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THE KEYSTONE PROFESSIONAL

In This Issue:

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

JUNE 2005
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Northern Research Basins

By: N. Soonawala, Ph.D., P.Geo and G.A. Thorne, P.Geo.

Engineers and geoscientists practicing in the North know quite well the challenges posed to their profession by factors unique to the subarctic. A working group on Northern Research Basins (NRB) was established in 1975 by Canada, Denmark, Finland, Norway, Sweden, U.S.A. and U.S.S.R (now Russia) to formalize the study of northern hydrology and exchange ideas and scientific data. Iceland joined the group in 1992. Membership is open to any country with land territory lying north of the Arctic Circle and most of the research is on basins within the latitudes 44º50' N and 80º N. The member nations document hydrological studies conducted in specific, identified research basins within their countries and hold a conference every two or three years to exchange data and ideas. Results of the studies are available in the open literature and some of the papers are published in prestigious journals after appropriate peer review. This high quality research would no doubt be of value to many APEGM members. One of the authors of this article (Garry Thorne) has had the privilege of being a member of the NRB since 1990 and the Chief Delegate of Canada from 1997 to 2001.

Research in northern hydrogeology and the need for better scientific data is driven by resource related development and growth of population centers in the North. For example, the mining, fisheries and transportation industries can cause acidification and toxic pollution of the surface waters, and mitigation is required. Hydro development in the far North also benefits from studies on ice strength, ice on rivers, and ice effects on reservoirs storage. Interest in greenhouse gas buildup and the related global warming has sparked an interest in the study of northern atmospheric circulation patterns for understanding global circulation as well as transport and deposition of pollutants.

The objectives of the NRB Working Group are:

- to gain a better understanding of hydrologic processes, particularly those in which snow, ice and frozen ground have a major influence on the hydrological regime, and to determine the relative importance of each component of the water balance;
- to provide data for the development and testing of transposable models which may be applied to regional, national and international water and land resource programmes;
- to relate hydrologic processes to the chemical and biological evolution of northern basins;
- to assess and predict the effect of Man's activities on the hydrological regime in northern environments;
- to encourage the exchange of personnel (technicians, scientists, research officers and others) among participating countries;
- to provide information for the improvement and standardization of measurement techniques and network design in northern regions;
- to encourage exchange of information on a regular basis; and,
- to set up task forces to promote research initiatives on topics of special interest to northern research basins.

A major Canadian contribution to the northern hydrology NRB has been a study called MAGS – Mackenzie GEWEX Study, GEWEX being the acronym for Global Energy and Water Exchange. MAGS commenced in 1994 within the Mackenzie Basin. The Mackenzie basin covers an area of 1.8 million km^2 and encompasses a variety of environments common to the North, including high mountains, boreal plains, tundra and Shield country comprising bedrock outcrop along with lakes wetlands and soil-filled valleys [1].

Other research has provided new insight on the dynamics of breakup of ice cover on northern rivers, permitting improved models for ice-jam release surges and the

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Investigators examine ice breakup at Fort Simpson, NWT.

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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.

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Editor's Note

The following individuals are new members who were registered during January and February 2005: G.K.D North, J. Peng, T.J. Peters, and J. Sandhu.

New Members Registered March & April 2005

H. Ali	R.K.E. Fabricius (ON)	E. Ho	J.D. Quibell (BC)
R.E. Barrett	L. Fisher (ID)	G.K. Holder (QC)	P.P. Sabau (ON)
M. Bisson (QC)	T.E. Fletcher (BC)	D.M. Honan (NY)	H.P. Sangam (AB)
D.K.S. Booy	J.S. Gilmore	L.W. James (ON)	J.R. Siefken (BC)
S.J. Boychuk	B.H. Gorczyca	E.W. Johnston	M.K. Sjoblom (MN)
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A.B. Brogden (ON)	W.C. Hayne (SK)	N.E. Malott (SK)	G. Vachon (ON)
R.G. Brown (ON)	A.P. Henderson (CA)	D.W. Mauthe	C.W. Walker (WI)
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L.J. Demaiter (ON)		R.V. Ojala (ON)	D.J. Wright (ON)
A. Dune		M.J. Opresnik	H. Wu
R.J. England (SK)		A.R. Powell	

Members-In-Training Enrolled March & April 2005

R. Bari	N.J. M. Douville	J. Molnar	D.M. Surminski
J.E. Bashucky	D. Feimi	A.M.K. Ng	K.J. Thiessen
E.F. Bohncke	J. Gill	J.D. Petaski	C.D.G. Tokarz
A.M.S. Born	W. V. Goolia	T.L.A. Schmalenberg	G.M. Tydings
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A.M.H. Chau	J.G. Lambert	G.P. Smerchanski	
J.P. Conway	J.M. Levasseur	M.K. Steinbusch	
R.T. Cunningham	A.B. Marchand		

Reinstatements March & April 2005

R.C. Koltes (AB) L.Y.W. Leung T.I. Norman

Members Deregistered April 1, 2005

R.H. Buchanan	M.P. Booy	R. Guerin	S.F. Liver
E.M.C. Chang	P.T.C. Chung Wing	A. Haberling	D.N. Nedohin
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C.S. Sparham	B.E.J. Gaboury	M. Langlois	T.V. Ta
M. Varol	J.E.C. Gardner	S.M.F. Lee	A.J. Walker

Resignations as of January 1, 2005

A. Andres	G. Impey	J.R. Potvin
I.H. Bassin	M.E. Jorgenson	S. Ritz
H.S. Bassan	P.L. Kopystecki	R.L. Rosin
R.C. Butler	H. Labridis	P.J. Skiba
E. Byzio	A.P. Lehman	R.E. Sporns
E. Caligiuri	W.H. Lehn	B.G. Stone
T.H.E. Cheng	J.L. Loewen	R. Tang Kong
S.D. Fjeld	A.M. McDowall	B.G. Trenholm
V.S. Funk	S.J. McLennan	A.M. Vermette
R.R. Gagnon	K.R. Merkley	E.F. Vickers
H.K. Heinz	S.K. Mondal	E.H. Wagner
B.S. Henney	M.B. Ozarker	
S.D. Holm	L.I. Popescu	

Members-in-Training Removed from Enrollment April 1, 2005

W.R.G. Bates	R.P. Doerksen	L.J. Lazareck
C.L. Taylor	E.C. Domingo	J.K. Ritchie
D.K. Tomsons	M.J. Duggan	K.L. Shuvera
J.K. Topangu	R.F. Gerus	R.J. Tremblay
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D.W. Bishop	B.J. Humphrys	T.M. Zink
S.E. DeWit	A.M. Juck	

Certificates of Authorization March & April 2005

ARW Engineers BCP Technologies Ltd.
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President's Message

A.D. Silk, P.Eng.

Flying back from the Annual General Meeting (AGM) of the Association of Professional Engineers and Geoscientists of Alberta (APEGGA), I was intrigued by a headline in the Globe and Mail, *"NEW AGENCY TO TRACK DOCTORS."* In the article André Picard wrote *"The federal government is about to unveil a new agency that will prevent doctors who have lost their licences in one province from setting up shop in another."* If you look beyond the fact that the difficulty keeping track of the licensing status of Medical Doctors, or any other professional practitioner, in 13 provincial and territorial jurisdictions is hardly lofty work, the fact that it is a federal agency that is spearheading this is very troublesome. Reading on, one will discover the real target of the federal government. *"The National Credential Verification Agency should also make it easier for qualified foreign-trained doctors to practise in Canada by cutting down on paperwork."*

Many people in Canada wish that professions, with the possible exception of lawyers, were nationally regulated. It would make mobility between provinces a non-issue. It would also cut down on the licensing fees for the professionals who are required to practice in a multiple of jurisdictions. Others would argue that some engineering standards are geographic and are better suited for local regulation. The fact of the matter is that the ***British North America Act*** settled this years ago by making the regulation of professions a provincial matter. The provinces then adopted the model self regulation that we find in all jurisdictions today. The fact that the Federal Government wishes to stop doctors who have been prohibited from practising in one jurisdiction after their license is revoked in another jurisdiction is admirable, but it still the responsibility of the local jurisdiction to determine who has the privilege of practice and who does not.

Now it was coincidental that this article appeared on the very same day as a National Round Table for Presidents and/or Executive Directors of Engineering and Geoscientific associations across Canada took place in Calgary. This round table, which was designed to talk about regional issues, concentrated on the actions of governments that were eroding the model of self-regulation. George Comrie, the Past President of Professional Engineers Ontario, discussed changes to Ontario legislation which requires all people who work with the building code to become building code certified by completing a government sponsored examination process. This legislation degrades the ability of the Professional Engineers of Ontario and the Ontario Association of Architects to regulate this part of their professions. What is the value of registering with a professional organization if the government is going to impose additional requirements outside of control of that organization before the practitioner can practise?

Mr. Comrie reported that he did talk to the Attorney General of Ontario, who, as a lawyer, is a member of a self regulating profession, and asked him how this legislation would work considering there were already two professional organizations charged with regulating this part of the profession. The answer seems to lie in the fact that not all members of legislative assemblies are professionals and not all members of legislative assemblies see the value, or understand the value, in having self regulating professions. A person at the round table related a comment made to him by a member of a legislative assembly that suggested that they would like to see every person be allowed to practice to the full extent of their ability. Although this is a lofty goal, it would be a regulatory nightmare and flies in the face of having a reserved scope of practice for professional practitioners.

The real message that André Picard was giving in his article in the Globe and Mail which was echoed at the National Roundtable that I attended in Calgary, is that Government, nationally and provincially, want to have professional organizations address their problems, and failing that, they will address them for us. It is also apparent that many members of these governments do not understand or see the value in self regulating professions.

The result in this gradual shift in the Government's attitude with professional organizations will mean that all self-regulating professions will have to change their methods of approaching governments and government initiatives. The present hot topic is how all professions deal with immigrant professionals. The Federal Government, which is charged with immigration, is frustrated that provincial associations are not allowing the professionals that they allow into the country to practice their profession. The federal government has made it known that the status quo is not acceptable and is looking to organizations like CCPE, CCPG, and APEGM to make it easier and fairer for immigrant professionals.

I discovered that other associations are being proactive with their governments. APEGGA has recently met with a number of ministers discussing the challenges that lay ahead for the engineering and geoscientific communities. The Association of Professional Engineers of Saskatchewan (APEGS) has hired a consultant to help them keep the Saskatchewan

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Certificates of Authorization Discontinued March & April 2005

Aero Consulting Services Ltd.
Bluerock Engineering Ltd.
Enerco Engineering Ltd.
Fulcrum Engineering Ltd.
Gisborne Holdings Ltd.
Heidema Engineering Ltd.
McFadyen O'Briant Consulting Engineers, Inc.
Talon Projects Inc.
The Canam Manac Group Inc.
The Sear – Brown Group Inc.
Water Resource Consultants Ltd.

In Memoriam

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

Robert Gerald Jankiewicz
David Charles Rourke

Annual General Meeting

The 2005 Annual General Meeting of the Association of Professional Engineers and Geoscientists of the Province of Manitoba will be held on Saturday, October 22, 2005, at the Winnipeg Convention Centre, 375 York Avenue, Winnipeg, MB R3C 3J3

NOMINATIONS FOR ELECTION TO THE COUNCIL

Members of Council whose term of office continues for another year are:
James A. Blatz, P.Eng.; Digvir S. Jayas, P.Eng.;
J. W. Patrick Lengyel, P.Geo.; B.J. (Jim) Miller, P.Eng.;
Edward M. Ryczkowski, P.Eng.

Members of Council whose term of office expires at the 2005 Annual General Meeting are:
Frank J. Deniset, P.Eng.; Kelly V. Gilmore, P.Geo.;
Raymond P. Hoemsen, P.Eng.; Douglas J. Taniguchi. P.Eng.
Allan D. Silk, P.Eng. (Will continue as Past President)

Those nominated for election to the **FOUR PROFESSIONAL ENGINEER** positions on the Council are:
W. C. Girling; D. D. J. Himbeault; B. R. Malenko;
P. T. Sheedy; R L. Taylor

Nominated for election to the **ONE PROFESSIONAL GEOSCIENTIST** position on the Council is:
G.S. Lodha

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 9, 2005.** Each completed nomina-

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Professional Development

Developing Hybrid Drives For Heavy Vehicles

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

Over forty people attended the excellent lunchtime APEGM professional development meeting at the Transcona Canad Inn on April 20, 2005. The topic was the development of hybrid drives at New Flyer Industries, Winnipeg's premier transit bus manufacturer. Mr. G. Paul Zanetel, P. Eng, was the speaker. Paul, a graduate of the University of Waterloo, has 35 years experience in the development of industrial and mobile systems. He held top technical management positions at Versatile and New Flyer during his career, and is currently chief technical advisor for New Flyer and Engineer-in-Residence at the University of Manitoba.

The Market

North America is home to 70,000 transit buses, according to Mr. Zanetel. Out of this number, 5,000 are replaced annually, with 70% going to the U.S. market. New York City alone has 4,500 buses. Anyone in the transit business must be competitive in the U.S., and Flyer has succeeded there. However, selling into the U.S. market requires unusual arrangements. Since 80% of U.S. transit is publicly funded New Flyer must build in the U.S., and that is the reason for Flyer plants in Crookston and St. Cloud, Minnesota. Manitoba supplies the engineering design and bus shell, while the rest is done in the U.S.

Flyer must meet a number of stringent bus quality targets. New York City is a very demanding environment for transit, so buses must survive 500,000 miles of simulated NYC driving. Another hurdle is durability and performance testing at The Altoona Bus Research and Testing Centre in Pennsylvania. Other standards include the White Book and the Canadian Urban Transit Association guidelines.

Why Hybrid?

Transportation, in general, is the largest contributor of CO_2 and NOx pollution, and public transportation contributes a share. Hybrid drives reduce emissions by capturing energy wasted by braking. Flyer's production hybrids are gasoline-electric and diesel-electric, but other fuels are possible: LNG, CNG, and biofuels. Liquid fuels are still the most energy dense fuels available, and are the easiest to contain and fill. Biofuels, which are produced from field crops, have the advantage of recycling CO_2 from the environment, rather then creating more through fossil fuel combustion. CO_2 emissions are very high for SUVs and low for buses when compared on distance travelled and passenger load.

Regenerative Braking

Regenerative braking is the key to hybrid performance. Since transit buses typically make many stops and starts, capturing brake energy can reduce fuel consumption by 30%. When braking, the wheels couple to generators to slow the bus. So instead of creating heat in the brake linings, kinetic energy is converted to electricity and stored in large, roof-mounted battery packs or capacitor banks. When the bus accelerates, this stored electrical energy is fed back into motors which blend their torque with the bus's diesel engine. This makes for smoother, quieter acceleration without any input from the driver.

The 650-kilogram roof-mounted batteries must be kept below 40ºC for maximum life. If natural convective heat transfer isn't adequate, air conditioners provide added cooling capacity. Batteries provide good energy density but have a finite life. Super capacitors store less energy, but have almost infinite life.

Hybrid buses do more than save fuel and reduce emissions – they also provide other important side benefits. Engine and transmission life is extended by a 1.7 factor, allowing engines to last 430,000 miles. Brakes, a large expense for transit operators, last twice as long.

Mr. Zanetel briefly touched on hydrogen as a fuel. Hydrogen is unparalleled for cutting emissions, but requires very heavy containment and has a short 185-mile range.

The Future

Paul Zanetel concluded his talk with a look into the engineering crystal ball. He saw electric engine accessories and weight reduction as future developments. Fuel cells were a contender. But the most promising way forward may be to capture heat energy from bus engine exhaust. When they do find a method, Paul Zanetel will engineer it into Flyer's buses. ■

Northern Research Basins

Continued from page 1

associated floods [2]. Research also showed the effects of the boreal forest cover on snow entering the hydrogeological cycle. A suite of models was developed to improve our capacity to evaluate water resources in cold regions.

Closer to home, hydrological and geotechnical research, conducted by Atomic Energy of Canada Limited as a part of the Nuclear Fuel Waste Management Program has improved our understanding of both surface and groundwaters in Canadian Shield watersheds [3]. Results of the research completed at the Underground Research Laboratory and the nearby Whiteshell Laboratories have been widely reported in scientific journals and used to develop the concept of deep geological disposal of nuclear waste. Contributions to the NRB resulting from this study show that near-surface crystalline rocks, until recently thought by many to be essentially impervious, actually have extensive intersecting fractures and are an integral part of shallow groundwater flow systems. Continuous measurements were made over a 14-year period of the major components of the water budget for the area: precipitation, runoff, and surface and subsurface storage.

An aerial view of the Mackenzie delta showing a pingo (right, far distance). Pingos are topographic features in the North caused by an interaction of groundwater and frozen ground.

To view abstracts of papers presented at a recent NRB workshop at Victoria, BC (March 2004) go to http://iahs.info the site of the International Association of Hydrogeological Sciences, and follow the links to "Publications, Red Books and Red Book 290." ■

References:

[1] Prowse,T.D. and M.N. Demuth . Using Ice to Flood the Peace-Athabasca Delta, Canada. Regulated Rivers: Research and Management,Vol. 12, 447-457 (1996)

[2] Ming-ko Woo. MAGS. Canadian Geophysical Union Newsletter-ELEMENTS. Vol. 23, Number 1, Jan. 2005.

[3] Thorne, G.A. and J. Hawkins, Hydrological processes and water balance for the Dead Creek watershed of southeastern Manitoba, 1982-1995 pp 164-177. In Northern Research Basins Water Balance. Ed. Douglas L. Kane and Daqing Yang. IAHS Publication 290

CCPE CEO's Message

Marie Lemay, P.Eng.

Engineering a long-term approach to infrastructure: The National Roundtable on Sustainable Infrastructure

Canada's infrastructure – a $1.6 trillion asset – is central to our quality of life, public health, and economic prosperity.

As you likely know, our existing civil infrastructure systems are nearing the end of their serviceable lifespan, creating a growing need to quickly expand, repair and rehabilitate our infrastructure. If we do not act soon, we will see increased maintenance and repair costs, along with reduced levels of service that may have a negative impact on public health, safety, and our environment.

In response, CCPE has been actively working, in partnership with key players from the Canadian Society for Civil Engineering, the Canadian Public Works Association, and the National Research Council of Canada, as well as other engineering associations such as the Canadian Academy of Engineering, the Engineering Institute of Canada, and the Association of Consulting Engineers of Canada, to develop strategies that will satisfy Canada's long-term infrastructure needs.

CCPE's work on infrastructure renewal stems from the development of the Technology Road Map (TRM), which began in 2002. The TRM is a comprehensive action plan that plots new courses towards improving the rehabilitation of our road and water systems, while addressing Canada's $60 billion infrastructure deficit.

As part of the TRM, more than 140 leaders and experts were consulted in Canada-wide town hall meetings in 2003. The consultations resulted in 10 TRM objectives for the next decade, leading to recommendations for action, including the creation of the National Roundtable on Infrastructure, now known as the National Roundtable on Sustainable Infrastructure (NRTSI), for which CCPE was identified as the lead organization.

The NRTSI is a holistic, integrated forum for long-term infrastructure renewal that will change the way we look at and think about infrastructure. It aims to ensure improved planning, development and dissemination of innovation and best practices, leading to the better use of investment dollars for a sustainable infrastructure in the years to come.

In February 2005, CCPE sent out a NRTSI concept paper to the provincial and territorial ministers and other key government officials/stakeholders. The concept paper was developed by a working group composed of the Canadian Public Works Association, Federation of Canadian Municipalities, Infrastructure Canada, Conference Board of Canada, Canadian Construction Association, and CCPE. The paper called for the government's involvement in the NRTSI initiative and explained how the creation of a national round table would be extremely valuable in sustaining Canada's infrastructure. The paper also stated what role the NRTSI would play, how it might be structured, and what services it would offer. So far, the government's response to our proposal has been positive.

As engineers, we possess a unique combination of skills. First off, we have a solid technical foundation that has been built through our rigorous engineering education, and further applied through our work experience. It is this knowledge of technical concepts that enables us to build bridges and develop state of the art materials.

But our skill set spans much beyond our technical abilities. We also have superior problem-solving skills. As problem solvers, with strong technical backgrounds, we are well positioned to not only analyze issues at a technical level, but also to make an active, value-added contribution to the development of ideas and projects at a policy level.

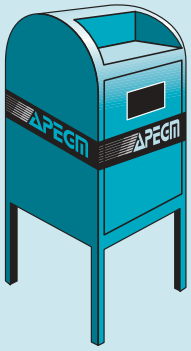
Yet, all too often, we, as engineers, are not utilized for our strategic planning abilities. We are seen as the makers of pipes and cement, but we are excluded from the planning or policymaking stage. However, I am confident that by becoming involved in the NRTSI, we can offer a unique approach and provide a wealth of information to ideas that might otherwise be overlooked.

We need an integrated approach to address the infrastructure deficit and other challenges facing society. Working collaboratively with the government and other key stakeholders, I encourage members of our profession to apply their strong problem-solving abilities to determine ways in which we can more actively contribute to long-term infrastructure renewal at the policy and program development levels.

Together, we can bring a fresh, unique, and technically sound problem-solving approach to traditional infrastructure challenges. We can also help contribute our human and financial resources to influence decisions that will have a positive effect on the long-term feasibility of Canada's infrastructure. As professional engineers, we are a resource that needs to be tapped for expertise and guidance.

I am very excited about our progress with the National Roundtable on Sustainable Infrastructure and am hopeful that it will ultimately change the way Canada's infrastructure is looked at. Our strategy is one of foresight and innovation. We bring with us a longer-term approach to utilizing government funds and as a result, I am confident that all Canadians will collectively experience a better quality of life. ■

Letter to the Editor



Hello,

I am writing after having read the April 5 2005 *Keystone* article on the Achievement Award for the Provencher Bridge.

It is a great design and addition to the Winnipeg skyline and I am glad that Wardrop was recognized for their work on the project, but my main reason for writing is the glaring omission of even a slight reference to the architects that worked on this project. Without them, designs such as these would never have been born.

Gaboury Préfontaine Perry Architects should have been mentioned at least in some recognition. Understandably, this is an engineering award, but I was hoping that in these days of concurrent design and creativity, we could lay down our "engineer vs architect" biases and give praise when praise is due.

In particular Étienne Gaboury is a true Manitoban treasure and can be thanked for many projects including the famous Precious Blood Church, the Royal Canadian Mint, St. Peter's Abbey, Metro Plaza, U of M Drake Centre, Taché House, the new St. Boniface Cathedral, the Winnipeg Remand Centre, the Canadian Chancery (Mexico), and the Sparks Street Development (Ottawa) – to name a few.

Architects and Engineers go hand in hand; in fact even the name of newsletter is linked... "Keystone" is known as the last top stone placed in an arch that holds the shape of the structure —> the masons of earlier times that had mastered this construction were very sought after and respected, since it was only they who could build the large open arches and vaults that were in high demand by royalty and clergy —> the Greek name "arkhitekton" that was given to those who had the knowledge of how to design and build such vast spaces still remains today.

Cheers,
Nils Pokrupa, EIT

A Bridge to the Future

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

When the first bridge-builders spanned the Red River their only concern was to join points A and B with a structure they hoped would withstand the rigors of water, weight, and weather. When the city of Winnipeg decided in 1998 to replace the Provencher Bridge, the city's 1918 link to historic St. Boniface, they initiated the Provencher Paired Bridges project, a complex multi-disciplinary effort which encompassed cultural, environmental, historical, and engineering components. The project included a road bridge and a "signature" pedestrian bridge.

The paired bridges are the newest of many bridges to St. Boniface, but the necessity for people to cross the treacherous Red River goes far, far, back into history. Archaeological excavations at The Forks revealed evidence of 6,000-year-old Native encampments at the confluence of the Red and Assiniboine rivers. (The pyramids were built around 5,200 years ago.) The rivers were important transportation links for our Aboriginal peoples and the Forks served as a social, economic, and political meeting place for thousands of years. The picture changed forever when European fur traders, led by the La Vérendryes, father and sons, made their way to the Forks in 1737. The Hudson's Bay Company had traded furs out of Hudson Bay since 1670, so the arrival of European traders at the Forks was the natural culmination of the expansion of the fur industry into the heart of the prairies. In 1738 La Vérendryes' men returned and constructed the Fort Rouge trading post, making river crossings even more important. Now the cultural mix of Assiniboine, Cree, and Ojibway tribes dominant in the area also included Europeans.

In the summertime those early river crossings were informal, the exclusive domain of watercraft, and always at the mercy of wind and currents. Permanent settlement around the Forks arrived in 1812 when the Colony of Assiniboia was established on the east side of the Red. Several years of intense rivalry between the major trading factions, The Hudson's Bay Company and The Northwest Company, followed, and culminated in violence and destruction. Lord Selkirk, founder of the Colony of Assiniboia, needed a stable settlement so he organized a military expedition to pacify the region. Included in his expedition were members of the disbanded De Meurons and De Watteville regiments, many of whom were Roman Catholics, and who were to receive plots of land for their service and to remain as a protective army. To further stabilize the Colony of Assiniboia, Lord Selkirk sought divine help from the Roman Catholic clergy to minister to his militia and to the Métis. After receiving intense lobbying over the location for its new mission, the Catholic Church chose the east side of the Red over Rainy River. So it was in 1818 that Fathers Norbert Provencher and Sévère Dumoulin founded St. Boniface in the place previously known as the Colony of Assiniboia. The west side of the Red was still English and growing into what would eventually become Winnipeg.

The old Provencher Bridge, August 1952

St. Boniface grew rapidly after its establishment mainly because the Bishops founded many institutions dedicated to meeting the medical, educational, and spiritual needs of its residents. More people in St. Boniface also meant more customers for the trading post across the Red in Fort Garry. The first formal crossing of the Red appeared in 1845 when a rowed ferry service was established across the Red and Assiniboine rivers. From all accounts the first few ferry operators provided sub-standard service. In 1854 Duncan McDougal took over and apparently never left anyone behind, and transported all regardless of their ability to pay. In general though, the service provided by most of these early operators generated many complaints about sporadic service, steep landings, missing or intoxicated staff, and substandard watercraft.

Technology made a great leap forward when the rowed ferry was replaced in 1862 by a cable ferry operated by James Mulligan. Now crossings were not quite so vulnerable to the capricious prairie winds. Mr. Mulligan also made improvements to the landings and built a larger boat. However, the ferry guide rope wasn't popular with other river traffic and was often cut. Wire cable replaced rope, but the vandalism continued. Several sawmills operated on the river banks and regularly floated log booms down river, so it's hardly surprising that conflicts occurred. The rise of steam power technology percolated down to the Red when the cable ferry was replaced by a steam ferry operated by Winnipeg flour merchant J.W. McLane. A foot passenger making a return crossing over five cents for the trip, while a team of draft animals, wagon, and driver cost 50 cents to transport. While steam ferries were an improvement over cable ferries, steam engines of the day were underpowered for the job.

Manitoba became a province and joined the Dominion of Canada in 1870, and in the process raised the status of the St. Boniface and Winnipeg settlements. It was clear that a ferry boat could no longer service the increased cross-river traffic. On the other hand, a bridge crossing would be available at any hour of the day or night and in any weather or season. St. Boniface would benefit, it was thought, by being a quiet, fashionable place to live while the burgeoning business areas of Winnipeg provided goods and services to St. Boniface; a typical "win-win" situation.

An astonishing assortment of interests came together to make a permanent bridge spanning the Red a reality. The Hudson Bay Company had controlling interest in the newly created Red River and Assiniboine Bridge Company, an offshoot of an earlier company dedicated to bridging the Assiniboine. The partnership included Bishop Taché, who bought into the venture on behalf of the Catholic church. Oddly enough, the president of the bridge company was himself named C.J. Brydges.

In June of 1881 the Cleveland Bridge Company, builders of the Louise and Assiniboine bridges received a contract for the superstructure of the bridge while Carman and McDonald were awarded the substructure work. In November of 1881 oak piles were driven in at the foot of Winnipeg's Broadway Avenue and the bridge was underway. In January, iron cylinders were placed on the oak pilings and filled with concrete, forming the piers of the bridge. Since the Red River was a navigable waterway under federal law, the centre of the bridge swung out to allow watercraft to pass. After a few minor delays caused by bad weather, the 900-foot-long, 18-foot-wide passage, flanked by two six-foot-wide foot paths, was completed on April 16, 1882.

April can be a cruel month in Manitoba, and it was so in 1882, when only a week after opening, ice carried away two spans of the new bridge. Outside of the bridge itself, the only casualty was a flour-laden Red River cart which fell in the water after the driver quickly unhitched his ox and ran for shore. By May repairs to the spans allowed foot traffic to resume, but heavier commerce had to wait until April of 1883 for passage. The bridge developed a dual personality, called the Broadway Bridge on the west side, and the St. Boniface Bridge on the east side.

The following years were difficult ones for the Broadway Bridge, as it came to be known, both financially and structurally. The bridge operated on a toll basis and any time it wasn't open was time with no income. This happened seasonally when the bridge closed for winter repairs and travelers opted to use the frozen and free river ice for passage. Spring breakups caused more damage to the bridge in spite of reinforcements and boilerplate clad icebreakers. Business conditions on both sides of the river deteriorated after a real estate collapse on the Winnipeg side. Railway bridges now carried large amounts of heavy goods and offered free foot passage too. Low revenues also meant less money for repair and upgrade, so the Broadway Bridge fell into a vicious cycle of decline.

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A Bridge to the Future

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By the early 1900's the railway tracks across Broadway Avenue caused numerous public complaints about traffic delays on the St. Boniface – Winnipeg route, a frustration which carries over into our time. To make matters worse, the CNR wanted to build a train station directly across east Broadway. Residents on both sides of the river were vehemently against it, but in 1904 the City of Winnipeg passed a by-law approving the scheme. Now the direct route from St. Boniface to Winnipeg was spoiled and bridge users had to detour around the new station, adding another nail in the coffin for the bridge. In spite of the bridge's poor business prospects, the City of St. Boniface purchased the bridge in 1908 for $59,000, made it free to use, and renamed it the Provencher Bridge. Apparently this was more economical at the time than building a new bridge.

In 1912 St. Boniface city engineer M.P. Blair shocked the public with his assessment of the bridge's safety. The piers on the St. Boniface side were seven inches out of plumb and unsafe for heavy traffic, he said. The narrowness of the bridge also made double-tracking of streetcars across the bridge impractical, and St. Boniface was in great need of streetcar access. Like any engineer, he was enthusiastic about a completely new bridge taking its place. With the original access to Broadway blocked, many new routes were considered into the main business area of Winnipeg near Portage and Main. After a period of protracted negotiations between Winnipeg and St. Boniface regarding the design and cost of the bridge, a judge settled the dispute. However, the judge's decision wasn't accepted by St. Boniface which felt it could proceed unilaterally with its own bridge. In general, Winnipeg thought St. Boniface's plans too elaborate and too expensive.

After seemingly endless wrangling Winnipeg agreed to pay one third of the construction costs and St. Boniface assumed the maintenance costs. By this time external factors entered the equation; the material needs of World War One caused the price of steel to spike, adding $40,000 to the cost of the new Provencher Bridge. To further complicate matters, Dominion Bridge and Manitoba Bridge, the two firms contracted to build the structure had overlapping contracts. In the end they agreed to tear up their individual contracts and work together on the bridge in an unusual display of teamwork.

On July 22, 1918, the new Provencher Bridge opened, and the first person over was a St. Boniface farmer with a load of hay, not exactly the image of modernity the builders wished for. However, critics were full of praise, saying it was "the longest, widest, and most substantial bridge.... in Manitoba" and it was "free from those unsightly metal obstructions in midair that are such an unsightly blemish on the fair look of nearly all bridges in Manitoba."

The Broadway Bridge fell into immediate disuse and the superstructure was eventually torn down for scrap metal. The piers were left in place until they gradually collapsed and became hazards to navigation.

The life of the 1918 Provencher Bridge was, thankfully, largely uneventful, a tribute to the skill and foresight of the builders. Trolley buses replaced streetcars, diesel buses replaced trolley buses. The lift span, which hadn't been used in 20 years, was decommissioned in 1971; a concrete and asphalt deck was installed in 1973. By the late 1980s maintenance costs were escalating and another new bridge was the solution. The 1997 flood damaged the bridge further and closed it for a time, thus accelerating the planning for a new bridge. Eventually the professionals and the community, whose voices were completely left out in the early 1900s, agreed on a two-span solution, one for traffic and one for pedestrians. In 2003 the cycle was complete and the newest Provencher Bridges opened. The Esplanade Riel, the footbridge, once again points to the base of Broadway. Though physical access was blocked long ago, symbolically the old link between Winnipeg and St. Boniface had been restored.

The building of the bridges brought several awards to its designers, planners, and managers. In June of 2004, at the International Bridge Conference, The Engineers' Society of Western Pennsylvania awarded the Arthur G. Hayden medal to the City of Winnipeg. The citation reads:

"Awarded to recognize a single recent outstanding achievement in bridge engineering demonstrating innovation in special use bridges such as pedestrian, people-mover, or non-traditional structures."

In 2002, ICMA (International City/County Management Association) awarded the City of Winnipeg and Chief Administrative Officer Gail Stephens the "Program Excellence Award for Citizen Involvement" in recognition of the public consultation process used in planning the Provencher Paired Bridges project.

And finally, this year APEGM presented the Certificate of Engineering Achievement to The City of Winnipeg and Wardrop Engineering Inc. for the complex and challenging technical work required for the design of the Esplanade Riel. ■

Meet Your New Councillor – Dr. Digvir Jayas

By: D.J. Etcheverry, GIT

The APEGM Council is pleased to welcome Dr. Digvir Jayas.

Dr. Jayas began his career in India, earning his bachelor's degree in Agricultural Engineering at G.B. Pant University of Agriculture and Technology, Pantnagar in 1980. He acquired his M.Sc. in Agricultural Engineering at the University of Manitoba in 1982. Before completing his Ph.D. in 1987 at the University of Saskatchewan, he joined the University of Manitoba in 1985 as an Assistant Professor. Soon after receiving his Ph.D. he became a Citizen of Canada.

You may remember Dr. Jayas as the recent recipient of APEGM's Outstanding Service Award. Dr. Jayas has also received professional awards from the Canadian Society for Agricultural Engineering, the Canadian Institute of Food Science and Technology, the American Society of Agricultural Engineers, along with a host of other associations; bringing his list of scholarships and awards to over 50. Add this to his total of over 500 publications and his active involvement in some 13 national and international organizations and you get one remarkable individual!

Currently Dr. Jayas is a Distinguished Professor and an Associate Vice-President (Research) at the University of Manitoba. He also holds the Canada Research Chair in Stored-Grain Ecosystems and is the Interim Director of the Richardson Centre for Functional Foods and Nutraceuticals at the University of Manitoba. Dr. Jayas maintains strong ties to his Indian heritage through his involvement in the Hindu Society of Manitoba and his position on the Board of Directors of the India Canada Culture and Heritage Association.

Professional development for APEGM's members is a key issue that Dr. Jayas would like to address while on Council. He believes that, "by looking at the National Guidelines and the practices of other associations like APEGGA, APEGM can structure a program, which is more than continuing education, that benefits its membership." Dr. Jayas acknowledges that, "APEGM's professional development program for MITs is very good."

Another issue Dr. Jayas wishes to tackle while on Council is increasing APEGM's involvement at the University of Manitoba through the implementation of a series of outreach activities on campus. Dr. Jayas would like engineering and geoscience students to be introduced to APEGM long before they leave the university so they have a better understanding of what the Association is about. He adds, "this may also be possible through APEGM sponsored events such as industry field trips and design competitions." In addition to students, Dr. Jayas would also like to reach out to engineers coming from other countries; to help them understand why we have APEGM, and to encourage them to register.

New Councillor Dr. Digvir Jayas

Dr. Jayas's experience on Council has so far been a good one, "everyone on Council has the profession and public safety in mind and is there to make things happen."

Please join in welcoming Dr. Digvir Jayas to the APEGM Council. ■

Council Reports

Thursday, March 17, 2005

By: N. J. Kelly, P.Eng.

COUNCIL DISCUSSES OPTIONS FOR EXPEDITING THE PROCESSING OF MOBILITY APPLICATIONS

A discussion of boundaries of Professional Jurisdiction dominated the March 17, 2005 Council Meeting. At the heart of the issue was the need to clarify the jurisdictional boundaries between Engineers, Architects, Technicians and Technologists. This is not only contentious in its own right, but also impacts upon many other Council issues.

Efforts to clarify jurisdiction between APEGM and the Manitoba Association of Architects (MAA) have been especially contentious and are being pursued through negotiation as well as political and legal channels.

Manitoba is one of the few Provinces that have not yet clarified professional jurisdiction between engineers and architects. The most recent negotiations were conducted through the Engineering, Geoscientists and Architects Inter-Association Relations Joint Board (EGAIAR). The Board was established by the Government of Manitoba with a mandate to put forth recommendations to resolve the jurisdictional disputes. More recently the Minister of Labour imposed a fixed deadline for the negotiations. Although that deadline was extended, Dr. Witty, EGAIAR Chair, was not able to reach consensus between APEGM and MAA. His mandate as Chair authorized him, under conditions where consensus could not be reached, to put forward his recommendations to resolve the issue. Dr. Witty has done so and attended this Council meeting to present a summary of his final report with some of the rationale for his recommendations. Following his presentation there was a brief question period.

There was a meeting on February 9, 2005 where Council discussed Dr. Witty's report with the Deputy Minister of Labour and MAA.

Council is also aware of a legal challenge initiated by the MAA by way of an injunction application against The City of Winnipeg. This issue has proceeded through channels and has been heard by the Court, however, the judge has not yet announced a decision.

Council is also working with the Certified Technicians and Technologists Association of Manitoba (CTTAM) to clarify professional jurisdiction. Although similar discussions are taking place across Canada, no agreements have been completed. This creates the opportunity for APEGM and CTTAM to play a leadership role and both groups feel there is potential to reach agreement.

The second issue which received considerable discussion was that of professional mobility, which refers to the ability of professional engineers and geoscientists registered in one province to do work in another. This is of primary concern to geoscientists and although the Inter-Association Mobility Agreement exists, there are issues with implementing its measures within the framework of existing legislation and without compromising our own admission standards. Our present application system is working, but is considered to be slow. Council has approved changes to the Manual of Admissions and has now asked the Executive Director to report on options for a process that would allow approval within three business days.

Council was brought up-to-date on the search for a new Executive Director. The Bowes Leadership Group has been retained to assist in finding suitable candidates. Council will be developing the job specification and some discussion took place regarding the question of requiring the Executive Director be registered, or at least eligible for registration, with APEGM ■

Tuesday, April 12, 2005

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

RECRUITMENT, RETIREMENT, AND RAINY DAY FUNDS

The dedication of the Council was evident as this meeting was held after normal working hours at the APEGM office. President Silk called the meeting to order at 5:00 p.m. After the usual routine of adopting the agenda, the meeting opened with a half-hour-long in-camera session.

The open format resumed with Councillor Permut summarizing his report from the recruitment committee. Councillor Permut touched on the type of candidate they were looking for to replace the soon to be retired, Executive Director and Registrar, Dave Ennis. Council discussed Councillor Permut's proposed change to the position's title as a means of improving responses to fill the position. The discussion concluded with Council agreeing that further review of APEGM's by-laws is required before there is any change to the current title.

A presentation by Councillor Shortt followed with a summary of his report on the Terms of Reference of the Discipline Committee. In short (no pun intended), Councillor Shortt's report had highlighted that the Discipline Committee was not in compliance with the Engineering and Geoscientific Professions Act with respect to the composition of the committee. A motion was carried requiring Council to ensure that the Discipline Committee comprise at least ten people, three of which are laypersons and a minimum of one P.Geo.

Council then reviewed the 2004 Annual General Meeting (AGM) motion on the "P.Eng.(Ret.)" designation for retired members. APEGM sought legal advice for possible exposure to liability resulting if by-law 7.1.2 was revised to permit formerly registered members, who are now retired, to continue to use the "P.Eng." designation without the "Ret.". The legal advice received concluded that allowing retired members to use the designation "P.Eng." would not expose the Council or the Association to legal liability. With this legal opinion in hand, Council carried a motion to recommend a revised phrasing to by-law 7.1.2, which would remove the "Ret." requirement, and for this revised phrasing to be presented at the 2005 AGM.

The next item on the agenda included a discussion on the establishment of a "Rainy Day Fund". This fund would be built up over time and would include a restricted fund to cover costs should APEGM close its doors. Council requested that the Executive Director determine the funds required for the "closure plan", while the Executive Committee will propose a value and an implementation plan for the "Rainy Day Fund". How this will affect the membership dues is yet to be determined.

Council reviewed a number of informational items and wished Councillor Deniset a fond farewell as this was his last Council meeting. The meeting adjourned at 7:30 p.m. ■

APEGM President's Message

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Government informed of what it is doing and helped to be the ears of the association at the Saskatchewan legislature. The Association of Professional Engineers of Nova Scotia (APENS) recently hosted a provincial cabinet meeting at their association office in Halifax.

We will have to follow suit if we intend to keep ahead of the government in their initiatives. Council and senior staff will have to get to know all government ministers and be in regular contact with them. Members of the professions will have to get to know their MLAs and MPs and discuss issues that affect our professions. The one message that we have heard from our government and other associations that have heard from their governments is that governments never seem to hear from engineers and geoscientists; so they assume that they must be happy with what is going on. This will have to change if we expect the self-regulating model to continue.

For APEGM to flourish we will need to promote the value of self-regulating professions, especially the engineering and geoscientific professions, to the public and to all levels of government. We will have to be adaptive to change, even with processes that we are comfortable with,or they will be changed for us. We will have to examine what we do and why it is important to regulate it and demonstrate to the public why it is important that APEGM, and not the government, regulate these functions. We will have to do all this and more. And of course we will have to do this while keeping paramount our trust of protecting the public. ■

Professional Development

Internet Map Servers and GeoPortals: OGC Standards in Action

By: S. M. Jurkowski, EIT

Grant Forsman, Regional Manager of Intergraph Mapping and Geospatial Solutions, delivered this presentation to a capacity crowd on Wednesday, April 6th, 2005, at the Holiday Inn South. Mr. Forsman began by talking about some common web mapping sites (such as the Provincial Government's Road Conditions maps, MapQuest, and the like) and asked how many of the audience had used such services before. An overwhelming majority of the assembled members and MITs indicated some experience or interest in using the internet for maps and related data. The internet has changed the expectations of its users, creating a demand for instant responses to a search request. Mr. Forsman presented the idea of a Ten Second Rule – users will accept a maximum wait time of ten seconds for results to any request.

Mr. Forsman explained that a GeoPortal is a web site that facilitates browsing, viewing, and procuring spatial databases online. A good GeoPortal provides data interoperability, speed, scalability, spatial analysis, and download capabilities, in an easy and open development environment.

Data interoperability refers to the ability of software components to communicate with applications built by different vendors, on different platforms, using data in different formats or from separate databases. This quality is difficult to find in situations where data is stored in a binary format, because the format is specific to the application. The move towards using Extensible Markup Language (XML) improves data interoperability by encoding data in terms of elements and attributes. This is a text based language, so it is bulky, but also flexible, extensible, and readable.

Mr. Forsman then spoke about the Open GIS Consortium (OGC), whose mission is "to deliver spatial interface specifications that are openly available for global use." The OGC vision is "a world in which everyone benefits from geographic information and services made available across any network, application, or platform." In 1997, OGC approved a series of specifications for core GIS technology known as "Simple Features" for OLE/COM, CORBA, and SQL. These specifications have resulted in spin-off technology such as coordinate systems and feature geometry which are fundamental for the next generation of Open Web Services.

Geography Markup Language (GML) is an XML grammar written for the modelling, transport, and storage of geographic information. It provides a variety of objects for describing geospatial information, such as features, coordinate reference systems, units of measure, values, topology, and geometry. We need a framework of shared meaning, building on elementary constructs like numbers, strings, and dates, on which geographic constructs (such as points, lines, polygons representing features) can be built. On this framework, more specific constructs such as roads and cities can be built. With a common framework as a base, data can be shared and merged from different sources. OGC web mapping interfaces have been defined to allow this sharing of data. Of note are the Web Map Server (WMS) and Web Feature Server (WFS).

The Web Map Server provides interfaces such as GetCapabilities, which provides information in XML about what the server can do, what data layers it can serve, and formats available. The GetMap interface is then used to provide a picture of a map for the area and information requested. The GetFeatureInfo interface is an optional interface which when available can provide information about features within the map display.

Mr. Forsman proceeded to demonstrate a live session of a WMS by browsing ***www.wmsviewer.com***, a public site which acts as a graphical user interface to the OGC WMS interfaces and demonstrates OGC's commitment to open standards. Unfortunately, Mr. Forsman's internet connection appeared to have timed out, and several audience members humourously counted past the ten seconds in which any request must be satisfied to obey the ten-second rule. Once the internet connection had been re-established the WMS proved to be very quick in returning the data requested by manipulating the website's controls.

Web Feature Server is a further evolution of WMS technology, which returns a vector map using GML, not just a raster image. The interfaces are similar to that of WMS with the addition of the Transaction interface which describes data transformation operations that are to be applied to a web-accessible datastore.

Mr. Forsman concluded his presentation by listing popular commercial and freeware internet map servers, as well as some additional links to references.

The Holiday Inn South did an excellent job of accommodating the abundance of attendees by setting up an extra table in a timely fashion so that the presentation could start on schedule. Mr. Bob Bruce, of the APEGM PD committee, introduced Mr. Forsman, and after the presentation, thanked him on behalf of the audience.

Look for the slides from this presentation on the APEGM website at ***www.apegm.mb.ca/pdnet/papers.html*** ■

Student Employment Services (SES) at the University of Manitoba can help you with your engineering recruitment needs! These services are free of charge to employers, students and alumni. To advertise your full-time, summer, term or part-time position, e-mail the job information to ***penny_debrowski@umanitoba.ca***. For further information on how SES can help you with your professional recruitment needs, contact Penny Debrowski at (204) 474-6586.

THOUGHTS ON

Design

...and still trying to understand how it can be taught.

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

The process of applying for a renewal of our Design Chair here on campus has caused us to examine who we think we are, and what we think we are doing. Our original proposal was advanced under the ambitious goal of creating "design-ready" graduates. Simply stated, this was to be an attempt to expose our engineering students to the real world into which they graduate. One of the outcomes has been to look more deeply into the meaning of some of the catch phrases that are tossed around as we attempt to justify what we are doing. We need to define "design" before we can hope to produce "design-ready" graduates.

In most universities engineering education is composed of a mix of science, math, arts, engineering science and engineering design. The attempt is to spend four years (which turns out to take an average of 4.85 years) and pack in the material that will convert bright young 18 year olds into technically competent 21 year olds. Given the constraints of time and material volume, the process tends to be constrained. Task One is to develop some level of technical competence in some area of our very broadly based profession. Typically the engineering portion becomes a series of technology oriented courses in which the focus is on the details of particular technologies, not their broad application. Correctness rather than judgment tends to be stressed. Understandably, the end product is a graduate who has a reasonably good understanding about the details of some specific parts of the technological world they plan to enter, but relatively little understanding of how those details integrate into the demands of the real world.

Talk about a Catch-22. On the one hand there is a need to provide an education with enough depth to make the graduates technically competent, and therefore marketable. On the other hand, there is a need to provide enough breadth to make the graduates aware of the multiple ways in which their skills can be utilized and where that can eventually lead.

For those of us who can remember watching Neil Armstrong walk on the moon, live in black and white, we can also remember undergoing extended training programs in our early years as graduate engineers. This was usually our first exposure to using the things we had learned. It was often a "bucket of cold water in the face" type of an experience, but at least the culture and the economy permitted that "post-graduate" training to occur.

My first real understanding of "engineering judgment" occurred when I proudly showed my boss a "design" I had worked on all weekend and he informed me that the snow loads were wrong, resulting in too small a beam. The building in question was next to a much higher structure and would be subject to drifting loads. I was "book correct", based on the information in the prevailing code, but "application unaware", based on the nature of my undergraduate education.

This was the first in a series of experiences that caused me to appreciate that design is only part technology. I can thank a number of more senior engineers who pointed me, some more gruffly than others, to a process that was not clearly defined, but one that opened the world of design as a career path for me. I'm not sure they could have defined that path any more clearly than I can today. It was, in a sense, an engineering apprenticeship not unlike the more widely accepted apprenticeships in the trades. It was, and still is, the EIT portion of the making of a P.Eng.

But a number of things have changed. There was a long period in the 80s and 90s in which downsizing was the corporate and government culture. The impact of this culture was a freeze on hiring new graduates. Mid-career engineers advanced through the ranks with no young engineers to tutor. The training was not being refreshed within the companies or government departments as people found themselves "doing more with less". When demographic realities struck, new graduates were once more in demand, but the culture of "apprenticing" had been lost and the young folks with their computer analysis skills were just expected to "know".

People (governments, industry, the profession, graduates) turned to the universities to address this lack of understanding. Universities, which had been driven by the research needs of the country, had few academic staff who had experience in the practical design world. Funding, the thing that drives all university initiatives, became available to develop Design Engineering programs within the existing Engineering programs. Eleven different programs with eleven different visions were developed at eleven different universities. But like all new initiatives, we are still raising more questions than answers.

So, here at the University of Manitoba, as we look at our goal of producing "design-ready" graduates, we find ourselves struggling to strike a balance that represents a "best practice" in engineering design education. We also find ourselves further from being able to define the core question, "what is the engineering design process?" than we were five years ago. None of the ten other Design Chairs are any closer than we are.

What do we intend to do? Predicting the future is a mug's game, so we do not intend to become clairvoyant. We do intend to continue relying on input from those who employ our graduates as a sort of quality control mechanism. We also intend to look back at the history of engineering here in Manitoba to gain from the collective experience of those who went before us. We intend to launch research to gain a more fundamental understanding of the engineering design process. And finally, we intend to keep working at developing ways to make our students aware of the application of their technological competence without decreasing their level of competence.

Now if we can just figure out what design is... ■

Annual General Meeting

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tion 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 7, 2005.**

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 ■

Manitoba Engineering Community Join to Work on Historic Flood Protection Project

The start of construction on the Red River Floodway expansion project is one step closer, as the Manitoba Floodway Authority recently (MFA) awarded two contracts on the final design of the project and is preparing to tender the first contracts for construction for the $665 million flood protection project.

The Red River Floodway expansion project will be one of the most significant construction projects in Manitoba's history. Anticipated to last five years and employing hundreds of workers, the $665 million project, once completed, will protect more than 450,000 Manitobans, over 140,000 homes, over 8,000 businesses, and prevent more than $12 billion in damages to the provincial economy in the event of a one-in-700 year flood. Floodway expansion will also provide long-term protection for the environment by preventing untold environmental damage that would result from a major flood impacting the City of Winnipeg.

With the pre-design, environmental assessment and public consultation processes well underway, the MFA recently reached a major milestone when it was announced that two consortiums, consisting of ten local Manitoba engineering firms, had been named the successful bidders for the final design of the project. At an investment of $27 million, the contracts will be a major financial injection into the Manitoba economy and will result in significant benefits for Manitoba's world class engineering community.

The first contract, worth approximately $16 million, is for the final design of the main floodway channel, structures and the West Dyke and was awarded to a consortium led by KGS Group and included Acres, SNC Lavalin, UMA, Wardrop, Earth Tech, Barnes & Duncan, and First Canadian Engineers. The design contract will include:

- Widening of the existing channel to a design capacity of a one in a 700 year flood.
- Modifications to eight drainage structures.
- Relocation of the City of Winnipeg's Aqueduct
- Improvements to the Floodway Inlet Control Structure.
- Expansion of the Outlet Structure and discharge channel into the Red River, including erosion protection downstream of the outlet structure.
- Extension and raising of the West Dyke.
- Potential mitigation works to minimize impacts to groundwater resources, socio-economic and biophysical impacts.

The second contract, worth approximately $11 million, is for the final design of the bridges and transportation components of the project, and was awarded to another consortium lead by Dillon Consulting and included Earth Tech, ND-Lea, UMA, Wardrop, Barnes & Duncan, and First Canadian Engineers. The design contract will include:

- Replacement of six highway bridge crossings and one railway bridge over the Floodway.
- Rehabilitation of 5 railway bridge crossings over the Floodway.
- Associated roadworks with the highway bridge crossings.
- Associated trackage with the railway bridge crossings.
- Temporary detour structures for the railway bridges.
- Channel excavation within 200 meters of the bridges.

Rick Carson, P. Eng., Project Manager, representing KGS Group, the lead consultant working on the floodway parcel, said that although his firm was familiar and has worked with some of the firms in

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Manitoba Schools Science Symposium 2005

Future Engineers-In-Training?

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

From April 22 to 24 over 400 projects filled the University of Winnipeg Duckworth Center as grade four to 12 students from across Manitoba participated in the Manitoba Schools Science Symposium (MSSS). For the 16th year in a row, the APEGM Public Awareness Committee took on the challenge of judging the engineering and technology entries for special awards.

Looking back to MSSS in the 1980s and early 1990s, projects from the science and technology category filled the floor. It was a daunting task to judge the projects – the projects had to be narrowed down from hundreds, and only a few were judged. This year over half of all projects were in the biology and health science categories, and only 22 projects were entered in the engineering and technology category! By having a group of enthusiastic APEGM volunteers outfitted in APEGM t-shirts, "Why Engineering" brochures provided to all students, and awarding ALL engineering and technology related projects awards through the generosity of engineering companies in Winnipeg, hopefully students will get the message that engineering is an exciting career!

The following outstanding contributions were selected for the APEGM awards:

$300 Cash Awards

- Nishant Balakrishnan, *"Leech Bot"*
- Adam Nowicki, *"The Structural Strength of Woven Cords"*

Digital Cameras

- Matt Haydey, *"300B Set"*
- Tristan Saloranta, *"Ready, Aim, Fire!"*

$150 McNally Robinson Gift Certificates

- Kieran Beveridge, *"Angle of Attack"*
- Cameron Piled, "Hovercrafts"
- Jon Niemczak, *"A New Future in Space Shuttle Design"*
- Jeremy Hill, *"The Power of Electromagnets"*

Local engineering companies also provided their support to aspiring engineers of tomorrow. "Special Engineering" job shadowing opportunities, cash awards, and scholar-

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Flood Protection Project

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the past, the larger number of firms working together on the floodway consortium will be an opportunity to build relationships within the engineering community. "It's definitely going to be a learning experience but so is the floodway expansion project itself. We look forward to working with the other firms and building on the synergies that are created."

"The floodway project is a unique and challenging project that is vital to the future of our province, said Norm Ulyatt, P. Eng., Project Manager, representing Dillon Consultants, the lead consultant on the bridges and transportation component of the project. "I think all of the firms recognized the importance of ensuring the success of this project. We look forward to working with the other firms on this project.

First Canadian Engineers & Constructors Inc., an engineering firm operated by Tribal Councils Investment Group of Manitoba Ltd. and representing fifty-five Manitoba First Nation communities, is a partner with both consortiums working on both parcels. "This project will provide our staff the experience of working on a major infrastructure project," said Cory Shangreaux, representing First Canadian. "We see the floodway project as an excellent opportunity for our firm and look forward to working with our partners to increase flood protection for Manitobans."

"We are pleased with the work and support of Manitoba's engineering community so far into the project," said Ernie Gilroy, CEO of MFA. "Their experience and expertise has benefited the project and we look forward to proceeding into the final design stage of the project. The awarding of these contracts is a major step forward and will allow us to begin planning for the start of construction.

In addition to final design, the MFA is also working with the two consortiums in preparing to tender the first contracts for construction. Doug McNeil, P. Eng, Vice-President of Hydraulics with the MFA, advises that the first tender for the project will involve excavation for a gap in the channel embankment and will be issued at the end of May with an award expected to be announced in mid July. Jim Thomson, P. Eng, Vice-President of Transportation with MFA, advises that the first bridge tenders will be advertised later in the summer of 2005. Pending environmental approval, construction on the project is anticipated to begin in August. ■

Future Engineers-in-Training?

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ships to attend the University of Manitoba Mini-University were provided by: Crosier Kilgour & Partners Ltd., Dillon Consulting Limited, Earth Tech Inc., FWS Construction, IEEE Winnipeg Section, KGS Group, Manitoba Hydro, Maple Leaf Construction Ltd., MicroPilot, Nelson River Construction Inc., Oldfield Kirby Esau Inc., PCL Constructors Canada Inc., Smith Carter Architects & Engineers Inc., Stantec Consulting Ltd., Teshmont Consultants LP, The National Testing Laboratories Ltd., and Vector Construction Group.

The APEGM judges selected the following projects for the "special engineering" awards:

- Matthew Rohulych & Matthew Haynes, *"Blade Power"*
- Kristin Park, *"Tough Stuff"*
- Mark Ularte, *"'Aero'ing on the Race"*
- Michelle McKay, *"The Cradle Will Rock"*
- Steven Klassen & Cullen Klassen, *"Catapult vs. Trebucket Shoot Off"*
- Michael Wiens & Robert Pitman-Jelly, *"Battery Power"*
- Phillip Klassen & Dustin Gerbrandt, *"Is Hydrogen a Reliable Fuel Source?"*
- Neilloy Roy, *"Would You Like Some Lead With That?"*
- Ming Munikar & Jacqueline Leung, *"LEDs – A Technology That Will Revolutionize the Lighting and Energy Industry with Global Benefits"*
- Raja El-Mazini, *"Brick to Brick"*
- Mary Furgate & Julia Vossen, *"Strength of Concrete Structures"*
- Katherine Bonness, *"Prosthetics: Building Artificial Limbs"*
- Andrew Nazer, *"Wind Works"*
- Adam Benson & Tyler Matthews, *"Helicopters"*
- Issac Wiebe, *"Wow! Magnets"*

On behalf of the Public Awareness Committee, I would like to thank Allan Silk, APEGM President, for presenting the awards to the exceptional students named above at the awards ceremony. A big thank-you also to all of our volunteer judges for their hard work: Amela Basic-Bilic, Jonathan Epp, Kasia Rak, Kin Ooi, Rui Yang, Trevor Bowden, and Wesley Mikolayenko. ■