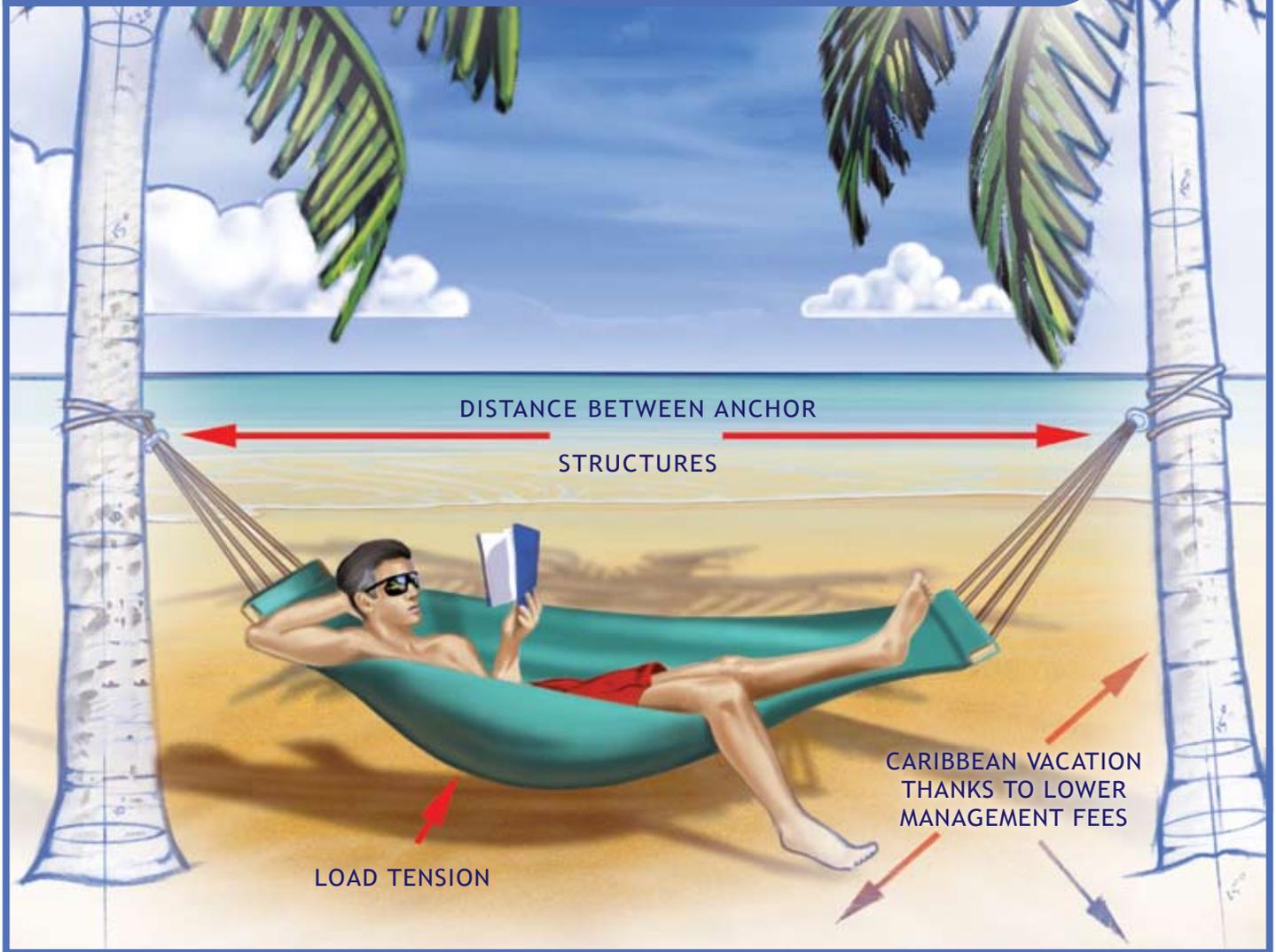
The 89th Annual General Meeting of the Association of Professional Engineers and Geoscientists of Manitoba will be held in Winnipeg on October 24, 2008.

AGM activities will include a Professional Development Conference, the AGM Business Meeting, as well as the Awards Dinner and accompanying Dance. A companion program is also being organized for Friday morning. More information will be provided in the Keystone Professional Fall issue and on the APEGM website.

Mark down October 24th on your calendar! See you soon!

The AGM Organizing Committee

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Provincial Engineering and Geoscience Week (PEGW)

R. Minhaz, EIT

Canada has the National Engineering and Geoscience Week, and to cooperate and participate with all other provinces, Manitoba puts on its own Provincial Engineering and Geoscience Week (PEGW) at the same time. This year it took place at Kildonan Place Shopping Centre from February 29 to March 2, 2008. The goal of the event was to celebrate engineering and geoscience, along with some of the achievements here in Manitoba, while promoting careers in these fields with young people.

Engineering is a very broad field of expertise and many people do not understand what engineers and geoscientists do. Engineering brings everything that we take for granted in our daily lives; engineers bring everything to us in this modern civilization that makes

us comfortable. The roads that we drive on, the cars that we drive in, the bridges that we drive over, all the technology and information that we take for granted, clean running water in our homes; all those types of things are brought to us by engineers and geoscientists.

A lot of people have started to realize just how broad engineering is, and how needed engineers are. The demand for engineers with technology being what it is, with where the world is heading with respect to green technology and being environmentally friendly, engineers help make that happen, and engineers will make a difference.

We need more professionals and one of the things that PEGW wants to accomplish is to get people excited about the broadness of engineering and geoscience and let them

know that if someone really does want to make a difference in the world, one of these degrees is the way to go.

The event started on Friday morning February 29, 2008, with an official government proclamation followed by a celebrity competition with a number of teams from the media including a University of Manitoba design team. A series of activities took place over the weekend such as the spaghetti bridge competition, robot games, and children activities. A number of interactive kiosks were set up at Kildonan Place Shopping Centre during the event for view by the public. Kids were given a chance to get some hands on experience, with a variety of engineering related activities, followed up on Sunday with the opportunity to watch a related movie at the IMAX theatre. ■



H. Reynolds

The Manitoba Robot Games is a project of the Science Council of Manitoba and the purpose is to promote interest in science and technology.

The Manitoba robot Games partnered with APEGM to present PEGW displays at Kildonan Place Shopping Centre on Saturday and Sunday, March 1 – 2, 2008. APEGM is one of the sponsors of the Robot Games and many APEGM members support the games with volunteer hours.

PEGW provided an excellent opportunity to involve the public in trying robots that are on display and learn about the Robot Games. The public's interest, especially kids, in the games drew many people to the PEGW event and involved the public further in viewing the other mall displays which came from a wide assortment of engineering and geoscience companies from around Manitoba.

At the PEGW mall display, the Manitoba Robot Games set up playing fields used at the annual competition, along with demonstration robots that members of the visiting public could test drive. Many adults and students chose to do battle using mini sumo robots. Young (and a few older) students tried one of the Robo Critters, driving to hit the targets and change the

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Many career opportunities are presently available. For further information, we invite you to visit the career section of our website. If you are interested in any of the positions, please apply online or send your application by e-mail at: bill.brant@genivar.com

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colour of the lights. Many students also chose to try a Super Scramble Robot (a tracked vehicle).

For more information regarding the Manitoba Robot Games or the Robot Game competitions, see their website at: <http://www.mbrobotgames.ca/>. ■

2008 Annual Celebrity Competition

M.K. Kwiatkowski, P.Eng.

Can you “Raise a Tower” for Charity? On Friday, February 29, 2008, four teams of would-be engineers from City TV, Hot 103.1 FM, the Winnipeg Free Press, and University of Manitoba Engineering Department put their creative talents on the table, and their reputations on the line, to compete in our Annual Celebrity Design Competition for Charity. This year, celebrity teams went head-to-head to design and build the strongest Styrofoam tower for their share of \$1000 in prize money provided by APEGM to be given to the charity of their choice.

The event began with introductions by APEGM Executive Director Grant Koropatnick followed with a proclamation by Bidhu Jha, MLA for Radisson, to formally announce the start of Provincial Engineering and Geoscience Week in Manitoba. Also present were Bill Brant, President of the Consulting Engineers of Manitoba, Ron Britton, University of Manitoba, and Tim Corkery, APEGM President, who spoke about the continued importance of Engineering and Geoscience in our society.

The start of the competition was marked by introducing each team to their adoring fans, a declaration by the celebrities as to which charity would benefit from their efforts, and some friendly tongue-in-cheek comments to mock their competition.

Each team was provided with the same kit of basic materials consisting of two Styrofoam sheets (24” x 48” x 1”) and fifteen wooden dowels (48” x 1/8”). Their toolkit: a tape measure, straight edge, knife, and a permanent marker. Teams were challenged to design the strongest tower possible using only these supplies. Despite simple building materials, and a minimum 48” height constraint, each team put forth tremendous effort and had fun in the process.

The teams were given nearly 1.5 hours in which to design and construct their towers which would eventually be tested-to-destruction to determine the winners. Officially, entries were to be judged on the ultimate load-bearing capacity of their tower, but in reality, testing amounted to which tower could support the most patio

bricks that were speedily dug up from my garden the night before.

Special consideration would be given to designs that used the least amount of the materials provided in the kit, but strategic theft of supplies between teams made it difficult to determine exactly how much material any one team had to work with.

At noon, teams were instructed to halt construction and bring their designs to the stage for testing, regardless of completion. An initial inspection of each team’s design revealed constructions which were light on engineering design and heavy on artistic interpretation. Three of the four teams borrowed heavily from my preliminary design that was displayed on the stage for demonstration purposes. Team U of M took a different approach and proposed a slightly more creative design. While teams sized up their competition, witty trash-talk filled the microphone as only celebrities from the media can do. During the commentary, more people stopped by to watch the teams compete.

Team U of M, represented by Chris Laing, Don Petkau, and Carolyn Geddert, appeared very confident and had an edge on the competition – An Engineering Degree. Unfortunately, the engineers spent more time debating their on-the-spot design than constructing it and proved that you can lead a horse to water, but you can’t make him design and build a tower in a shopping centre with only 1.5 hours lead time. Technical difficulties forced the premature failure of their tower after only 2 bricks, but set the stage for the competition.

Newcomers Chrissy Troy, Jordan Knight, Chris Fantini, and Lloyd the Intern from Hot 103.1 FM were the second team to challenge their design. After careful placement of bricks atop their structure, their tower set the expectations much higher at 11 bricks. They seemed as surprised as they were impressed, but quickly dismissed the notion, claiming that their design was superior.

Not to be outdone, Edith Bonner, Amy Anders, Tracey Woodward, and Ben Graham from the Winnipeg Free Press

continued on page 32

Teams constructing their towers



Team U of M testing the load weight of their tower



Mark Kwiatkowski presenting Team Hot 103.1 FM their 1st place certificate



Team Winnipeg Free Press with their \$300 prize certificate



Jimmy Mac from City TV accepts his certificate for the charity of choice



2008 Spaghetti Bridge Competition

L. Hume, EIT

Students of all ages gathered at Kildonan Place Shopping Centre on Saturday March 1, 2008, for the 14th annual Spaghetti Bridge Competition. As part of Provincial Engineering and Geosciences Week (PEGW), this highly successful event strides to promote engineering within the community and challenges students in a fun and educational way.

The challenge was to design and build a bridge with only spaghetti and white glue. The constraints were that the bridge had to span 300 millimetres and weigh less than 350 grams. On competition day, the bridges would be loaded at the top centre of their span and tested to destruction. The bridge that withstood the greatest load would be the winner.

The competition was open to all students in grades one through twelve with prizes distributed by grade level. Cash prizes of \$50.00 were awarded to the strongest entries from each grade. The students were divided into two categories for bridge testing, the grades one to six students competed in the morning and the grades seven to twelve students competed in the afternoon.

Two overall grand prizes of \$200.00 each were awarded to the strongest bridges from each category. All prizes were awarded by the Association of Professional Engineers and Geoscientists of the Province of Manitoba (APEGM).

Overall, 70 bridges were broken in this year's competition, an average turnout. A select group of schools such as John

Taylor Collegiate and Ecole Guyot had a considerable number of entries, suggesting that some schools or teachers are including bridge building into their curriculum and encouraging participation

in the Spaghetti Bridge Competition. One notable group of entries this year came from a group of grade two students from Wanipigow, MB, situated approximately 190 kilometres north of Winnipeg. Although it was too far for all the students to make it to competition, their teacher was gracious enough to bring all their bridges to Kildonan Place Shopping Centre for testing.

bridge broke at 147.42 kilograms (325 pounds)! It was even stronger than a bridge submitted for fun by his father Vern Nelson. Better luck next year Dad!

The winners from the grades seven through twelve division reached peak loads ranging from 38.26 - 170.18 kilograms. The overall grand prize went to Geraden Giannuzzi, a grade 11 student from John Taylor Collegiate whose bridge broke at an impressive 208.96 kilograms (460 lbs)! Last year Geraden won in the grade 10 category with a peak load of 156.81 kilograms. Demonstrating the quality of a true engineer, Geraden refined his bridge design and supported an additional 52 kilograms this year!

Organizers Don Spangelo, Glenn Penner, Shane Mailey, Adele Poulin, Val Yereniuk, and Lindsay Hume, would like to thank

APEGM for their continued support of this event. We would also like to recognize William Boyce, Ernie Surminski, and the PEGW committee for their assistance. Of course this day would not be possible without the help of our competition day volunteers

who were: Don Himbeault, Alex Bilesky, Heather Schultz, Andrew Kamerloch, and Robert Holatko.

This year, the Spaghetti Bridge Competition was once again a successful PEGW event, promoting engineering in the community and to children of all ages. Let's help bring awareness to this fun and educational annual event and make next year the largest competition ever. Hope to see you and your kids at Spaghetti Bridge 2009! ■



Bridges are tested to failure



Incoming president, Don Himbeault, P.Eng. presents award to Grades 7 to 12 overall winner Geraden Giannuzzi.



Grant Koropatnick, P.Eng., presents award to Grades 1 to 6 overall winner, Reid Nelson.

The winners from the grades one through six division reached peak loads ranging from 38.58 - 145.93 kilograms. The overall grand prize went to returning winner Reid Nelson, a grade six student from Dieppe School whose

APEGM-AMLS Joint Committee on Inter-Profession Issues

Q. Menec, P.Eng.

Operating within the framework of a Memorandum of Understanding (MOU) first signed on April 24, 1998, between APEGM and the Association of Manitoba Land Surveyors (AMLS), a joint committee of the two Associations was revived under new representation. This representation includes three members from APEGM, appointed by the Registrar of APEGM:

- Mr. Chuck Steele, P.Eng, MBA (Co-chair);
- Mr. Quinn Menec, P.Eng., MBA;
- Mr. Kas Zurek, P.Eng.; and,
- Mr. Stacy Courmoyer, P.Eng. (alternate)

and three members of the AMLS, appointed by the Registrar of the AMLS:

- Mr. Steven J.P. Bossenmaier, MLS, P.Eng (Co-chair);

- Mr. Wilson Phillips, MLS;
- Mr. Jim Watling, MLS; P. Eng. and,
- Mr. Les McLaughlin, MLS (alternate).

As per the MOU, The Committee is resolved to focus on serving the public interest and to maintain a mutual respect for Public and Private Property Rights. To this end, the committee is to develop standards and guidelines for areas of common practice, co-ordinate practice by-laws and resolutions for the direction of their respective members, and co-operate with each other in the facilitation of educational forums.

The Committee meets bi-annually (generally in April and October of each year) to carry out the functions as outlined in the MOU, consider complaints as to practice between the members of each Association or any

matter respecting relations between the two Associations, and provide recommendations to the Associations on other matters of inter-professional practice and inter-association relations which may be referred to it by the Associations of their members.

Recognizing that the two Associations have both exclusive and common areas of practice, any issues and areas of practice that are of concern or interest to the APEGM membership should be forwarded to the Association Registrar or an APEGM Committee representative. The Committee will endeavour to address and resolve such issues, keeping its mandate to serve in the public interest as its overriding objective. ■

APEGM is asking members to promote the Call for Nominations for the following APEGM awards to be presented at the Annual APEGM Awards Dinner:

- Certificate of Engineering or Geoscience Achievement
- Early Achievement Award
- Member-in-Training Award
- Honorary Life Membership
- Leadership Award
- Merit Award
- Outstanding Service Award

If you are aware of Manitoba engineers or geoscientists who are deserving of an award, please submit your completed Nomination form, available through the APEGM office or website.

Your help in this regard is pivotal to the ongoing success of the awards program, and to ensure that Manitoba's most worthy professional engineers and geoscientists are recognized for their contributions to our professions and society.



2008 Manitoba Schools Science Symposium

C. McNeil, P.Eng.

The 2008 Manitoba Schools Science Symposium (MSSS) took place April 25 – 27, 2008 at the Duckworth Centre, University of Winnipeg.

For the past 19 years, APEGM has been an enthusiastic supporter of this event by supplying special awards and judging in the Engineering and Geoscience categories. This year, APEGM handed out nine special awards, seven in the

Engineering category and two in the Geoscience category.

APEGM would like to congratulate the following winners and hope that they will continue to follow a path that leads them to become Engineers or Geoscientists.

APEGM would also like to thank the Public Awareness Committee for all their hard work in making sure that this event went smoothly. Special thanks to the

following members who volunteered their time to judge this event: Derek Litke, John Rooney, Scott Suderman, Johnny Salangad, and Mitko Tomov, and Tim Corkery, APEGM President, who presented the awards.

The efforts of our members and committees encourage young people to pursue a career that will lead them to be future APEGM members. ■

Manitoba Schools Science Symposium 2008 - APEGM Special Awards

Level	Division	Name	Project	Award
Junior	Engineering	Devon Sawatzky	Sense What You Can't Hear	\$150 McNally Robertson Book Token
Junior	GeoScience	Lane Hornford	Drop in the Sand	\$150 McNally Robertson Book Token
Elementary	Engineering	Mathew Warren & James Murray	Fantastic Fins	\$150 McNally Robertson Book Token
Elementary	GeoScience	Rylen de Vries	Much ado about Garbage	\$150 McNally Robertson Book Token
Intermediate	Engineering	Cody Shaw	I see with I.C.'s	\$250 Digital Camera
Intermediate	Engineering	Nirusan Jayaranjan	Voice Activated Navigation for the Blind	\$250 Digital Camera
Intermediate	Engineering	Brandon Leverick	Erosion in Lake Winnipeg	\$200 Cash Award
Senior	Engineering	Nishant Balakrishanan	...and then there were none.	\$200 Cash Award
Senior	Engineering	Victor Le	Fuels Future - Biofuel production capabilities of Clostridium thermocellum under heat stress	\$200 Cash Award

continued from page 29, Celebrity Competition

took the stage with their design shrouded in secrecy using advertising fanfare from their beloved newspaper. Jokes were made about a missing team member hiding inside the structure, but their design was no joke. These first time competitors also held a staggering 11 bricks with their tower and soon there were two teams fighting for first place.

Jimmy Mac, Jenna Khan, Laurel Clark, and Mark Jardine from City TV were the last team to show off their design and couldn't wait to thwart the efforts of their rivals. City TV boastfully loaded their tower with 11 bricks right away and taunted the other

media teams with their confidence. The addition of only one more brick caused their creation to yield as well, resulting in a final successful load of 11 bricks. The real dilemma now was how to award prizes for a 3-way tie?

After brief deliberation and a few good laughs, Hot 103.1 FM, the Winnipeg Free Press, and City TV were each awarded a first place prize of \$300, and will donate their winnings to the MS Society of Manitoba, Agapé Children's Soup Kitchen, and Winnipeg Harvest respectively. The University of Manitoba Engineering Department will forward their second place prize of \$100 to Engineers Without Borders.

I would like to extend a special thank you to all of the celebrities for dedicating their time and effort in making this event a great success. Thanks also to Kildonan Place Shopping Centre for hosting our Annual Celebrity Competition. This is the first year APEGM has held the PEGW event at Kildonan Place, and we look forward to returning next year with a new competition.

For you curious readers out there, my demonstration design supported 11.5 bricks before failing but is exempt from the competition – maybe next time . . . Until then, take care and see you next year! ■

The Brown Sheet

Detach page for posting

Planning by Design in Community: Making Great Places

The conference is designed to be a 'legacy' conference with a rich engaging mix of inquiry, celebration, and inspiration. Great places are defined as places that are Healthy, Caring, Inclusive, and Green.

With 59 sessions, 13 mobile tours/workshops, 15 professional development/CPL workshops and approximately 200 speakers from all parts of Canada and the world, the Organizing Committee has endeavoured to provide you with many opportunities to explore the conference theme.

Full conference registration includes all regular plenaries, concurrent sessions, welcome reception, gala dinner, breakfast (July 14-16), lunch (July 14-15) and the nutrition breaks. Additional fees apply for the mobile workshops/Tours, some pre/post continuing Professional Development Workshops and companion event tickets.

More information can be found on the conference web site: <http://www.cip-icu.ca/2008winnipeg/english/index.htm>.

Date: July 13 - 16, 2008

Cost:

\$650.00 Member

\$750.00 Non-Member

Reduced rate for Student

/Retired members

Location: Winnipeg
Convention Centre
Winnipeg, MB

Sustainable Practices in Metallurgy and Materials: Embracing the Future

The Conference of Metallurgists, the premier annual event of the Metallurgical Society of the Canadian Institute of Mining, Metallurgy and Petroleum is returning to Winnipeg after an absence of 21 years.

Like the 1987 Conference, the 2008 COM will offer an exciting technical program with international flavour, which is currently being developed under the guidance of Dr. Bill Caley of Dalhousie University in Halifax.

Lectures will be given by internationally recognized leaders in Industry and will address the major topics that impact the future of the sector. Topics will include economic drivers, impacts of industry consolidation, development of new products, technological developments, manpower development, sustainability, trends in operations and productivity, and human health issues.

More information can be found on the conference web site: <http://www.metsoc.org/com2008/>.

Date: April 24-27, 2008

Time: 7:00 a.m. - 8:30 a.m.

Cost:

\$850.00 Member

\$1000.00 Non-Member

Reduced rate for Student

/Retired members

Location: Winnipeg
Convention Centre,
Winnipeg, MB

National Professional Practice Exam

Deadline for application September 12, 2008.

Application forms are available at the APEGM web site: [http://www.apegm.mb.ca/register/geninfo/Application to Write APEGM 2008.pdf](http://www.apegm.mb.ca/register/geninfo/Application%20to%20Write%20APEGM%202008.pdf)

Deadline: September 12, 2008

Date: October 20, 2008

□ 5th International Conference on Advanced Composite Materials in Bridges and Structures

The objectives of the ACMBS-V Conference are to provide a forum for the presentation and discussion of recent developments in the use of advanced composite materials (ACM) and fibre reinforced polymers (FRP) in bridges and other structures, and to provide an opportunity for national and international delegates from industrial, research and academic institutions to interact and share their knowledge, to learn about new and innovative technologies in the field, and to discuss future directions.

The ACMBS-V Conference will deal with all aspects of research, applications and monitoring of advanced composite materials and fibre reinforced polymers in the design, construction and rehabilitation of bridges and other structures.

For more information about the conference and how to register, please visit <http://www.isiscanada.com/acmbs/index.htm>

Date: September 22 - 24, 2008

Cost:

\$750.00 Member

\$850.00 Non-Member

Reduced rate for Student Members

Location: Fairmont
Winnipeg Hotel, 2 Lombard
Place, Winnipeg, MB

□ The Wisdom Within

QNET's annual conference is the place for knowledge sharing, with access to new and innovative information for businesses and organizations. Over 400 leaders and professionals from business and the public sector are expected at the full day event, including senior executives, managers, board chairs and directors.

From the thought provoking keynote speaker to relevant education sessions, the conference is an opportunity to network and learn with other managers and professionals. You will leave with knowledge and innovative ideas that you can apply immediately in your business or organization.

More information about this conference can be found in their brochure: <http://www.qnet.mb.ca/events2006/08> Conf flyer.pdf

Date: October 1, 2008

Cost:

\$179.00 Member

\$199.00 Non-Member

Location: Winnipeg, MB

□ APEGM Annual General Meeting & Conference

A continuation of the 2007 one-day format will be offered including the Professional Development Conference, AGM Business Meeting, Awards Dinner and Dance, and Companions Program.

Check the APEGM website for updates; details to follow in the Fall Issue of the Keystone Professional. Mark your calendars now!

Contact Angela Moore at 478-3727 or amoore@apegm.mb.ca for more information regarding sponsorship and related details.

Date: October 24, 2008

Location: The Fort Garry
Hotel, 222 Broadway,
Winnipeg, MB

New Members Registered February, March, & April 2008

M.M. Alcock	D.R. Domenichini	M.T. Hicks	D.I. MacIntyre	S. Rahman	J.D. Truman
G.B. Andrist	R.V. Dozzi	M.K. Hollender	G.A. MacNeill	K. Rak	C.A. Van Gorp
E.M. Berthelot	M. Dufresne	M. Houde	R.L. Martin	R.G. Ramage	S.J. Van Haren
G.R. Bisson	A. Duta	A.L. Isaacs	A.D. McLean	R. Rosario	G.J. Van Iterson
J.S. Blixhavn	C.M. Elliott	R.D. Jirava	C.G.G. McNabb	R. Roy	L.J.C. Veillette
M.R. Catto	L.E. Fernandez	J.F. Kalmar	G. Mediwake	A. Sadhukhan	C.Q. Vu
R.I. Chowdhury	R.N. Foda	B.R. Kellie	S. Neethirajan	B.S. Sandhu	X. Wang
G.A. Ciro	A.B.C. Forest	W. Kobylinski	M. Niquet	S. Sharif	J.D. Williams
G.A. Cofreros	K.C. Frederickson	P.M. Kung	T.W. Osmond	J.A. Singleton	L.E. Wong
D.A. Coles	D. Gareau	F. Levasseur	S. Parvez	J.D. Southern	A.L. Wychreschuk
C. Cordogiannis	M. Gawelek	M.D. Limoges	D.K. Patel	J.K. Sparling	J.G. Zhang
C.J. Cormier	A. Gazzola	R.P.	T.D. Payne	M.A. Starzynski	H.D. Ziervogel
W.B. Crosbie	M. Geula	Lokugonaduwa	J.D. Petaski	R.C. Taliotis	
M. Desrosiers	N. Heidari	R.W. Lymer	R.A. Phernambucq	C.K. Tam	
J.S. Dhindsa	E. Hewayde	S. Ma	J.A. Phillips	D. Tremblay	

Licenses Enrolled February, March, & April 2008

J.M. Druck	W.L. Gerszewski	J.P. Nerison	C.L. Osberg
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Members-In-Training Enrolled February, March, & April 2008

M.P. Antunes	J.P. Dhaliwal	C.-S. Kim	S.C. Meatherall	B.W. Reid	Z. Wang
J.A. Arango Diaz	S.D. Epa	H.F. King	M.L. Moore	E.L. Rex	Q. Wang
R.G. Bernier	E.M. Fainblum	N.R. Komarnisky	M. Muller	M.S. Sainbhi	C. Weerakoon
E.K. Birir	D. Fan	B.D. Krahn	R. Mustajab	B.J. San Juan	J.N. Woodhouse
V.B. Buda	S.R. Fields	F.R. Lagadi	P.M.M. Nakoneshny	J.D.A. Shambrock	Y. Zhang
C.L. Byrnes	L.D. Gordon	R.A. Le Neal	J.D. Olivier	L.K. Stansell	P.C. Zhou
L.P.B. Chan	M.A. Hannan	B. Luo	M. Patel	M.K. Stocki	J.W. Zimmer
C. Chung	A.J. Jenson	T.L. Macijuk	J. Planinich	M. Toma	
S.F. De Marni	J.A. Johnson	F.D. Magalhaes	J.S.C. Plett	A.S. Tsilinsky	
B. Dhakal	S.M.J. Kenny	A.R. Marcynuk	T.J. Ramnath	K. Usenmez	

Reinstatements February, March, & April 2008

S.B. Clarke	R.H. DeRuiter	A. Dhawan	R.J. Dunlop	P.D. Handlovsky	R.G. Heath	R.W. Tiller
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Member Deregistered April 1, 2008

A.G. Angeli	V.K. Campbell	K.I. Franklin	J.R.R. Hudson	T.J. McIntyre	I. Sabau
R. Anisimovicz	G.H. Currie	B. Gaber	V.M. Jamadagni	T.G. Miller	G. Schorn
C.J. Arbeau	R.W. Demianyk	G.E. Gillespie	M.R.J. Jeanson	W.D.K. Moore	A.C. Seymour
J.L. Azucena	N.M. Dhanani	J.S. Hancharyk	K.A. Hartikainen	R.F. Nichols	R.E. Sigurdson
J.P. Bertens	E. Dolhun	W.C. Hayne	M. Lu	S.D. Paish	M.J. Tinholt
J.D. Bunda	D.A. Donachuk	J.A. Hernandez	R.A. Manastersky	J.S. Paulsen	W.E. Wersch
E.C. Burgener	S.E. Dudding	C.J. Hogan	P.F. Mayer	N. Rahmaty	D.H. Xue
J. Butler	A. Dune	G.D. Hubick	T.G. McConnell	W.A. Reid	Z. Zhang

Member Resignations as of March 31, 2008

R.A. Bielus	B.J. Denny	Campbell	K.W. Marcinyshyn	E.O.B. Ogedengbe	A.N. Schott
T.J. Borycki	P. Duchesne	W.J. Hargrave	J.W. Mault	D.L. Olischefski	A. Staudzs
J.D. Caufield	N.P. Doherty	M.L. Hawker	D.G. McCabe	K.F. Olischefski	W.A.R. Toth
P. Cerny	W. Friesen	W.A. Heywood	W.J. McCulloch	A.J. Raposo	PE. Veter
R.R.J. Chartrand	D.J. Grant	D.G. Kroeker	M.J.C. McDermaid	J.S. Sagoo	C.A. Walker
E. De Cutis	S. Ingimundson-	J.L. Lalonde	V. Miliu	D.C. Saxerud	G.G. Wang

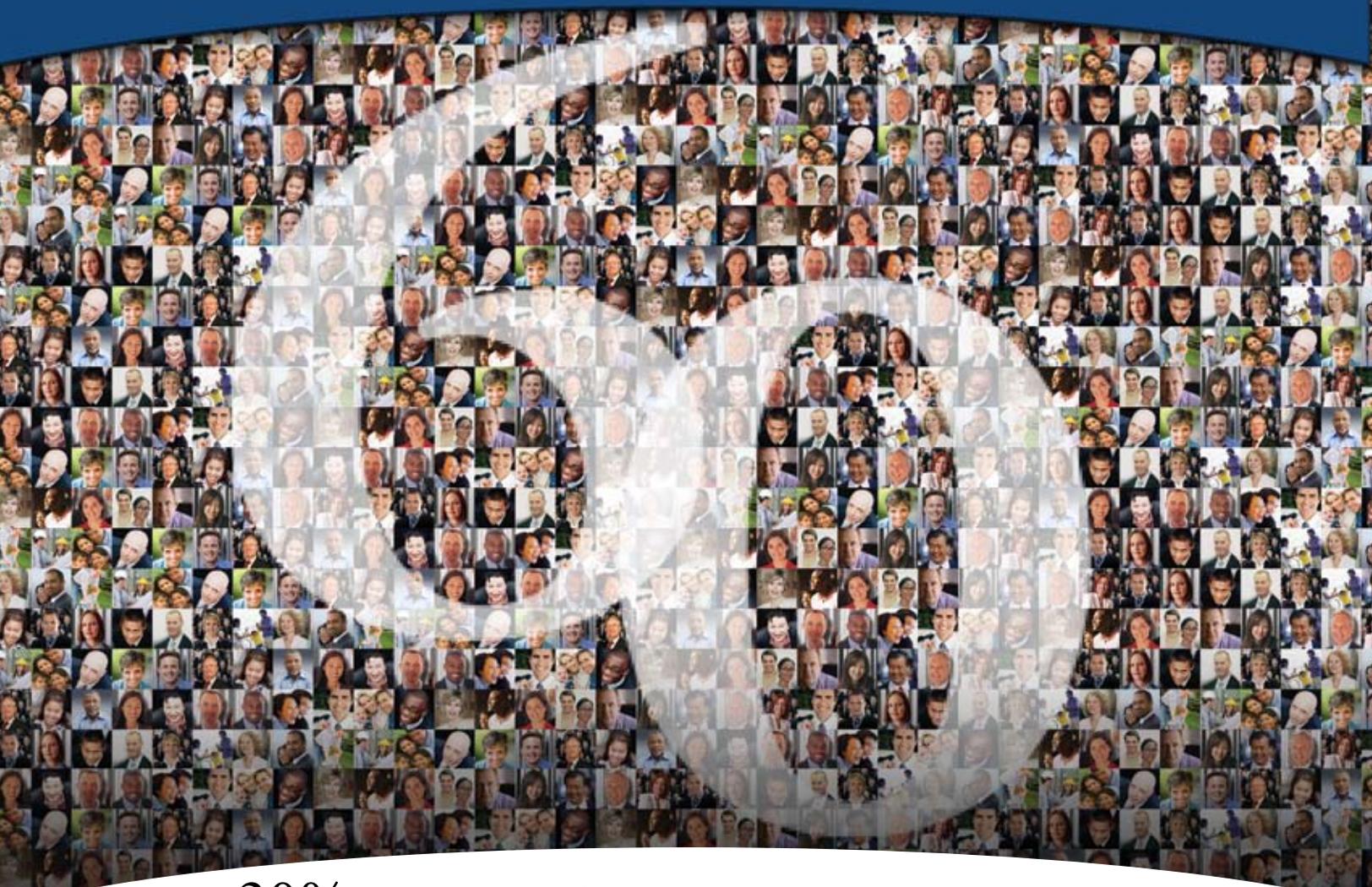
Member-In-Training Removed from Enrollment April 1, 2008

J.E. Enright	S.J. Halbesma	B. Narasimhan	B. Rezanja	J. Smith	V.M. Wheelwright
F.C.J. Fernando	L. Mulugeta	P. Rafajlovic	T.M. Scatliff	C.S. Tretiak	K.H. Zelickson
R.T. Garvey					

Certificates of Authorization February, March, & April 2008

Barnes & Duncan	E M Welding Ltd.	Karges-Faulconbridge, Inc.	Torjak Engineering
Cohos Evamy Manitoba Inc.			

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