THE MANITOBA
Professional Engineer
February, 1994
APEM

Red River Flood Protection in Winnipeg

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

Anyone who views the Red River in Winnipeg at its normal summer level may have difficulty believing that it could cause disastrous floods. At those "quiet times", the Red is a placid stream flowing between well-defined banks from 20 to 30 feet high. Yet there are records of a number of very extreme flows.

The 1950 flood, the largest within the memory of anyone now alive, rose some 27 feet above the normal summer water level. This flood event had a statistical return period of roughly 30 years. The flood damages caused by the flood of 1950 have been estimated at $114 million. In terms of 1993 dollars, this damage would be about $1 billion. The 1979 flood was similar in magnitude, but in inflation and the additional flood-prone development that has taken place since 1950, the damages would have amounted to many times more were it not for the existing flood protection works.

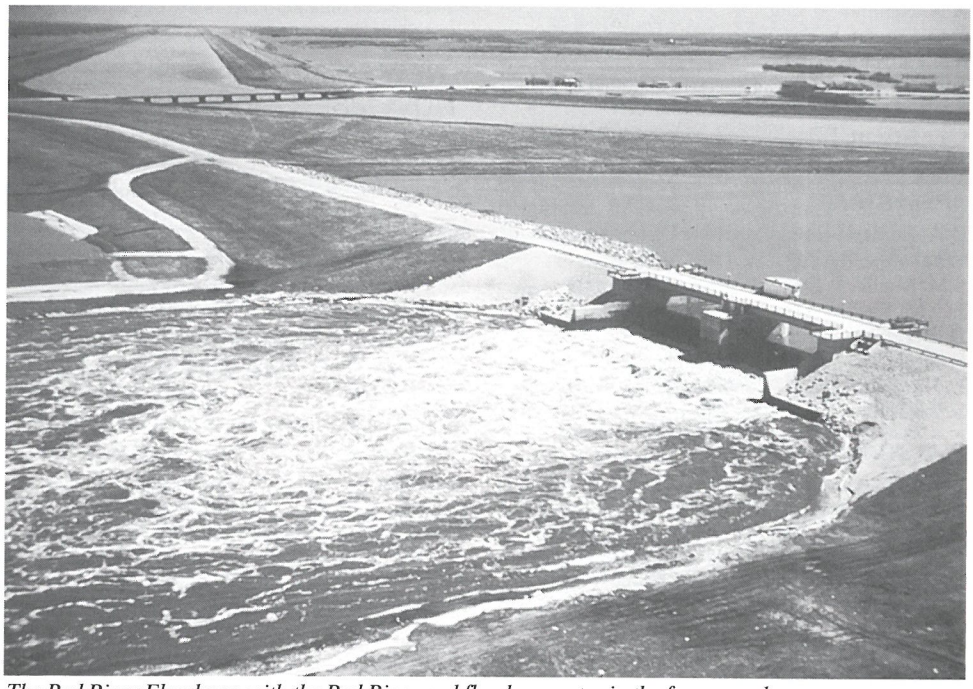
There are clear records of three major floods since the area was first settled, all of which were larger than the 1950 flood. In 1826, the volume of water flowing through Winnipeg was more than twice as large as the amount recorded in 1950, and the water reached levels in the city that were six feet higher than in 1950. There are also historical references to a major flood on the Red in 1776. In addition, there may have been other major floods in this period for which there is no record. The Red River Basin Investigation estimated that a flood with flows 2.6 times greater than those in 1950 could occur.

Major floods on the Red River invariably occur during the spring run-off period. The climactic conditions which lead to the likelihood of an extreme flood are:

1) A wet summer or fall in the preceding year, which thoroughly saturates the ground before freeze-up;
2) Cold weather with little snow during the early winter, allowing a deep penetration of frost;
3) A cold winter with heavy snowfall over the entire drainage basin;
4) A late spring followed by a sudden rise in temperature, producing a rapid run-off;
5) Heavy rains during the run-off period.

Many or all of these conditions were present in each of the flood years.

After the 1950 flood, the Greater Winnipeg Dyking Board realized that much work was required to protect the city against recurring floods. To this end, the following protection works were installed:



The Red River Floodway, with the Red River and floodway gates in the foreground.

Plaza Drive Dyke.

I Major River Controls

1) Red River Floodway
2) Portage Diversion
3) Shellmouth Reservoir

II Dyking System

1) Primary Dykes
2) Secondary Dykes
3) Gate Structures
4) Flood Pumping Stations

In 1950, after the flood water subsided, approximately 65 miles of primary dykes were built to protect the City against a 1948 flood level plus two feet. These dykes were designed so that they could be raised an additional four feet during flood events. It was also realized that, during the 1950 flood, a large portion of the flood damage was caused by sewer back-up onto streets and into houses.

To correct this problem, 21 flood-pumping stations were built and outfalls were provided with sluice gates. During flood-water stages, these

Continued on page 12

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APEM

WE HAVE LOST CONTACT. MAY WE HAVE AN ADDRESS?

C.A. Anderson
G.H. Atwood
A.E. Ball
A.G. Carlos
R.J. Dunlop
N.J. Dust
M. Kapila
M.T.H. Koh
M.D. Kosokowsky
D.W. Kroll
C.E. Lowry
S.D. MacSwain
D.S. Pich
T. Smoter
O.R. Thorsteinsson
E.S. Younan

Ten Times Smaller

By: J. Lucas, P.Eng.

I attended a technical presentation, recently, to discuss things esoteric and phenomenal. All attendees were "smarter than the average bear" and individually as capable as they come.'

During our mental meanderings, a point was made that there was a desire to "reduce errors by ten times". A noble quest to say the least; but is it achievable?

It was questioned that if errors were reduced by one times, did that not mean all errors had disappeared. And, if so, reducing them by a further two, three, seven, nine or ten times must surely move us into an Einsteinian/relativity conjunction where fewer than zero errors are occurring.

Perhaps a rewriting of Albert's $E = mc^2$ is in order whereby E = errors; m = mathematical function and c = speed of comprehension.

With this rework, we can easily see that the error-correction function is directly proportional to the square of the speed of presentation/comprehension. This opens endless opportunities to horn-swoggle the unknowing, and at tremendous speeds!

In a move to protect the uninterested and unknowing, I propose that we, as a technical body, take action to eliminate these occurrences by at least 20 times. □

NEW MEMBERS REGISTERED NOVEMBER & DECEMBER 1993

M. Ahmad
R. Balachandar
G.C. Carson
R.G. Coleman
E.A. Doleman
P.E. Dullerud
N.P. East
E.M. Fleming
N.D. Gustafson
W.N. Hasegawa
R.B. Henderson
A.B. Hill
S.H. Ho
M.J. Kizuik
A.P. Laing
D.A. Lecuyer
R.C. Loewen
T. Loo
B.J. Lukes
R.D. McLeod
G.J. MacDowall
R.T. Machibroda
C.D. Mack
D.A. Menzies
W.R. Ostermann
A.R.M. Philip
D.J. Puhach
K.W. Rae
G.M.W. Roehr
C.N. Rosner
S.D. St.George
G.F. Soprovich
C.G.A. Straub
N. Sun
F. Towfigh
E.F. Vickers
S.J. Wopnford
C.E. Yee
A.C.W. Yim
T.R.W. Yip

LICENCES ISSUED IN NOVEMBER & DECEMBER 1993

D.E. Anderson (SK)
R.L. App (ON)
J.A. Axelson (WI)
R.A. Cherkewski (ON)
S.H. Gebler (IL)
M.M. Hrabok (SK)
B.D.P. Koziak (AB)
W.H.W. Leung (ON)
J. Lightowler Jr. (ND)
B.F. Murdock (ON)
B.G. Robb (SK)
B. Tanguay (PQ)
R.F. Williamson (IO)

ENGINEER-IN-TRAINING MEMBERSHIP NOVEMBER & DECEMBER 1993

C.G. Coey
W.H.W. Fu
D.R. Goehring
A.G. Johnston
G.B. Kay
J.B. Kopytko
M.G. Peck
R.M. Skorpad
K.A. Soudki
R.E. Stutsky
J.M. Tutkaluk
B.J. Witherspoon
B.M. Zikman

TRANSFERS OUT DECEMBER 1993

A.A. Benko
J.A. Betts

RESIGNATIONS DECEMBER 31, 1993

P.G. Claridge
B.B. Clements
C.J.A. Coats
W.R.J. Cole
J.A.G. Collins
J. Comtois
C.A. Crawford
C.S. Crocker
L. Csordas
G. Dyck
S. Feldman
C. Feuer
I.D. Garg
A.G. Goertzen
K.H. Hallson
E.C. Hamilton
A.G. Hook
G.D. Hooper
J.W. Huskins
J.G.B. Iliffe
K. Kamachi
J. Karlinsky
G.R. Kendall
A.J. Kostyniuk
T.A. Kowalchuk
C.T. Kummen
T.G. Laidlaw
D.Y.W. Lam
N.H. Lee
P.A.R. Lowe
W.G. Maclean
J. Milne
R.B. Minchin
G.P. Mitchell
L.S. Mitchell
P.C. Moeykens
D.M. Neuburger
D.K. Newey
O.B. Newton
L.R. Nilsen
J.E. Peters
S.G. Petursson
W.A. Porter
G.R. Ritchie
G. Sagi
J. Saltvold
J.T. Shaw
T.J. Sherman
D.J. Sinclair
B.N. Thadani
I.W. Thomas
G.A. Tough
M.M. Uloth
J. Van Oostrom
H.G. Volume
F.J. Winstanley
J.F. Yellowlees
R. Zakaluzny

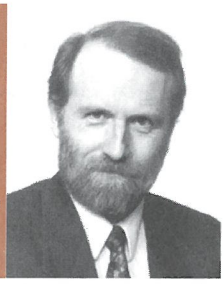
In Memoriam

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

J. Laks
K.E. Snidal

President's Message

Dr. D.G. Chapman, P.Eng.



Are You Experienced?

This question is asked of every applicant for registration with the APEM. Before registration is approved, Council must be satisfied that an appropriate amount of applicable experience has been obtained. APEM's primary mandate is to protect the public, by ensuring that only qualified persons are licensed to practise engineering in Manitoba.

At its December meeting, Council approved major revisions to the admissions process, with particular emphasis on the evaluation of experience. Some details of the pre-existing and revised processes are outlined below.

The Old System

Under the current registration system the Director of Admissions (Shirley Matile, P.Eng.) reviews the application form and the reference forms for each applicant. The application form details the work experience of the applicant while the references provide additional information on the level of work experience, the competency of the applicant, and the general character of the applicant. Once all references have been obtained and registration is supported by the work experience detailed by the applicant and corroborated by the referees, the application is passed to Council with a recommendation, and Council then either approves or denies the registration.

In unusual cases, where there is missing information, where the references are not consistent, or where there are special circumstances involved with the work experience, the applicant's file is referred to the Admissions Review Board (ARB) for a recommendation before it is passed to Council. Occasionally, Council may refer the file to ARB for a recommendation. The ARB, comprising senior practising engineers, may ask for additional experience to be obtained or recommend registration. In some circumstances an interview is conducted with the applicant before a decision is made.

The Problems

The old system was in need of improvement. The chief problems identified were:

- All applications were processed by one staff person. There was a potential for inconsistency since any one person could not be expected to be able to judge the actual experience obtained by an applicant unless the experience was in an area known to the staff person.
- There was a great reliance on the written statements of referees, but the information which referees provided varied widely.
- With the APEM moving to a four-year experience requirement and with the newly approved admissions standards mandating specific components of the experience requirement, there would have been a large increase in the workload on the staff person. This increase is due to a need to review experience after two years and to a need to review twice the amount of experience for each applicant.

"...after much discussion within staff, the ARB and an Ad-Hoc Committee on Admission Standards, significant revisions to the admissions process, particularly with respect to the evaluation of experience, were recommended to Council."

- Council was in an awkward position with respect to appeals of denial of registration because it would have made the original decision to deny registration and then would have had to hear the appeal against its own decision.

Therefore, after much discussion within staff, the ARB and an Ad-Hoc Committee on Admission Standards, significant revisions to the admissions process, particularly with respect to the evaluation of experience, were recommended to Council. The recommendations have now been approved by Council and will be phased in over the next three to six months.

A Revised Admissions Process

The main features of the revised admissions process are:

- Council will delegate the decision, with respect to registration, to a new Registration Board. Council will only receive a report on registrations granted by the Registration Board. The Registration Board will comprise approximately nine senior engineers.
- Two boards, the existing Board of Examiners (which makes a recommendation with respect to academic qualification), and a new Experience Review Board, will report to the Registration Board.
- The experience of each applicant will be evaluated, in detail, by the Experience Review Board. This Board will likely have 15 to 20 members, with a wide range of disciplines represented.
- The new experience-review process will be compatible with the move to a four-year experience requirement. With the Experience Review Board in place, the APEM will be able to review the work experience of applicants at the mid-way point in the experience period and to make recommendations to applicants on the quality of that experience.
- The Registration Board will act as the appeal body for decisions by the Experience Review Board and the Board of Examiners.
- Council will now be a true appeal body for decisions of the Registration Board.

It is believed that these changes will result in a more consistent evaluation of experience, since each case will be considered in detail by a knowledgeable sub-committee of the Experience Review Board, then discussed by the full Board before a decision is reached. The sub-committee will be free to interview applicants, referees and employers, and to visit the worksite, if felt necessary. It is acknowledged that the members of the Experience Review Board will be asked to devote a considerable amount of time to each application.

The Board of Examiners already operates on a similar basis, but it only considers applicants who do not have Canadian Engineering Accreditation Board (CEAB)-accredited degrees or recognized equivalent degrees (for example, ABET-accredited degrees in the USA). It has been found that the process of an in-depth investigation by a sub-committee, followed by discussion by the full Board, in conjunction with a comprehensive guide to evaluation, will lead to a high degree of consistency and fairness.

In other provincial associations, notably the Association of Professional Engineers and Geoscientists of British Columbia, the process of evaluating experience is augmented by having the applicant maintain a detailed log of experience, updated at least monthly, and signed-off by the applicant's supervisor. The APEM likely will adopt a similar recording process.

The task of Council and staff, now, is to establish and support these new Boards. If you are interested in taking part in this aspect of the APEM's mandate, please contact Dave Ennis, Shirley Matile or me. □

Introducing:

"The Women in Engineering Advisory Committee"

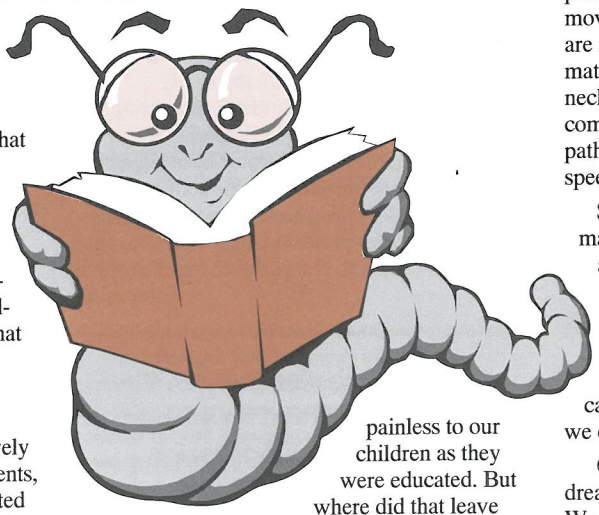
By: B.A. Dobran, P.Eng.

The subject committee is one of the newest committees of APEM. Its mandate is to address issues and concerns of women in engineering and to ensure their full and equal participation in the profession. Meetings will focus on some of the unique concerns that women engineers have, regarding their careers.

There are currently six members on this committee, with one liaison councillor and one APEM staff support member. For more information about this committee, call Carol Roberts, Chair, at 956-0980. □

Educational Symbiotics

By: J. Lucas, P.Eng.



It is encouraging to see the groundswell of interest in educational standards. It seems that more and more parents and educators are becoming outspoken about the seemingly deteriorating levels of learning in our public school system.

I don't think that it can be argued that standards are no longer being forced upon our children. Even more positively, can it be argued that this is a step in the right direction?

In the not-too-distant past, every child was taken through the grade system and, with the appropriate examinations, led through a relatively narrow educational gateway. Regardless of talents, abilities, or basic 'likes', each child was expected to achieve a passing grade in each and every subject or be pushed out of the educational process.

This system produced a frustrated, demoralized but uniformly educated stream of graduates turned out on an expectant world. The only problem with the 'product' being supplied to the marketplace was that society needs a wide range and diversity of skills while the graduate student population had been effectively cloned. The inexperienced student body had been effectively molded into a stilted and regimented product of idealism.

Now, in an ideal workplace, this would be most acceptable; but in our world, this proved to be most unacceptable. The real world does not have a demand for like-talented and like-educated people. Our modern workplace demands a diverse workforce with abilities and training ranging across a spectrum that includes cowpersons and chairpersons, firepersons and mailpersons. This is not to say that the range of jobs requires different levels of intellect, but rather different levels of interests, dreams and ideals.

What has our educational program done to fulfill the requirements of society's workshops, and at what cost? In the past, the typical school program took energetic and wildly unconstrained raw material and extruded this unlimited potential through a very small set of constraints. This was done over a dozen or so years and became almost painless to our children as they were educated. But where did that leave our students? What happened to the best auto mechanic ever-to-be who dropped out of school because she couldn't pass British History? How about the proverbial miracle-cure doctor who is now spinning pizzas because he couldn't spell? Another example: why are people with Master's degrees driving taxis? These were not the children's dreams.

We have taken the infinite spectrum of our children's abilities, educated them through the narrowest set of parameters possible, and presented them to the wide-open world, where grade point averages matter for about three days.

What I see happening today offers some hope. Individual talents and interests are not being stripped away or being bound and formed into curriculum paths, but, rather, respected and left intact to develop into whatever the individuals choose for themselves. What can now happen is that the student body (and minds) will enter the school system as individuals, be exposed to, and take advantage of, the educational system as individuals and, finally, leave school with a unique education ideally suited to each personality and talent.

This system of education is, in a small way, mirrored in our ever-upgraded computer systems. A major problem experienced with the speed of computer processing is the pathway constructed for the information flow. Large processing components have large amounts of information to move between here and there but the pathways are not always wide enough to move this information as quickly as it is available. This bottleneck has no positive effect and only slows the computer (while frustrating the operator). Wider pathways allow a smoother flow of data at ideal speeds and result in higher productivity.

So it is with our students. We have created a major impediment between their starting points and their careers, and to what advantage?

We are never going to reach the educational level of countries like Japan, so we should stop brow-beating ourselves over this reality. Instead of looking where we can't go, why don't we take advantage of where we can excel?

Our children not only have a right to their dreams, but they have the ability to achieve them. We have only to step aside and let them reach out to their limits. A nation of free-thinking, dynamic personalities will produce, and enjoy, a far better society than a stilted, frustrated stream of children. □

Admissions Update

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

At its December 13, 1993 meeting, Council made some important decisions regarding the four-year work experience requirement.

As of January 1, 1995, this Association will require applicants to have obtained at least four, rather than two, years of acceptable engineering work experience in order to be considered eligible for registration.

How will this affect you? Well, if you are an EIT member of this Association, or if you are eligible for, and have made application for, either EIT membership or registration, by December 31, 1994, you will be required to demonstrate a minimum of two years of acceptable engineering work experience. If you apply for EIT membership or registration after December 31, 1994, you will be required to demonstrate a minimum of four years of acceptable engineering work experience.

Council also decided, at the same meeting, that any applicant for either registration or EIT membership who has not passed the current mail-in Professional Practice Exam by December 31, 1994 will be required to pass the new three-hour, formal Professional Practice Examination prior to registration.

The new examination is expected to be in place early in 1995. □

Retired Membership Change in Requirements

By: D.A. Ennis, P.Eng.

In response to concerns expressed by the membership, the Council of the Association has altered one of the requirements for transfer to the Retired Membership. The change is that the requirement for a retired member to have a combination of age and years of membership in a Canadian engineering association at least equal to 85 has been removed.

Retired members who have already paid their 1994 Annual Dues and who qualify for the Retired Membership category because of the policy change may switch categories up until June 30, 1994. If the request for a category change is approved, the difference in annual dues will be refunded. □

Photographer Needed

The Publication Committee is looking for volunteer photographers to take photos at the various APEM events such as: Breakfast Meetings, Luncheons, Seminars, and the Annual General Meeting. The APEM office will supply the film and camera.

If you are interested, please contact Donna Bilodeau at 942-6481.

Annual Meeting of APEM Council with Faculty of Engineering

By: G.O. Ouellette, P.Eng.

Once a year, the University Liaison Committee meets with the APEM Council and the Dean, Department Heads and other members of the University of Manitoba Faculty of Engineering to discuss topics of mutual interest. This year's dinner meeting was held on November 15, 1993 at the University of Manitoba Faculty Club. The topics selected for discussion were: (a) the Canadian Engineering Accreditation Board (CEAB) accreditation process; and (b) the proposed change to the engineering experience requirement for registration, from the present two years to four years.

The meeting started with a brief introduction by Elliott Garfinkel, P.Eng., the committee Chair, followed by greetings from Garland Laliberte, Dean of the Faculty of Engineering.

The first speaker was Bob Foster, P.Eng., representing the CEAB. He has been one of the 13 members of the CEAB for eight years, representing the Manitoba/Saskatchewan region.

Accreditation is a six-step process. Briefly, the six steps are: (1) the Board receives a request for accreditation (with supporting documentation) from a university; (2) the team Chair assembles a visiting team which may consist of from four to members; (3) the team visits the university, ets with university administration, professors and students, assesses the engineering program and university facilities, prepares and arranges a preliminary report and conducts an exit interview to give the university an opportunity to comment on its findings (this process usually takes two very full days); (4) a final report is prepared by the Chair based on information supplied by all visiting team members; (5) the Dean of the Engineering Faculty reviews the team Chair's final report and returns comments to the CEAB; and (6) the Dean is invited to the CEAB spring meeting to discuss the request prior to the Board's decision to grant or deny accreditation.

The decision made by the Board, at the spring meeting, will be one of the following:

1. Grant accreditation for a six-year period.
2. Grant accreditation for a three-year period and request a report from the Dean as to how the CEAB's concerns have been addressed to determine whether the accreditation should be extended for an additional three years.
3. Grant accreditation for three years.
4. Deny accreditation.

Other speakers on the topic of accreditation where Cathy Stewart, P.Eng. and Graham Matthews, P.Eng. Both were members of the team involved in the latest University of Manitoba accreditation visit. Ms. Stewart described the visit as an intense two-day fact-finding mission where not only the engineering program is reviewed but also such support facilities as the physics lab and computer facilities. As an APEM member educated outside the country, Mr. Matthews was impressed with the accreditation process in Canada. He noted that all universities are assessed on the same basis, and expressed the hope that the process will lead to full reciprocity among all provinces. In Mr. Matthews' opinion, the highlights of the University of Manitoba's engineering program are the industrial experience of the teaching staff and the co-op program.

Shirley Matile, P.Eng. opened the second topic for discussion by announcing that the APEM has adopted the four-year experience requirement for registration, effective January 1, 1995. The new requirement will be consistent with most other provincial associations, the U.S. and Europe. The change, Ms. Matile advised, will go hand-in-hand with the plans to change the role of the Admissions Review Board. The Board will now be responsible for reviewing the work experience of all registration applicants, using a five-point "experience checklist", established by CCPE and yet to be "fleshed out" by APEM.

The "experience checklist" includes the following:

1. Application of theory.
2. Practical experience.
3. Exposure to the management of engineering works.
4. Development of communications skills.
5. Awareness of the social impact of engineering.

Following the announcement by Ms. Matile a panel discussion, chaired by Elliott Garfinkel, took place. The three-member panel included Ms. Matile, representing APEM, Bob Foster, representing engineering consultants, and Ms. Yolanda Cates, who presented the students' perspective. The following points were raised during the discussion:

1. From an industry point of view, the quality of experience and not the quantity of experience is most important.
2. Students are of the opinion that post-graduate education and co-op term work should count towards the four-year experience requirement.
3. The policy does not currently recognize co-op experience as counting towards the four-year experience requirement.
4. APEM will recognize a maximum of 12 months of graduate work as work experience provided that the thesis advisor is a professional engineer.
5. University professors must meet the "experience checklist" requirements in order to be eligible for registration.
6. The CEAB recommends that a minimum of 60% of the teaching staff be registered as professional engineers.

The very successful dinner meeting adjourned at 10:30 p.m. Some attributed the success to the good food and the interesting discussion topics. Others credited the fine wine and the exchange of ideas between educators and practising engineers. Yet others enjoyed the excellent choice of menu and the lively and frank discussions at the tables during dinner. □

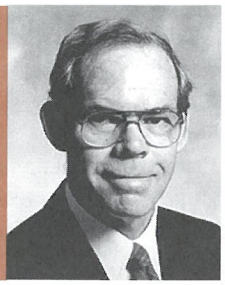
Pay Your Dues!

Fee invoices have been mailed to all members. Members are again reminded that receipt of fees in the Association office after February 28th, 1994 will incur a late payment administration fee of $50.00. If fees are mailed prior to February 28th and received after February 28th, the late payment fee will apply.

Also, be reminded that if all fees owing are not received in the Association office before July 1st, 1994, your name will be removed from the register and you will then be prohibited, by law, from practising engineering in Manitoba.

CCPE President's Message

Dr. Robert E. Burridge, P.Eng.



Human Resources in Engineering in the 90s

At CCPE, Engineering Human Resources issues are dealt with through the Canadian Engineering Human Resources Board (CEHRB). The CEHRB is one of four standing committees reporting to CCPE. Dr. Frank Wilson, P.Eng., Vice-President, Research and International Co-operation, University of New Brunswick, was recently appointed to chair this Board.

The CEHRB was recently reconstituted by CCPE and was given revised terms of reference. The new CEHRB will be broadly representative, having members from across Canada and from engineering sectors having a direct interest in engineering human resources and the profession: CCPE's constituent associations, industry, universities, the Association of Consulting Engineers of Canada (ACEC), the Engineering Institute of Canada (EIC), and others. In a consultative fashion, it will first review its mandate and establish priorities. The first meeting of the revised Board is expected in early January.

The CEHRB maintains a human-resources inventory and conducts labour-market surveys, an annual undergraduate- and graduate- enrolment survey and various studies concerning employment-related issues. Many of these studies are carried out by consultants on contracts funded by Human Resources Development Canada (HRDC), formerly Employment and Immigration Canada.

The work of the Board is long-term. For example, a current study on how engineering work is organized is nearing completion. Another study will examine productivity in engineering work. The results of these studies give us a much better understanding of important factors affecting demand for engineers and the sets of skills employers expect. Most controversial are the studies it carries out on the long-term supply and demand of engineering human resources.

Estimating Supply and Demand of Engineering Human Resources

Stanley Baldwin, Prime Minister of Britain for much of the period between 1923-37, once remarked that three things are not worth chasing because another will always come along soon: buses, persons of the opposite sex, and economic policies. He might have included economic projections.

The estimates of supply and demand made by CEHRB use a model developed by CEHRB and HRDC to project engineering employment. The demand-side general economic projections are prepared by Informetrica Limited for the Canadian Occupational Projections Systems (COPS) of HRDC. Supply projections are extrapolations of enrolment, school-to-work transition and workplace attrition patterns prevailing in the recent past.

The model is regularly refined but will never be able to predict which economic future awaits us with any precision.

The projections are useful and give an informed estimate of future possibilities in a what-if kind of way as long as assumptions, limitations and methodology are clearly set out and understood from the outset. Some fundamental problems with the model are well summarized in a recent report: "IAS Committee Report for the implementation of the EIC/CEHRB Outlook Conference Recommendations". (This report is available upon request from the CCPE Public Affairs Group.) A review of the model and its use will be carried out.

Aside from economic factors, the most important factor affecting demand is productivity. It is difficult, if not impossible, to obtain reliable information for ill-defined groups like engineers. Nonetheless, as noted in the IAS report, the increase in the use of computers in all areas of engineering has increased in the past decade and continues to do so. The question is: will this reduce the requirement for engineers or will it generate activities that will require more?

The Current Situation and Changes in the Nature of Engineering Employment

Those who work in Faculties of Engineering at our universities, or who are concerned members of our profession, know of the difficulties our graduates are having getting jobs upon graduation.

We know that engineering enrolments and employment opportunities have traditionally reflected the business cycle and we believe that engineering knowledge and creativity must be a major component in an economic recovery based on innovation, creativity, productivity and quality. We are a knowledge-based, technology-expert, creative profession...so the future is bright.

However, since we are not in just another downturn in the business cycle but in a period of fundamental restructuring, we must assess what this means for practising engineers in their education and skills if we are to keep the promise of a bright future.

A study on the pattern of employment for recent graduates was carried out about a year a by two professors at the University of New Brunswick – Monique Frize, P.Eng., Chair of Women in Engineering, and Alan MacLean, Chair, Technology Management and Entrepreneurship. Not surprisingly, the absolute figures show that hiring by small firms is increasing but not enough to compensate for the reduced hiring by large firms.

The study leaves no doubt that the new graduate is going into a different environment than did engineers of previous generations. The skills a young engineer must bring to a small firm are different from those required by a large one – not so

Continued on page 11

CCPE National Scholarships – 1994 Competition Officially Opens

The Canadian Council of Professional Engineers is pleased to announce the opening of the 1994 National Scholarship Program competition. This year, six cash prizes totalling $37,500 will be awarded to promote excellence in the Canadian engineering profession through advanced studies and research programs.

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

The following scholarships are available:

- The **NORTH AMERICAN LIFE Scholarship Program** offers three scholarships of $7,500 each to provide financial assistance to engineers returning to university for further study or research **in an engineering related field.**
- The **MELOCHE MONNEX Scholarship Program** offers two scholarships of $5,000 each to provide financial assistance to engineers returning to university for further study or research **in a field other than engineering.** This field of study will be one that is chosen to augment the candidate's performance in engineering.
- The **ENCON Endowment** of $5,000 will be awarded to an individual wishing to pursue studies **in the area of engineering failure investigation and/or of strength of materials.** This area of engineering is concerned with the analysis of the various causes of materials failure, and the prevention of accidents which may result from them, either in the industrial, manufacturing or construction sector.

Please contact: National Scholarship Progr Canadian Council of Professional Engineers, 4 116 Albert Street, Ottawa, Ontario K1P 5G3 for an application form.

Deadline for all applications is May 1st, 1994. □

APEM Council 1993-1994

The results of the 1993 elections to Council were announced at the Annual General Meeting in Winnipeg on October 23, 1993. Elected were S.K. Fedeniuk, P.Eng., A.N. Kempan, P.Eng., R.J. Partridge, P.Eng., and C.L. Stewart, P.Eng.

Your Council for 1993-94 is as follows:

Dr. D.G. (Doug) Chapman, P.Eng., President, Winnipeg
C.E. (Carl) Anderson, P.Eng., Past-President, Winnipeg
M.D. (Mel) Cornell, Appointed Councillor, Winnipeg
Dr. E. (Ertrice) Eddy, Appointed Councillor, Winnipeg
S.K. (Stella) Fedeniuk, P.Eng., Brandon
J.G. (James) Hildebrandt, P.Eng., Winnipeg
A.N. (Arthur) Kempan, P.Eng., Winnipeg
D.G. (Don) Osman, P.Eng., Winnipeg
R.J. (Bob) Partridge, P.Eng., Winnipeg
A.H. (Arnold) Permut, P.Eng., Winnipeg
E.L.J. (Eva) Rosinger, P.Eng., Winnipeg
C.L. (Cathy) Stewart, P.Eng., Thompson
J.M. (Mal) Symonds, P.Eng., Winnipeg

The total number of votes cast was 712, which represent 20.8% of the eligible voters.

1993-94 APEM Council

Standing (left to right); Mal Symonds, Cathy Stewart, Bob Partridge, Doug Chapman, Eva Rosinger, Mel Cornell, Arnold Permut, Don Osman, Arthur Kempan.

Seated (left to right); James Hildebrandt, Carl Anderson, Ertrice Eddy.

Missing; Stella Fedeniuk.

Meet Your New Councillor – Arthur Kempan, P.Eng.

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

At the time of writing, Arthur was employed by Paramax Systems Ltd. Unfortunately, due to cancellation of the EH-101 helicopter program, work was kind of slow and this allowed plenty of time for an interview.

Arthur was born in Yorkton, Saskatchewan and lived there until he moved to Winnipeg to enter university. Arthur spent his first year and a half in the University of Manitoba Faculty of Architecture and decided that wasn't quite what he was looking for. Engineering turned out to be his calling. Arthur graduated from the University of Manitoba with his B.Sc. Mechanical Engineering in 1973.

Councillor Arthur Kempan, P.Eng.

Arthur worked for Versatile Farm Equipment as a design engineer, designing both self-propelled and pull-type swathers. Perhaps his best achievement was the design of a wide pull-type swather with a hydraulically-driven outer wheel to prevent side draft. He is the co-holder of patents incorporating this concept. While still at Versatile, Arthur moved into their Computer Applications group, where he remained until the agricultural industry downturn in 1982, when he moved to Flyer Industries. At Flyer, Arthur worked on the design of the power train for the San Francisco bus contract. In 1987, Arthur took a position with the Industrial Technology Center (ITC), concentrating on technology transfer and acting as a consultant to small business. During his employment with ITC, Arthur worked extensively with finite analysis and completed several complex models, to the point where he was seeing finite elements in his sleep. He still considers finite-element analysis and computer-aided engineering as two of his specialties.

Arthur left ITC in 1987 to take a job with what was then Unisys. Arthur was the Manager of Engineering Resources, and acted as project engineer. Somewhere along the way, Unisys renamed its Winnipeg facility Paramax, and won the EH-101 contract. Arthur was a Specialties Engineer for the EH-101, working the areas of Human Engineering, System Safety, Airworthiness, and Electromagnetic Compatibility.

Arthur is married and has two sons: Chris, 14 and William, 8. Both have strong aptitudes in science and math and may someday be members of this Association. Arthur is active in his community center, participating as a soccer coach and league convener.

Arthur has been a member of APEM since 1978, and has held various offices in the Society of Automotive Engineers. He is on an advisory board at the South Winnipeg Technical Center, and he is a member of Toastmasters.

Arthur enjoys woodworking, as well as spending millions of hours at his home computer.

He would like to return to the field of engineering, to attain a position of importance in the community, and to make the province a place where new engineering grads can easily find good jobs. Back when Arthur and I graduated, there were several jobs waiting for each engineering graduate, and a graduate would move away from the city by choice. Arthur would like to work toward that scenario again. He believes that the cancellation of the EH-101 helicopter contract, and before that, the CF-18 overhaul, were heavy blows to the aerospace industry in Manitoba.

Arthur was elected to Council in October, 1993. □

Seeking Employment

Chemical Engineering (EIT)

- B.Sc. (Chem), B.S. Ch.E.
- Knowledge of ceramics and composites
- Graduate level Engineering Statistics and Kinetics
- Computer experience in basic programming, controller tuning, STAT-GRAPHICS and CHEM-CAD
- Experienced in optimization and screening procedures using Factorial, Central Composite, Box-Behnken, Fractional Factorial Plackett-Burman and Mixture designs.
- **Will volunteer to acquire experience.**

Contact: R. Skorpad 15 Embassy Lane, Winnipeg R2V 2W8 Phone 334-4580. □

Council Reports

November 15, 1993

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

AT WHICH NEW COUNCILLORS JOIN THE APEM COUNCIL

Council met on November 15, 1993 to tackle the usual hefty agenda, with the help of new members Arthur Kempan, Ertrice Eddy, Stella Fedeniuk and Bob Partridge. The order of business began with the customary approval of the agenda followed by discussion and approval of previous council minutes, financial reports, new licences, transfers, registrations and reinstatements.

The next order of business involved the appointment of Executive Council Members and Liaison Councillors for various committees. In keeping with tradition, these items had been deferred to the second meeting of the new Council. As well, the new Board of Examiners and Chairperson were appointed. Council made a recommendation to the Board of Examiners to include a member from the aerospace industry.

A report on the CCPE Semi-Annual Directors' Meeting in Ottawa was given by Pat Feschuk, APEM's CCPE Director. Most notable were the presentations of the 1993 Canadian Engineers' Meritorious Service Award for Professional Service to D.R. Grimes, P.Eng. and the 1993 Canadian Engineers' Gold Medal Award to W.D. Hurst, P.Eng., both prominent Manitoba engineers. Also, the Directors' Meeting initiated several guidelines on gender equality for the provincial Associations to develop.

Council members debated the merits of such policies, primarily the issue of whether policies of gender equality should be established by government legislation and the responsibility of employers, or, initiated by, and the responsibility of, the Association. No conclusive decisions were made.

Other business included the following:

- A task force for implementing the new four-year EIT program was introduced;
- The Premises Task Group is to table a report to the Council for he February Council meeting; and
- Council appointed the members of the Professional Practice Exam Task Force.

With the recent abolition of the non-resident and non-practising categories of membership, Council decided that members currently in the non-practising category could opt for full membership or retired membership for their 1994 dues on the basis of being retired. Similarly, non-resident members could opt for full membership or continuing non-resident membership, on the basis that they are non-resident for their 1994 dues. □

December 13, 1993

By: W.B. Mackenzie, P.Eng.

AT WHICH COUNCIL ELECTS A VICE-PRESIDENT AND CHANGES THE RULES FOR "RETIRED" MEMBERSHIP

At the meeting, Council gave rubber-stamp approval to the monthly financial statements and all applications for registration, license, etc. put before them by the Director of Admissions, and "ratified" all actions and decisions made by the Executive Committee.

Don Osman, the Head of Engineering at the Industrial Technology Centre, was elected Vice-President. Arnold Permut, Manager of the Laboratory Services Division of the Waterworks, Waste and Disposal Department of the City of Winnipeg was elected a member of the Executive Committee.

Of more interest to the general membership, the following matters were considered, and action was agreed on:

- Architect vs. Engineer jurisdiction in the building construction field. The age-old question of engineers claiming the architects are doing engineering work and vice-versa has once again been moved up to the front burner. It will never be resolved since it is impossible to define the dividing-line. Nevertheless, APEM and MAA continue to jockey for position. The current round of discussions has culminated in letters to the mayor relating to proposed changes to the City of Winnipeg Building By-Law.
- Recent By-Law changes have necessitated some soul-searching on the part of Council and some policy decisions relating to non-practising membership and non-resident membership.

Previously, APEM members moving to another jurisdiction could qualify for "non-resident/non-practising" membership at a reduced fee. APEM members resident in Manitoba who had reached the age of 65 and retired from the workforce could qualify for "non-practising" membership at a reduced fee.

On advice from the Registrar, Council decided to eliminate these "non-practising" categories of membership entirely. They put forward By-Law amendments to accomplish this. The By-Laws were changed. The changes were implemented by staff and three (out of a membership of over 3000) complaints were received. On the basis of these three complaints, Council, at this meeting, changed the rules again, creating an administrative nightmare.

The question of who is entitled to "retired" category of membership was debated. One councillor suggested we should be guided by procedures followed in the military!!

Eventually, Council decided that "retired" means "not practising engineering". The whole convoluted process to get rid of the non-practising category of membership has come full circle with Council putting it back in place.

Oh tempores, oh mores. □

U of M Engineering Grads Continue to Bat 1000 in American EIT Exam

By: K. VanCamp, EIT

The results are in for the second batch of Civil Engineering graduates from the University of Manitoba who have chosen to write the optional Engineer-In-Training exam required for registration as an EIT in the USA, and so far they are batting 1000. Even John Olerud can't match that figure.

The exam is a comprehensive eight-hour test of knowledge of all facets of engineering, not restricted to any one discipline. It encompasses such diverse subjects as circuit analysis, calculus, fluid mechanics, thermodynamics, and applied mechanics. In April 1992, three students wrote the exam, the first time it was offered at the University of Manitoba. In April 1993, another six students wrote the exam, and the record to date is nine passes, and no failures, while the overall success rate for American students writing the same exam is roughly two-thirds pass, one-third failure.

Professor Alan Clayton of the Civil Engineering Department at the University of Manitoba generously donated his time to invigilate the exam so the students wouldn't have to travel to Minnesota to write it.

One of the first areas to be opened up under the Free Trade Agreement is the movement of professional services. Those who have registered as EIT's in the USA may soon be able to apply for jobs in the much larger market down there. Judging from the test results, the training provided by the Faculty of Engineering at the University of Manitoba compares very favourably with that being offered south of the border. Hopefully, we can develop some jobs in Manitoba to keep these bright young graduates at home. □

CCPE November Directors' Meeting

By: N.P. Feschuk, P.Eng.

The semi-annual CCPE Directors' Meeting in Ottawa is immediately preceded by the CCPE Canadian Engineer Awards Gala. Approximately 100 persons attended the awards gala, including award recipients, CCPE Directors and Executive members, past award- winners and the public.

The awards presentation began with the Canadian Engineering Memorial Foundation Scholarships and Corporate Award which were presented by Dr. Eva Rosinger, P.Eng. as follows: Scholarship Award Graduate Level – Sonia Faucher; Final Year of Engineering – Janet Gaskin; First Year of Engineering – Catherine Mortin. The Corporate Award, in recognition of its variety of programs aimed at encouraging women in the workplace, was awarded to SaskPower. Donations to support these scholarships can be made to the Canadian Engineering Memorial Foundation, Suite 401, 116 Albert, Ottawa, Ontario K1P 5G3.

The CCPE National Awards were presented by CCPE President Bob Burridge, P.Eng., as follows: 1993 Young Engineer Achievement Award – Bernard Tetu, ing.; 1993 Canadian Engineers' Meritorious Service Award for Professional Service – D.R. Grimes, P.Eng.; 1993 Canadian Engineers' Meritorious Service Award for Community Service – Kathryn Woodcock, P.Eng.; 1993 Canadian Engineers' Gold Medal Award – W.D. Hurst, P.Eng. Both D.R. Grimes and W.D. Hurst are members of APEM.

The CCPE Board of Directors' meeting started early Friday morning, November 5, 1993 and after approximately 45 minutes recessed to begin the Engineers and the Environment Workshop. The workshop involved the balance of the day. Four speakers addressed the issue of the engineer's role in environmental issues from different perspectives. In the afternoon, the participants (Directors and executive members, speakers and guests) divided into three workshops. Out of the workshops came a number of ideas, concerns and recommendations, which will form part of a report to be prepared by CCPE staff. The Board of Directors authorized the Executive to establish a task force to develop a position with respect to the Engineer and the Environment, including a guideline for the practising engineer. There were particular concerns that engineering graduates of 10 or more years should be able to demonstrate that they are knowledgeable on environmental concerns and that this be accomplished through continuing education.

The Board of Director's meeting covered a variety of subject areas, including reports from standing committees. Natural scientists have written all provincial and territorial governments with respect to infringement of the engineers into the "natural scientists" fields. The concern was raised as a result of APEGBC proceeding with changes to its Legislative Act, including revising the definition of the practice of engineering to correspond with the CCPE definition of the practice of engineering. The natural scientists' position is that the new definition should specifically exclude them as the Ontario definition does. CCPE has responded by meeting with the natural scientists and, as part of the dialogue, requesting a definition of "natural scientists". CCPE will continue the dialogue with the natural scientists and will be sending a letter, outlining CCPE's position on the issue, to all territorial and provincial governments.

"...the Board of Directors, to reinforce self-governance in the profession of engineering, reaffirmed its commitment to the principle of co-operation and sharing of experience among its constituent bodies in national public issues."

The Directors' meeting adopted a number of recommendations with respect to the National Plan on gender equity, including: policies on sexual harassment for associations and employers of engineers; a code of professional conduct which includes gender fairness and censures harassment and gender discrimination; gender-balance in the membership of association councils, committees, and executives; and development of a network of professionals in the areas of alternative dispute resolution and employment equity who can act as referrals for members or employers who require this support. Both Quebec and Ontario felt these gender equity recommendations did not go far enough and, as a result, the Board of Directors authorized the establishment of a task force to look at some broader issues and to report back in April, 1994 to the Board of Directors' meeting in Saskatoon.

Since Quebec and Alberta were opposed to the establishment of the National Contingency Resource Pool, which was to be a fund to finance investigation and litigation of common enforcement issues, the Board of Directors, to reinforce self-governance in the profession of engineering, reaffirmed its commitment to the principle of co-operation and sharing of experience among its constituent bodies in national public issues, and requested that specific cases be submitted to the Executive Committee for review as to national impact and opportunity to assist the concerned constituent bodies.

Considerable debate ensued with respect to the electronic seal project. The intent of the electronic seal was to "stamp" electronic drawings as well as to "seal" the electronic drawings to prevent "stamped" drawings from being changed by someone other than the designer. A decision was made by the Board to further investigate the proposal without any further financial commitment. The project is estimated to cost in excess of $1,000,000.

For further information on the CCPE semi-annual Director's Meeting contact N.P. (Pat) Feschuk, P.Eng., APEM's CCPE Director, at the APEM office. □

Manitoba Winners – Bill Hurst and Doug Grimes

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

Two prominent Manitoba engineers have been recognized and honoured by their peers – Bill Hurst with the CCPE Gold Medal and Doug Grimes with the Meritorious Service Award for Professional Service.

The presentation of these medals was made during the fall meeting of the Canadian Council of Professional Engineers on November 4, 1993 in Ottawa.

W.D. Hurst – The Gold Medal Award

To many engineers, Bill Hurst's career is associated with 40 years of service as City Engineer of Winnipeg. His involvement in all aspects of the city's infrastructure, particularly the water supply and distribution systems, was recognized by the naming of the W.D. Hurst pumping station and ground storage reservoir located at Wilkes Avenue and Waverley Street.

Through his involvement in the infamous flood of 1950, he was asked to assist in dealing with a similar flood in Kansas City, the next year. For his participation and knowledge he became an honourary citizen of Kansas City.

While the management of the engineering functions of the city was in itself a major task, Bill also found time to contribute both to his profession and to the community. He was one of the first Canadians to serve as President of both the American Water Works Association and the American Public Works Association. He played a major role in compiling and publishing the history of public works in Canada, entitled "Building Canada".

Bill Hurst has been an active leader of many committees, such as the Winnipeg Symphony Orchestra, several hospital boards, and the Manitoba Historical Society. Bill is a graduate of the University of Manitoba, (Civil Engineering, 1930). He obtained his M.Sc. in Civil Engineering from the Virginia Polytechnical Institute in 1931. Mr. Hurst is retired and still resides in Winnipeg.

Due to an untimely illness, Bill was not able to attend the awards ceremony, and the Medal was received by his son, who is an architect.

Continued on page 12

Morton Kaiserman Discusses Canadian Standards

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

A luncheon organized by the Research and Development Committee on November 9, 1993 featured Morton Kaiserman, a project manager with the Canadian Standards Association (CSA) Environmental Program. Morton is responsible for Environmental Auditing, Environmental Management Systems (EMS), Water Quality, Laboratory Competency Standards and Guidelines.

The purpose, methods of operation and organization of CSA were reviewed briefly to establish an understanding of how the EMS Standards are being prepared and can be used by Canadian businesses. CSA has over 2000 publications. These documents are put together by volunteers and are finally agreed to by consensus. CSA produces Standards, Guidelines and Codes of Practice using this process.

CSA has a Standards Policy Board with 36 Standards Steering Committees(SSC), one of which deals with the environment. The Environment Committee has four responsibilities:

1. Technical Committee;
2. Environmental Audit;
3. Environmental Site Assessment;
4. Life-Cycle Cost Assessment.

The process for creating a standard is as follows:

1. Proposal;
2. Research and First Draft;
3. Technical Committee Review;
4. Internal Quality Control and Public Review (1000 copies);
5. Balloting by Technical Committee;
6. Review by SSC and DUE PROCESS to obtain consensus;
7. Publication and cost recovery.

The creation of a standard takes between six and 20 months, with an average of 17 months. The lifetime of a standard is typically one to three years, with a maximum of five years.

The CSA tries to balance the regional interests with international activities.

The international standards on environment are organized under three main areas:

1. ISO Technical Committee 207 with a Secretariat, a Chair and the Environmental Management System working group;
2. European with Eco-Audit;
3. United Kingdom with British Standard 7750.

Canada has an important position to help ensure that trade barriers are not raised to prevent our products from entering the export markets. Quality management, documents and processes that are well defined allow companies to comply with and meet international standards. These procedures allow a starting point and lead the way for continuous improvement.

The ECO-Audit

The Eco Audit management and audit comprises voluntary participation with public disclosure. This audit was recently approved by the Europe Parliament. Within this framework are the development and implementation of an environmental policy, environmental programs, a management review system, an audit program, the use of an independent accredited verifier, and the issuing of an environmental statement. There is a registration program for EMS that is site specific, and a comprehensive audit. A public statement, including a description of activities, is made.

CSA Environmental Management Program

CSA will provide:

1. information about how environmental issues relate to Canadian business;
2. a good understanding of the relationships between various environmental standards such as BSI 7750, Eco-Audit, ISO 9000 and CSA Z750;
3. a working knowledge of how Z750 may be integrated into existing management systems;
4. first-hand experience in using the new CSA Z750 EMS document;
5. support in integrating Z750 into existing management systems;
6. feedback regarding the guideline and the implementation process.

The CSA is trying to help businesses adopt environmentally responsible programs, product registration and stewardship that will lead the way to SUSTAINABLE DEVELOPMENT. □

A Quality Experience

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

It was a quality seminar, both in subject and in content. Total Quality Management, Continuous Improvement ...call it what you will, the day-long Professional Development session was an extremely well-organized, well-attended event with top-notch speakers presenting first-class material.

The seminar commenced with a state-of-the-economy address from Ralph Bullock, Vice-President, Engineering and Quality at Bristol Aerospace. Mr. Bullock described Canada as an "economic basket-case", a situation which is not likely to improve until Canadian attitudes toward science and technology, and Canadian management methods, improve.

Rick Wiens, of G.R. Technologies, provided an overview of IS0 9000, a series of standards which have been adopted as the industry standard by the European Economic Community. He reported that, while there is currently no provision in IS0 9000 for continuous improvement, it **will** become a requirement in 1996.

There is no question that, in service and manufacturing, profit and non-profit sectors alike, customers are demanding quality as they have never demanded it before. A very lively panel discussion highlighting the experience and successes with quality management programs of four very different organizations (a construction company, a bank, a municipal government and a company involved in overhaul and repair), and an excellent presentation by Ken Holland, P.Eng., President of Carte International, a manufacturing company, which has successfully implemented a quality improvement program, left little doubt that there is a place for the teachings of Deming, etc. in workplaces of **every** description.

The final speaker of the day was Steve Russell, P.Eng. of Ernst & Young who, for the third time in as many years, had come to share with the engineering community the results of his firm's latest studies of quality improvement practices in Canada, the USA, Germany and Japan. Mr. Russell single-handedly "burst" the TQM "bubble" that the first seven speakers had done such an excellent job of creating, by reporting that the financial, operating and performance data collected from 600 organizations worldwide indicated that TQM is **not** a generic model for organizations of all types, locations and sizes. He cautioned that quality management practices not carefully selected and not implemented at the appropriate stage of an organization's development can actually **harm** the organization, and he went on to describe the appropriate conditions for such practices as strategic planning, empowerment, training and compensation.

All in all, the calibre of the speakers, the material presented and the organization of the event (thanks to co-ordinators Kelly Kjartanson and Sital Rihal) made the Seminar a very positive experience for all who attended – and well worth the registration fee! □

Notice

The Manitoba Law Reform Commission has released a discussion paper entitled "The Future of Occupational Regulation in Manitoba". This paper discusses alternatives for the regulation of all professionals, including engineers, in Manitoba. The paper solicits feedback on a range of questions about if, when and how occupations (including professions) should be regulated. To obtain a copy of the paper contact the Law Reform Commission on the 12th floor of the Woodsworth Building, 400 Broadway, Winnipeg R3C 3L6, phone 945-2896 and Fax 948-2184. The deadline for submissions (which must be written) is March 1, 1994.

Memorial Foundation Announces Award Winners

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

On November 4, 1993, Dr. Eva Rosinger, P.Eng., APEM Councillor and Vice-President of the Canadian Engineering Memorial Foundation, presented the Foundation's annual Corporate Award and 1993 Scholarships to four most deserving recipients at a gala ceremony in Ottawa.

The Foundation was established in commemoration of the 14 young women studying engineering at L'Ecole Polytechnique who lost their lives in the tragedy of December 6, 1989.

The winner of the $5,000 First-Year Scholarship was Catherine Mortin, a native of Regina in her first year of engineering at Simon Fraser University who intends to specialize in automation and robotics.

The $5,000 Final-Year Scholarship was awarded to Janet Gaskin, a native of Kingston, Ontario who will be completing her Civil Engineering program at Queen's University in May, 1994.

The $5,000 Graduate Scholarship went to Sonia Faucher, who completed her Bachelor of Engineering degree in Mechanical Engineering (Co-Op) in December, 1992 and is currently enrolled in a Master's program in "simultaneous engineering", both at the Universite de Sherbrooke.

Dr. Rosinger expressed delight at the calibre of this year's scholarship recipients, all of whom, she enthused, have demonstrated scholastic excellence and displayed exceptional community involvement, leadership and communication skills.

The Corporate Award, which recognizes excellence in programs aimed at encouraging, promoting and integrating women engineers in the workplace, was presented to SaskPower, the Saskatchewan electrical utility, for its pro-active hiring practices, its support of women engineers and its mentoring program for female high-school students considering careers in the sciences.

Dr. Rosinger was so impressed with SaskPower's distinguished commitment to women engineers that she presented the award – believed to be unique in Canada, and possibly in North America – not once, but twice, to SaskPower's Executive Vice-President Carole Bryant: at the CCPE Awards Gala on November 4 in Ottawa, and again at a special reception on November 8 in Regina. □

Tour Announcement – Energy & Environmental Research Center

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

Tour Details

The Research and Development Committee has made preliminary arrangements for a tour of the Energy & Environmental Research Center, University of North Dakota, Grand Forks, ND, by members of the APEM, on Thursday, May 19, 1994. The tour group, it is planned, will leave Winnipeg at 8:30 a.m. and arrive at the Center in Grand Forks by 11:30 a.m. for a pre-arranged luncheon and tour. The tour will wind up with a brief "overview of the center" and question-and-answer period led by Gerald H. Groenewold, Director. The departure for Winnipeg is scheduled for approximately 3:00 p.m.

About the EERC

The EERC is one of the world's leading energy and environmental facilities. The center conducts research on all ranks of coal and is recognized as an international leader in low-rank coal research and technology. The center attracted approximately $20 million in contracts during fiscal year 1992.

EERC researchers are in high demand in the national and international marketplace, with a growing list of customers. The premier research and development center on the Great Plains, the EERC also has the leading groundwater protection program in the Upper Midwest. Other major expanding programs include the areas of advanced power systems, waste disposal, waste reuse, air emissions control, biomass fuels, energy policy, contaminant cleanup, and mine land reclamation.

The EERC uses an interdisciplinary approach to energy and environmental research, beginning with fundamental evaluation and characterization of the earth's resources. This is followed by research and development of innovative technologies designed to extract and use these resources in an efficient and environmentally acceptable manner. The final step in the approach is the use or safe disposal of products generated by a process.

The EERC's staff consists of 260 full- and part-time employees – chemists, biologists, geologists, paleontologists, biochemists, physicists, groundwater hydrologists, microbiologists, chemical engineers, civil engineers, mechanical engineers, electrical engineers, and a skilled support staff of laboratory and equipment technicians.

Further Information

If you would like further information, please contact Edgar Lach, P.Eng., at 984-6034. □

UMSAE – Ambitious Projects Ahead

By: T. Cassidy

The students of the University of Manitoba Faculty of Engineering run a student chapter of the Society of Automotive Engineers (UMSAE). The group has over 70 active members.

Due to recent budget cuts, the Mechanical Engineering Department has removed all practical shop training from our Undergraduate Mechanical Engineering program. UMSAE provides the only opportunity for students to design and build mechanical projects. The Mechanical Engineering Department has allocated a small space for construction and storage, and recently developed two courses that include portions of UMSAE design projects in the course material to aid in the design of these projects.

The three projects currently being designed are a Formula race car (scaled down), a Super Mileage Vehicle (SMV) and an Aero Design project consisting of a model air-cargo plane. All three projects are planned to compete this spring in the United States. The Mechanical Engineering Department has volunteered to pay for part of our travel expenses.

UMSAE has many activities planned this year, including a wine-and- cheese reception on February 24, 1994. All those interested are welcome to attend. For your enjoyment we have scheduled a guest speaker, Bruce Aubin, former CEO of Air Canada.

Our thanks to all those who previously sponsored UMSAE projects and we welcome any donations, monetary or service, to keep UMSAE competitive with other international competitors. If you would like more details on UMSAE or the wine-and-cheese reception, please contact Stef Roberts at 474-8736 or Fax 275-7507. □

CCPE President's Message

Continued from page 6

much the technical skills as the more personal ones. For example, many will have to work in an entrepreneurial context, which means leadership and communication skills will be as important as technical competence.

If we are to maintain the strength and health of the profession, we must have a better understanding of what is happening in the workplace. We know that radical changes are taking place, and the past is not a particularly reliable guide to the future. We have always been an introspective profession given to self-analysis. The CEHRB must continue to examine the engineering workplace to help fuel discussion between practitioners, educators and students as to what is the significance of the changes and what actions are required. □

Red River Flood Protection in Winnipeg

Continued from page 1

sluice gates close and the pumps discharge raw sewage back into the river, effectively closing off the river during flood states. Since 1950, 14 additional pumping stations and gates have been installed to protect the city against flood-water.

In 1952, the Dyking Authority Act was passed to ensure that the dykes and pumping stations constructed subsequent to the 1950 flood were maintained in a state of readiness to combat future floods.

While authority and control over dykes and pumping was vested with the city or rural municipality in which they were situated, provision was made, by provincial statutory authority, for the appointment of a Dyking Commissioner. This official was granted powers to inspect dykes and pumping stations and to order work to be undertaken to maintain an integrated system of flood defenses. Duties included the establishment of the location of the line of flood defense.

Each year, the city reports to the Dyking Commissioner on maintenance of the dykes and pumping stations, locations of borrow pits, bank stability, erosion and new facilities, and presents current issues for resolution. The Dyking Commissioner, in his role as 'watchdog', is required to present his annual report each spring, before the Provincial Legislature, as evidence that the city's flood protection system is constantly in a state of readiness.

Several major changes have taken place since the passage of the Dyking Authority Act of 1952:

1) The Red River Floodway, Portage Diversion and Shellmouth Dam projects were completed. These works provide control of potential flood flows from the Red and/or the Assiniboine Rivers, such that protection from high river levels is extended from a one-in-30-year to a nearly-one-in-300-year frequency of occurrence.
2) The Canada-Manitoba Flood Damage Reduction Agreements have produced an Interim Flood Risk Map designating Flood Risk Areas and Floodways in the City of Winnipeg, and has defined certain criteria for developments dictated by flood levels. In general, the legislation prohibits construction in the floodway portion of the river and sets flood-proofing criteria for buildings constructed in the flood fringe.
3) Urban development has taken place beyond the lines of flood defense established earlier.
4) The five cities and two rural municipalities subject to the Dyking Authority Act were replaced by a single city.

These changes have given rise to the following issues:

1) The flood defense lines, as currently established, should be revised to recognize the reality of the Floodway and urban growth expanding beyond the designated lines. The City completed a study on high river levels and is reviewing the Primary Dyking System for improvements and possible extensions. Surveys of several deficient areas and possible extensions suggested in the report have been completed and will be submitted to the Dyking Commissioner for approval.
2) Operating rules for the Red River Floodway and the Portage Diversion should be reviewed and formally approved.
3) Design criteria for storm sewers and pumping stations under flood conditions should be reviewed and defined.
4) The requirements of the Flood Damage Reduction Program differ from the requirements historically associated with the primary dyking system. These differences relate to the different elevations between the new flood protection levels, which are determined by a computer model of the rivers with their flood protection works, and the actual 1950 flood levels along the river.
5) With the ever-increasing value of serviced land, there has been an upsurge in development pressures within the designated flood fringe areas. The City of Winnipeg Act now includes regulations which strictly regulate dwelling and primary dyke construction within the floodway fringe. The restrictions apply to dwellings not protected by a primary dyke. In order to avoid the structural building restrictions imposed by the Act, developers may construct a primary dyke for their subdivision, complete with pumping and gating facilities, in conformance with the regulation.
6) Stormwater Retention Basins are designed to protect land developments from summer storms. An added benefit concerning flood-fighting is their ability to store severe spring storms without the need for pumping during high river levels, provided that their river outfalls are properly gated.

In summary, major works such as the Floodway have reduced the risk of high river levels in Winnipeg. The city is ensuring that the existing dyke and pumping system is in a state of readiness. New development is being regulated to ensure that all new construction is in accordance with the flood-proofing criteria of the Flood Damage Reduction Program. □

Engineers in the News

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

Professor Slobodan P. Simonovic has been invited to join the Editorial Board for the international journal, "Water Resources Management" and also to become an Associate Editor of the "Hydrological Sciences Journal." Both duties commence in 1994.

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Professor H.C. Card was recognized for his contributions to teaching in the highest manner possible: by the students. Mr. Mark Poole (Gold Medallist TE/93) presented the award to Professor Card at a reception put on by the students. □

Coming Events

Instrument Society of America
INSTRUMENTATION EXHIBITION AND SEMINARS
March 10, 1994
International Inn, Winnipeg
Contact: Todd Coulter
Phone: 633-6657

National Association of Corrosion Engineers – Manitoba Chapter
TANK LINING PRACTICES AND STANDARDS and SUCCESSFUL COATING OF GALVANIZED STEEL SEMINARS
Both presented by R. Lasby
March 15 and 16, 1994
Contact: D. Gordon
Phone: 284-8100

Bill Hurst and Doug Grimes

Continued from page 9

D.R. Grimes – Meritorious Service Award for Professional Service

Doug Grimes is well known in the consulting engineering field. He has been President of Wardrop Engineering since 1987, having joined that company in 1962. With the exception of a few years following graduation, Doug's career has been associated entirely with the consulting field. He has been a member, including President, of the Association of Consulting Engineers of Manitoba (ACEM) since its conception in 1979.

Doug's years of service to the Association of the Professional Engineers of Manitoba surpasses those of his service to ACEM. For the past 31 years, he has been on a committee every year – including the office of the President. He has also lent his services to the United Way, The Boys and Girls Club and the Transportation Association of Canada, to mention a few of many organizations he has supported. President Burridge of CCPE said, "Throughout the years Doug Grimes has been unwavering in his service to the profession and in his professionalism."

Doug graduated from McGill University with a Bachelor's degree in Civil Engineering in 1954, received an M.Sc. in Civil Engineering from Queen's in 1956, and then ventured into Western Canada.

It was indeed with heartfelt sorrow that, due to a current medical treatment, Doug was unable to be present to receive the medal in person. However, his son, Michael Grimes, P.Eng., accepted the award on his behalf.

Two awards to two very note-worthy engineers of Manitoba. □