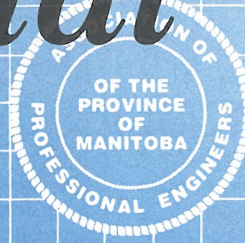
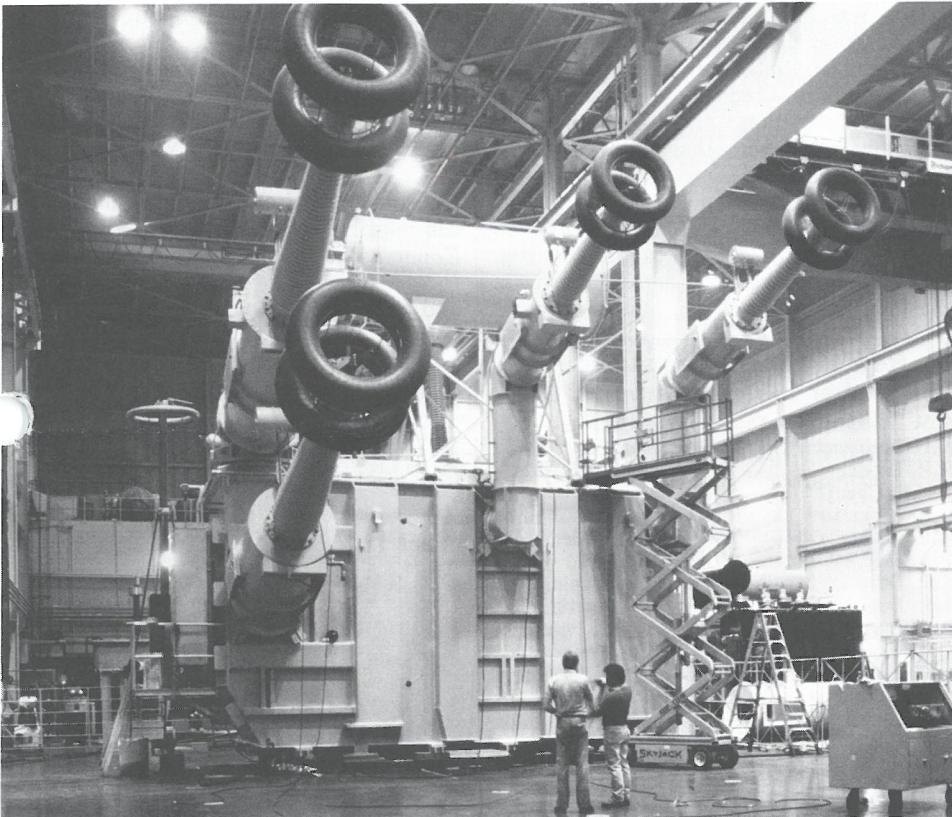


Professional Engineer



February, 1988

Manitoba Firm Exports HVDC Transformers Worldwide



The first Pacific Intertie HVDC Converter transformer in the high test bay area of Federal Pioneer Limited's Winnipeg transformer plant.

by R.P. de Lhorbe, P.Eng.

Federal Pioneer Limited is a diversified manufacturer of electrical products, 100% Canadian owned. They are a major player in the electrical industry, including the Large Power Transformer market, and have developed special expertise in HVDC Converter Transformers.

Late in 1986, FPL was pleased to accept an order for converter transformers for the southern terminus of the Pacific Intertie expansion project, which runs North and South along the Pacific coast. This latest expansion, about 1200 Megawatts, increases the capacity of the system which is used to transmit power generated in the Pacific Northwest area of the United States (Bonneville Power Administration) down to the high load centers around Los Angeles (Los Angeles Depart-

ment of Water and Power). This was a significant order for FPL as it allowed them to expand this part of their product line into the international market. These transformers are being designed and manufactured at FPL's Large Power Transformer plant in Winnipeg.

The order consists of 7 units of 212 MVA top rating, single phase, 4 limb core, three winding transformers, with horizontally mounted DC bushings (the interesting external design features can be seen in the photograph). These DC bushings go through the wall of the valve hall and are connected directly to the thyristor assemblies. This method is very popular with current designers of HVDC stations as it is direct and relatively inexpensive. The AC winding is rated 230 kV and is split into two

(Continued on page 4)

C.C.P.E. National Awards Nominees Needed

The National Awards presented by the Canadian Council of Professional Engineers are intended to bestow distinction on outstanding professional engineers in this country and to recognize their exceptional achievements, as well as to assist in the furtherance of public understanding of the important role of the professional engineer in Canadian society.

CCPE National Awards are presented each year at the Annual and Semi-Annual meetings of the CCPE Board of Directors. There are four awards: GOLD MEDAL AWARD (presented at the Semi-Annual meeting); MERITORIOUS SERVICE AWARD FOR PROFESSIONAL SERVICE (presented at the Annual meeting); MERITORIOUS SERVICE AWARD FOR COMMUNITY SERVICE (presented at the Annual meeting); and YOUNG ENGINEER ACHIEVEMENT AWARD (presented at the Semi-Annual meeting).

The four principal factors taken into account in selecting the national Award winners are: 1) Work related achievements, in design, teaching, management, research, etc.; 2) Service to the profession of engineering through, for example, active and productive participation in engineering associations and societies; 3) Service to the community, such as volunteer work and other participation in worthwhile non-engineering organizations and activities; and 4) Enhancement of the quality of life in Canada, through environmental work or other achievements not easily or exactly related to the above three factors.

It is important that as many members as possible of APEM give thought to who among our members might be appropriate nominees for these awards, and then advise the Association office as soon as possible of their recommended nominees and the basis for the recommendations. The Association staff and the APEM Awards Committee will consider these recommendations, and will seek such additional information as may be necessary to enable a decision. The APEM Awards Committee will then submit a list of recommended candidates to APEM Council, and following Council's decision will prepare

(Continued on page 4)

THE MANITOBA

Professional Engineer



February, 1988

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Notices

Annual Fees Important Reminder

Fee invoices have been mailed to all members. Members are again reminded that receipt of fees in the Association office after February 29th, 1988 will incur a late payment administration fee of \$35. If fees are mailed prior to February 29th and received after February 29th, the late payment fee will apply.

Also, be reminded that if all fees owing are not received in the Association office before July 1st, 1988 the member's name will be removed from the register and that person is then prohibited, by law, from practising engineering in Manitoba.

Transferred Not Keeping Manitoba Membership

L.M.F.P. Lye

C.D. Nelson

J.R. (Jack) McDougall Member of Council



Jack McDougall

Jack McDougall has been a member of Council since October, 1987. He is a lay member, appointed in accordance with the requirements laid down in The Engineering Profession Act. He will serve a term of two years. He is already making a positive and useful contribution to our Association at Council meetings.

Jack was born, raised and educated in Regina. After graduating from high school he joined C.P. Rail. Three years later he joined the firm of Credit Foncier, a national financial institution, and spent the next thirty-five years with that firm. When he retired from active business practice in 1986 he was the Manitoba manager. During his service with Credit Foncier he lived in Regina, Toronto, Ottawa and Winnipeg. Jack's broad background and experience in the financial field will be, and already has

been, valuable to Council. During his career he had occasion to be indoctrinated into architecture. He has retained a strong interest in the building construction field. (In retrospect Jack thinks he would like to have been an architect!).

For many years Jack has been an active volunteer in the Arthritis Society. He is the immediate past president of the Manitoba section and a member of the National Executive Council.

Jack has been blessed with a charming wife and two delightful daughters. His wife Wendy, a University of Winnipeg BA Honours graduate, works in the library field. Daughter Barbara, a University of Manitoba B.Comm. graduate, is carving out a career in Calgary and daughter Karen, a Laurier University B.Comm. graduate is a senior manager in a chartered accountancy firm.

Jack is very much aware of the reasons for and the value of lay members on the APEM Council. He concurs fully with the primary Association mandate to protect the public interest in the field of engineering and feels he can contribute to that process as a member of Council. The Association is fortunate indeed to have a person of Jack's caliber, expertise and dedication serving on Council. □

New Members Registered in December 1987 and January 1988

G.W. Alock	D.T. Lane
D.F. Bosowec	G.P. Lee
R.R. Brodeur	T.G. Livingston
T.C.E. Cheng	B.U. Lutter
G.M. Comeau	D.G. McKibbin
A.R. Dalkie	K.G. Miller
P.A. Dalkie	C.D. Murray
L.P. Dean	H. Musaphir
L.E. Dunn	R.J. Partridge
R.I. Enns	H.A.C. Perera
C.A. Evancio	E.G. Price
L.F. Fainstein	R.J.N. Prychitko
A. Ferlatte	M. Razzaghi
C.E. Fletcher	M.P. Rispin
A.B. Foster	D.W. Ruth
E.H. Garfinkel	R.M. Sawatzky
W.K. Henry	C.L. Stewart
J.R. Hosang	A.W. Stewart
C.D. Hughes	K. Tsoi
J.E. Itzkow	G.S. Waters
J.D. Kilgour	R.P. Wierckx
M. Kocalka	J.R. Zadro

Congratulations to the following people who achieved 100% on the professional practice examination:

G.P. Lee	R.R. Brodeur
G.S. Waters	C.A. Evancio

Licences Issued in Dec. and Jan.

D. W. Chambers (Alta.)	W.B. Lester (Alta.)
K.W. Dean (Sask.)	G.C. McPhee (Alta.)
J.C. Draper (Que.)	Z.A. Marsic (Ont.)
R.P. Fallowfield (Ont.)	P.K. Mehta (Ont.)
R.E. Harder (Alta.)	W.A. Meneley (Sask.)
M.D. Hidas (Ont.)	C.A. Pugliese (Ont.)
G.W. Ilott (Que.)	B.G. Robb (Sask.)
S.F. Jim (Ont.)	R.R. Ryland (Alta.)
D.L. Killam (B.C.)	A. Tork (Ont.)
P.S. Lamba (Ont.)	

With Deep Regret, the Association Records the Passing of:

W.A. Trott
C.L. Fisher-Past President, 1952

Engineering Graduates December 1987 and January 1988

E.F. de Arcos	R.D. McNair
W.T. Burdz	M.R. Phaneuf
F. De Luca	P.R. Poutanen
B.N. Feuer	M.J. Procca
T.E. Heidinger	D.B. Thompson
P.C. Isaak	A.H.J. Weremy
G.C. Johnson	E. Chen-On Yu
D.N. Kjartanson	

Resignations - December 31, 1987

F. Aysan	J.R. McKay
T.B. Brewster	R.A. Morgan
J.G. Bragg	G.W. Patterson
A.G. Carlos	D.M. Petriw
V.B. Cook	G.R. Pool
D.E. Costantini	P.W.J. Rivett
T.A. Crosier	J.L.S. Ross
D.D. Davidson	W.R. Shields
R.A. Downing	A.G. Sidebottom
F.B. Dunn	R.A. Smith
J.J. Harris	M. Spigelman
G.L. Hird	G.R. Stunden
D.E. Honeyman	B.J. Ulrich
W.J. Horner	C. Vogel
H.F. Keats	S.J. Walsh
G.H. Kent	W.A.P. Warnhammar
A.C. Livingston	H.H. Warnock
J. McEwan	R.G. Zahalan
A. McGregor	

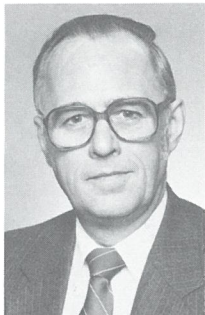
The Association Cannot Locate

A.J. Ament	V. Kumar
W.B. Ashby	R.D. McLatchy
D. Breur	K.B. Mirza
H.A. Chan	L.V.V. Oman
K.F. Chow	C.A.J. Paul
C.P. Derooy	R. Pearson
D.A. Doucette	R. Rampaul
J.E. Elias	G.W. Robson
David Free	T.R. Sabzwari
J.K. Filo	J.E.A. Sagman
B.G. Friesen	P. Schober
S.K.W. Keung	K.R. Singh
V. Kukoraitis	K.J. Van Loon

IMPLEMENTATION BY COMMITTEE

President's Message

W.D. Christie, P.Eng.



The affairs of APEM are governed by a Council elected by the members. However, the issues requiring consideration are too numerous for Council to handle effectively. Council therefore appoints committees to ensure that all issues are considered in a timely fashion.

The Engineering Profession Act has a clause which empowers the APEM Council to provide for the appointment of committees. This principle is further embodied in clause 31 of our By-laws which deals with committees and which reads in part "Council may—appoint committees—for the purpose of facilitating business—in the interest of the profession". At the present time there are 21 committees which have been established by Council.

In the period between May, 1982 and May, 1983, a major review of all committees of Council was undertaken. The result of that review was that the preexisting list of 24 committees was thoroughly analyzed. The review resulted in: * The dispersal of inactive committees; * The development of new Terms of Reference for active committees; * Grouping of the committees under three new headings, namely; - Committees Necessary Under the Act, - Committees Assisting Council, - Committees Considered to be Service Oriented. A

grouping of common functions of some preexisting committees under a single new committee.

Following this review, 15 standing committees emerged. This list has subsequently been expanded to include 18 standing committees. There are 3 ad hoc committees in place which are charged with specific duties. These ad hoc committees will be dispersed following the completion of their mandates.

The current committee list is as follows:

Group 1 -Boards and Committees Necessary Under the Act

- * Admissions Review Board
- * Board of Examiners
- * Executive/Finance Committee
- * Practice & Ethics Committee
- * Safety in Engineering Practice Committee

Group 2 -Committees Assisting Council

- * Awards Committee
- * Consulting Engineers Committee
- * Legislation Committee
- * Nominating Committee
- * Professional Development Committee
- * Salary Research Committee

Group 3 -Service Oriented Committees

- * Annual General Meeting Committee
- * Publication Committee
- * Public Relations Committee
- * Research & Development Committee
- * Sports Committee
- * University Liaison Committee
- * Social Committee

Ad Hoc Committees

- * Review of Code of Ethics
- * Stamping of Shop Drawings
- * Technologists

Each committee provides valuable support functions to Council. They are all comprised of volunteer members of our Association and we owe each of these people a sincere vote of thanks for their diligent efforts on our behalf.

Under procedures established by Council, committees deal with matters which may be identified internally within the committee or which are referred to the committee by Council or by the staff of the Association. Once issues are considered by a committee, the committee forwards to Council a suggested motion for consideration by Council or a recommendation for a course of action to be followed by Council.

Terms of Reference for each committee are established and approved by Council. Terms of Reference typically include items such as the purpose of the committee, the composition of the committee, the terms of office of the members, duties, procedures, composition of any sub-committees, frequency of meetings and reporting requirements.

The membership of committees changes through resignations, transfers out of the Province and for other reasons. Council is constantly searching for new members to replace those leaving. If any members of APEM wishes to volunteer his/her service in order to contribute to the long-term well-being of our Association, I would encourage you to contact our Registrar, Bill Mackenzie, P. Eng. and make him aware of your interest. Bill will be happy to hear from you and will try to assign you to the committee of your choice at the first opportunity. From personal experience, I know that participation in committee work results in a significant increase in knowledge of the workings of the Association and can be a singularly rewarding experience. □

Annual Rock Fest



Piping them on.

On the morning of January 12th, in keeping with tradition, a piper in full highland regalia piped the participants onto the ice at the Granite Club and the APEM annual bonspiel was under way.

Curling expertise was not as much in evidence as was an abundance of enthusiasm displayed by the participants. After the shooting stopped and the smoke cleared Jim Suzuki and his rink of Murray Vanderpont, Harvey Kaita and Brock Sanderson managed to scratch their way through the bonspiel without a defeat. They will have their names

engraved on the President's Trophy for the second year in a row! As curlers know, in a bonspiel, good luck is just as important and maybe more important than ability. Unquestionably Jim and his gang did experience some good luck along the way, in view of the fact that there were a number of other rinks who were quite capable of winning it all. There were five events in the bonspiel and it is interesting to note that in one event, the rink that won second place did so without managing to win a single game in the bonspiel. It is probably better that they remain nameless.

A comment made by a member of this particular rink was that the rink that beat them out in the final game of this fifth event was extremely fortunate. Sean Kavanagh from Brandon had two of his sons and his boss curling with him. Despite this, Sean, a canny curler of the old school, experienced some significant success in the bonspiel.

Our President, Bud Christie, managed to catch on with a rink of senior citizens and (their age notwithstanding) won three games (but no prizes). Bud stayed on for the presen-



Jim Suzuki, Harvey Kaita, Murray Vanderpont, Brock Sanderson - No. 1 in '88.

tations of prizes and presented the President's Cup to the winning rink.

All in all, the bonspiel was enjoyed by all. The Granite Curling Club provided good ice, good service and good beer. Chairperson, Cindy Kohuska and her committee are to be congratulated. The committee wishes to thank, on behalf of all the participants, the generosity of the firms who made donations for prizes. It can be said I think, without contradiction, that the APEM bonspiel is a highlight event in the Association's calendar. □

Manitoba Firm Exports HVDC Converter Transformers Worldwide

(Continued from page 1)

50% sections, one on each wound leg of the core. Each of the DC windings is rated at 204.5 kV, and one is mounted on each wound core leg. One of these DC windings will form part of a delta to become the 250 kVDC bridge, and the other one will form part of a wye connection to become the 500 kVDC bridge. In addition, each AC winding contains a load tap changer in the neutral providing variation of -22% to -5%. Each AC circuit is completely separate from the AC bushing to the neutral bushing to ensure proper ampere-turn balance and minimal circulating currents.

The finished weight of each unit is nearly 285,000 kg, and the height from ground level to the top of the conservator is 10.75 meters.

The design of HVDC Converter Transformers is a complex juggling of what is in effect two insulation systems, which of course must end up as one fully integrated system. The one insulation system takes care of the AC stress and the other takes care of the DC stress. To make a long story short, the division of AC stress amongst the components of the insulation system are determined primarily by the ratio of the dielectric constants of the materials. Because the dielectric constants of oil and oil soaked pressboard are fairly similar in magnitude, there are only relatively minor changes in the voltage field at an interface between two or more materials. In the end it turns out that most of the AC stress is picked up by the oil. However, in a situation where a DC voltage is being applied to an insulation assembly, the eventual distribution of stress is proportional to the resistivity of the materials. The word eventual is important, as it takes time for the full DC stress to develop (we are talking tens of minutes sometimes). The application of a step DC voltage first appears just like an AC stress to the insulation, but gradually shifts to become the DC stress. The ratio of resistivity of materials used in transformers can vary by up to several orders of magnitude. These large differences mean that huge stresses can develop at the interfaces between different insulating materials. The specific values of the DC stress is picked up by the solid insulation, especially the pressboard (as it is the most abundant solid insulation material present).

All of the above means that the designer must juggle the oil spaces and the pressboard insulation, along with any other insulation used to ensure that all stresses are controlled within the limits required. Further complications with DC stress are added because the values of resistivity are not reasonably constant as dielectric values are, but vary in proportion to water contamination, temperature and even the electrical stress itself. In short, the insulation systems in HVDC Converter transformers are extremely complex.

All windings have a full range of dielectric tests applied to them, including full and

chopped wave impulse, switching surge, applied AC tests, induced tests and of course, applied DC tests. To provide another idea of the size of the transformer, consider the insulation levels: * AC winding 900 kV LIL; * Wye DC winding 1425 kV LIL; * Delta DC winding 800 kV LIL; and * Neutral 200 kV LIL.

As usual, the DC tests are the really interesting ones. In this case, some of the challenges resided within the DC generator itself. When FPL purchased this equipment in 1969 for the first of the Manitoba Hydro Nelson River units, HVDC testing was still very much an art and not yet fully defined (DC testing is still in the process of being changed but is a lot better defined now than in 1969). One of the tests developed and accepted in the mid 1970's was the polarity reversal test, used to represent stresses due to one of the modes of operation of a DC system (an operating mode whose system implications were not fully foreseen in 1969). Thus, FPL's DC generator was not designed to change polarity within a short period of time as part of a test sequence. Polarity could be changed but only by modifying various settings, controls and connections, by hand, within the generator itself. This took significant time and the transformer under test had to be discharged and grounded for safety reasons. Converter transformers will build up a huge electrical charge on their insulation similar to a capacitor during the DC tests, which could be lethal unless proper precautions are taken. Left to itself, this charge may take many hours to bleed off, and therefore must be carefully discharged by the test department before the transformer is worked on again. As the polarity reversal test is now considered standard, the plant contacted the manufacturer who claimed that the necessary modifications were impossible. The plant therefore set out to prove otherwise and successfully modified the generator to perform this test to the customers specification. In addition, FPL believe that this is the highest voltage converter transformer to be ever tested in this way in North America.

There are two major DC tests which must be performed on each DC winding, the applied and the polarity reversal tests. First consider the applied test. A positive DC potential is applied for 60 minutes and partial discharge is monitored for the last 10 minutes (the maximum discharged allowed being 10 pulses in excess of 2000 pC). As previously mentioned, it takes a while for the full DC stress to develop, and since partial discharge is more important at the high stress which develops in the latter part of the test, it is not monitored until then. This positive polarity test is conducted at 403 kVDC for the X (delta) winding and 778 kVDC for the Y (wye) winding. Each of these tests is followed by another applied test at the same voltage levels, but at negative polarity (with the same partial discharge criteria as mentioned above).



The second test is the polarity reversal test, which may at first appear similar to what was described above, but because the reversal is performed within a very short time period (maximum 120 seconds) the stresses are very different. The higher voltage tests mentioned above allow a much longer time between the reversal of polarity as well as allowing the insulation to be discharged. Thus they can be considered as two completely separate tests, one at positive polarity and one at negative polarity. During the polarity reversal tests the windings appear to see something like the full difference in the voltages at the changeover time (although it's not exactly this simple due to the time lag of the DC stress).

For the reversal test, the X winding is run for 60 minutes at negative 246 kVDC (in order to stabilize the DC stress) and then within 120 seconds is changed to positive polarity (246 kVDC) for 30 minutes, with partial discharge measured for the final 29 minutes (30 pulses exceeding 2000 pC allowed as a maximum). The Y winding reversal test is similar in sequence but as the Y winding is connected to the 500 kVDC bridge, the voltages are 558 kVDC negative for 60 minutes and then positive 558 kVDC for 30 minutes with partial discharge as above.

The first two units of the seven have passed all their tests at the time of this writing with no problems, proving that another highly successful design has been developed. The successful completion of this project further enhances the reputation which Manitoba Engineers have justly earned in the field of HVDC systems.

Mr. R.P. de Lhorbe, P. Eng. is the Product Manager, Large Transformers Federal Pioneer Limited, Toronto. □

CCPE Nominees Needed

(Continued from page 1)

complete nomination documents regarding APEM's final nominees. If the schedule is as in past years, these formal nominations must be forwarded to CCPE before the end of June 1988.

If you have any questions about the basis on which the CCPE National Award winners are selected and need additional information, please phone Ted Clarke at 986-5285 or Bill Mackenzie at 942-6481.

Above all, if you believe that important engineering achievements by a fellow engineer (particularly, of course, a fellow Manitoba engineer) have not been adequately recognized, this is your opportunity to do something about it. Please do so in the near future. □

BUILDING A HOUSE IN THE SOUTH OF SPAIN



Through correspondence with Derek P.R. Moore, P.Eng. we have received information for an interesting article on house construction in the south of Spain on the Costa Del Sol. Mr. Moore is a member of APEM and is originally from Winnipeg. He now lives in Elviria which is located on the Costa Del Sol.

House styles and building methods vary considerably from those in Canada. Before construction, approval of specifications and plans are required as in Canada but may take longer than 12 months to receive.

The primary materials are concrete and clay bricks. Lumber is a precious commodity in Spain and is only used for some interior mill work. Many special ceramic products are used as the basic structural and architectural components.

The two basic methods of house construction are "load bearing walls" and "beam and columns". Both use a combination of clay tile and reinforced concrete for floor and roof platforms.

Foundations are usually shallow since the soil is firm and rock is normally close to the surface. Thus, there are usually no basements except on the hillsides. Reinforcing steel is used in typical footings.

The basic platform is typical for both the floors and ceiling of a bungalow. "Viguetas" span between walls or beams. These are small precast concrete beams with their reinforcing stirrups exposed on their top sides. A stan-

dard vigueta is 100 mm thick by 6500 mm long and is cut to length as required. The viguetas are spaced precisely to accommodate rows of ceramic "bouvadillos" between them. Bouvadillos have a light weight honeycomb construction and are typically 170 mm high. They generally span 650 mm between viguetas and are similar in use to pan forms, but do not require stripping. Reinforcing steel is placed in both directions which sits on the top of the vigueta's stirrups. After temporary props are positioned below the platform the floor, vigueta and perimeter beams are integrally poured. Around the entire perimeter of the building is a well reinforced beam referred to as the "forajado ver estructura" from which the method of construction derives its name. If a house has two stories the upper floor is similar to the main. The ceiling platform extends over the wall to provide an eave.

The exterior walls are typically 290 mm thick. This allows for two wyths of brick separated by a cavity in which sheets of insulation are installed. Interior partitions are typically one wythe of brick. Internal brick arches are a typical feature. Floors are usually marble tiles.

Windows are normally aluminium. Wood is subject to unwanted maintenance. Some houses use mosquito gauge frames which slide in tracks in front of the window. Externally, vertical bars called "rejas" are usually incorporated for security. Scroll motifs are added providing an Andalusian appearance.

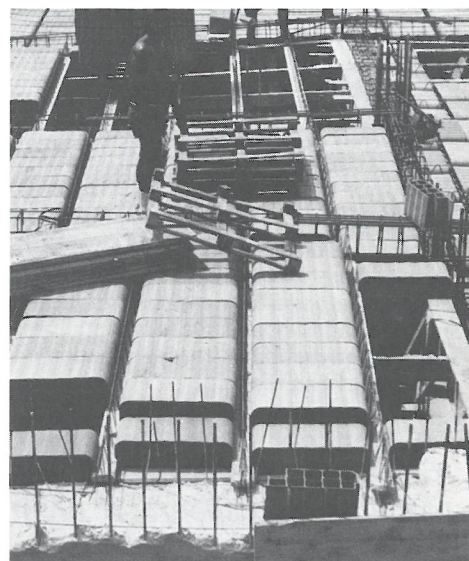
Roofs are invariably tiled and slope between 15 degrees and 60 degrees. The framing for the roof tiles is ceramics. A series of single brick wythe walls, with staggered bricks, are built on top of the ceiling platform approximately 1000 mm on centre. Two layers of ceramic "rasillon" plates then span between the sloping walls to form the sub roof. Rasillons are approximately 40 mm thick and have hollow cores to reduce weight.

On top of the rasillons mortar is plastered a layer of tar. The semi circular tiles are then very carefully and expertly laid on top of the sub roof. The tiles themselves are actually less than semi circular being 125 mm wide at their tops and 165 mm wide at their lower ends. Overall length is 290 mm and are set with an overlap of 100 mm.

The exterior walls are plastered and finished with a layer of small pebbles producing a stucco like surface. By convention all walls are painted white. Originally this was done with a chalk water paint which is not very durable. However, new plastic paints are gaining popularity due to their longer life.

A feature that houses have in Andalusia are patios or terraces. So much use is made of these outdoor spaces that they essentially form part of the living area. They usually have brick tile floors but may have marble tiles as in the interior.

Thanks to D.P.R. Moore, P.Eng. for the information for this article. □



Platform under construction.

Engineering Endowment Fund Campaign

by G. Morris, P.Eng.

In September 1986, the Faculty of Engineering at the University of Manitoba established the Engineering Endowment Fund. Its purpose is to promote excellence in engineering education in Manitoba. The Faculty initiated the Engineering Endowment Fundraising Campaign in October, 1986, as part of the 5-year University of Manitoba Drive for Excellence.

Engineering staff were canvassed first, and they responded enthusiastically. To date, they have contributed or pledged \$147,000, an average of about \$1635 per academic staff member. In January, 1987, the Engineering students voted 84 percent in favor of a \$50 per student annual contribution. Their contribution, which is to be reviewed after three years, will total \$160,000. Next, the 1987

graduating class initiated the "Parting Pledge Program", under which members of the class pledged an increasing amount each year, over five years. To date, 60% of the 1987 graduates have pledged more than \$50,000.

In May, 1987 a canvass of Winnipeg alumni who graduated during the 1950's was begun. To date, it has yielded pledges in excess of \$85,000. The canvass of Winnipeg alumni of the 1960's commenced in January 1988. It is planned to conduct sequential canvasses of alumni of decades other than the fifties and sixties, first in Winnipeg, then in other centres.

The University is conducting a corporate canvass throughout Canada. Engineers are encouraged to request their firms to earmark part of their pledge for the Faculty of Engineering.

APEM members paid tuition fees that covered perhaps 10 percent of the cost of their engineering education. Governments paid the other 90 percent. With declining government support for education, engineering faculties are finding it increasingly difficult to maintain excellence in engineering education. The Faculty of Engineering is calling on Manitoba professional engineers to help to provide our young people (perhaps sons and daughters of APEM members) with the high quality of engineering education that we enjoyed. Employers of engineers will want to ensure a continuing supply of highly competent engineering graduates.

For more information, please contact Glenn Morris, P.Eng. at (204) 474-9808. □

LIABILITY INSURANCE LIABILITY INSURANCE LIABILITY INSURANCE

Pertinent Excerpts from the Task Force Report on Liability Insurance for Professional Engineers in New Brunswick

The following material appeared in the APENB September, 1987 Bulletin.

Introduction

The year 1986 began with startling developments in the Canadian liability insurance fields which quickly involved manufacturers, municipalities, service industries and the professionals in a mad scramble for liability coverage at any cost.

The engineering profession was no exception, with huge premium increases, dramatic drops in coverage availability, and all but one insurance carrier bailing out of the liability market.

Objective and Scope

The objectives of this task force investigation were: 1) to research and report on the current situation in New Brunswick; 2) to review and report on the efforts to date of other association/groups, and 3) to recommend plans of action to improve what is generally perceived as an unfavorable situation.

The scope of this investigation was limited to the developments and parameters which affect the design professional. Engineers practicing in construction or manufacturing settings were not considered. However, in the course of this investigation, considerable interest was expressed by engineers in the construction industry and the Association may wish to consider a separate investigation into that area of engineering.

"A concept that Canadians have, which causes the practicing engineers a great deal of concern, is the statute of limitations."

Statute of Limitation

A concept that Canadians have, which causes the practicing engineers a great deal of concern, is the Statute of Limitation.

John R. Singleton, in his article "Limitation Periods in a Construction Law Setting in Canada", outlines the recent developments of the Statute of Limitation in the Canadian courts. The first limitation statute was passed in England in 1623. The purpose of the statute was to bring an end to disputes while it was still possible to reach an informed conclusion about the disputed events.

An arbitrary deadline was drawn as a matter of legislative policy. In setting the deadline a balance had to be struck between the time required by the alleged victim to discover a cause for action and the diminishing ability of the alleged wrongdoer

to properly defend himself due to faded memories, missing witnesses, and documents.

In recent years the Canadian courts have seen fit to favor the plaintiff by extending the limitation periods at the expense of justice or fairness to the defendant. Singleton cites a few examples of ways "where the passage of time has created substantial prejudice to one or more of the litigants. . .of the building inspector who fourteen (14) years after completion of a project is asked to recall what he observed inspecting steel joists of the roof, which has now collapsed...of the electrical engineer who is required but unable to recall what representations were made to him by insulation manufacturers 17 years ago. ."

The prevailing opinion on that matter of limitation periods in Canada's courts is that "the cause of action in contract and in tort for building defects does not commence to run until the victim discovers facts or ought to have discovered facts which a reasonably prudent person would conclude gave the right to a cause of action against the alleged wrong doer." This effectively extends the limitation period to the life of any given facility.

The engineer faces not only the onerous task of trying to defend and protect himself against claims which may arise decades into the future but he also faces dangers from the changing expectations which society places on the profession. An example of this relates to an emergency overflow on a sewage pumping station functioning during a control malfunction and discharging to a stream. The owner, a municipality was found negligent and all appeals were dismissed. The municipality may yet look to the consultant for indemnification now some seven years later on an item of what was standard design practice.

To make matters worse, National Program Administrators has advised that it is the only insurer covering liability arising out of fines, penalties or punitive damage and it is not certain how long it will be able to provide this coverage.

The concept of an infinite limitation period or everlasting liability is of grave concern to engineers provincially, nationally and internationally. It means that for an individual engineer to be prudent about his own security, he must carry liability insurance on into retirement and until the administration of his estate is concluded. However, as these recent developments indicate, it is very difficult to predict if any retired engineer will be able to afford the annual premium or even if any insurance will be

available at all. In Australia, the Joint Committee on Liability in the Building Industry (JCLBI) have called for a 6 year limitation period starting from the completion of the project. In the United States the majority of the states have enacted statutes of limitation with a time period of usually 6 to 8 years after substantial completion of the project. Engineering Associations in other provinces in Canada are contemplating calling for similar limitation periods within their provinces.

"The concept of an infinite limitation period or everlasting liability is of grave concern to engineers."

Joint & Several Liability

A second concept which is of grave concern to the engineer is that of Joint and Several Liability. For example, in cases where several defendants are named, which is normally the case in construction claims, if judgement is rendered against all the defendants, the law may make each defendant fully liable for the total judgement, even if a particular defendant is only negligent in a small degree.

In almost all court cases it is impossible to prove that a particular defendant is entirely without fault. Suppose an engineer is only 2 percent negligent; however, the other consultants, the contractor and sub contractors, and the owner are no longer in business or have been judged to be bankrupt or have inadequate assets to pay their share, the engineer in that situation may be liable for the entire award.

Various tort reform groups in the United States are now pushing for the elimination of the joint and several doctrine in favour of a concept where each defendant is required to pay its share of the damage in proportion to its degree of fault.

Summary of Findings

All professionals today are finding it increasingly difficult to obtain liability insurance. Accountants, doctors, lawyers, engineers and even insurance brokers have all seen their insurance premiums skyrocket. Although the current situation has been exacerbated by the cyclical nature of the insurance industry and the recent disasters around the world, it is primarily due to the increasing tendency for society and the courts to view the legal system as a means to a no-fault, risk-free social environment and to look to the insurance industry as a limitless source of revenue. The legal system has

LIABILITY INSURANCE LIABILITY INSURANCE LIABILITY INSURANCE

come a grossly inefficient mechanism which retains the majority of money entering its system for itself and where excessive and unpredictably high damages are awarded not on the basis of fault but on the ability of one's insurer to pay.

"In recent years the Canadian courts have seen fit to favor the plaintiff by extending the limitation periods at the expense of justice or fairness."

Yet of all the professions, the plight of the practicing engineer is perhaps unique. Due to the combination of everlasting liability, and joint and several liability, the engineer or engineering company finds that its liability increases exponentially with time. Doctors, for instance, who have the same time of discovery in their statute limitation as engineers, remain responsible to only their patients and generally as time goes, the liability to the patients ceases as the patient dies (hopefully of natural causes). The engineer on the other hand finds that as his career progresses, the group he is responsible to increases dramatically to include the original client, any new owners and the general public who may use the facilities of which he was part of the design team. Because of the serviceable life of most engineered facilities are in the order of 40 to 50 years, as his career progresses the engineer finds himself responsible for facilities worth hundreds of millions of dollars. In addition, because of joint and several liability, the engineer could find himself having to pay damages arising out of errors committed by other members of the design team or the contractor; a contractor, with whom the engineer seldom has a contractual link and who is increasingly chosen not for technical merit, but on the basis of lowest price.

Even the advancement of technology, in which the engineering community has played a major role, now poses a threat to the practicing engineer. There is now a recent case in the Canadian courts where an engineer faces damages for facilities which was designed some twenty years previously using methods and systems which were standard practice at the time. However since technology and standards have changed and society now expects engineered facilities to function in a different manner, this engineer is liable not because the facility failed to operate in the manner it was designed, but because it failed to meet today's expectations

Recommendations

The Task Force makes the following recommendations of APENB:

1) APENB should immediately revise the Engineering Profession Act to reduce the

statute of limitation governing engineering services to a six year period after the completion of a project. This would be in line with similar changes being made in the United States and Australia.

2) APENB should establish a liability insurance committee to monitor the insurance industry, handle complaints from engineers concerning insurance, and to ensure the recommendations of this task force are carried out.

3) APENB should campaign for the establishment of a special referee system similar to that being set up in British Columbia to assist the courts in matters of technical dispute.

4) APENB should investigate the possibility of the creation of a quasi-judicial technically oriented body to screen all actions brought against an engineer before they go to the trial to screen out frivolous actions. This should be based on the pre trial panels now in place in many of the states for medical cases and the panel established in Hawaii to hear engineering cases.

5) In the light of the fact that over half of the claims brought against engineers are based upon misunderstandings between the engineer and his clients, consultants or sub consultants or the contractors, APENB should continue to increase its role in the following areas: * Promotion of the use of clear standard contracts where responsibilities are well defined; * further improvements in practice standards of New Brunswick engineers, and * review of building and construction administration processes.

6) In order to assist companies in providing a portion of their own protection, APENB should investigate the feasibility of a system whereby a company may put aside money, with a tax free status, solely for the purpose of meeting defence and settlement costs in the case of a future claim against them.

7) APENB should campaign to have the principle of joint and several liability abolished. Settlements should be based on the degree of fault, not the ability to pay.

8) APENB should campaign for a review of the tort system, particularly as it applies to third party liability, punitive damages and pain and suffering awards.

"If the design professionals are left to face escalating and unknown risks, designs will become increasingly conservative and the public will ultimately pay more."

Conclusion

The Association of Professional Engineers was established in 1920 for the stated purpose of service and protection of the public. The

question has to be asked whether the status quo is in the best interest of and provides the best protection for the public. The situation is now developing where one lawsuit can wipe out long established firms. What practical protection or service does that provide to the hundreds of other clients that firm has served over the years? Presently, engineering firms are bearing the increased insurance costs; however if the risks of lawsuits and hence the insurance costs are not reduced, the costs of insurance will have to eventually be shifted to the client and hence the public will bear the costs.

If the design professionals are left to face escalating and unknown risks, designs will become increasingly conservative and the public will ultimately pay more through increased construction costs. The benefits and utilization of technological advancements through new high risk and innovative work will be halted as fewer and fewer engineers will prove brave enough to bear the associated risk.

The answer has to be that the status quo is not in the best interest of the public nor does it serve to protect the public. The engineering community in New Brunswick and in Canada has served the public well in the past. It will only be by the reduction of risks to a reasonable level that the engineering community will be able to effectively serve the public well in the future. □

Are You Discarding Your Old Files?

The following insert has been received from Mr. E.W. Peever, Legal Counsel for APENB for the attention of professional engineers.

"The attention of the profession is drawn to the decision in **Central Trust Company v. Rafuse** (1986) 2 S.C.R. 147. The Supreme Court of Canada rules in an action against a professional, that the client—plaintiff is not bound by the six year limitation period in contract, but may rely upon the limitation period in tort. (Tort - A private or civil wrong, Editor). **While the limitation period in tort is only 2 years, the period does not begin to run until the client—plaintiff has discovered the facts giving rise to the claim.**

This decision will be of concern to those engineers who presently rely on the six year limitation and destroy old client files shortly thereafter.

Members of the profession may wish to review their file destruction procedures in light of this decision and exercise greater care in the review of files prior to destruction."

Mr. Peever also comments that this decision appears to have the effect of indefinitely extending the limitation period of liability of engineers and other professionals. □

Research and Development Committee Breakfast

by W.L. Dutton, P.Eng.

Ron Britton said that it wasn't the coldest morning this winter—but it was decidedly nippy. In spite of that, the turn-out to the Research & Development Committee's first Breakfast Meeting was up to the standard of the P.D. Committee's Breakfasts—to the immense relief of the doom-sayers.

Dr. Alvin Wexler, P.Eng. was the first of the two speakers. He gave us a very interesting presentation on Quantic Laboratories Inc., the high-tech company which he has developed. He, and his associates at Quantic, have developed a programme which, by using simulations, reduces the time needed to produce the sophisticated pcb's (printed-circuit boards) used in today's devices.

Dr. Wexler presented some interesting material which should be most helpful to those about to try their own hand at the game of entrepreneur-ship. He left the audience with eight points to guide them. 1) Don't waste time chasing investors. 2) Mind the shop. Sell your product. 3) Use governmental programmes for seed-money. 4) Watch your expenditures. 5) Establish a Board of Directors and listen to them. 6) Talk to investors from a position of strength.

7) Meanwhile - Struggle—Enjoy yourself—Keep your sense of humour. 8) Talk a lot and listen a lot.

David Woytowich, P.Eng. was the second speaker. As Dave admitted to me after the meeting, his talk was definitely not "high tec" - and yet, within the industrial complex of Manitoba, the work that he has been doing, with Fiber West Industries Ltd., is most important.

Dave spent a few minutes philosophising before illustrating two activities that are attaining success. The first is the Cowatt Clarifier—a system for clarifying the effluent from sewage digestors. The system—developed by Mr. C.D. Hughes, P.Eng. retired Chief Engineer for the City of Brandon - has been installed in Souris and another is, apparently, well along in the design for Snow Lake. Mr. Hughes is continuing with the development of the system which should, if all goes well, bring significant business to Manitoba.

The product, being developed by Fiber West Inc. is a new type of culvert made from fibreglass and plastic. The rural municipalities are always greatly concerned about their drainage systems and the costs in-

involved in maintaining the culverts under secondary roads. Mr. Woytowich says when corrugated steel culverts encounter certain soils, they do well to last for eight year. Concrete pipes may be used, but transportation and handling costs during installation, often make them less desirable.

Starting with an installation in the R.M. of de Salaberry, twelve municipalities now have these frp culverts in service. Fiber West are anticipating continuing expansion of this aspect of their work, as their sales effort expands into Saskatchewan and Alberta. They are also developing "tanks" for use as pontoons for such structures as floating docks and house-boats. It was interesting to learn that the Province of Ontario no longer permits the use of barrels, of one kind or another, as the buoyancy chambers for floating devices, because of the contamination that results when the barrel finally deteriorates from corrosion. When will Manitoba catch up on this aspect of environmental pollution?

If the second R. & D. Breakfast is as interesting and informative as the inaugural Breakfast, you will have to register early if you want a seat at the table. □

Council Reports

NOVEMBER 9, 1987 by V.L. Dutton, P.Eng.

At which council develops new committee to finalize procedures for group practice licensing in Manitoba.

This was the first Council meeting for our new president - Bud Christie - and almost immediately he was enmeshed in an interpretation of the terms of reference for the nominating committee. The discussion related to appointments to this committee and in particular to the appointment of the immediate Past-President. There is some ambiguity in the terms of reference for this committee and Council asked the Executive Committee to have a look at them. As a result of the discussion it was agreed that our immediate Past-President Ted Speers is not eligible to serve on the Nominating Committee. Councillors Buhr and Goble were appointed to this committee as Council appointees.

Council then named liaison councillors to various committees. They are: **Board of Examiner** - Ostap Hawaleshka; **Consulting Engineers** - Ken Buhr; **Professional Development** - Kelly Kjartanson; **Safety in Engineering Practice** - Bill Newton; **Salary Research** - Bill McGilvery; and **University Liaison** - Ted Speers.

Application for Temporary Licence: The application form, on which applicants apply for a temporary licence to practice engineering within our Province is being revised in order to facilitate its review by Council after the applicant has returned it. One new item has been added to the form for the purpose of determining the applicants academic qualification for registration.

Standards for Admission to the Association: When a graduate engineer, who is not working under the supervision of a Professional Engineer wishes to have his engineering work experience verified he must conform to certain procedures which are outlined in our Admissions Standards. A number of documents relating to these procedures were considered by Council for approval. Council discussed the question of liability of Professional Engineers who agreed to pro-

vide references for the applicants. Legal opinions are that these engineers are Professionally responsible for the applicants work and therefore must assume legal responsibility. Concern was expressed that engineers might not be prepared to accept this liability without liability insurance coverage.

The Registrar expressed concern regarding the legality of certain procedures in the admission standards and will subsequently ask Council to consider certain deletions.

Council also referred the matter of a contradiction between the admission standards and Association By-Law 44 to the Legislation Committee with a request that they recommend new wording to the By-Law so that there is no contradiction with the admission standards.

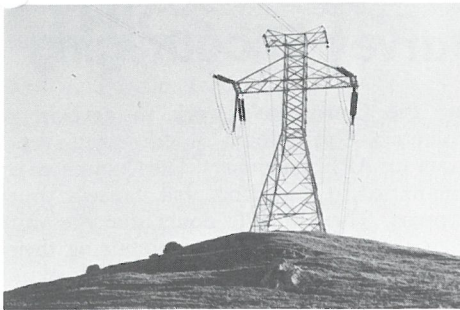
Committee to Implement Group Practice: Council considered a report from an Ad Hoc Committee relating to the "Implications" of Group Practice licensing, i.e. licensing of groups such as consulting engineering firms and engineering departments in government and private industry. This is done in a number of other provinces. Council considered a recommendation from the Ad Hoc Committee that another Ad Hoc Committee be put in place to proceed with implementation of Group Practice licensing procedures. This recommendation was referred to the Executive Committee for further study.

Engineering Faculty Council: Council reappointed Vish Gupta and Pat Karras-Spangelo as APEM representatives on the Engineering Faculty Council.

"Old Pinawa" Plaque: Councillor Newton advised Council that a bronze plaque, to be installed at the Old Pinawa Generating Station, is being cast and will be installed before year-end. The membership will be pleased to learn that this is going to cost significantly less than the estimates. For this old Scout canoe, the next trip down the Pinawa Channel is going to be doubly interesting. (If you have never done this trip, portage on the east end of the dam).

Manitoba Expertise in New Zealand

A.H. Young, P. Eng., Vice President



North Island Tower carrying electrode line above the main conductors.

In 1966, when studies were initiated on the Nelson River High Voltage Direct Current (HVDC) Transmission System, Manitoba engineers visited New Zealand to discuss and learn about the new HVDC system that had just been installed in that country to link the South and North Islands by undersea electrical power cables. Today after more than 20 years experience in HVDC system engineering, Manitoba engineers are assisting engineers in New Zealand to study and implement a new HVDC transmission system by upgrading their existing system. In May of 1987, Teshmont Consultants Inc. of Win-

nipeg were awarded a contract by Electricorp, the New Zealand electrical utility, to study various aspects of dc system design for three transmission alternatives to deliver power from hydro resources in the South Island to load centers in the North Island. The present system delivers 600 MW of power from a hydro station on the South Island to a location just north of the capital city of Wellington, a transmission distance of some 600 km including a 40 km submarine cable crossing of the Cook Strait. The three alternatives in the study looked at delivering either 600 or 1000 MW of power a distance of some 700 km from a new hydro site on the South Island to a location north of Wellington with the third alternative delivering 1000 MW of power from the same new hydro site to a location near Auckland, a transmission distance of some 1260 km. Some of the areas covered in the studies were review of system performance studies, preliminary designs of dc transmission lines and converter stations, electrical environmental effects from dc lines and stations, review of status of dc submarine cable development, selection of dc voltage for the three alternative schemes, project schedules and project cost estimates.

During the course of the studies, the work

emphasis changed from studying a completely new link to studying how the existing HVDC system could be upgraded to increase the power transfer from 600 MW to 1000 MW. The proposed upgrade to the system would consist of installing new converter equipment at the existing terminal locations, upgrading one half of the existing transmission line to a higher voltage, installing new submarine cables, paralleling the existing submarine cables, paralleling the existing converter equipment to form one half of the new system and installing new control systems for the upgraded system.

One of the major challenges associated with this work is the study of the control aspects of operating a transmission system with part of it being a 25 year old mercury-arc design and intergrating that with the new state-of-the-art thyristor design. Another part of the work is the detailed clearance studies which are being carried out on the transmission line to determine modifications required to the existing structures that will permit acceptable flashover performance with the voltage and switching surge over-voltage levels of the new system.

Present plans call for specifications for the new converter stations to be issued to tender towards the end of 1988 and for the new upgraded scheme to be in service by the early 1990's. □

Practice and Ethics Committee: Council considered a request from the Practice and Ethics Committee to appoint two new members. After discussion, Council appointed James S. Hicks and Walter Saltzberg to the committee.

Admissions Review Board: Council appointed the members for this Board and appointed Dr. Garland Laliberte, Chairman and Ted Speers, Vice-Chairman.

This was the final item of business and the meeting adjourned at 6:45 p.m. □

DECEMBER 14, 1987 by J.W. Bogan, P. Eng.

At which Council ratified the committee memberships.

In addition, Council revises the Nominating Committee Terms of Reference, approves an out-of-province travel policy, reviews its Brief to Government, and rescinds a previous motion concerning U.K. applications for registration.

The final Council meeting of 1987 was held on Monday, December 14th. Applications for licences, engineering graduates, registrations, transfers, and reinstatements were reviewed and approved.

Terms of Reference for the Nominating Committee Revised: Council approved a recommendation by the Executive Committee that the composition of the Nominating Committee should include the two most recent past presidents (including the immediate past president), who are willing to serve. Council members, other than the immediate past president, whose term expires at the next Annual General Meeting, would be disqualified.

Mr. E.A. Speers was appointed Chairman of the Nominating Committee.

Out-of-Province Travel Policy: A draft out-of-province travel policy prepared by Mr. E.W.J. Clarke was reviewed and approved with minor revisions. In summary, the policy recommends representation at out-of-province meetings by the President and/or the Registrar. Spouses may attend a limited number of meetings at Association ex-

pense where social programs are included. The President may attend up to three annual general meetings of other associations each year. Preference will be given to attending meetings of nearby provinces. The Registrar shall attend meetings of the CCPE to which Association permanent staff officers are invited and up to three other provincial or territorial association meetings. The policy states that every effort shall be made available to limit expenditures on Association business travel to a reasonable level.

Committees for Ratification: Council ratified all committees except for two. Approval of the Ad Hoc Committee on the Stamping of Shop Drawings was deferred to permit the President an opportunity to speak with the current chairman. The Publication Committee will be asked to select a Chairman and an Editor.

Brief to Government: Council reviewed a draft of the Brief to Government prepared by Mr. E.A. Speers. The Brief in its final form will be reviewed again by Council at the January 1988 Council meeting and will be presented to the Province as soon as possible.

Board of Examiners' Recommendation Re: U.K. Applicants: Council approved the Board of Examiners' recommendation made at its December 7th, 1987 meeting that Council rescind a previous motion "That applicants for membership who are currently members of Senior British Engineering Institutions in the categories of Electrical, Mechanical, Civil, Aeronautical or Production Engineering be considered academically qualified for registration without reference to the Board of Examiners." Other provincial associations do not follow the same procedure and have strongly disagreed.

Other Items in Brief: Council approved donating \$500.00 to the University of Manitoba Engineering Society to assist engineering students to attend the 20th Congress of Canadian Engineering Students at Universite Laval, Quebec City, January 5th to 10th.

Mr. W.R. Newton was elected as Executive Member of Council.

The Ad Hoc Committee on Technologists recommended another meeting with MANSETT for further discussion of their proposed separate "right-to-title" legislation. □

Professional Development

Results of 1986 Professional Development Survey Encouraging

by B.D. MacBride, P.Eng.

In 1982, Council established the Professional Development Committee to "develop and monitor a voluntary professional development program for members of the association". In its planning document approved by Council, the Professional Development Committee defined as its goal: "to define and provide a professional development program that ensures the professional competence of practicing engineers over their careers, for the benefit of the member, and to protect the public." The Committee defined professional development as "maintaining and enhancing the level of competence of engineers through continuing education in professional engineering, including training in; technical subjects, engineering professionalism, management, communication, and interdisciplinary skills. Continuing education is viewed in the broad sense, including formal courses, seminars, conferences, technical reading, technical writing, and contributions to related Associations."

The Committee has five work areas in its work plan. 1) Provide information on existing professional development opportunities. 2) Develop professional development opportunities where none exist. 3) Monitor the professional development activities of members. 4) Promote professional development to the members, clients, and employers. 5) Work with other provincial engineering Associations to develop a national professional development program.

With respect to work-area three, monitoring professional development activities of members, in December of 1986 members were sent two Professional Development Reporting Forms, one for each of 1986 and 1987. The 1986 results have been compiled. The purpose of this article is to report these results to the membership.

The results are shown in Tables 1 and Figure 1.

Results

1. Only 121 of 2580, or 4.7% of the members, submitted the forms. This is the only statistically significant result. The low number of returns, and the fact that they are self-selected rather than random makes it impossible to generalize the results.
2. The median number of hours reported was 78, or approximately two working weeks devoted to professional development.
3. As shown in Figure 1, the distribution of results was skewed. On log probability paper, the results plotted in virtually a straight line.

4. The majority of hours (64.2%) were in the engineering area of study. This was gratifying since a prime concern of Council is that engineers continue to study engineering.
5. A number of people expressed concern with the form in terms of clarity.

What can we learn?

The Committee believes that a 4.7% return in the first year is encouraging. However, it is obvious that there is much to do in continu-

ing the Committee's work to develop a voluntary Professional Development program for APEM members. The Committee is committed to this effort, but it needs your support. There is little doubt that the vast majority of engineers are maintaining their competence through professional development. The challenge for engineers is to document this professional development. Only the members can do this. Make a commitment now to fill out the forms for 1987 and 1988. □

Table 1 - 1986 Professional Development Reporting Forms

Overall			Geographical Breakdown		
Membership (Full Members)	2580		Winnipeg		91
Number of Forms Received	121		Manitoba (Non-Winnipeg)		19
Total Number of Hours Reported	18508		Other Canadian		9
Average Number of Hours per Member	153		Foreign		2
Median Number of Hours per Member	78				
Type of Activity	Hours	%	Area of Study	Hours	%
(1) Seminar	2032	11.0	(1) Engineering	11875	64.2
(2) Correspondence	824	4.5	(2) Management Studies	3381	18.3
(3) Lecture	2829	15.3	(3) Law	121	0.7
(4) Conference	1806	9.8	(4) Communication	373	2.0
(5) Technical Writing	1625	8.8	(5) Finance/Economics	395	2.1
(6) Teaching	1269	6.9	(6) Personnel	159	0.9
(7) Technical Reading	3830	20.7	(7) Humanities	256	1.4
(8) Other (Specify)	4293	23.2	(8) Others (Specify)	1948	10.5
	18508	100.0		18508	100.0
Sponsor of Activity	Hours	%			
(1) A.P.E.M.	223	1.2			
(2) University/College	4396	23.8			
(3) In-House	3452	18.7			
(4) Government	2227	12.0			
(5) Industrial Association	887	4.7			
(6) Technical Society	3516	19.0			
(7) Management Association	718	3.9			
(8) Financial Institute	212	1.1			
(9) Other (Specify)	2887	15.6			
	18508	100.0			

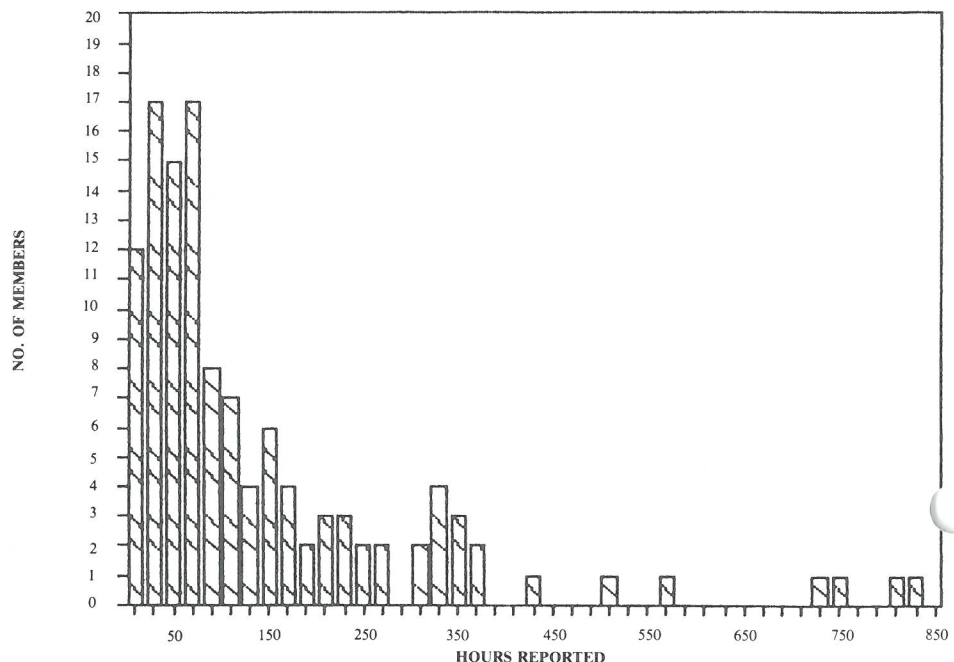


Figure 1 - 1986 Professional Development Forms Results

Professional Development

ETHICS — The Grey Area...

by V.L. Dutton, P.Eng.

Those who attended your Professional Development Committee's second Breakfast of the Fall season were presented with both food for their bodies and food for their souls. Dr. Arthur Schafer gave us half an hour of material that, from the many questions asked later, attested to the interest the professional has in this subject of ethics.

There are some members of the P.D. Committee who feel that these reports should contain more details of the talks given by our speakers since, either because of geography or for other reasons, many members cannot attend the breakfasts. Conscious of this desire, your reporter dutifully attempted to keep up to the erudite Professor Schafer, all the time envying Shaw's Professor Higgins and the latter's ability to write in shorthand. It was an uneven battle and, in the final analysis, all this reporter can do is mention one or two points.

According to Dr. Schafer, to be ethical means that, sooner or later sacrifice will be demanded of us. He asked the question, "How much are we prepared to accept?" He told us that "ordinary duty requires that you be prepared to accept personal sacrifice." He also opined that the students, when they enter the Faculties of Engineering, are "narrow" and that their university education "makes them narrower". The dilemma facing the students in the Faculty of Medicine—the dilemma of their high idealism when forced to face the treatment of a known carrier of the AIDS-virus was mentioned. Dr. Schafer also challenged the profession to re-examine its Code of Ethics which he considers to be largely a group of "pious virtues that clash

with each other."

Dr. Schafer listened to the question and comments of eight members before taking the final ten minutes to reply to them. Much interesting thought was presented in this question and answer portion of the meeting. Your reporter was unaware that some associations have already hired an "engineering ombudsman" to protect those of their members who "blow the whistle" on their employers. This revelation, from Professor Schafer, caused your reporter to "dig out" the following material from the October, 1986, issue of Engineering Digest. The article, by Professor Goldman, P.Eng., of Concordia University, is entitled: *Design of Structures: A Dilemma Calling for Action by the Professional Associations*. The nub of Professor Goldman's peice is contained in this paragraph, "It is time the professional engineering associations set up the necessary committees to provide engineers with a forum for discussing some basic problems. Just as many doctors are troubled by ethical problems of continuing or ending life, so it seems to me many engineers are troubled by similar ethical questions associated with their work. An individual may find it impossible to argue with his superior or employer. However, he may wish to make a statement of conscience in confidence to be deposited with his provincial association or order of engineers. On the other hand if enough engineers working on a particular job want to have a discussion on the implications of a specific project they should have the opportunity to have a closed or open discussion under the auspices of their professional associations without fear of reprisals." □

Professional Development Bulletin Board

by J. Hildebrandt, P.Eng.

The Professional Development committee is offering a new service to APEM members. The service is an electronic Bulletin Board for the members to exchange information about activities that will assist each other in their professional development. Examples of the type of information that might be posted would include courses, seminars, conferences or even monthly meetings of associations that would be of interest to professional engineers. Each notice lists information about the event, e.g. when, where, who to contact, cost, additional comments.

If you are organizing something of interest engineers this will provide you instant access (no waiting for publication dates). If you have a specific interest you can ask for the events that contain keywords of interest to you (e.g. IEEE, Hydrology, Stress Analysis, Mining, etc.).

Wardrop Engineering Inc. has offered to

provide access on their VAX 11/750 on a temporary basis, to permit the APEM members to evaluate the new service. If the system is found to be useful a more permanent arrangement will be made. You can reach the Bulletin Board with a PC or computer terminal, a modem (300, 1200 or 2400 baud) and a telephone. The phone number is 957-0633. The Username is BULLETIN and the Password is WARDROP. (Terminal setup is: noecho, 8 bit nparity, 1 stop bit). No experience required to operate this service.

All of the information on the Bulletin Board is provided by those using the service. The usefulness and quality depends entirely on the APEM members. Take advantage of the service, but also provide your own information that might help your fellow members.

When you log on you will notice that a mechanism is provided to give your suggestions. We await your participation. □

Thesis Days

by G. Morris, P.Eng.

Quickly now, what was the title of your graduation thesis? While you may not remember that, you no doubt remember the struggle you had to get that writeup done and handed in to good old Professor Chant by the week before exams. The week after exams?

I'll bet today's Engineering students don't face the trauma of meeting those April deadlines! No they don't. Their deadlines are much earlier. Not only that, they must make a polished oral presentation of their thesis work, complete with visual aids. Then they must face a barrage of technical questions from a tough audience of professors, visiting Professional Engineers and fellow students. Fortunately, they receive prior advice and instruction on technical presentations from the Faculty of Engineering resident expert in technical communication, Dr. Anne Parker.

Thesis Day has become an annual "happening" in the Faculty. There is the aura of a high-profile technical conference, as the well-rehearsed graduands hover outside the presentation rooms, resplendent in their three-piece suits, clutching their slide trays, transparencies or computer disks.

The dates for the 1988 University of Manitoba Thesis Days, and the names of the departmental coordinators, are: Agricultural Engineering, Friday, March 18, Dr. N.R. Bulley (474-6033); Civil Engineering, Friday, April 8, Dr. A. Alfa (474-9762); Computer/Electrical Engineering, Friday, March 18, Prof. A. Jacobschuk (474-9603); Industrial/Mechanical Engineering, Friday, Feb. 26, Prof. R. Schilling (474-6402); and Geological Engineering, Friday, April 8, Dr. B. Stimpson (474-8770).

All APEM members are cordially invited to attend. For further information, please call the appropriate departmental coordinator. □

P.D. Cells

by V.L. Dutton, P.Eng.

Your Professional Development Committee is investigating various ways of helping you with your professional development. One of these is the P.D. Cell—a few members who get together to study a particular topic over a period of time agreeable to the members.

To start this experiment in P.D., James Hildebrandt (Office: 956-0980, Res: 256-9240) and Vernon Dutton (Off. 284-1770, Res: 256-5346) are looking for a few engineers who would be interested in forming a Cell to study fracture mechanics for, initially, the remainder of the winter.

If you wish to try to form a P.D. Cell for the study of a particular subject, please send the topic, and your name and telephone number, to the Editor for inclusion in the following M.P.E. □

News from other Associations

The **British Columbia Association** reports that geologists, geophysicists and scientists have expressed a desire to be registered under the Engineering Profession Act and that the Association is currently considering amendments to accommodate this. It has also set up a joint task force with the Association of Consulting Engineers of British Columbia to study and develop the principals of an amendment to the act to permit the licensing of corporations which practice engineering. In a further development the Association has published a bulletin on the use of the seal, one of the recommendations is that the sealing of original drawings should be avoided and that to prevent unauthorized duplication of the seal, a "fresh" stamp on each copy accompanied by date and signature of the engineer is the preferred method of asserting the responsibility of the professional engineer. At its October meeting the Council agreed with the delegation of the power to the Professional Practice Committee to act on behalf of Council (and not merely advise) on all matters concerning the practice of professional engineering.

At its December meeting the **Alberta Association Council** approved the 1988 budget, which was trimmed to help offset costs of the Engineering Centennial. It was characterized by major cut backs in committee expenditures and the discontinuance of a \$10.00 discount to those members who submit their annual fees early. The Council has also approved a motion recommending to the Provincial Government that corporations that hold permits to practice be exempted from the provisions of the Builders Lien Act, when its inclusion produces a conflict of interest in the administering of a contract, and that such exemption be extended to employees, sub-consultants and suppliers of the permit holder. The Practice Standards Committee also has ready for printing, a publication entitled "Responsibility for Structural Design on General Engineering and Building Projects" which is intended to address concern of their members that current practices in this area are not in the public interest. Apegga has also joined with the Alberta Association of Architects in filing a joint submission requesting that the Provin-

cial Government rescind certain sections of the 1985 Alberta Building Code, which impose a prohibition on certain engineers from practicing in their area of expertise.

The **Yukon Provincial Geoscientists Society** has been formed at the request of the **Yukon Territory Association** to establish a group to deal with A.P.E.Y.T. to arrange acceptance of qualified geoscientists as separate professional members of that association and to establish a financial base to help defray the expected costs of legislation and other expenses that would be incurred by A.P.E.Y.T.

The **Ontario Association** reports that its video film on professional ethics entitled "The True Steel Affair" has reached the finals in the business and industrial category at the recent International Educational Film Festival held in Birmingham, Alabama, and that the film was also awarded a "First Place Gold Camera Award" at a U.S. industrial film festival. A copy of this film in VHS format is available on a loan basis from the APEM office to the membership. □

SOCIETIES:

by T. Wingrove, P.Eng.

The **Canadian Geotechnical Society (CGS)** is an independent, federally incorporated technical society with its own By-Laws. CGS is also a supporter of the EIC core program. CGS represents technical specialists working in the areas of geotechnical engineering, engineering geology, rock mechanics, hydrogeology, frozen ground, snow and ice. The Society currently has about 1200 members. Engineers, scientists or students working or interested in these areas can join CGS directly or through cross-membership with one of the other technical engineering societies.

CGS has a National Executive formed from the body of elected Regional Directors. The current president is Dr. M. Bozozuk. The Society maintains a Secretariat in Toronto with a permanent secretary and an Executive Director. Through the Secretariat, the National Executive manages the society's affairs. To ensure that the interests of all the membership are properly served, the Society has established specialty divisions in Engineering Geology, Rock Mechanics and Cold Regions Geotechnology. The strength of the CGS is in its 14 Local Sections which operate in the 10 Regions of Canada.

On a national scale, CGS holds an annual technical conference hosted, on a rotating basis, by the various local sections. The Society publishes the *Canadian Geotechnical Journal* - a world class technical journal - and participates in *Geotechnical News*, a communication vehicle between Canada, the United States and Mexico. CGS also prepares and publishes technical manuals, such as the

The Canadian Geotechnical Society

Foundation Engineering Manual, and sponsors Cross Canada Lecture tours with invited national and international experts. The society participates strongly in the International Society for Soil Mechanics and Foundation Engineering (ISSMFE) and the International Association of Engineering Geologists (IAEG).

The Winnipeg Section is a strong part of the CGS. There is a Regional Director, Section Chairman and supporting local executive. Annually, the local section runs 6 to 7 technical presentations on a luncheon format at the Pembina Hotel as well as a spring wind-up dinner with an invited guest speaker. The Winnipeg Section has also been a leader in the area of continuing education, holding one day technical short courses on pertinent topics of wide spread interest. The 42nd Annual Geotechnical Conference will be held in Winnipeg in 1989.

For further information on the CGS, please contact Tom Wingrove, P.Eng., Regional Director at (204) 284-0580 or c/o UMA Engineering Ltd., 1479 Buffalo Place, Winnipeg, Manitoba R3T 1L7. □

Slowpoke Reactor Gets Off to Good Start

Atomic Energy of Canada Limited's mini-nuclear power demonstration reactor went critical recently at the Whiteshell Nuclear Research Establishment about 100 kilometres east of Winnipeg.

The Slowpoke Demonstration Reactor will now be tested at a range of up to 200 kW thermal to provide AECL scientists and engineers with verification of their design assumptions.

Designed to supply heat for both isolated and urban buildings, the reactor is the size of an industrial furnace, costs from \$5-\$7 million and uses enriched uranium fuel. It is at least 100 times more powerful than its predecessor, the 20-kW Slowpoke Research Reactor, and can operate unattended for up to 72 hours. AECL is the first company in the world to market small reactors for heating buildings. □

The Professional Engineer's Wives Award Bursaries

by D. Jardine

The Professional Engineers' Wives Association has awarded its annual bursaries to Engineering students for 1987-88. The following students were selected at this year's recipients.

Warren Scot Grieder, Engineering III
Dean E. Featherstonhaugh Memorial Bursary
 Mitch Guy Decaire, Engineering III
Dean A.E. McDonald Memorial Bursary
 Brent Keith Horning, Engineering II
Professional Engineers' Wives Association Bursary