

THE KEYSTONE PROFESSIONAL

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- Design...and the effect it has where we live



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

JUNE 2003

www.apegm.mb.ca

Consulting Engineers of Manitoba Holds 4th Annual Awards of Excellence, Celebrates 25 Years

By: R.G. Rempel, P.Eng.

With lights, cameras, and action, the Consulting Engineers of Manitoba celebrated both its 4th annual Manitoba Awards of Excellence in Consulting Engineering and the organization's 25th Anniversary on April 9, 2003 at The Fairmont Winnipeg. Three hundred consulting engineers and their guests, including His Worship Glen Murray, the Honourable MaryAnn Mihychuk, P.Geo., and numerous CEM Past Presidents gathered to honour some of the best examples of Manitoba's vibrant consulting engineering industry.

The evening's Master of Ceremonies was none other than Mr. Peter Jordan, Gemini award-winning host of CBC Television's hit series "It's a Living". Peter's presence and wit has proven to be a wildly popular and humorous element of the CEM Awards Gala tradition. Back by popular demand, Peter assured the sold-out crowd

that he fully intended to complete his "drive for five" in hosting the CEM Awards in its fifth year in 2004.

A record number of projects were in contention for CEM Awards of Excellence in 2003. Firms competed in six categories including International Projects, Industrial Projects, Resource Development Projects, Environmental Projects, Infrastructure/Buildings, and Innovation. In addition, the coveted Keystone Award was presented to the best overall project of the awards. The projects were judged by a Blue Ribbon panel chaired by Mr. Ray Scouten, P.Eng., consisting of engineering professionals and selected representatives from related professional sectors. This year's Judging Panel included: Barry MacBride, P.Eng., City of Winnipeg, Bob Eastwood, FRAIC, Number Ten Architectural Group, Ronald Hambley, MCP, Winnipeg Construction Association, Kathy Gaudry, FCGA, APEGM, Dr. Jay Doering, P.Eng., University of Manitoba, Jim Thomson, P.Eng., City of Winnipeg, Ron Suzuki, P.Eng., Lombard Place Limited, and Malcolm Symonds, P.Eng., University of Manitoba.

The evening included some very special moments associated with the Consulting Engineers of Manitoba's 25th Anniversary. Special guests included Mr.

Bill McKay, CEM President (1981) and the honorary presenter of this year's Keystone Award, as well as a roster of CEM Past Presidents. Over the past 25 years, the organization truly has evolved from furnace room to grand hall. In his address to the crowd, Mr. McKay recalled the modest beginnings of the organization, expressing his delight at both the size of the organization today and the size of the crowd gathered to celebrate the Consulting Engineers of Manitoba Awards of Excellence. Together with Mr. McKay, Past Presidents stood and were recognized by the audience for their efforts in building the Consulting Engineers of Manitoba to its current profile in Manitoba's economic landscape.

Awards of Excellence were presented to Acres Manitoba Limited, Wardrop Engineering Inc., UMA Engineering Ltd., KGS Group, and Dillon Consulting Limited in the



His Worship Mayor Glen Murray praised engineers for their contributions to the lifestyle of the city

categories of Resource Development, Industrial, Environmental, Infrastructure/Buildings, and Innovation, respectively. Wardrop Engineering was awarded the 2003 Keystone Award, presented by Mr. Bill McKay for Wardrop's Design-Build RWOS2 Project. Under the CEM Awards Guidelines, judges can award one Award of Excellence and up to two Awards of Merit in each category. The full list of winners of Awards of Excellence and Awards of Merit is as follows:

International Category

Award: Merit

Firm: Wardrop Engineering Inc.

Project: Northern Region Water and Sanitation Project (NORWASP) – Ghana

Industrial Category

Award: Excellence

Firm: Wardrop Engineering Inc.

Project: Design-Build RWOS2 (Radioactive Waste Operations Site) Bruce Nuclear Generating Station

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Current CEM President Neil Ferguson, P.Eng., addresses the crowd

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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.

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 the APEGM or the APEGM Council.



Publications Mail Agreement Number 40062980

New Members Registered March & April 2003

N.A. Arora (ON)	W.C. Hillman	L.W. Norrie (ON)
D.V. Bonin	F. Hrdy	J.A. Smith
J.D. Bowen	D.Kruger (AB)	C.W. Steele
J.B. Dietrich (ON)	D.P. Kuenstler	B.J. Thomson
L.L. Douglas	C. Liu	E. Williams Portal
G.D. Dowman (ON)	B.J. Madison	S.B. Williamson
P.J. Fleury	G.A. Martinez	D.L. Wilson (AB)
R.L.J. Girouard	D.W. McKenna (AB)	D.I. Windley (ON)
A.M. Halayko	D.N. Nedohin (AB)	H. Zhu

Members-In-Training Enrolled March & April 2003

J.D. Botha	R.E. Ferris	F.V. McPhee	R.K. Russell
T.L. Brako	C.J. Hewitt	S.A. Mihalus	I.C. Smallwood
H.L.A. Brojges	M.T. Jenkins	E.L.F. Packulak	R.D. Wizbicki
M.B. De Baets	A.G. McCorrister	N.K. Paul	
	D.C. McGee	P.L. Pulak	

Resignations March & April 2003

R.A. Baynit	R.A. Froese	R.L. Maniere	T.I. Norman
N.S. Bhatt	W.F. Hayes	A.F. Martin	J.D. Robertson
P.H.O. Binns	I.T. Hosain	R.M. Martin	J.H. Smith
L.B. Dabek	J.D. Johnson	D.M. McCartney	G. Tyc
D. Free	R.W. Johnson	M.D. McKay	P. Vlahos
D.D. Freeborn	P.D. Leseberg	C.M. McKenzie	
	D.E. Luprypa	P.M. Meyer	

Members-In-Training Resignations March & April 2003

J.F. Brodeur	J.A. Cutts	J.L. Meleschuk	J.C. Sloane
K.B. Brunham	M.F.R. De Prophetis	R.M. Skorpad	E.S. Tan

Members De-Registered April 1, 2003

D.W. Andrey	J.P. Hansen	G.A. Oucharek	F.M. Stanford
R.H.M. Balbaa	H.T. Ho	W. Pedrycz	P.J. Stewart-Hay
C.J.G. Barratt	H.R. Hopper	Q.H. Phan	T.Y. Tang
C.P. Brown	E. Hrudko	K.J.D. Ridley	L.B. Tompkins
S.P. de Wit	M.C. Kazdan	C.C. Ross	L.W.K. Tse
P.J. Dimmell	P.H. Mare	N.E. Schipper	G.D. Waldmo
J.R. Elkind	K. Nachman	D.G. Scott	G.A. Webster
S.A. Hader	P. Ng	K.R. Spence	B.R. Wohlgemuth

Members-in-Training Removed from Enrollment April 1, 2003

S.D. Amor	C.A. Dann	S. Mann	T.C.D. Rudachek
G.V.R. Cadieux	E. Ho	W. Pakingan	B.N. Skanderbeg
G.D.H. Chung	K.H. Lew	S. Patel	E.D.J. Toupin
B.D. Clegg	A.M. Lou	D.A.S. Paziuk	
	T.R. Mackinnon	R. Rasidescu	

Licences Issued March & April 2003

B.E. Guth (ID)	D.M. Honan (NY)	T.D. Schwenk (NM)
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Reinstatements March & April 2003

S.C. Seymour

Certificates of Authorization

Issued

Avion Services Corp.
Gulay Elevator Services Inc.
Norrie Engineering Inc.
SEACOR Environmental Inc.
Talon Projects Inc.
WINTEK Engineering Ltd.

Discontinued

Ancor Engineering Ltd.
Ashford Engineering Ltd.

Bronte Engineering Limited
Brown & Co. Engineering Ltd.
DWD Consulting Ltd.
Egberts Engineering Ltd.
Kassian Dyck & Associates
K.E. International Ltd.
SCL Engineering Ltd.
Stohtert Engineering Ltd.
Talon Geotechnical Engineering Inc.
Thurber Engineering Ltd.
Winnipeg Airports Services Corp.



Executive Director's Message

D.A. Ennis, P.Eng.

Copyright and Professional Service Agreements

An issue that has been identified as a concern of late is that of contracts that require the assignment of copyright when a professional engineer or a Certificate of Authorization holder provides services to the client. It is generally understood that the client owns the documents that are provided in the course of the service, and that the copyright on an original concept and the right to reuse the information in the documents that are supplied as part of the service is retained by the professional. Recently, however, some clients (and in some cases clients that are represented by professional engineers in their employ) are putting forward contract documents that also lead the assignment of copyright on the "works for hire" principle that applies when a service is provided by an employee. The concern is that wording of such contracts not only transfers the rights of the design professional, but may also result in unintended financial or liability difficulties.

Normally, clients will use plans and specifications for their maintenance or facility management needs, and do not use them inappropriately for new projects or for changes to the original project without appropriate modification. However, in the interests of both the client and employer, professional members on both sides of the issue should be cognizant of the implications, and work towards a professional service agreement in which any rights that are to be transferred to the owner are clearly identified, and that there is appropriate compensation and legal protection.

With regard to the legal protection, the client/owner should absolve the professional engineer from claims arising from the owner's use of any document prepared by the professional engineer for a purpose or project other than the one for which it was prepared. With regard to reuse, the professional engineer may wish to obtain permanent royalty-free right to use his or her concepts that are not part of the owner's proprietary equipment or process.

Certificate of Authorization

The concept of the Certificate of Authorization requirement of *The Engineering and Geoscientific Professions Act* has been the subject of a number of questions lately, so I take this opportunity to comment.

The Certificate is in effect a permit for an entity to practice professional engineering or professional geoscience, i.e. offer or provide professional engineering or professional geoscientific services, in its own name. This is in conformance with *The Corporations Act* (Manitoba) which provides that:

"Where the practice of a profession is governed by an Act, a corporation may practice the profession only if the Act expressly permits the practice of the profession by a corporation and subject to the provisions of such Act."

The legislation making this provision came into effect in 1999 after the current Act governing APEGM came into effect. It included amendments to other Acts governing the accountants, dentists, and lawyers, which makes them subject to the equivalent provisions.

There is more detailed information on the Certificate of Authorization on the Association's website at www.apegm.mb.ca/practice/policies/coa.html.

However, there are three points in particular that I bring to the attention of members considering whether their corporation requires a Certificate:

1. the test of whether the corporation is practicing engineering or geoscience in its own name is whether there is a transfer of professional services (i.e. that constitute the practice of professional engineering or professional geoscience) at the interface between the corporation and the customer;
2. with very few exceptions, there is a requirement for the corporation to have professional liability insurance with the corporation as the named insured; and

3. section 59 of the Act reads "No person shall knowingly engage, employ or contract with any person, corporation, partnership or other legal entity that does not hold a certificate of authorization for any work that requires the services of a professional engineer or professional geoscientist."

Privacy Legislation

Beginning on January 1st, 2004, Manitobans and APEGM will be required to comply with Federal Government legislation entitled the *Personal Information Protection and Electronic Documents Act*, or "PIPEDA" as it is known. I raise the matter to let members know that

current indications are that compliance with this legislation will require a number of changes in the Association's operations, and in the information and authorizations required from members, members-in-training, and student members. Again, information on PIPEDA can be obtained on the internet at http://www.privcom.gc.ca/index_e.asp. I note for those of you who were concerned about the listing of information on the Association's website that the definition of personal information in the legislation "means information about an identifiable individual, but does not include the name, title or business address or telephone number of an employee of an organization." ■



Letter to the Editor

Just finished reading the latest (February 2003) *Keystone Professional*, and thought I had better drop a line.

On page 8, around the middle of the page, is an article I would guess was submitted by V.L. Dutton, P.Eng. (Ret.), that caught my eye.

While we are members of the same Association, I certainly would not be so bold as to submit an article on engineering in any form without first checking its accuracy with an appropriate engineer.

Perhaps something was lost in translation; however, the volcano found by the Brazilian geologists is definitely NOT the 'oldest volcano in the world'. Here in Manitoba, and in most Precambrian cratonic areas throughout the world, there are numerous volcanoes that range in ages from much older to younger than 2.0 Ga.

Any geoscience article is appreciated in the newsletter;

however, editing by appropriate professionals in the same organization is expected.

W.S. Mandziuk, P.Geo.

NOTE

The Brazil claim apparently refers to a preserved volcanic edifice within 1.9-1.0 Ga Uatuma Supergroup equivalent volcanic rocks in Brazil. These subaerial volcanic rocks are variously preserved and undeformed due in part to synvolcanic block faulting and to a lack of NeoProterozoic and Phanerozoic orogenic deformation. It appears that a 250 m high section of volcanic stratigraphy at or near the edifice of one such long-extinct volcano has been preserved, recently exposed through tropical weathering and erosion, identified and dated. Depending on where the line is drawn as far as how much has been preserved, strictly speaking Professor Julian of Sao Paolo University may be correct. Additional confirmation from affiliated U.S.G.S. geologists is pending. However, W.S. Mandziuk's comments concerning the oldest volcanic rocks are also correct. Some of the world's oldest volcanic rocks are found in the North Caribou Terrane in Manitoba and Ontario (3.0 Ga). J.W. Patrick Lengyel, P.Geo., Communications Committee. ■

In Memoriam

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

Larry Donald Barker John Benjamin Striowski

APEGM Annual General Meeting

The 2003 Annual General Meeting of the Association of Professional Engineers and Geoscientists of the Province of Manitoba will be held on Saturday, October 25, 2003, simultaneously at The Fairmont Winnipeg, Two Lombard Place, Winnipeg, and videoconference locations in Thompson and Flin Flon.

NOMINATIONS FOR ELECTION TO THE COUNCIL

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

J.R.C. (Jay) Doering, P.Eng.,
Lawrence R. Ferchoff, P.Eng.
(As Past President);
Don Harfield, P.Eng.,
Robin L. Hutchinson, P.Eng.,
Arnold H. Permut, P.Eng.,
Eric C. Syme, P.Geo.

Members of Council whose term of office expires at the 2003 Annual General Meeting are:

M.A. (Moe) Barakat, P.Eng.,
(Past President)
Trevor J. Cornell, P.Eng.,
Kelly V. Gilmore, P.Geo.,
Marianne L. Goldsborough,
P.Eng.,
Raymond P. Hoemsen, P.Eng.,
Allan D. Silk, P.Eng.

Those nominated by the Nominating Committee for election to the **FOUR PROFESSIONAL ENGINEER** positions on the Council are:

Trevor J. Cornell;
Frank J. Deniset;
William E. Evans;
Raymond P. Hoemsen;
Bryan D. Norrie;
Allan D. Silk;
Douglas J. Taniguchi

Those nominated by the Nominating Committee for election to the **ONE PROFESSIONAL GEOSCIENTIST** position on the Council are:

Kelly V. Gilmore;
J. Patrick Lengyel

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, 2003.** 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 **Wednesday, September 10, 2003.**

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.



David A. Ennis, P. Eng.,
 Secretary

VIDEOCONFERENCE FACILITIES

The Association is arranging videoconference links between the three meeting locations: Winnipeg, Thompson and Flin Flon, to facilitate the participation of members in the business of the Association. Further information on the arrangements and the procedures will be provided in a September mailing.

2003 ANNUAL GENERAL MEETING PROGRAM

The events scheduled for the AGM and the agenda for the Professional Development Conference on Friday October 24, 2003, will be published in the September 2003 edition of the *Keystone Professional*. The Professional Development Conference tickets will include lunch. There is no charge for the business meeting, or the business meeting luncheon, on October 25, 2003. All events will take place at The Fairmont Winnipeg.

APEGM AWARDS

The APEGM Awards Dinner will be held on Friday, October 24, 2003, at The Fairmont Winnipeg. Details regarding the awards recipients will be available in the September 2003 *Keystone Professional* and on the Association's web page. Dinner and entertainment will follow the awards presentations.

Tickets for the Professional Development Conference and the Awards Dinner will be available at the Association office in September.

Current information is available on the Association's web page at www.apegm.mb.ca. ■

Conawapa – All Talk or Serious Consideration?

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

Recent press coverage has renewed interest in the possibility of building the estimated \$5-billion Conawapa hydro generating station on the lower Nelson River in northern Manitoba.

You may have read the article in the Winnipeg Free Press, Friday, March 28th, 2003 (written by Paul Samyn) purporting the following: "The proposed \$5-billion Conawapa dam, which would be the biggest economic project in Manitoba history, got a major boost yesterday when the Ontario budget made specific commitments to a power deal with Manitoba Hydro and to construction of a transmission line... Manitoba Energy Minister Tim Sale said Ontario's budget provides two key commitments needed for the dam project to start. He said Ontario

is making clear its support for not only the power sale, which can now be negotiated in earnest, but also for construction of a \$1-billion transmission line needed to get the power to its customers... Sale said the power sale could take six to nine months to negotiate, and funding for some initial engineering studies could soon begin."

The next day, Saturday, March 29th, 2003, an Editorial in the Winnipeg Free Press retorted: "It would appear that a lot of political dust needs to settle before anything about this project can be characterized as anything other than electioneering."

However, the following announcement was made on May 1st, 2003, and it seems that at the very least, both provinces are will-

ing to further investigate the feasibility of Conawapa. "Ontario and Manitoba took another step toward starting construction on the massive Conawapa hydro generating station. The two provinces have agreed to produce a more detailed study on the total costs of the project." Source: Canadian Press, *Manitoba, Ontario to study major dam project*, Thursday, May 01, 2003.

I investigated further, and Manitoba Hydro confirmed that they would be undertaking this study jointly with Hydro One (the company owning and maintaining most of the high voltage transmission in Ontario). It was noted that before any negotiations for a power sale to Ontario could begin, the feasibility study would need to be com-

Continued on page 8

Student Reminder Attention All Student Members

Please remember that your student membership expires September 30, 2003. A renewal notice will be sent to you in early September. If you do not wish to renew your student membership at that time, please contact the office. Student members who do not renew will be required to re-write the Professional Practice Test when enrolling as a member-in-training. ■

Consulting Engineers Awards of Excellence

Continued from page 1

Resource Development Category

Award: Excellence

Firm: Acres Manitoba Limited

Project: Wuskwatim Generating Station Planning Studies

Environmental Category

Award: Merit

Firm: UMA Engineering Ltd.

Project: Risk Assessment and Stabilization of the Clinton Creek Channel at the Abandoned Clinton Creek Asbestos Mine – Yukon Territory

Award: Merit

Firm: ND LEA Engineers & Planners Inc.

Project: Glenboro-Rugby International Transmission Line

Award: Excellence

Firm: UMA Engineering Ltd.

Project: Manitoba Hydro Selkirk Generating Station Fuel Switching Project

Infrastructure/Buildings Category

Award: Merit

Firm: EARTH TECH Canada Inc.

Project: Condition Assessment and Major Repairs to the Arlington Overpass

Award: Merit

Firm: Wardrop Engineering Inc.

Project: Composite Steel-Glulam Roof Trusses for Structural Upgrading – Biggar Jubilee Stadium, Biggar, Saskatchewan

Award: Excellence

Firm: KGS Group

Project: Red River Floodway Expansion Study

Innovation Category

Award: Merit

Firm: E.B. Systems Limited

Project: Manitoba Telehealth Network

Award: Merit

Firm: Wardrop Engineering Inc.

Project: Design of the Structural Health Monitoring (SHM) System – Provencher Pedestrian Bridge

Award: Excellence

Firm: Dillon Consulting Limited

Project: Golden Boy Conservation 2001 to 2002

Keystone Award

Firm: Wardrop Engineering Inc.

Project: Design-Build RWOS2 (Radioactive Waste Operations Site) Bruce Nuclear Generating Station

The Consulting Engineers of Manitoba expresses its sincere gratitude to its valued category sponsors, specifically DPIC Companies and Oldfield Kirby Esau Inc., ENCON Group Inc., Manitoba Hydro, Manitoba Trade and Industry Canada, the University of Manitoba Faculty of Engineering, and the Engineering and Information Technology Centre. In addition, the CEM extends thanks to all competing firms for the high quality and professional presentation of their

submissions. While firms look ahead to the 2004 Awards, it is important to note that Winnipeg's celebration of engineering expertise continues in the fall of 2003, with the Association of Consulting Engineers of Canada's National Awards of Excellence taking place for the first time ever in Winnipeg. Join us for this exciting event in Winnipeg on October 25, 2003, and start preparing for Manitoba's 5th Annual Awards of Excellence in 2004! ■



Two CEM past presidents and the honorary presenters of the first two Keystone Awards, Mr. Bill McKay, P.Eng. and Mr. Les Wardrop, P.Eng.

Professional Development

Winnipeg's Water Treatment Project: Past, Present, and Future?

By: W.T. Jackson, P.Eng.

Why do we need water treatment? This was one of many questions put forth as more than 40 people attended the Professional Development Breakfast presentation at the Viscount Gort on May 13. The simple answer to the question was provided by the keynote speaker, Duane Griffin, P.Eng., Water Planning Engineer and Branch Head for the Water Planning Branch of the City of Winnipeg: Water treatment is about protecting public health.

Winnipeg has enjoyed a high quality, reliable water supply from Shoal Lake since 1919. Minimal treatment has been required, including chlorine for disinfection prior to 1937, and fluoride for dental protection since 1956. In 1993, Winnipeg's City Council accepted a recommendation to undertake construction of a water treatment facility within a 10-year time frame. A comprehensive program of monitoring, pilot-testing, and engineering studies was undertaken between 1995 and 1999. Griffin pointed out that there is public health support for water treatment, quoting Dr. Margaret Fast: "The rationale for construction of a water treatment plant is based primarily on health concerns, and it is for this reason that I offer my sup-

port for this request." Griffin added that public confidence in municipal tap water is a valuable asset, and is easily lost. Griffin said an outbreak of a waterborne disease has significant consequences, including illness and loss of life, liability, and loss of public confidence.

Unlike the U.S., Canada sets water quality guidelines rather than standards, and the provinces are responsible for the regulation of drinking water. Manitoba's water quality is regulated under the Public Health Act, and Canadian guidelines are used as a reference for quality requirements.

Griffin revealed that 41 percent of customers are not satisfied with how their water looks and tastes, adding that unpleasant taste and odour from algae are a frequent summer occurrence.

Goals and criteria for potable water in Winnipeg and a flexible model for evaluating alternative treatment technologies were developed, and the most cost effective approach to achieving water quality goals was selected. A conceptual design for the preferred "state-of-the-art" water treatment plant was completed, and the plant is expected to be operational by 2007. ■

MSSS Engineering...Building Tomorrow

By: R.L. Taylor, P.Eng.

Another successful Manitoba Schools' Science Symposium (MSSS) was held at the University of Winnipeg Duckworth Centre from April 25 to 27, 2003. This year, the MSSS clearly linked science and engineering by adopting the theme of ENGINEERING... BUILDING TOMORROW.

There were over 500 projects from grades 4 to 12. Our 14 APEGM judges, including myself, had the challenging, but enjoyable, task of previewing over 90 engineering-related projects, and selected the following outstanding contributions on behalf of APEGM:

Two APEGM Sponsored \$300 Cash Awards

- Mitchell Bushuk of Glenlawn Collegiate, grade 10, "*Traffic Flow & Vehicle Emissions on Jubilee Avenue (Study that relates to the Kyoto Accord)*"
- Mark Grondin, St. Maurice School, grade 7, "*The Cryro-electric Generator (A new generator that creates lightning)*"

Four APEGM Sponsored Mini University "Technology Plus" Scholarships

- Kevin Zhang, Acadia Junior High School, grade 8, "*How Does Shape Affect Air Resistance? (Test of molded shapes on toy cars)*"

- Nirusan Jayaranjan, Stevenson-Britannia Elementary, grade 4, "*Transportation of the Future (How magnetic levitation works)*"
- Matthew Lorange, Ecole Robert H. Smith School, grade 4, "*Conductivity of Metals (Which metal heats the fastest)*"
- Graeme Gillies, Ecole Robert H. Smith School, grade 4, "*Le Triangle Fantastique*"

In keeping with our engineering theme, the following sponsors provided job shadowing opportunities and cash awards:

- Teshmont Consultants
- SMS Engineering Ltd.
- Stantec Consulting Inc.
- MicroPilot
- Manitoba Industry, Trade and Mines – Mineral Resources Division
- Manitoba Hydro
- Nelson River Construction Inc.
- Crosier Kilgour & Partners Ltd.
- KGS Group

The APEGM judges also selected projects for the special awards:

"Science Mentor Day" and "Engineering Theme" Cash Award Recipients

- Mark Grondin, St. Maurice School, grade 7, "*The Cryro-*



Science Fair displays at Duckworth Centre

- electric Generator (A new generator that creates lightning)"*
- Carolyn Barber and Jacky Phalen, Ecole River Heights School, grade 8, "*Riding on Air (Testing how much weight a hovercraft can hold)*"
- Collin McKenzie, St. Andrews Elementary, grade 6, "*Warming Winnipeg Winters (Testing the heat absorption of different materials in buildings)*"
- Nicole Caithness, Emerson Elementary, grade 6, "*How Does Wing Design Affect Lift and Distance of a Plane*"
- Elizabeth Worden, Ecole River Heights School, grade 8, "*Vaporiser ou atomiser? (Fogging or spraying – which is better to control mosquitoes and West Nile virus)*"
- Daniel Ali & Adam Soliman, Acadia Junior High School, grade 8, "*Comes With The Wind (Experimental wind turbine which generates electric current)*"
- Dale Morrison, Whyte Ridge School, grade 4, "*The Strength of Supports (Which supports on a structure are the strongest)*"
- Nishant Balakrishnan, Acadia Junior High School, grade 7, "*SERVOBOT – Automated Delivery System (Three wheeled vehicle with robot riding it)*"
- Ellen Whitmore & Jannelle Van Den Bosch, Ecole Viscount Alexander, grade 8, "*Using Corrosion To Prevent Corrosion*"

On behalf of the Public Awareness Committee, I would like to thank Arnold Permut, APEGM president elect, for representing the Association at the opening ceremonies, and Robin Hutchinson, APEGM Council, for presenting the awards to the exceptional students at the awards ceremony. A big thank you also to all of our volunteer judges for their hard work: Kevin Sydor, Andrée Kirouac, Ashley Dent, Mitra Tirandaz, Ted Sontag, Sadhna Schipper, Ryan Sporns, Loren Bekeris, Phaedra Taiarol, Mahmoud Zandi, Kiran Kumedan, James Betke, and Trevor Bowden. ■



APEGM Volunteer Judges

Fire Safety

The Kursk

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

What caused the explosion that ripped into the hull of a large Russian submarine and left 23 seamen fatally stranded at the bottom of the ocean?

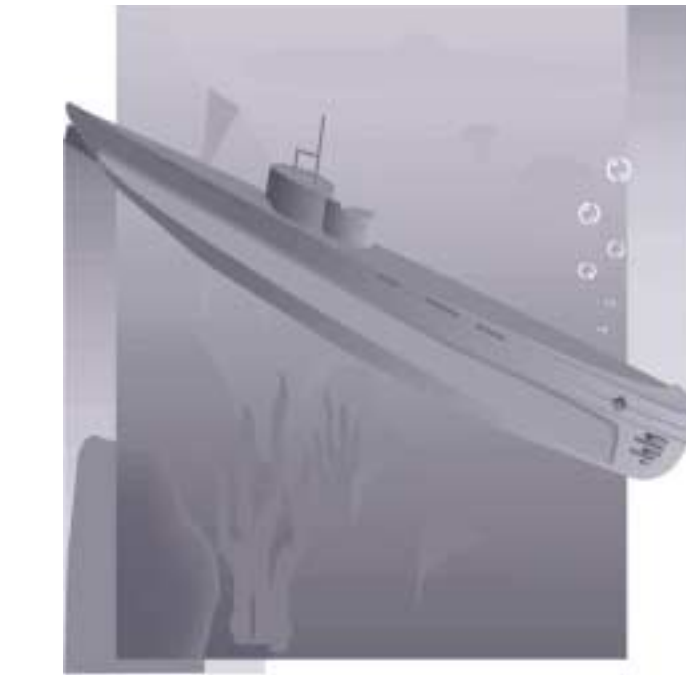
Not every dream that comes true is a good thing.

It's been said that a submariner's worst nightmare is to be trapped on the ocean floor. The nightmare became a reality for 23 Russian sailors during the worst submarine disaster in recent history.

On August 9, 2000, the Kursk, a Russian nuclear powered submarine, left Severomorsk Naval Base in the Barents Sea. The next day, she joined the rest of Russia's Northern Fleet for a series of war games. At 9 a.m., August 12th, the Kursk made her final radio contact. It received orders to carry out a mock attack on the Russian ships. The fleet waited. The attack never came.

The Kursk is described by Norman Polmar, a US Naval Analyst, as being "one of the most potent, anti-ship weapons ever developed." She was six stories tall, five hundred feet long, made use of a double hull design, and was separated into nine water-tight compartments. The Kursk was built to take a direct hit and still survive. But on August 14 the Russians admitted that for two days the Kursk had been lying at the bottom of the Barents Sea, unreachable by radio. Russia confirmed that a powerful blast of an unknown origin destroyed the Kursk. Commander Viktor Rozhkov, Captain of the Kursk from 1991 to 1997 said: "You can't take the Kursk out; even with a torpedo."

The U.K., U.S., and other countries immediately offered their assistance in rescuing any possible survivors. The Russians first attempted their own rescue operation; but after two days of failure, they asked the U.K. and Norway for help. The British rescue submersible, the LR5, arrived at the scene on August 19. For reasons unknown, however, the Russians did not permit the British to descend to the Kursk. The Americans, who operate the Avalon, a rescue submersible capable of transporting 24 survivors, were not contacted. It was later discovered that of the 118 crew members, 23 had survived for at



least 100 minutes after the blast by locking themselves in the ninth compartment. There, the survivors waited, trapped on the bottom, hoping for a rescue that would never come – at least not in time. Even if the Russians would have allowed the British or the Americans to help in the rescue operation it does not seem likely that the Kursk crew would have survived. Still, this is the kind of uncertainty that keeps the families of the deceased awake at night, wondering what might have been.

The Russians held two theories as to what caused the disaster. The first theory was that a Kursk torpedo had exploded in the hull -- a theory that has found international support. The second theory was that a submarine collided with the Kursk. Video footage from the disaster showed the hull had been ripped open and the Russians claimed this was evidence of an American submarine collision with the Kursk. The collision theory seemed plausible. According to retired Admiral Valery Aleksin of the Russian Navy, "a total of 25 collisions have been recorded since 1967. And many of these, 11, occurred near the naval base in the Barents Sea." The Russians provided a military satellite photograph showing an American sub docked at a Norwegian port six days after the Kursk sank, where the Russians claimed it was being repaired after the collision. The Americans denied the claim and it appeared that the solution of what happened on the Kursk disaster would remain a secret.

The Kursk investigation turned a new corner when seismologists at the Blacknest Seismic Research Centre in Berkshire, England, made a breakthrough discovery. The seismic monitoring station is capable of detecting nuclear and other explosions anywhere in the world, and on August 12, 2000, it recorded an event equivalent to a measurement of four on the Richter scale. Blacknest concluded this event was the explosion of the torpedo warheads which resulted in the hull being ripped open. But they soon found something even more interesting. Dr. Peter Marshall of Blacknest says that "two minutes and 15 seconds before the large event arrived, there was indeed another much smaller event from the same area." This first event turned out to be only one per cent of the size of the second event (the warhead explosion) and it provided a clue as to what happened on that fateful day.

The Russians assumed the first event was the collision with an American sub and that the second event was the resulting explosion of the warheads. Dr. Marshall's team enlarged the seismic signal of the first event and superimposed it with the signal of the second -- and larger -- event. If the two signals were different it might show that the Russians were correct that the first event was not an explosion and was, possibly, a signal of a collision with an American vessel. But what Dr. Marshall's team noticed was that the signals matched extremely well. This discovery was remarkable because seismic signals are rarely the same size and shape. The two

seismic signals proved that the first event was not a collision. It, too, was an explosion.

The investigation now needed to determine what could have caused the initial, smaller blast in the front compartment of the Kursk. Theories such as an explosion of the reactor core or the warheads were dismissed because they would have created an explosion greater than the signal from the seismic graphs.

An incident on a British submarine almost half a century earlier, on June 16, 1955, gave a clue as to the most likely cause of the Kursk disaster.

On that day, the British submarine HMS Sidon loaded an experimental torpedo carrying Hydrogen Peroxide (HTP) while docked in England. The torpedo exploded killing 13 people. In researching this earlier catastrophe, the investigators of the Kursk learned that when HTP comes into contact with metal it breaks down and produces water and oxygen. When it changes to a gas phase it expands in volume by a factor of 5,000. The connecting point was that the Kursk had torpedoes that also used HTP.

Torpedo designer Maurice Stradling said that "if the torpedo was accidentally started [before launching], then because the propellers were not in the water there would be nothing to control the speed of the engine. The engine would have over-revved and the HTP pipe would have burst. HTP would have sprayed into the hull of the torpedo." He goes on to explain that the HTP would then have reacted with the metal. The resulting gas build-up would have created an enormous pressure within the casing of the torpedo. The casing would have exploded and a fireball of torpedo fuel and oxygen would have raged around the warheads. The first seismic signal was likely from an explosion of a burst torpedo casing. The second seismic signal came two minutes and 15 seconds later when the fire set off the warheads.

After the explosion, Lieutenant Kolesnikov and 22 other sailors barricaded themselves in the ninth compartment. Kolesnikov wrote a note to his new bride that was later recovered. He recorded his final thoughts about the incident. "None of us can get to the surface," he wrote. "It seems as though we've got little chance. No more than 10 or 20 per cent."

Continued on page 8

Council Report

Wednesday, April 9, 2003

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

COUNCIL RECEIVES LETTERS FROM THE EDGE

The first item on this meeting's agenda was the agenda itself. An item involving an appeal was taken off the consent part of the agenda and re-introduced as a discussion item. The meeting learned that two special guests would address the meeting at 1:15 p.m. So after some re-ordering of items, a revised agenda was adopted by Council.

The first major discussion item of the day was an appeal from an out-of-province member who wished to resign gracefully from APEGM. According to a new by-law, a member must give notice of his or her intention to resign and pay a portion of the annual dues according to the number of months of the year he or she was a member. If notice is received prior to January 1, membership terminates at year-end and no money is due. The member issuing the appeal wished to resign on March 31, and for this to happen, APEGM wanted three months dues and a late fee, all adding up to \$116.01. The member thought the required sum was inappropriate, capricious, and arbitrary. A Councillor asked if the member was better off than before the by-law governing this transaction changed in December of 2002. According to Executive Director Dave Ennis, the answer was yes: prior to the bylaw change the member would have paid a penalty of six months fees. Appeal denied. So the member must either pay the \$116.01 and resign in good standing or pay nothing and be struck off.

Most Manitoba engineering graduates are aware of the demise of Room 229 and the demolition of the building surrounding it. Now it was time to hear of what was replacing it all. Dr. Doug Ruth, P.Eng., Dean of Engineering, University of Manitoba, and Mr. Les Wardrop addressed the meeting. Dr. Ruth said the university and APEGM had a mutual problem – engineering graduates, particularly electrical and computer engineers, weren't registering. The solution to this problem, he said, was a 5,000 square foot design studio located in the new building, and named in honour of APEGM.

The proposed design studio would be premium engineering space, according to Dr. Ruth. It would be in a highly visible place when entering the new building and would have the same view as did Room 229. All first and fourth-year students would pass through it. The design studio would provide students with early and continuous exposure to APEGM, culminating in professional registration. Dr. Ruth expanded his treatise to speak about the total cost of the new engineering complex – \$52 million – and how this cost was shared equally between the federal and provincial governments and

private donors. He said the cost of the engineering building was part of a larger \$200 million fundraising effort at the University of Manitoba and that engineering had first priority in that effort.

As was to be expected, placing APEGM's name over the design studio door was contingent on a substantial financial offering to the fundraising effort. Councillor Cornell injected a touch of levity when he asked if the door hinges were open to sponsorship.

Councillor Doering asked Dr. Ruth if a new engineering building was essential to maintaining accreditation. The accreditation board had been critical of the old space, Dr. Ruth said, but their concerns had dissipated when the faculty demonstrated they had a plan in place to address those concerns, and in the end, this led to a six-year accreditation term.

Executive Director Dave Ennis asked Les Wardrop how generous engineers were in responding to fundraising appeals. Mr. Wardrop said he'd spoken to 300 engineers, mostly retirees, and received 30 expressions of interest. Of that number, 11 went on to actually donate money.

After Dr. Ruth and Mr. Wardrop left the meeting, Council went on to debate the merits of the offer. Due to the sensitive nature of the deliberations, further information will be released after Council reaches a decision.

Council turned back to the more mundane aspects of leadership, wading through a number of monitoring reports and ending up on a prolonged review of our governance "Ends." The effort essentially came to a standstill when fatigue set in and people just burned out on the topic.

This is the time of year when Council receives a few interesting letters from members wishing to resign. One ex-member expressed some dissatisfaction with our city. He had returned to his alma mater after a career in Toronto. He "was astounded" that we had very little secondary industry, the streets were in deplorable condition, stoplights were a hodgepodge, rent controls bad, downtown sad, street sanding inadequate, strip malls unsightly, zoo run-down, MTS privatization deplorable, and the location of APEGM offices undignified. He held that Winnipeg was a static city with poor future prospects and that we'd be well-advised to close our engineering faculty and combine it with Alberta's. In closing, he said he'd be gone from Manitoba if it weren't for pressing personal matters and the cold temperatures.

Another soon-to-be ex-member said APEGM was a "bloated committee ridden bureaucracy and policing institution, offering little or no enrichment for me". The writer concluded by stating that APEGM "seems to primarily serve as a mutual admiration society and outlet for the more bureaucratically minded of the engineering members of Manitoba". The writer paid \$41.33 and left. Read these comments before your next performance review. After that, anything your boss says will sound like high praise! ■

Conawapa – All Talk or Serious Consideration?

Continued from page 4

pleted, which has been targeted for as soon as early winter 2003/04. Then, extensive negotiations would be required for such a major power sale.

Manitoba Hydro indicated that many factors would affect a decision to build Conawapa including: future export prices, transmission capacity and availability to markets, updated Conawapa and transmission capital costs estimates, identification of a suitable counterparty, and acceptable schedules for the development of Conawapa consistent with the need in the market.

I inquired about the possibility

of building Conawapa instead of or in conjunction with Wuskwatim, and Manitoba Hydro indicated they "have studied Conawapa in the recent 'Needs and Alternatives to Wuskwatim' submission to the Manitoba Clean Environment Commission. That analysis does not include the concurrent possibility of an additional major transmission link to Ontario. It is anticipated that, subject to provincial and federal reviews and other factors, Manitoba Hydro and NCN will develop Wuskwatim, regardless of the outcome of studies and negotiations concerning Conawapa."

For information regarding the Wuskwatim project, visit the Manitoba Hydro web page at www.hydro.mb.ca/wuskwatim. ■

The Kursk

Continued from page 7

Most of the Kursk has already been raised, and plans were under way to lift the bow by mid-summer 2002. But on June 19, 2002, CNN reported that Russia, without having raised the bow, confirmed that a faulty torpedo, and not a collision or a mine, was to blame for the accident. The investigation of the Kursk disaster has been officially closed by Russian Prosecutor General Vladimir Ustinov. Loved ones of the victims, however, are not accepting the report issued by the Russian Navy, claiming that it implies the crew is to blame for the disaster.

What we are left with is a plausible theory about what happened to

Russia's flagship submarine, but not a definitive answer. We may never know with absolute certainty the answer to what went wrong on the Kursk. But it's a question that 23 sailors, trapped at the bottom of the Barents Sea with their air running out, probably thought about during their final 100 minutes. ■

This article previously appeared in Canadian Consulting Engineer. It is printed with permission.

Sources:

The Learning Channel: "Kursk: Disaster at Sea," and "Extreme Machines: Submarines"

All quotes taken from "Kursk: Disaster at Sea."

BBC News Online – Aug. 30/00, Aug. 7/01, July 31/02

CNN.com – Nov. 16/01, June 19/02

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

THIS IS NOTICE that on April 23, 2003, a conviction was registered against Percival Anthony Augustus Ransford Beach, P.Eng., on a charge of unskilled practice or professional misconduct, or both, in accordance with the provisions of Section 35.1(f) of *The Engineering and Geoscientific Professions Act* of the Province of Manitoba.

The penalty for this unskilled practice and/or professional misconduct is that:

- a. Mr. Beach is required to pass the Association's Professional Practice Examination;
- b. a condition is imposed on Mr. Beach's entitlement to practice professional engineering whereby he will be prohibited from undertaking any residential building inspections and/or reports for a period of at least 8 months, commencing 14 days following his acceptance of the proposed penalty, or sooner by mutual agreement between him

and the Registrar in consultation with the Investigation Committee Chair, and ending after Mr. Beach has passed the Association's Professional Practice Examination;

- c. a condition is imposed on Mr. Beach's entitlement to practice professional engineering whereby he agrees to cooperatively permit periodic random inspections of his practice of engineering by a person authorized by the Investigation Committee to carry out such inspections, the cost of the inspections to be borne by Mr. Beach, to a maximum of \$10,000. (The objective of the condition is to encourage and assist Mr. Beach to improve the quality of his practice and avoid any practices that may be substandard, inadequate, or incomplete);
- d. a Notice of the conviction and penalty will be published in the *Keystone Professional*, including Mr. Beach's name;

- e. a Notice of the restriction of Mr. Beach's entitlement to practice will be published in the *Manitoba Gazette*, the *Winnipeg Free Press*, and the *Winnipeg Sun*; and
- f. a Notice of the restriction of Mr. Beach's entitlement to practice will be sent to the Winnipeg Real Estate Board with the request that the Board draw this matter to the attention of the Real Estate Agents.

The conviction is based upon Mr. Beach's failure to properly conduct and report on a pre-purchase inspection on behalf of a prospective purchaser of a residential building, in that he failed to make an adequate investigation or inspection to confirm the structural condition of the building, and failed to adequately advise his clients of structural problems that might exist or arise and of the repair costs that might be incurred. In so doing, he contravened Fundamental Canon 3 of the *Code of Ethics for the Practice of*

Professional Engineering and Professional Geoscience.

This Notice is provided in accordance with the provisions of 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.

David A. Ennis, P.Eng.
Executive Director & Registrar ■

REMINDER



Please notify APEGM (apegm@apegm.mb.ca) of any change to your e-mail address, mailing address, company information, or phone numbers.

Employment Opportunity Notice

THE POSITION:	Working Title: Electrical Engineering
	Salary Range: \$44,500.00 - \$62,000.00 per annum
	Closing Date: June 30, 2003
	Additional Benefits: Comprehensive Health Plan (Eye, Dental, Drugs,..) Profit Sharing (commences after 1 year)
QUALIFICATIONS:	University graduate in Electrical Engineering; eligible for registration in the Province of Manitoba as a Professional Engineer. Thorough knowledge and ability in electrical engineering design as it relates to Industrial Control and Automation Systems (Programmable Logic Controllers, Industrial Instrumentation, Motor Control Centres, Human Machine Interfaces, Distributed Control Networks). Supervisory experience, Superior organizational, oral and written communication skills. Thorough knowledge of electrical codes and standards. Proficiency in AutoCAD, word processing, spreadsheets and databases programs. Valid drivers license and ability to travel throughout the province.
DUTIES:	Functioning as a professional electrical engineer will produce electrical designs and specifications. Will liaise with clients and other professional disciplines, develop preliminary and final design, estimate electrical costs, investigate and write reports, stamp final design drawings and specifications, conduct site meetings and inspections, co-ordinate single and multi-disciplined projects, supervise consultants and the activity of the electrical section/department.
Apply in Writing to:	Hund Automation Incorporated 59 Scurfield Boulevard, Unit 8 & 9 Winnipeg, Manitoba, R3Y 1G4 Fax: 204.772.6382 Email: fkoreman@hundautomation.com

THOUGHTS ON

Design

...and the effect it has where we live.

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

When you look around Manitoba you see a frenzy of construction activity: Maple Leaf Foods in Brandon; Simplot in Portage; True North, CanWest Global Stadium, and the Provencher Pedestrian Bridge in downtown Winnipeg; and a number of projects, including the reconstruction and renovation of the Engineering complex, at the University of Manitoba. Hydro is at the centre of plans for new dams, wind power generation, and a new headquarters building. Both Mayor Murray and Premier Doer suggest this activity is a sign of the regrowth of the City and the Province. Others suggest it is little more than a blip on the radar screen and a sure sign of a pending provincial election.

Regardless of the underlying causes, there is a very interesting

side issue emerging, at least in Winnipeg. Mayor Murray has become an outspoken advocate of the need to "provide a presence" in the city in order to attract and retain the "creative class". The social scientists who study such things suggest that the "creative class" are young, well-educated persons who "make things happen". Apparently, they seek out environments that offer a broad range of cultural options and that "have a visual presence". He cites the comparison between Paris and Pittsburgh, from both economic and aesthetic perspectives.

At the recent Consulting Engineers of Manitoba Awards Gala, Mayor Murray spoke of design that goes beyond the functional. He compared the Midtown Bridge to the new Provencher Pedestrian

Bridge. Certainly, the Midtown Bridge is functional. It gets vehicles across the Assiniboine River at minimum cost with minimum environmental interference and a reasonably acceptable maintenance cost. However, he argues that the Provencher Pedestrian Bridge accomplishes the functional tasks, and more. Yes, it costs more than a linear, unpretentious alternative, but it makes a statement respecting the character of the city. It reflects our history, our environment and our vision of being a city that is beyond minimalism. It also represents the vision of an Engineer, Doug Stewart.

To me, this challenge to go beyond minimalism in the design work we do represents the real issue for those of us who design things for a living.

Back in my undergraduate days, Pete Seger sang about minimalism in design (although I didn't recognize it as such at that time). The specific song that keeps coming back to me referred to suburban development of the time as

*"boxes, little boxes, little boxes
in a row,
and they're all made out of
ticky-tacky,
and they all look just the same."*

Thinking about it today, he was speaking to the housing equivalent of the Midtown Bridge: functional, but uninspiring.

Typically, most engineers have avoided the question of aesthetics, preferring to leave this poorly-defined design variable to architects or artists. Obviously, much of what we do has nothing to do with aesthetics. Sewage lagoons, heat recovery systems, electrical transformers, airport runways and automated production lines have precious little potential for visual appeal. They are, by their nature, functional, not visual. They exist to meet clearly defined functional needs that only have visibility when they fail.

Nevertheless, our problem as design engineers arises when we allow the mindset that is required for the efficient, economic, functional design of a sewage collection system to define the overall process. If we assume that form only follows function and minimum cost is the only critical variable for all engineering design, we get the Midtown Bridge, not the Provencher Pedestrian Bridge.

Yes, I recognize that design must respond to numerous outside pressures that are beyond our control. However, the designs are still our designs. We bring the technical capability that provides solutions to problems. We select the criteria that must be met and set the priorities among those criteria. Unless the issue of aesthetics as a design priority is a conscious decision in each and every design project, eventually it ceases to be considered at all. If it is never considered, we get the Midtown Bridge: functional, but certainly not inspiring. Virtually everything around us has significant engineering input. If we and our families live in a "plain vanilla" environment, maybe we are partly to blame.

So, Mayor Murray has challenged us to help give the city a "presence". Are we up to the challenge?

One other question, in passing. Was Leonardo da Vinci an architect, an artist, or an engineer? ■

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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.*

Geophysics for Better Subsurface Characterizations

By: J.G. Hayles, P.Eng., P.Geo., and I.J. Ferguson, P.Geo

There is a need to improve our understanding and management of the shallow subsurface of the Earth. The shallow subsurface provides us with water and supports our agriculture and infrastructure. The shallow subsurface also receives the bulk of our industrial, agricultural, and municipal wastes along with chemical and radioactive pollutants. The proper management of the shallow subsurface of the earth is a serious challenge to society and better planning is needed due to stresses of increased population, consumption, and climate change.

At present, knowledge of the subsurface typically involves only drilling or excavating and sample collection. These techniques are relatively expensive, time consuming, and the sample volumes collected may not be representative of the field scale. This hit-and-miss aspect to drilling and sampling often leads to an inaccurate initial model of the site geology and hydrogeology, which leads to improper decisions.

The TRIAD approach advocated by the US Environmental Protection Agency clearly shows the benefits of using geophysical surveys prior to most subsurface inspections to better characterize the site. TRIAD incorporates three important principles:

systematic planning, dynamic work plans, and on-site measurement technologies where geophysical techniques provide strong input. Substantial cost savings have been realized along with much improved understanding of the site by using the TRIAD methods. The US Army Corps of Engineers, who are involved with site assessments of all forms, also advocate the use of geophysical characterizations prior to drilling or excavation to provide a model for the shallow geologic units across the site.

A report on Sustainable Livestock Development in Manitoba, published in 2000 by the Government of Manitoba, recommended geophysical measurements to "support a strong monitoring and inspection effort". Baseline surveys prior to the establishment of earthen manure structures were also recommended. These recommendations have not been implemented.

Application of near-surface geophysical methods in shallow site investigations has the potential, at many sites, to both improve the understanding of the structures present and to reduce project costs. Engineers, geoscientists, and other professionals managing site investigations should be aware of the resolution of modern geophysical

methods and consider the integration of these methods with other investigation methods in appropriate situations. Few of the new mines or petroleum reserves are located without significant geophysical input prior to drilling. This same benefit can also be expected for near-surface studies.

Imaging techniques that have evolved in the last 20 years provide 2-D and 3-D images of the subsurface of the Earth. These advances are similar to advances made in medical imaging, such as CAT scans and MRI. These techniques use many Canadian instruments and methods, originally developed by the geophysics community for mining and petroleum exploration. Common geophysical measurements are listed below (in no particular order):

- Terrain electrical conductivity;
- Time-domain EM;
- Multi-electrode dc-resistivity;
- Ground-penetrating radar (GPR);
- Seismic refraction & high-resolution seismic reflection;
- Gravity and magnetic; and
- Downhole measurements (electrical, electromagnetic, seismic, radar, radioactive & nuclear)

Most university geoscience programs provide courses and in-field labs in these areas.

Geophysical scanning for environmental, engineering, and agricultural sites is becoming common

practice. Groups such as the Near-Surface Geophysics Section (NGS) of the Society of Exploration Geophysicists and the Environmental and Engineering Geophysical Society (EEGS), and conferences such as the annual Symposium on the Application of Geophysics to Environmental and Engineering Problems (SAGEEP), reflect these developments.

If drilling and sampling follows the geophysical surveys, the number of boreholes needed is often reduced, while the quality of the characterization is improved. The geophysical surveys often cost a fraction of the drilling and sampling, and results are available almost immediately on site. If downhole physical property measurements are recorded, a further level of understanding and confidence is gained. Professional engineers and geoscientists should be using the best possible techniques to understand the Earth. Some of the world's best technology is Canadian and you should be benefiting from this excellence. ■

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- Crumbling D.M. 2001. *Using the TRIAD Approach to Improve the Cost-Effectiveness of Hazardous Waste Site Cleanups*. US Environmental Protection Agency EPA 542-R-01-016
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Engineers, Not Lawyers, Hold Key to Solving the World's Problems

By: Dave Brown, Senior Editor, Ottawa Citizen, March 1, 2002
(Re-printed with permission from the Ottawa Citizen)

After writing about 10,000 of these columns, I have learned to sum up everything in 750 words. Today I offer a history of the world, where all its problems came from, and the solution. To bring the package in within the word limit, I have to resort to fiction. But there's truth in it.

A river separated two shires in merry Old England and a boat was available for common use. Over time, it was forgotten who owned the boat and a dispute developed because each shire wanted the boat parked on its side. If not there, one had to swim to fetch the boat.

When the residents were almost ready to go to war, the lords of the manors decided to settle the dispute by putting their champions, or advocates, to work. These were hard men on big horses who charged at each other with lances, axes, swords, and anything else that could maim or kill.

A joust was held. Bleachers were set up and a crowd gathered. The champions had at each other for a couple of hours and eventually the issue was settled. The boat would be left on the east side of the river. It didn't much matter because nobody would take the boat back and swim

home after using it anyway.

The advocates started to think there had to be a better way.

They became lawyers. It took a few hundred years to evolve, but the suit of armour and helmet were replaced by black gowns and wigs. The weapons were replaced by law books. The bleachers became courtroom benches. The issues were the same and settled in the same manner – confrontation by two win-at-any-cost adversaries.

But now the champions couldn't lose. There were no broken bones or bumps and bruises. After the courtroom joust they could repair to the

tavern and hoist a few. Win or lose, they got paid. They still held the admiration of the crowds in the bleachers.

As a result, when people demanded and won representational government, they tended to elect their champions. There were problems. Having evolved from a system of violent confrontation, the champion/lawyers' method of resolving disputes remained adversarial.

Adding to the problem was that their thought processes were shaped by law schools. As soon as elected, they set about doing what they had been trained to do. They solved problems by applying laws and, where there were no laws, they made new ones. Soon there were so many laws that nobody knew them all, so more lawyers had to be hired to try to keep this exploding pile of laws working.

Continued on page 12

University of Manitoba ASE Career Fair 2003

You're invited to the 5th annual University of Manitoba's ASE Career Fair 2003 hosted by the Faculties of Agricultural and Food Sciences, Science, and Engineering. This two evening event brings employers in contact with hundreds of motivated and skilled students to promote professional development, share knowledge of the industry and potential career opportunities.

This year, the event is being held on-campus at the University of Manitoba during the evenings of October 28th for the Faculty of Agricultural and Food Sciences and October 29th for the Faculty of Science and Faculty of Engineering. Depending on recruitment needs, companies have the option to participate for one or both evenings.

Undergraduate and graduate students from the programs listed below will be in attendance, eager to learn about your present and future

employment opportunities. Co-op options and internships are available through many of the programs.

Each company will be provided with display space, dinner buffet for two representatives and two parking passes for a nominal fee of \$210 for one evening (plus GST), \$290 for both evenings (plus GST) or a \$150 non-profit flat rate. Based on previous years' participation, we expect considerable industry interest in this event. Please confirm your organization's intent to participate by completing and returning the fax-back registration form on the APEGM website (www.apegm.mb.ca) by October 3rd, 2003.

We look forward to your organization's participation and representation in this profile event, bringing together the professions of today with the professionals of tomorrow. For more information, contact Student Employment Services at (204) 474-9456. ■

Agribusiness	Agricultural Economics
Agroecology	Agronomy
Animal Science	Biology
Biosystems Engineering	Botany
Chemistry	Civil Engineering
Computer Engineering	Computer Science
Ecology	Electrical Engineering
Entomology	Environmental Science
Food Science	Genetics
Geological Science	Manufacturing Engineering
Mathematics	Mechanical Engineering
Microbiology	Physics & Astronomy
Plant Science	Soil Science
Statistics	Zoology

Key to Solving the World's Problems

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It was an impossible task. By the time they learned the contents of one book of laws, the lawmakers had created two more books. Descended from men who could ride horses at a full gallop while wearing a full suit of armour and with the strength to hold a lance, nothing was impossible. Only the outward trappings of the champion had changed. In his (and now her) mind, they are still on snorting chargers, whelming the crowd.

Those of us in the bleachers struggle to survive in a society that is becoming increasingly hobbled

by its own exploding laws. These laws go far beyond control of the boat on the river, and now reach into our homes. We can lose our children if a lawfully appointed child protector thinks we are applying too much discipline – or too little.

We can lose our families through laws and courts designed by lawyers to resolve domestic disputes. The family is under attack. If the family fails, the society fails.

Where did we go wrong?

Back at the river in the fight over the boat. We used lawyers.

We should have used engineers.

They build bridges.

And my job is done in 641 words. ■

Math, Engineering Drawing Women, Statscan Says

By: Roma Luciw – Globe and Mail Update

Women, already the dominant gender on Canadian university campuses, are increasingly turning to technology-related fields such as engineering and mathematics, Statistics Canada reported Monday.

The latest StatsCan survey, which compares university enrolment in 2000/2001 with the situation three years earlier, paints a picture of a growing number of students entering math, engineering, physical and applied science classes, particularly women.

During the three years, the number of students in mathematics and physical sciences soared 19 per cent, the biggest jump among all fields of study. That was nearly twice the growth of 10 per cent in engineering and applied sciences, the second fastest growing discipline, StatsCan said.

In the fields mentioned above, traditionally seen as more male-orientated, the number of women enrolled rose more than 20 per cent during the three-year period.

"Despite the overwhelming majority of men in engineering and applied sciences and mathematics and physical sciences, women made the bigger gains in enrolment in both fields," the government agency said.

Women now outnumber men in all fields of study except engineering, applied sciences, mathematics and physical sciences.

Overall, the number of university students continues to grow. In 2000/2001, 861,700 full-time and part-time students signed up at universities across Canada, up 2 per cent from the previous academic year and up 5 per cent from 1997/98.

Women comprised 57 per cent of the total of 861,700 university students in 2000/2001, their highest proportion ever.

In addition, women make up the fastest growing group pursuing post-secondary education. Between 1997/1998 and 2000/2001, they accounted for more than two-thirds of overall growth in university enrolment.

Despite the shift toward technology, math and science-orientated classes, some things stayed the same. Women are still the dominant gender in fields such as education, where they represented 72 per cent of total enrolment.

Overall, the most popular field of study among university students, both men and women, was still social sciences, which includes commerce, economics, psychology, sociology, political science and anthropology.

Social sciences accounted for 30 per cent of total university enrolment: six out of every 10 students in the field were women, StatsCan said.

The rise in social sciences was also the largest single contributor to the increase in the actual number of students on university campuses since 1997/98.

Only three fields of study saw a slight decline in the number of students enrolled: agricultural and biological sciences, humanities and related fields and education.

The StatsCan survey also showed enrolment among graduate students outpaced that of undergrads. From 1997/1998 to 2000/2001, the number of graduate students rose 7 per cent while the number of undergrads rose 4 per cent. ■



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