



# The Challenge

THE NEWSLETTER OF THE WESTERN CANADA GROUP OF CHARTERED ENGINEERS

## Message from the Chairman



From the logos displayed around this title page you can see that the WCGCE is a diverse group representing seven sponsoring UK institutions. If you are a member of any of these institutions and live in the province of British Columbia, the Yukon or the states of Alaska or Washington, you are automatically a member of the WCGCE. There are no fees payable - funding for the group's activities comes from the sponsoring institutions. This publication is supplied free-of-charge to all WCGCE members.

The group operates according to a constitution (which can be found on the group's web site ([www.wcgce.org](http://www.wcgce.org)) originally drafted in July 1987 under the *Regulations of Groups of Professional Engineers* sponsored by the Institutions of Civil, Mechanical and Electrical Engineers.

The constitution defines eight objects of the group. Three of these are:

- "...to promote and encourage the acquisition of knowledge relevant to the engineering profession."
- "To establish friendly exchange between members."
- "To stimulate among members interest in the work of the Sponsoring Institutions."

Towards the first objective the group provides presentations and visits throughout the year.

These are arranged by the group's technical presentation co-ordinator Michael Thornley who spends many hours booking and advertising them.

All presentations are open to the public (again free-of-charge) and are well received. Michael, through his network, has been able to arrange some excellent speakers and visits including Dr. Geoffrey Ballard founder of Ballard Power Systems and General Hydrogen in Vancouver, BC, Peter Buckland, a principal of the local bridge engineering firm, Buckland and Taylor Ltd, and, just last month, a special tour of some of the recently constructed award winning buildings at the University of British Columbia.

These presentations are not only are of general interest but, since "*Members who participate in any professional development activity they believe to be relevant to their practice will have their activity recognized...*" [APEG web-site], may also be counted as continuing professional development hours by the Association of Profes-

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sional Engineers and Geoscientist of the Province of British Columbia, the local regulatory body for engineering.

The WCGCE is an excellent forum for friendly exchange between members of all ages and experience and for individuals from the public interested in engineering. In addition to the technical presentations, committee member Ian Price and his wife Jane host the annual inspection of the phone box (and barbecue) at their home in North Vancouver in July. Details of the inspection of the phone box are enclosed with this newsletter and have been posted on the website. Also, for the last few years, WCGCE members Alan Greatbatch and Ron Mansfield in Victoria have arranged for a September field trip. Last year's visit was to the Dominion Astrophysical Observatory just outside Victoria. Watch for announcements on the website for details of the upcoming field trip to Victoria.

The group maintains good contact with the sponsoring institutions. Honorary Secretary Bob Martin keeps communication lines open through the IMechE, the group's designated corresponding institution. As well, a few of the committee members serve as officials of the sponsoring institutions. We also have regular visits from institution executives. Last year we were visited by the president and CEO of the IMechE and this August executives from the Institution of Structural Engineers will visit. Details of this upcoming visit have been posted on the website.

An interesting event in which committee members Ian Price and Arul Raja will be attending is an IEE conference this fall in Ottawa. I am sure Ian and Arul will have much to report.

Have an enjoyable summer and I hope to see you at the coming WCGCE events.

James Canova, (MIMechE, CEng, PEng)

WCGCE Chairman, 2005

## Message from the Editor

The position of editor is still open. I am filling a gap with support from the committee.

I would like to thank everyone who has contributed reports on our technical meetings and

other activities.

If you wish to contribute a report on a technical event, an article or an announcement, please contact me; my contact details are listed below.

*Chris Richardson, C.Eng., MIEE.*

*Newsletter Editor 2005 (Interim)*

*email: [backwater@telus.net](mailto:backwater@telus.net) tel: (604) 879-9980*

## Technical Program Notes

### ELECTRIC ARC

**February, 2004**

*Presented by: Dr David Peelo, P. Eng, MIEE*

The technical presentation was on Electric Arcs, by Dr David Peelo, P. Eng, MIEE, and a former member of our Committee. Although the free burning electric arc was studied extensively at the end of the 19th century the invention of the circuit breaker about 1904 dimmed interest.

Utilities have a vested interest in free-burning arcs because air-break disconnect switches are used to interrupt currents of varying magnitude. His presentation covered the use of air-



**The result of a failed breaker**

break switching gear to open the circuit of high-voltage transmission lines. He outlined his points by the use of video clips which, even with the limited sound from the lap top computer speakers, were

quite impressive. What he was actually showing was man-made lightning the arcs made as the switch opened very impressive both visually and audibly. As the total operation took place in a few seconds the slow motion clips showed more vividly the twisting nature of the arc as it crossed between the arms of the opening switch. He also showed the differences in arcs emanating from the different switches and the use of whips to minimize the arc. Dr. Peelo answered a number of questions from the audience of about 25 members and guests. He was thanked by our Chair James Canova and presented with one of our coveted umbrellas, hopefully to keep the sparks from falling on his head.

*Report by Bob Martin*

**MUD SLIDES****March, 2004**

*Presented by: David Smith P.Eng., Principal of Thurber Engineering*

The presentation was MudSlides or its official title, Landslides & Erosion Problems in Glacio-Fluvial Soil Escarpments around Greater Vancouver. Presented by David Smith P.Eng., Principal of Thurber Engineering, the lecture was based on a paper by Professor Oldrich Hungr of UBC.



**The aftermath,  
Riverside Drive**

The talk was initiated by the recent mud slide which killed one occupant and hospitalized the husband in the Riverside Drive area of North Vancouver, near where our Web Master Ian Price resides. He and his neighbours spent weeks

in the Holiday Inn hotel, while geoscientists checked the area for potential future slides, before being allowed back in their homes.

David outlined the geography with the help of illustrations showing the type and composition of the ground covering many areas of the Lower Mainland around Vancouver. The local mountains are part of the Coast Mountain Range and like most of the province were covered by a large Cordilleran ice sheet during the most recent ice age some 15,000 years ago. This allowed the land to rise up to 100 meters. The remnants of the glaciers which eroded these mountains have all but disappeared leaving only the glacial till of boulders, gravel, sand and clay on which most of the buildings in the area are constructed.

He showed how more porous sand and gravel layers, draining rainwater down to the glacial till, locally called "hard pan" results in an impervious barrier to the water. It also acts as a shear plane which causes the upper hillside to slide if saturated soil conditions cause the slope to be overloaded.

In some areas undercutting the hillsides to excavate gravel pits causes an increase in the

slope angle and increases the potential for the upper slopes to sluff down on the lower area until a more stable slope is established.

One of the better known areas illustrating this was the Westwood Plateau recent housing development. Other areas that have had the slides are the UBC Point Gray peninsula, and Port Moody where heavy rains caused slides in 1979.

Other examples were; the December 1981 flooding in White Rock, the January 2005, Misunderstood building codes (possible weakly-applied) has resulted in some homes being built on areas that should not have had any structural loads imposed on them and, in addition, homes have been built at the bottom of slopes that are potentially unstable.

The speaker illustrated his presentation with examples of unstable slopes and slides in the lower mainland and in other similar areas such as Hong Kong where slides can take out whole apartment blocks causing many deaths.

*Report by Bob Martin*

**ENERGY EFFICIENCY STRATEGIES AND TECHNOLOGIES IN CANADIAN HOUSING****April, 2005**

Our speaker Richard Kadulski is a Vancouver



architect who has specialized in healthy, energy efficient, solar and climate sensitive residential design for more than 30 years, and was project manager for the BC Advanced House. He has won numerous awards, has been active on many industry technical

bodies, and is a Past President of the Solar Energy Society of Canada. He has also contributed to the drafting of R-2000 Technical Standards, the development of the National Energy Code for Houses, and does ongoing work on the National Building Code of Canada.

Energy use and green-house gas emissions in Canada were still increasing in all sectors between 1990-2001, with residential energy

use comprising 16.8% of national total energy use. Out of the 1336.7 petajoules of energy used in residential buildings in 2001, 58% is used for space heating, and energy efficiency design and construction has contributed a saving of approx. 255 petajoules.

The bare minimum energy efficiency requirement for new housing to be approved is prescribed by current code practices. A national standard for new detached or low-rise energy-efficient housing is the R2000 Standard, which is based on "Building/The House As A System". R2000 is a voluntary performance standard that goes beyond the building code requirement and provides a quality assurance program for certifying these houses. In 1993, a number of Advanced Houses across Canada was also built at a much higher standard than R2000 for the purpose of benchmarking, and the demonstration of new material and new technology. In 2005, a "Factor-9 House" will be built in Regina, and it is designed to use 1/9<sup>th</sup> as much energy as a conventionally built new house. Its target is to reduce total purchased energy to within 30kwh/m<sup>2</sup>/yr.

The R2000 Standard includes technical requirements on building envelope, mechanical system, energy performance target, indoor air quality features and resource conservation features. Whilst the average annual energy consumption per household is 103 GJ for a R2000 home, the average for all houses that had been measured by the EnerGuide for House program is 203 GJ. In comparison, the energy consumption of an average house built in 2001~03 is 148 GJ, in 1991~2000 is 160 GJ, in 81~91 is 181 GJ, in 71~80 is 192 GJ, in 61~70 is 200 GJ, in 46~60 is 207 GJ, and pre-1946 is 277 GJ. At the same time, because of changing consumer expectations, house footage per capita is getting larger, from less than 400 S.F. in 1940's to more than 800 S.F. today per capita. Regrettably, there is also often a departure from designing a house to best suit its climatic condition.

Building envelope construction, insulation products, windows, foundation insulation and mechanical system are areas that offer good potential for energy efficiency upgrades. Air leakage accounts for 20~40% of heat loss,

and there are various approaches that can be used to achieve airtight construction. Some insulation (e.g. sprayed icynene) can also be used as an air barrier. When measured at 50 Pascal, an average R2000 home has an airtightness of 1.1 air change per hour, while a conventional home built in 00~02 is 3.5, in 97~99 is 3.6 and 94~96 is 4.4. For foundation moisture management and insulation, insulated concrete form (ICF) is often used. There is also a trend towards using the ICF for the whole house. High performance windows are now sealed with argon gas that leaks less than 1% per year. Integrated HVAC systems can combine all heating and cooling requirements into one unit, and provide energy saving ventilation. Continuous mechanical ventilation is essential as each person inhale and exhale 54 lb. of air per day.

The presentation ended with a lively Q&A session that had Mr. Kadulski offered more advice on energy efficiency upgrades, and further dispelled some popular myths around building science.

*Report by Wilma Leung*

## **VISIT TO UBC CAMPUS**

### **May, 2004**



This event was a bus tour of the new buildings constructed during the building boom taking place at the University of British Columbia. The guides were Doug

Napier, Facilities Manager, and David Griggs, Assistant Director Infrastructure and Services Planning for UBC. Three buildings were visited. A short tour of the main floor in each was taken.

The first was the New Life Sciences Centre, a series of 3, 5-story buildings connected by 2 atria with glass roofs; all the labs have windows facing an atrium so there is a lot of natural light.

The second building was built in honour of Dr. Michael Smith, a Nobel Prize winner who won the prize for his work on DNA and Chemistry. A lot of wood has been used in

the buildings as structural and aesthetic treatment. The 2nd and 3rd floors are dedicated to the research facilities of the former Biotechnology Laboratory. The Stewart and Marilyn Blusson Education forum is on the ground floor and is open to the Public.

In the first building strips of 1" x 4" varnished wood were used to line the walls in the atrium; in the second building glulam beams molded into S-curves were used as supports for the skylight over a small dining area. The buildings we examined are built to meet LEED standards for low energy and low environmental impact both in construction and operation.

The tour also took us around the campus and we saw the large amount of accommodation that has been built in the last few years. Some of it for students, some for faculty and some high-end million dollar plus units for people wanting to live in the university environment.

We also visited the interior of the Chan Centre which is an acoustically designed auditorium used for live music and drama performances as well as the graduation ceremonies for the new graduates. We were allowed to visit the backstage area and to walk on the stage which has a section at the front which can either be lowered for extra seating or lowered further as an orchestra pit. A great deal of wood has also been incorporated in the décor of the building. In addition, the side and back walls of the interior have acoustic blanket-like blinds which can be raised or lowered to adjust the acoustics of the interior.

Our last stop was at a special draining basin which acts like a overflow reservoir during heavy rain to reduce the erosion of the cliff face surrounding the university campus.

Some 39 people enjoyed the tour and asked numerous questions.

Our Chairman James Canova thanked our guides for the interesting and informative tour.

*Report by Bob Martin*

## Current Activities

### 2005 IStructE ANNUAL CONFERENCE

I was pleased to be able to once again attend the ***IStructE Annual Conference***, held each

May in London. This event is especially meaningful for me as it attracts delegates from all over the world and emphasizes the international aspect of the Institution. It is an excellent opportunity to meet the other international representatives, receive reports on Institution activities, and discuss matters of common interest.

A key matter for discussion this year was the experience in various countries of the process for registration of structural engineers. This currently exists in several countries, and most recently in Scotland. Plans are underway for a similar scheme to be introduced in England and Wales which, as in Scotland, would be run by the IStructE. I was pleased to be able to describe the structural registration process in BC which attracted keen interest from delegates from other jurisdictions.

Other events I attended were a meeting of the ***International Agreements Panel***, a meeting on international structural examinations, and the ***IStructE Annual General Meeting***. At the AGM, I was elected as Senior Vice President, and Patrick Lam as Councillor, which will provide BC with two representatives on the IStructE Council for the 2005/6 session. After the AGM, Jon Magnusson of Magnusson Klemencic



Jon Magnusson (rt) receives his fellowship certificate from president Mike Fordyce

Associates was presented with his Fellowship certificate by the President. This was followed by a presentation titled "Engineering for Culture" in which he described his breathtaking structural designs in the City of Seattle. The unique nature of Jon's structural designs evoked a lively discussion with the audience.

The highlight of the Annual Conference is always the Annual Dinner, held at the magnificent Guildhall. Over 400 guests attended at this most spectacular venue, to hear speeches from the Senior Vice President, the President, and the guest speaker Peter Swannell, Emeritus Vice-Chancellor of the University of Queensland.

Dr. Swannell gave us a hilarious talk which captivated the audience, emphasizing why he is in high demand as an after-dinner speaker.



**The Guildhall Crypt**

The splendid Dinner was followed by night-caps in the ancient Crypt beneath the great hall. This is the 26th consecutive IStructE Dinner to be held at the Guildhall and those attending are captivated by the majesty and history of the venue. However, in 2006 the building will be closed for refurbishment and the IStructE Dinner will not return there until 2007.

The IStructE Annual Conference was most enjoyable and informative and produced opportunities to work with other overseas representatives on some interesting professional activities. I look forward to returning next year and to increased involvement with the Institution.

David Harvey CEng FIMStructE PEng  
WCGCE IStructE Representative

### **AGM & DINNER DANCE**

The Annual General Meeting followed by the Dinner Dance, took place on January 22<sup>nd</sup> 2005 at the Four Seasons Hotel in Vancouver.



**A blast from the brass**

The band - Route 66 was in fine form and kept everyone on their feet, both waltzing or rocking, well into the small hours.

Several members were distracted, indeed quite taken, by the accomplished and alluring gyrations of a belly dancer who floated in during an intermission

A good time was had by all. Thanks are due to Alan Kay for organizing this event and for coordinating the reservations.

## **Upcoming Events**

### **2005 IStructE President's Visit**

#### **Thursday August**

For the fourth time in recent years an IStructE President will visit Vancouver as



**Mike Fordyce  
President IStruct E.**

part of the planned 2005 North American tour. The Institution of Structural Engineers actively promotes the practice of structural engineering activities around the world and is a supporting institution of the Western Canada Group of Chartered Engineers.

WCGCE members are encouraged to come and meet the IStructE President during his brief stop in town. **We are currently planning to co-sponsor (with the Division of Structural Engineers) a dinner meeting on Thursday August 18**, venue to be confirmed. Dinner will be followed by announcements and introduction of the speakers.

Presentations will follow from Keith Eaton, IStructE Chief Executive, and Mike Fordyce, IStructE President, who will doubtless tell us all about their experiences touring North America, along with Institution news, and interesting stories about structural engineering. Mike Fordyce, who hails from Australia, is the first IStructE President who normally resides outside the United Kingdom. As a consulting engineer, with over forty years of experience on varied projects from across the globe, Mike will have many fascinating tales with which to delight us.

Since the last IStructE President's visit in 2002 some fifteen new local members have elected to join the Institution. Some of those joining in 2005 will receive their membership certificates from the President during his visit. The encouraging interest in

becoming a Chartered Structural Engineer is a direct result of passing the Chartered Membership exam for registration with APEGBC as a Designated Structural Engineer. The IStructE President will be signing an updated Agreement with APEGBC during his visit to Vancouver.

**The venue will be the Garibaldi Room, Blue Horizon Hotel, 1225 Robson Street, Vancouver, BC (604 688-1411).** Dinner will be at 6 p.m., followed by Mike Fordyce's presentation at 7.30 p.m. The three-course dinner featured entree will be Chicken Diane, and a no-host bar will be available.

We plan to have on-line registration for this event on the APEGBC web site. We anticipate the dinner cost will be \$25 for advance registration, \$30 at the door – those not dining can attend at no charge. This is a perfect opportunity to meet the visitors, enjoy good food, be entertained and be brought up-to-date on institution matters.

*Registration will be handled by APEGBC, by telephone (604 430-8035) or on line at*

**<http://www.apeg.bc.ca/prodev/prodevents.html>**

So reserve the evening of August 18 in your calendars - we'll see you there. G'day!

David Harvey

WCGCE IStructE Representative

## **ANNUAL FIELD TRIP**

**September 10th, 2004**

Destination to be announced

## **INSPECTION OF THE PHONE BOX**



**See enclosed flyer**

The inspection of the phone box will take place **Saturday July 23rd** and if rained out then the event will take place on **Sunday July 24th**

## **Other Business**

### **WCGCE Bursary**

The following individuals received awards from the WCGCE Bursary this year: -

*In Electrical and Computer Engineering: -*

**Mr. Kevin Lai**

*In Civil Engineering: -*

**Ms. Kimberley Wong**

*In Mechanical Engineering: -*

**Mr. Jonathan Dirk Zand**

### **Concerning US Use of the Title "Chartered Engineer"**

The **Engineering Council (UK)** had been concerned that the internationally recognized title "Chartered Engineer" might be used as a licensed qualification and designation in the United States by the **National Council of Examiners for Engineering and Surveying**.

Due to excellent timely collaboration between these two bodies a confusing situation has been averted.

The president of the National Council of Examiners for Engineering and Surveying Jon D Nelso P.E. has assured the Engineering Council in a letter to its executive director Andrew Ramsay that

*"The licensure model and work of the LQOG (Engineering Licensure Qualifications Oversight Group) are important to the future of engineering regulation in the U.S. We do not want the title, whatever that might be, to get in the way of the concept being conveyed. Neither do we want a title to jeopardize the cooperative relationships the U.S. has with the U.K. and other countries.*

*Therefore, the title "Chartered Engineer" is no longer being considered in connection with the licensure model".*