THE MANITOBA

Professional Engineer

ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF MANITOBA

April, 1988

Fort Garry Place — Engineering a Revolution in Dining

Revolving Restaurant, 200 Ton Crawler Crane.

by D.M. Kilgour, P.Eng.

Amidst all the publicity of high profile projects like Limestone and North Portage, Marlborough Development Corporation is quietly building one of Winnipeg's largest projects behind the Fort Garry Hotel. The project consists of 1,000 apartment suites, 100,000 square feet of office space, 140,000 square feet of retail space, banquet facilities, two restaurants, 1,200 parking stalls, and contains 20,000 cubic metres of cast in place concrete and 11,000 pieces of precast concrete.

The entire site which is approximately 260 feet by 480 feet is covered by a seven level podium, which is a cast in place reinforced concrete structure consisting of 2 levels of parking below ground, 2 levels of commercial above ground with another three levels of parking on top. On top of this structure are three 20+ storey apartment buildings, which are totally precast concrete structures.

On top of the podium and between the apartment towers will be a landscaped plaza, complete with bridges, fountains, and a meandering stream which the owner hopes to stock with trout for harvesting before freeze-up. Also at this level is a large banquet hall and a swimming pool and other recreational facilities. The bridges and the channel for the stream are of cast in place reinforced concrete, and the roof over the banquet hall is pre-stressed concrete single tees. The roof over the pool will be structural steel and glass.

The apartment tower immediately behind the Fort Garry Hotel has several interesting features. At the 28th level there is a four storey structure which will house the Royal Crown Restaurant. The first level is of precast concrete and the upper three stories are structural steel and cast in place concrete construction. The top two levels will each contain platforms around the perimeter of the building, which revolve in different directions. The lower level platform is 10'-0" wide with an outside diameter of 76'-0" and is driven by 5 friction drive motors. The upper level platform is 6'-0" wide with an outside diameter of 45'-0" and is driven by 4 motors. A unique (and experimental?) feature is a rotating disc under one of the tables on the platform. This disc will revolve as the platform rotates and is recommended for strict tee-totallers!

Unlike other revolving restaurants the ledge between the tables and the windows will also revolve so that anything you leave on it will follow you around. The original plans did not conceive of this arrangement and the perimeter steel columns were designed and built as vertical elements, while the glass sloped outwards. The ledge was between the columns and the windows. After the steel was erected, the concrete poured and the window framing installed, the owner decided he

(Continued on page 4)

Canadian Conference on Engineering Education

G.A. Morris, P.Eng.

On Sunday, May 15 through Tuesday, May 17, 1988, the Faculty of Engineering at the University of Manitoba will host the Sixth Canadian Conference on Engineering Education. In conjunction with the Conference, the National Committee of Deans of Engineering and Applied Science, and the Chairmen and Heads of Engineering Departments will hold meetings at the University of Manitoba. As well, the Canada-Wide Science Fair will be hosted by the University from May 16-20.

The Engineering Education Conference will be preceded, on Sunday afternoon, by a program of 4-hour workshops, on the following topics. *Getting Your Ideas Across; Personal Organization; Options in University Teaching; Expert Systems and Problem Solving.*

The Conference will open on Monday morning with a plenary session on the Topic "Maintaining the Quality of Engineering Education in the Face of Resource Constraints". Speakers will be representatives from university administration, government granting agencies, private industry and the engineering profession (CCPE).

Dr. Phil Lapp, President of CCPE, will be the Monday Luncheon speaker. He will discuss the findings of a survey of 100 Canadian engineering employers who were asked what skills, knowledge and abilities engineers will require in the twenty-first century if they are to competently discharge their responsibilities as Professional Engineers.

Approximately 60 papers will be presented, in four simultaneous sessions, on Monday afternoon and Tuesday. They will cover subjects as diverse as computers in engineering education, CAD/CAM and graphics, industry/university cooperation, professionalism, mathematics in engineering, laboratory instruction, engineering software and the teaching of design.

Monday evening, there will be a cruise and banquet aboard the Paddlewheel Queen. For those who survive the banquet, there will be a Fun Run early on Tuesday morning.

All APEM members are invited to attend the pre-conference workshops, the entire conference or individual events.

For further information, or to register, please call the Dean's Office, Faculty of Engineering 474-9808. □

THE MANITOBA
Professional Engineer

April, 1988

Published by the Association of Professional Engineers of the Province of Manitoba
530 - 330 St. Mary Avenue
Winnipeg, Manitoba R3C 3Z5
(204) 942-6481

Notice

Payment of Outstanding Fees and Deregistrations

All members who have not paid their 1988 Annual Fees and the late payment penalty fees are reminded that, if all outstanding fees are not received **in the Association office** on or before June 30th, 1988 then such member will have his name removed from the register and he shall cease to be a member. No exceptions are allowed under the Associations By-laws.

Those who are deregistered for non-payment of fees can apply for reinstatement. This incurs extra expense and the applicant will have to write and pass the Association's Professional Practice Examination and provide Council with a satisfactory explanation as to why he allowed his membership to lapse.

Manitoba Engineers Honored

Several professional engineers in the Faculty of Engineering were honored recently in recognition of their professional activities.

Dr. A.B. (Sandy) Thornton-Trump, P.Eng., Mechanical Engineering Department is a recipient of the 1988 Ralph R. Teetor Educational Award.

Dr. Thornton-Trump was one of 10 North American Engineering educators so honored during the Society of Automotive Engineers International Congress and Exposition held in Detroit, Michigan, February 28 - March 4. Following the Congress, he spent several days at Ford Motor Company design and manfacturing facilities in the Detroit area.

Dr. Lot Shafai, P.Eng. Head of Electrical Engineering received a 1986-87, University of Manitoba Outreach Award. Dr. Shafai's award was in recognition of his efforts in promoting contacts between the Engineering Faculty and Canadian Industry and Canadian and International educational and research organizations. During 1986 and 1987, he was instrumental in establishing a consortium of Manitoba industries to design and manufacture a Multichannel Microwave Distribution System. He participated in the establishment of a consortium of Canadian companies to help Fleet-Tack-Systems Inc. of Ottawa design and manufacture the Interim Mobile System, a satellite-based syst for locating commercial vehicles on hig ways. He worked with Astech-Telesis of California on the design of a global positioning system and the use of satellites in surveying. On top of all of that, he organized several conferences and symposia.

Another Outreach Award winner was **Professor Ostap Hawaleshka, P.Eng.,** Associate Head of Mechanical Engineering, and a member of the APEM Council. He was recognized for his activities in promoting the benefits of industrial engineering techniques, both in Manitoba and overseas.

Dr. D.S. Jayas, P.Eng. recently received the Rh Award for Outstanding Contributions to Scholarship and Research in the Applied Science category from the University of Manitoba. Dr. Jayas is an Agricultural Engineering assistant professor at the University of Manitoba.

Dr. M.C. Chaturvedi, P.Eng., Associate Dean of Engineering, has been appointed Chairperson of the Manitoba Research Council. Dr. Chaturvedi has been a member of the Manitoba Research Council since 1983 and was vice Chairperson of M.R.C. and Chairperson of the M.R.C. Centre's Board of Directors in 1987. □

New Members Registered in February and March

D.E. Ans
H.W. Ash
P.J. Babulic
G.H. Baril
R.B. Bird
C.J. Blatchford
B.K. Chorney
R.E.B. Condon
B.E. Crow
K.J. Dick
G.C. Edwards
B.A. Epp
J.W. Fitchett
V.S. Funk
B.M. Gavrailoff
R.K. Giercke
R.A. Graham
B.J. Glowa
J.C. Herbert
B.H. Hunt
R.R. Irvine
W.C. Kent
H.T. Kroeker
J.F. Lavergne
L.G. Lizotte
B.P. McDonald
K.P. Morgan
E.E. Mah
G. Maretzki
T. Nocita
P.R. Poutanen
M.A. Prydun
R.J. Pietrus
J.H.P. Quenneville
R.V. Schmidtke
P.T. Sheedy
D.B. Sigismund
S.P. Simonovic
J.P. Smith
W.J. Stewart
D.G. Snider
D.A. Trask
J.G. Watling
Y.B. Yildir
C.S. Yuen

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

P.J. Babulic
R.E.B. Condon
J.R. Dugay
B.A. Epp
H.T. Kroeker
S. Kulbaski
L.G. Lizotte
J.H.P. Quenneville

Engineering Graduates February and March

L.K. Banks
J.R. Duguay
D.E. Griffin
S. Kulbaski
P.J. Mignacca
J.W. Nicholson
C.A. Nieuwenburg
G.D. Peters
S.D. Ursel
J.S. Williams

Licences Issued In February and March

R.A. Allan (Ont.)
P.F. Ast (Ont.)
D.E.G. Bromley (Alta.)
W. Dobslaw (Alta.)
R.L. Dorey (Ont.)
M. Fabius (Ont.)
T.A. Fekete (Ont.)
J.B. Fussell (B.C.)
R.B. Guppy (Sask.)
R. Halsall (Ont.)
J.A. Hayes (Ont.)
R.J. Hopkins (Ont.)
L.G. Keeping (Ont.)
N.W. Kopp (Alta.)
S.L. Lackey (Alta.)
J. Laidlaw (Que.)
R.D. Lapas (Ont.)
K.D. Laustsen (Alta.)
J.B. Neil (Ont.)
B.R. Pluhator (Sask.)
D. Pristach (Ont.)
H.D. Reilly (Que.)
C.H. Twardowski (Alta.)
T.G. Vincent (Ont.)
M.M. Wall (Alta.)
P.H.L. Wong (Alta.)
M. Yazici (Ont.)

Cannot Locate

A.J. Ament
H.A. Chan
C.P. Daley
C.P. Derooy
D.A. Doucette
J.E. Elias
J.K. Filo
V. Kumar
D.I. MacIntyre
C.A.J. Paul
R. Pearson
G.W. Robson
T.R. Sabzwari
J.E.A. Sagman
P. Schober
K.L. Somerville
D.W. Dobson
J.E. MacPherson

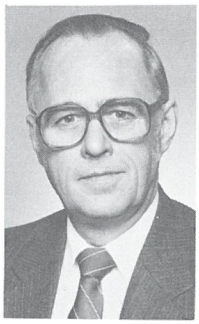
WITH DEEP REGRET, THE ASSOCIATION RECORDS THE PASSING OF:

L.G. Scott
F. Penkava
D.K. Strang
A. Tamburi
G.C. March

Continuing Competence — REREGISTRATION

President's Message

W.D. Christie, P.Eng.



At the present time, APEM registers engineers in the Province of Manitoba when they meet a number of basic requirements. Firstly, the applicant's education must meet certain requirements as set out by our Council. Otherwise, their academic credentials must be assessed by our Board of Examiners. Secondly, the applicant must have had at least two years of satisfactory engineering work experience working under the direct supervision of a registered professional engineer. Finally, they must pass a professional practice examination which is used to demonstrate their understanding of the engineering Professsion Act, the Association By-laws and the Engineering Code of Ethics. This examination is not one of competence in engineering technical subjects. That is demonstrated through the first two requirements.

After having met these requirements and having become a registered engineer, a member's registration is maintained each year simply by the payment of the prescribed annual fees. There are presently no further mandatory tests of competence during the engineer's working career. Each engineer, however, has a responsibility to remain competent in his or her field of practice and to carry out only that work for which he or she is qualified.

Because there has been an accelerating rate of development of new technology over the past several years, a heavy burden is placed on the practicing engineer to keep technically current. Lessons learned during our formal training at University may well have to be updated a number of times during our working careers. Will APEM have to modify its requirements in order to ensure that those who are registered have maintained their competence and thereby fulfill our basic mandate to protect the public in engineering matters?

Our Practice and Ethics Committee investigates complaints of various types which are brought against our members. One type of complaint which is investigated is that of conduct detrimental to the public interest. For the number of engineers registered in our Association, these complaints are relatively few. This would seem to indicate that practicing professional engineers in Manitoba are taking their responsibility to maintain their competency in their fields of practice very seriously.

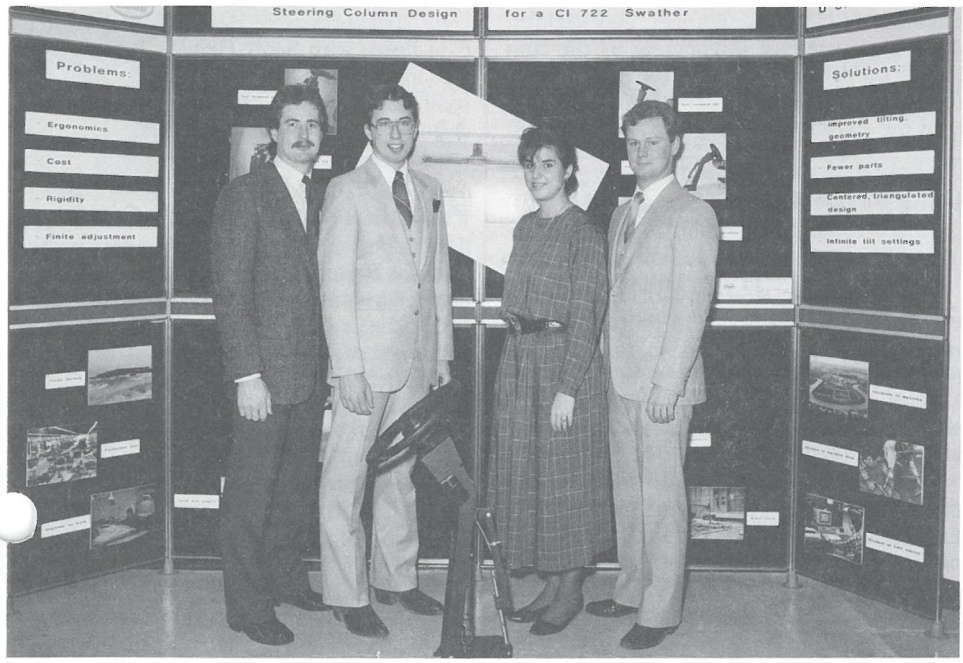
In my view, engineers tend to pursue one of two career paths. One is a management path where typically they first spend several years in a technical role and then proceed into a management role. In this path, they are applying current technology when they are in the technical role. It is at that time that their work is likely to have a direct effect on public safety. When they proceed to the management role (where a whole series of non-engineering skills are required), they will usually still have access to current technology through recently registered engineers who work for them. The second career path is one in which the engineer becomes a technical specialist. In this case, they must obviously maintain a thorough knowledge of current technology.

Our Professional Development Committee encouranges engineers to undertake activities which will enhance their own professional development. This is a very positive initiative taken by APEM toward ensuring continuing competence of our members. The EIC presently has a proposal before Canadian engineering organizations to run a program of Continuing Education Units (CEU's) for all Canadian engineers. This demonstrates very clearly that continuing competence is a serious concern in the engineering profession.

Now, what of the future? Will we reach a stage where engineers will have to be reregistered periodically through an examination process before they are allowed to continue their engineering practice? Will this require various classes of registration such as Specialist, Manager, etc.? What will be required to reregister engineers in the ever broadening range of disciplines? These are important questions!

I believe that we, in APEM, must be cognizant of the changes occurring around us in society and particularly in the engineering field. We must ensure that our mandate to protect the public in engineering matters continues to be fulfilled. This may require changes to our standards and procedures in the future.

However, for the present, I am confident that the citizens of Manitoba are well served by our current practices. But, I encourage all members to undertake personal improvement activities which will ensure that they remain competent in their field of engineering work, and only to undertake assignments for which they are fully qualified. □



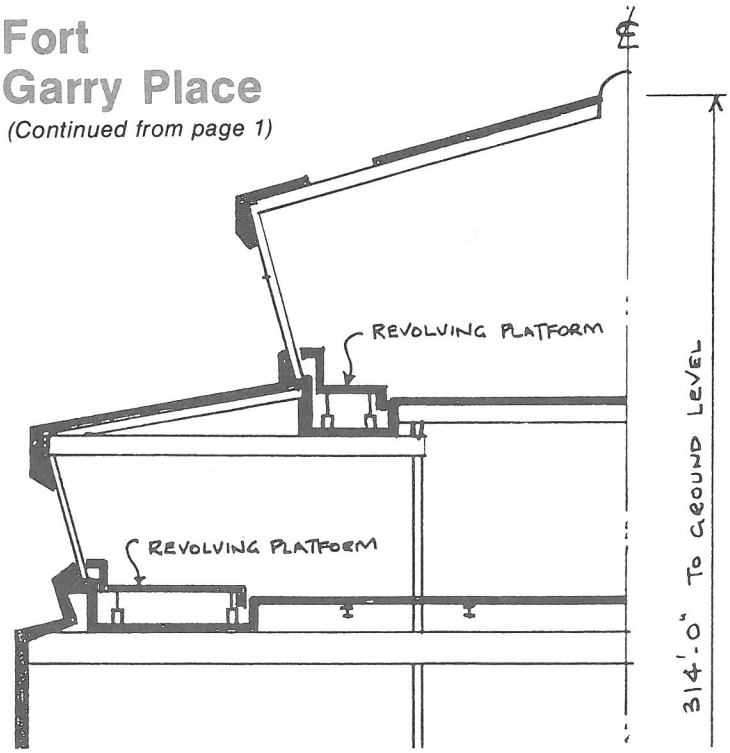
Winners (left to right) Kevin Mason, Al Dixon, Georgine Van de Mosselaer, Trever Crowe of the Canadian Engineering Competition in Moncton, New Brunswick.

Agricultural Engineering Students Win Canadian Engineering Competition

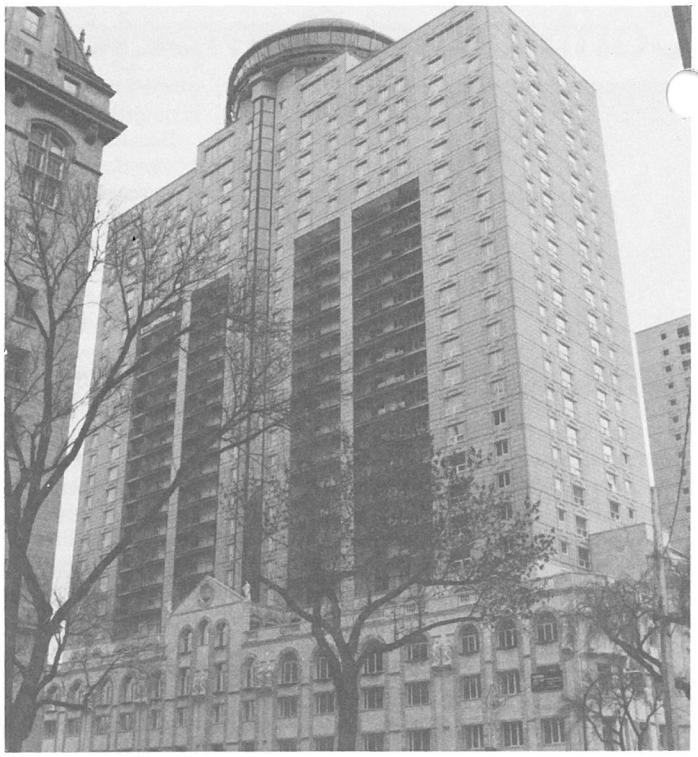
Congratulations to the four **Agricultural Engineering** students, **Georgine Van de Mosselaer, Trever Crowe, Kevin Mason** and **Al Dixon** for coming in first in the Corporate Design Section at the recent Canadian Engineering Competition. The four students are in their final year in the Department of Agricultural Engineering at the University of Manitoba. Qualifying in the Western Engineering Competition in Vancouver in February entitled the team to complete with the top two teams from each of the four regional competitions at the Canadian Engineering Competition in Moncton, New Brunswick on March 19, 1988. The competition is held annually and is open to all undergraduate engineering students in Canada. The team were winners of the Telecom Canada Award as first prize for their design of a steering column for the CI 722 swather. The team's corporate sponsor was Vicon Western Canada. □

Fort Garry Place

(Continued from page 1)



Revolving restaurant.



Glass enclosed exterior elevator.

would like the ledge to rotate as well and asked if the columns could be removed. After much head scratching back at the office a way was found to remove the columns, do some reinforcing and install new sloping columns. The work was done (very carefully) in a couple of weeks, so when you leave your drink on the window sill you know you don't have to keep your eye on it.

Once you have had a whirl on the rotating table you can ride down the exterior glass enclosed elevator on the north side of the building, which should be the final test of mind over matter!

For those who like to get mud on their boots, the geotechnical investigation revealed that the whole site was covered with river silt to a depth of 24 feet at the north end, and all the way down to glacial till at 48 feet at the south end. This "soup" presented some problems to the contractor responsible for excavation shoring and some local failures occurred. The biggest concern was for Con-Force's big 200 ton crawler crane which exerts a pressure of 2,200 lbs. per square foot under its 4'-0" wide tracks. During erection of the north tower the crane had to operate at the top of a 20'-0" deep shored excavation for the next phase. This created a lot of concern, however, the shoring performed satisfactorily and the job was completed without incident. The building was founded on driven precast concrete piles with some pile clusters under individual columns consisting of 17 piles.

The exterior facade of the 5 storey podium is limestone masonry, embellished with approximately 1,000 sculptures and figures. The figures are cast in concrete by the contractor on site and are likely the most unique feature of the building. The contractor first used the statues on a project in St. Vital but those were imported from Germany. The first figures on Fort Garry Place were also imported from Germany but it became more economical to import the moulds and cast the figures on site.

The project has been fast-tracked with design starting only slightly before construction in the summer of 1985. Design work has been more or less continuous and has only been finally completed in February of 1988. The good news is we finished before the contractor, although with the owners penchant for improving or changing things as he goes along we're keeping our erasers handy.

The structural design was carried out by Crosier Kilgour & Partners. The precast concrete structures were designed and built by Con-Force with Scott Heuvel, P.Eng. being the responsible engineer, and the geotechnical work was carried out by Dyregrov & Burgess, Consulting Engineers. □

Canadian Academy of Engineering

Last May, the Canadian Academy of Engineering held its inaugural meeting in Montreal. At that time, the Academy's constitution and by-laws were officially adopted and its Executive Committee members: President R.F. Legget, P.Eng., President Elect P.A. Lapp, P.Eng., Vice-President L. Kerwin, P.Eng. and Secretary Leopold Nadeau, P.Eng., were elected.

Subsequently, the 40 founding Fellows of the Academy were selected by the Executive Committee. According to its by-laws, the maximum number of Fellows in the CAE is 250 with a ceiling of 40 elected in any one year. Dr. J.B. Stirling, P.Eng. who was 99 years old at the time, was invited and accepted to be, the First Fellow of the Academy.

The Canadian Academy of Engineering was formed to fill a gap in the engineering profession. Its mandate is to tap the best minds of the profession to study major national problems involving engineering. It was conceived to be both a think tank and watchdog organization.

The CAE joins the ranks of such eminent organizations as the National Academy of Engineering in the U.S. and the Fellowship of Engineers in the U.K. It stands ready to cooperate with other organizations in the development of "considered statements on relevant national issues with a view to assisting Government". □

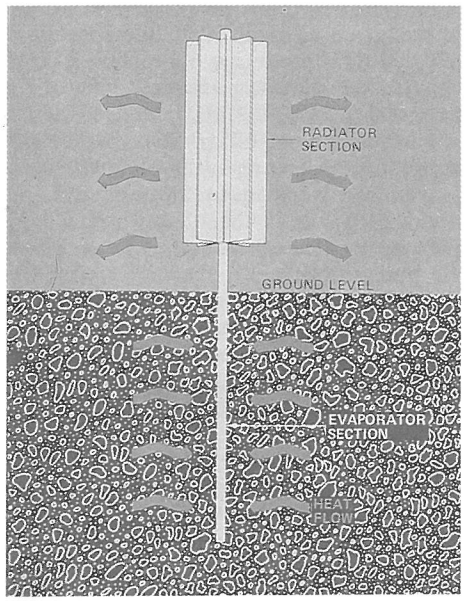
Acoustical Society of America Publishes New Standards Catalogue

The Acoustical Society is the leading professional organization of scientists and engineers concerned with sound and vibration. The catalog covers new standards in four acoustical fields: physical acoustics, mechancial shock and vibration, bioacoustics, and noise. Thirteen new standards are included among the eighty-four listed in the new catalog, its seventh revision. Included are new standards for outdoor noise barriers, assessment of noise in resident communities, instrumentation, and hearing aids.

For a free copy of the new ASA catalog, or information regarding other ASA standards, contact Dr. Avril Brenig, Standards Manager, 335 East 45th Street, New York, New York, 10017' (212) 661-9404. □

Hudson Bay Railway Grade Stabilization Program

J.W. Bogan, P.Eng.
Planning & Inspection Engineer, C.N. Rail



Operating Principle of Thermosyphons.

C.N. Rail is participating in a study to evaluate the effectiveness of using heat pipes to stabilize the grade in permafrost regions on two sections of its roadbed on the route to Churchill.

In 1910, construction of the Hudson Bay Railway began at The Pas, Manitoba. Construction continued until 1917 when the project was suspended because of the demands on manpower and material placed by World War I. Track construction had been completed to the Limestone River, north of Gillam and the right-of-way had been cleared to Port Nelson on the coast of Hudson Bay.

Considerable development work had also been completed at Port Nelson. However, because of severe silting at the mouth of the Nelson River, there was a controversy over the selection of Port Nelson as a terminus for the line.

Following the recommendations of the Palmer Royal Commission, the port location was changed to Churchill when construction resumed in 1927.

A significant portion of the Churchill route crossed permanently frozen, ice rich soils called permafrost. It ranged from sporadic in the southern areas, to continuous in the north. Due to the increasing amount of permafrost encountered north of the Nelson River, it was decided to build the remaining grade almost entirely of an embarkment, keeping cuts to a minimum.

Downward settling of the grade occurred during and immediately following construction. This served as an indication of the long term behaviour of the roadbed. Track forces have coped with the repetitive maintenance necessary to keep the line operational. Over the years, there has also been an increase in the number and severity of thaw settlement locations, a diminishing supply of gravel for maintenance, and a reduction in funds available.

Research into roadbed stabilization was initiated in 1976. It began with a study funded jointly by C.N. and the Transportation Development Agency to investigate the cause and if there was any remedy for unstable surface conditions. The lack of stability was believed a result of the continuous settlement of specific locations called "sink holes". The study concluded that sink holes were advancing into the frozen plateau areas and that subgrade settlement could be solved by arresting the advance of thawing. The application of "heat pipes" was investigated as a means to stop thaw settlement action by recreating stable permafrost at the transition zone.

Heat pipes, or thermosyphons, work by radially freezing the surrounding soil. They also equalize soil adfreeze strength along the length of the pile to resist frost heaving. Adfreezing is increasing the skin friction by adhesion of ground ice. Typically, thermosyphons are constructed of a pipe closed at both ends and they are charged with a refrigerant which can be in a liquid or vapour phase, depending on temperature. The units are considered passive and they operate by convection. The top portion of the thermosyphon is finned to improve heat transfer. Freezing of the subgrade occurs when the ambient air temperature is less than the soil temperature. Condensation of the refrigerant occurs in the radiator portion (above ground) and initiates evaporation of the refrigerant liquid in the evaporator portion (below ground). The condensate flows down the interior walls of the pipe by gravity. Re-evaporation occurs where the interior wall temperature is greater than the temperature of the base of the unit. As the cycle continues, the entire evaporator portion of the thermosyphon is reduced in temperature and it cools the surrounding soil.

Based on the findings of the preliminary investigation, a federally funded program was initiated under the Grain Line Rehabilitation Program in 1978 to test the application of heat pipes for railway grade stabilization.

Five sink hole locations were selected as test sites with varied positioning of the heat pipes for evaluation purposes. Testing demonstrated that it was feasible to arrest the warming of the subgrade to maintain stable ground ice.

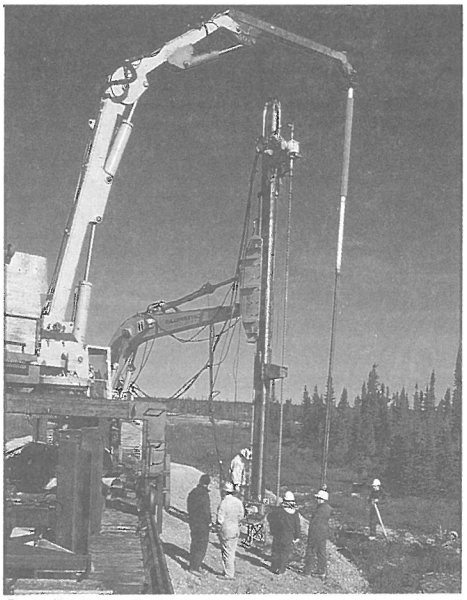
In 1978, there was only one known manufacturer of heat pipes. Since then, another manufacturer has emerged. A comparative test between them and an evaluation of their performance was considered necessary. Once tested, the heat transfer characteristics of the two were found to meet or exceed the estimated design parameters.

The success of this testing led to further work, starting in 1985 and funded within the Canada-Manitoba Economic and Regional Development Agreement. It was necessary to determine the number of potential sink holes on the line, establish the economics of a full scale application and help to maximize efficient placement of heat pipes. The test sections would also provide an opportunity for developing and refining an efficient heat pipe installation technique for large scale projects.

The original test sections were located between Ilford and McLintock, in the discontinuous permafrost zone. Here, ground ice thawing is distinct and winter ambient air temperatures are condusive to refreezing of the ground ice with heat pipes. Further testing would take place in the discontinuous and sporadic permafrost regions.

In 1987, the Federal Minister of Transport authorized C.N. to proceed with the latest portion of the on-going study. A contract was awarded to purchase four hundred heat pipes from the lowest bidder, Arctic Foundations, who have established a plant at Elie, Manitoba. By 16 October 1987, thermosyphons were installed through two protoype test sections, each approximately two and a half miles long at Mile 196 Thicket (approximately 196 miles north of The Pas) and Mile 363 Herchmer (approximately 37 miles north of Gillam) Subdivisions. An average of thirteen heat pipes were installed per day with as many as fifty-one completed in one day. Evaluation of the heat pipe performance is presently underway and the final report is due December, 1989. This will allow study over two full winter seasons of operation.

The author wishes to acknowledge the assistance of R.G. Winkler in preparing this article. □



Installation of Thermosyphons.

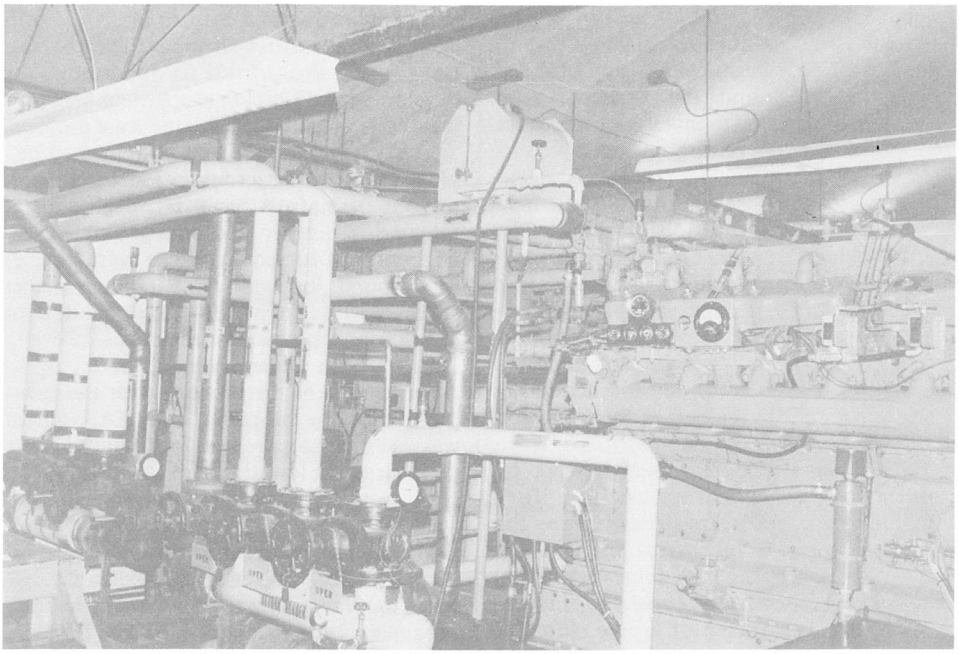
RETIRING PAST PRESIDENTS

The Manitoba Professional Engineers acknowledges the recent retirement from active practice of the following Past-Presidents of the Association:

Ray E. Chant 1962
Tom E. Weber 1963
George A. DePauw 1974

Best Wishes from the Council □

UTILITY "LIFE SUPPORT"



Power Generation and Heat Recovery.

by Major B.R. King, P.Eng.
Base Construction Engineering Officer,
C.F.B. Trenton, Ontario

Throughout history, the Military Engineers have played a major role in the growth and development of Canada. One recent example of the innovation and skill of the Military Engineers is the utility systems which were designed and installed in the most northerly permanent community known as Canadian Forces Station Alert. This article will briefly describe some of the present utility or as I like to refer to them the "life support systems" which exist at Alert, specifically the water supply, power generation and heat recovery systems.

General Description of Alert

Canadian Forces Station Alert is the most northerly settlement in North America, located high in the Canadian Arctic, 725 km from the North Pole. The climate at Alert is similar to other Arctic communities, only the duration of the cold weather is different. Data collected from the High Arctic Weather Station (HAWS) collocated with CFB Alert show that the average annual temperature is -18° C. February is the coldest month of the year with daily temperatures averaging -33° C. July and August are the only two months of the year with daily mean temperatures above 0° C. The area receives a total of 160 mm of precipitation per year. The average wind speed is approximately 10 km/hr with the maximum observed hourly wind speed was 155 km/hr. As is normal for the high Arctic there is 6 months of sunlight and 6 months of darkness in the year.

Transportation to and from Alert is exclusively by air. Normal resupply takes place from Canadian Forces Base Trenton located at Trenton, Ontario (4500 km away). A second method of supplying Alert is through a combination of transporting material from Montreal to Thule, Greenland by sea during the summer months and subsequently flying the material to Alert in Hercules aircraft. Much of the bulky and heavy construction material and equipment required is delivered in this manner. Due to the remoteness of Alert it is imperative that the "life support" systems are reliable.

Power Generation

Needless to say, the most important life support system at the base is the power generation equipment that supplies heat and light. With so much at stake, there are two complete power stations at Alert, each capable of providing the entire power requirements of the base. In the event of a fire or major problem in one of the plants, the base doesn't want to risk having "all its eggs in one basket."

Plant #1 has 4 Caterpillar engines with a total generating capacity of 2300 kW, while Plant #2 has 3 engines with a generating capacity of 1400 kW. The two power houses operate alternately, one supplying power for a month at a time before switching over to the other. The base has standardized on Caterpillar engines for prime power.

The plants are operated and maintained by military electrical generating technicians whose tour at Alert last for 6 months at a time. This continuous turn over of personnel and distance from spare parts are obvious reason why standardization was the logical decision.

The electrical distribution system on the base is a twin loop system which ensures that a backup of power is available if problems are encountered in the main distribution system. The key word for all utility systems in the North is backup and reliability.

Heat Recovery System

As stated the large power generating engines specifically the Caterpillar D398 consumes approximately 181 litres of oil per hour @ 170,000 BTU producing 6.8 million BTU of input potential. Approximately 30% of this potential (2,049,000 BTU) produces the 600 kW of power (3415 BTU/kW). Another 30% is used in the heat recovery from the engine jacket, 10% is radiant heat loss, which leaves about 30% lost in the stack gases. Of this 30% approximately half could be reclaimed for heat recovery.

The heat recovery project was directed at the engine cooling system as no modifications to the buildings were required and the equipment is fairly simple. Mr. Gordon MacDonald the Utilities Officer at CFB Trenton devised a simple but extremely effective system to use the waste heat from the engines to heat the buildings at Alert. The system was was designed to use this approximate 1.8 million BTU's per hour. The system incorporates horizontal radiators with incremental fans on all the generating engines. These units replace the conventional radiators normally installed on diesel engines. The horizontal radiator has three 7.54 hp fans each providing sufficient cooling to handle two of the large engines simultaneously. Normally the engines require 48 hp each to dri the conventional radiator fans. This chan also provided significant power reduction and fuel savings.

In addition to the horizontal radiator, a "tube in the shell" heat exchanger provides heat to various buildings and systems utilizing the same equipment used in a normal hot water heating system.

As stated the annual diesel oil usage was approximately 1.8 million litres which takes about 100 round trips of the Hercules aircraft from Thule, Greenland to Alert. It takes about 11,365 litres of aviation fuel per trip to fly 18,185 litres of diesel oil to the station. The 1.8 million BTU available from this "tube in the shell" heat exchanger is equivalent of 11 gallons of oil per hour. Replacing oil burning furnaces which normally provide the heat represents a savings of $88 an hour or close to $65,000 a month for one engine. At a cost of approximately $1.76 per litre for diesel fuel the cost benefit of the heat recovery system results in savings of more than 1 million dollars a year. The heat recovery system is the main source of heat for almost all buildings in Alert and is also used exclusively through heat exchangers in the water supply system as a means of heat for the water supply from Dumbell Lake.

For obvious reasons, heat recovery and cogeneration projects of this nature have most potential in extreme climates. Because the base requires the heating value produced by the power houses for all but a few weeks of the year, the heat recovery system is used all year round, which has proven to be an excellent way to maximize the return on the investment of heat recovery equipment and

SYSTEMS IN THE HIGH ARCTIC

nergy conservation. The complete heat recovery system was designed and installed by personnel of the Construction Engineering Section of CFB Trenton.

Water Supply System

The source of water for CFB Alert is Upper Dumbell Lake located approximately 2.5 km south of the main station complex. The lake holds 26 Gm^3 of water. The water temperature varies from 2 to 4 °C and for the majority of the year is covered by 2 to 3 cm of ice while in the winter the ice depth can extend to 225 cm. Chemical analysis of the water samples taken from Upper Dumbell Lake indicate that the water is of very good quality.

Water is continuously pumped from the interior of heat traced insulated intake structure by submersible pumps. Aside from an emergency heater, there are no mechanical components in the pump house to heat the water before it enters the raw water supply line. The temperature of the raw water supply entering the intake structure is raised by mixing it with surplus warm water heated by heat recovery returning to the pump house from the station during normal operation.

The water is then pumped to the water treatment plant where it is filtered, chlorinated, heated and stored in two 50,000 allon water tanks prior to being pumped in- o the water distribution system. All heat requirements of the plant and water is fulfilled by the heat recovery system. The water in the reservoirs is maintained at a temperature of 13 °C with 25 USGpm pumped through the heat exchanger where the temperature is raised to 26 °C and then pumped to the pumphouse intake structure through a return line similarly constructed as the supply line.

The water distribution system is a double loop system in order to accommodate for addi tion and removal of buildings, and fire fighting services. The water supply line consists Series 160 High Density Polyethylene (HDPE) pipe butt fussioned together and covered by 76 mm of urethame insulation and a steel jacket on the outside. The entire length of the supply line is protected from freezing by heat trace cables which have been installed between the HDPE pipe and the urethane insulation. The heat trace cables are operated by a series of automatic controllers. The heat trace cables are normally off and are only required if a heating system malfunction occurs.

To provide early warning of problems which may occur and to enhance the operator's ability to identify and troubleshoot these problems, sensors of various types and remote control devices have been installed throughout the water system. These sensors and remote control devices are connected to a central control panel which is located in the water treatment plant. A visual and audible alarm is displayed at the central control panel whenever one of the sensors detects an abnormal condition. The system monitors 25 operating conditions and remotely controls six functions.

By virtue of the vulnerability to freezing of the supply lines, special attention was given to reduction of this risk. This part of the system has nine different sensors which warn the operator of conditions which may eventually lead to the freezing of the supply line. Remote control devices are installed which permit the operator to remotely start and stop critical components at the pumphouse. Heat trace cables installed along the entire length of the supply line automatically maintain the pipe temperature above 70 °C.

The water supply system was designed so that it could be easily maintained and operated by trained technicians and withstand one of the most severe climates in the world. This was accomplished by ensuring that each primary system has a backup, utilizing a complex monitoring system and using the minimum amount of mechanical equipment.

The challenge of providing the "life support systems" to CFS Alert 725 km from the North Pole is one example of the Military Engineers' motto **Ubique.** This motto defines where Engineers are required to perform their mission **"Everywhere".** □

Professional Development—March Breakfast

by V.L. Dutton, P.Eng.

The notice told us that the topic, for the March Breakfast meeting of the Professional Development Committee, would be The APEM - What Can It Do For Me? The speaker, our own General Manager and Registrar, Mr. William "Bill" Mackenzie, started his talk by disclaiming having had anything to do with choosing this title. From now on, you may think of him as our very own latter-day JFK: ". . .but ask what you can do the the Association". I wonder if recruiting members for the various committees will be easier in the future?

Bill's talk has been recorded both aurally and visually should you, or any of your acquaintances, wish to review the address in full. The subject may not have the appeal of some topics, and yet it never hurts a member to refresh his memory on some of the details which Bill covered so compentently.

Associations of professional people have a long and honourable history, dating back to the medieval Guilds. These groupings were, f course, the precursors of today's unions as well. Deciding if all the members of these groups were appropriately qualified has always given society problems. As our Speaker pointed out, our Canadian legislators displayed admirable foresight in placing upon the professionals the responsibility for ensuring that their members are, in fact, qualified. Unlike the approach taken by our "cousins" south of the 49th, where penalties are emphasized, Canadian professionals have a Code of Ethics. Perhaps this is a topic which might be explored in greater depth in the future. As Bill pointed out, clergymen are not licensed. It could be an interesting subject.

Another interesting point, which Bill discussed in some detail, was the fact that our Provincial Attorney-General makes us responsible for ensuring that no one is practising "illegally". In other words, each of us must be alert to his or her responsibility to be alert to what is happening around us. Incidentally, it costs us between ten and fifteen kilobucks to prosecute an offender.

A recent innovation, which our speaker considers to have been an important one, was to include two people, from outside the profession, as members of Council. Thus is history made.

The talk concluded with a number of questions, all of them relating to self-interest. Bill considers that it is not possible to be both a professional person and a member of a union, and he emphasized that the Association is not a self-interest group, nor can it be. Perhaps the P.D. Committee might try a panel discussion for a future meeting with "professionalism and self-interest" as the subject. □

Sealing Work Done by Others....

by W.B. Mackenzie, P.Eng.
General Manager & Registrar

The Engineering Profession Act clearly states that a professional engineer may seal the engineering work done by a person employed or engaged under his immediate and direct supervision. In this case the engineer assumes all responsibility for the technical quality of the work done by that person.

The Engineering Profession Act just as clearly states that a professional engineer may not seal the engineering work done by anyone who is not engaged or employed under his immediate and direct personal supervision and guidance. If a professional engineer does so, he is in violation of The Act and The Professional Engineers Code of Ethics and subject to investigation by The Practice and Ethics Committee and discipline by Council.

It is illegal for anyone who is not a Professional Engineer or who is not working directly under the direct personal supervision of an engineer to engage in any aspect of the practice of engineering. □

A MESSAGE FROM THE PRESIDENT OF THE ENGINEERING INSTITUTE OF CANADA

by W.A.H. Filer, P.Eng., OSM, FCSCE, FEIC

I appreciate this opportunity to communicate with the Professional Engineers of Manitoba and to bring greetings from your fellow Engineering Institute of Canada members across Canada.

The Centennial Congress, which I hope many of you attended, was not only a stimulating forum for technical exchange for the individual engineer but it has, in my view, awakened a new spirit of co-operation between the three national engineering organizations—the CCPE, ACEC and the EIC. Each has a distinct role to play in ensuring a strong, competent and competitive engineering component on which the economic future of Canada depends, and indeed relies.

The National Engineering Awards Dinner in October in Ottawa was further evidence of the unity of purpose and mutual respect which now exists. I can predict that there will be closer ties between us as we each serve the profession and the public in our respective areas. We must be always wise enough to recognize the contributions of each of these organizations to the technical strength of this country.

As we have reviewed and recognized the engineering achievements of the last 100 years in the development of Canada, so we must fulfill an equally important role in Canada's future—"Towards 2000 and Beyond".

As a Federation of Learned Engineering Societies, representing over 16,000 engineers, the EIC will and must fulfill its role in enhancing technical competence through the voluntary professional development of engineers.

The EIC is the only Canadian institutional member of the Council on the Continuing Education Unit and is the Canadian engineering registry for the Continuing Education Unit (CEU). This Unit has been an accepted measure of voluntary professional development among engineers and other professions in North America for almost 20 years. As a matter of interest, the EIC registered over 1800 Continuing Education Units in 1986 in its data bank, representing over 18000 man-hours of voluntary study in approved programs. Information about the approval procedure for qualifying programs for Continuing Education Units can be obtained from Mr. Chris Arnold, Executive Director, The Engineering Institute of Canada, 2050 Mansfield, Suite 700, Montreal, Quebec H3A 1Z2.

There has always been a good nucleus of support of the EIC in Manitoba and I urge you to build on the foundation laid by our Centennial to maintain the competence of our profession through Continuing Education. The future engineering leaders, now students, must be encouraged to join the Canadian technical societies while at university. Part of your responsibility as a professional is to share your experiences with them and to lead them by example.

Our sphere of activity and responsibility is the voluntary enhancement of the engineer's knowledge through continuing education, both technical and life skills. It is surely complimentary to your purpose.

Canada's economic health depends on the technical competence of its Professional Engineering, our human resources rather than our natural resources. Each of us has a professional responsibility to assure Canadians that we will continue to build Canada as we have done for the past 100 years. When you support the EIC and its five Member Societies— Civil, Mechanical, Electrical, Geotechnical and General Members— you are building a strong Canada "Towards 2000 and Beyond— an Engineering Challenge." □

APEM Awards Nominations Requested

Merit Award

The terms of reference upon which Merit is judged are:

1) A contribution to engineering literature showing scholarly achievement.
2) Magnitude of engineering works successfully completed.
3) The pioneering achievement in the field of engineering application.
4) Outstanding public service.

Certificate of Engineering Achievement Award.

This award is intended to recognize engineering excellence in, and major contributions to, the concept, design and implementation of engineering works by a member (or group of members) of the Association. Merit for this award will be judged on one or more of:

1) Engineering excellence, and/or
2) Relevance and contribution to Manitoba in concept, design and implementation of engineering works. The location of the work may be outside of Manitoba.

Nominations should be submitted to E.W.J. Clarke, P.Eng. Chairman c/o The APEM office. Contact J. McKinley — 942-6481. Nominations should be received no later than May 31st, 1988. □

The Canada Wide Science Fair — Call for Engineers as Volunteers

This is a national Science Fair to be held on May 16-17, 1988 at Max Bell Centre at the University of Manitoba. About 30 Engineers are required for 300 projects of an engineering category. Your volunteered help would be appreciated.

For further information please contact — James S. Townsend, P.Eng., Agr. Eng., University of Manitoba. Telephone 474-9858. □

Registration of Geologists & Geophysicists

by G. Laliberte, P.Eng.

For some time now, the Association's Executive Committee has been concerned with the current practice of registering geologists and geophysicists as Professional Engineers. The Executive Committee believes that the definition of the practice of engineering in The Engineering Profession Act is not broad enough to encompass geology and geophysics. It is concerned that continuation of this procedure could result sooner or later in embarrassment either to the Association or to a geologist or a geophysicist or to both.

Historically, regulations under The Mining Act in Manitoba required that assessment reports bear an engineers stamp. Mining regulations and/or legislation in several other provinces and regulations governing the oil and gas industry in a few provinces incorporate similar requirements. In Manitoba, there has also been a regulatory requirement under the provincial Securities Commission that certain submissions to the Commission be made only by a mining engineer, a geologist or by another qualified person. The Executive Committee has requested more information on this requirement.

The Mining Act regulation in Manitoba was withdrawn in 1975. Hence, that particular reason for registering geologists and geophysicists as Professional Engineers has not existed for some time. The provincial Securities Commission's practice of requiring that geologists making submissions to it be registered as Professional Engineers may be more a matter or preference than an absolute requirement under its regulation.

The Executive Committee decided, therefore, at its meeting of 4 January 1988, to communicate with the Canadian Geosciences Council to obtain the views of the Council on this matter. It decided also to contact other provincial Associations to determine how they accommodate geologists and geophysicists. The Committee is aware, of course, that the legislation in Alberta provides for the registration of engineers, geologists and geophysicists. However, the Alberta Association issues a separate stamp for each, establishing the holder as a Professional Engineer, a Professional Geologist or a Professional Geophysicist. Newfoundland has similar legislation and this may be the direction that the Manitoba Association will have to take.

Members of the Association who have an interest in this matter or who wish to express a view on it are invited by the Executive Committee to write to Mr. W.B. Mackenzie, General Manager and Registrar of the Association. □

Council Reports

JANUARY 11, 1988 *by D.E. Cross, P.Eng.*

At which Council approves its Brief to Government.

The meeting began promptly at 3:30 p.m. with President Christie in the chair. Council quickly dispatched the approval of; the agenda, minutes of the last council meeting, financial statement, licenses, engineering graduates, transfers, registrations, and re-instatements with minimum discussion or problem.

Investment Consultant - It was proposed that council engage an investment consultant to develop and assist in planning an investment strategy for the reserve fund of $258,500.00. At present this amount consists of; term deposits, bonds, and GIC's which is in keeping with the Associations By-laws. The proposed consultant is a retired Vice-President of Great West Life. It was suggested that his fee would be based on a $100.00 per hour and the annual amount would be in the $1,000.00 to $3,000.00 range. It was further suggested that the Association's Investment Income may increase by as much as $10,000.00 per year. After great discussion the motion was tabled with the suggestion that executive council investigate the matter further and be prepared with additional data for the next council meeting.

As an aside it was suggested that council may consider in the future changes to the By-laws to allow greater investment flexibility.

Brief to Government - Council reviewed a draft of the brief to the Government. The document was discussed on a page-by-page basis with changes implemented as required. It was further decided to forward the document to the Premier and his colleagues.

Liaison Committee Councillor's Report to Council - The President has instituted a policy of having selected liaison councillors submit verbal status reports to council on the activity of their committee. Different liaison councillors would report each month. In this manner all council members would become aware of the activities of the committees plus it was suggested it may encourage all committees to become active.

Liaison councillors to the Professional Development, Research and Development, Safety, and Salary Research committees reported at this meeting. From the reports it appeared that these committees have been very active. □

FEBRUARY 8, 1988 *by P.R. Gordon, P.Eng.*

At which Council established an Ad Hoc Committee to investigate the necessity of establishing guidelines for building inspection and construction supervision.

President Bud Christie called the meeting to order at 3:39 P.M. and added three items to the agenda. The minutes of the previous meeting, the financial statements, licences, engineering graduates, transfers, registrations, and reinstatements were approved with little discussion.

Financial Advisor - Council accepted an offer from Councillor John R. McDougall to serve as the Association's investment advisor. A motion of thanks to Mr. McDougall for volunteering his services free of charge was carried unanimously.

Engineering Inspection and Supervision - After considering a letter received in response to the article "Concerns Over Building Inspections" contained in the December issue of the Manitoba Professional Engineer and after considerable discussion, Council agreed to establish an Ad Hoc Committee to look into the necessity of establishing the professional engineer's role in building inspection and construction supervision of engineered works. The committee will consist of representatives from the Practice and Ethics Committee, the Safety in Engineering Practice Committee, the Consulting Engineers Committee, the City of Winnipeg Plan Inspection Department, the Fire Commissioners office and the Mechanical Division of the Department of Labour. Included in the guidelines established for the committee was that it should have a close liaison with the Manitoba Association of Architects in order that their input be obtained and considered. A target date of August 8, 1988 for a draft report was set.

Ad Hoc Committee on the Stamping of Shop Drawings - Council ratified the composition of the Ad Hoc Committee on the stamping of Shop Drawings. The Committee consists of E. Weiszmann, P.Eng., Chairman; W.R. McQuade, P.Eng.; D.L.T. Oakes, P.Eng.; R.L. Steel, P.Eng,; K.W. Franklin, P.Eng.; G.W. Winch, P.Eng.; V.W. Becker, P. Eng.; B.W. Gulay, P.Eng.; H. Penner, P.Eng.; W.D. Christie, P.Eng.; W.B. Mackenzie, P.Eng.

Research and Development Committee - A request for $750 to cover the unbudgetted costs of three breakfast meetings to be held by the Research and Development Committee was approved. The first breakfast meeting sponsored by the R&D Committee, (which was covered in the February 1988 edition of the Manitoba Professional Engineer) had a net expense of $209.

Practice and Ethics Committee - The Council considered and accepted three reports relating to investigations by the Practice and Ethics Committee which recommended no further action in each case. A motion requesting additional information on one investigation was defeated on the basis that P&E committee investigations must be kept confidential for the protection of those being investigated.

Consulting Engineers Committee - Councillor Buhr reported that the Consulting Engineers Committee had not been meeting and that there were no items being considered at this time. Mr Buhr will encourage the committee to meet.

Annual General Meeting Committee - The Annual General Meeting Committee has been meeting regularily. The 1987 Annual Meeting has been reviewed and there was general agreement that it was a success. The meeting had a net expense of $4,800. A sub-committee has been established to identify alternative formats for the 1988 Annual General Meeting including an extended format with a workshop and the possibility of a Saturday meeting.

Executive Committee - Mr. Christie reported that the Executive Committee had developed an action plan for the Association for the coming year consisting of 20 to 30 items. Action is being taken on all important issues.

Ad Hoc Committee on Technologists - The Ad Hoc Committee on Technologists has just received a draft of proposed legislation prepared by MANSCETT relating to their "right-to-title". The Committee will be meeting with the MANSCETT Executive in the near future to discuss the Association's concerns.

The meeting adjourned at 6:45 p.m. □

SAFETY IN ENGINEERING PRACTICE COMMITTEE:

Substandard or Counterfeit Bolts . . .

by F.A. Roberts, P.Eng., Chairman

During recent months substandard bolts have appeared in the North American market and engineers should be wary of their appearance locally. Although these bolts have been found primarily in the U.S. there have been cases reported in Ontario and Saskatchewan.

The material strength of these bolts is generally adequate although some "counterfeit" bolts have been found with low shear and tensile strength. The problem stems from "discount" offshore sources which often deliver bolts from one manufacturer and nuts from another. This leads to excessive tolerances which result in the bolts failing in thread shear. Therefore, they do not have the required capacity for tension or friction connections.

These substandard bolts can usually be detected by visual examination since most often they do not have the correct grade or manufacturer's markings. Bolts can also be checked by ensuring they are tightened using the "turn of the nut method" rather than by torque wrench since any substantial strength deficiency would result in failure before the prescribed number of turns.

1) Be certain that the appropriate grade marking and manufacturer's headmarking appear on all fasteners.
2) Purchase only from suppliers who keep chemical and physical test reports - do not rely on mere letters of compliance.
3) Be certain to purchase only from reputable suppliers from who can provide technical assistance and who are financially able to satisfy any claims.

It is strongly recommended that the engineer ensure that specifications require nuts and bolts be purchased together and from the same manufacturer.

Designers should also be aware that they may encounter a similar problem with standard galvanized bolts. In this case the greater tolerances required for galvanizing reduces the thread strength in the same manner. Designers should make allowances for this when specifying galvanized bolts.

Engineers requiring additional information may contact the Committee. □

THE ENGINEERING ACCESS PROGRAM

by Glenn A. Morris, P.Eng.

Although twenty percent of Manitobans are of Native ancestry, only 2 percent of our university students and 0.2 percent of university staff are Native. Their representation in the engineering profession is even smaller. A program was established in the Faculty of Engineering in 1985 in an attempt to begin to redress those imbalances.

Specifically designed to provide Manitobans of Native ancestry with access to an engineering education, the Engineering Access Program (ENGAP) is the only one of its kind in Canada. By providing academic, personal and financial support, ENGAP helps students who, because of residence in remote areas, financial constraints or lack of formal education, would not otherwise have access to an engineering education. Students in the program also have the opportunity to work in an engineering-related job during the summer months.

In order to be considered for selection to the program, applicants have to be either Indian or Metis. Academic, financial and social needs are important criteria in the comprehensive applicant screening process. Interviews are conducted by a committee which has representation from the University, Native organizations and the engineering profession. The final selection of students is the responsibility of the ENGAP staff.

The academic program consists of preparatory courses in mathematics, science, computing and English, combined with tutoring in regular First Year Engineering courses. The students take two years to complete the preparatory work and the 12 First Year Engineering courses. The latter are taken with the rest of the student body. Following completion of First Year Engineering, the students proceed, as regular students, to one of the 7 programs offered in the Faculty. They continue to receive financial and councelling support, while in turn providing moral and academic support to the more junior students.

The program staff includes the program director, Professor John Glanville, P.Eng., two other academic staff members, a counselling support, while in turn providing secretary. The director is responsible to the Dean of Engineering. The staff have been successful in establishing a friendly, supportive learning environment, and student-staff interaction is informal and flexible. The academic staff serve as teachers, tutors and academic counsellors, while the counsellor also serves as an instructor.

Approximately 15 students are admitted every second year, and because of inevitable, and anticipated, attrition, students are admitted at other times to fill available places. They range in age from eighteen to forty-three, and come from a variety of backgrounds, the rural/urban, north/south and Indian/Metis ratios all being about 50/50. Women account for about 10 percent of the student body. The students have a very positive attitude toward the program, and they have contributed substantially to its successful development. They are rapidly becoming an integral part of the engineering student body.

While some of the students have spe their summer periods doing coursewor others have been successful in finding employment in engineering-related jobs. Their places of employment have included a pulp mill, a testing laboratory, a consulting engineering firm, a furniture factory, a fabricating shop, and the National and Manitoba Research Councils.

The ENGAP program is operated by the University of Manitoba, under a contract with the Post-Secondary Career Development Branch of Manitoba Education. While not part of the initial program plan, there has been a 20 percent increase in the student body through the admission of students who are being supported financially by their Band Councils. Also, in an agreement between the governments of Manitoba and the Northwest Territories, two students from Yellowknife have joined ENGAP.

The colonization of Canada has had its damaging effect on the psychology of the Native people. With the following story, one student alerted the ENGAP staff to what he called "the psychology of failure". Apparently the Dean, at a welcoming address to the engineering freshmen, emphasized the need for hard work by pointing out that one student out of three would not graduate. As the student told it, each non-Native studer looked left and right and wondered which c his neighbours would not make it. Each ENGAP student silently concluded "it's me he's talking about." Our objective is to prove those students wrong. □

LOOK BEFORE YOU LOAD

by D.A. Ennis, P.Eng.

Members of the Association should be aware of a requirement of the regulations under the Workplace Safety and Health Act which, if not properly addressed, may lead to problems for the engineer.

The particular sections of the regulations, Manitoba Regulation 189/85 a regulation under the Workplace Safety and Health Act respecting the construction industry, state in part;

Safe Loading of Building Materials

39(1) No employer shall cause building materials or equipment to be placed, or stored, on a permanent or temporary structure so as to exceed the safe loading as specified in the Manitoba Building Code or the design requirements of a professional engineer.

Professional Engineer to Approve

39(2) If it appears that the placement or storage of building materials or equipment may exceed the safe loading conditions described in Section (1), the employer shall engage a professional engineer to inspect and approve the loading conditions prior to the use.

When an engineer is called upon to pass judgement or make recommendations under these requirements he is strongly urged to be very sure that he is **fully congnizant of and has verified** all conditions before providing his recommendations.

In this regard it is recommended that;

1. The engineer ensure that the request for any service in this regard is in either written or drawing form and indicates clearly the location and magnitude of the loading condition.
2. After having first ascertained and confirmed that the structure or component is the one in question the engineer shall refer, where possible, to the original design calculations to assess the original load capacity.
3. The engineer should either inspect or arrange for an inspection of the structure or component to assess its present condition, any modification that may have been made to it and any changes in the loading conditions.
4. All recommendations should be in written or drawing form and under seal indiciating the locations of loads, magnitude of loads, material strength and design codes for standards used in the determination of the recommendation.
5. The engineer should also inspect the site immediately before the loading takes place in order to ensure that the intent of his recommendation is being carried out and that the location and magnitude of the load is as per his assumptions. □

NOTICE TO MEMBERS

Brandon Area

Council is planning to hold a meeting in Brandon during the first week of May. This meeting will be open to all members and will provide the opportunity to meet your councillors on an informal basis.

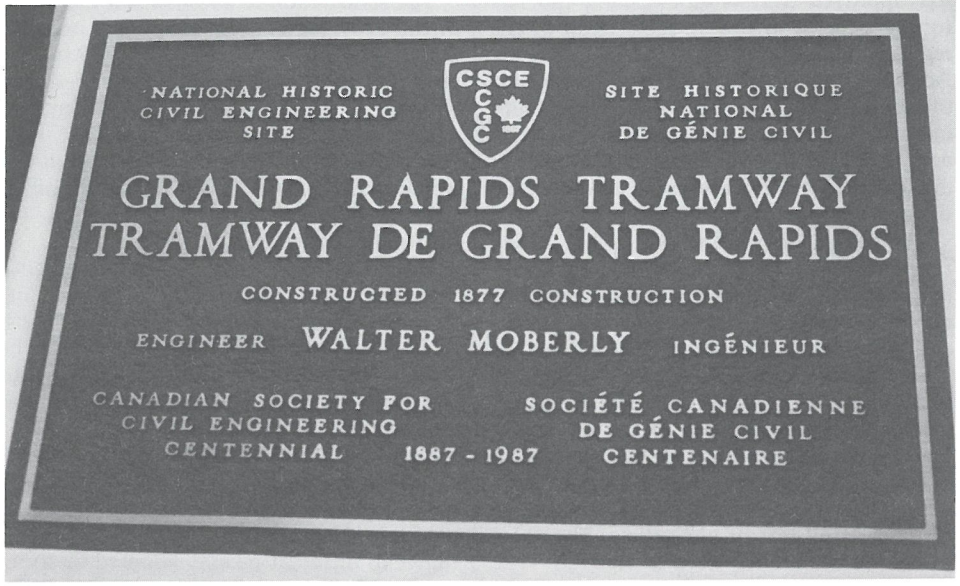
For further details contact D. Menon, P.Eng. 728-0053.

NOTICE

CCPE Group Life Insurance

North American Life Assurance Company advises that benefits from their CCPE Group Insurance Policy will be paid only if the insured is a member in good standing.

EARLY ENGINEERING IN THE PRAIRIE REGION — THE GRAND RAPIDS TRAMWAY.....



Bronze plaque to commemorate the Tramway and engineer Walter Moberly.

by W.G. Plewes

Situated 265 miles north of Winnipeg, Grand Rapids, Manitoba, had an important historic role in the opening of the prairies. Until the 1960's the town was totally inaccessible except by air or water. Consequently few Canadians had been there. Today cars, trucks, and buses pass through the town on a paved highway and there is a large hydro dam nearby. Nevertheless it still has some aspects of a frontier town and it still is in the midst of a wilderness.

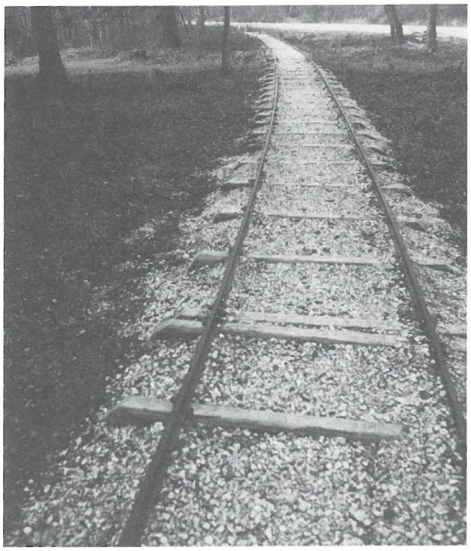
Before the days of railroads the bulk of the supplies and trade was carried west of Winnipeg through Lake Winnipeg and beyond to the Rockies via the Saskatchewan River. The junction of the river and the lake was a natural place for a Hudson's Bay Company post and a mission. The difficulty with the site was that the waters of the Saskatchewan poured into Lake Winnipeg through turbulent rapids, impassable except to the most daring canoeist. All goods and furs had to be carried across a 3½ mile portage or towed up the rapids from the shore to waiting canoes, Yorkboats, and later steamboats on the river. Many are the stories of the Indians shooting the rapids in canoes on the downward trip, sometimes carrying a panic stricken passenger.

This bottleneck in the transportation route caused great delays and expense to the Hudson's Bay Company and the Company looked for a solution. After much deliberation, Walter Moberly, engineer and surveyor, was commissioned to design and build a railway around the rapids. Given the remoteness of the site, it is a tribute to Moberly that he organized and built the railroad during a single summer season from May to October, 1877. This was a year before any train had reached Winnipeg and eight years before the CPR was completed. Thus it was the first railroad on the prairies.

The railway actually turned out to be a tramway. Originally it was planned to purchase an engine to haul the flat cars of goods around the rapids. This was never done and during its life the tramway was operated by "horse" power. For 20 years it was very successful but with the expansion of railways west of Winnipeg it was rarely used by the Hudson's Bay Company and fell into disrepair, although it was used locally until some time in the 1930's.

Today about two-thirds of the Grand Rapids Tramway is flooded by the hydro development but some of the old narrow gauge, 18-lb., rails and ties can still be seen in their original location. The Grand Rapids Historical Society has recognized its significance and through their efforts a section of the roadbed and two of the original flat cars have been restored.

Walter Moberly, generally remembered for his discovery of Eagle Pass through the mountains, was one of the hardy and adventuresome band of civil engineers that opened up the west. Among his other achievements were the layout of the City of Westminister, the location of the road to the Caribou, and the building of the first sewers in Winnipeg.



Remaining rails and ties in original location.

During the CSCE Centennial Year the Prairie Region chose the Grand Rapids Tramway as a fitting early civil engineering achievement to honour. A paper on the Tramway was given at the Centennial Convention in May, 1987, by Rodger Letourneau a railroad historian. On October 16, 110 years after the Tramway was opened for business a CSCE bronze plaque was installed at the site to commemorate both the Tramway and Walter Moberly its engineer and builder.

The ceremony was attended by many of the people of Grand Rapids. Also present were Mr. Val Leader, representing the Honourable Harry Harapiak, M.L.A. for The Pas, Mayor Don Pranteau, Mayor of the Local Government District of Grand Rapids and Mr. Albert Campbell of the Historical Society. On the same date the Manitoba Culture, Heritage and Recreation Department also installed a plaque giving the story of the site in English, French, and Cree.

The CSCE plaque was unveiled by Mrs. Shelley Cook and Mr. Albert Campbell of the Grand Rapids Historical Society and dedicated by the Reverend Garth Neel of St. James Anglican Mission. □

THE 1988 ENGINEERING STUDENT NIGHT DINNER

by J.A. Clendenan

The Annual Engineering Student Night Dinner was held at the International Inn on Thursday, February 4th, 1988. Mr. K. Murdock, Chairman of CSCE was in charge of the event.

The Engineering groups responsible for sponsoring this years events were: CSAE, CSEE, CSME, CSCE, EIC, SAE, IEEE, and the University of Manitoba. Their sponsorship and contributions provided an enjoyable and informative evening.

The feature speaker, Mr. Doug Broadhurst, the National Program Manager, Knowledge Systems Centres, UNISYS, Canada Inc., presented his listeners with informative comment on the topic of applied artificial intelligence and spoke of the challenges facing Canada in this new and exciting field.

Participation by the practicing Engineers who sponsored students and helped to make this years Engineering Student Night Dinner possible was also greatly appreciated. The event's 1988 organizing committee hope to see as much enthusiasm and support in 1989.

See you next year! □

News from other Associations

The **British Columbia Association** has agreed to join the City of Vancouver Architectural Institute and Building Inspectors Association in supporting a **Certified Professional program.** The program would involve the promotion of professional education regarding the B.C. Building Code and Vancouver Building By-Law.

At the same time the **Ontario Association** has registered its opposition to a similar program proposed by amendments to the Building Code Act in Ontario which would provide for the Certified Professional to be able to obtain a building permit and to construct buildings without site inspection by municipal building officials. **The Professional Practice Committee has major concerns** over liability, the responsibility for disciplining a special or second level professional and with the undermining a benefit provided to the public by all professionals competent to practice in that field.

In the area of liability, the APEO Council has approved a resolution asking the Attorney General to revoke the section of the regulations under The Professional Engineers Act which requires that holders of certificates of authorization have professional liability insurance with acceptable minimum coverages. This particular section has never been implemented. APEO also has a new **schedule of suggested fees** for engineering services.

The **Saskatchewan Association** has an arrangement with the University of Regina and the University of Saskatchewan whereby it makes **a donation of $5000.00 annually** to each university toward the purchase of library materials in exchange for the granting of the same borrowing privileges to APES members as are available to the University Faculty and students. APES has also revamped its newsletter to a format of condensed articles and with a reader service card to request full text of any article. The name of the publication has been changed to "The Professional Edge".

The Association of Professional Engineers of the **Province of New Brunswick** has submitted its **fifteenth annual brief to the government** of that province addressing a wide range of issues including a recommendation that the Government of New Brunswick enact a statute of limitations which would clearly establish the period of liability following project completion for professional engineers.

In **Quebec the O.I.Q.** has implemented a **reorganizational plan** which redefines its structure, identifies a new sharing of responsibilities and introduces major changes in the mechanism of running its business in order to provide for a better distribution of the roles and responsibilities within the order.

The Discipline Committee of the **Alberta Association** has, because it has found that the two terms "unskilled practice" and "unprofessional conduct" may mean different things to different people, adopted interpretations of the two terms. **Unskilled practice** by the professional is that which is deemed by his peers to be below the standards of acceptable practice and technical competance in the overall performance of the scope of the services undertaken. **Unprofessional conduct is** conduct by a member which is in violation of The Code of Ethics or which is otherwise inappropriate for professionals regardless whether or not the conduct arises within the members professional practice.

Now that the **"fixed crossing"** between Prince Edward Island and New Brunswick is likely to proceed **A.P.E.P.E.I.** and **A.P.E.N.B.** are seeking ways and means to ensure that engineers involved in the design and construction are registered or licenced with one or both of those Associations. □

SOCIETIES: The Canadian Society for Civil Engineering

by K. Murdock, P.Eng.

The Canadian Society of Civil Engineers was originally incorporated in 1887. By 1918, in response to an observed need, the society was changed to include a broader base. That base included a multitude of engineering disciplines and thus the new society was named the Engineering Institute of Canada (EIC).

By 1972 the EIC membership had grown enough that a series of individual learned Constituent Societies were necessary to manage the needs of the particular disciplines within EIC. Thus the Canadian Society for Civil Engineering (CSCE) was formed to serve the Canadian Civil Engineers' needs.

In 1986, under the adoption of new EIC bylaws, the EIC Federation became an umbrella organization composed of independent, learned Canadian engineering societies (or Member Societies). The CSCE, by virtue of that second incorporation, became independently responsible for its membership's (close to 6000 nation wide) financial budget and technical needs. The incorporation of the CSCE and the other Member Societies freed the EIC Federation to pursue its objectives; facilitating the interaction between the Member Societies on topics of common interest, representing the Member Societies nationally on those topics and promoting the presence of the learned societies.

On the other hand the prime objective of the CSCE was and is to provide the practicing civil engineer with a forum where updated technologies are presented. The forum is necessary since the practicing civil engineer is responsible both professionally and legally to consider all feasible alternatives to engineering problems.

The CSCE meets the information need through publications such as: the Canadian Journal of Civil Engineering (with 6 issues per annum) and the information newsletter the Canadian Civil Engineer (published bimonthly). The CSCE also provides the civil engineering community with information in the form of Regional Conferences, workshops and special courses.

In addition to providing technical support at the National level (this year's CSCE Annual General Conference will be held in Calgary May 25th to 27th) the local sections provide a Technical Session Series.

The Manitoba Section of the CSCE holds, at minimum, one Technical Session per month beginning in September running until the end of May. The sessions remaining include a luncheon on the Design and Construction of the Olympic Bobsled and Luge Run (May 4th) and a two day seminar on Bridge Evaluation and Rehabilitation (May 16th and 17th). The section's past year's program included many diverse topics from the Hydraulic Design of Fishways to the Influence of Free Trade on the Engineering Community.

The CSCE Manitoba Section Executive meet monthly during the Technical Session Series. Organizing these sessions would be much more difficult without the enthusiastic support of the CSCE Student Branch at the University of Manitoba.

For more information on the CSCE or the CSCE activities in Manitoba please contact Ken Murdock, P.Eng., Chairman of the Manitoba Section at (204) 895-1010 or c/o Lafarge Canada Inc., 2395 McGillivray Blvd., Fort Whyte, Manitoba R0G 0R0 □

COMING EVENTS

IEEE Wescanex 88 Conference
"Moving Onwards With Digital Communications" - May 11th & 12th
Saskatoon, Saskatchewan; D. Barnett (306) 933-7066

CSCE Annual Conference - May 25th - 27th
Calgary, Alberta
Local Contact: Ken Murdock - Canada Cement LaFarge Ltd. 895-1010

Life Member Organization EIC Annual Meeting & Dinner - May 27th, 1988
Winnipeg, Manitoba
Local Contact: Bill McKay - 888-9396

EIC Annual General Meeting & Awards Dinner - May 28th, 1988
Westin Hotel, Winnipeg, Manitoba
Local Contact: Dennis Beaudry - 474-3305

Canadian Water Resources Association Annual Conference - June 22nd - 24th
Saskatoon, Saskatchewan
G. Grismer (306) 665-6887

Bridge Evaluation & Rehabilitation
May 16th - 17th, 1988
Holiday Inn Downtown, Winnipeg Manitoba
Local Contact: J. Tuck - 284-0580