Publications Mail Agreement Number 40062980

THE KEYSTONE PROFESSIONAL

**In This Issue:**



APEGM The Association of Professional Engineers and Geoscientists of the Province of Manitoba

APRIL 2003
www.apegm.mb.ca

# An Evening of Recognition

A reception was held on Tuesday, March 4, 2003 at the Niakwa Country Club to welcome new members of the Association and to recognize the recipients of the 2003 Awards of Merit, Early Achievement, Professional-in-Training, and the Certificate of Engineering Achievement.

## APEGM 2003 Merit Award

**Presented to Fred Nicholson, B.Sc.(M.E.), M.B.A., P.Eng.**

Fred Nicholson received his Bachelor of Science in Mechanical Engineering in 1968 and his MBA in 1975, both from the University of Manitoba. Prior to his engineering studies, Fred taught high school science. After graduation, he was in charge of the Mechanical Inspection Branch of The City of Winnipeg's Building Inspection Division. After seven years, he was promoted to head of the Division, a position he held for 23 years until he retired in 1998. For the final three years he was also the Acting Director of the Environmental Planning Department on a part-time basis.

During his tenure as the chief building official for The City of Winnipeg, he worked very closely with APEGM and the Manitoba Architectural Association (MAA) to facilitate investigations regarding work done by members of these associations. This was only possible because of his efforts in getting changes made to The City of Winnipeg Act, The Engineering and Geoscientific Professions Act, and The Architects Act. His activities in this regard have resulted in improvements to the procedures and policies followed by these associations in the monitoring of work done by their members. As a follow-up to this process, Mr. Nicholson is now the Chair of APEGM's Practice Standards Committee.

Fred has served, with distinction, on a number of committees focused on the development and improvement of building and engineering standards at both the provincial and national levels. At the provincial level, Fred served as a member of the Building Standards Board, including seven years as Chair of the Executive Committee of the Building Standards Board. In his capacity as the Chair of APEGM's Practice Standards Committee, he has led the Committee in the development of a number of practice guidelines, which will be useful to engineers practising in Manitoba. Fred is currently Executive Director of the Mechanical Contractors Association of Manitoba. In this capacity he brings a wealth of experience and knowledge as an engineer and former building official and is continuing to serve the needs of the construction industry. At the national level, Fred has been on many committees pertaining to construction codes and standards that are now used as a basis for construction throughout Canada.

At the community level, Fred was the Chair of the Building Committee for the construction of his church. He has been involved with the local community club as a coach, organizer, and fundraiser. He has also been involved with Scouts Canada.

The Association was pleased to recognize Fred Nicholson's contribution of having established one of the most respected building departments in the country, for his outstanding accomplishments, and for his many contributions in the area of codes and standards by serving so many Association, provincial, and national engineering regulatory areas.

## APEGM 2003 Early Achievement Award

**Presented to Rick Haldane-Wilsone, B.Sc.(C.E.), P.Eng.**

Rick Haldane-Wilsone received his Bachelor of Science in Civil Engineering from the University of Manitoba in 1991. After graduation, he worked for the Manitoba Department of Highways as a survey assistant. From 1992 to1994, he conducted Master's level research into the effects of imperfections and perforations on the compressive resistance of cold-formed steel z-sections at the Structural Engineering and Construction

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*New APEGM Members*

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The Communications Committee would like to hear from you. Comments on your newsletter can be forwarded to us through the Association office. Members are also encouraged to submit articles and photos on topics that would be of interest to the membership.



Publications Mail Agreement Number 40062980

## New Members Registered January & February 2003

| | | |
|---|---|---|
| J.L. Biczok | R.S. Gibbings (AB) | C.J. Peter |
| R.A. Brown | M.H. Ginter | X. Qiu |
| K.L. Burbank | C.G. Gulay | F. Rizzuto |
| K.A. Bush | P. Heidema (BC) | S. Robert (ON) |
| B.C. Bute (AB) | B.J. Horton (SK) | A.C. Shea (AB) |
| R.A. Carter | M.D. Keating | D. Singh |
| G. Cavey (BC) | J.A. Kell | B.S. Sitarz |
| S.N. Chapman | C.T. Klos | D.E. Taylor (AB) |
| K.J. Chisholm | D.G. MacKinnon (BC) | W.A.R. Toth (ON) |
| M.J. Cholach (AB) | M.P. Maendel | Z. Vuksa |
| R.J. Clissold (AB) | A.T. Magalhaes | B.W. Watson (SK) |
| N. Cote (AB) | J.D. Mann | B.D. Wilcox |
| L.T. Court (AB) | S.A. McCartney | A.E. Williams (AB) |
| D.J. Danielson | D.J. Mizak | R.D. Woolgar |
| N.M. Dhanani (SK) | P.K. Patni (OK) | C.Q. Wu |
| A.A. Galea (ON) | J.A. Pell (BC) | B. Zaimi (ON) |

## Members-In-Training Enrolled January & February 2003

| | | |
|---|---|---|
| J.J.N. Anderson | B.M. Guyot | J.D.T. Rimmer |
| S.D. Baker | T.T. Kaminski | C.R. Rosolowich |
| J. Cadloff | R.J. Kieper | M.J. Shewfelt |
| H.A. Cea Canas | R.A. Lawrence | K.Y. Tan |
| K.W.G. Chalmers | S.L. Leslie | D.A. van Nes |
| H. Chung | F. Liu | G.G. Wang |
| A.D. Cleugh | D.P. Mages | J.J. Weppler |
| M.B. Crowley | S.D. Masse | J.L. Wolfe |
| M.L. Fahey | S.R.G. Miller | W.K. Wong |
| S.N.P. Fernando | C.A. Orellana | B.N. Zoski |
| R.A. Foth | N. Rattanawangcharoen | |
| M.K. Groff | J.D. Regehr | |

## Licences Issued January & February 2003

| | | |
|---|---|---|
| P.D. Galloway (NJ) | A. Reza (CA) | C.W. Walker (WI) |
| S.H. Gebler (IL) | M.K. Sjoblom (MN) | |

## Reinstatements January & February 2003

| | | |
|---|---|---|
| M.R. Jamieson | D.R. MacLean | N.N. Nicholson (BC) |

## Certificates of Authorization Issued

Aluma-Systems Canada, Inc.
A Plus Inspection, Inc.
BCB Engineering Ltd.
B. P. Designs Ltd.
Building Alternatives Inc.
Corbett Cibinel Architects
Geomatrix Consultants and Engineers Inc.
Heidema Engineering Ltd.
Hydrogeological Consultants Ltd.
Kenonic Controls,
A Division of Emerson Electric
MechWave Engineering Ltd.

## Notice Under the Engineering and Geoscientific Professions Act and the Association's Discipline By-Law

THIS IS NOTICE that on March 20, 2003, Dietmar Reinhold Duester, P.Eng., was reprimanded following a conviction on a charge of unprofessional conduct in accordance with Section 15.6.6 of the By-Laws of the Association of Professional Engineers and Geoscientists of the Province of Manitoba.

The conviction is based upon his preparation and issue of engineering drawings and specifications making use of electronic copies of drawings and specifications which electronic records are the property of, and part of the database of a former employer without first obtaining permission from the owner.

This Notice is provided in accordance with Section 50 of The Engineering and Geoscientific Professions Act and Section 15.6.6 of the By-Laws of the Association of Professional Engineers and Geoscientists of the Province of Manitoba.

***D.A. Ennis, P.Eng.**, Executive Director & Registrar*

# Executive Director's Message

*D.A. Ennis, P.Eng.*

## Professional Development and Declaration of Compliance

A number of the Associations in Canada have a requirement for on-going prescribed professional development, including the reporting of that activity to the Association on a regular basis. APEGM does not. However, the absence of a program does not diminish the member's responsibility to "possess the training, ability and experience necessary to fulfill the requirements of any engineering or geoscientific work undertaken." In that regard, I remind members that:

a) beginning with the 2004 membership year, members in the practising category will be asked to declare at the time of the payment of the annual dues that they have, on an ongoing basis, acquired the knowledge, skills and level of awareness necessary to undertake the professional services that they currently provide, or intend to provide, to their employer and clients, and to fulfill their professional responsibilities to the public;

b) the Association has a guideline on Professional Development complete with a sample activity recording form and examples of the self-analysis that is recommended by the guideline. It is available at the web site and from the office.

If you aren't already following a process to maintain the necessary knowledge, skills, and awareness, now would be a good time to start. In that context I am reminded of the quotation that strikes me as appropriate; "It wasn't raining when Noah built the ark". *(Howard Ruff, 1930)*

### Memorandum of Understanding on Discipline and Enforcement

In February of 2002 I reported that the Associations that are constituent members of the CCPE were working on an agreement to co-operate, to the extent possible and when warranted, by taking disciplinary action against their registered individuals and corporations who are found to be practising professional engineering or using engineering titles in another jurisdiction without appropriate authority. Members should note that agreement has now been reached and the document will be executed in May.

### Engineering Building at the University of Manitoba

Elsewhere in this issue is an article recounting some of the nostalgia associated with the demolition of Room 229 of the engineering building at the University of Manitoba. With apologies in advance to those of the membership who are not alumni, this is an unabashed pitch to encourage the rest of you who are alumni of the Faculty of Engineering at the University of Manitoba, to support the Faculty in the long overdue redevelopment of the old Engineering Building into the Engineering and Information Technology Complex. It will be a modern facility equipped with up-to-date technology that will provide graduates with the skills needed to meet the challenges of tomorrow's workplace. The Faculty is already well on its way to providing its students with a design-ready education. The skills and abilities of the professional engineers and computer scientists who will graduate from that complex will be fundamental to the growth and development of Manitoba.

If the engineering education you received has helped you to prosper, perhaps now is the time to put something back in with a financial contribution to the new complex. You can learn more about the complex by going to the following link at the University of Manitoba's web site: ***http://www.umanitoba.ca/campaign/tools_facilities/engineering/design_for_growth.html*** ■

## Practice Note to Designers of Residential Buildings Using Engineered Lumber Products

*By: APEGM Safety Committee*

APEGM members involved with design of residential buildings using engineered lumber products, i.e. Laminated Veneer Lumber (LVL), Parallel Strand Lumber (PSL), and Structural Composite Lumber (SCL), should take note of a potential problem associated with the use of standard adjustable steel columns and footings as referenced in Part 9 of the Manitoba Building Code (MBC). This concern has been raised by suppliers of pre-fabricated building components and building regulatory authorities.

### Background

With the introduction of engineered lumber products LVL, PSL, and SCL, it is now possible for the designer to provide greater clear spans between structural supports. Consequently, because of the increase in tributary area from larger, more open floor areas, the loadings to the structural supports are increased. As such, routinely specified structural elements for residential buildings such as footings and teleposts that are intended for use with dimension lumber could easily become overloaded.

### Overloading of Standard Teleposts

The Manitoba Building Code, Subsection 9.17.3, references a standard to which typical adjustable steel columns are to be manufactured. That standard (CAN/CGSB 7.2 - M88) specifies that these columns be designed to support loads up to, but not exceeding, 36 kN (8,000 lb). However, as noted above, greater loads are now commonly developed.

In considering solutions it is to be noted that the doubling up of two standard teleposts is not good engineering practice and should not be used. Alternative design usually involves a heavy-duty telepost or specialized column design.

### Better Footing Design Needed

A further issue arises when increased loads must be supported. The standard footing design as outlined in the Manitoba Building Code may well be under capacity and cannot be used. Once again, an alternative design will be required.

### Recommendation

It is strongly recommended that professional engineers providing services for residential building under Part 9 of the MBC take note of whether the structural system is other than the standard system provided for in the MBC. If not, then particular attention should be paid to the capacities required of the column and foundation systems, and if necessary, alternative designs provided. The supporting documentation to demonstrate code compliance should be submitted to the authority having jurisdiction. ■

## Call for Nominations

The Nominating Committee is seeking nominations for positions that will become vacant on the Council in October 2003. If you know of someone who is capable of participating in the governance of the Association and who is willing to represent the engineering and geoscience communities, please submit their names and supporting information to the Nominating Committee. The consent of the nominee must be obtained.

Alternatively, if you wish to nominate someone directly, 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, 2003. Each completed nomination form must be accompanied by the nominee's resume and platform (preferably not to exceed 100 words). Resume forms and examples are also available from the Association office. ■

# Ever Popular Spaghetti Bridges

*By: A.A. Poulin, P.Eng.*

"The return of the ever popular event, Spaghetti Bridge Contest…" as described on the APEGM website, is not an exaggeration of the competition held each year as part of National Engineering Week. The ninth annual competition was held on Saturday, March 1, 2003, at St. Vital Centre in the Food Court and it was another successful year for event organizers. It was the second year with the new test-frame, and the competition went off without a hitch.

Since the introduction of a new "In-School Spaghetti Bridge Competition" program, organizers have been kept busy throughout the year as well as on the day of the annual competition. The program allows schools to bring the test-frame right into their classrooms, and the demand is only increasing. For the second year in a row, spaghetti bridges were showcased on A-channel's Big Breakfast, which aired on Monday morning, February 24, with a demonstration breaking of a few bridges.

As it has always been, the competition was open to students in Manitoba from grades 1 through 12. The goal: to build a bridge that can withstand the highest load, built only of spaghetti and white glue, weighing no more than 350 grams, with a minimum span of 300 mm. Cash prizes of $50.00 were awarded to each grade winner. There were also two Grand Prizes, of $200.00 each plus tickets to the IMAX presentation "Cyberworld", awarded to the overall winners from the two categories, grades 1-6 and grades 7-12. All prizes were provided by APEGM.

*Testing the breaking point*

*Spaghetti Bridgers show their designs*

Attendance was up again this year, with a total of 110 entries and a fairly even split - with about half of the entries being in the grade 1-6 category and the other half in the grade 7-12 category. The designs varied from simple beams to complex trusses. The winners from grades 1 through 6 reached peak loads ranging from 9.37 kg to 108.98 kg. The grand prize for the grade 1-6 category went to a grade 5 team from Dr. Hamilton School, whose bridge broke at 108.98 kg (or 240.26 lbs.)! The winners from grades 7 through 12 reached peak loads ranging from 26.62 kg to 90.18 kg. The grand prize for the grade 7-12 category went to a grade 11 team from Steinbach Regional Secondary School, whose bridge broke at 90.18 kg (or 198.81 lbs.).

Organizers Glenn Penner, P. Eng., Shane Mailey, P. Eng., Don Spangelo, P. Eng., and Adèle Poulin, P.Eng., would like to thank APEGM for their continued support of the event. We would also like to recognize the N.E.W. Committee – Paul Novak and Peter Roach – for their assistance. Of course the day couldn't be pulled-off without the help of our competition-day volunteers, who this year were: Ryan Sporns, Ben Chao, Paul Everton, Cristian Orellana, Rubin Sifrim, and Kevin Sim. ■

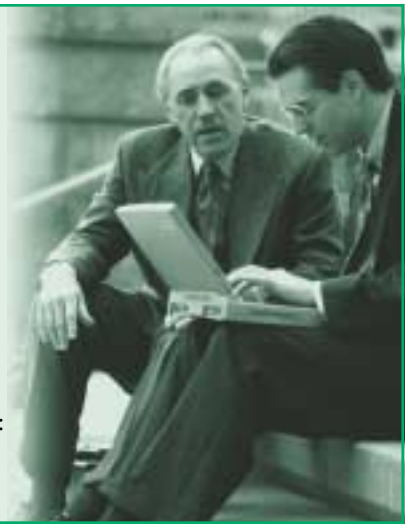
**VOLUNTEER OPPORTUNITY!**

## Would you like to help another engineer?

The International Centre of Winnipeg needs professional engineers or engineers-in-training to volunteer as career mentors in our Link Up and Connect career mentorship program. We are a non-profit agency dedicated to facilitating and supporting the settlement and integration of immigrants to Winnipeg.

The Link Up and Connect Program matches highly-skilled immigrants (newcomers) with volunteer mentors. Professional newcomers need to be connected with individuals knowledgeable about their profession who can give their time and positive energy. Mentors are not expected to offer or find employment for newcomers. What mentors can offer is their experience, information, insight, and most importantly, their support and encouragement while newcomers work to pursue their occupational goals. Mentors will enhance their leadership and cross-cultural communication skills, and will feel good about helping others!

If you are interested or would like more information, please contact Maylia at the International Centre: 943-9158 ext. 228 or by e-mail at: ***maylia_s@icwpg.mb.ca.*** ■



## *An Evening of Recognition*

*Continued from page 1*

Research and Development Facility at the University of Manitoba.

In 1994, Rick joined Wardrop Engineering Inc. Rick has been recognized for his technical ability and leadership, and became a Principal of the firm in 2001. He has extensive experience in applications using advanced composite materials. His participation and leadership in the design of girders and bridge deck for the Taylor Bridge in Headingly, Manitoba, the project management and design development of a patented composite material bridge deck, and various other advanced composite materials reinforcing applications exemplify this experience. Rick has also worked on a variety of other projects in which his experience with advanced composite materials has been applied, in addition to numerous projects using "conventional" structural materials and methods.

Rick worked as a mentor for the Civil Engineering Department's Capstone Project – design portion of the assignment. He worked closely with the University's Engineering Department in getting the four 4th-year students through a bridge-design process, and was involved in the "shadow" program to bring a high-school student to work with you for a day.

Rick has been involved in the organization of the CEM golf tournament for a number of years, and has sponsored a student at the APEGM Student Dinner Night yearly since graduation. He presented a paper at an Intelligent Sensing for Innovative Structures (ISIS) conference, and co-authored a paper on a patented GFRP bridge deck. He has presented papers on the Provencher Pedestrian Bridge project and on Structural Health Monitoring for Bridges.

Rick was the Wardrop Chairperson for the United Way Campaign for five years, is involved in church activities, organizes and prepares (with friends) yearly Christmas hampers for two less-fortunate families, has been involved in the "Ride for Life" event for juvenile diabetes, and has still found time to coach hockey.

### APEGM 2003 Professional-in-Training Award

**Presented to Nelson Ferreira, B.Sc.(C.E.), M.Sc., EIT**

Nelson Ferreira is employed by UMA Group in Winnipeg where he works on a number of projects as a Junior Geotechnical Engineer-in-Training in the Earth and Water Department.

*Nelson Ferreira, EIT*

Mr. Ferreira completed a Masters degree at the University of Manitoba in the Department of Civil Engineering in April 2002. His research focused on the influence of suction on slope stability at a cut along PR259, East of Virden, Manitoba, that failed in the spring of 1999 following heavy rainfall. The work has attracted considerable local and national attention. It resulted in three conference papers and a paper that has been accepted for publication in the Canadian Geotechnical Journal. It has been presented locally to the Canadian Geotechnical Society, to the Society's graduate student competition in June 2002, and to the national Canadian Geotechnical Conference in Niagara Falls in October 2002. As a Graduate Student, he also helped organize Geotechnical Research Seminars at the University of Manitoba. Nelson Ferreira was on the Dean's Honour List during his university studies, and has received other awards, including the Neil Burgess Memorial Scholarship, the Canadian Geotechnical Society Travel Award, and the O. & G. Allen Memorial Scholarship.

Even at this early stage in his career, Nelson has an outstanding record of service to the engineering profession through his participation in technical societies, conferences, and professional development activities. He has served on committees of the local section of the Canadian Geotechnical Society (CGS), including its regular program of meetings and the 2nd Canadian Conference on Computers in Geotechnics. In February, 2002 he co-chaired the Great Northern Concrete Toboggan Race in Winnipeg. This annual event brings together engineering students from across North America and around the world.

### Certificate of Engineering Achievement Award

**Presented to The City of Brandon and Earth Tech Canada Inc. for the Maple Leaf Meats Wastewater Treatment facility in Brandon, Manitoba.**

The project offered many challenges to the engineering team. Due to the need to meet the operational date of the Maple Leaf Meats Hog Processing Facility, the schedule was a very tight 18 months. This included conceptual design, the environmental license application process, and final commissioning of the treatment facility. In addition, the City and the Province, which funded the construction of this facility, had only limited financial resources. Therefore, one of the key objectives of the project was to provide a reliable but low-cost facility, which would meet the tight regulatory effluent discharge limits for the protection of the Assiniboine River. The City also had only limited experienced staff resources to operate an additional facility, so one of the challenges was to provide a simple-to-operate facility that required minimum operator efforts in operation and maintenance.

The implementation of the hog processing facility received wide public attention. Generally, the public was skeptical about the commitment from both Maple Leaf Meats and the City to provide facilities that would adequately address the environmental impact concerns. Therefore, careful consideration was required in the selection of the appropriate treatment processes and the detailed design of the facility. Throughout the design process, Earth Tech continued to work with the City in a Client/Consultant partnership, with input from a multi-disciplined Technical Advisory Committee made up of representatives from The City of Brandon, Manitoba Conservation, Manitoba Water Services Board, Manitoba Economic Development Board, Brandon University, and Maple Leaf Meats and its consultants. Participation from various other provincial departments, and numerous equipment suppliers and contractors, is also acknowledged.

All of the project's objectives were attained. A cost-effective facility was constructed, on time and within budget, thus strengthening The City's reputation of fulfilling its commitments. The treatment plant is working well within all regulatory requirements. The facility is also easily expandable as the wastewater treatment requirements for the food processing facility grow. ■

*Representatives of the City of Brandon and Earth Tech Canada Inc.*

# Farewell Room 229

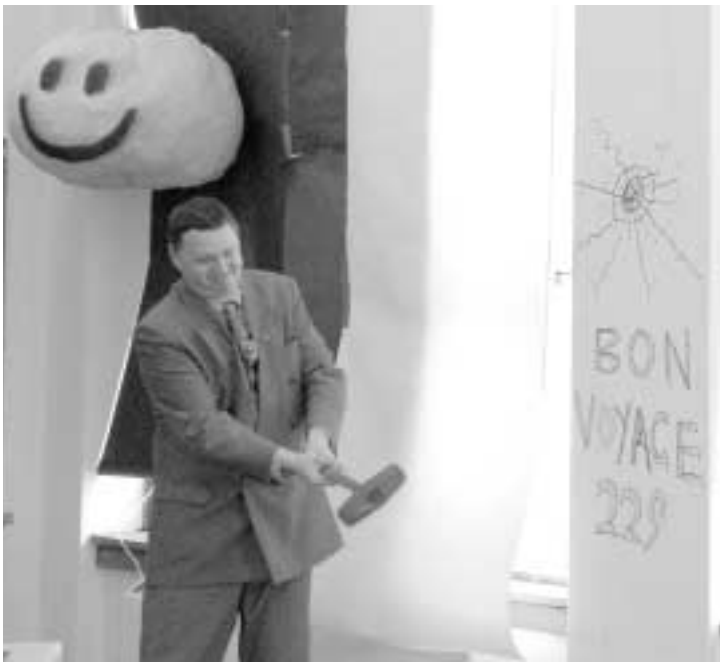
*By: A.N. Kempan, P.Eng. (Ret.)*

For the 24% of APEGM members who aren't University of Manitoba graduates, I offer a word of explanation concerning Room 229. The engineering complex at the U of M is split into three epochs; the first consists of what appears to be World War I architecture, the second post-WW II, and the last, late-1960s. Room 229 is a large, plain, windowed room dating to the second epoch. What made it special was that everyone who enrolled in Engineering passed through 229. No matter if you emerged Civil, Mechanical, or Electrical you started out in Room 229 learning the intricacies of graphics, descriptive geometry, or drafting, the lingua franca of engineers.

Afternoon, January 31. Room 229 is filled with stacked pizza boxes (just two slices for now please!), tubs of iced soft drinks, students, faculty, alumni, all of us there to bid farewell, or good riddance, to an institution. She wasn't going down without a fight; a moving truck was still at the front door collecting the last few relics and Dr. Britton confirmed that 229 was used for instruction as late as the day before. Room 229 was about to fall before the march of progress and the wrecker's ball to make way for new engineering facilities.

The northwest corner of the room was the focus of activity with Dr. Brian Stimpson as master of ceremonies. Hoarse cries of "It's coming down!" rang through the room as Dr. Doug Ruth marked the official beginning of demolition by swinging a hefty sledgehammer into the amorphous stucco wall amid engineering jokes questioning the structural integrity of the building. Even after all these years, I doubt anyone could actually put a colour name to that nondescript expanse of stucco.

After the hammer blow, student leader Owen Preston, assisted by a slide presentation, ran through the many uses that Room 229 had served; for graphics training, as a meeting place, lunch room, study hall, exam room, nap room, and floor hockey venue. The crowd was amused by early portraits of a few faculty members – pictures taken at the start of their academic careers – back when Sherlock Holmes pipes and mustaches were in fashion. Mr. Preston went on to extol the "engineering spirit" so evident in the design projects, and also in the high-spirited pranks perpetrated through the years, a memorable one being the draping of a "McArts" banner on the Administration Building.




*Dean Doug Ruth, P.Eng., wishes Bon Voyage to Room 229*

Next, former faculty member Dr. Glen Morris summed up his 45-year association with the University of Manitoba. As a youth Glen majored in hockey and baseball, but the time came to choose a career. A quick decision was necessary because his cousin was driving him to the university "to register in something." After five or ten minutes of deep thought Glen said he'd do engineering; his cousin said he was making a hell of a mistake. Mistake or not, there he was in Room 229 serving half a term of "drafting." Glen spoke of how fascinated he was by his new drafting instruments, they were so

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# Meet Your New Councillor – Don Harfield, P.Eng.

*By: P.H. Boge, P. Eng.*

About halfway between Flin Flon and The Pas is the town of Wanless. Just off the west side of Number 10 highway is a fantastic little restaurant called Dan's Café. On a Friday afternoon, Don Harfield and I met there to discuss his second term as Councillor. While eating our sandwiches made of homemade bread and enjoying the impromptu live country music, we talked about some of the issues that are important to Don.

One of Don's interests is to attract new members to the profession. In this regard, he has two main target groups that he hopes to address. First, he hopes to encourage new graduates, and secondly, he hopes to convince qualified practicing individuals to become registered in the applicable MIT or P.Eng/ P.Geo. category.

He is also interested in providing a practical process for the mobility of professionals between provinces through a multi-jurisdictional license. More and more, professionals are finding the need to practice in more than one province, so registration in subsequent provinces should be administered in a timely and cost-effective manner.

He also wants to increase public awareness of the contributions of engineers and geoscientists.

Don is a firm believer in promoting competent practice and ethical conduct through self-governance. He maintains that one of the key factors in being competent is that we constantly strive for excellence, always seeking to do better. As problem-solvers, professional engineers need to consider the broader perspective and ensure that designs provide the best solution to the real needs of the organization or client. Our efforts, then, should reflect our ongoing pursuit of understanding the world around us in order to serve our clients, our employers and society in an increasingly effective and responsible fashion.

A practical way where excellence can be promoted is through peer accountability and mentoring. By working together new and veteran members can gain the benefit of sharpening one another.

As a senior project manager for KGS Group, most of Don's work occurs within a five-hour radius from The Pas. He is involved in project management, construction inspection and investigative work. He received a degree in mechanical engineering from the University of Alberta in 1975 and has been a member of the APEGM since 1996. He was integral in forming the Kelsey Chapter of the Association where he has served as a founding member, vice-chair and chair.

*New Councillor, Don Harfield*

Don and his wife, Donna, live in The Pas with their two teenage children. Their two oldest sons attend university-one in Winnipeg and the other in Edmonton. ■

# Council Report

## Wednesday, February 12, 2003

*By: A.N. Kempan, P.Eng. (Ret.)*

### IS APEGM DOING ENOUGH TO ASSIST FOREIGN-TRAINED ENGINEERS?

Outside, winter was punishing us for living in Winnipeg, but inside everyone was happily munching sandwiches and prepping for the first Council meeting of 2003. The first item of business was to introduce APEGM's new Director of Admissions, Sharon E. Sankar, P.Eng.

Some routine items, adoption of an agenda and the minutes of the last meeting were dealt with. Then into a meaty item, Government Initiative on Qualifications Recognition for Highly Skilled Immigrants. The title is long and mind- numbing and its premise could unleash some nasty surprises for APEGM and other professional licensing bodies. The logic of it runs like this: Canadian society is aging and not replacing itself. We need immigration to maintain our viability as a nation. In spite of this demonstrated need for skilled workers, immigrants often cannot find work in their field. Manitoba has an additional problem in that we don't attract our fair portion of immigrants, skilled or otherwise.

To deal with this problem the provincial government had adopted a strategy on Qualifications Recognition and, to communicate this vision, the government sponsored a think- tank in November 2002. APEGM and other professional bodies were in attendance. It was clear at the meeting that the government thought the engineering profession was one of the occupations that had the most potential for the integration of immigrants.

Now, Executive Director Dave Ennis was scheduled to make a presentation on February 18 to present APEGM's position before a committee formed by the Minister of Labour to develop a strategy for immigrant assimilation. Mr. Ennis told Council he would indicate that APEGM must maintain its entrance requirements which ensured that applicants were academ–ically qualified, had suitable experience, and passed a professional practice exam. He noted that APEGM had no quotas on engineers and had many members from outside Manitoba. Furthermore, Mr. Ennis speculated on whether the economy provided enough engineering jobs for Manitoba grads.

Councillor Doering added to the speculation by stating that the government's figures suggested that an additional 300 engineers would enter the Manitoba economy at a time when there was a surplus of civil engineers. He said that APEGM should do its part to help immigrant engineers but government should be made aware of the numbers. Councillor Permut wondered if there was a risk of the government taking over registration. He said APEGM should not and must not limit enrollment. Councillor Gaudry said that APEGM should ask for funding for the extra expense involved in pursuing the government's policies and APEGM should come out strongly in support of those policies. Mr. Ennis concluded by summarizing the themes he would stress in his presentation: public safety is paramount, the number of APEGM members who are from outside Canada, APEGM's commitment to assisting immigrants through mentorship and other in-kind contributions.

After a short break Council returned to move quickly through Executive Director Dave Ennis's Monitoring Reports and then on to the Governance Process items. None of these solicited much controversy or discussion.

The meeting moved into its final phase with a review of a coaching report on October's meeting. This prompted Councillor Goldsborough to suggest that APEGM should put its governance "Ends" on the wall as a ready reminder to all of why they were there.

Councillor Hoemsen recounted his first meeting as the Council representative on the engineers and architects Joint Board. He said there had been progress and encouraging signs of a willingness to work toward a compromise but with significant issues remaining. Mr. Ennis provided a summary of the turf skirmishes between the two professions.

The meeting concluded with the customary self-evaluation. Councillor Permut said they'd done some future planning. Past President Barakat said that, strictly speaking, under our Policy Governance "Ends" Mr. Ennis wasn't required to consult with Council about his presentation to the government committee, but in this case it was necessary. This inspired Councillor Permut to quip that this time "the Ends justified the means." Once again Councillor Goldsborough said that newcomers should have their Ends on the wall. With that the meeting ended. ■

### *Farewell Room 229*

*Continued from page 6*

shiny they reminded him of surgical instruments. To while away the time Glen and his friends thought up creative names for faculty members based on some aspect of their personality or appearance; thus Ed McGill became "Easy Ed McGill" and Oscar Marantz became "Boxcar Marantz." Glen Morris ended by remembering the many good times they had.

Time for a break and for a fresh supply of pizza. (Would those that have had some leave some for those who haven't had any. Thank you.) Time to scan the artifacts around the room – yearbooks, slide rules, ancient Hewlett Packard calculators.

"He needs no introduction" is an over-used phrase, but today it really meant something when Don Daikiw, majordomo of Room 229 from 1967 to 1999, spoke to the gathering. Room 229 opened in 1949 and 30,000 students passed through it according to Don. He mentioned some of the room's less well-know uses – for administration and convocation, and even as a movie set for a movie starring Donald Sutherland as renowned Canadian humanitarian Dr. Norman Bethune. Don said when he began his tenure in Room 229 he used the P.A. system to make himself heard, but it wasn't long before he could project his voice to all corners of the room. He noted that it was exactly 50 years since the first class of Room 229 students graduated. Celebrate the past, embrace the future was Don's parting advice.

Dean Stimpson read to the crowd a commemorative e-mail from former Dean Laliberte. Dr. Laliberte said how, as a student working on his first graphics assignment in Room 229, he did his very, very, best lettering possible and was stunned when he got a grade of 3.5/10. He also recalled the radios in Room 229 for the great 1952 World Series.

More fond memories from former faculty member Jerry Clayton who served from 1955 to 1980. His first assignment was to lecture on Materials and Processes. He was very new to this and feeling scared about it. He had come across town on a bus to give his class and was running rather late. When he found the lecture hall Jerry discovered 35 students lying in wait for him. However, the students looked as scared as he was. Just as he realized this the bell rang and that was the end of his first lecture. Jerry said he was sorry to see the building come down, but not as sorry as seeing Eaton's demolished.

Dean Doug Ruth delivered the final tribute to Room 229. He noted that there were still two faculty members alive from the 1949 opening...Professors Gawley and Baracos. He said passing through Room 229 was like owning your first car – it may have been a bad experience, but nice to remember. Dr. Ruth said one of the major shifts in the undergraduate world was how today women made up 20% of the student population.

Dr. Ruth called on the understanding, flexibility, and creativeness of all to see them through the building phase when a third of Engineering's normal floor space will be gone during construction. It's worth waiting for, he said – finally the floors will be at the same level.

All that was left to do was to sing a chorus from the Engineer's Hymn... "We are, we are, we are the Engineers..." ■

**APEGM VISION**

*APEGM is the leader and a facilitator of the process that ensures excellence in engineering, geoscience, and applied technology for the public of Manitoba.*

# Meet Your New Councillor – Ray Hoemsen, P.Eng.

*By: A.N. Kempan, P.Eng. (Ret.)*

"I'm just a tractor guy." This is how Ray Hoemsen, one of APEGM's new councillors describes himself.

Tractors were part of Ray's early life growing up on the farm near Elkhorn, Manitoba, but instead of driving them, Ray ended up building them. Ray earned his bachelor's degree in agricultural engineering, specializing in the power and machinery option. His first job, in 1977, was with Versatile Farm Equipment Company as a Quality, Design, and Testing engineer. He was responsible for the release of a new tractor design and for subsequent engineering support on the assembly line. He remembered that as a very exciting point in his career. How often does a 23-year-old have responsibility like that?

Ray squeezed in a few more achievements at Versatile, setting up a new mini-computer system for the engineering department and using it to integrate quality and engineering data. Unfortunately for Ray and many of his co-workers, the golden days of agricultural manufacturing were over, never to return.

After his tractor experience Ray turned closer to his eventual life work when he joined the Industrial Technology Centre in 1982 as manager of the industrial and mechanical engineering group. It was his function to provide consulting and technology transfer services to Manitoba industry. As part of his mandate he set up a $1.5 million computer-aided engineering system, the most advanced in the Province at the time. Ray wasn't neglecting his own education either; he completed his master's degree in 1983 while working full-time.

Ray's move, in 1986, from ITC to the University of Manitoba came at a time when cooperation between academics and industry was a new idea. He took up his post as Research & Development Coordinator for the Institute of Technological Development. Success built on success and Ray moved through a series of technology transfer roles culminating in 2000 as Vice President/Director of Operations of SmartPark.

In 2001 Ray decided to pursue the business side of technology development on his own when he started NEXUS Manitoba, which specializes in technology-driven economic development, with emphasis on innovation, technology transfer and commercialization, new venture development, incubation and research parks.

In addition to his professional pursuits, Ray maintains a dizzying array of commitments to sports, cultural, and business interests. The sheer number of posts he's held would fill several normal life-spans. A sampling of current positions: Member, CCRA Scientific Research & Experimental Development Partnership Committee, Founding Chair, Western Innovation Network, Director, Diaspec Holdings Inc, Director, MRV Systems, Board Member, Canadian Advanced Technology Alliance.

Ray has a keen interest in volunteering, reading, and travel. His wife Joan has been his life's companion for 25 years. They have two sons, Travis (21) and Dylan (19). Joan is busy working towards a CGA designation while Travis is aiming for a career in law enforcement and is entering criminology. Dylan is in University 1. ■

*New Councillor, Ray Hoemsen*

# U of M team excels at Great Northern Concrete Toboggan Race

*By: Jared Mitchell*

The Great Northern Concrete Toboggan Race (GNCTR) has grown into one of the most renowned engineering events of its kind in Canada. It is a competition where students meet to display their engineering creativity and innovation. Each team consists of a minimum of five students who design, construct and race a toboggan with a running surface made completely of concrete. To increase the challenge of the event, each team must follow a set of predetermined constraints. These constraints require the toboggan to hold five racers while not exceeding the maximum allowable weight of 300 pounds. Throughout the event, teams are judged on design, presentation, creativity, a technical report and race performance.

This year's GNCTR, hosted by the University of Alberta in Edmonton, took place from January 29 to February 2. With 17 competing teams and one alumni team participating in the 29th annual event, the imagination and technical ingenuity of approximately 300 engineering students from across North America was avidly displayed. Competition was tough, but the fun and sense of adventure that an event of this magnitude brings was very clear.

The University of Manitoba has a great history in this event, placing in the top ten in a number of recent competitions. From making new friends and spirited chanting, to the technical exhibition and the race itself, the University of Manitoba's 1972 Summit Series-themed team acted in a manner befitting the school and city they represented. The 2003 GNCTR team was comprised of 35 engineering students whose skills ranged from new and innovative-thinking second-year students to experienced toboggan racers in fifth year. A race team of this magnitude offered the abundance of creativity and technical skills needed to accomplish what we felt was necessary to excel in this year's race. The team would like to take this opportunity to acknowledge each individual on the team for his or her contribution to this year's Great Northern Concrete Toboggan Race.

Carrying on the tradition of excellence, the U of M team captured the coveted "World's Best Concrete Toboggan" award this year. Along with the first-place award, the team also took home awards for 'Best Toboggan Aesthetics', 'Best Team Costume' and an award that meant a lot to the team, the 'People's Choice Award'.

The team would like to thank all of their sponsors that helped make this year's team such a success. It is only with the generous support of the University and local engineering communities that our team was able to compete so successfully in this competition.

### Gold Level

University of Manitoba Faculty of Engineering Dean's Office

University of Manitoba Faculty of Engineering Endowment Fund

University of Manitoba Administration Office

### Silver Level

Acres International

Empire Iron Works Ltd.

PCL

University of Manitoba Engineering Society

University of Manitoba Students Union

Wardrop

### Bronze Level

ND LEA Engineers and Planners Inc.

Stantec ■

# New Graduates In High Demand

*By: Kathie Anderson, Co-Op Administrator, Civil Engineering, University of Manitoba*

Trends in the engineering sector indicate that there will be a shortage of new engineering graduates in Manitoba within the next five years. This is a real concern for government and industry, and employers are looking for ways to encourage new grads to stay in Manitoba. Students who have had quality pre-grad work experience in the province are more likely to remain in Manitoba after graduation. Companies have found that one of the most reliable ways of recruiting new graduates is to hire co-operative education students before graduation. Experience has shown that co-op students develop loyalty to their co-op employers and frequently commit to permanent employment during their last work term. Regular co-op employers have a high profile on campus, and gain a reputation for mentoring young talent and fostering career development.

The co-op program provides industry with bright, enthusiastic, educated employees. Students have valuable computer skills, and bring a fresh approach to the work place. Employers are provided with term employees for seasonal work and special projects. This is an excellent opportunity for industry to "try out" a position or employee, without having to make a permanent commitment. If the fit is right, the student can be groomed for future promotions.

The Faculty of Engineering at the University of Manitoba has co-op programs in Civil Engineering (474-6251), Biosystems Engineering (474-9722), Mechanical and Industrial Engineering (474-7358), and internship programs in Computer and Electrical Engineering (474-9099). Interviews for summer placements are being scheduled and employers should contact the departments immediately. ■

# Meet Your New Councillor – Robin Hutchinson, P.Eng.

*By: J.A. Blatz, P.Eng.*

It wasn't a very long trip for me to arrive at the office of one of our newest councillors, Dr. Robin Hutchinson, P.Eng. who is a colleague in the Department of Civil Engineering at the University of Manitoba. Robin was born and raised in Manitoba where she began her formal engineering education, graduating from the University of Manitoba with her bachelors degree in 1988 followed shortly after by her Masters in Structural Engineering in 1990. Following her Masters, Robin worked as a consulting structural engineer with Crosier Kilgour and Partners Ltd. until she decided to return to the University of Manitoba to pursue her Ph.D. under the direction of Dr. Sami Rizkalla, P.Eng. During that period, Robin also took a short break from work to start her family. Robin completed her Ph.D. in 1999 after accepting a tenure track faculty position in the Department of Civil Engineering at the University of Manitoba. Since joining the faculty of Engineering at the University of Manitoba, Robin has been very dedicated to the teaching aspects of academic life and even decided to spend one year at Red River College in their Civil Engineering Technology program. During her time at the University, Robin has supervised a number of graduate students and conducted research in the area of structural engineering. Robin has attracted considerable funding to her program which is evidenced by her extensive list of research publications in journals and conferences. She currently is the Associate Head of the department of Civil Engineering. Her career contributions to the profession were recognized with the APEGM Early Achievement Award in 2001.

*New Councillor, Robin Hutchinson*

Robin brings considerable professional service experience to the Council having served on the American Concrete Institute local executive and also the APEGM Women in Engineering Committee. Having taken an 18-month break when she started her family, she experienced first hand the policies

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THOUGHTS ON

# Design

## ... just what is design competence?

*By: M.G.(Ron) Britton, P.Eng.*

Over the past two academic terms I have had the pleasure of working with ten grad students in a new course I call the Engineering Design Process. We have explored a number of issues, not the least of which is the question of what constitutes design competence. The list of characteristics they assembled and the thoughts behind the list are worth sharing with a wider audience.

If we accept that Design Engineering, and therefore Design Competence, flows from the identification of a problem through the delivery of a product, we also accept that it requires a multiplicity of skills and technologies. Design Competence, in its broadest sense, does not fit well into any bureaucratic listing of specific definable skills. Maybe it justifies the definition, offered in jest, of being "all things to all people".

Given the scope of the concept of Design Competence, total Design Competence probably exceeds the capacity of any one person. Therefore a prime requisite of Design Competence is the ability to work within, and contribute to, a team. Further, that team will incorporate views and abilities that far exceed those of the individual engineers within its membership.

To contribute to any team one must have a clear understanding of the limits of ones own abilities and the confidence to accept those limits. This attitude will allow individuals to think beyond the constraints of their own past experiences and discover how their skills can contribute to innovative solutions.

Teams are about communication. Therefore, if design happens in teams, a person with Design Competence must have the ability to communicate. Communication must occur on all levels from conceptual to detail, in written, oral and graphic forms.

Petroski defined Engineering as the "rearrangement of what is". It takes a creative mind to rearrange rather than just reproduce. If innovation is to occur, the Design Competent person must be creative. On the other hand, practicality, borne of a basic understanding of "how things work, are made, and endure", also characterizes a Design Competent individual. This must not be allowed to limit creativity, but rather to assist in bringing creativity to a deliverable and affordable end point.

A Design Competent individual must have the ability to conceive solutions in the "big picture" and articulate the inputs and constraints associated with this perspective. As well, he/she must be able to "reduce" the "big picture" to manageable parts that can be addressed as separate, but linked, projects. This implies an ability to assess the resources required to undertake each project. As a follow-up, however, the Design Competent person must be able to reassemble the "parts" into a "workable whole".

Within specific projects that require technical engineering input, a Design Competent Engineer must have the technical competence to assess and, where appropriate, utilize the various analytical tools available for problem solution. Often it is more important to have the ability to determine which of the many tools are appropriate for the task at hand than to have specific competence in utilizing a particular tool.

The Design Competent person must be thorough in everything that he/she undertakes. From brainstorming to component analysis to writing specifications to assessing customer service reports, it is attention to detail that assures a functional end product.

Finally, the Design Competent individual must be humble. Most design projects are exceedingly complex, and that complexity can challenge even the most brilliant among us. The humble person will seek out assistance in understanding the nature of the problem, and listen to whoever might be able to provide that assistance. He/she will also accept that perfection is unlikely, and therefore optimum solutions will be acceptable to him/her.

In summary, a Design Competent Engineer must:

- be a team player;
- know what he/she doesn't know;
- be a communicator;
- be creative; but
- be practical;
- be able to see the "big picture"; but
- be able to reduce a project to manageable pieces; and
- reassemble the pieces into a workable whole;
- be technically competent;
- be thorough; and
- be humble.

So there you have it, a definition of Design Competence from some of the people who are the future of our profession. ■

## Women's Action Committee – Evening of Networking

*By: L.E. McFarlane, P.Eng.*

The Women's Action Committee hosted an entertaining evening of networking at The Golf Dome on Thursday February 27th. This event was held to celebrate National Engineering Week, and proved to be a great success! Several key factors combined to produce a winning format that we intend to follow for future events. Lori Truax, a golf instructor from The Dome, provided a short presentation on golfing etiquette & rules followed by brief lessons on grip and stance. Duly warmed up, we then teamed-up to play a round of mini-golf before climbing to the second level to practice our swings on the driving range.

Everyone present agreed that a format of learning something valuable and interesting, having a practical component to our evening's events, remaining suitably casual, and being formed into groups for some fun activities were all a big part of making this a great night.

On behalf of the Women's Action Committee, thanks to everyone who attended for helping to make this a fun event. We all hope to see many more of you at our next gathering, which we plan to host in late April or early May. Please watch the Calendar of Events (the brown sheet) and the website for further details. As with past events, we will also e-mail an event invitation to all female members of APEGM. If you would like to receive an e-mail invitation, please make sure to contact the office at 474-2736 to provide us your correct e-mail address.

If you have any suggestions for future events, or would like to know more about our committee, please contact Lesley McFarlane at 958-2984, or Brenda Danielson at 474-3138. We look forward to seeing you all again in the spring! ■

### *New Councillor Robin Hutchinson*

*Continued from page 10*

regarding reinstatement requirements for APEGM. Although she notes that the reinstatement process was overall a positive experience, she has some new ideas on how the process might be improved to provide a more timely and equitable method of reinstating non-practicing members. Similarly, Robin is also very interested in the policies regarding immigrant qualifications and the member-in-training pre-registration program. One other aspect of the council that Robin is eager to experience is the new policy-governance model currently being implemented.

Outside of the profession and her career, Robin is strongly family oriented. She and her husband, Robert, have two young girls, ten year old Nicola and seven year old Madeline. Robin and her husband spend much of their time in the community involved with their church and the musical interests of their daughters. After hearing about the incredible balance that Robin has achieved in all aspects of her career and personal life, I am sure she will have considerable insight to help with the council activities during her coming term! ■

## Letter to the Editor

# Upholding Entry Standards – Versus Entry Procedures

*By: D.J. Hamilton, P.Eng.*

Recent Keystone Professional articles have attempted to focus attention on different elements of the APEGM registration process. This article provides recommendations to further improve the registration process from the perspective of an experienced P.Eng. candidate.

As most readers already thoroughly understand, the Canadian Engineering profession, with its rights and responsibilities, is founded within the laws of each province. These laws govern each jurisdiction, but all generally follow consistent national guiding principles. These laws limit the practice of engineering to professional engineers or those working under the supervision of a professional engineer, who accepts the responsibility for the work being performed. These laws establish each association's responsibility to control entry into the association and to regulate professional practice. The process to become a professional engineer generally requires applicants to meet standards and criteria set by each association that typically covers academic qualifications, engineering work experience, and other professional qualifying activities. Once someone has attained professional engineering status in one jurisdiction, through the use of the national mobility agreement, they are normally able to obtain that same status as they move or work in different jurisdictions in Canada with few if any new qualifying requirements (the Canadian Council of Professional Engineers, CCPE, maintains a website that contains valuable information on national principles and links to all provincial engineering associations at ***www.ccpe.ca***).

The APEGM (Manitoba) registration process generally recognizes two streams of entry. New Association members either transfer from other associations (under the auspices of the national mobility agreement), or they meet the entry qualifying criteria as engineers-in-training (EIT). Since four years of engineering work experience is required for EITs to become professional engineers, the entry process seems to be built on the assumption that the registration process will take at least a number of years to complete.

In addition to acceptable work experience, the APEGM EIT process requires applicants to meet academic standards and other professional development activities. The professional development activities include an introductory open-book, Professional Practice test, and later, the National Professional Practice exam. Throughout this period of internship, EITs are also required to meet continuing professional development and volunteer service criteria. Each of these additional requirements are intended to reinforce desired characteristics of a professional member and are set at a level that can reasonably be expected to be satisfied while an EIT obtains their required work experience.

Engineers, more so than most, know the value and caution associated with making assumptions. Assumptions are something we believe to be true so that we may continue to solve a problem. Assumptions must then be proven true or they become risks that, if they turn out not to be true, can have undesirable results.

The detailed and structured process that has been established by APEGM for EITs is generally suitable for new or junior engineers who spend 3, 4, or more years obtaining required engineering work experience. However, I believe that the assumption that it will take years for an EIT to become a professional engineer is not necessarily true for all circumstances that can exist.

In my particular circumstances, I graduated with a B Eng in 1985 and at that time also became an Engineering officer within the Canadian Forces. Throughout my career I have been able to develop and gain engineering and engineering support experience without being a professional engineer. (This situation is a recognized exclusion within the engineering laws for most Canadian jurisdictions.) I also chose to become registered as a professional engineer in 1988 while in Alberta and completed the entry process in place at that time. Following an assignment to new responsibilities in Germany a few years later I then let my APEGGA membership lapse. Having recently reached the point in my career where I am choosing to settle in Manitoba, I have since been pursuing the requirements to obtain APEGM registration.

My experience in working through the steps to become a professional engineer with APEGM has been mixed. At the outset I had two options available, as noted at the start of this article, attempt to reinstate my registration in Alberta and then transfer, or I could process my application with APEGM as an EIT. The latter choice seemed most appropriate since I have not resided in Alberta for over twelve years nor do I expect to do so in the near future.

As an EIT I have been required to meet all of the same standards as any other applicant. Some flexibility has been exercised in allowing me to report all required experience at one time. I also have had my first writing of the National Professional Practice exam accepted as fulfilling that requirement. Although I have been able to report all work experience at one time this requirement turned out to be time-consuming to provide the required detail for all positions of responsibility that I have held. Some procrastination on my part, or natural distraction as a busy person, has also occurred as I share my time among my many other responsibilities and interests. Each time I have been required to submit new information to process my registration the overall process has encountered at least some delay on my part. Once my work experience submissions were completed supervisor reports were then requested. I was fortunate in that my supervisors were all responsive to requests for information. But, this process still took several months to determine that my work experience met the entry standard.

Having met the work experience requirement, the process next required character references to be obtained. For my situation this then involved sending different surveys to some of the same supervisors that had just completed experience verification reports. The Experience Committee had also found that despite my varied past, which includes other professional and community service activities, I was short in meeting the standard for voluntary professional service to the Engineering profession. This should not have been unexpected since I only became part of this particular organization when I became an EIT.

From my experience with this entire process, I would observe that the process is structured for new engineers to complete throughout the time they are gathering their required work experience. Anyone who falls outside of that mainstream is still forced to work within the bounds of this process with only minor adjustments. I also have felt that some of the criteria to be followed are too rigid for the objective or purpose they intend to serve. For instance, the objective of being responsible to voluntarily promote a profession is limited to activity supporting this profession, although the desired characteristics can be demonstrated with many other professional responsibilities. In situations where work experience is not required to be gained, this serial reporting and review process is too time-consuming. Although a responsibility exists to verify information that has been provided by a candidate at some point within the process, a degree of trust should also be introduced. If a candidate is short volunteer hours, is it appropriate to hold up their registration, or should this be something that could be expected of them to complete on their honour or within a fixed period.

Based on my experience I can offer recommendations in several different directions. Junior engineers with any aspirations to practice engineering should all be encouraged to start the registration process early and maintain a concerted effort to meet all of the obligations to become professional engineers. Junior engineers will gain valuable experience in meeting all of the different requirements and should do so with the advice and assistance of their supervising engineers. This recommendation also extends to junior military engineering officers. Based upon the current priorities within the military, it is unlikely that more substantive change could occur in the engineering occupations. It would, however, be useful if the military were able to promote engineering professionalism along with military professionalism, or to maintain their own 'engineering' association in such a way that it could evolve to allow experienced

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# Innovative Wave Energy Technology Poised for Commercialization

*By: Alan K. Vowles, P.Geo. and Avery Ascher*

The Wavemill® is a unique and revolutionary technology that efficiently harnesses the energy inherent in both rising and falling waves. It has been developed in Manitoba by Alan Vowles, P.Geo.

Initially validated through trials at the National Research Council and elsewhere, the Wavemill® holds Canadian, U.S. and several international patents. In 1996, it was recognized as the best environmental invention of the year at the Canadian GreenVention awards.

Driving development of the Wavemill® from the outset has been the desire to design a device that produces clean water and electricity in a pollution-free manner. In serving as the primary power source itself, the Wavemill® effectively displaces the use of diesel and other conventional fuels in generating electricity or facilitating desalination.

Ocean wave energy is a concentrated form of solar energy. The Earth's surface is heated unevenly by the sun, resulting in the creation of winds. Air flowing over the sea exerts a tangential stress on the water's surface, causing formation of waves. The wind then exerts a stronger force on the upwind face of the wave, causing wave growth. The amount of energy transferred, and hence the size of the resulting waves, depends on the wind speed, length of time the wind blows and distance over which it blows (the "fetch"). The concentrated energy yielded through this process is such that solar power levels, typically about 100 kW/m$^2$, can eventually be transformed into waves with power levels of over 100 kW per metre of coastline.

The global average wave energy flux is 8 kilowatts per metre of coastline. In comparison, the annual average flux of solar or wind energy is generally less than 300 W/m$^2$. The energy density of ocean waves is therefore an order of magnitude greater than the natural processes that generate them. Calculating the amount of available energy in a series of random waves in a real sea state is a complex problem. However, a simplified equation for this calculation is P = .5H2T; where P is equal to power, in kilowatts, per metre of coastline, H is the significant wave height (the average of the highest one-third of a number of waves) and T is the dominant wave period. As waves travel shoreward they lose energy as they experience friction and wave breaking. The energy density is affected by both water depth and slope of the sea bottom. Therefore, the power density is significantly lower near shore than further offshore.

There are two forces in a wave: surge (horizontal force) and heave (vertical force). Whereas competitive technologies harness only one or the other of these forces, the Wavemill® is unique in capturing both forces with a single moving part.

The most common type of wave energy converter is referred to as the OWC or Oscillating Water Column. This device consists of a partially submerged chamber, open to the sea at the bottom with an air turbine on the top. As waves flow against or around the OWC, the water level rises and falls within the chamber, driving air through the turbine during both the rise and fall of the water level within the chamber.

The Wavemill® consists of three key components: the wave follower, the surge wall and the hydraulic pump. Viewed from the side, the wave follower is triangular in shape. It is buoyant with an open-bottomed lower portion containing water as ballast. The surge wall is oriented at a 45º incline against which the wave follower slides up and down, continuously compensating for tidal variation. As a cresting wave impacts the seaward face of the wave follower, the combined forces of buoyancy and surge drive it upward, powering a hydraulic pump. As the wave begins to fall away, the water held by suction in the lower portion of the wave follower provides gravitational force that drives the hydraulic pump in the opposite direction.

The hydraulic pump pressurizes seawater, which then passes through a bladder accumulator, providing a steady state flow to a Reverse Osmosis (RO) desalination unit. The Spectra Watermaker RO system used with the Wavemill® boosts the pressure from 120 to the 600+ psi required to desalinate seawater.

Diesel generators provide the power to most desalination systems that are located on islands, necessitating importing fuel at considerable cost. In 2001, industrial diesel costs in Bermuda averaged US$3.21 per U.S. gallon. By replacing the diesel engine, the Wavemill® eliminates the cost of fuel. In addition, this technology produces no greenhouse gases (calculated at 2730 grams of $CO^2$ produced for every litre of fossil fuel consumed).

Wavemill® units are modular and designed to be portable. An array of ten, 300 kilowatt capacity Wavemill® modules will produce roughly 6.5 million kilowatt hours of energy annually. Based on the U.S. average fuel mix, approximately 1.4 pounds of $CO^2$ is emitted for every kilowatt generated.

Operating such a Wavemill® array would prevent the emission of (6.5 million kWh x 1.4 pounds of CO2) 9.1 million pounds or 4136 metric tonnes of CO2 each year.

In a test off the Nova Scotia coast in September 2001, clean water was produced from a desalination device powered solely by the Wavemill®. United Nations predictions indicate that if present water management and consumption trends continue, fully two-thirds of the Earth's population will live in 'water stressed' conditions by 2025. Markets and potential applications for the Wavemill® are thus anticipated to exponentially evolve and increase, not only offshore but also on large inland lakes. The company sees opportunities to partner with select Manitoba firms in manufacturing some of the hydraulic and desalination components used in the Wavemill®.

Wavemill Energy Corp. is extremely grateful for the range of support received to date from the Manitoba government. As much of the research and development into wave energy worldwide has taken place in the U.K., Wavemill Energy Corp. has tapped into that knowledge base by working jointly with Robert Gordon's University and several Scottish engineering firms, all with considerable experience in the offshore oil industry. Certification to ISO 14001 and 9001 standards will be a key focus for WEC as it moves forward with commercializing the Wavemill®. ■

*Alan K. Vowles is President of Wavemill Energy Corp. (www.wavemill.com).*

*Avery Ascher is a professional writer (www.ascherwordsmith.com).*

## *Upholding Entry Standards*

*Continued from page 12*

members to transfer from this special jurisdiction to any provincial association.

I would also recommend that the APEGM registration stakeholders take up the challenge to confirm that the registration process is appropriate for dealing with experienced applicants, whether they come from the Canadian military or outside of Canada. In today's lean, technology-enabled, quality-focused and fast-paced society, a more time-sensitive process should be achievable to allow an experienced applicant to submit all required entry information and have it quickly assessed to determine whether entry standards have been met.

The underlying goal of the registration process should be to protect the interest of our association by ensuring members meet the standards of character and performance that have been established to earn the right to be called a Professional Engineer. It is also important to recognize that a 'standard', as it applies to the entry process (criterion standards), should be a well-defined state, measure, or value that can be tested and judged to have either been satisfied or not. The processes to judge the achievement of those standards should be flexible enough to recognize that the entry standards may be met in many different ways. It may seem easy to require structured procedures to be followed as 'one-size fits all' solutions, but this approach creates artificial limitations to meeting the true desired outcome of quickly confirming whether someone has or has not met the standards. The EIT process may also serve a purpose as an 'apprentice' development process, but this objective should remain separate and distinct from upholding association entry standards. APEGM should strive to ensure that they have clear entry standards supported by flexible processes that can measure whether the standards have been achieved, knowing that they can be achieved in many different ways. ■

# Inadvertently Responsible?

*By: A. D. Silk, P. Eng.*

As professionals we are required to take responsibility for our work and actions. The purpose and mandate of APEGM is to regulate the practices of engineering and geoscience in Manitoba so as to safeguard the public interest. This is accomplished firstly by ensuring that only qualified persons are authorized to provide engineering or services, and secondly by providing a process whereby they are held accountable for their work. Ultimately though, the onus rests with the individual professional to be certain of the completeness and adequacy of the services provided and to accept responsibility.

In the case of engineers, some may be unaware that, in some circumstances, they could be accepting responsibility for the work or actions of others. Two scenarios follow.

### "Non Engineer" Contractor

There are indications that some companies are providing engineering services without a Certificate of Authorization or, if unincorporated, without proper review by a professional engineer. In many cases such companies are manufacturers, vendors or contractors/trades. Often an engineering consulting firm operating as the prime or major sub-consultant on the project is involved in the incorporation of the services into the project. Providing such services in the absence of a Certificate of Authorization is a contravention of the Act, and engineers who approve the provision of their services on a project may be inadvertently accepting responsibility for that engineering.

The circumstances that lead to this scenario are when an engineer prepares a specification for tender that requires design work by the contractor or supplier.

This typically occurs when the tender specification for the project details the functional performance requirements but not a detailed design. The detailed design is left to the contractor. The tender normally states the contractor is to provide copies of the design (drawings and specifications) for approval. After the contract has been awarded the drawings and specifications, which are seldom signed and sealed by a professional engineer, are then accepted or approved by the engineer. When the work is accepted, the acceptance stamp usually includes a disclaimer that the engineer has reviewed the design for general requirements and that the contractor remains responsible for the design and for errors and omissions.

In this situation there are risks and liabilities that may arise for the engineer accepting the drawings if they have not been properly signed and sealed. The first risk is that the engineer is party to "approving" the contractor's drawings even though there is no engineer's seal. If they are unsealed the engineer who approved the drawings could become responsible for the work. The second issue is that the engineer accepting the drawings should be aware that the work involves the application of engineering principles (i.e. and is the practice of professional engineering) and that such services may only be provided by firms which have a Certificate of Authorization and/or by individuals who have the authority to practice engineering in Manitoba. The third factor is that the Act provides that a person who knowingly engages a corporation (i.e. is aware that corporation does not have a Certificate of Authorization) to perform services that require the services of a professional engineer is in contravention and subject to prosecution. Added to these is the provision of article 4.4 of the Code of Ethics which provides that "each practitioner shall present appropriate information to the registrar of the Association if a professional colleague, or any other person or entity, is believed to be in violation of the Act, the By-laws or this Code of Ethics".

To avoid the potential issues described, if a specification requires a contractor to provide design work, the specification should state that the contractor is to ensure that an engineer shall seal all drawings. In addition, the specification should indicate that the contractor must hold a Certificate of Authorization to ensure that the contractor is also properly insured for the engineering work undertaken.

### Supervising a Member-in-Training's (MIT's) Work

The other scenario is related to the supervision of MITs. In some situations where a MIT's workplace does not have a professional member available, another professional member from outside the organization agrees to mentor and supervise the work. Such mentoring and supervision is very laudable, and basic to the development and sustainability of the professions. At the same time, in so doing the supervisor or mentor is accepting responsibility for the work product of the MIT, and the commitment should be approached in that context.

He or she should also bear in mind that, if the work experience is to qualify as acceptable for internship, it must by definition also be the practice of engineering or geoscience. While the probabilities may be low, it also follows that, should a problem arise from the work produced by an MIT, responsibility may flow back to the supervisor or mentor signing off on the work experience. The work is, when required, also subject to the same requirements for sealing.

Supervising a future member of your profession is both a responsibility and a privilege, and care should be taken to ensure that the process is thorough and that the appropriate responsibility is understood and accepted. ■

# You Want How Much For That?

## Or what should the public expect to pay for geoscience services?

*By: Raymond Reichelt, P. Geo., Member of the Geoscience Issues Task Force*

For many years now APEGM has published a schedule of suggested fees for engineering services and one of our members has volunteered to update them. These suggested fees are what the public should expect to pay for such services and are presented as a range of fees depending on the experience of the engineer and the type of engineering services being provided. The fee schedule for engineering services is not mandatory but is published as a guideline. At our recent meeting, (Feb. 17, 2003) the Geoscience Issues Task Force (GITF) discussed whether or not APEGM ought to publish a similar schedule of suggested fees for geoscience services. We decided that the question should be put to the membership at large and I volunteered to write it up as a discussion paper. GITF wants to hear your comments on the following questions:

**Do we want APEGM to publish a schedule of suggested fees for geoscience services?** In an ideal market all potential customers and providers have access to price information. In reality, it can be difficult to find out what people are paying for geoscience services. Issues of confidentiality can be compounded with the fear that potential customers will use the information to "shop around" for the lowest rates. Consequently, many practitioners prefer to deal with their customers on a project by project basis. For the public, however, there is a real advantage to being able to find out what they can expect to pay for our services and for APEGM there is a requirement to protect the public from unethical or unqualified practitioners.

**How should we organise the suggested fee schedule?** Not all geoscientists are of equal experience or ability. Consequently the public should not expect to pay the same rate for the services of a geoscientist with 20+ years of experience as they would for a newly minted GIT. Should our fee schedule reflect this obvious difference? As well, there are different areas of geoscience practice with different demands for practitioners and different supplies of those practitioners. Consequently, should we also divide up the schedule by the various realms of geoscience practice found in Manitoba? Such a division should include the major areas of Mining Exploration, Petroleum Exploration and Hydrogeology. Each of these areas has its own market and current practices for remuneration.

Alternately, should we organise the fee schedule by project type? This would show how much it would cost to hire a geoscientist for a geophysical survey, a mapping program, or a subsurface contaminant investigation, just to name three examples. This would help people who know what sort of work they

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National Engineering Week 2003

# Celebrity Competition is a "Gas"

*By: S.B. Williamson, P. Eng.*

National Engineering Week kicked off this year at St.Vital Centre with the reading of the Proclamation by Hon. MaryAnn Mihychuk, P.Geo., Minister of Industry, Trade & Mines and the always exciting Celebrity Competition.

This year's Celebrity Competition showcased local celebrities from A-Channel (Jimmy Mac and Lisa Saunders), CKY (Shelley Jesseau, Erin Shelby, and Jon Hendricks), and the Goldeyes baseball team (Charles Peterson and Andrew Collier). The rules were simple and consisted of building a racecar out of household items in a 25-minute time-period. The completed cars were then judged on appearance, racing distance and speed.

*Hon. Maryann Mihychuk, P.Geo., proclaims National Engineering Week*

The teams were given similar items to work with and an assortment of tools to assemble the racecars. Each team frantically scrambled to design, build and add that special finishing touch to their cars. Glue, nails and especially duct tape were all utilized in the assembly of each car which ranged from tin cans, adding machine tape, and ice-cream pail lids used as wheels to styrofoam and pop bottle bodies.

A-Channel's car focused on using ice-cream pail lids for the rear wheels, adding machine tape as a front wheel and a two litre pop bottle for the body. The use of the adding machine tape proved to be the key factor in the car's design as it added the necessary weight to the front of the car, which with the assistance of gravity accelerated the car down the ramp far beyond its competition. There were also subtleties to the car such as pop bottle caps for decoration, compact discs for rims and a flag.

CKY's racecar utilized soup cans for the car's front and rear wheels, styrofoam for the body and what appeared to be a whole roll of duct tape to give the car some "flash". Unfortunately CKY's racecar must have had brake problems, as their car didn't even make it off the ramp, even with a hefty push by Mr. Hendricks.

The Goldeyes team car also incorporated tin cans into their design for wheels, a piece of wood for the car's body and a triangular piece of styrofoam that was attached to the top of the car to act as a spoiler. But again, smooth rolling wheels were a problem along with the wheel alignment as the car barely made it off the ramp while veering into the crowd.

A-Channel pulled off a commanding victory with a total of 100 points by winning both the appearance category and the racing category with a distance of 267cm. The Goldeyes team squeezed out a second place finish with 40 points as their car's appearance came in last but the second place finish in the racing category (105cm) gave them just enough points. The team from CKY ended up third in the racing event (43cm) and third overall with a total of 30 points.

Each team received a cash award to be donated to their chosen charities. The Tim Horton's Children's Foundation received $600 on behalf of team A-Channel, $300 was donated to the Goldeyes Field of Dreams Charity on behalf of team Goldeyes, and team CKY donated their $100 prize to the Children's Hospital.

Once again the Celebrity Competition was a success and many thanks go out to the organizers and the competitors. ■

*Team A-Channel with their 1st place racecar*

## *You Want How Much For That?*

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need but don't know what it should cost.

**Should we explain how we developed the fee schedule?** This may be as important as the actual suggested fees. Consultants commonly hear the question that I used a title for this piece: You want how much? It is fairly easy to look up the salary survey for APEGM on the web and discover that geoscientists with XX years of experience are commonly paid $XX,XXX per year. It is a fairly simple task to then determine what hourly pay the geoscientist receives. However, what a geoscientist receives as a salary is only a fraction of what the customer is charged. In consulting, charge-out rates for an individual are typically between two and three times the individual's salary; i.e. if an individual's salary works out to $25/hour, the charge out rate paid by the customer will be between $50 and $75 per hour. The difference is the cost of overhead – professional liability insurance (**now mandatory**), office buildings, office equipment and support staff. Is this the kind of information that the public needs to know when they are looking to hire geoscientist?

On a related issue, should we also state what the fees do not include? Projects typically include the services of drilling contractors and laboratories. As well, project costs often include rental for specialised equipment such as geophysical instruments, sampling supplies, data loggers and the like. All these are on top of the fees charged for the geoscientist's time.

**What are the "going rates" in your field of practice?** If we agree that APEGM should publish a schedule of suggested fees for geoscience services, we will need to compile information on what people are charging for their services. We know what people are being paid from the salary survey. For those working in consulting, it is a fairly easy task to apply the "going rate" for calculating charge-out rates as I pointed out above. However, for some of the other fields of practice, we will need to know what the current practices are.

**We want to know your comments.** Please forward them to the APEGM, attention to the Geoscience Issues Task Force. ■

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