From Nigel Shrive, Our Chairman

The AGM was held at the Palliser in January. The executive elected for 2001 is shown at the back of the newsletter. You will note considerable continuity from last year, which is excellent news.

Bob Frost has stepped down due to pressure from work. On behalf of the group, I would like to acknowledge all the hard work Bob has done over the last while, and offer sincere thanks for that. He has been tireless in helping get the Newsletters ready with Mac Stenson, and also arranging social events. His considered comments and great sense of humour will be missed on the executive. Many thanks indeed, Bob for all your contributions.

Ivor Jones has joined the executive and I am certain will make a significant contribution to the activities of the group. Welcome, Ivor.

The technical programme for 2001 is shaping up to be very diverse and interesting. The topics range from an introduction to Nanotechnology through to compressors and structural health monitoring. If members have areas of particular interest for which they would like presentations arranged, please contact one of the executive.

This year we also expect to repeat a number of the better attended social activities, and will try a few new ones. As above, we would be very pleased to hear from members if there are desirable events that someone would like organised.

Lastly, I would note that there is the potential of a visit from the President of the IStructE this summer. We will keep members informed should this come to be.

Please remember to check on activities by looking on our web site. I wish all members a wonderful 2001. Keep in contact, attend events. We look forward to seeing you throughout the year.

Our New Feature

Every engineer, and that means you, has a story inside them about their career; maybe what brought them to engineering or a lesson learned that they would like to pass on to the next generation. At the last technical meeting, while socialising over a glass of beer and listening to the conversation, I heard the makings of two or three anecdotes that would be of real interest to other members.

We are going to entice (drag ?) that story from you for the edification and enjoyment of us all. We plan to carry one or two of these vignettes in each newsletter so that we can get to know our colleagues better. Bob Enever bravely volunteered to do the first one and you will find his story, ‘An engineer and his bike - an engineering education’ inside this issue. We thought about calling it ‘All you wanted to know about Bob but were afraid to ask’.

Do not be intimidated by the high standard that Bob has set in this first article, we really want to share your story and will gladly help to polish it, if that is what you want. We are looking forward to your contribution.

For updated information, visit the CPGCE web site at http://www.CPGCE.org
Technical Programme for 2001

Technical meetings are normally held at the Danish Canadian Club, 727, 11th Ave SW, Calgary on Wednesday evenings at 6.30 p.m. for 7 p.m. start unless otherwise noted. Spouses and guests are always welcome.
Any changes will be notified by e-mail, on the website and in the next edition of the Newsletter

February 21 : Wednesday.

“The Challenge of Locating Cell Phones and Similar Devices”
by Dr. Michel Fattouche of Cell-Loc
Refer to the report of this excellent presentation later in this Newsletter to see what you missed.

March 14 : Wednesday.

“Building Sensors and Monitoring Systems”
by Mr. P. Paulson of Pure Technologies
Learn how a ‘stethoscope’ can listen for sounds of structural failure in structures on the other side of the world with ‘SoundPrint’ technology. The purpose of these systems is to produce data on the effects of ground movements, heating & cooling, component failures and others in large buildings and bridges. This is undertaken with a view to early intervention and hopefully less costly remedies for structural failures.

March 16 : Friday

Visit to the British Army Training Unit Suffield (BATUS) hosted by Major Adrian J. Betteridge MBE, REME, Officer Commanding the Workshop
Note that due to the Alberta Provincial Election being called for March 12, the visit date has been changed from that previously announced.
Planning is in an advanced stage. We will be going by bus, leaving Calgary at 7:00am (parking at the bus stop will be arranged). We expect to be back in the city about 6:30pm. There is a limit to the number we can take on this trip and we have already a lot of places reserved. I will accept requests for the remaining places on a first come, first served basis. There will be a small charge to cover the cost of the bus but the CPGCE will cover the lunch costs. Lunch will be served in the Officers’ Mess.
Please note:- Dress code, Jacket and Tie please!
Contact : Derrick Harrison 286-6850, derrick.harrison@home.com

April 18 : Wednesday

“Fuel Management Systems for Diesel Engines”
by Mr. J. Newson of Alternative Fuel Systems Inc.
This presentation will describe the research and development of systems to increase the efficiency of diesel engines. These systems optimise the performance of conventional diesel engines for fuel economy and reduced exhaust emissions. AFS Inc. also produces systems for the conversion of diesel engines from oil to natural gas fuel. We will hear about their leading edge research into exhaust treatment to meet emission regulations.

May 16 : Wednesday.

“Molecular Manufacturing for Nanotechnology”
by Dr. Qiao Sun, Department of Mechanical and Manufacturing Engineering, University of Calgary
This talk starts with the definition of Nanotechnology followed by a brief overview of its history and potential social and technological impact. Potential research areas will be identified, particularly from the viewpoint of mechanical engineering. It will then focus on the concept of nano-manipulators for molecular manufacturing and present activities currently underway at the U of C in areas associated with Nanotechnology.

June 27 : Wednesday

“New Technology for Humanitarian De-mining”
by Mr. Andy Wutherspoon of The Canadian Centre for Mine Action Technology
We will hear how technology is attempting to solve this tragic legacy of war. Such techniques as Hyperspectral Imaging, X-Ray Back Scatter imaging, Ground Probing Radar, Electrical Impedance Tomography and Nuclear Quadrupole Resonance are all being used in the fight. An evening not to be missed.

September 16 : Wednesday

“The Future of Gas Compression Systems”
by Mr. Ron Porter of Enerflex Compression Services
Enerflex manufactures custom compression modules and ships them all over the world. With the tendency to higher pressures in many pipelines and processes there is a constant challenge to the technology of delivering that compression. In this talk we will learn how research and development is responding to the challenge.

October 17 : Wednesday

“Oil Sands Tailings, the Past, the Present and the Future”
by Dr. Y. Liu, of Goldar Associates
Disposal of tailings in large oil sand mining operations is a very significant component of the costs of bitumen extraction. This talk will provide an overall picture of the current operations and the associated environmental impacts. It will focus on the evolution of technologies in the last decade and the potential environmental benefits.

November 14 : Wednesday

“The Challenge of Constructing Large Process Vessels”
by Mr. Bill Rogers of DACRO Industries
The DACRO story is one of remarkable achievement as it has grown from a small vessel manufacturing shop to producing the largest vessels in the world. Perhaps their most interesting job has been the fabrication of the Cokers for the Suncor Millennium Project. Learn not only the technical challenges of ever larger and more sophisticated vessels but also of the logistical problems in producing such huge vessels on a fast track program. If you are in the EPC game this will be one not to miss.
Provisional Social Programme for 2001

The programme for 2001 is still under development but here are activities that are being considered. Final arrangements will be announced by email and on the web site at www.CPGCE.org.

March 15 Thursday Wine Testing
Once again this will be at the Willow Park Liquor Store at 7:00pm. Those who attended last year will recall how we were serenaded by a singing gaucho who was also a connoisseur of Argentine wines. We cannot guarantee that again this year but we can guarantee that it will be a very mellow event. Please inform Alan Rhodes of your receptive palate in plenty of time or you may be disappointed.

March 16 Friday Visit to BATUS
See the Technical programme for details.
We hope that a few members of the Calgary branch of the Military Engineers' Association of Canada (MEAC) will be able to accompany us. We will visit the Force Maintenance Area and after a briefing we will have a static demonstration of a selection of armoured fighting vehicles. Following lunch in the Officers' Mess we will tour the workshop facilities.
We understand that BATUS is currently the largest British Army training unit in the world.
Major Betteridge is a Chartered Mechanical Engineer.

April 7th Saturday IMAX Theatre and Restaurant
Meet at 6.45 near the Imax Box Office (Eau Claire for 7pm and 8pm shows. Shows are; 'Great North' - about Inuit culture and Arctic animals followed by 'Journey Through Amazing Caves' - about people who explore caves and animals that live in them. Cost at Group Rate: Age 18 - 59 = $10.50; Age 60+ = $9.50. Afterwards we gather at the Whiskey Creek restaurant, just down from IMAX (formerly Outwest, still same layout and style of food, meal costs still reasonable). 45 seats, as far back as possible, have been booked. Please let Paul or Margaret Camwell know: (1) how many tickets you would like, (2) if you require senior rate and (3) if you plan to come to the restaurant. FINAL DATE for booking through the Camwells is MARCH 31st. Any late deciders will need to book their own tickets at regular prices and cannot be guaranteed seats near the main group (new less lenient IMAX policy). Payment for tickets on April 7 at the meeting place, preferably by cheque payable to CPGCE. Paul at Ph: 256-4198 Fax: 256-4198 Cell: 510-7807 email: pcamwell@home.com

May Something equine?
We are looking for inspiration on this one. It has been suggested that engineers are too risk averse to go to the races.

June BBQ Brunch
Any suggestions for a suitable spot? Perhaps a Naturalist's Guided Tour of the Bird Sanctuary before the brunch may set our taste buds a flutter. We need your input. Something horticultural?

July Summer Hike
In July this year, in view of the somewhat soggy event last year. The smell of wet, woollen socks did not enhance the gastronomic delights. Barrier Lake in Kananaskis Country is the target. 

August BBQ and River Raft
Perhaps CPGCE should demonstrate that maturity, ingenuity and cunning is still alive, by building a fiendish, killer raft?

September Bowling or Archery?
A revival of the once popular bowling or something entirely new? Let us hear if your bowling finger is itchy or a quiver.

October Halloween Party / Potluck Supper

November Dinner Theatre / Stage West Brunch

CPGCE Scholarship Award

The winner of the CPGCE award for the year 2000 is a student at the Southern Alberta Institute of Technology. Ms. Meagan D. McAleese, the winner, is in the final year of the Civil Engineering Technology Programme and will graduate in the Spring of this year.

This award is funded by the Institutions of Civil, Electrical, Mechanical, Chemical and Structural Engineers and reflects the multi-disciplinary nature of our group.

Meagan's letter of appreciation would, we thought, be of particular interest to our members. On behalf of the CPGCE Membership we wish her continued success in her engineering career.

L to R: Ray Marsh, Bob Environ, Larry Roda (SAIT), Meagan McAleese, Charles Dempsey, Dave Dawson (SAIT)

January 05, 2001

Mr. Charles Dempsey
Scholarships Director,
Canadian Prairies Group of Chartered Engineers
4112 Crestview Road SW
Calgary AB T2T 2L4
Re: Canadian Prairies Group of Chartered Engineers Award

Dear Mr Dempsey:
I was pleased and honored to be chosen as the recipient of the CPGCE Award for this year and would like to extend my heartfelt thanks to you, in charge of scholarships, as well as to the rest of the executive CPGCE committee members. I am committed to working in the field of civil engineering technology and am flattered that you rewarded my enthusiasm in this way.

I enjoyed meeting you and the other two CPGCE members, Ray Marsh and Bob Environ at the evening dinner that I attended and look forward to seeing you again in the spring at the SAIT Construction Department awards evening. Thank you again for choosing my application. I am still unsure where my future lies in the field of engineering but receiving your award has been a highlight of my college years.

Respectfully

Meagan McAleese
Student, Civil Engineering Technology Program
Southern Alberta Institute of Technology
Notes On Our Recent Technical Meetings

"Enhancing Business Opportunities, Alberta-UK"
by Mr. Clark Grue of The British Trade Office, Calgary - 20th September 2000

Clark outlined the functions of the British Trade Office in Alberta. It is a part of the UK’s initiative to develop trade opportunities in the areas following areas:-
1 Air Pollution Control
2 Industrial Wastewater Treatment
3 Instrumentation Monitoring and Detection Equipment

A focus is the promotion of efficient conservation strategies with the objective of sustainable development. Most of the companies involved are Small Manufacturing Enterprises (SME’s). The support activities undertaken by the office include hosting Trade Exhibitions in Alberta and British Columbia for companies to showcase products and expertise.

The office will also produce Research/Economic reports on markets and business potential in market segments in Western Canada for a fee depending on time and work involved. Currently trade between Alberta & the UK is approximately $2 billion annually which is about 20% of the $10 billion for all Canada & the UK.

"The Millennium Project of Suncor Energy"
by Mr. Bob Sparrow, Chief Process Engineer, Banret Inc. - 18th October 2000

Bob gave us a fascinating talk on the process aspects of this $3 billion project to raise production of the Steepbank Mine at Ft. McMurray to 225,000 barrels/day by 2003. The size of the process plant impressed everyone.

In the first place, why go for central processing? Bob explained that the viscosity of the bitumen was high, as was the sulphur content. Add to this that the sulphur cannot be boiled off and you have a product that cannot be transported by pipeline. Venezuela takes the approach of partial upgrading to make it pumpable for shipment. Suncor chose full upgrading.

The technology of upgrading offers two choices, add hydrogen or reject carbon. ‘Hydrocrackers’ add hydrogen through the use of catalysts and high pressure and temperature. A major challenge in this process is the poisoning of the catalyst by heavy metals and the plant maintenance rate when both high temperature and pressure are used. The emphasis at Suncor is on ‘delayed coking’ where carbon is extracted at high temperature but low pressure. Of course the problem then becomes one of removing the coke. The process used also removes the heavy metals and sulphur.

The very large crackers are filled with bitumen over a 16 hour period and heated to 9200 F for the rejection of carbon. Large augers the decend through the vessel cutting out the coke, which is removed through the bottom. The vessel is then refilled; the complete cycle taking 32 hours. Since the cokers’ control the throughput of the total operation the number of them is designed to give continuous plant operation.

Bob also explained the design process co-ordination by use of a 3-D computer model. All disciplines enter their working files each night, the computer then updates the model overnight and produces a conflict report for each discipline for the next day’s work. It also generates all material take-offs and other documentation. Enough here to generate another presentation on its own.

"Heavy Mining Equipment"
by Mr. Hal Lundeen, Marketing Manager, Terex Mining Ltd. - 15th November 2000

Hal gave an interesting talk on the development of large haul trucks and hydraulic shovels. The talk focussed on the unit rig MT5500 diesel electric - AC drive system truck. This unit has a capacity of 326 tonnes, an empty weight of 202 tonnes, giving a total gross weight of 528 tonnes. The unit is over 9 m wide and nearly 15 m long. When the haul box is raised the height is 13.3 m, and when lowered the height is a mere 7.2 m, or about the height of a two storey building. If you encounter one coming towards you take evasive action!

The Ri4 400 shovel was also described in detail. This unit weighs 840 tonne, has a 4,400 hp engine and a bucket capacity of 43.5 cubic metres. This means that every bucketful of material weighs over 100 tonnes. It can load the MT5500 truck in three passes.

Mr. Lundeen also discussed the evolution of the design of shovels as their capacity has continually increased, pointing out the judicious use of changes in cross section to enable components to have greater load bearing capacity yet less weight.

We all left the meeting ‘thinking big’ and our cars felt very small that night.

"Locating Cell Phones and Similar Devices"
by Dr. Michel Fattouche, President & CEO of Cell-Loc Technology - 21st February 2001

Dr. Fattouche was introduced to the audience by Dr. Camwell who had worked with him at Noveltec labs many years earlier.

Michel explained the history of his Company from its genesis as an idea associated with transmitter location by a technique called super-resolution, to its present situation as a potential world-scale provider of asset and fleet tracking. The technology originally attempted to solve the following problem - What is the position of a cell phone that has just dialled 911?

He explained that there are two main methods of transmitter detection and location - Either build in a GPS satellite receiver and transport the coordinates via the cell phone, or detect the position via automatic triangulation from remote cellular base stations. GPS suffers from the need to have a reasonably clear line of sight to at least 4 satellites. This can cause loss of location in downtown cores.

His company has a patent on a specific super-resolution technique and he had expected the American FCC to mandate that all cell phones be locatable in the near future. It looks as if this will not happen soon enough for his company to reap timely commercial rewards so Cell-Loc is now assessing the asset tracking and fleet management market.

One advantage of Cel-Loc’s technique is that it is entirely passive. All that is required is to set up a number of base stations in a city with location units that enable the time difference of arrival from the transmitter signals to be calculated. This can position the device approximately 100 to 200m on the ground. Another advantage is that it is passive - there is no need to modify the transmitter.

Finally, Michel was presented an Operation Eyesight certificate taken out in his name to enable a 4-year-old girl in the Third World to have a sight-restoring operation.
As a youth in England in the late 50s living in a village, my only transport was a bicycle. When I started to play rugby seriously for my grammar school some seven miles away in Oxfordshire, it entailed practising 4 nights a week after school and the only means of transport outside of the school bus was pedal power up and down three major hills. My father took pity on me and helped me with contributions from my paper round to buy a Norman moped with a 50 cc 2-cycle engine. At the age of 16 I was hooked on motorcycles and was about to learn many lessons in practical engineering. The moped would do about 25 mph (with a following wind) and probably developed at least 0.9 hp.

The speedometer went up 50 mph. There was the challenge, how to get the needle off the scale! I avidly read books on tuning Vincents, Nortons and Triumphs but to no avail, no one seemed to be racing 50cc mopeds in the TT at that time. Supercharging, desmodromic valve gear, high compression heads, none of these seem to have much relevance to an engine that bore a remarkable resemblance to lawn mower power units and two moving parts. Not exactly developed from Formula One racing lines. So turning my back on the theoretical aspects of motorcycle racing and my future training in the sciences I withdrew into the experimental mode of trial and error.

My father had talked about using 100 octane in sports cars from World War 2 fighters. It did not seem to be readily available in the village and higher octanes from the village pump made no difference. I had learned a basic difference between 2 and 4 stroke engines.

I added methanol with negative results, researched nitromethane but it did not seem to be available from Boots in Reading. When I asked the chemistry master at school about making nitromethane he looked at me suspiciously, which was probably because we had asked previously about improving home made bombs with oxygen boosters and then solid state rocket motors.

The first real result came about when I pulled out the silencer core. It made 10 times the noise. Now I was making progress. I finally got the moped to 53 mph (on the speedometer anyway) by approaching Peppard Hill at maximum speed with following wind, disengaging the clutch and freewheeling down a 1 in 8 gradient round a 90 degree turn and... success!

Unfortunately the chain broke.

My next engineering lesson was that I realised, as all North Americans know, there is no substitute for cubic inches. I traded up to a 125 cc Capri scooter. This was Italian so obviously it had a thoroughbred engine with the lineage of Ducati, MV etc. and probably put out around 5 hp. It was also a little more streamlined and would do about 40 mph. It revved a lot higher and used to shed the occasional bolt. This was how I learnt that Europeans used foreign threads called metric, not proper ones using Whitworth. The local garage man told me this disparagingly when I attempted to buy replacements. Later it became more confusing when AF appeared on the scene.

To improve the performance I implemented my proven upgrade and removed the silencer core. My mother remarked that she knew when I was near home because she could hear me coming a mile or two away down the country lanes. I next took off the cylinder head decoked and polished the combustion head and attempted to increase the compression by putting a thinner gasket in. I did try to emery paper the head down and increase the compression ration but to little effect. I next played with the spark plug using a hotter model and experimented with the timing. The scooter did have a primitive carburettor rather than the tube and bent wire that the moped had. I found I could increase the revs, which made even more noise and did go a little faster. It had the unfortunate consequence of shedding bolts faster because of the increased vibration. Now I knew why on racing machines they wire all nuts and bolts to stop them falling off during a race.

I also threaded some of the stud tapings trying to tighten up the bolts and learnt about the failings of aluminium against steel. The scooter had smaller wheels than the moped so it had a lower centre of gravity, I thought it would corner faster because I could lean over farther. I soon discovered it was less stable in cornering because of lower gyroscopic stability from the smaller wheels.

I now moved away from university in Brighton some 90 miles from home and the scooter was too slow for such a distance. I upgraded to a Norman 250 cc with a Villiars 2T engine. At last real power, the bike developed 15 hp with a top speed of 75 mph. Now I was in a position to threaten John Surtees supremacy. The first major problem was that on one home trip the vibration caused carburettor cover to unscrew allowing excess air into the fuel, which eroded the piston crown and caused failure. A classic 2 stroke problem. Because I was a twin I struggled home on about 30% power. Lesson learnt two cylinders are more reliable than one.

I replaced the pistons and managed to crack the cast iron inlet manifold. I felt Araldite was unlikely to work in my efforts to make a repair. It was suggested I talk to the research support staff in the physics department. A brilliant move, I never realised such talented and skilled resources existed. A technologist looked at the pieces, heated them slowly, brazed them together, cooled slowly under bricks and smoothed them with a belt sander, a sound lesson in metallurgy.

On leaving university and discovering the decadence of full weather protection in a car, my enthusiasm for motorcycles waned somewhat. However I invested in a 500 cc Triumph Tiger at the time when all British manufactures were rapidly going bankrupt in the early 70s. I learnt a lot about oil seals and how in a vertical split crankcase it is hard to stop oil leaks.

Having been accepted in marriage my partner was not enthused about 2 wheel transport, so on emigrating to Canada I passed the bike onto my brother. A sign of maturity my wife encouraged.

In my recent second childhood I abandoned all my acquired technical knowledge and purchased a Triumph Bonneville. When I looked at the pool of oil under the crankcase, while trying to kickstart it, reality hit me. So I moved over to a Honda 500 cc, water cooled, V twin with electric starter and a 100% reliability.

I realised I had learnt something about engineering.
### Executive Committee Directory

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**WEB PAGE URL**: http://www.CPGCE.org  **WEBMASTER**: Bob Ennever

### MEMBERSHIP SURVEY

If you have provided this information within the last 12 months, please accept our thanks and ignore this request.

If not, or if any amendment is required, please take the time to complete this questionnaire and advise Tom Williams at:-

**Phone**: Bus (403) 268-3792  **Home** (403) 271-8520  **FAX** (403) 268-488  **tdwilliams@home.com**

**Postal address**: C.P.G.C.E., BP / P.O. Box 61361, Calgary, Alberta, Canada, T2L 2K6

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**Institution Affiliation** (Chemical/Civil/Electrical/Mechanical/Structural)________________________  **APEGGA Member?**________________________

**Membership number in institution (if known)**________________________

**Would you like reminders of group events?** Technical________  Social________

**Would you be willing to assist with group activities?**________________________

**How can CPGCE help you?**________________________  **What activities would you like to see sponsored?**________________________  **Remarks?**________________________

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