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THE KEYSTONE PROFESSIONAL

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

JUNE 2000
www.apegm.mb.ca

Manitoba Consulting Engineers Honoured With Awards of Excellence

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

On April 6, 2000, over 200 consulting engineers and their guests gathered at Winnipeg's historic Hotel Fort Garry to celebrate the achievements of Manitoba's Consulting Engineering Industry at the inaugural Manitoba Awards of Excellence in Consulting Engineering. This awards program marks the first local initiative to honour outstanding work in Manitoba's $176 million consulting engineering industry. Winners of the awards were announced at a ceremony following a showcase viewing of project displays and dinner enjoyed by representatives of the engineering industry, officials from provincial and civic governments, and Manitoba's business community. Master of Ceremonies Peter Jordan, host of CBC's nationally broadcast television program "It's A Living", hosted the sold-out Manitoba Awards of Excellence in Consulting Engineering.

The newly instituted Manitoba Awards of Excellence program is a significant part of the Consulting Engineers of Manitoba's ongoing efforts to raise the profile of consulting engineering in Manitoba. The awards program provides an excellent opportunity to also showcase the work of consulting engineers and their Manitoba firms, and also demonstrates the high industry standards that CEM members have established for themselves.

Twenty different projects were submitted by leading Manitoba Firms in the categories of International, Resource Development, Environment, Infrastructure and Innovation. Many of these projects have impacted positively on the daily lives of Manitobans.

A team of leading industry professionals conducted judging of the entries. Based on strict criteria, the judging panel selected an Award of Excellence in each category and Awards of Merit where warranted.

A total of eight different firms won Awards of Excellence or Awards of Merit. Two firms won multiple awards, TetrES Consultants won both awards in the environmental category and Wardrop Engineering won an award in the infrastructure and innovation categories.

The Honourable Mary Ann Mihychuk, Minister of Trade and Industry greets the audience on behalf of the Province of Manitoba.

Manitoba Hydro's Tom Gouldsborough (l) presents Alan Roberts of Roberts, Sloane & Associates the Award of Excellence in Resource Development.

A complete list of the 2000 Manitoba Awards of Excellence in Consulting Engineering is as follows:

International *Presented by the Consulting Engineers of Manitoba*

Award of Excellence **Teshmont Consultants Inc.**
"Interconnection of the Electrical Networks of Jordan and Egypt"

Resource Development *Presented and Sponsored by Manitoba Hydro*

Award of Excellence **Roberts, Sloane & Associates Inc.**
"Can-Oat Milling Plant, Saskatoon"

Award of Merit **KGS Group**
"Pointe du Bois Generating Station Turbine Replacement"

Environment *Presented by the Association of Professional Engineers and Geoscientists of Manitoba*

Award of Excellence **TetrES Consultants Inc.**
"Town of Roblin Engineered Wetlands and Hybrid Poplar Tertiary Wastewater Treatment Demonstration Project"

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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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New Members Registered March & April 2000

W.J. Alcock (BC)	R.C. Forbister	K.B. McIntosh	N. Soonawala
R. Arndt (SK)	D.H. Grandy (ON)	J.J. Miedema (ON)	W.J. Thoburn (ON)
D.R. Baert	E.C. Hamre (AB)	R.G.R. Munroe	G.E. Tufts
R.R.D. Brodeur	R.F. Hand	D.M. Myers	R.I. Weir (ON)
R.G. Cameron (AB)	N.N. Ilich	G.F. Naterer	I.L. Whittington (ON)
M.T. Corkery	J.S. Jamrozek	K.W. Ouelette	R.E. Williams (SK)
D.G. Cormier	J.J. Knight (PQ)	J.M. Pawluk	M.W.Y. Wong (ON)
T.N. Crilly	R.A. LaFleche	J.S. Payne	T.H. Woolhouse (ON)
A.A.J. Daly (PQ)	M.H.S. Lau	R.A. Piliounis (ON)	D. Yang
B.A. Derks (ON)	H.P. Lepp	G.J. Prior	R.V. Young
D.P. Dudek	R.V. Liew (BC)	M.D. Rusk	
R.B. Ejeckam	D.B. Loree	G.W. Samide (AB)	
T.B. Epp	R.N. Matthews	R.F. Schmidt (SK)	

Members-In-Training Enrolled March & April 2000

G.J. Bartlett	J.P. Hacault	C.L. Novakowski	W.D. Sigfusson
M.L. Boychuk	P.A. Harrison	K.J. Ostash	V.A. Spezzano
B.S. Brar	J.Q.L. Horton	A.N. Passalis	D.D. Stangeland
D.D.G. Chevrier	V.M. Jamadagni	B.C. Piniuta	K.T. Tait
B.R. Coreau	B. Jose	K. Rakhra	A.K. Takyi
P.S. Dhaliwal	S.C. Ladd	R. Roman	B.J. Thomson
N.Z.J. Dhalla	M.A. Larouche	E.A. Schor	C.L.J. Turenne
E.R. Ducharme	S.T. Netsere	R.I.M. Sifrim	J.W. Ward

Licences Issued March & April 2000

J.M.A. Deschiever (PQ)	D.L. Post (IA)	C.P. Tran (PQ)
J. Konczynski (PQ)	L.M. Sargent (IA)	T.T. Truong (PQ)
K.M. Leytham (WA)	M.K. Sjoblom (MN)	R.F. Williamson (IA)
M.D. MacPherson (SK)	W.K.T. Tong (BC)	

Members De-Registered April 1, 2000

J.G. Anderson	J.M.H. Davies	I.S. Kaler	Y. Qin
R. Balachandar	W.C.D. DeGagne	W.C. Kent	S. Rangarajan
A.W.S. Beaton	N.R. Dickey	A.C. Lau	M.M.S. Rashwan
T.O.P. Bialek	C.J. Dudeck	R.J. Lewak	M.P. Shioler
G. Bizien	A.S. Forzley	J.G. Loewen	C.R. Schneider
M.R. Bower	L.J. Fouillard	K. Mains	S.C. Seymour
I.Boyd	J.K. Grieder	T.R. Marr	S. Singh
R. Chen	J. Hamian	J.M. McPhee	C.P. Smith
E.A. Cheung	G.P. Hawley	K.B. Mirza	P.G. Smith
C.H.K. Chu	D.R. Hilborn	G.W. Neufeld	N. Su
M. Constantinescu	K.P. Ho	G.A. Nicholas	J.D. Thomson
C.R. Dahl	C.J. Hunter	D.C. Oliver	
B.R. Danaher	J.H. Jurgenliemk	B.E. Petzold	

Members-In-Training Removed From Enrollment April 1, 2000

L.N. Anderson	M.C. Britton	T.A. Henwood	H.D. McKibbin
S. Bal	T.J. Bryant	K.H. Hill	J.A. McKinnon
B.D. Batchelor	Y.T. Cates	G.S. Hobbs	R.G. Menon
K.C. Beach	T.B. Chau	R. Janzic	K.G. Saban
R.K. Beardy	N. Dack	T.J. Jobb	I.S. Smart
J.M.H. Bergeron	D.J. Desveaux	L.B.E. Lansard	S.H.T. Yao
M.J. Berrub	P.G. Ducharme	R.H. MacDonald	

Reinstatements March & April 2000

B.H. Allen	T.E. Bates	B.R. Megli

Cannot Locate

A.J. Carlson	P. Cordeiro	D.M. McLeod
C.W. Chapman	C.T. Jones	G.S. Mychajlyszyn

President's Message

John Hosang, P.Eng.

The Relevance of the Engineering Profession

Engineers are by their nature problem solvers. We exist to solve other people's problems. Ironically, one of the more foreboding problems facing the professions and threatens our relevance has been, in part, self inflicted. The problem is the perceived relevance of the engineering profession not only by the public, but also by other engineers.

"Not only is there a general and significant lack of awareness of the need for professional engineering licensure within the business community, in some areas there is outright resistance."

The problem exists right across Canada. For me it was emphasized at a recent meeting of the Canadian Council of Professional Engineers where most provincial and territorial representatives acknowledged the lack of awareness of the importance of regulation and becoming a professional engineer by engineering students, practising engineers and their employers, and the general public. If this general lack of awareness and appreciation is not addressed, everyone will suffer. We engineers will lose the status that we, and our predecessors, have worked hard to achieve, and the public will be ill served if the profession is not meaningfully regulated or, indeed, becomes unregulated.

The problem begins with the ever-increasing percentage of engineering graduates failing to become professional engineers. On analysis, it appears that not enough effort is being made by the provincial associations to explain to those graduates why they should enroll in EIT programs and why the wearing of an iron ring does not entitle one to practice engineering. They do not understand why it is important for them to become professional engineers.

The answer lies in better communications with the students, not only engineering but also geoscience, early and frequently during their university program. The Associations carry this responsibility, and APEGM is looking at ways to enhance its activities in this area. I personally believe that the President should be more deeply involved. The President should do more than give a few remarks at the Iron Ring Ceremony and at the graduating-class dinner. At these occasions, the students are almost out the door – it is too late.

It is a sad statement, but true, that employers in many fields of engineering industry do not see the value in their employees becoming professional engineers and make no attempt to require or encourage them to seek licensure. Corporations involving the newer disciplines in information technology, software development and bio-engineering areas are guilty of this practice. As the President of APEGM, I find this practice disturbing and I am critical of the company executives, particularly those who are graduate engineers. How can they allow this to happen when they must know of the existence of provincial engineering Acts and the legal requirement to practise engineering only if you are registered? The answer lies, in part, in the fact that the Associations have not been diligent enough in informing graduates and employers and in promoting the Acts and the benefits, quite apart from the requirement of becoming professional engineers.

Not only is there a general and significant lack of awareness of the need for professional engineering licensure within the business community, but, in some areas there is outright resistance. In Quebec there has been objection from many areas to amendments to the provincial Act from firms which appear to want the right to carry out engineering using less-qualified employees. This goal seems to be driven in part by the global economy and more sophisticated communications, which place continuous pressure on the price of service. Meanwhile, in the midst of it all is the public which is bombarded with information and advertising, and is unaware of the protection it receives through the work of professional engineers and the provincial Associations which regulate the practices and ethical conduct of its professionals on their behalf.

At the beginning of this article I said that we professional engineers face the serious threat of a challenge to our relevance. That threat can only be overcome through education and communication, both of which have to start with the Associations, and must ultimately involve all of us in promoting the quality and value of professional engineering. We have a better understanding of the nature of the problem, which is the first step in developing a solution. However, it is only the first step! ■

In Memoriam

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

Robert Arthur Beddome

Ronald John Giesbrecht

Young Engineers on the Rise at MSSS 2000

By: K.M. Huminuk, EIT

Once again, the Manitoba Schools Science Symposium was a success. As usual, APEGM was there participating in the judging, sponsoring and awarding of prizes. This year, the MSSS was held at Grant Park High School and Arena on April 29-30. There were over 600 projects, submitted by students in grades 4-12. Of these, there were over 100 engineering-related projects for APEGM's judges to consider.

Following a careful review of the engineering-related projects, APEGM's ten volunteer judges awarded six students with enrollments to the "Careers in Engineering" section of the University of Manitoba's Mini-University program. Unfortunately, we didn't award our usual $500 scholarship to the Faculty of Engineering as we didn't have any grade 12 projects to judge!

The lucky winners were:

- Grade 4 – Nishant Balakrishnan from Bairdmore Elementary School with his project "Cyberarm" *(Robotic Arm developed from Lego Mindstorm),*
- Grade 6 – Joshua Bergmann and Colin Rumbolt from Linden Christian School with their project *"Which Metal Conducts Heat the Fastest?",*
- Grade 7 – Melissa Blieske from Mennonite Brethren Collegiate with her project *"Does Temperature Affect the Strength of Spruce Wood?",*
- Grade 7 – Graham Hawryluk from St.John's Ravenscourt School with his project *"Is Your Bicycle Helmet Working For You?"*, and
- Grade 8 – Dominic Leang from Shamrock School with his project *"Multi Function Claw Made From Lego".*

On behalf of the Image Enhancement Committee I would like to thank Alan Pollard, our APEGM president-elect, for presenting the awards to the lucky students at the Awards Ceremony on May 1. I would also like to extend a big "thank you" to our volunteer judges for all their hard work: Kris Dick, Nicole Dunn, Brent Evans, Kelly Hunter, Chris Kroeker, Mitch Omichinski, Brian Trenholm, Irene Wasilewski and John Yestrau. ■

U of M Students Get Efficient

By: J.J. Pera, P.Eng.

The winners of this year's Energy Efficiency in Commercial Buildings Student Competition were honoured at the Building Owners and Managers Association (BOMA) meeting held on April 17, 2000. Three teams of engineering students from the University of Manitoba were presented with certificates and cash awards, kindly donated by the competition sponsors. The sponsors were: The Energy Management Task Force, Manitoba Hydro, Winnipeg Hydro, Manitoba Government Services, Manitoba Conservation, ASHRAE, BOMA, and Johnson Controls Ltd.

The student competition was organized by the Energy Management Task Force (EMTF). The EMTF is a non-profit organization of professionals, facility managers and energy managers who are interested in promoting the efficient use of energy and water in buildings. The EMTF worked with Professor Rudy Schilling of the Mechanical Engineering department to organize this successful competition. The primary objective of the competition was to provide the students with some real-world experience in the field of energy and water efficiency. The competition also provided the facility owners and managers an assessment of their energy use, and some ideas on where they can save energy.

Nine teams of students, in groups of two to four, participated in the competition. The majority of the students were 3rd year mechanical engineering students. The students received scholastic credit for the competition towards one of their 3rd year courses. Each team was assigned a different facility to study for energy- and water-saving opportunities. The facilities ranged from the Winnipeg Arena, to apartment blocks, to office buildings such as the Great-West Life building. Each team was also assigned a mentor. The mentors, being knowledgeable about buildings and energy efficiency, provided direction to the teams and ensured that the students stayed 'on track'. The students were to analyze the utility bills, audit the facility, and submit a report describing the facility, as well as the energy- and water-saving opportunities that they found. Cost- and savings-estimates for the opportunities were also to be provided. An oral presentation was required after submission of the final reports. The

written reports and oral presentations were judged by a panel of three Professional Engineers. The judges were Joe Lucas, P.Eng. of MCW consultants, Georges Marchildon, P.Eng. from the Public Schools Finance Board, and David Stones, P.Eng., of The Forks North Portage Partnership.

The winning team of Chris Kelbert, Paul Schoemperten, Michael Oster, and Devin Evenson received $3,000 for their study of the Winnipeg Arena. The second-place team of Michael Whitton, Richard Pound, and John Pattie received $2,000 for their assessment of the Canadian Grain Commission Building. The team of Jeremy Silcox, Corissa Krahn, Andres Castro, and Tanis Brako placed third and received $1,000. They were assigned a multiple-tenant commercial property at Kenaston and Grant (Grapes).

As a whole the students did an excellent job and identified many energy- and water-savings opportunities such as T8 lighting retrofits, LED exit-light retrofits, glycol run-around-loop heat recovery, electric to gas conversions, low 'e' window films, natural-light harvesting, Direct Digital Control upgrades, faucet aerators, urinal-tank controls, parking-receptacle controllers, pipe insulation, and roof insulation, to name only a few.

If anyone would like more information about the Energy Management Task Force please contact the Chair, Terry Silcox, at Manitoba Energy and Mines at 945-2035 or *tsilcox@gov.mb.ca.*

Thanks go to all the students, sponsors, judges, mentors, facility owners and the organizing committee for making this year's competition possible. ■

Edward Leith, Geologist

By: V.L. Dutton, P. Eng. (Ret.)

Perhaps it was appropriate that, as the only member of the Communications Committee who had been a student of Professor Leith, I be asked to write this little tribute to him. Yes, he had tried hard to turn the Civil Class of 1944 into competent geologists. If he was not entirely successful, it was not for lack of trying on his part; Canada was at war and most of us were involved in the C.O.T.C. at Minto Armouries twice each week or were training with the R.C.A.F.

Professor Leith was born in 1906 and died on September 8, 1999. Graduating from the University of Manitoba with a B.Sc. in 1928 and an M.Sc. in 1929, he did post-graduate work at Yale. He joined the University of Manitoba faculty in 1935 and retired in 1971.

He taught introductory geology as well as courses in paleontology and stratigraphy. In all, he was associated with the University of Manitoba for over 60 years.

Among his awards were:

- The Dr. and Mrs. H.H. Saunderson Award for Excellence in Teaching, 1971 – 1972
- University of Manitoba Outreach Award, 1983
- Honourary Life-Membership in the Museum of Man and Nature.
- October 25, 1999: Elected (posthumously) Emeritus Member of Meteorite and Impacts Advisory Committee of the Canadian Space Agency.

Most impressive to this reporter was the fact that material from three meteorites have been found in Manitoba and it was Professor Leith who identified the one that had landed near Homewood. ■

2000 Annual General Meeting – Issues Forum

As part of the 2000 Annual General Meeting on Saturday, October 28, the Meetings Committee is planning an Issues Forum. It is intended to provide an opportunity to discuss topics or issues that you, as a member or member-in-training, feel are important.

The Meetings Committee asks that if you have any topics or issues you would like to have discussed during the session, that you provide a brief description and fax them to (204) 474-5960, or e-mail to ***jmckinley@apegm. mb.ca***

The Meetings Committee will select the most popular topics for the agenda. ■

David A. Ennis, P.Eng.
Executive Director

Awards of Excellence

Continued from page 1

Award of Merit	**TetrES Consultants Inc.**
	"Environmental Assessment: Lower Churchill River Water Level Enhancement Weir Project"
Infrastructure	*Presented by and sponsored by DPIC Companies and Oldfield Kirby Esau Inc.*
Award of Excellence	**EB Systems Ltd.**
	"Manitoba Learning Network Wireless Cluster Networks"
Awards of Merit	**Stantec Consulting Ltd.**
	"York Avenue Underpass Reconstruction"
	Wardrop Engineering Inc.
	"St. Andrews Lock and Dam Corrosion Protection System"
Innovation	*Presented by the Faculty of Engineering, University of Manitoba*
Award of Excellence	**Wardrop Engineering Inc.**
	"Wardrop Solution© Remediation of Heavy Timber Roof Trusses"
Award of Merit	**Reid Crowther & Partners Inc.**
	"Main Street and Norwood Bridges Project"

APEGM's Dave Ennis (l) presents the CEM Award of Excellence in Environment category to Grant Mohr of TetrES Consultants Inc.

Congratulations to all firms who won awards and also to all firms submitting projects. The CEM wishes to express its sincere gratitude to event-sponsors Manitoba Hydro, DPIC Companies and Oldfield Kirby Esau Inc., Royal Bank of Canada, Pitblado Buchwald Asper, Price Waterhouse Coopers, and MTS. The CEM also wishes to thank our Judging Committee Chair, Mr. Mal Symonds, P. Eng., Bristol Division – Magellan Aerospace Corporation, and his judging committee which included Barry MacBride, P. Eng., City of Winnipeg, Ray Scouten, P. Eng. (retired), Cathy Stewart, P. Eng., INCO, Jim Thomson, P. Eng., City of Winnipeg, Doug Ruth, P. Eng., Dean - Faculty of Engineering, University of Manitoba, and Bob Eastwood, FRAIC, Number Ten Architectural Group. CEM would also like to recognize Wordsnorth International for their assistance in event-planning and management.

Due to the success of the sold-out inaugural Manitoba Awards of Excellence in Consulting Engineering, the event will be hosted at a larger venue next year. The CEM invites firms to watch for details in the fall of 2000 on entering projects for the 2001 awards, scheduled for April 5, 2001. ■

"Equity" and the Engineer's Dilemma

By: J. Parker, P. Eng., CEng.

(This article appeared in Vol 18, Number 4, page 13, Winter 1998/99 Quarterly Journal, Canadian Healthcare Engineering Society. Reprinted with permission.)

Canada's industrial base is beginning to recognize with some concern the current shortage of engineers and the following observations and thoughts (and in particular reference to health care) may help to explain the reasons for this shortage.

The question I pose is why a dedicated career professional in the difficult and demanding field of engineering should be expected to discard expensively acquired and valuable knowledge and experience to change to alternative roles and duties in order to advance financially.

Engineering requires among the highest entry standards for university. It is a fully licensed, self regulating, publicly accountable profession defined by provincial statute and licensed under the Professional Engineer's Acts. Engineers are responsible for a great many designed and manufactured items as well as construction involving the application of scientific principles and liability for public safety. Of recent note we can cite the Space Shuttle, Confederation Bridge and the exploding world of computer technology as examples of exceptional and diverse engineering work.

Many years of preparation during and beyond an Honours Bachelor's-level education are required to achieve full peer acceptance and professional recognition. This recognition of academic achievement, actual performance in the working world reinforced with further studies and examinations, results in the post-graduate professional degree of P. Eng. – an indicator of achievement and evidence of dedication and contribution of a public responsibility.

The necessary financial and intellectual investment and subsequent liability risks involved in rising to the challenges of engineering and the necessity for in-depth knowledge can result in "pigeonholing" by specialization. This can effectively act as a restriction, resulting in poorly rewarded careers when compared with the relatively prompt rewards and steady promotion of a generalist education obtained, in many cases, with less difficulty and a short period of foregone income than a P. Eng. Examples are common of inexperienced professionals receiving substantially higher rewards than those of highly experienced veteran professionals upon whose knowledge, advice and guidance an organization is very much dependent.

The unbalanced reward system has not gone unnoticed by students applying for university, with the result that fewer take up the intellectual stress of engineering science and more take less-rigorous educational paths. In reality, the education of professional engineers develops a broad and detailed knowledge base and produces a systematic and analytical approach to problem solving. This system can be utilized in many other fields including social studies, health care and management in general.

Without the science and technology which is engineering, it can readily be seen that there will be very much less to manage. Many great and thriving industries are planned, designed, constructed and managed by engineers. The engineering hierarchy has the advantage of detailed knowledge over the full spectrum of the applied sciences from, as it were, the "shop floor" upwards and outwards. Their accomplishments in managing huge industries and projects belie the long-standing myth that engineers, for enigmatic reasons perhaps put forward by non-engineers, cannot "manage".

In hospitals, engineering work accounts for up to 65% of the capital costs of new or renovated facilities and requires advanced knowledge of both the application and management of construction. Yet there are relatively very few professional engineers actually employed by hospitals.

The leaders in our society must

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A Life in Engineering – Sir Arnold Hall

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

The British engineering world lost a brilliant star this year when Sir Arnold Hall passed away at the age of 84. His life work is a catalogue of outstanding achievements, but perhaps he is best known for his pioneering work in solving the mystery crashes of the de Havilland Comet 1 jet airliners.

Sir Arnold was born in Liverpool to parents of modest education. His mother's fondest wish was to make him into a pianist, but his interests were always science and invention. As he put it, "I was too busy making steam engines and other gadgets." His brilliant mathematical and scientific abilities propelled him to Cambridge University where he won prizes in engineering, aeronautics, and thermodynamics.

While on a postgraduate fellowship Sir Arnold worked with Frank Whittle who was busy developing the world's first jet engine. Sir Arnold assisted by computing the stresses in the compressor. Their first jet engine ran in 1937 and heralded the beginning of a new era for Sir Arnold and the aircraft industry.

After joining the Royal Aircraft Establishment in 1938, Sir Arnold spent the war years developing a bomb sight and a gyro stabilized gun sight that is credited with doubling the kill rate of Allied aircraft.

The de Havilland Comet 1 aircraft was the pioneer of modern jet liners. It flew faster and higher than any before it and was a major advance over the slow, noisy piston-powered aircraft of the day. The Comet's popularity with the traveling public made it a sales success and filled de Havilland's order book.

Sir Arnold became directly involved with the Comet after an

aircraft designated as G-ALYP (shortened to Yoke Peter) crashed on January 10, 1954 near Alba, Italy. Yoke Peter was the fifth Comet aircraft to crash in a space of less than two years. Fear and panic gripped the industry and Sir Arnold and the Royal Aircraft Establishment were called in to find the cause of these disasters. Sir Arnold quickly decided that the analytical methods which had served aircraft designers so well in the past were not adequate for this new type of airplane.

He decided to conduct extensive tests on another Comet aircraft, G-ALYU (Yoke Uncle) to see if he could induce a similar failure. This testing would involve varying the cabin pressure to simulate take off and landing. The designers of the Comet had also used pressure tests, but these were proof tests to ensure that the cabin could withstand a predetermined maximum pressure. The pressure testing of the Yoke Uncle cabin was done by submerging the aircraft in a tank of water while simultaneously filling the interior of the cabin. Pressure inside the cabin was created by pumping excess water into the cabin. Using water instead of air had several advantages; if the cabin failed under pressure with air it would create an enormous explosion due to the compressibility of air. That explosion would also destroy the source of the failure and prevent any meaningful examination of the failure mode.

Yoke Uncle made about 1,800 pressurized "flights" in the water tank before the cabin split open at the forward escape hatch. Coupled with the 1,200 air flights it had made previously pointed to a probable aircraft life of approximately 3,000 flights, although it was estimated that this would translate to a real-world limit of 2,500 flights. When Yoke Peter crashed it had made 1,290 pressurized flights.

The data from the tank tests demonstrated for the first time the behavior of aluminum alloys under repeated stress, showing that these materials do not have infinite life, but will eventually fail under repeated loading, a fact known to engineering students today. The designers of the Comet and the passengers paid the price for being pioneers in aircraft design.

Within two years of Sir Arnold's findings de Havilland was building a modified plane, the Comet 4, which corrected the structural problems. Crashes of Comet aircraft became a rarity. However, by that time aircraft manufacturers in the U.S. and Europe had their own jet aircraft on the market and Britain lost its early momentum.

Sir Arnold received a knighthood at the age of 39, and after his work at the Royal Aircraft Establishment ended he moved into private industry and became technical director at Hawker Siddeley. In time, he served there as vice-chairman and chairman of the entire group, which marked his transition from technical man to industry leader. He always felt a great sense of responsibility for the 85,000 people working for him in the mid-1970's. Sir Arnold kept Hawker Siddeley in the Airbus project after the government pulled out, and saw it grow into a highly successful enterprise.

Sir Arnold was named "Businessman of the Year" in 1975 for turning Hawker Siddeley into one of the most efficient business enterprises in the country. He had always been a champion of private enterprise, so when the government nationalized the industry in 1977 he left the aircraft business forever.

(Note: Although most of the early Comet losses were of aircraft owned by British Overseas Airways Corporation (B.O.A.C.), Comet CF-CUN was owned by Canadian Pacific, a pre-cursor to Canadian Airlines International. That plane went down on March 3, 1953 at Karachi, Pakistan. However, that crash was not due to metal fatigue. It was found that the aircraft lost lift if pulled up too quickly.)

If you want to know more about the Comet, point your browser to ***www.geocities.com/CapeCanaveral/Lab/8803/fcometcr.htm#top*** ■

Notice of Annual General Meeting

The 2000 Annual General Meeting of the Association of Professional Engineers and Geoscientists of the Province of Manitoba will be held on Saturday, October 28, 2000 simultaneously at the BEST WESTERN INTERNATIONAL INN, Wellington at Berry, Winnipeg and video conference locations in Brandon, Thompson, and Flin Flon.

Professional Development

PD Breakfast Meeting

Deregulation of the Electric Industry

By: W.T. Jackson, EIT

"The Electric Grid in North America is the largest machine ever engineered to operate in real-time" and it is this "machine" that is now witnessing the deregulation of the electric industry, according to Ed Tymofichuk, P.Eng., Manitoba Hydro, who addressed a crowd of more than one hundred people at the Norwood Hotel on Wednesday, March 22. The breakfast meeting was organized by APEGM's Professional Development Committee in cooperation with the Emerging Technologies Committee and IEEE Winnipeg PES Chapter.

The machine that Mr. Tymofichuk referred to also has many owners and more than one driver, complicating any move toward deregulation. Historically, the role of the transmission system has operated under the "Old Paradigm" which includes the utility-centered focus which meant moving our energy from our plants to our customers. The focus also meant that there were no developing transmission lines for use by others, no way to keep track of others and no way to keep track of other's transactions across your transmission system. Tymofichuk said the paradigm shift began in 1990 with the break-up of vertically integrated utilities, bundled products, and services. Contributing to the shift was the globalization of economies, saturation of electricity loads in western economies, combined-cycle gas turbines and independent power producers.

Locally, 1996 was a significant year for Manitoba Hydro which re-organized into four sections: power supply, transmission and distribution, customer service, and corporate management. Manitoba Hydro also profited from the benefits of interconnections. However, the question remained, "Has open wholesale competition in the export markets been good for Manitoba Hydro's stakeholders?" The answer seems to be "Yes". Mr. Tymofichuk stated that Manitoba enjoys the lowest rates in North America. Manitoba Hydro has been Canada's highest net exporter in the last three years. In the last four years, there have been no rate increases. Export revenues were greater than $300M in 1998-99.

Emerging "new" technologies are among the many challenges that the electric industry faces. High-tech solutions are required, market solutions still remain as an unknown, stranded investments linger and the unanswered question persists – Is bigger better?

In summarizing his address, Mr. Tymofichuk asked " What will the largest machine ever built in North America look like ten years from now?" "What will the drivers look like?", and "How many will there be?" ■

Practical Flexible Working Arrangements

By: B.A.K. Danielson, P.Eng.

A sub-committee of the Women in Engineering Advisory Committee (WEAC) has prepared a series of articles to provide information to members of APEGM about flexible working arrangements that began in the October, 1999 issue of "The Keystone Professional". The members of the sub-committee are: Brenda Danielson (Chair), Elan Swatek (WEAC Chair), Meghan O'Laughlin, Carolyn Geddert, Kelly Olischefski, and Robin Hutchinson. The complete document is available on the APEGM website under "Professional Practice" (click on "Information for Members").

The following is the fifth in a series of seven articles

V-Time

Description

V-time (short for "voluntary reduced work time") is a time/income trade-off which gives employees a range of choices for reducing their hours (and income) by a fixed percentage over a set period of time. V-time programs incorporate a variety of work reduction percentages, typically 2.5, 5, 10, 20, 25, or 40 percent of full-time. Employees may be given a choice of time off in the form of a shorter work day, shorter work week, or extended vacation time. Employees are usually given periodic opportunities (every three, six, or twelve months) to enroll/renew and must commit for a fixed amount of time (six or twelve months for example) to facilitate staff planning. V-time can be a creative alternative to lay-offs by spreading the available work around. For a standard work week of 40 hours, the following table illustrates the effect of the various options:

Pay Reduction	hours off per day	days off per month	weeks off per year
2.5%	12 minutes	.5	1.25
5%	25 minutes	1	2.5
10%	45 minutes	2	5.0
20%	1.5 hours	4	10.0
25%	2 hours	5	12.5
40%	3.25 hours	8	20.0

Considerations

Advantages

- increases productivity due to decreased absenteeism and turnover
- inexpensive way to improve employee morale and reduce burnout
- potential cost saving for the employer
- creative opportunity to retain staff
- gives employees a range of choices for reducing their working hours
- more time and opportunity for professional development

Disadvantages

- employee income and benefits will be proportionally reduced
- typically, it is not suitable for an individual employee within a department/organization – it is a system for a group of employees ■

Council Reports

Tuesday, March 14, 2000

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

AT WHICH COUNCIL WRESTLES WITH THE CERTIFICATE OF AUTHORIZATION

Some Council meetings have had perfect attendance, but the March gathering had the dubious distinction of unusually low attendance. In spite of this, Councillors Pollard, Eschenwecker, Rizkalla, Ball, Matthews, Britton, Quinn (via teleconference), and Hamilton were present, as well as President Hosang and Past-President Britton, plus the regular supporting cast. With Councillors coming and going, President Hosang had to exercise considerable logistical skill to ensure that a quorum was present for items requiring a vote.

The privacy of our personal information, a hot topic in our Internet culture, was again on the agenda at this meeting, a subject which first surfaced at the February Council meeting. The information in question are the data that APEGM gathers and maintains regarding new applicants, and the quantity of that information subsequently passed on to Council. Part of a Councillor's (and a reporter's) briefing notes include a statement from the Registration Committee listing approved applicants. Historically, this list includes the applicant's place of work, degrees, date and place of graduation, and possibly some other items. The Registration Committee was concerned that this information might prejudice an applicant's appeal to Council, as it is an applicant's right to ask Council to review contentious Registration Committee decisions.

Past-President Britton said that perhaps Council received too much information, that perhaps disciplinary history was not necessary, but on balance, such information was important. Councillors should know the sources of our membership, he thought. Councillor Ball said Council should receive information which would normally appear on a resume. At this point Council launched into a rather lengthy, detailed discussion on which items should be reported, based on a menu of eight permissible items enumerated by Executive Director Dave Ennis. Councillor Eschenwecker cut this short by reminding Councillors that, under the precepts of good governance, such details should be left to the Administration based on cost criteria set out by Council.

During the past few meetings Council had been unable to find a candidate able to make the commitment to stand for the post of President-Elect. However, this time the suspense was over. Councillors Eschenwecker, Rizkalla, and Matthews all passed on the honour, but Councillor Pollard stepped forward to fill the post. Our congratulations to Councillor Pollard. We know he will provide the fine leadership we expect and receive from our Executive. The elevation of Councillor Pollard left open a seat on the Executive Committee, one which was quickly filled by Councillor Penner.

The next item had some Councillors diving for a foxhole, the Certificate of Authorization, known in short as the C of A. This seemingly innocuous item is the legal authority for group practice. It was included in the new legislation governing our profession passed by the Government of Manitoba. The stinger in all this is that any entity using a C of A is also required to have liability insurance. This will mean increased operating costs for anyone using a C of A. Past-President Britton summed it up when he said that some members will think "Council is doing it to me again," that is, saddling me with unwanted and unnecessary burdens. Mr. Britton wanted to make clear that it wasn't the work of APEGM that brought in the C of A and liability insurance, but an act of our Legislature. The rationale behind creating a C of A for Manitoba is to harmonize with other provinces.

No Council meeting would be complete without some discussion of APEGM's legal affairs. This time it was a visit from Mr. J. Kroft, who represented APEGM in a recent case. Briefly, the Discipline Committee disciplined a member, the member appealed to Council, lost the appeal, after which the member took the matter to the Court of Queen's Bench. This time APEGM lost, based on procedure. The member successfully claimed that the Discipline Committee's lawyer actually helped write the decision, rather than just advising the Committee on the law. Now it was up to Council to decide whether to appeal to a higher court. Councillor Matthews suggested that the discussion should continue at the next Council meeting when, hopefully, more Councillors would be present. President Hosang instructed Councillors not to discuss the merits of the case since there was a possibility that the whole issue might someday return to Council.

The regular Council meeting ended at 4:05 PM, but it wasn't the end of the day for the Councillors. There was a special meeting of Council called to discuss another of APEGM's legal matters. That meeting was closed to reporters. ■

Tuesday, April 11, 2000

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

AT WHICH COUNCIL ATTENDANCE REBOUNDS

April's Council meeting attendance was a great improvement over March which must mean that our Councillors are all up-to-date at work and ready to tackle the business of the Association. Councillors Rizkalla, Pollard, Poetker, Washchyshyn, Hamilton, Suski, Ruff, Matthews, and Past-President Britton were present and ready to tackle the agenda under the steady hand of President Hosang. Whereas most meetings seem to coalesce around a few major items, this was more of a collection of many small parts.

Routine items occupied the early part of the meeting. Under the Report from the Executive Director, Mr. Dave Ennis informed Council that the Consulting Engineers of Manitoba Awards Dinner had been a great success. APEGM sponsored a table at this event, as authorized by Council at the March meeting.

Council turned next to a legal matter carried forward from the March meeting. Owing to the sensitivity of the issue your reporter agreed to absent himself from the room for that item.

Councillor Eschenwecker, Chair of The Governance Task Force, informed Council that his group had met twice and had commenced "To kick start the policy governance process and create a framework to achieve completion." Councillor Eschenwecker promised the Task Force would prepare a process for the next Council meeting. He expected to complete his mission by September.

Under discussion of Budget Policies and Priorities, Council touched on the subject of a new member roster. Executive Director Ennis said that someone asks about it once a month. A new one would cost around $18,000 to produce, he said, and it would be out-of-date before it was mailed. Councillor Pollard said that our immigration authorities used the roster to determine if you are a P. Eng. and Councillor Penner said they used it to calculate retirement age. Council liked the idea of an electronic roster and passed a motion for Administration to estimate the cost of converting to electronic format.

Councillor Washchyshyn briefed Council on the recent Canadian Council of Professional Engineers meeting he attended. He was happy to report that it had been a pleasant meeting, this sentiment being seconded by President Hosang. Executive Director Ennis had attended a parallel meeting of the Staff Liaison Group (the administrators) where they had discussed the possibility of nation-wide professional liability insurance for $5 to $10 a head. This type of insurance would not cover consulting engineers.

The next item will be of special interest to our geoscience brethren, because Council discussed the Canadian Council of Professional Geoscientists (CCPG) Admissions Criteria and Mobility Agreement. Councillor Matthews was the point-man on this issue and he said that Manitoba, and a number of other provinces, were not ready to sign it. The University of Saskatchewan would need to make changes to its curriculum and the Academic Review Committee would need to complete its study.

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CCPE National Engineering Scholarships

In November 1999, the Canadian Council of Professional Engineers (CCPE) awarded $52,500 in scholarships to six engineers across Canada. The six recipients work in the areas of industrial productivity, water supply, and buildings. The awards are presented annually to engineers who are members in good standing of one of the twelve provincial and territorial associations/ordre that regulate the profession of engineering in Canada. Applicants are evaluated based on several criteria, which include the applicant's previous engineering work experience, the likely benefits of their work to society, and their prior academic performance.

CCPE-Manulife Financial scholarships, valued at $10,000 each, were awarded to Carlo Coscia, Eng., Nick Pfeiffer, P.Eng., and Jianpeng Zhou, P.Eng., to undertake postgraduate studies or research in an engineering field. Evelyne Coulombe, ing., and Vincent Rogers, P.Eng., won the CCPE Meloche Monnex Scholarship and each will be awarded $7,500 to pursue postgraduate studies in a non-engineering field. Scott Benson will receive $7,500 as the recipient of the CCPE Encon Endowment to pursue postgraduate studies and research in engineering failure investigation, risk management, and/or materials testing.

A brief description of each award follows:

- Mr. Coscia, a member of l'Ordre des ingénieurs du Quebec (OIQ), is investigating chemical processes to regenerate hydrochloric acid contained in by-products produced during steel pickling, which could reduce process costs.
- Mr. Pfeiffer is a member of the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) and is conducting research that could lead to new cost-effective techniques for fabricating microconductors.
- Mr. Zhou, who is also a member of APEGBC, is studying a new process to treat biosolids produced by municipal wastewater-treatment plants. The research may allow treated water to be used safely as an agricultural or forest fertilizer.
- Mr. Rogers is licensed by the Association of Professional Engineers, Geologists and Geophysicists of Alberta, and is conducting toxicology assessments of naphthenic acids. The acids are contained in the effluent water produced when bitumen is extracted from Alberta's tar-sands. His work could help engineers to design safer mining processes.
- Ms. Coulombe is also a member of OIQ and pursuing her MBA. Her goal is to use her business and engineering knowledge to participate in international projects involving the treatment of wastewater.
- Mr. Benson is a member of the Association of Professional Engineers of New Brunswick and is investigating the safety of open-web steel joists that could lead to changes in their design. ■

Engineers' Work Changing: Study

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

Work that used to be done by engineers is going increasingly to technologists and technicians with two- or three-year diplomas, a study on engineering career trends shows.

Work has also been reallocated from the skilled trades to technicians and technologists, the report says.

Automation and robotics have cut needs for some skilled tradespeople. However, there has been a corresponding need for technicians to set up, diagnose and repair these systems.

At the same time, the growing use of engineering software means that technologists can now do many design and process control tasks that previously needed engineers.

The study, Trends in Engineering Work, was done by KPMG consultants for the Canadian Technology Human Resources Board. The board is a non-profit group set up to promote national standards for technology workers.

Michael Brennan, the board's executive director, said he hopes the trend will encourage Canadian companies to allow engineers to concentrate on research and design, thus providing challenging work to college or technology institute graduates.

To download an Adobe Acrobat file of this report point your browser to: ***www.cthrb.ca/english/market_research/changingroles/nav/changingroles_fs.htm*** ■

Governance Policy Manual Task-Force

By R.J. Eschenwecker, P.Eng.

In October of 1997, an APEGM Council Governance Manual was initiated. It is based on a set of principles of Policy Governance,, recommended by a model developed by John Carver. Although the process of developing a complete manual for APEGM has been underway for some time, Council has recently appointed a task force to help accelerate the process.

The Manual organizes the policies by which the Council governs the Association under four headings:

- **Ends:** what does this organization produce, for which people and at what cost to society;
- **Governance Process:** the Council's definition of and rules for its own job;
- **Executive Limitations:** the limits of ethics and prudence the Executive Director must adhere to in achieving the 'Ends';
- **Council-Executive Director Relationship:** the Council's delegation and accountability linkage through the Executive Director.

The following diagram shows the headings as quadrants, and displays the concept of depth of responsibility of the various policies:

The task force has seven members, four of whom are Councillors. An opening exists for a Geoscientist.

The team's objective is to "Kickstart the Policy Governance process and create a framework to achieve completion". Decisions regarding policies forwarded to Council for approval are made on a consensus basis. The Mission and Vision statements for our Association were reaffirmed at the April Council meeting. Do you know what they are?

Work is now progressing on Governance Process policies. Work on the manual will continue throughout the rest of this year and into 2001. The team will continue to update the Association as the process moves forward. For more information and/or feedback please forward questions and comments to the team via the APEGM office. ■

Cryogenics Puts the FREEZE on Wear...

By Don Laferriere, Vice-Pres., Polar-Tech Cryogenics Ltd., a Winnipeg firm specializing in deep-freezing techniques to improve wear resistance and reduce stresses in steel tooling, as well as increase kinetic-energy transfer in metal golf clubs and aluminum baseball bats.

In the 1850's, Swiss watchmakers buried balance wheels in snow banks to improve wear and accuracy. A hundred years later, tool and die-makers kept steel in deep freezers and dry ice to increase wear resistance and reduce internal stress. They weren't sure how or why cold treating worked, but they knew that it did.

Then, in the 1970's, deep cold temperatures of -320°F (-196°C) were achieved by pouring liquid nitrogen over steel parts – more often than not shattering them due to thermal shock! Today's cryoprocessors avoid this by very slowly lowering the temperature inside the air chamber, letting the part 'dry-soak' for 20-30 hours, and then slowly returning it to room temperature under computer control.

The Space Age was the real engine that drove cryogenics technology. NASA continues to develop new applications in the electronics and aerospace fields.

The result is stronger, more durable, and more dimensionally stable components that have a service life three, four, or five times longer than previous. At Polar-Tech, we typically see wearability gains in the order of 200-400%, as measured in time between sharpenings, number of hits per stamping die, reductions in downtime, etc.

About the only time we don't see marked improvements is when it is found the part has already been cryogenically treated at the factory. More tool manufacturers are turning to cryogenics and sales are skyrocketing -- contrary to the doom & gloom predictions of industry insiders who feared large-scale cut-backs in reorders of replacement tooling.

However, it wasn't always smooth sailing. Some cryo-treated steels turned out brittle and tended to chip. Processors learned the hard way that they had to heat-temper again after treatment. Today, responsible operators re-temper as a matter of course, but it was years before the tool companies let us forget the mistakes of those early days!

How does it work?

What actually takes place during the cryogenic process that makes metal (and plastics) infinitely stronger and more wear resistant? The main change is the conversion of retained austenite (left over from the original tempering process) into martensite, a harder, tighter grain structure visible under an electron microscope.

A second major change is the rapid precipitation of ultra-fine carbides which fill the microscopic voids in the matrix, resulting in a much denser, longer wearing material.

Third is the reduction of internal stresses caused by ongoing post-temper transformation of austenite into martensite. Wilkinson sword blades hammered out and heat treated 250 years ago have been examined and found to be still undergoing the conversion process.

Tool gauges have been a problem historically because they grow in size as martensite forms. Cryo-treating allows the molecules to realign uniformly by speeding up the conversion, rendering gauges dimensionally stable and more accurate over the long term.

Like the formation of ice crystals, the molecules move into tighter, more homogenous patterns. Cryogenics, in effect, accelerates the aging process and can be viewed as an extension of conventional heat quenching, but at the cold end of the temperature spectrum.

Tools that we treat with beneficial results include: end mills, drill bits, saw blades, bearings, key cutters, taps, dies, gears, gauges, and lathe tools. If it wears, cuts, rubs or rolls, it could be a candidate for cryo-treatment.

A big plus is that once a tool is cryogized it can be pulled out of production, reground, and put back into service with no need for further treatment. Cryogenics is a permanent (not surface) process, a one-time step that lasts the life of the tool.

All of this adds up to potential cost savings for virtually all major industries from mining to manufacturing and agriculture to aerospace. Let's look at some real-world applications, which include, incidentally, distance records achieved in golf and baseball.

Typical applications

Copper alloy electrodes on welding guns last 2x to 3x as long. Brass instruments and guitar strings sound more mellow due to improved resonance. Rifles are much more accurate because barrels are smoother and stress-relieved. Knives have keener edges, hold them longer, and chip less. Circuit boards last longer and have better conductivity ratings.

You can add about 10% to your drives with treated golf clubs. Treated baseball bats do the same. They sound and feel more like wood than metal. Golf balls have a flatter trajectory, less lateral deviation, and roll further.

Stamping tools and dies, punches, cutting blades like slitters and guillotine knives - all are prime candidates for cryogenic processing. Racing engines run 3x to 4x longer between rebuilds and show marked increases in RPM and horsepower after a single treatment.

Carbide tools and inserts tend to double in life expectancy, even though they have no martensite or austenite. This is because of changes to the binder material holding the carbide grains in place. Don't try it with reprocessed carbide, however; it has already been treated during manufacture.

Documented results

A precision stamping company using D2 steel dies was producing 250,000 pieces between regrinds. After processing, that figure increased to 1,500,000 pieces.

A Winnipeg pump manufacturer and a Saskatoon machine shop both reported a 300% life increase on large threading dies.

An aircraft manufacturer was using premium, titanium-coated T15 bits to drill holes in stainless steel components. Average life: 15 holes

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

THIS IS NOTICE that effective April 1, 2000, Michael John Mark, P. Eng., was suspended for 60 days following a conviction on a charge of unskilled practice of professional engineering, and contravention of the Code of Ethics for the Practice of Professional Engineering & Professional Geoscience in accordance with Section 15.6.6 of the By-Laws of the Association of Professional Engineers and Geoscientists of the Province of Manitoba. In addition, the condition was imposed on his practice of engineering that he not seal any work in the mechanical engineering discipline for a period of 120 days following the expiry of the aforementioned 60-day suspension. He was also required to pay the out-of-pocket costs of the investigation of this matter in the amount of $3300.00

The conviction is based upon his providing professional engineering services that were substandard, inadequate and incomplete, thereby failing to effectively fulfill the requirement of the engineering work undertaken, and his failure to provide adequately for the safety of the public.

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

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

NBCC 1995, Part 9, Housing and Small Buildings

The CSA Technical Committee S16, "Limit States Design of Steel Structures" has expressed a concern to the Canadian Commission of Building and Fire Codes relative to a situation existing within the current National Building Code of Canada (NBCC).

The concern of the S16 Committee is that structures that fall within the scope of NBCC Part 9 do not require an engineering analysis for lateral loads, such as those due to wind or earthquake. Resistance to lateral loads is an absolute requirement for all structures.

Large structures in the 600 square metre range and beyond (with appropriate firewalls) and special structures such as fire halls, which have large openings in one elevation, are being constructed using Part 9 of the NBCC without due consideration of lateral effects. These structures could be unsafe and collapse under critical wind or earthquake loading.

The S16 Committee points out that Part 9 of the NBCC was created to answer the need of non-professional users and residential contractors for a prescriptive document directed at their particular housing type. It is intended that other types of buildings that still fall within the scope of Part 9 have their structural members and their connections designed in conformance with Part 4, Structural Design. This will ensure that all lateral loads are appropriately considered.

The S16 Committee has recommended that the NBCC be changed to reflect this intent. ■

Pre-stressed Concrete

By V.L. Dutton, P.Eng. (Ret.)

In the 1920s, following the Great War, the French engineer Eugène Freyssinet began to use reinforced concrete for the construction of hangars. With the development of the dirigible for rapid long-distance travel, hangars having arched roofs with radii of 25 metres were in demand. It was in 1928 that Freyssinet took out the world's first patent for pre-stressed concrete. ■

"Equity" and the Engineer's Dilemma

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recognize that we cannot progress without scientific and engineering invention and production. We must move rapidly away from the current importance attached to technologically unenlightened management hierarchies, from preoccupations with legal-political diversions and from the degradation of the scientifically-based professions or we can look forward to a very rapid decline in our standard of living.

Equity for professionals will require career ladders parallel to the highest plateaus of management if we are not to become a nation of clerical "hewers" and "shufflers of paper products" and other raw resources produced in Canada but "engineered" and "value added" elsewhere. The management of knowledge, resources and public safety by professionals must be recognized as at least equal in value to administration and human resource management. ■

John Parker is a retired engineer who spent many years with the Ontario Department of Health.

April Council Report

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Council rejected the admissions criteria at this time since there's a possibility that they will be revised in the near future. Also, they would not sign the mobility agreement until the matter of admissions criteria is resolved.

Councillor Eschenwecker said it should have happened twenty years ago when he heard about The University of Manitoba's initiative to create an Engineering Design Chair in the faculty. The U of M was asking for Council's endorsement for their initiative. Their proposal stated that engineering education had emphasized science and research in the past at the expense of design. Their thrust would be to develop a design culture at the U of M. They planned to use expertise from industry and to renovate part of the engineering building to accommodate the venture. Funding would come from the University and NSERC, who would be expected to provide $200,000 per year. Council voted to write a letter of support for the U of M proposal.

When Council reviewed the material on "Duty to Report" their reaction was to bring it back to another Council meeting for a full discussion. Their decision is very wise since the subject is sure to send a chill through any engineer. "Duty to Report" means that an engineer must disclose any instance of danger to the public arising from their work. This can put an engineer in a conflict with his or her employer since they are required to maintain professional confidentiality also. Councillor Matthews said that this situation applies particularly to geoscientists.

The meeting concluded with discussion of yet another appeal, this time from an EIT who felt the Registration Committee had not given sufficient credit for work experience. At first it seemed there was no process for such an appeal. Matters became very confused because people were confusing an appeal from the public about a member with an appeal by a member on Association process – two very different situations. Finally, it became clear that in this case the EIT could personally appeal to the full Council. ■

Tendering Trials

Owners' freedom to accept bids is curtailed

The recent decision of the Supreme Court of Canada in the case of MJB Enterprises Ltd. v. Defence Construction (1951) Ltd. is a significant development in Canadian tendering law. It has substantially refined the principles relating to construction-bidding that were established in the Court's previous watershed decision of 1981 in The Queen in Right of Ontario v. Ron Engineering & Construction (Eastern) Ltd..

MJB Enterprises' tender for a construction project on a Canadian Armed Forces base was the lowest of several that properly conformed to the requirements of the tender documents. However, the owner awarded the construction contract to a tenderer with a lower price whose bid was non-compliant because it included a qualification in the form of a handwritten note (the note outlined a schedule of final costs). The tender document required that tenderers submit only one price.

In the earlier case involving Ron Engineering, the court had decided that the bidding process involves two levels of contract. Contract A arises when a bidder submits a tender; the contract exists between the owner and each bidder, and its terms are the provisions of the tender documents. Contract B is the construction contract between the owner and the successful bidder. The significance of the Contract A/Contract B analysis in the earlier decision was that it established that contractual rights and responsibilities arise in the tendering process before the award of the tendered contract. Subsequently other courts took this approach further to mean that the owner had an implied duty to be fair to all the bidders in the tendering process.

In allowing MJB's appeal against the owner in the new case, the Supreme Court of Canada reached the following conclusions.

1. It was decided that a tendering Contract A does arise if it is the clear intention of the parties to initiate contractual relations by submitting a tender in response to the invitation to do so. Thus, although a Contract A will usually arise, it will not always do so simply upon the submission of a tender. On the other hand (and contrary to the previous theory), a tender does not have to be irrevocable in order for Contract A to exist.

The confirmation that Contract A can still exist even when a tender is revocable potentially expands the situations to which the Contract A/Contract B analysis may be applied. It now can apply to a wider range of tenders, requests for proposals and expression-of-interest situations between owners and contractors, and between contractors and subcontractors.

2. The privilege clause of the tender documents (which provided that the lowest or any tender would not necessarily be accepted) did not operate to preserve the owner's right to consider accepting an invalid tender, i.e. one that did not comply with the requirements of the tender documents. In this specific case, the owner's Contract A with MJB included an implied term that the owner would accept only a compliant tender. The owner could accept a tender other than the lowest-price tender if it saw fit, but such a tender had to comply with the tender rules.

The decision indicates that owners must disallow any non-compliant tender, not just one that contains fundamental problems such as uncertainty as to bid price. It appears that the combination of the privilege clause and related provisions stating that errors, qualifications, etc., in the tender may (but not must) be the cause of rejection of the tender may no longer suffice to allow the owner to waive irregularities in considering a bid.

If so, the MJB Enterprises case will significantly restrict the owner's flexibility. It will also complicate the tendering process since, on many projects, some or all of the tenders contain errors. The results of this decision may be delays in the tendering phase of construction projects due to a need for retendering, and budgetary problems arising from owners' inability to award contracts to tenderers who might otherwise be acceptable.

Even though the owner did not have a positive obligation to award Contract B (the construction contract) to the lowest compliant tender (MJB), according to the judgement the owner's conduct in awarding the job to a non-compliant tenderer was a breach of the owner's Contract A with MJB.

As for damages awarded to MJB, the Court decided they should be measured by the company's expectation of projected loss of profit on Contract B, rather than based on the lesser amount of the expenses they had wasted on preparing the tender. This decision further emphasized that owners risk incurring high costs if they do not enforce their own tender-form requirements. ■

J. Marc MacEwing
Shapiro Hankinson & Knutson
Barrister and Solicitors, Vancouver

Cryogenics Puts the FREEZE on Wear

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before the drill lost tolerance. Using standard cryogenically treated and ground M2 drills, tool life increased to 200 holes between regrinds, saving $150,000 /year.

After having their tools treated on a regular basis, a job shop recorded a 50% drop in new tool orders. Annual savings: $30,000.

A Winnipeg printer used to get 3 days out of his guillotine knives. Now he gets 7-8 days.

A job shop cutting various ferrous and SST metals found that cryogenic treating of saw blades extended wear life 400 to 500%.

A car wash brush manufacturer in Regina uses a slitter blade to cut the centre tube. By switching to treated D2 tool steel, time between sharpenings went from 1 to 21 days.

Getting started

Cryogenic processing has come a long way in the past 30 years. There is enough test data now to persuade even the most skeptical of us that almost unbelievable improvements in wear resistance and stress relieving are possible with a variety of metals and plastics.

It is important that the people doing the cryo-processing are knowledgeable and that their equipment meets rigid specifications. Any new field attracts quick-buck operators, so be cautious and ask to see documentation if the claims seem just too good to be true.

Request experimental runs for your own parts and tooling. This can sometimes be arranged with your processor at cost. Be prepared to track the results over several months. Remember, one treatment is all that's required.

Once you have documented your own in-house experience with cryogenics, you will know the kinds of savings to expect. We get involved in the evaluation phase by setting up pilot program tracking systems that yield the hard data upon which to base your final decision.

For more information, pick up Cryogenics, by William Bryson (Hanser Gardner 1999). A well-illustrated guide full of actual production case histories. Highly recommended! ■

Call for Nominations for Election to APEGM Council

Nominations for election to the Council in four professional engineer and two professional geoscientist positions will be received up until September 15, 2000.

Nominations must be made upon a form available from the Association office and shall be signed by the nominator and six other members. The written consent of the nominee must also be provided. Nominees qualified as both a professional engineer and a professional geoscientist are only eligible for election in one category and must stipulate in which category they wish to stand.

Nominations must be received in the Association office **on or before Friday, September 15, 2000.** 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 (preferably not to exceed 100 words). Forms for the resume are also available from the Association office. ■

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