

Professional Engineer



World's Largest Caméré-Curtain Dam at Lockport Named a National Historic Site

By: P.V. Harding, P.Eng., C.B. Colp, P.Eng., and W.G. McKay, P.Eng. (Ret.)

On September 16, 1995, in a ceremony sponsored by the Historic Sites and Monuments Board of Canada, the St. Andrews Lock and Dam were designated a National Historic Site. The Historic Sites and Monuments Board (H.S. & M.B.) is an advisory body to the Minister of Canadian Heritage. For this occasion, Dr. M. Kinneer, Manitoba Representative on the H.S. & M.B., acted as Chair.

Of possible interest to the readers of the MPE are the presentations of Ms. P.V. Harding, P.Eng., Manager, Engineering Facilities and Mr. C.B. Colp, P.Eng., Project Manager, Marine Facilities, Public Works of Canada, of Edmonton and Winnipeg respectively. Public Works has been involved in the repair and reconstruction of the facilities over the past seven years.

The following are excerpts from their presentations made at the official ceremony:

Design & Construction

Let us look back to the mid-1800s when rivers were a key element of community life. In 1862, steamboat freight service was established on the Red River between St. Paul, Minnesota and Winnipeg. Interest grew to extend this route further north into Lake Winnipeg in order to gain access to its natural resources. However, during times of low water levels, river passage was obstructed by the St. Andrews Rapids. The cost of overland portaging between Selkirk and Winnipeg

prompted local businessmen to pressure the federal government. Petitions were sent to Ottawa from various business groups and individuals.

The promise for the construction of canal works came during the general election of 1900 and the project was assigned to the Department of Public Works.

The design was under Mr. A. St. Laurent with Mr. E. Dufresne, Design Engineer and Mr. E.A. Forward, Resident Engineer.

The site was chosen at Lockport where there was a long bend in the river which would allow for a channel to be cut for a lock. Also, there was a natural fault in the rock strata of the river bed which could give easy access to bedrock for the footings of the piers.

The designers looked to France for a prototype as French engineers have been faced with similar problems on their rivers and had constructed the first moveable dam on the Yuvonne River in 1834. Two caméré-curtain bridge dams built in France in the 1880's attracted the attention of the Canadian engineers. Though the French Curtain Dams were quite massive for their time, neither one of them approached the scale of the moveable dam planned for St. Andrews.

Sod was turned on October 8th, 1900, and the first contractor was Mr. T. Kelly, who was responsible for the first stages of the excavation of the lock. The initial construction organization was

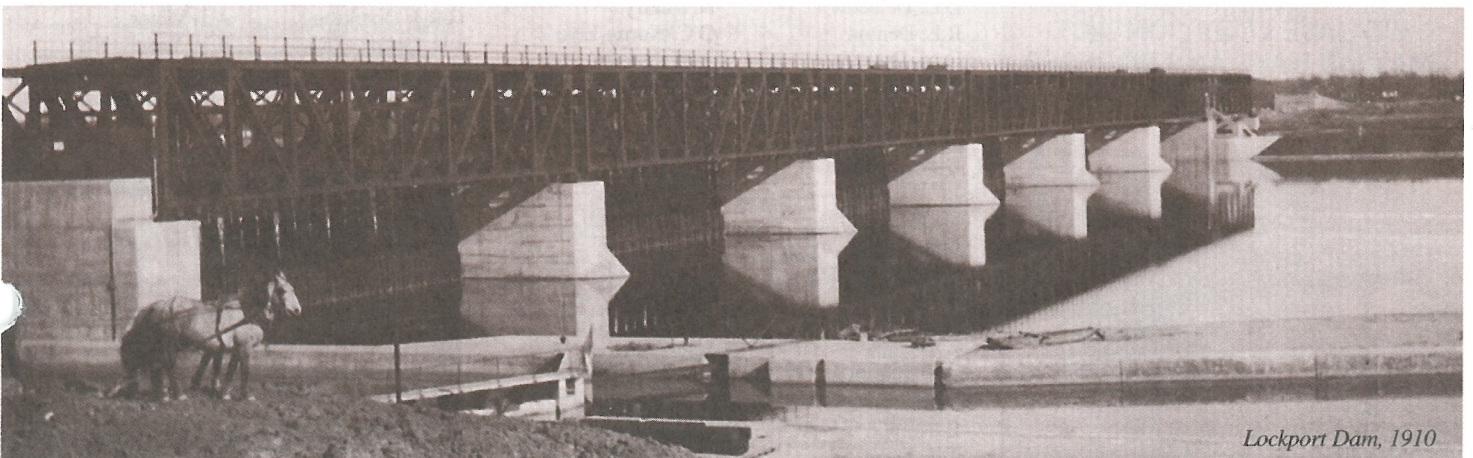
very rudimentary – horses, steam shovels and men. Labourers were paid 15 cents an hour for unskilled, 25 cents an hour for skilled labour, while men with teams were paid \$2.50 a day for a 12-hour day.

The project proved to be a test for Kelly as the job seemed thwarted by small failures and slow-downs. In fact, work was so slow that by 1905 the public was referring to the site as "Kelly's Hole". Mr. Kelly was finally relieved of his contract and it was awarded to Messrs. Quinlan and Robertson.

Messrs. Quinlan and Robertson proceeded with the building of the lock, bridge piers and submerged dam from 1905 to 1909. The lock was constructed in 1907. Excavation for the dam commenced in 1907 and the concrete work was completed by 1909. Double shifts went round the clock to provide continuous pours for the sections of the dam.

The bridge superstructure, caméré curtains, and operating machinery of the dam were designed by a consulting engineer, Mr. H.E. Vautelet. Manitoba Bridge Company furnished the material and Brown Concrete did the construction of the main bridge in 1908. The lock gates were fashioned and built by Mr. J. Burns. The removable part of the dam was supplied and erected by Canada Foundry, which put the dam in operation by May 10, 1910 and handed it over to the government one week later.

Continued on page 10



Lockport Dam, 1910

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**WE HAVE LOST CONTACT.
MAY WE HAVE AN ADDRESS?**



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Canadian Academy of Engineering Elects New President

Angus Andrew Bruneau, P.Eng., Chairman, President and Chief Executive Officer of Fortis, Inc. was elected President of the Canadian Academy of Engineering at its annual general meeting held in June, 1995.

Dr. Bruneau, Officer of the Order of Canada, 1983, is a founding member of the Academy, which was established in 1987 as the senior national body of distinguished Canadian engineers. Its main objective is to enhance, through the application and adaptation of science and engineering principles, the promotion of well-being and the creation of wealth in Canada, and to recognize excellence in engineering contributions to Canadian society. Election to Fellowship in the Academy is the highest recognition of merit granted to an engineer by his peers and is limited to a total of 250 Fellows.

Dr. Bruneau graduated with a B.A. Sc. in Engineering Physics in 1958 from the University of Toronto and received a Ph.D. in physical metallurgy from the University of London in 1962.

His early career was in the academic world. He served as Director of General Engineering at the University of Waterloo, Founding Dean of Engineering at Memorial University of Newfoundland, and, later, Vice-President, Professional Schools and Community Services, at the same university.

Dr. Bruneau became active in the business world in 1969. He became a director in a number of major organizations in Canada, many of which are in the Maritimes and Newfoundland. He has received much recognition within and beyond the profession, including the CCPE gold medal. □

TRANSFERS OUT DECEMBER 31, 1995

J.C. Bouchart	C.L. McGinn
R.R. Brodeur	H.A.C. Perera
A.H. Duffield	R.G. Thom

EIT RESIGNATIONS DECEMBER 31, 1995

C. Bundus	J. Lukaseder
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RESIGNATIONS DECEMBER 31, 1995

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F.L. Berard	E.D. Lidfors
R.G. Boehnke	D.N.P. Matthews
C.W. Booy	T.J. McCann
P.J. Broad	T.C. McCavour
J.J. Brummer	T.L. McDougall
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A.T. Kaita	V.D. Warrior
A.J. Kaminker	D.B. Whittaker
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E. Kuiper	C.T. Williams
T.N. Kvist	

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J.E. Burson (TX)	G.V. Nagel (MN)
J.A. Carter (ON)	M.C. Sekerak (ON)
W.K. Cody (MN)	R.F. Williamson (IA)

ENGINEERS-IN-TRAINING ENROLLED NOVEMBER & DECEMBER, 1995

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R. Cameron	M.J. Samuda
T.B. Epp	R.B. Schilling
S.J. Fletcher	D.C. Schuster
E.W. Kowalyk	P.A. Wishart
J.P. Nosé	

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M. Bima	J.P. O'Driscoll
D.A. Coleman	G.A. Proteau
C.F. Connors	M.G. Renaud (PQ)
R.R. Deighton	R.E. Stutsky
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G.R.J. Doerksen	A.J. Victor
J.H. Goertz (SK)	R.B. Welch (NB)
K.M. Harb	W.H.C. Bobyk
J.P.W. Kidd	J.R. Wonnacott
T.A. Lock	

In Memoriam

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

N. Bercuson	W. Greenfield
D.R. Grimes	K.K. Singh

President's Message

C.L. Stewart,
P.Eng.



Visions!

A number of articles have already been written on the visioning process started by CCPE in November 1994. The challenge to the profession is to adapt our regulatory and governance models to fit the fundamental changes that are occurring in society. We need to cast aside the paradigms of the last 75 years and develop a vision that will take the profession into the 21st century. Creating a new vision does not necessarily mean wholesale change. But as Daniel Verreault, CCPE President, says, "It is essential that we come to terms with what a modern society expects of its engineers and what engineers can and should expect of their profession." Our role in applying science to solve problems and create value will continue, but the context in which we fulfill that role will change.

To date, the visioning process has occurred at the National level, to prevent the vision from having a regionalized approach and to ensure it will reflect a national perspective. The work has involved participants from across Canada, engineers from each constituent association (five from APEM), engineering students, national represen-

tatives from related engineering associations, and stakeholders.

Part of this process included a survey to gather the opinions and perceptions of engineers across Canada on the future of the profession. I thought you might be interested in some of the results from the survey.

435 people were surveyed, by telephone: 92% male, 8% female. 75% were employee engineers, 12% were self-employed and 6% were retired.

There were three issues identified as being very important to the future of the profession:

- the quality of work done by engineers (79%)
- the quality of engineering education at the University level (57%)
- the ability to work in teams with members of other professions (50%)

Ninety percent of the respondents said the core components of the profession include ethical behaviour, respect for the laws governing the profession and a sense of self-discipline. Seventy-nine percent of the respondents believe that self-regulation is the most appropriate regulatory model for engineering.

On the subject of continuing competence there was some divergence of opinion. Of the professional engineers, 50% thought that continuing competence should be mandatory and 48% thought it should be voluntary. However, of the Association Council members surveyed, 66% thought it should be mandatory; and of those belonging to other public associations (lawyers, chemists, architects, etc.) 100% thought it should be mandatory. Of the professional engineers surveyed, 65% reported that they were involved in either formal (short courses, seminars, technical meetings, graduate courses) or informal (reading

& publication of technical papers, presentations, patents) professional development.

I am sure that your Council will consider these ideas and other details in the survey, prior to the 1996 Long-Range Planning session, which will have been held by the time this article is published. Your Council will also be participating in a special meeting with representatives from CCPE to discuss the elements of the vision.

The CCPE consultation team has three objectives for this meeting:

- 1) to review and discuss the vision and its elements,
- 2) to share and discuss the strategic issues currently facing the profession, and
- 3) to develop an implementation framework.

This may sound like all the decisions will be taken before YOU have a chance to participate. However, I am sure that many of you have some thoughts and opinions on the direction in which the profession should be moving. I was pleased to receive several letters, after the annual general meeting, regarding the accountability session. Keep those letters coming! I would encourage you to contact me, any of the other Council members, or your CCPE director, Doug Chapman – or to fax your thoughts to APEM at 942-3718. □

Engineers In The News

By: S.M. Matile, P.Eng.

Dr. S. (Bala) Balakrishnan, P.Eng., received a U of M 1995 Outreach Award for his outreach to engineers, educators, dignitaries, industrialists and school children.

In 1989, Dr. Balakrishnan won the Wighton Fellowship for developing a distinctive undergraduate laboratory facility to teach automated material-handling and production techniques. The laboratory facilities have continued to expand to include innovative research-and-development projects which have attracted and excited visitors of all ages.

Peter Stumpf, EIT, Dr. Neil Popplewell, P.Eng., Dr. Arvind Shah, P.Eng., and Dr. S. Balakrishnan, P.Eng. will be receiving the Society for Experimental Mechanics Inc's 1994 Outstanding Paper Award for their "Automated Wind Tunnel Measurements" paper. The award will be presented in June, 1996 in Nashville, Tennessee.

Walter Muzyczka, P. Eng., recently received the Manitoba Hydro Professional Engineers Association's (MHPEA's) 1994-95 Engineering Safety Award. This award is presented annually to a

member of the MHPEA who has shown outstanding leadership in the development of methods or programs to reduce the risk of injury or improve occupational health.

Walter's achievement was the design of a unique segmental lightweight aluminum platform for the inspection and servicing of hard-to-reach generator components.

J.R. Cousin Consultants Ltd., a Winnipeg engineering firm, has received an Association of Consulting Engineers of Canada (ACEC) Engineering Award of Excellence for the Ste. Agathe Water Pipeline project in the R.M. Of Ritchot. The ACEC Engineering Award of Excellence, one of three awarded nationally, was presented in Ottawa to **Jerry Cousin, P.Eng.**, for exemplary engineering design in the Civil Engineering category.

Earlier in 1995, this project also received the Sustainable Development Award as it resolved environmental problems and provided a proper utilization of a high-quality resource to a water-starved area. □

Letter to the Editor

Sir:

When the 75th Anniversary Committee placed their order with Durand et Cie for the embossed Le Chablis wine glasses, it is highly improbable that they would have known that France was about to begin a series of nuclear tests in the South Pacific.

With the Code of Ethics requiring us to give major consideration to the protection of the environment as it does, I trust that this is the last order for things French (including wines and cheeses for the President's annual Reception) to be placed by any of our committees.

Sincerely,

Vernon L. Dutton, P.Eng. (Ret.)



Research and Development

APEM Luncheon Meeting, September 14, 1995

Refurbishment of Spacer-Dampers in Manitoba's HVDC Transmission Line

By: E.E. Lach, P.Eng.

Manitoba Hydro's HVDC Transmission Line has been in service for approximately 25 years. It was constructed between 1967 and 1971, when Manitoba Hydro became concerned about the condition of the natural-rubber bushings in the spacer-dampers.

Houston & Company Inc., an Ontario consultant with over 35 years of related experience, was contracted to conduct a vibration investigation of the 500-kv D.C. Transmission Lines. The company carried out the investigation using Manitoba Hydro personnel and the testing capabilities of the Industrial Technology Centre (ITC), with technical support and assistance by the Centre's Research Engineer, Joe Begin.

Background

The HVDC transmission lines transmit approximately 80% of the province's hydro-electric power. Therefore, in addition to the technical challenges resulting from a line outage, the economic impact to the Utility would be in the order of \$10,000 per hour. The focus of the investigation was the vibration-protection system for the two-conductor bundle (450 mm spacing). The spacer-damper is a unique, aluminum, three-unit assembly, consisting of a horizontal bar with bolted, energy-absorbing elastomer elements at each end where it is connected to short curved arms that extend upward and clamp onto twin (450-mm spacing) conductors. The spacer-dampers were produced by Dunlop U.K. and utilize a spacing system, along the line, developed by Teshmont Consultants for Atomic Energy of Canada Limited. The system has been largely successful, with no reported conductor-fatigue damage. There were, however, reports of loos-

ened clamps with isolated conductor damage, fatigue failure of a number of 'slender' tower-arm-bracing members and apparent failure of the elastomeric element in some spacer-dampers.

In 1988 a diagonal or web member of a transmission-line tower crossarm was found broken at the upper connection where it bolted to the top chord of the crossarm. The failure was confirmed as due to fatigue and service linesmen reported that this member was observed vibrating under certain conditions. This led to the site inspection of 150 towers by Manitoba Hydro. Fifteen percent of the towers inspected exhibited the fatigue failure of the tower-arm web members. Manitoba Hydro consequently set up a test section of the upper part of the transmission-line tower for full-scale experimental modal analysis, using accelerometers and conductor loadings incorporating modulated hydraulic shakers. In addition, the Industrial Technology Centre (ITC) was commissioned to conduct a finite-element analysis of the tower. When the data from the full-scale test were fed into the finite-element model, the tower web-member could be observed on the computer monitor to vibrate just as it had been observed in the field. Further, since the failure line (crack) extended through a bolt hole (and therefore under a bolthead), it was not feasible to measure the critical stress with a strain gage.

However, with the computer model, the stress level and failure location were established - matching the field observations.

As a result of the combination of full-scale testing and finite-element analysis, Manitoba Hydro and the ITC were equipped to design a bracing kit for the tower-arm web member.

Exciting!

It was during this part of the presentation that Mr. Begin showed some James Bond-type photos, in which helicopters hovered over transmission-line towers with grounding-cable drop-lines to conductors, suspended ladders and speck-sized linesmen crawling along tower crossarms and conductors. The heli-

copters were used in the crossarm and spacer-damper inspections.

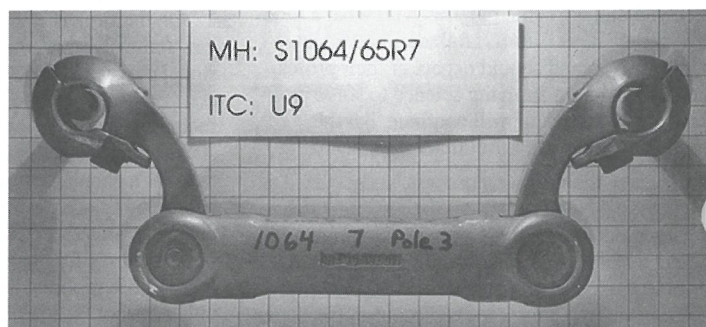
Vibration Investigation Program

Following field vibration-monitoring of four conductor spans, under both summer and winter conditions, Houston & Company were authorized to investigate:

- Residual life of spacer-damper population.
- Rehabilitation possibilities for existing spacer-dampers.
- Source of energy causing tower-arm member failure and possibility of reducing driving energy.
- The advisability of adopting a revised spacing system for spacer-dampers.

Residual-Life Testing - Spacer Dampers

The helicopter inspection mission in 1992 also yielded 25 spacer-dampers (50 elastomer elements) for residual-life assessment and Manitoba Hydro's inventory (since 1967) of five unused spacer-dampers (ten elastomer elements) provided the reference sample.



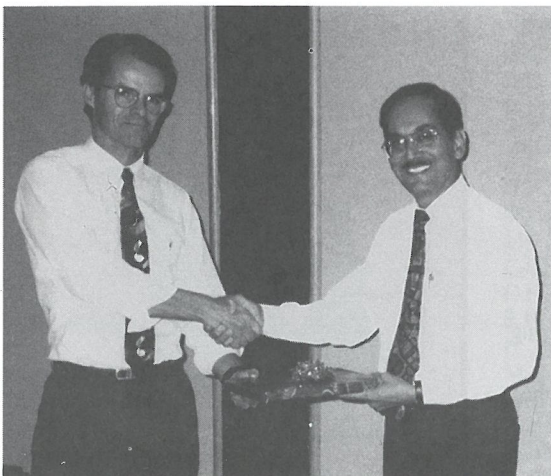
A spacer-damper.

In a free-wheeling discussion, not unlike the coffee-break sketches of the lunar-mission spider that moved NASA into the lead in putting the first man on the moon, the ITC came up with the testing equipment that made it feasible to test the 60 elements to the failure criterion of 6,000,000 cycles at 3 Hz. The solution was to use Ford V8 engine-blocks to provide the reciprocating motion that resulted in the necessary angular strain in the spacer-damper element. Each of two engine-blocks could fatigue-test eight spacer-damper elements and, at 3 Hz, it required approximately 24 days to reach the six-million-cycle level.

The fatigue-testing equipment developed by the Industrial Technology Centre was fitted with a sophisticated data-acquisition system that provided the data necessary for performance and failure assessment. The failure mechanism was failure of the elastomer adjacent to the aluminum core-sleeve.

The test data permitted Houston & Company to arrive at design-life predictions (25% of the elastomer elements between 20 and 36 months from the collection date). However, the test data also revealed that, after bond failure in the elastomer unit, the damping continues (albeit in a different mode) for millions of cycles - until the elastomer surfaces are worn away and the arms

Continued on page 12



Kedar Tandon (r) thanks Joe Begin.

Pay Your Dues!

Dues invoices have been mailed to all members and EITs. Members are again reminded that receipt of dues in the Association office after February 29th, 1996 will incur a late payment administration fee of \$50.00. If fees are mailed prior to February 29th and received after February 29th, the late payment fee will apply.

Members

Members are reminded that if all fees owing are not received in the Association office before July 1st, 1996, your name will be removed from the register and you will then be prohibited, by law, from practising engineering in Manitoba.

EITs

EITs are reminded that if all dues and fees are not received in the Association office before July 1, 1996, your name will be removed from the roll of Engineers-in-Training. Should that occur it will be necessary for you to reinstate as an Engineer-in-Training. You will also be required to fulfill the 1996 requirements before becoming eligible for registration as a professional engineer. □

Meet Your New President: Cathy L. Stewart, P.Eng.

By: C.M-L. Kelly, P.Eng.

At the Annual General Meeting in October, Cathy Stewart, P. Eng., became the first female president of APEM in its 75 year history.

Cathy's career began as a chemical technologist in INCO's Thompson Refinery in 1974. She is currently the Supervising Metallurgist for the Refinery Technical Services group. Combining a career and a very active social life, which includes being a Bronze Life Master in duplicate bridge, has demonstrated just some of Cathy's capabilities and her desire to give back to her community.

Cathy was born in Winnipeg in the early 1950s and she spent her first 20 years there. Her father, Alan, an electrical technician and entrepreneur, and her mother, Rose-Marie, a strong woman, very involved in the community, provided the tools with which Cathy would quickly build the foundation to a successful career. After obtaining her Chemical Technology Diploma from Red River Community College, she began her career with INCO, Manitoba Division in Thompson, in 1974. The following eight years of work included increasing responsibilities on hydrometallurgical and electrometallurgical projects. Then Cathy and her husband, Wayne Stewart, returned to school to earn degrees in Chemical Engineering from the University of Ottawa. They graduated in 1985 (magna cum laude) and became registered as professional engineers in 1987. Cathy, along with others, began building what would become in 1992, the Thompson Chapter of the APEM. During this

period, Cathy served the Chapter as Vice-Chair in 1988 and Chair in 1989. She was first elected to Council in October 1991, and re-elected in 1993. Now, Cathy has become the first female and Northern representative to serve as President of APEM.

Beyond her professional place in society, Cathy has made many contributions to Thompson's community through her social involvement. She has spent 15 years with the Thompson Youth Bowling Association, as coach and on the local and Provincial executives. She has also been involved in fund-raising activities for her favourite charity, the Heart & Stroke Foundation. Cathy has been a Brown Owl and assisted with Brownies and Cub camps. She still assists with Brownie-badge testing. In June, 1995, Cathy delivered a seminar on "Science for Girls" at the Provincial Guiding Conference held in Thompson. Cathy is also on the local executive of the Thompson Bridge Club and is President of the Northern Manitoba Bridge Unit. In her spare time, Cathy curls, plays volleyball, plays social and competitive bridge, and once a month you can hear her voice on CBC's weekend book club.

As Cathy would say, "You get out of life what you put into it. If you are serving others you need not be bored". Following her parents' example, Cathy has given much and is now beginning to enjoy what she deserves... an occasional canoe ride just to listen to the loons.

Congratulations, Cathy, from the Thompson Chapter! □

Meet Your New Councillor – Don Spangelo, P.Eng.

By: J.W. Bogan, P.Eng.

One of the Association's newest councillors is Don Spangelo. Don was elected to Council in October of last year. Prior to that, Don served with the Publication Committee from 1982 until 1989, the Legislative Committee from 1989 to the present, and the Disciplinary Committee from 1993, where he still serves as an active member.

Don graduated from the University of Manitoba in 1981. I first met Don while we were both employed with Dominion Bridge in Winnipeg. Don worked in the Construction Department there for three years. He later moved to Crosier Kilgour Partners Ltd., where he stayed until 1992. At that time, Don gained employment with Manitoba Hydro, in the Transmission and Civil Department as a Civil Design Engineer. He is, at present, involved with the North Central Project, where Manitoba Hydro is providing switch-yards (substations) for northern communities which

currently rely on diesel generators and where limited household power is available. Don is also involved in Hydro's building designs and new control-centres.

Don is married to Pat Karras-Spangelo (also a member of this Association) and they have three daughters, aged three, seven, and nine. These days, Don's favourite pastime usually includes driving his kids to their many activities. When spare time is available, Don works on finishing a cottage at Victoria Beach. The project was started in November, 1994 and Don's work has progressed through the year. Once completed, it will provide an opportunity for winter and summer getaways.

So far, Don has enjoyed his brief time spent on Council activities. It has provided him with an opportunity to learn how the Association operates. He does not see any major issues at present, but wants to pursue the development of profes-



Councillor Don Spangelo

sionalism and protect the public according to the Association's mandate. Don has also been appointed liaison Councillor for the Westman Chapter and looks forward to his involvement with the Association's members there. □

U of M Hydraulics Research and Testing Facility Makes Waves

By: H.F. Lobo, EIT

On October 6, 1995 the grand opening of the Hydraulics Research and Testing Facility (HRTF) took place at the University of Manitoba. Some of the distinguished guests present were Dr. Arnold Naimark, President of the University of Manitoba, Mr. Robert Brennan, President and CEO of Manitoba Hydro, and the Honourable Jim Downey, Deputy Premier.

In the February, 1995 MPE, it was mentioned that a plan was underway to re-build the existing facility to include a constant-head tank, a new variable-slope flume and a random-wave flume, and to add state-of-the-art electronic instrumentation to complete the package.

The claim was made and accomplished by Dr. John (Jay) Doering, P.Eng., whose background is well-suited to this enormous task. Having graduated from Queen's University in 1984 with first-class honors in Civil Engineering, he received an NSERC '67 post-graduate scholarship. This allowed him to conduct graduate work at Dalhousie University in Physical Oceanography – in particular, Coastal Hydraulics, in which he received his Ph.D in 1988. His hydraulics laboratory training was received at the Canada Centre for Inland Waters (CCIW) in Burlington, Ontario, where he served as a research scientist from 1988 – 1990. After that, John decided to do some private consulting for a year, before accepting a position as a Civil Engineering professor at McMaster University (1991-93). John moved to the Civil Engineering department at the U of M in 1993.

The final specifications for the 650-sq.m. (7,000 sq.ft.) hydraulics laboratory are:

Random Wave Flume:

- 34-m-long x 1.5-m-wide x 1.5-m-deep flume.

- "wet back" position-type wave-board.
- software which incorporates second-order correction of spurious waves.
- 40 h.p. pump; 40 US GPM & 2500 psi capacity.

Variable-Slope Flume:

- 14.6-m-long x 1-m-wide x 0.75-m-deep flume.
- vertical headgate with louvered tailgate.
- 0 – 2% slope range.
- maximum flow rate 0.38 m³/sec.

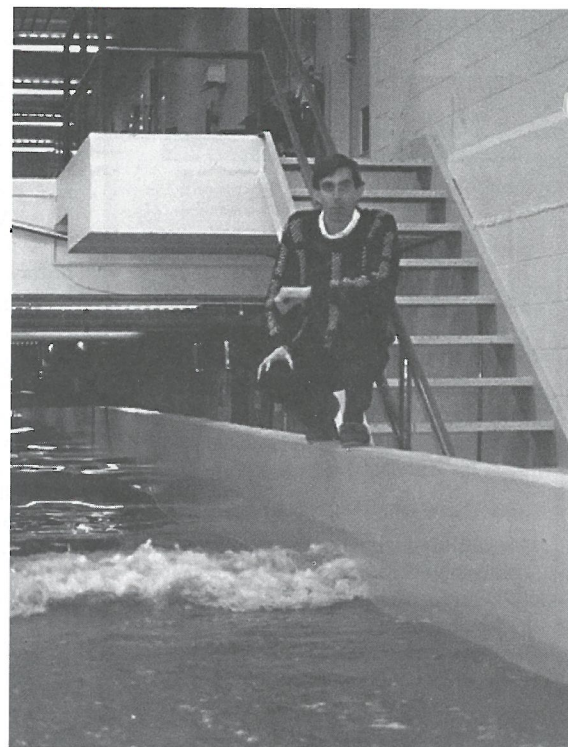
Constant-Head Tank:

- 20-m³ reservoir drained by 80 m sharp-crested weir.
- two pumps which circulate a discharge of 0.45 m³/sec. through two 28-m³ volumetric tanks in a closed system.
- flow regulated by 50:1 turn butterfly valves.
- flow monitored by MSR electro-magnetic flow meter (flow stable to +/- 1 l/sec).

and Hydraulic Model Flume:

- 14-m-long x 1-m-wide x 0.75-m-deep flume with louvered tailgate.
- maximum flow rate 0.38 m³/sec.

Water is supplied by a choice of pumps: one 60 H.P. (3600 GPM) and the other 75 H.P. (4500 GPM). The water is distributed via 16-inch PVC pipes throughout this system, excluding the Random Wave Flume which operates separately. (Incidentally, the plumbing alone amounted to some \$45,000.) It should be noted that the servo-



John Doering on random-wave flume.

hydraulic piston-type waveboard was designed by John Doering.

Funding for this project (\$300,000) was provided by the Natural Sciences and Engineering Research Council (NSERC) Canada, Manitoba Hydro, and the University of Manitoba. The new facility will allow the University to train graduate students and will provide local industry with the opportunity to conduct research. This centre will become a hub of activity once industry realizes the benefits of hydraulics research. The lab's new capabilities will enable the conduct of research on such concerns as changing shorelines, riverbank erosion, culvert redesign, the design of weirs to enable spawning fish to navigate upstream, and the design of more-efficient sewer systems or hydro-dams. Although the facility will be managed by a Board of Advisors, access can be obtained through Dr. John Doering in the Civil & Geological Engineering Department at the University of Manitoba.

Professor Doering and his graduate student, Kevin Gawne, are currently developing an acoustic method of turbine calibration, to make sure that peak efficiency is utilized in hydro-electric power generation. (Using more water does not necessarily translate into better performance. In fact, if the peak efficiency of a turbine is exceeded, there could be a significant cost.) Hence, efforts to optimize turbine power generation usage through these techniques would bring huge savings to companies involved in this area. Funding for this research, to the tune of \$80,000, has been provided by NSERC and Manitoba Hydro. The team is also working with a firm in Dartmouth, Nova Scotia called Focal Technology.

This is a truly state-of-the-art facility – one which will be an invaluable resource to the local community. □

Your Council 1995-96



Back Row (from left): Arnold Permut, Don Spangelo, Vice-President Mal Symonds, Joe Lucas, Ron Britton, Bonnie Thomson, Stuart Ursel, Peter Washchyshyn. Seated (from left): Carol Roberts, President Cathy Stewart, Brian Stimpson. Missing: Ertrice Eddy, Don Osman

Professional Development

Continuing Professional Development: Planning the Partnership

By: G. Ouellette, P.Eng.

The annual dinner meeting of the University of Manitoba Faculty of Engineering with the APEM Council and University Liaison Committee was held on December 12, 1995 in the Tartan Room, Pembina Hall.

The evening's program started at 6:00 p.m. Glenn Morris presided over the opening of the meeting. Don Shields, Dean of Engineering, and Cathy Stewart, President of APEM were both introduced and made brief welcoming remarks.

The topic for discussion chosen for this year's dinner meeting was continuing professional development. The topic was a timely one. The APEM Professional Development Committee had presented a brief at this year's Annual General Meeting on continuing professional development activities by members of the Association. The topic is also of great interest to the Faculty of Engineering. The Faculty is currently investigating ways and means of providing continuing engineering education to professionals and off-campus students in remote locations.

The meeting provided an excellent forum for both the educators and professionals to inform one another of their needs and requirements with respect to continuing education and professional development.

Three speakers were invited to make presentations at the meeting. The first speaker was Doug Kramble, P.Eng., Chair of the Professional Development Committee. Doug presented the Committee's position on the importance and necessity of continuing professional development. It is the Association's only way to ensure continued competence of its members. Most self-regulating bod-

ies are currently experiencing close public scrutiny by governments, the media and advocacy groups. Generally, the public perceives self-regulating bodies as protecting their own members and not adequately protecting the public from delinquent members. The Committee is of the opinion that continuing professional development and education, and mandatory reporting of such activities, would go a long way toward changing the public's perception. The engineering profession would be seen as a profession that is actively protecting the public by ensuring that its members are upgrading their skills and keeping abreast of new developments in the fields of engineering.

Glenn Morris, Associate Dean, the second speaker, briefly reported on the Faculty's recent activities relating to continuing engineering education. The Faculty's main thrust is in the area of multi-media distance education. Distance engineering education will become a reality on January 2, 1996 as Ron Britton and a colleague from the University of Saskatchewan will begin the joint teaching of a course that will be available to students on both campuses. The Faculty will also be co-ordinating its continuing-education efforts with the University's Continuing Education Department.

The third participant in the evening's program was Len Dacombe, P.Eng., Director, Data Networking & Software, TRILabs Winnipeg. The TRILabs research facilities in Western Canada, are government-university-industry-sponsored research facilities specializing in the field of telecommunications. Len demonstrated how multi-media distance education work-stations can be used in medical practice where medical

advice may be provided from a distance through the use of audio-visual equipment.

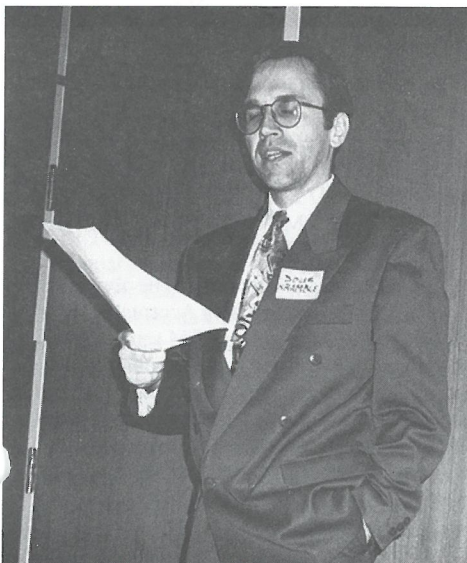
Group discussions followed the presentations. The discussions were held during dinner. The questions for discussions were as follows:

- What kinds of activities qualify as professional development activities?
- What types of subject matter should qualify as professional development?
- Should the reporting of professional development activity be mandatory?
- Should professional development activity be mandatory. If so, how much?
- What role could the University of Manitoba's Faculty of Engineering play in delivering professional development activities to professional engineers?

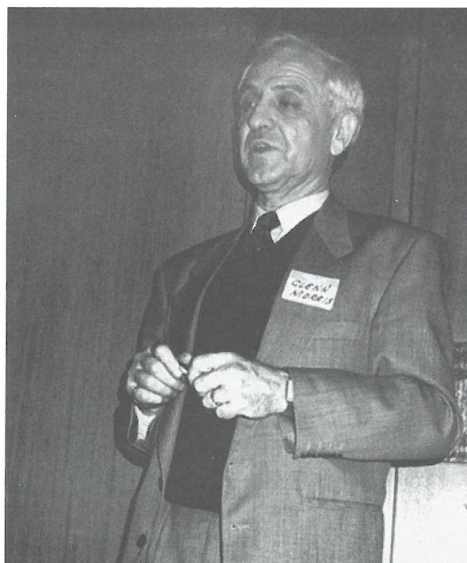
Cathy Stewart chaired the group discussion. The first part of question four is the only issue where there was unanimous agreement: professional development activity should be mandatory. A statement was made during discussion that perhaps the Faculty should take on a continuing education role for Western Canada similar to that of TUNS (Technical University of Nova Scotia), which offers continuing education courses and seminars in all regions of the country. It is obvious, from the variety of ideas and opinions reported by the discussion groups and expressed by individuals, that much remains to be discussed before the Association defines its policy regarding professional development activities and the reporting of such activities.

The issue of access to graduate-level courses by practising engineers was also raised during the group discussion. The Faculty agrees that practising engineers should not, without reasonable cause, be restrained from enrolling in graduate-level courses. The minimum-grade-point rules of admission are administered by the Faculty of Graduate Studies and not the Faculty of Engineering.

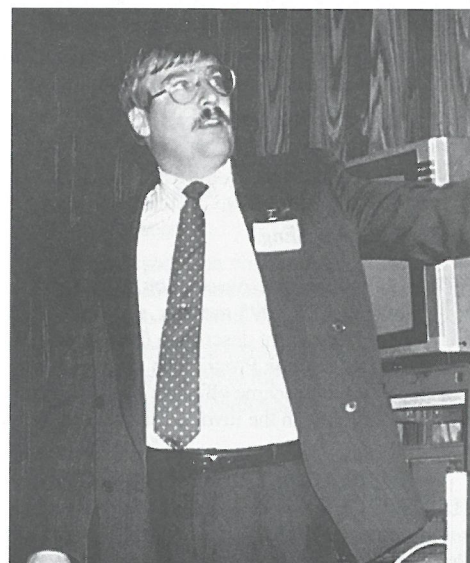
To everyone's surprise and astonishment the meeting was adjourned at the scheduled time of 8:30 p.m. □



Doug Kramble describes APEM's continuing competence plans.



Glenn Morris describes the U of M's continuing education plans.



Len Dacombe presents new technology.

Council Reports

Tuesday, November 21, 1995

By: W.G. McKay, P.Eng. (Ret.)

AT WHICH COUNCIL CONSIDERS A NEW HOME

The first meeting of the new Council opened with President Cathy Stewart presiding, and all of the newly-elected Councillors in attendance.

PEO and Novell

The opening item of business involved a complex legal problem, involving the use of the term "engineer", which has been under extensive legal and jurisdictional action between the Professional Engineers of Ontario (PEO) and Novell, an international computer organization. Novell has been issuing certification to trainees indicating that they are "Certified Network Engineers", or "CNE". PEO has entered into a settlement with Novell whereby Novell agrees not to use the word "engineer" but intends to continue to use the designation "CNE". PEO is soliciting other provincial associations' concurrence to the settlement and requesting that they become signatories to the agreement. Council, having considered a number of legal opinions on the PEO action, is hesitant to agree, and will seek its own legal counsel.

Canadian Council of Professional Geoscientists

As has been noted in the past, several provincial organizations register, or, like APEM, are considering registration of, geoscientists – mainly due to the close association between the disciplines of engineering and geology. At the national level, a CCPE Task Force is working on the formation of a national body (CCPG) for geoscientists. The proceedings to date have received favorable comment.

Election of Vice-President and Executive Member of Council

At the next Council meeting (December), these two positions will be filled by election from within the Council's members. In the meantime, the mem-

Tuesday, December 12, 1995

By: C.P. Gray, P.Eng.

AT WHICH COUNCIL ELECTS ITS OFFICERS

President Cathy Stewart called the Council meeting to order at 12:30 p.m. on December 12, 1995 with all but one Councillor present. After the usual orders of business (adoption of agenda, adoption of previous meeting minutes and the financial review by the Executive Director, Dave Ennis), Council organized the Council's structure and duties for the new term. Mal Symonds was elected President-Elect and Stu Ursel was elected to the Executive Council. All Councillors volunteered for various appointments as Liaison Councillors for APEM Committees.

Attention, EITS!

By: S.M. Matile, P.Eng.

The Council of this Association, at its November 21, 1995 meeting, adopted a revised document describing the Association's Pre-Registration Program. A copy of this document, which became effective immediately, was sent to you with the invoice for your 1996 EIT dues.

THE PRE-REGISTRATION PROGRAM HAS NOT CHANGED. EITs are still required to submit semi-annual Progress Reports, take the Professional Practice Seminar and Examination, engage in ten contact hours of professional development activity (not including the Professional

Practice Seminar!) annually, and obtain two professional service points each year.

The "grandfathering" provisions have not changed, either. If you had 18 months' acceptable engineering work experience before January 1, 1995, you are not required to demonstrate (although you are certainly expected to undertake) professional development or professional service activities. If you were "grandfathered" under the "two-year work experience requirement" but had not acquired 18 months' acceptable engineering work experience by January 1, 1995, you are required to obtain a total of ten contact hours of professional development and two professional service points prior to registration. ALL EITS ARE STILL REQUIRED TO SUBMIT SEMI-ANNUAL PROGRESS REPORTS,

bers have the opportunity to evaluate the positions, and each other, for the positions.

Location of APEM Office

The lease for the APEM office space, which expires in September, 1996, will not be renewed. Council was advised that the offices can remain in the same building we currently occupy (the landlord requires the space, and is providing a financial incentive for APEM to vacate its current premises by May 31, 1996), move to another building close by, or to a site on Pembina Highway. Other locations such as East of Main and Portage and Main were suggested. Parking for volunteer committee members (paid or otherwise) was discussed at length with the resolution that it will be factored in. At the December meeting, Council will have to decide whether to commit to vacating the existing premises by May 31.

NAFTA

As the NAFTA agreement on engineering services moves closer to total ratification, there is still some concern regarding the standards of accreditation by the other two partners. By comparison with Canada, Mexico has few or no standards, whereas the USA has standards which some consider to be below those of Canada. On the basis of the Canadian participation in this agreement, much good work has been done, and there will be an audit of the overall accreditation to safeguard our standards. An interesting comment on the global economy: the UK, Australia, Germany and other countries have no form of registration. Is their standard of engineering that different?

Report of the Manitoba Law Reform Commission

A lengthy report by D. Chapman on a clause-by-clause basis of the recommendations of the Manitoba Law Reform Commission was presented to Council. This report will form the basis for a position-paper from the engineering profession to be presented to the Minister of Justice. Comments were requested from Council members.

By 5:00 p.m., the 22-item agenda had been completed. Before the December meeting there will be an orientation session on the operations for new and not-so-new members, and a full-day session for all members on the review and revisions of the long-range plan.

"The councillor's lot is not a light one". □

The landlord for the APEM offices has allocated the present space to another tenant. Another space within the building has been made available to APEM. Council discussed the various options and criteria for the APEM office premises, and voted to vacate the current premises by May 31, 1996. The new office location has not yet been decided, but several proposals are being considered.

Council recommended that the Publication Committee draft guidelines on an editorial policy regarding APEM publications, including the Manitoba Professional Engineer, leaflets and brochures sent out by APEM.

Councillor Dr. Brian Stimpson agreed to represent APEM on the Canadian Council of Professional Geologists (CCPG) Task Force.

Councillor Carol Roberts gave a report on the CCPE Gender Equity Task Force. □

TAKE THE PROFESSIONAL PRACTICE SEMINAR AND PASS THE PROFESSIONAL PRACTICE EXAMINATION PRIOR TO REGISTRATION.

The changes to the document lie almost exclusively in the guideline listing Acceptable Professional Service Activities. APEM seminars and meetings are now listed as Acceptable Professional Development Activities, rather than Professional Service Activities; the numbers of points assigned for the various professional service activities have been revised; and a number of activities have been added to the list.

If you have not yet received the revised document entitled "Pre-Registration Program", please call the APEM office, at 942-6481, to request your copy. □

Meet Your New Councillor – Joe Lucas, P.Eng.

By: L.Y. Ganetsky, P.Eng.

Joe was born in Winnipeg. He graduated from Engineering at the University of Manitoba in 1973.

Joe's first job was with the national consulting firm of MCW Consultants Ltd. After a stint working in Vancouver, Joe returned home to hone his skills with K & D Engineering, becoming registered with APEM in 1975.

Slow times, and a new challenge, saw Joe move to the Provincial Department of Energy and Mines to perform on-site energy audits with the famous Energy Buses. Changing times allowed him to return to MCW Consultants Ltd. to his present position as a Partner in the firm. Joe notes that his most treasured assets are the friends being gathered along his journey.

Challenges to date include the design work for the Portage Place Shopping Centre and the Ducks

Unlimited Conservation Centre. Joe is also practising in Ontario and the United States and each of these areas has its individual challenges.

Joe is a provincially licenced Power Engineer and is active in ASHRAE and the Manitoba Energy Task Force. Some of his spare time is spent advising U of M Architecture students on the mechanical aspects of their practicum projects.

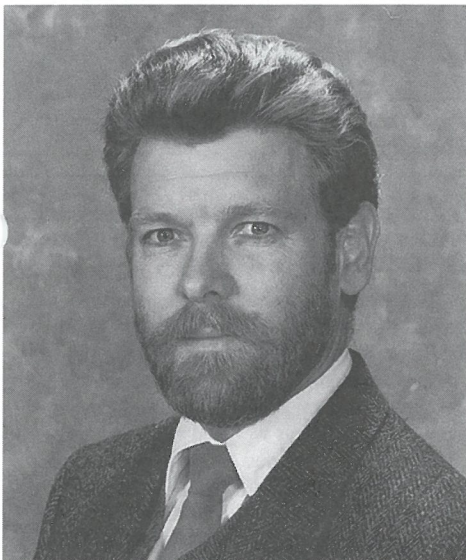
Joe reports that his engineering experience is probably unparalleled. During his relatively short career, he has had a chance to work with the giants of the consulting field. The "old masters" who started, defined and nurtured the industry have provided invaluable insight to, and training in, the consulting world. Another appreciated aspect of his career is the opportunity of passing along some level of support to the 'new' engineers who are just coming into the field. Joe values his position of bridging from the pillars of the past to the beginnings of the future.

In addition to serving on Council, Joe hangs out on the Publication, Experience Review and Awards Committees.

After a couple of decades together, Joe and his wife, Susan, are still working on the first half of their marriage. A couple of adopted cats help fill up the family chateau on the left bank of the Seine – conveniently located in St. Vital.

Personal interests range madly from restoring his '27 Ford, white-water kayaking on the Seine, cross-country skiing, banjo-picking, computer aggravating and endless reading of 'anything printed'.

Joe has a fair amount of Council experience from sitting in the 'cheap seats' as APEM reporter, but finds sitting at the BIG table very exciting and a personal challenge. He looks forward to serving the brave members who actually voted him into this position. He counts these people as friends. □



Councillor Joe Lucas

News from Thompson

By: C.M.-L. Kelly, P.Eng.

The Thompson Chapter of the APEM held its annual general meeting on the evening of October 12th, 1995. We were fortunate to have Don Osman and Shirley Matile join us for the meeting. The business portion of the meeting saw three new members elected to the executive as well as two appointees. Cathy Stewart reported on Council activities. Shirley Matile then gave a brief overview of the EIT program and its highlights to date. Following business, Malli Aulakh, City Engineer of Thompson, gave a presentation on his experiences of engineering in the Northwest Territories. (The thought of having to bolt your house down to the ground because of high winds certainly made the audience appreciate

Thompson!) Don Osman thanked the guides for the INCO tours and encouraged the Chapter to remain active. The meeting was then adjourned. □



Malli Aulakh, new Thompson City Engineer, addresses Thompson Chapter.

National Engineering Week

'96

National Engineering Week will be held from March 2-9, 1996.

During this week-long celebration, exhibitions, displays, open-houses, student design competitions and career information sessions will be held all across the country.

In Manitoba, Innovators in the Schools will be conducting a speakers' blitz to promote engineering in the schools throughout the week.

The St. Vital Shopping Centre in Winnipeg will be the venue for the events to be staged by APEM's Public Awareness Committee, this year. On March 2, the committee will once again be conducting its highly successful Spaghetti-Bridge-Building Competition. This competition, for which pre-registration is required, will be for students from grades one through twelve. On March 2, also, the committee will be introducing a new competition – the Straw Tower Competition. This competition will be open to all members of the public, and there will be no pre-registration.

The Committee also plans to set up a photo display booth in the mall, and to have volunteer engineers available during mall hours on March 2 and 3 to answer questions about engineering.

The Association will be holding a New Members' Reception and Member Awards presentation on March 4.

The Committee encourages all engineers to become involved in the promotion of the profession during National Engineering Week. □



Professional Development

Professional Development Committee Breakfast Meeting, November 21, 1995:

"NAD83 – The North American Datum of 1983, Readjustment and Redefinition Project"

By P.C.H. Wong, EIT

Lorne Brooks, Manager, Land Parcel Services, has been involved in the field of Geomatics with the Government of Manitoba for the past 35 years. On November 21, he gave an overview of the North American Datum of 1983 (NAD83) at a breakfast meeting organized by the APEM's Professional Development Committee.

The NAD83 project is an international undertaking involving the re-computation and re-adjustment of survey control networks in continental North America and Greenland and the re-definition of the datum upon which the resultant co-ordinates are based.

The purpose of the project is to define a distortion-free set of co-ordinates for survey markers that may be used as a basis for mapping and other geomatics-related activities including Geographic Information System (GIS) applications. The re-

adjustment project was necessary because the existing co-ordinate system, based on the North American Datum of 1927 (NAD 27), contained unacceptably large distortions that developed as a result of the way survey networks were developed and built up over time. Current satellite survey methods enable surveyors to define co-ordinates for control-survey markers across the continent with much greater precision and uniformity than was previously possible.

After many years of preparation, data evaluation and software development, the project is now close to completion. This presentation discussed the results of the project and its benefits to engineers and land surveyors. It also discussed some practical difficulties encountered during the project as well as recommendations to the audience on software usage regarding land surveys. □



President Cathy Stewart thanks speaker Lorne Brooks.

Caméré-Curtain Dam at Lockport Named National Historic Site

Continued from page 1

Messrs. Quinlan and Robertson faced their own project challenges. The excavation pit flooded in 1907, typhoid fever broke out in 1908, and several men died of injuries and drowning.

Approximately 55,000 cubic yards of concrete and about 6.5 million pounds of steel were used in the construction. The main bridge, lock and dam were completed at a cost of about \$3.5 million.

Mr. Dufresne announced that the lock would

be opened for light-draught vessels in the spring of 1909. On July 4, 1910, the St. Andrews Lock was declared formally opened by Sir Wilfred Laurier from the deck of the steamer "Winnitoba". There were some 3,000 people on board, and an even greater crowd gathered on the locks. Sir Wilfred saw this opening as the start of a great water-transportation route in the west.

In the first season there were 181 commercial vessels and 1,400 pleasure boats, with over 44,000 tons of material and over 7,000 passengers locked through.

Due to local lobbying, work finally began on building approaches to the bridge so that there could be a roadway over the dam. A new type of design – a Strauss Bascule Bridge – was to be built over the lock.

The addition of the fish ladder was next. It was completed in the spring of 1913 under an international agreement which continues to this day.

In August, 1913, to much local celebration, Mr. Thomas Hay, the Reeve of St. Clements, was the first to cross the bridge in his automobile.

Operations

Perhaps the most overlooked part of the structure is its unique caméré-style dam. The dam is the reason the structure can perform its main function which is facilitating navigation from Lake Winnipeg to the City of Winnipeg.

Chosen for its ability to be quickly installed and adjusted to regulate a river that flows from a drainage area of over 10,000 square miles, the dam has served its purpose well since it was first lowered into place in 1910. The development and activity at the Forks reflects the trust placed in the

St. Andrews Lock and Dam to maintain a stable summer water level in the City of Winnipeg so the Red River may be enjoyed.

The decision to install, adjust, remove or just leave the system alone is not one taken lightly by the Superintendent at the dam. He relies on information provided to him by Manitoba Water Resources, Federal Inland Waters and Environment Canada. This is weighed with his knowledge of the structure and his own observations of the river with its ice and, most importantly, debris load. All this information is balanced by the river. Many agendas are played out on the Red River.

The greater the success the Superintendent has in meeting the objectives of the user groups, the higher the level of performance demanded. No one year or day is exactly the same in the life of the river. The caméré system has its limits and over and over again it has been taken to its limits by the forces of nature.

It is a credit to the wisdom, dedication and hard work of the Superintendents (A.S. Innes followed by John Hay, S. Coppleman, H.B. Johnston, Norman Ross, John Hokanson, Tom Sinclair, Norman Lalchun and, at present, Henry Wiechern), that St. Andrews Lock and Dam is functioning as it was conceived, 85 years after its initial installation.

The ceremony closed with the unveiling of the H.S. & M.B. plaque which will be permanently in place, along with the C.S.C.E. Historic Structures plaque, dedicated in 1990, by mid-1996.

Canadian engineers can be truly proud of this unique marine structure, the only one of its kind on this continent and the largest ever constructed in the world. □



It's official! The APEM office will be moving! We don't know **where** we're going, but we **do** know **when**: on May 31, 1996. The final decision as to whether the office will remain in the Royal Trust Building will be made by February 23. Stay tuned!

CCPE National Scholarships

1996 Competition Officially Opens

The Canadian Council of Professional Engineers is pleased to announce the opening of the 1996 National Scholarship Program competition. Six cash prizes totalling \$45,000 will be awarded to promote excellence in the Canadian engineering profession through advanced studies and research programs.

To be eligible, candidates must be registered as full members with one of the provincial or territorial professional engineering associations, and have been accepted for post-graduate studies by a recognized university.

The following scholarships are available:

- The **MANULIFE FINANCIAL** Scholarship Program offers three scholarships of \$10,000 each to provide financial assistance to engineers returning to university for further study or research in an engineering related field.
- The **MELOCHE MONNEX** Scholarship Program offers two scholarships of \$5,000 each to provide financial assistance to engineers returning to university for further study or research in a field other than engineering. This field of study will be one that is chosen

to augment the candidate's performance in engineering.

- The **ENCON** Endowment of \$5,000 will be awarded to an individual wishing to pursue studies in the area of engineering failure investigation and/or materials testing. This area of engineering is concerned with the analysis of the various causes of materials failure, and the prevention of accidents, which may result from them, either in the industrial, manufacturing or construction sector.

Deadline for all applications is May 1st, 1996.

Contact your provincial or territorial professional engineering association, or the National Scholarship Program, Canadian Council of Professional Engineers, 401-116 Albert Street, Ottawa, Ontario, K1P 5G3. Fax: (613) 230-5759 or E-mail: lmacdon@fox.nstn.ns.ca.

CCPE wishes to thank ENCON Insurance Managers Inc., MANULIFE FINANCIAL, and MELOCHE MONNEX Inc. and its subsidiaries, Monnex Insurance Brokers Limited and J. Meloche Inc., for their continued sponsorship of this program. □

Engineers & United Way 1995 Campaign

By: Wm. M.A. McDonald, P.Eng.

Winnipeg's engineers have once again demonstrated their "spirit of caring" and commitment to their community through their generous support of the United Way.

A total of \$51,200 was raised in the 1995 Campaign by individuals in workplace campaigns and through the direct mail. We were the first professional group to meet our goal!

The following firms achieved award-winning employee-campaign results based on per-

centage participation and dollars raised for their community:

Action Consulting Engineers Inc. Leadership
DS Lea Consultants Leadership
Wm Hanuschak & Associates Leadership
GH Currie & Associates Gold

Your continued support, time and effort is appreciated by thousands of people in Winnipeg every single day who benefit from services provided by over 65 agencies. □



Bill McDonald (centre) congratulates Howard Procyshyn (l) and Dave McKibbin (r) whose firm, Action Consulting Engineers, achieved 100% participation.

The Professional Engineers' Wives Association

Executive for 1995-1996

President	Judith Beattie
Vice-President	Hannya Klimenko
Past-President	Carol Klein
Secretary	Beverley Gulay
Treasurer	Vacant
Membership	Linda Caligiuri
Social Convener	Erma Hotchkiss
Program Convener	Mary Matthews
Telephone Convener	Charlene Scouten
Councillors	Dorothy Chant Jane Stewart

Program 1996

Tuesday, January 23, 1996 Healthy Fitness for the 90s

1:00 p.m. Niakwa Country Club,
620 Niakwa Rd.

Speaker: Michelle Meade, B.P.Ed, from
the Reh-Fit Centre

Tuesday, February 27, 1996 Travel Fantasies

7:30 p.m. Winnipeg Squash Racquet
Club
275 Stradbrook Ave.

Speaker: Gerri Shippam, Senior Agent
Vacation Travel Services
AM Express

Tuesday, March 26, 1996 Spring Golf Fashions

1:00 p.m. Niakwa Country Club,
620 Niakwa Rd.

Presented by: Valerie Morrow, Proprietress
Tee Time Fashions

Tuesday, April 23, 1996 Annual Meeting & Luncheon

10:00 a.m. Bridge
St. Charles Country Club,
100 Country Club Rd.

1:00 p.m. Luncheon
Piano entertainment by
Margaret Robertson of Yamaha
Music Centre

Luncheon Reception 12:15 p.m. Lunch
1:00 p.m.

Transportation available to all events –
Contact Mary Matthews 257-2800

Looking forward to seeing you, and please
bring a friend!

EITs Pull for Safe Babies

Last Fall, the Manitoba Hydro-sponsored team of Jason Coreau, James Leisle, Nick Fanai, Larry Halayko, Cliff Carriere, Brent Coreau, Rob Tkach, Sam Matheson, Cam Zealand, and

Kevin Gawne competed in the Winnipeg Fire Department's Corporate Pumper Pull to raise funds for the Fire Department's "Safe Baby" program – and WON!

The "Safe Baby" program officially kicked off on January 1, 1995. Its goal is to deliver a smoke alarm and fire-prevention kit to every baby born in Winnipeg over the next two years.

Congratulations guys! □



Refurbishment of Spacer-Dampers in Manitoba's HVDC Transmission Line

Continued from page 4

provide no resistance to motion. The latter information resulted in extended-life predictions that provide a reasonable amount of time for Manitoba Hydro to plan and implement replacement or rehabilitation before the integrity of the line is threatened.

Rehabilitation Possibilities for Spacer-Dampers

The key to the spacer-damper rehabilitation is the elastomeric element that provides the spring force to return the arm to the neutral position. The research program involved selection and testing of replacement-elastomer formulation and curing and molding to the shape and dimensions of the Metalastik-designed spacer-damper. The aging of the unused spacer-dampers, as determined by testing, added the critical criterion to the rubber selection: minimum aging.

Houston & Company selected Freudenberg-NOK as molders and Burton Rubber as the basic rubber compounders and the testing capabilities of the ITC to prove out the compounds. The ITC was again able to develop an economical means to perform the testing. The ITC developed the detailed testing to produce power-dissipation curves at temperatures of +22°C, 0°C and -20°C.

The test program also involved evaluation of the aluminum castings of the Metalastik spacer-damper including metallurgical examination, clamp design, long-term performance, and condi-

tion and performance of the clamping bolts and frame fasteners. The ITC was instrumental in determining the cause and solution of the loose-clamp condition – related to the 21-day aging of the aluminum alloy.

Tower-Arm Investigation

The original investigation by Manitoba Hydro and the ITC established the modes of vibration and resonant frequencies and, in this investigation, Houston & Company, with the assistance of Manitoba Hydro and the ITC, accomplished the goals of defining the source of the energy, the coupling mode and corrective measures to eliminate or mitigate the vibration damage.

Houston & Company concluded that rehabilitation of the spacer-dampers with new elastomer elements and adopting a new spacing system would result in a 17-fold reduction in the tower-arm failure.

Recommendations

In summary, the investigation recommended rehabilitation of the spacer-dampers (50,000 plus) with a specific elastomer element and installation technique as well as replacement frame fasteners and the addition of Belleville washers to the clamping bolts.

Mr. Begin's presentation included excellent graphics (always appreciated by Engineers) which summarized the test results and trends and also awakened the learning spirit ("hey, I know something about vibration and dynamic/statistical analysis") of the audience. The technical content earned an invitation for a presentation to the Department of Civil and Geological Engineering the following week. □

Attention, EITs!

By: S.M. Matile, P. Eng.

Last year, you received your invoices for your 1996 EIT dues. These dues were payable by January 1, 1996, although there is no penalty for late payment until after February 29, 1996.

Even if you expect to be registered as a professional engineer early in 1996, your EIT dues must be paid in full, prior to registration.

Upon registration, you will be invoiced for the 1996 annual dues for practising members; and if you are registered before June 30, 1996, you will be refunded one-half of your EIT dues (all annual dues are pro-rated on a semi-annual basis).

Coming Events

Engineering Management Seminar "Electronic Business Management"

This one-day seminar will include topical presentations on innovative and contemporary issues such as: The Information Highway, Workflow Software, Electronic Seals, and a Panel Discussion/Case Studies on "Automation in the Workplace".

Date: Thursday, February 22, 1996

Place: Norwood Hotel

Presented by the APEM Professional Development Committee

Engineering Student Night Dinner

Thursday, February 22, 1996

Hotel Fort Garry

18:00 Cash Bar – Mezzanine Floor

19:00 Dinner – Provencher Room

Host a student and enjoy an evening with tomorrow's engineers. Mark the date, you will be contacted.

National Engineering Week

March 2-9, 1996

Position Wanted

Civil engineering graduate looking for employment relative to the field of engineering. Currently enrolled with APEM as an EIT. Experience includes inspection of new pipe work, surveying, and working knowledge with different computer programs and computer languages. For more information please call Tony any time at (204) 667-6822. □