THE MANITOBA
Professional Engineer
April, 1993
APEM

Raising the Dredge in the Yukon

By: P.M. Habiluk, P.Eng., Project Manager, Public Works Canada Winnipeg

Gold Dredge #4 is a relic from the Yukon mining era that followed the gold rush to Dawson City from 1896 - 98. Besides being a fine example of classical engineering, Dredge #4 is the largest wooden hull, bucket-line dredge in North America. It was designed by the Marion Steam Shovel Company and built in 1912 - 13 for the Canadian Klondike Mining Company on Claim No. 112, below Discovery on Bonanza Creek, about 1. 6 km from Dawson City.

The materials used to construct the dredge had to be shipped up to the Dawson area from southern Canada and assembled on-site. Considering weight of some of the components (up to), overcoming the material transportation problems over the various trails and river systems to the final destination was an accomplishment in itself.

Dredge #4 operated periodically on various creeks in the area from 1913 until the late 1930's. During this period, there were times when the dredge produced as much as 800 ounces of gold in a single day. In 1940, the vessel was dismantled, re-designed and rebuilt by the Yukon Consolidated Gold Company (YCGC).

After reconstruction, the dredge hull was 43 m long, 20 m wide and 3.5 - 5 m deep. The total height of the dredge from the bottom of the hull to the top of the control room was 23 m and the displacement weight of the vessel was over 2,722 t.

The dredge was powered by all-electric drive motors from 30 to 300 HP output, which operated the bucket arm, waste material stacker arm and numerous onboard pumps ranging in capacity from 750 to 7,500 US gpm. Power supply was by land line from Dawson City, about 13 km away.

The complete hull and the structural components of the machinery are made of B.C. fir timbers measuring up to 0.6 m by 1.2 m, the quality of which is superior to what is readily available today. When in operation, the bucket chain could theoretically handle 13, 740 m^3 of gold-bearing gravels in 24 hours. Each bucket in the bucket chain weighs approximately 2,100 kg, and has a capacity of 0.46 m^3.

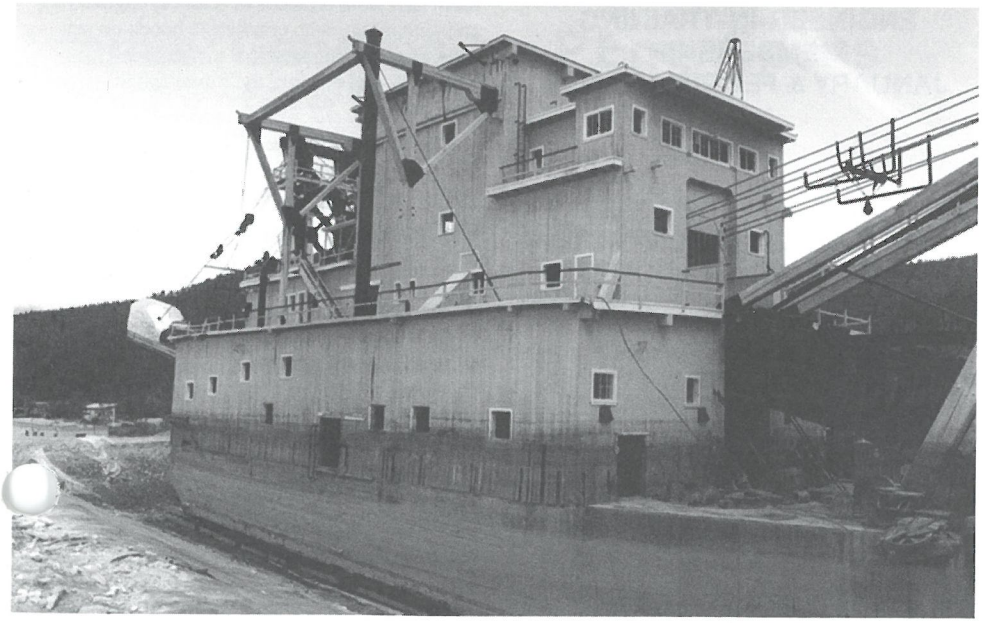


Dredge before excavation, reflotation and relocation.

From 1941 - 59, gold Dredge #4 worked up the Bonanza Creek valley to its final location on Claim No. 17 below Discovery. It was routine maintenance to overhaul the buckets during the winter period; following the operating season of 1959, they were removed and placed alongside the dredge, which had been left in its own self-created flotation pond. In the spring of 1960, the dredge sank as a result of a flood precipitated by an upstream water impoundment failure. Over the intervening years, the vessel became silted-in with alluvium to a depth of 5-6 m, and remained that way until early 1991.

In the mid-1970's, the Canadian Parks Service (CPS), represented by Klondike National Historic Sites, purchased Dredge #4 from YCGC. Its new owner quickly recognized that the dredge was subject to various external and internal forces that were slowly deteriorating its condition. The CPS undertook field investigations of the vessel in 1983 and 1984 to determine its condition and to gather information for the preparation of possible relocation scenarios.

In 1987, the Department of National Defense, 1 Construction Engineering Unit (lCEU), was invited to prepare a feasibility study to determine whether the dredge could be successfully excavated and repositioned on higher ground to protect it from seasonal flooding on Bonanza Creek. The report, produced in 1988, recommended pursuit of the reflotation option for the relocation of the vessel contingent upon the hull being free of major structural damage once the excavation to exhume the dredge was complete. The project



Dredge raised. Note stain indicating 6-7m depth of burial.

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APEM

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Now That The By-Laws Have Been Changed...

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

At its January 11, 1993 meeting, Council established both the semi-annual pro-rating of dues and a new, uniform "penalty" for persons who have been de-registered for non-payment of dues and who wish to reinstate their memberships.

The pro-rating of dues will, of course, only affect persons applying for registration with this Association – not continuing members. It will allow persons admitted to membership after June 30 to pay half of, rather than the full, annual dues for the year.

The de-registration fee, which was approved by the membership in the recent By-Law changes, was set, for 1993, at $300. This amount will be payable in addition to the admission fee ($95 for 1993) and the annual dues for the year (or half-year) of reinstatement. □

LICENCES ISSUED IN JANUARY & FEBRUARY, 1993

J.C. Draper (PQ)
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W.J. Fisher (ON)
E.C.H. Fok (ON)
N.Y. Haddad (AB)
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ENGINEER-IN-TRAINING MEMBERSHIP JANUARY & FEBRUARY, 1993

T.A. Lock
G.A. Proteau
J.V. Smith
H.C. Turner

WE HAVE LOST CONTACT. MAY WE HAVE AN ADDRESS?

M.L. Brownstone
N.R. Krpan
P.W. Lai
D.D.D. Macnamara
A.M.A. Mahmoud
G. Maretzki
N. Peters

WITH DEEP REGRET THE ASSOCIATION RECORDS THE PASSING OF:

I.P. Beck
L. Kitchin

Engineers in the News

George D. Balacko, P.Eng., Chief Public Health Engineer, Province of Manitoba has been appointed to the Executive Committee of the Water Environment Federation (formerly Water Pollution Control Federation). George is on the Board of Directors of this organization, representing Western Canada Pollution Control Association (a member Association of W.E.F.). He is one of six members chosen from the Board of Directors at large, along with the officers who make up the Executive Committee.

■ ■ ■

Ted Speers, P.Eng., received his Ph.D. in Metallurgical Engineering from the Department of Mechanical and Industrial Engineering at the University of Manitoba in February, 1993. Remarkable is the fact that he obtained this degree 35 years following the receipt of his last degree (a Master's degree in Chemical Engineering from the University of British Columbia) and 49 years following the receipt of his first degree (a Bachelor of Arts from the University of Manitoba).

His thesis, on the silicadizing of aluminum, stemmed from industrial research he had commenced for a client, taken a profound interest in, and continued on his own. □

Innovators In The Schools

From vectors to videos, from aardvarks to astronauts, science is everywhere around us these days. Yet many students do not associate the math and science subjects learned in school with practical applications. How can you help open their eyes to the amazing world of science? Become an Innovator! Innovators are professionals from all areas of science, engineering and technology who emphasize hands-on science, encouraging students to see, touch, ask questions, and propose their own solutions to problems.

These are just some of the ways in which Innovators are helping to spark the interest of young students in science and math:

- Classroom speaking and demonstrating
- Participating in career awareness programs
- Judging science fairs
- Mentoring individual students
- Leading field trips
- Advising science clubs
- Hosting job shadowing for students and teachers
- Serving as information resources for teachers
- Conducting workshops for teachers
- Adopting a school and maintaining an extended association with that school

If you are interested in becoming an Innovator, or if you know of a classroom you would like to see benefit from the introduction of an Innovator, please call Charlene Okell at 943-8482. □

President's Message

C.E. Anderson, P.Eng.



"Thanks for Nothing"

That was the wording of a message written across the invoice accompanying one member's dues payment. Similar messages were written on a couple of other invoices, all obviously in reaction to the recent dues increase. The wordings of each were different, but the message likely carried two basic themes.

Firstly:

What is it that APEM does for me or what am I getting for my money?

That is a question that I used to ask when I first entered the profession. Today, I rationalize the reasoning behind that question as a lack of understanding. My understanding grew with time and particularly as I became more involved in Association affairs.

As professionals, we have two choices:

- **To be self-governing**

or

- **To be governed by the government**

Professions across Canada, such as Medicine, Law, Dentistry, Architecture, and Engineering have the right and responsibility of self-governance as defined in the various Professions Acts that are provincially legislated.

The Law Reform Commission in Manitoba is presently reviewing the issue of self-governance and the extent to which the provincial government should delegate governing authority to the professional associations.

With the right to self-governance come responsibilities and obligations. Under the legislation, those responsibilities and obligations are not defined as serving the membership. APEM's responsibility is to **serve and protect the public interest by governing the practice of engineering in accordance with the Engineering Profession Act.**

In the last couple of years, APEM has seen a significant increase in complaints against members resulting in the need to investigate and rule on these complaints. In addition, an increasing number of university and technical school graduates from other countries have immigrated to Canada and to Manitoba with the hope of practising engineering in our province. We have an obligation to assess their credentials and, if deemed not sufficient, to provide them with the requirements whereby, through examination or further education, they can become registered to practise professional engineering in Manitoba. That is their right. Any disagreements with APEM's decisions coupled with the provisions of the Act in this area can, and do, result in legal actions. Overall, these increased self-governance responsibilities of enforcement and assessments have added significantly to our cost of operation. These costs combined with a substantial drop in investment income, with declining interest rates, were the major budget impacts necessitating the dues increase.

If we fail to govern our profession adequately, the government will do it for us. In addition to APEM's staff, a significant portion of the Association's activities is carried out by some 150 volunteers, each of whom contribute in the order of 50 to 200 hours a year of their time. If even a portion of that time commitment was transferred to a full-time government administration, I somehow doubt that we would experience a decrease in dues.

So, what does APEM do for me?

- APEM provides me with the legislated right to practice my profession and be recognized as a Professional Engineer.
- APEM ensures that only qualified persons are authorized to practise engineering, thus protecting the public interest and the integrity of our profession.
- APEM provides me with the opportunity to be involved in the self-governance of my profession and to affect change. **This is an opportunity provided to every member. Try it!**

Secondly:

How can APEM justify an increase in dues when an increasing number of members are unemployed and the rest of us are constantly being asked to exercise constraint?

This is a question that the membership has every right to ask, in particular those who are unemployed.

The unemployed engineer is in the Catch-22 position. You need to be registered to get a job, but you need a job to be able to afford to pay the dues. APEM is sensitive to this situation and has taken steps to accommodate members facing this hardship.

For those of us who are employed, the question should only be judged with respect to whether APEM is being managed effectively and efficiently, and meeting its mandate. Council and the administration are keenly aware of the responsibility for stewardship of the membership's dollar.

As noted in my President's Message in the February issue, we have a Long Range Plan in place which is designed to improve the operations, efficiency and effectiveness of APEM and have our profession remain self-governing.

Council sincerely welcomes your constructive input on further improving APEM. □

Premier Gary Filmon, P.Eng. Opens New Lecture Series

By: J.T. Atchison, P.Eng.

"Engineering for Sustainability" is the title of a new Lecture/Discussion Series of APEM meetings on SUSTAINABLE DEVELOPMENT (SD) arranged for presentation during 1993/94. The first meeting was held March 3rd, 1993 with a lecture by Premier Gary Filmon, P.Eng., entitled "Sustainable Development, Public Policy and Engineering". This is the first of three lectures arranged for the Spring of 1993, as a group under the general thrust of "Introduction and Overview of Sustainable Development". The other lectures in the group are planned to be "Rio and Sustainable Development" by Dr. Pierre Marc Johnson and "Business Directions for Sustainable Development" by Ken McCreedy, P.Eng., President and CEO TransAlta Utilities. The 1993/94 program will cover more focused studies on SD and will include case-studies, starting in September.

Premier Filmon, in his presentation, demonstrated his deep interest in the promotion of awareness of Sustainable Development among all sectors of society, and encouraged Professional Engineers to take a leading role in its applications. As Chair of the Manitoba Round Table on Environment and Economy, together with his Government colleagues' involvement in all aspects of its program, he illustrated the Government's clear commitment of public policy to a sustainable future in terms of the economy, the environment, and society.

The APEM SD Task-Force is very fortunate in having as a member the Executive Director of the Manitoba Round Table, Mr. Bob Sopuck; and we are appreciative of his major contribution to a successful meeting, at which some one hundred plus were in attendance. □



Gary Filmon, P.Eng., presents first lecture on Sustainable Development

CCPE President's Message

The Contribution of Engineers to the Economy

By: M. Bouchard, ing.

At the 3rd Annual Conference of the Canadian Engineering Human Resources Board held on November 4th of this year, representatives from business, the profession and academia gathered to hear several speakers on the topic of engineering Canada's place in the global environment. It was widely recognized that in Canada we must move rapidly and purposefully toward a technology-oriented, knowledge-based economy. We have been much slower than our competitors to recognize and exploit the links between engineering, innovations, and improvements in both productivity and value-added products and services. Technological change underpins economic growth in highly developed societies. Yet, there is abundant evidence that many Canadian firms do not use engineering and innovations as a source of strategic advantage. This under-utilization of engineers in Canada is a concern that is shared by CCPE's constituent Associations. Several have asked the Council to address the issue in order to help to ensure a strong and lasting economic recovery.

Canadian engineers have a key role to play in this respect because they understand and use "best practice" technology and management skills to solve problems. However, a fundamental change of course must happen toward a knowledge-based economy if we wish to sustain wealth generation and maintain our quality of life.

As I see it, we have a double challenge before us. The first is to expand the awareness to firms of the value engineers can bring to their operations. Small- and medium-sized businesses in particular are not very well acquainted with modern technology and its applications, due both to a lack of qualified technical personnel and to the virtual absence of a technical culture within the company.

The second is to find a way to facilitate the process whereby firms can avail themselves of the engineering talent and expertise they need to solve their problems and develop innovative solutions. With this in mind and in response to our provincial Associations' concerns, I have proposed a plan to create a Technical Advisory Board for small- and medium-sized businesses to assist them in planning and developing in today's technological environment. This Board would act similarly to a Board of Directors and assist firms in increasing their productivity and enhancing their competitiveness.

As you may be aware, the failure rate among small- and medium-sized Canadian businesses is very high. One million businesses closed their doors between 1978 and 1984. The majority of businesses (70%) do not survive longer than five years; 90% do not reach the ten-year mark. The future of a great number of small- and medium-sized businesses will depend on their capacity to introduce and manage technological change and develop technical know-how.



Micheline Bouchard, ing.

Since the potential for economic growth and job creation will be found to an increasing degree in the small- and medium-sized businesses, the Technical Advisory Board would help to ensure that this important business sector survives and grows by increasing its ability to compete.

The majority of businesses (70%) do not survive longer than five years; 90% do not reach the ten-year mark.

The Technical Advisory Board is designed to assist companies that have a gross yearly revenue of between two and 20 million dollars, that do not presently employ engineers or technicians and for which technology is critical to their survival and growth.

The committee typically would be comprised of two or three engineers, a technologist or technician, a lawyer and an accountant. Its makeup should reflect the various technological, administrative, financial and legal challenges involved in managing a business. It will place particular emphasis on the technical professions with technology being used as a tool to further productivity and competitiveness. In short, the committee will recommend means of reducing costs, improving quality and expanding markets.

While the Canadian Council of Professional Engineers will be responsible for co-ordinating and assessing the program across Canada, CCPE constituent Associations will act as facilitators by proposing to interested parties (government agencies for economic development, venture capital funds, financial institutions) a list of names of professionals qualified to carry out the responsibilities of the advisory committee. They will also keep their members informed about the program, recruit candidates, and follow up on results.

The implementation of this project will be contingent upon achieving appropriate support from "funding organizations" within their existing programs. These will identify companies that could benefit from the assistance provided by the Technical Advisory Board, and promote the idea amongst potential clients. They will also finance the participation of Board members (honorarium and attendance fees) and will administer the Technical Advisory Board within their current program and in conjunction with provincial Associations. Remuneration for the professionals involved will be similar to that applicable to company directors.

This program will provide many benefits to small and medium businesses. First of all, it will provide a management and planning tool that is technically simple, flexible and adaptable. With ongoing access to many different sources of expertise, it will familiarize business executives with the role and the contribution of technology and of engineers in the growth of their businesses.

The program will also provide continuous support to other government initiatives and programs that are already available to small and medium-sized businesses and are normally provided for a limited period of time. Perhaps more importantly, it will stimulate the development of a technical culture within small and medium businesses, and create role models for that community. Finally, it will go a long way towards enhancing the profile of engineers in Canada.

The Board of Directors of CCPE has given approval to one-year pilot projects in Canada during which the results will be reviewed and the program adjusted. Several CCPE constituent Associations, including the Ordre des ingenieurs du Quebec (OIQ), the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA), the Association of Professional Engineers of Manitoba (APEM), and the Maritime provincial Associations have made a commitment to launch pilot projects in their provinces. Following a successful trial phase, an action plan would be prepared for national implementation.

Canadian companies and organizations, both private and public, must integrate science and engineering into a strategy for producing quality services and products. The CCPE Technical Advisory Board will help us achieve this objective. □

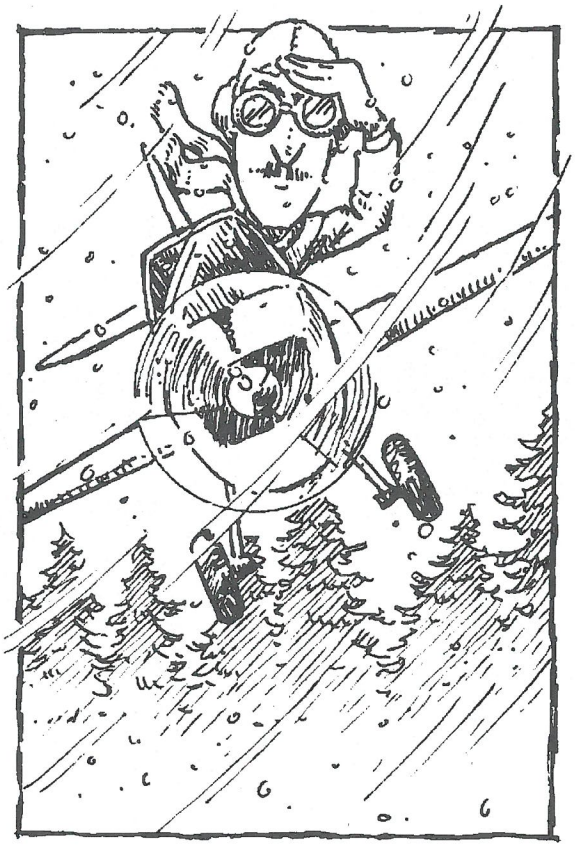
The Berens River Flyer

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

In January, I had the pleasure of travelling to the community of Berens River. For those not familiar with God's country, Berens River is located on the east shore of Lake Winnipeg, about 300 km northeast of the thriving metropolis of Winnipeg. Our firm, DS-Lea Consultants, was retained by the Southeast Tribal Council to inspect the bridge over the river of the same name and conduct a load-rating study. Now some of our readers will astutely point out that January would not be their first choice for doing inspection work, having something to do with wind chills and frostbite. But not for those accustomed to Manitoba winters (I'm lying through my teeth). I believe it also had something to do with contractual obligations, a minor consideration. Anyways, work is work, and I joined my burly companion, Mike "Roald Amundsen" Hatch on this journey.

My punctual partner arrived one Wednesday morning to begin our sojourn to St. Andrews Airport. That day, visibility was severely reduced because of strong winds and blowing snow. I didn't think about it a great deal because I was preoccupied with trying to figure out how to generate more heat in a Nissan, short of setting the upholstery on fire. It would turn out that this would be the smoothest ride I would have for two days (foreshadowing, for you literary types).

After finding the hangar of our airline (to remain nameless), we had a short wait for the staff and flight crew. This is always reassuring: I don't like pilots who are in a rush. It was not a big deal, because we were delayed for an hour by the weather. The staff graciously explained to us passenger types that it was usually in your best interest to wait until you could see the control tower. Now, there are those of you out there that might say these conditions wouldn't be a problem for a 747, or a DC-10, or a 320. You're probably right, except we're talking about a seven seat Piper Navajo (including the pilot).



The pilot found the correct runway and positioned himself for takeoff. The first-timers tried to look nonchalant, but I became nervous when told there would be no in-flight movie or headphones available. After pointing the plane into the blustery wind, we were off. We climbed to 500 feet (notice I didn't say smoothly) after passing through 250 feet, no make that 350 feet, no make that 200 feet - I didn't want to look anymore. We turned north thinking the toughest part was behind us.

Wrong. Now I remember what goes up, has to land some place; or something like that. I couldn't convince our pilot to refuel in-flight and make our way to Florida, or another safe haven. When the plane approached Berens River, my understanding of aviation physics told me to think of how I would land on an east-west runway with a strong north-south wind. I hoped that the pilot had at least paid attention during his classes. The plane's pitching and yawing told me that skipping breakfast was a wise move. Judging from our landing, we soon found out that the pilot must have attended the Top Gun Flight Academy. Due to the wind conditions, he came in at about a forty-five degree angle into the wind, cutting into the wind far enough to blow back towards the runway so that the wheels would come down some place on terrafirma. A carrier landing would be luxurious by comparison.

After rubber-legging off the plane, the bridge inspection turned out to be the most relaxing part of the journey.

The next day, we arranged our return to Winnipeg, ahead of schedule. We were told that our trip back would be through Poplar River and Little Grand Rapids. To add to our excitement, the wind was as strong as the day before. From the airport, we watched our plane land, and were reassured by our pilot Kenny, when he said "That was one hell of a landing." "Oh good," I thought, "something to look forward to."

Shortly after taking off from Berens River International Airport (no duty-free available), we were alerted by a sharp, buzzer-like noise, emanating from the pilot's console. So close to takeoff, I hoped it meant that the coffee was ready, but I was afraid it might mean our wheels would not clear the adjacent lodge roof, conveniently located near the end of the runway. Fortunately, we cleared the roof with at least five or six feet to spare.

Our route to Poplar River was shrouded in fog above 500 feet. This gave our pilot, Kenny, an opportunity to practise his stealth training (flying low under enemy radar). The inertial guidance

Continued on page 16

Meet Manitoba's Future Scientists

By: C. Okell

Through the Innovators in the Schools program, I was asked to recruit volunteers for two large science fairs.

I was rather impressed with the planning and thought that goes into the students' projects. Here are a few examples of the evaluation criteria which sound a little bit like those for the Olympic figure skating roster!

- Scientific Thought
  - scientific/technical relevance
  - programming techniques/sophisticated use of computer potential
- Originality
- Understanding/Presentation
  - confidence/ease of delivery
  - appropriate scientific vocabulary
- Exhibit
  - layout
  - dramatic value/effectiveness
- Project Summary/Log Book
  - evidence of planning and continuous record-keeping

Both divisions have French immersion programs, and both English- and French-speaking volunteers are needed.

River East Divisional Science Fair
Friday, April 16
8:30 - 11:30 am Judging grades 4 - 6
12:00 - 3:00 pm Judging grades 7 - 12

Science/Mathematics Fair
St. James Assiniboia School Division
Friday, April 16
8:45 - noon Judging k - 6
1:00 - 5 pm Judging 7 - 12

If you can free up a few hours in your busy schedule and are willing to share your enthusiasm for science and technology with students, please contact:

Charlene Okell
Science/Technology Awareness Network Inc.
411 - 435 Ellice Avenue
Winnipeg, Manitoba
R3B 1Y6

Phone: 943-8482
Fax: 944-0584

APEM Addresses University Education Review Commission

By: B.A. Dobran, P.Eng.

"Today's concerns with a more competitive global economy, the environment and the proper efficient use of our natural resources make it essential that significant attention be given to the needs of the Engineering Faculty."

This statement appeared in APEM's presentation to the University Education Review Commission, presented December 3, 1992. The brief was prepared by Stu Ursel, Vice-Chair of the Professional Development Committee.

Several important points were made:

1. Since APEM is charged with the protection of the public under the Engineering Profession Act, it places considerable emphasis on ensuring that the engineering educational experience delivered in this province remains current, innovative and vital.
2. APEM considers it necessary that the University, Federal and Provincial Governments and business sector be cognizant of society's needs. Mention was made of the predicted shortfall of 19,000 engineers over the period 1992-2002, with about 5,000 new employment opportunities in the prairies.
3. The needs of the local manufacturing and consulting engineering community must be addressed through improved consultation (read, "funding"). (For example, Manitoba is home to the third-largest aerospace industry in Canada but, for want of funding, no degree program is offered in aerospace engineering.)
4. APEM is concerned that, due to the relatively low ratio of engineering students (5% of the total University population), issues which may have a significant impact on the Engineering Faculty are often given minor consideration by faculties which are not as significantly affected. APEM suggests a different weighting of the votes, or an increase in the number of senate seats delegated to the Faculty of Engineering.
5. The economic life of this province is heavily dependent on the support of the engineering profession. APEM is prepared to assist the University by providing support to the governance of the University in whatever way the commission or the University feels can be the most constructive.
6. The importance of research cannot be overemphasized. Research must be directed to addressing issues which will enhance our products and, therefore, improve our competitiveness in the global market. There is also a need for excellence in transferring the educational benefits of research to the students.
7. University funding of the Engineering Faculty must take into consideration the importance of the contribution of engineering goods and services to the provincial economy. At present, education funding does not do justice to the importance of the engineering field. "In an area as important to our economic future as engineering, increased funding must be viewed as an investment, not an expense."



8. Engineers in today's workforce are a resource that should not be neglected. The University, in co-operation with industry and the Association, can play a pivotal role in providing the opportunity for practising engineers to continually upgrade their skills in the technical, managerial and professional aspects of their chosen fields.
9. Alternate methods of exposing students to the various needs of industry in their formative years (eg. Co-op program) should be investigated.
10. The student attrition rate in the Faculty of Engineering is of great concern to the profession. The current attrition rate of 35% in the first two years is considered to be a waste of valuable monetary and human resources. Therefore, it is imperative that the issue be addressed. Possible solutions are: providing practising engineers to present special Career Days and Student Awareness activities in the schools; and increased co-operation in promoting the image of engineering as a career option to elementary and junior-high schools.
11. Engineering must become a gender-neutral discipline (at University and in the workplace) so that the profession is not deprived of 50% of the population from which to recruit some of the brightest minds.

APEM's submission to the University Education Review Commission contained the following conclusions:

1. The technological capability provided by the engineering profession makes the Faculty vital to the generation of wealth in this province and this country. Therefore, significant attention must be paid to the quality and numbers graduating from our University.
2. APEM will continue to support and improve the engineering program at the University of Manitoba, with the hope that the Commission will urge the Governments of Canada and Manitoba to do the same.
3. APEM is willing to work with the Commission "in the quest to improve the quality of education in this province." □

What If I Don't Pay My Dues On Time?

All members who have not paid their 1993 Annual Fees are reminded that, if all outstanding fees and penalty charges are not received in the Association office on or before June 30, 1993, their names will be removed from the register and they shall cease to be members.

Persons who are deregistered may not practise engineering in Manitoba or use the title "Engineer".

No exceptions are allowed under the Association By-Laws.

Those who are deregistered for non-payment of fees may apply for reinstatement. Each applicant will be required to: pay the current deregistration fee; pay the current annual membership dues, prorated as set by Council; pay the current admission fee; write and pass the Association's Professional Practice Examination; provide the names of referees who will verify at least two years of their recent engineering work experience; and provide Council with a satisfactory explanation as to why the membership was allowed to lapse.

Professional Development

Engineering Failures

By: R.J. Bruce, P.Eng.

A Breakfast Meeting on the topic: "Engineering Failures: What Can We Learn?" was organized by the Professional Development (PD) Committee of the APEM and held at the Viscount Gort Hotel on Monday, March 1, 1993.

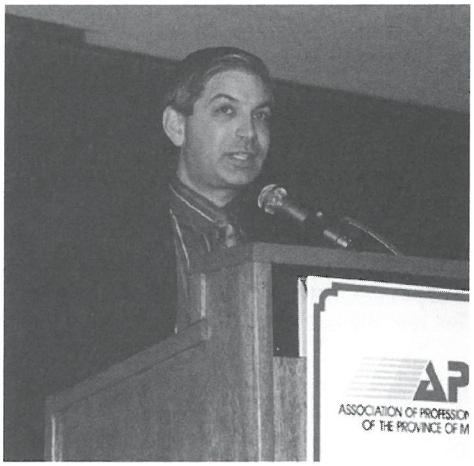
This presentation was given by Kenneth Carper, School of Architecture, Washington State University who was in Winnipeg to make a similar presentation to engineers at Manitoba Hydro. The PD Committee only became aware of this speaker after the February mail-out, and was unable to use the traditional means of publicizing this meeting. However, we did get a turnout of 38 people – which isn't bad, for a Monday morning!

This was an entertaining and informative presentation which defined and classified engineering failures, discussed the subject of forensic engineering, talked about the relationship of litigation to this subject and discussed the moral obligations of engineers in being involved in preventing accidents. He used many slides in his presentation to illustrate the collapse of buildings, bridges and other structures.

Mr. Carper has received five awards for being an outstanding educator, and the excellent presentation was polished, thought-provoking and stimulating.

An engineering failure was defined as "an unacceptable difference between expected and observed performance". He illustrated this by showing a slide of the Hotel California which was still standing after an earthquake. Many engineers considered that to be a success, since the main components of the structure withstood a severe earthquake; however, the owner was disappointed because he expected that the walls and windows would be undamaged.

Construction accidents were also discussed. These are a significant concern in the U.S., where there are 2,200 fatalities per year in construction. These accidents are mainly due to inadequate support of structures during construction. Several slides were used to show the collapse of buildings under construction. There is quite a bit of interest in U.S. construction failures and accidents in Japan, where there are very few incidents. Engineers are often counselled not to tell contractors when they feel that a site is unsafe since they may be held responsible if there is an accident at the site. However, Mr. Carper pointed out that an engineer has a moral responsibility to try to have unsafe conditions corrected.



Ken Carper discusses Engineering Failures.

The issue of whether litigation or mediation should be used to determine causes and liabilities of engineering failures was discussed. In several cases in the U.S. there has been an excellent technical determination of the causes, and a settlement of these cases by mediation.

Kenneth Carper is also Past-Chair of the National Technical Council on Forensic Engineering of the ASCE, the author of the book titled FORENSIC ENGINEERING, and the editor of the ASCE Journal of Performance of Constructed Facilities. Copies of this journal, which appears to be an excellent source of analyses of failures of constructed facilities as well as a source of ideas on improving safety in engineering projects, were distributed at the meeting. A copy of this journal can be seen at the APEM office. In promoting the journal, Mr. Carper made the point that the Station Square failure in Burnaby was very similar to a failure in a plaza in Tennesee two years prior to the Station Square failure and that, had those designers taken note of the accident in Tennesee, the Station Square collapse probably would have been avoided. The book was also available for viewing and there was considerable interest in it. □

Total Quality Management Re-Visited

By: J. Lucas, P.Eng.

With the air of unseasonably warm temperatures, Mr. Daniel Moceri, Vice-President of Branch Operations, Landis & Gyr Powers, drew a record number (102) to his January 21, 1993 breakfast presentation on Total Quality Management.

Mr. Moceri speaks with the advantage of having three years' exposure to TQM at Landis & Gyr Powers. He shared his organization's experience with the early morning group.

A key part of TQM is the transfer of information in as succinct, rapid and error-free a manner as possible. To this end, Mr. Moceri supported his point-form slide presentation with many colourful and educational examples.

To show that we have learned our lessons, we present Mr. Moceri's succinct TQM information transfer system:

Seven key requirements in TQM:

1. Corporate Leadership/Direction.
2. Competition Benchmarking.
3. Training.
4. Introduction/Roll-out.
5. On-going Implementation (goals).
6. Measurement.
7. Communication (extraordinary).

Why TQM is needed:

1. Customers demand quality.
2. Customers are limiting a number of suppliers.
3. Customer requirements change solutions and require faster solutions.
4. Yesterday's processes are not effective for today's requirements. (New needs require innovative solutions.)
5. Eliminate non-value processes.

What TQM is not:

1. Not a substitute for good management.
2. Not a quick-fix solution.
3. Not free (in the beginning).
4. Not easy to implement.
5. Will not solve all company issues.

TQM is a systematic way to meet customer needs through:

1. Structured problem-solving.
2. Measuring what's important to customers.
3. Establishing a culture of continuous improvement.
4. Empowering people/teams to make changes.
5. Senior management's commitment to quality.

Breaking down the seven key points, Mr. Moceri presented the following slide information:

1. Corporate Leadership/Direction Must:
   - Define direction.
   - Define goals.
   - Change management needs.
   - Provide measurement.
   - Create environment for quality initiatives.
2. Competitive Benchmarking:
   - Learn TQM strategies.
   - Challenge business as usual.
   - Outside Look – Adapt Best Practices.
   - Sources – Major Customers
     – Competitors
     – Surveys
     – Trade Associates
3. Training:
   - Starts at top.
   - Mid-level managers are key "Champions".
   - Team captains required to carry the concepts.
   - Eventually all employees must become involved.

Continued on page 15

Council Reports

January 11, 1993

By: V.L. Dutton, P.Eng.

AT WHICH COUNCIL INTRODUCES A DEREGISTRATION FEE AND RESCHEDULES ITS MEETING WITH THE ENGINEERING FACULTY

With all but two councillors present, this meeting was impressive by the even tenor with which its business was conducted. The interested/concerned reader may telephone the Association for the details of transfers, engineers-in-training, the budget sheet, and similar items of a routine nature. (See APEM-Builders, Inc., below, for an item that may affect the budget.)

The University Liaison Committee and Council enjoy an annual dinner at the University following which there is an extended discussion of one or more topics of concern to the Association and the Faculty. In the past, this evening has been held prior to the election of new councillors. The result has been that some of the value of the evening has been lost when one or more councillors found themselves NOT re-elected. To rectify this situation, the committee has recommended that the dinner be held following the Annual General Meeting. In fact, for the coming year, Council accepted the recommendation that the dinner be held on the evening of the day on which the November Council Meeting is held so that the out-of-town councillors would not have to make an extra trip into the city. Smart thinking!

The Legislation Committee continues to address the changing times with proposed changes to our Act. One suggestion from Council is that "microbiology" and "applied science" be added to the list of subject areas that are applied to engineering under the definition of "Practice of Professional Engineering." The report of the committee is being sent to our legal counsel for review.

Two of our Past-Presidents appear to be destined for "greater things". Council authorized our Registrar "to develop a nomination for G.E. Laliberte, P.Eng., for the position of President-Elect of CCPE" and "to approach K.A. Buhr, P.Eng., to allow his name to be placed in nomination as a member of the CCPE Executive Committee". I know you will join me in wishing these associates of ours well in their new endeavours at the national level.

It is called the "deregistration fee" but it might better be named the "re-registration fee" since it is what you will have to pay if you fail to remit your annual dues by the end of the six-month period of grace following the due date. In addition to the late registration fee of $50, you will be charged the sum of $300. (See article elsewhere in this issue.)

Six countries: Great Britain, the United States, Ireland, Australia, New Zealand, and Canada have been working toward a process of mutual recognition of academic credentials. The final agreement has been reached with the Institution of Professional Engineers of New Zealand. In a world of increasing mobility for engineers, this six-country agreement will be welcomed by many of our younger members.

APEM-Builders Inc.

The final item I wish to mention concerns a proposal from one of our associates whom many will know and for whom I have, over the past few years, developed a great respect. However ...!

Ted Glass has proposed that our Association "support an initiative to completely sponsor one of the 18 homes" that are to be built in a special 'blitz year' (1993) by Habitat for Humanity. Most will know that the Habitat for Humanity program erected four homes, for low-income families, in a period of a week this past summer in the Point Douglas area. They have set their sights higher this year and Ted wants APEM to become involved.

Ted writes, "So how would it be done. One alternative would be for Council to endorse the program and assign it to the Public Awareness Committee for implementation..."

This item did not produce much discussion by Council as they are obviously waiting to see how it will "fly" amongst you people since, as the minutes record, "Mr. Ennis agreed to approach a few people to champion an APEM-sponsored home under the 1993 Habitat for Humanity program in Winnipeg. This matter will be put on the next agenda for the endorsement a champion and discussion. Council agreed that a notice should be included in the next mailing and that Mr. Glass should be asked to prepare the notice." I look forward to reading a number of interesting letters-to-the-Editor as a result of this proposal. □

February 8, 1993

By: A.E. Ball, P.Eng.

AT WHICH COUNCIL UPHOLDS THE NEW CODE OF BUSINESS CONDUCT

President Carl Anderson runs a tight ship. Towards the end of lunch he began a countdown, minute by minute, to announce the start of the meeting (which caused a great flurry of councillors around the remaining sandwiches and cookies). Perhaps he had prior knowledge that this would be a four-hour meeting.

Registrations

The meeting had just begun when the first of two long discussions began. The first was over the qualifications of a transfer request from an individual currently registered in another jurisdiction. That individual held an unrecognized Bachelor's degree, with post- graduate standing from a Canadian university without CEAB accreditation, and had not been assigned any examinations prior to registration. The discussion was not about whether this individual qualified to register by transfer (Council quickly agreed to ask the Board of Examiners to review this case), but whether or not all registration requests were being treated identically (i.e. fairly and equitably in accordance with the Code of Business Conduct). To ensure that the answer to that question will always be a resounding "Yes", a motion was passed to modify the review process by requiring all applications for transfer to be referred to the Board of Examiners if they do not hold CEAB-accredited undergraduate degrees.

The second major discussion was over an appeal against policy on academic qualifications. Again, the discussion did not centre on the individual case as much as it did on ensuring that the applicant was being treated fairly and equitably, within the confines of the Engineering Profession Act and the By-Laws of the Association. This reporter was privileged to witness these two thorough, albeit lengthy, discussions, mainly because it gave me great satisfaction in seeing Council act in such an open and honest fashion.

Council felt that one of the applicants for registration, who had received his Masters and Ph.D. degrees in eastern Europe and who had been assigned one confirmatory exam by the Board of Examiners, should be congratulated in his letter of notification for obtaining an almost perfect mark in his exam. Having written a number of APEM exams myself (and knowing how difficult they can be), I also take my hat off to this gentleman.

Office Space

It was noted that the APEM lease is up for renewal this year and some initial concepts were tabled that compared leasing with ownership of space. The Ad-Hoc Premises Committee will meet soon to appraise, in greater detail, the potential of new lease space and properties for sale.

Sustainable Development

Mr. Jack Atchison, Chair of the APEM Task Group on Sustainable Development, updated Council on the progress of the Task Group. Mr. Atchison described a series of awareness lectures and panel discussions planned throughout 1993 and 1994 and targeted at experienced engineers and engineering managers. The program would initially centre around business, economic, and societal relationships with Sustainable Development. Further education would include application programs dealing with specific projects or industries, such as hydro-electric power, water supply systems, mining, forestry, etc. Program delivery could very well be handled by a cross-section of APEM's standing committees. Members should find these programs very enlightening. □

Meet Your New Councillor

J.M.(Mal) Symonds, P.Eng.

By: W.G. McKay, P.Eng.

It was a very pleasant and informative interview which the writer held with Mal Symonds, one of the newly elected councillors of APEM.

Mal was born in Scotland, came to Canada and settled with his parents in Vancouver. After high school, he joined the Royal Canadian Navy and became a Navy pilot. When asked where home was, he said he had lived from east to west and up to the Arctic Circle. While still in the services, he began some university training in the sciences. Then, having made a final decision to become a graduate engineer, he left the Navy and entered the University of Manitoba in Mechanical Engineering and graduated in 1977.

Upon graduation he joined Bristol Aerospace Ltd. and has continued to advance his career through many phases of their operations to his current position as Director of Aircraft Engineering, a senior executive position. He modestly says he was "in the right place at the right time", but one detects it was ability, motivation and hard work that was responsible.

Mal is an engineer with a strong lifetime interest in the aeronautical industry of Manitoba. He sees it approaching the "critical" mass in the near future, a time and condition when Manitoba and especially Winnipeg will be recognized worldwide for its excellence in human resources in the aeronautical industry.

While the Faculty of Engineering does not have an aeronautical engineering discipline, Mal promotes the introduction of aeronautical aspects to the disciplines where it is applicable so that graduates may relate to this local market-place. Moreover, as off-shore engineering personnel join the local industries, he will promote the assistance of the Association and the University in their assimilation and registration. Similarly, the technology graduates of Southern Alberta Institute of Technology (SAIT), whose advisory board he is on, are an excellent resource to this growing industry, and their acceptance as part of the engineering team is highly desirable.



New APEM Councillor Mal Symonds

Mal has been a member of the Association since his graduation and in that time has been a member and currently is Chair of the Salary Research Committee. During this later period the objectives were researched and a mandate was established.

He is also a member of the Discipline Committee and is the liaison councillor on the Consulting Engineers Committee.

On a volunteer basis he has been the Treasurer, President and Councillor of the Winnipeg Chapter of the Canadian Aeronautical and Space Institute, a Canadian professional organization.

For over 15 years he has been associated with the 402 Air Force Squadron, Winnipeg, having served as its Commanding Officer.

Mal is also the Manitoba member for the Canadian Forces Liaison Organization, an organization which acts as an Ombudsman between the Reserve Forces and Industry.

Mal Symonds is a keen, but modest, highly motivated engineer, and a champion of a major segment of Manitoba's industries. □

Join The Team!



If you are interested in joining an APEM Manitoba Marathon team, please call Murray Vanderpont at 284-0580.

Cause for Concern?

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

How well-equipped are Manitoba's high-school graduates to handle the pressures of university life?

Not well at all, according to the statistics I was exposed to, recently, at an Engineering Faculty Council meeting at the University of Manitoba.

It seems that the average engineering student requires 4.7 years to complete the four-year program; that the attrition rate in first year of engineering is still 30%; and that fewer than half of the members of any first-year class actually end up graduating.

The statistics on student performance in first-year engineering are not very encouraging: while the passing grade is 2.50 (C+), the average grade-point average (GPA) for the first term of the 1992-93 session was 2.29 - barely over a C. In calculus, the average grade was 1.92 - below a C. These statistics have not changed much over the past five years (average GPA's for first-year classes of 354-438 students have ranged from 2.22 to 2.31, with average calculus grades ranging from 1.87 to 1.99). In fact, only in mechanics and graphics have the class average grades been above the pass-mark in the last five years.

So what is being done to help rectify this problem?

Considerable efforts are being made by the Faculty of Engineering. Not only have a number of committees been created to address the transition from high-school to university life, in terms

Continued on page 16

Meet Your New Councillor

J.G.(James) Hildebrandt, P.Eng.

By: A.E. Ball, P.Eng.

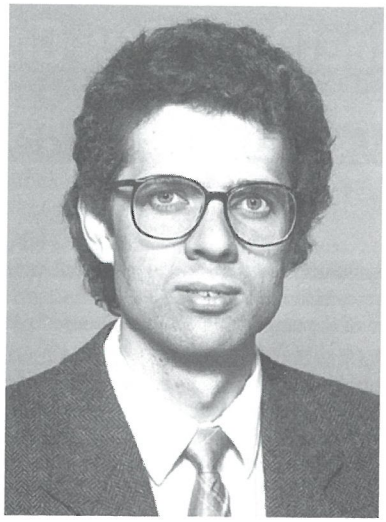
James was elected to Council in October, 1992. Although a newcomer to Council, James is very well known by all those early risers who have attended APEM breakfast meetings put on by the Professional Development (PD) Committee. James has been a member of the PD Committee since 1986 and Chair for the last three years. He also served on the University Liaison Committee from 1986-91, and the Nominating Committee from 1989-92.

James is Manitoba-born and -raised. He completed his Bachelors Degree in Mechanical Engineering at the University of Manitoba in 1980, before moving on to Edmonton to obtain his Masters in Mechanical from the University of Alberta in 1982.

James began his professional career at Wardrop Engineering in 1981 as a member of the firm's Computer Modeling and Engineering Analysis Group. He soon found himself knee-deep in solving linear and non-linear thermal, stress, vibration, buckling, acoustic, fatigue, aerodynamic and fluid problems in the nuclear, aerospace, mechanical, and civil engineering fields. As a project manager and engineering analysis specialist responsible for the distribution of ANSYS finite element modeling programs, James is involved in developing and delivering finite element application courses and seminars to practising engineers throughout Western Canada.

In his time away from work, James enjoys squash as well as outdoor leisure activities with his friends and family. Downhill skiing and summertime camping and hiking in the mountains are some of his favourites. Adventurous as he is, James has also dabbled in mountain climbing and white-water kayaking.

James has also found time to participate in other professional organizations. He is a member of the Canadian Nuclear Society and the Canadian Society for Mechanical Engineering (CSME). He was Vice-President of the CSME Prairie Region between 1990 and 1991. James was also a Mentor in the University of Manitoba Mentor Program between 1989 and 1991, and has been a Thesis Consultant for the University of Manitoba Engineering Graduate Studies for the last four years.



New APEM Councillor James Hildebrandt

During his term as councillor, James will be seeking to increase the role of the APEM in serving the profession and the members while maintaining its primary function of protecting the public. He feels that the Association is well-positioned, as a major organization of the profession, to promote a more coherent engineering community through existing technical societies, to facilitate education programs for practising engineers of all ages, and to enhance the public's image and understanding of the engineering profession.

We welcome James Hildebrandt to Council. □

Engineering Booth Wins First Place At Career Symposium '93

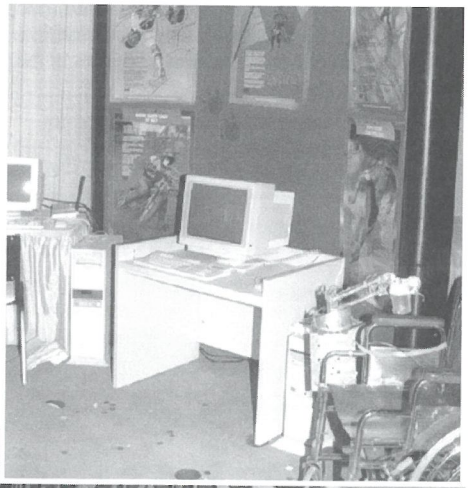
By: R.J. Eden, P.Eng.

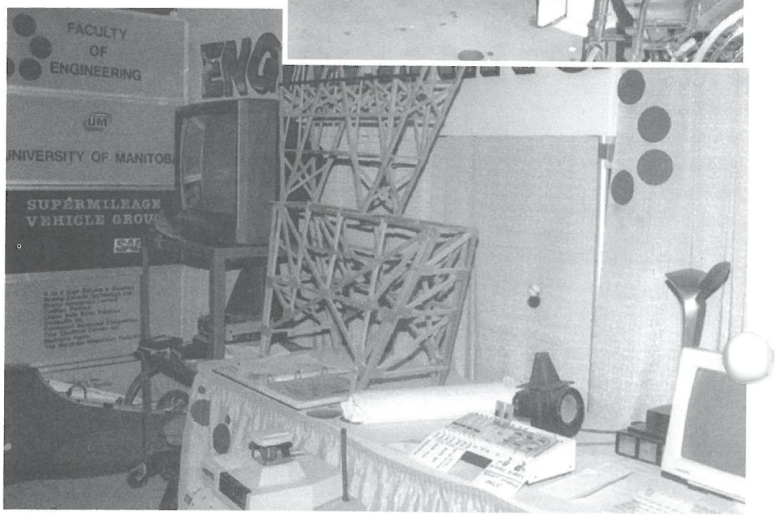
Engineering was once again featured as a career option at Careers Symposium '93, held at the Winnipeg Convention Centre on February 8, 9, and 10. APEM, the Faculty of Engineering, and student representatives of various committees all took a very active role in helping to make this year a great success. Congratulations to all of those involved who helped in winning FIRST PLACE for the booth in the Post-Secondary Education category!

The Engineering Booth was manned by volunteers comprising engineering students, professors, and members of APEM. This booth attracted a lot of attention as a result of various exhibits including a small robot, a Super Mileage Vehicle, a model airplane, two computers running interactive programs, and an award-winning mechanical arm for a wheelchair. This year, information cards were also filled in by anyone interested in engineering as a career. On this card, students could request additional information on various disciplines, a computer disk offering an interactive program describing engineering, and the opportunity to job-shadow a professional. The faculty hopes to be able to remain in contact with these interested students and "track" their interest in engineering.

In addition to the booth, four one-hour seminars were held. Irene Mikawoz, Director of Student Recruitment for the faculty, eight APEM members, an Engineer-in-Training and a student discussed university life, why they chose engineering as a career, and what it's like to practise engineering.

Once again, **Congratulations** to all of those involved in making this year an outstanding success! □





A Breakthrough in Technical Communications

By: J.J. Conklin

Western Economic Diversification (WD) Canada and the Society for Technical Communications (STC) have announced a major research project in western Canada aimed at improving western Canadian competitiveness by bolstering the quality and availability of the technical communication discipline.

The importance of technical communications to the engineering profession is widely recognized. Technical writing and communications are part of the core curriculum of most bachelor of engineering programs in North America. Last May, the Winnipeg Free Press ran a story about electronic engineers. In this story, Fred Cross (an engineer with MTS) stressed the importance of communications. He said that an engineer has to be able to communicate ideas to colleagues, and has to be able to translate technical language for non-technical customers. A few days after this story appeared, Jasper McKee, a scientist at the University of Manitoba, kicked off the 1992 Science and Technology Awareness Days with a speech about the critical importance of communicating scientific and technical knowledge to the public. Today's scientists and engineers, Dr. McKee said, are not always up to the task.



In fact, the importance of communicating technical information is becoming widely recognized throughout North America. As early as 1986, the U.S. Department of Labor identified technical communications as the fastest growing profession in the U.S. The latest U.S. census indicates that approximately 100,000 Americans are employed as technical communicators (writers, illustrators, editors, and educators). What's more, there are over 100 degree or certificate programs in technical communications at American colleges and universities - some of which lead to a PhD.

Technical communication is increasing in complexity and importance, and consequently it is starting to be viewed as a separate and self-contained profession. Many people - engineers, technologists, and even people without a formal technical education - are employed full-time as technical writers, trainers, illustrators, etc.

Canada, however, has not kept pace. While Ontario has two colleges and one university with programs in technical communication, there is nothing comparable in western Canada. Nevertheless, there are many technical communicators working in western Canada, most of them self-trained or trained by their employers. What's more, the companies that employ (or should employ) technical communicators often don't know how to make effective use of the discipline.

The WD-STC research effort aims at correcting this. Assisted by a $90,000 contribution from the WD, the STC will invest $132,000 in a project to research the technical communication market in the west and to identify the regional resources available to service this market. Seen as a comprehensive needs and capabilities assessment, the study will inform western businesses how technical communicators can add value to their products and services.

The research effort is being led by the Manitoba chapter of the STC. Chapter President James Conklin says, "When you consider aircraft can have over 100,000 pages of documentation and most PC software is accompanied by comprehensive instruction manuals, the importance of technical communication is evident. Effective technical communication is essential for companies whose growth depends on their ability to compete in today's highly competitive global marketplace."

For more information about the study, or for information about how your company can participate in the study and see the results of the research, contact James Conklin, President, STC Manitoba Chapter (204) 772-5505. □

Engineers Treat Engineering Students To Dinner

By: D.S. Jayas, P.Eng.

Members of the Canadian Society of Agricultural Engineering were the organizers for the Engineering Student Night Dinner this year. The event, which provides an opportunity for would-be engineers to meet and discuss the profession with practising engineers, was well-attended. The practising engineers sponsor students to the event. The large attendance at the dinner demonstrates the commitment of the engineers to the profession. If you missed sponsoring a student this year, you have a chance to do it next year and many years after that. Keep reading the Manitoba Professional Engineer in depth for details!



Eva Rosinger delivering a Message on the Engineer's Responsibility to Nature.

Students and sponsors exchanged information on "old" professors, curriculum, the job situation and what is involved in practising engineering. The discussion at our table certainly fulfilled the intent of the event. As usual, I had to explain, to students and fellow professionals alike, what agricultural engineering is (i.e. the application of any and all engineering principles to the biological world).

The formal part of the evening brought a welcome from Dr. Jim Townsend, P.Eng., Chair of the organizing committee for the event, and greetings from Deny St.George, P.Eng., CSAE Representative, Dr. Garland Laliberte, P.Eng., Dean of the Faculty of Engineering and Carl Anderson, P.Eng., President of APEM. Carol Klein, representing the Professional Engineers Wives Association, presented bursaries to K. Finnson, J. Veilleux, R. Lyons, and C. Pehura. Dr. Eva Rosinger, P.Eng., Director General of the Canadian Council of Ministers of the Environment, presented an enlightening talk on "Engineering the Environment – We Can Make a Difference".□



President Carl Anderson addressing Students.

Portage Engineering Group Tours PAMI/WESTEST

By: J. Close, EIT

Recently a group of engineers from the Portage la Prairie area convened to form the Portage Engineering Group (PEG). As their first activity, 15 engineers held a luncheon meeting and toured the Prairie Agricultural Machinery Institute (PAMI) on November 12, 1992.

The meeting was kicked off with a quick lunch and a video introduction of PAMI. Bruce Allen, Portage Engineering Group (PEG) member and PAMI Station Manager, continued with an informal presentation and tour of the facility. Participants learned that PAMI was formed in 1974, with the mandate "to improve the design and aid in the selection and use of agricultural machinery in the prairie provinces." There are two PAMI stations, one in Portage and the other in Humboldt, Saskatchewan. Traditionally, PAMI engaged in the evaluation of agricultural machinery and applied agricultural research projects. The Portage station's primary agricultural focus is in the materials handling, hay and forage, and tractor-testing areas (PAMI is the only authority in Canada for tractor performance testing designated by the Organization for Economic Co-operative Development (OECD).) The Humboldt station handles activity related to grain harvesting, soils and crops, and Roll Over Protection Structure (ROPS) testing. PAMI has published over 600 evaluation reports and numerous research reports.

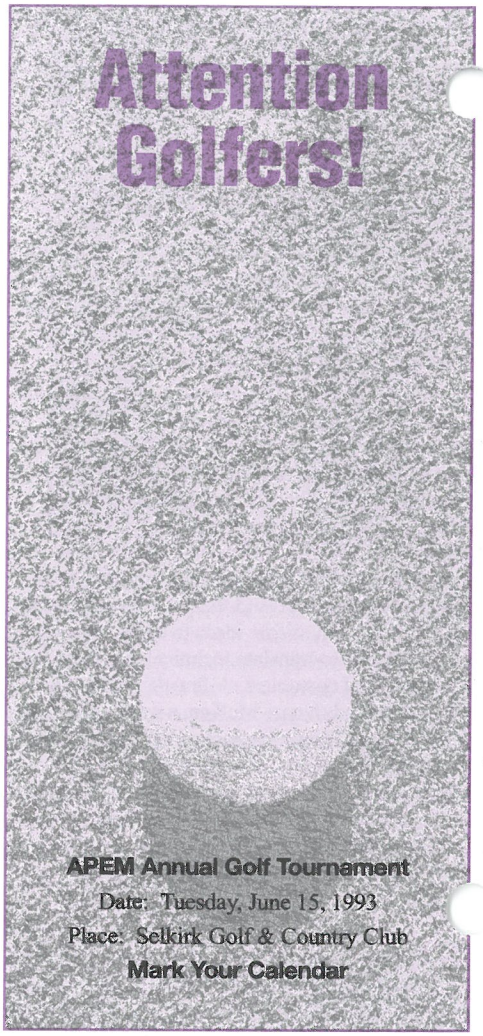
In addition to the traditional agricultural areas, PAMI has become proactive in providing development services to the industrial as well as the agricultural sectors. This includes providing assistance in the form of engineering analysis, physical testing, and prototype modifications to manufacturers in the development of their products. Two specific initiatives have been recently undertaken: packaging testing and a new organization called WESTEST.

The package testing program involves the certification of hazardous goods containers to Canadian and International standards. PAMI is registered with Transport Canada to provide these services. Various types of containers are subjected to a series of fatigue and destructive tests on site. Manufacturers from across Canada and the United States have found PAMI's package testing program expedient and valuable in attaining the necessary certifications.

PAMI has also been instrumental in the creation of Canada's newest physical testing lab. WESTEST is owned by a consortium of industry partners (Prairie Implement Manufacturers Association, J.I. Case, John Deere, Saskatchewan Mining Association, and Manitoba Hydro), and was made possible with additional funding through Western Economic Diversification. WESTEST is operated by PAMI through a management contract. WESTEST provides three primary services to industry including force and vibration simulation, stress measurement and analysis, and noise and vibration control. WESTEST held its official grand opening on October 13, 1992 and has undertaken a number of projects to date.

The meeting concluded with a brief tour of both the PAMI and WESTEST facilities. PAMI operates a 790 m^2 facility comprising a shop area complete with prototype fabrication equipment, two large overhead access doors, a wide array of testing equipment, and offices. Participants were able to see some of the package testing equipment on hand. WESTEST operates out of a 370 m^2 building complete with a 1,200 mm-thick concrete reaction mass for the force and vibration simulation equipment, as well as a 600 mm-thick concrete strong floor for component testing. Participants observed a demonstration of a vibration fatigue test on a hazardous goods container as well as a fatigue test of a road vehicle component. A demonstration of the portable sound and vibration measuring equipment was also conducted. Allen explained that WESTEST's sound-related services are unique in the prairie provinces. Not only can the equipment be used to provide sound-pressure spectra, it can also provide sound-intensity measurements. Sound intensity incorporates directional quantities into the analysis of sound. The equipment is effective in determining suitable noise-reduction methods.

Portage area engineers or other interested individuals can obtain information about PEG from Alphonsus Utioh (239-3179), Dan McInnis (857-9781) or Jon Close (239-0160). □



University of Manitoba Faculty of Engineering Addresses University Education Review Commission

By: B.A. Dobran, P.Eng.

Dr. Garland Laliberte, Dean of Engineering, presented a brief to the University Education Review Commission in December, 1992. As expected, his presentation made the same points and raised the same concerns as did the APEM brief. The Faculty of Engineering brief, however, was written in far more detail, complete with colour photographs and bar graphs (which were shown as slides at the presentation).

In the budget discussion, some historical information was provided. In 1984, the Engineering Faculty received a $2.5 million Economic Development Grant which the Government of Manitoba made available to the Faculty over a period of three years. This, coupled with some re-allocation by the University, helped make the Faculty one of which Government, Industry and the University could be proud. However, over the past three years, much of the corrective action has been eroded as a result of the University's declining resources. Worse still, engineering's support has barely kept up with the rest of the University.

It was sad to read about the Faculty's serious space and equipment deficiencies, and to see the photos which support the statements. What can be done, and who is going to do it?

The Engineering Faculty's brief recommends that the University Education Review Commission urge the Government of Manitoba to invite a proposal from the Faculty of Engineering for an Economic Development Grant consisting of a capital allocation plus an annual operating budget allocation to enable the Faculty to maintain its accessibility and the quality of its current programs, and to introduce a new bachelor's degree program in Environmental Engineering. It also recommends that the Faculty of Engineering continue to be accessible to Manitobans who want and who are capable of obtaining an engineering education. The Faculty also wants to undertake programming to reduce attrition in its bachelor's degree program. □

Meet Your New Councillor

D.G.(Donald) Osman, P.Eng.

By: B.A. Dobran, P.Eng.

Donald Glenn Osman, P.Eng. is one of our new APEM councillors introduced to the membership at our Annual General Meeting on October 30, 1992. Not that Don is a new face on Council: he chaired the Research and Development (R&D) Committee for three years prior to his election as councillor. The R&D Committee generated the Policy on Sustainable Development which was adopted by Council last year. There is a Task Force, reporting to the R&D Committee, charged with implementing the policy of sustainable development.

Don was recently appointed the liaison councillor to the R&D Committee. On the subject of Sustainable Development, Don believes that most engineers have practised it throughout their professional careers. "The challenge is to have the profession fully informed, taking it into consideration as a matter of course in their practice."

Donald G. Osman obtained his B.Sc. Civil Engineering from the University of Manitoba in 1974. Over the years, Don has been involved with construction work (commercial, industrial, residential and heavy construction), waterworks (Water Resources Branch, Province of Manitoba) and roadworks (Perth, Australia). Don is currently reporting to the department head of the Industrial Research Assistance Program (IRAP) to provide this service to the construction industry.

IRAP is an initiative of the National Research Council (NRC). Don represents NRC - IRAP and Economic Innovation and Technology Council (EITC) on the R&D Committee, Manitoba Home Builders Association (MHBA), Canadian Construction Research Board (CCRB), University of Manitoba Tall Structure Lab Advisory Board and the Canadian Society for Civil Engineering.

Don Osman believes that it is important to enhance the profile of the engineer. Perhaps the media should be more aware of our engineering accomplishments, so that the public has a better perception of our profession. Don feels that it is essential for APEM to be progressive, and to be innovative, especially in light of intense global competition. He thinks that there is room for the Association to lead the way, not just maintain the status quo. □



New APEM Councillor Don Osman

What Is The Standards Council of Canada?

By: R.M. Muzyk, P. Eng.

The mandate of the Standards Council of Canada (SCC) is to foster and promote voluntary standardization in fields relating to the construction, manufacture, production, quality, performance and safety of buildings, structures, manufactured articles and products and other goods, including components thereof, not expressly provided for by law, as a means of advancing the national economy, benefitting the health, safety and welfare of the public, assisting and protecting consumers, facilitating domestic and international trade and furthering international cooperation in relation to standards.

This mandate is fulfilled through the National Standards System (NSS) which is coordinated by the council and is composed of the following members:

- accredited standards writing organizations
- accredited certifications organizations
- accredited testing organizations
- accredited quality systems registration organizations
- the Canadian National Committee of the International Electrotechnical Commission (CNC/IEC)
- the Canadian National Committee on the International Organization for Standardization (CNC/ISO)

Specific objectives of the Standards Council are as follows:

1. **Recognition of the National Standards System**

   To promote awareness of the NSS and use of products and services available from the council and members of the NSS by industries, all levels of government and consumers.

2. **Acceptance and Use of Standards**

   To encourage the accredited standards writing organizations of the NSS to advance standards in use in Canada to the status of National Standards of Canada, and to promote the harmonization of national and international standards and their use by industry and government.

3. **Sensitivity to needs for Standards**

   To work through the National Standards System to promote interaction and dialogue with consumers and industry representatives to identify and respond to their needs for Standards.

4. **Accreditation of Organizations**

   To actively promote the accredited status of existing and new members of the NSS, as well as the value and quality of their work. SCC will increase the scope and number of accredited organizations as required.

5. **Essential Contribution of Volunteers**

   To promote the essential contribution of volunteers in increasing and maintaining the strength of the NSS.

6. **International Representation**

   To represent Canada in international standardization forums on strategic issues of concern to the domestic industrial and standardization communities.

7. **Information Services**

   To maintain and develop information services on national, regional, foreign and trade association standards and other standards related documents to meet user needs and to comply with bilateral and multilateral trade agreements.

8. **Standards Sales Service**

   To develop and expand its product lines and inventory of standards to ensure that Canadian industry has ready access to the information required to be competitive in world markets.

9. **Formation of Strategic Allowances**

   To work co-operatively with consumers, industry, labour and government to promote the recognition, development, uses and benefits of standardization, including the enhancement of: quality systems, health and safety, productivity and efficiency, international competitiveness and trade, research and development, product acceptance and the environment.

10. **Quality Systems**

    To promote implementation and use of quality systems in Canada, in line with the global drive for quality, and to establish and administer a program for the accreditation of register of quality systems.

11. **Environmental Issues**

    To promote the use of standards and standardization in environmental programs and to actively encourage participation on Council committees by representatives of groups concerned with the environment.

12. **Effectiveness, efficiency and economy**

    To continue to evaluate SCC's programs and organizational structure to increase effectiveness, efficiency and economy consistent with government policy.

13. **Cost recovery and revenue enhancement**

    To increase revenue from new and existing sources and maintain an orderly move towards cost recovery without hindering the growth of progress. □

Research & Development

Environmental Approvals in Manitoba

By: J. Begin, P.Eng.

At a luncheon held January 20th, Larry Strachan, P.Eng., addressed a group of over 80 APEM members on the process of licensing projects under Manitoba's Environment Act. Larry, who is the Director of Environmental Approvals at the Department of Environment, did a commendable job. In the brief 30 minutes allotted, he presented a concise summary of what obviously is a very complicated process.

The Environment Act, passed in 1988, replaces the former Clean Environment Act. The act complements planning and policy mechanisms and provides for environmental assessment of developments with significant impacts, including public participation.

Developments are divided into three classes, according to the size and type of environmental impact. Class 1 developments are pollution-related (e.g. asphalt plants). Class 2 projects are those which affect other uses of a natural resource such as land or water. Class 3 developments are large-scale projects such as highways, hydro projects and water diversions. (The recently cancelled Conawapa project is an example of a Class 3 development.)

Manitoba Environment has provided a "one window" application process; proposals for all three classes of developments are filed with the same office (Environmental Approvals). Within 30 days of a proposal and accompanying environmental impact assessment (EIA) being filed, notice of the proposal is advertised locally, and in public registries.

Environment Act proposals are then subjected to a technical review assessment, by several Technical Advisory Committees (TAC's). Standing committees representing fourteen government departments may be called on to review proposals in an advisory role. The number of TAC's which participate in the assessment depends on the anticipated impacts.

The technical assessment may result in:

1) a requirement for a public hearing;
2) a draft licence being granted without a public hearing; or
3) a licence being refused.

Public hearings are only required if judged necessary, and this is at the Minister's discretion. According to Mr. Strachan, there are no set rules, but generally, developments having five or more major objections will be subject to a public hearing. Where a public hearing is deemed necessary, further environmental impact assessment may be required.

For Class 3 projects, the Act allows for cost-recovery. Costs of joint assessments and public hearings may be charged to the project proponents.

For those projects which require it, once a public hearing is held, followed by a Clean Environment Commission report, a draft licence may be granted or refused.

The process provides for appeals at every major decision step, before licences are finally issued and enforced. Appeal decisions are made by the Minister and Cabinet.

The Environment Act also provides for certain exemptions from the approvals process. Developments that are subject to an existing approval process that addresses environmental issues may be exempt by ministerial agreement. Examples of this include controlled forest burns and forest management under the Department of Natural Resources.

Other developments which can be exempt are referred to as Municipal Exemptions. These are Class 2 developments or Class 3 roads in a municipality which have: no environmental impacts beyond the municipality; no direct discharge of pollutants; no significant provincial funding; and an appropriate environmental assessment that includes public participation.

When a proposed development affects jurisdictions other than Manitoba (federal, provincial, or territorial), a Joint Environmental Assessment Process is followed. In such cases, the process is established by agreement between the jurisdictions. However, it must include an EIA which is essentially equivalent to Manitoba's.

The Environment Act also allows for financial assistance to participants at public hearings. Proposals from groups that demonstrate significant interest, a willingness to co-operate with the process and financial accountability will be considered for financial assistance. Eligible expenses include professional fees, travel and accommodation, costs of collecting and disseminating information, accounting and administration. During the question period, we learned that the financial assistance provision has only been exercised for one project: Conawapa, where a total of $250,000 was awarded to eight interveners.

After a brief question-and-answer period, we headed back to work, grateful to have gained a better understanding of this important process. □



Bob Hamlin (left) thanks Larry Strachan.

Help Uncover the Secrets of WW II Radar Technicians

By: R.F. Linden

APEM members can help garner an oral history about RCAF radar technicians in World War II. From 1940 to 1943 over five thousand RCAF radar technicians and officers were recruited, trained and dispatched overseas to serve with the Royal Air Force. The radar was secret. The location of each individual's unit in the war zone was also secret, and still remains hidden in personal records.

At the National Archives and the archival records at the Department of National Defence, there is an absolute dearth of information on their activities and their contribution to the Allied War effort once they left Canada.

To rectify this glaring omission in our military annals, an oral history is being compiled.

If you are one of this group of veterans, we are seeking your contribution.

Please write about your involvement and any anecdotes, or for further information, to:

WW II RCAF Radar Personnel – History,
P.O. Box 84001, Pinecrest PO,
Ottawa, Ontario
K2C 3Z2
or

Fax: (613) 838-4309 or
Telephone: (613) 224-0640.

The Roaring Game

: W.B. Mackenzie, P.Eng.

Early on a frosty January morning, at Winnipeg's venerable Granite Curling Club, Kirby McRae, P.Eng., resplendent in full Highland regalia, piped a motley group of sleepy-eyed curlers onto the ice. The 1993 APEM bonspiel was underway.

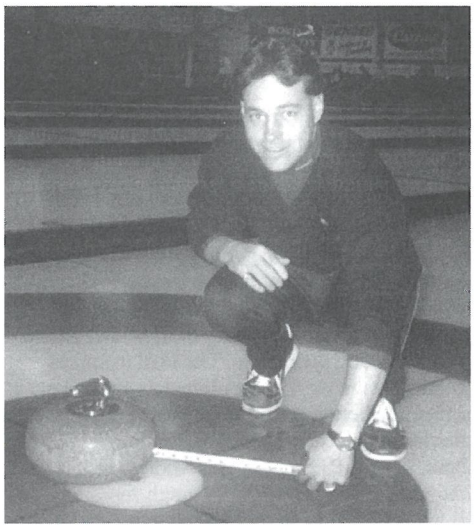
The skirl of the bagpipe, the slap-slap of straw brooms, the hoarse exhortations of skips, the "trock-taw" of a double kill, the good-natured banter between curlers - all contribute to what has affectionately been called "the roaring game". This wonderful cacophony of sound cannot fail to start the adrenaline flowing and heighten expectations. What though the weather outside is frightful? What though the city is hunkered down in a January deep-freeze? The excitement of a bonspiel warms the body, clears the mind and sharpens the senses.

In curling, skill is an important ingredient in winning. So is good strategy. Good ice-reading by the skip helps. Lady Luck plays an important role. Yes, in a curling game, the object is to outwit, out-shoot and out-manoeuvre the opposition; in short, to win. In a bonspiel, on the other hand, there are some ingredients that are just as important as winning. Good fellowship, good shot-making, good fun, and good sportsmanship are what make bonspiels very special occasions. All ese important ingredients were very much in evidence in the APEM annual rock-fest, proving that participation is more important than winning.

The dictionary defines "bonspiel" as "a grand curling match". The 1993 APEM Bonspiel was certainly a grand curling match. Who else but a bunch of Manitoba engineers could so successfully deal with the vicissitudes which are so much a part of the game - a game full of excitement and surprises, a game where a millimetre or two can be the difference between success and failure, a game where the unexpected is the norm, a game where, indeed, a great deal of intestinal fortitude is required to bear up under what Hamlet called "the slings and arrows of outrageous fortune" sent your way by Dame Fortune.

The participants did bear up; they persevered; and eventually, some prevailed. They were:

1st Event Winners:	1st Event Runners-up:
Tom Molinski	Ray Clement
Bruce Elliott	Murray Walker
John McNichol	Reed Winstone
Stewart Innes	Mike Saxton
2nd Event Winners:	**3rd Event Winners:**
Harold Wilson	Darryl Pokrant
John Bell	John Enns
Cy Howard	Stuart Kidd
Keith Miller	Peter Koopman
4th Event Winners:	**5th Event Winners:**
Tom Wingrove	Harvey Kaita
Terry Kjartanson	Jim Suzuki
Kelly Kjartanson	Brock Sanderson
Don Lecuyer	Murray Vanderpont



Greg Payne measures his winning draw.

In the "Draw-to-the-Pot" competition, Greg Payne, unassisted by sweeping, covered the nail hole on two successive draws. Now that's curling! Needless to say, Greg was a clear-cut winner. It should be noted that the monies collected from the curlers for this competition went partly for prizes but mostly to charity. On behalf of the curlers, the Sports Committee will arrange a donation to the Christmas Cheer Fund.

By any definition, and from any viewpoint, the 1993 APEM bonspiel was a success. Kudos to the Sports Committee! □



Kirby McRae leads the Grand March.



The First Event Winners.

TQM Revisited

Continued from page 7

4. Introduction/Roll-out:
   - New culture (way of life) - not new programs.
   - Start at manager level.
   - Use key managers.
   - Pre-test new processes.
5. On-Going Implementation:
   - Staff meeting number one agenda item should be TQM.
   - TQM must be number one individual business goal.
   - Require annual performance review of program effectiveness.
   - Expand formal customer satisfaction teams to include customer.
   - Conduct Branch/Department audits to evaluate implementation and effectiveness.
6. Measurement:
   - Customer-focused measurements.
   - Few but relevant.
   - Automatic where possible.
   - Do something with the data.
7. Communication for Monitoring TQM Program:
   - Extraordinary communication.
   - Newsletters.
   - Meeting minutes to share office performance.
   - Videos to improve impact of program.
   - Corporate updates to test and sample TQM results.
   - Monthly customer satisfaction meetings to ensure constant feedback through all management levels.

As can be seen, the field of Total Quality Management is not a simple, quick-fix add-on to any firm, but a new way of doing business that requires the commitment and participation of all members.

Stu Ursel, Phil Martin and Doug Granville wrapped up the meeting and thanked Dan for his most interesting presentation on TQM, a business style which will soon be affecting all of our workplaces whether we are willing participants or bypassed non-participants. □

Raising the Dredge

Continued from page 1

was viewed as being one of very high risk because very little information was available on the condition of the dredge hull, which was completely buried below grade in partially frozen sediments.

In the fall of 1990, lCEU produced a report, based upon additional field investigations completed in the summer, which detailed the full scope of activities necessary to excavate, refloat and reposition the dredge. The final technical details for the work were ultimately fleshed out at a meeting between the Public Works Canada marine engineering specialist, Eur.Ing. Alex Barbour, C.Eng, P.Eng., Captain Andrew Wisniowski, P.Eng., and Major Gareth Jones RE B.Sc. AMICE, in early December. In late January 1991, the project was finally approved, at cost of approximately $1.1 million.

Phase I of the project, under the command of Major Gareth Jones, entailed hydraulic and mechanical excavation around the vessel and thawing and removal of large accumulations of ice and silt within the dredge hull. This work was completed during the summer of 1991. When the excavation was complete in late September, no evidence of significant structural damage to the hull was detected. This gave rise to high hopes that the vessel could be refloated in the following year.

Phase II of the work, which began in early May, 1992, involved thawing and removal of ice that had formed above deck level within the superstructure of the vessel. As well, it was necessary to remove ice in the flotation pond that had bonded to the exterior of the dredge over the winter of 1991 - 92. For the most part all this work was accomplished using high-capacity pumps, 150-200 mm diameter hoses and plentiful supplies of water.

In late May 1992, with the flotation pond flooded, the hull of the dredge was pumped free of water to create a buoyant force to cause the vessel to float. Unfortunately, this did not occur, and it became necessary to install the suction-break system.

The suction-break system was comprised of a manifold piping arrangement which allowed water to be pumped under the hull to break the bond between the dredge hull and the bottom of the flotation pond. The system was only partially installed and working when, on June 11, 1992, the flotation of the dredge became a reality.

Over a period of six days, the flotation pond was pumped up to its full capacity, and the floating dredge was slowly towed over to its new location. It was then sunk onto a timber crib foundation which was submerged approximately 5 m underwater. After that, the pond was slowly drained to reveal that placement of the vessel on the foundation was accomplished within a tolerance of centimetres.

Needless to say, there was great joy and a collective sigh of relief from DND, Public Works Canada and Canadian Parks Service project personnel when this critical phase of the relocation was completed.

The writer wishes to acknowledge the dedication and hard work of the military engineers and staff of lCEU, who brought this high-risk project to completion on time and within budget. □

Cause For Concern?

Continued from page 5

of academic regulations and curricula, but the Dean's office has hired Irene Mikawoz, P.Eng., as Director of Student Recruitment, who is taking a serious look at ways to reduce the attrition rate and to create a more student-friendly environment on campus. This is no small task, given the longevity of the problem, and given recent announcements concerning Manitoba's education system.

The Province's recently announced plan to eliminate high-school streaming in English and social studies will do little to assist, and will likely do much to thwart, the Faculty's efforts. While our universities are working feverishly at narrowing the gap between high-school and university education, the Province appears bent on lowering the standard of high-school education and creating a chasm between the two levels of education. Will the de-streaming of mathematics and science be next? We can only hope not! □

Coming Events

PROJECT MANAGEMENT AND CONTROL

2-day Seminar, 1.2 CEU's

April 28 - 29, 1993
Winnipeg, Manitoba

Contact: Elizabeth Gesner (TUNS)
Telephone: 1-800-565-0703

POWER SYSTEM PROTECTIVE RELAYING

2-day Seminar, 1.2 CEU's

April 29 - 30, 1993
Winnipeg, Manitoba

Contact: Becky Grant or Mary Meidell (TUNS)
Telephone: 1-800-565-0703

STRUCTURAL DESIGN FOR NON-STRUCTURAL ENGINEERS

4-day Seminar, 2.4 CEU's

June 14 - 17, 1993
Winnipeg, Manitoba

Contact: Dennis Bicknell (TUNS)
Telephone: 1-800-565-0703

Berens River Flyer

Continued from page 5

system commonly used to navigate a commercial aircraft was replaced, in this case, by following the ice road next to the hydro line. I have found new respect for the term "white-knuckle" flying. Especially after encountering turbulence, which could position the aircraft anywhere between three and six hundred feet, your head often met the top of the cabin.

Landing in Poplar River turned out to be a breeze. The runway lined up with the prevailing wind and you actually had a hill to help you slow down. When taking off, I thought the hill helped to propel the plane into the air. The fog lifted enough for us to appreciate some of the scenery on our way to Little Grand Rapids and see rivers which don't freeze in the winter because of their flow.

We were able to return to the wide expansive runways of St. Andrews, what seemed much later in the day after again passing through the turbulence just above the ground.

I commend those who safely operate aircraft under these conditions so frequently encountered during our winters. This exaggerated tale is presented only for your reading pleasure. In the meantime, has anyone seen the latest Grey Goose schedule? □

ROSTER UPDATE/CHANGE OF ADDRESS NOTIFICATION

Full Name _____

New Address _____

City _____ Province _____

Postal Code _____ Country _____

Employer _____

Position/Title _____

Bus. Tel. _____ Date Effective _____

Mail to: A.P.E.M., 530-330 St. Mary Ave. Winnipeg, Manitoba R3C 3Z5 or FAX (204) 942-3718