



# The Challenge

THE NEWSLETTER OF THE WESTERN CANADA GROUP OF CHARTERED ENGINEERS

## Message from the Chairman



We are now well into the 2008 year and I am enjoying being Group Chairman. I am pleased that we had a successful Annual General Meeting and dinner event this year at the Royal Vancouver Yacht Club. We tried some new activities this year which were a lot of fun for those attending and we were able to enjoy a comfortable venue with good food and stunning views. I appreciate your support in electing me as Chairman and I will work hard to deliver an excellent program of events.

May I say a big "Thank You" to outgoing Chairman, Wilma Leung, who served us extremely well during 2007, bringing a lot of enthusiasm to her role. Wilma, well known for her energy efficient homes, also introduced a sustainability theme to the technical program. This was well received by those attending and so we will continue with the theme in 2008. So far the presentations on fuel cells and building revitalization were well attended and most informative; at this juncture the talk in May on the Waste Hydrogen Utilization project and site visit is eagerly awaited.

We recently had a special presidential visit

to the Western Canada Group. 2008 is the Institution of Structural Engineers' centenary year, and in April we were visited by Centenary President Sarah Buck. Sarah was thrilled to be visiting Vancouver for the first time and was delighted to meet our local members. At a meeting arranged at the Vancouver Club, Sarah spoke to 80 or so people, describing her unusual engineering career, and giving her vision of the future of our profession.

Especially meaningful for a visiting President is to present certificates to local members. This year, Sarah was delighted to present a certificate of Membership to Li Ming Yi, and a rare certificate recognizing 50 years of membership to local engineer Leo Allas. Sarah's strong interests are outreach to the younger members of society and our profession. She also enjoys undertaking projects with a human touch, that provide the maximum benefit at the community level.

At this time we are looking forward to the

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Annual Barbeque and phone box inspection at the Prices' residence. It should be another enjoyable occasion on a warm summer evening with good food and excellent company.

Your Western Canada Committee continues to do a superb job of serving the local members. Please support our activities by joining in the fun, and if you would like to help us, please do. I look forward to meeting as many of you as possible during the coming year.

David Harvey

WCGCE Chairman, 2008

### Message from the Editor

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

### Technical Program Notes

#### ENERGY EFFICIENT BUILDINGS

January 16th, 2008

The technical presentation was made by, Andrew Pape-Salmon, P.Eng, Acting Director – Alternative Energy Policy Branch, Ministry of Energy, Government of B.C. who talked on the subject of Energy Conservation for new and existing buildings and the highlights of the 2007 Energy Plan. The presentation outlined the application of a new B.C. Green Buildings Code and the introduction of an Energy Efficiency Act. B.C. Hydro is expected to obtain the equivalent of 50% of new electricity demand through the use of conservation actions by its customers. There will be implementation of En-

ergy Efficiency Standards and the introduction of energy efficient labeling of new homes.

New public sector buildings will be required to have an integrated environmental design to reduce green house gas emissions. There



Testing Building Air Tightness with a Minneapolis Blower Door

is to be a similar industrial Energy Efficiency Program, to provide a 33% reduction of green house gasses below 2007 levels by 2020. The application of a revised Model National Energy Code for building will also be reviewed and applied as appropriate. Furnace efficiency is to be 90% or better for new furnaces starting this year. More efficient lighting for residential and commercial building is part of the require-

ments. There will be a Provincial Sales tax exemption for insulation, Energy Star windows, doors, furnaces, boilers, heat pumps and solar heating.

In the residential area it is proposed that houses be fitted out with smart meters to allow customers to see the effects of using specific appliances on their total energy use. Building codes will be changed to require more energy efficiency and the application of the ASHRAE standard 90.1 (2004) and later editions to be used as the basis for a standard.

Andrew showed various tables and graphs illustrating the costs and energy savings from the anticipated reductions in both energy and green house gas emissions. The audience of 27 had numerous questions and comments for the speaker.

The Group Chair, Wilma Leung thanked the speaker for his interesting presentation and presented him with a coveted WCGCE umbrella.

Report by Bob Martin

**FUEL CELL RESIDENTIAL COGENERATION SYSTEMS**

**March 12th 2008**

The technical presentation was made by Evelyn Lai of Ballard Power Systems who gave a Power Point presentation on the research and model trials of the Ebara Ballard Corporations residential fuel cell cogeneration system.

The trials have been taking place in Japan, with the 1kw unit. This unit can use natural gas, propane or kerosene to fuel the system as it has a built in reformer which converts the incoming fuel to Hydrogen for use by the cell stack.



**Ballard Mark1030 Residential Co-generation Fuel Cell**

The unit is set up to provide both domestic hot water and space heating along with the electric power from the fuel cell. The unit is not designed to provide all the electric

and heating needs but to reduce the home owner's use of energy from the utilities.

The Mark 1030 unit has successfully powered hundreds of test homes in many geographic areas of Japan with wide variations in climate. It is claimed that the units save the home owners hundreds of dollars in annual energy costs and also reduce CO2 emissions up to 40% compared to traditional power generation.

The unit is relatively compact being about the size of a refrigerator, and is usually located outside the small homes typical in Japan. Evelyn showed a number of charts illustrating the operation of the units and their operating characteristics. The units are also available in larger sizes up to over 100kw. The cost of the unit is currently heavily subsidized by the sponsoring companies including the Gas Utility.

Evelyn answered numerous questions from a good turnout of about 36 members and guests.

The Group Chair, David Harvey thanked the speaker for her interesting presentation and presented her with a token of our appreciation.

Report by Bob Martin

**BUILDING REGENERATION—  
STRUCTURAL CHALLENGES**

**April 09, 2008**

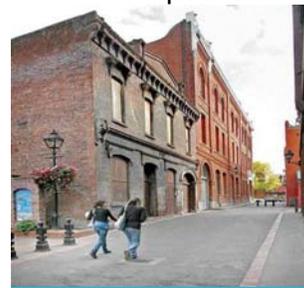
The technical presentation was made by Mark Porter, C.Eng, P.Eng, MIStructE.

Mark noted that Regeneration is a part of Sustainability and has the following benefits:

- it improves the existing urban area,
- it improves the existing structure,
- reduces the spread of Greenfield sites, and
- makes better use of vacant or derelict land and buildings.

He used the expressions Greenfield sites to signify those using existing arable land and Brownfield sites for sites that had already been developed but have been abandoned. Using a Power Point presentation he outlined the background of the benefits of salvaging and renovating existing building with a minimum of destruction to the original structure and façade.

Mark compared the building situation in B.C. and in England.



**Heritage Buildings for Regeneration in Victoria BC**

England is about 14% of the area of B.C. but has 12 times the population. Another interesting statistic was that 25% of English properties were built prior to 1914 but only 3% of B.C. properties were developed before 1920.

He illustrated this with the renovation of a small supermarket which was located in a

confined area in a small town in England. The \$7 million contract only allowed 16 weeks for the project to be completed. The original occupation of the building had been a pub, which now had become the supermarket.

Some of the challenges included prefabricating the large steel support member for a clear span for the check out counters, in a number of pieces that could be brought in through the doors then assembled on site.

Another challenge arose when they discovered an old basement area that had been out of use and partially backfilled. As the space was not needed it required special support structures to hold up the main floor over that area.

The contract was finished on time and within budget in spite of the unexpected problems.

The meeting was attended by a interested group of 21 members and guests who had numerous questions and comments that Mark answered

The Group Chair, David Harvey thanked the speaker for his interesting presentation and presented him with a token of our appreciation.

*Report by Bob Martin*

### **Integrated Waste Hydrogen Utilization Project**

**May 27th, 2008**

The technical presentation was made by Hamid Tamehi, P.Eng, on the development of the Integrated Waste Hydrogen Project which is part of the B.C. Hydrogen Highway promoted by the Provincial Government.

Two large chemical companies produce a large quantity of Hydrogen as a by-product in their production of other chemicals. Part of that hydrogen was used internally as a fuel source but a great deal was burned off as a waste product, enough to fuel about 25,000 vehicles on a daily basis.

The project makes use of this raw material to fuel a number of research vehicles such as Hydrogen and Natural Gas fueled city



**HCNH Transit Buses operating in Vancouver**

buses, a number of Hydrogen fuelled pick-up trucks, and a Combined Heat & Power net zero energy car wash which uses the hydrogen to power a fuel cell to provide electricity and heat

the water for the car wash.

In addition there was the design and construction of the Compressed Hydrogen fuelling distribution, the Light Duty Hydrogen Fuelling Station and the Heavy Duty HCNH Fuelling station

Hamid illustrated his presentation with a DVD which contained a number of short videos that illustrated the range of projects that the overall project covered. These are also being used as TV ads to promote the project. After his presentation Hamid answered a number of questions and comments, many querying the economic validity of the projects, and answered them very well. The audience then drove to the nearby site of the Light-Duty Hydrogen Fuelling station where the speaker showed the details of the station and described its operation.

The site is supplied with a bank of some 12 high pressure tanks assembled on a pallet



**Hydrogen Refueling Station and converted pickup truck**

that can be replaced as a unit with a full unit and the empty one returned to the main compressor station for re-

filling. It also has a bank of medium and a bank of low pressure tanks. A compressor keeps the high pressure bank of cylinders pumped up to about 5000 psi by transferring hydrogen from the lower pressure

tanks. These tanks are used in the vehicle refilling. The fueling station automatically fuels the truck from a selected pressure bank according to the pressure sensed in the truck's tank. As the pressure increases the station automatically switches to the next higher bank.

The truck's 3 cylinders made with an aluminum liner and then wrapped with a high strength plastic wrap are filled to a pressure of about 3000 psi. The weight of hydrogen in each cylinder is only about 2.5kg and the tanks will allow a trip of about 200km. The engines in the truck are standard internal combustion units that have similar fuel injection systems to a Natural Gas vehicle but tuned for straight Hydrogen. One of the odd problems they have with the vehicles is that the spark plugs get corroded from the high moisture content of the exhaust. He had one of the members, following the instructions on the station wall, use the fuelling hose to refuel the Hydrogen Pick up, to show how simple and safe it was to operate. The audience of 19 members and guests was impressed with the whole set up.

The Group Chair, David Harvey thanked the speaker for his interesting presentation and presented him with a token of our appreciation.

*Report by Bob Martin*

## Current Activities

### IStructE President and Chief Executive visit Vancouver

Sarah Buck, IStructE Centenary President, and Keith Eaton, IStructE Chief Executive were in Vancouver last April, as part of their tour of Canada which included participation in the 2008 ASCE/SEI Structures Congress.

While here they met with the APEGBC (The

Association of Professional Engineers and Geoscientists of British Columbia ) to sign an agreement to continue the use of the Chartered Membership exam for registration as a Designated Structural Engineer. The visitors also had a meeting with SE-ABC [The Structural Engineers Association of British Columbia] which has just commenced operations, to sign a sponsorship Agreement.

As mentioned in the Chairman's Message, on 22nd April Sarah and Keith held a very successful informal reception and addressed both IStructE members and representatives of the local engineering community. Sarah



Sarah Buck presents fifty Year certificate to Lepo Allas

then presented certificates of membership to new members, along with a special certificate to Leo Allas, commemorating fifty years of Institution membership.



Keith Eaton (left) with David Harvey and Cecilia Burnabe

Following this, the President hosted a dinner at the Vancouver Club for the WCGCE Committee, IStructE senior local members, and accompanying persons, where ongoing liaison and Institution support for WCGCE could be discussed. The WCGCE Committee members were honoured to be amongst the invited guests and for the opportunity to get to know the visitors personally. A wonderful time was had by all.

Special thanks are due to WCGCE Committee member Jack Bibby, FICE, for arranging such an ideal venue.

*Report by Chris Richardson*

## ASCE/SEI Structures Congress

The 2008 Structures Congress proved to be an absolutely stellar event! The fortieth ASCE/SEI Structures Congress was held in Vancouver, the first time the event has been held outside of the United States. The Vancouver congress featured ten tracks, 100 sessions, 300 presentations, and set records for registration (nearly 1300), attendance (over 1500), and exhibits (60 booths). Delegates were drawn from across the world to experience the education, excitement and community-building activities, and were treated to some very high quality presentations.



UBC Professor Carlos Ventura, Co-Chair of the 2008 Structures Congress addresses delegates at the Opening Luncheon

Also new in 2008 was event sponsorship by four cooperating organizations: the Council of American Structural Engineers, CASE; the Canadian Society for Civil Engineering, CSCE; the International Association for Bridge and Structural Engineering,

IABSE; and the Institution of Structural Engineers, IStructE. Each organization arranged technical sessions, advertised the event, and brought in speakers and delegates to create a unique international flavour to this year's Congress.

There were several notable events, including a fascinating talk at the Congress Opening Luncheon on the effectiveness science education and teaching methods, by keynote speaker Dr Carl Wieman of UBC, winner of the 2001 Nobel Prize for Physics. A spellbinding description of the design evolution and construction of the record-breaking Millau Viaduct, the world's tallest vehicular bridge, by its creator, Michel Virlogeux, was given to a packed room of over 200 delegates. Dan Doyle, Vice President, Construction, for the Vancouver Organizing Committee for the 2010 Olympic & Paralympic Winter Games (VANOC) was key-

note speaker at the Congress Banquet. Mr. Doyle described how facilities delivery for the Games is on time and budget. His talk was highly informative, yet amusing, and full of interesting anecdotes concerning Canadian athletes and construction staff.

There were two technical tours organized, together with pre-tour presentations. The Canada Line project consisted of a bus tour along the route, with technical descriptions of the \$1.9 billion project by Canada Line staff, Roger Woodhead and Chris MacCarthy. The Olympic Speed Skating Oval tour featured a visit to the new building, the largest new facility for the 2010 Games, by the designer of the Oval roof, Paul Fast.

IStructE's Joint Division in BC is with the Structural Engineers Association of British Columbia, and the 2008 Structures Congress was SEABC's activity to celebrate the IStructE Centenary. The Institution President, Sarah Buck, attended the Structures Congress, and moderated one of IStructE's two technical sessions for the International Structural Engineering track. The IStructE presentations were:

- Concrete Bridges Form and Function:  
Sungai Prai Bridge, by Srinu Srinivasan
- Exploring the Limits of Structural Glass  
Assemblies, by Tim Macfarlane
- Timber Engineered for C21 Architecture,  
by Michael Dickson
- Bridge Design for Extreme Conditions, by  
David Harvey
- Comparative Studies of the Structural  
Fire Engineering Design of Steel and  
Composite Building Structures, by  
Prof. Roger Plank
- Cutty Sark – The Phoenix of the Sea, by  
Steve Brown
- The Brighton i360 Viewing Tower Project,  
by Dr. John Roberts

The IStructE presentations were well illustrated and the presenters were all experienced speakers. Both sessions attracted a lot of interest from delegates and many favourable comments were made on the qual-

ity of technical information provided by IStructE. Just outside the presentation room, the Institution's display booth, ably manned by CEO Keith Eaton, was doing brisk business. The booth attracted many delegates who were interested in IStructE memorabilia and wanted to know more about the Institution.

The Structures Congress Banquet was held for the first time in 2008, and was arranged as a celebration of IStructE's centenary. President Sarah Buck talked about IStructE's history and role in worldwide structural engineering, while ASCE Executive Director Pat Natale, responded with a call for strengthened cooperation between the world's leading engineering organizations. At the banquet, IStructE signed renewed cooperation agreements with both the American Society of Civil Engineers and the Structural Engineering Institute.

The 2008 Structures Congress took four years of planning and was a massive boost to Vancouver's structural engineering community and to our City. Over fifty BC firms purchased corporate passes, giving over 300 local engineers the opportunity to experience a world class structural engineering conference. Some 25 local structural engineers served as session moderators, and many local firms manned booths in the exhibit hall. We owe a strong debt of gratitude to 2008 Structures Congress Local Steering Committee that spent many long hours organizing the 2008 Structures Congress. It was a superb effort to create a world class event, and a wonderful celebration of IStructE's Centenary.

*by David Harvey*

### **AGM & DINNER DANCE**

The WCGCE Annual General Meeting followed by the Dinner Dance, took place on February 17th 2007 at the Royal Vancouver Yacht Club in Vancouver.

After a wonderful dinner, this year a discothèque was featured, which had everyone

on their feet for classic ballroom dances, Rock and Roll. The more energetic remained on their feet dancing some nifty salsa moves after a little expert coaching.

Thanks are due to Arul Raja and Alan Kay for their great efforts to organize this event. A good time was had by all.

*By Chris Richardson*

## **Upcoming Events**

### **INSPECTION OF THE PHONEBOX**

The inspection of the phone box will take place on  
**Saturday July 26th 2007**  
**at:**

2414 Treetop Lane,  
North Vancouver, BC



**SEE ENCLOSED FLYER**

### **ICE AMERICAS CONVENTION**

**Date** 4th October 2008  
**Location** Desert Research Institute,  
Las Vegas  
**Theme** Sustainability  
**Contact** Simon Gray, ICE US Western Rp.  
[simon.gray@hatchmott.com](mailto:simon.gray@hatchmott.com)

### **FUTURE TECHNICAL MEETINGS** (Watch for a flyer in the mail and Emails with more details)

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**Date** - June nn, 2008  
**Topic** - PACIFIC PRESS Site Visit  
**Location** - Surrey BC

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**Date** Tuesday October 7, 2008  
**Topic** Renewable Energy Opportunities in Western Canada  
**Presenter** Sean Bolongero PEng, MIMechE  
Associated Engineering  
**Location** Holiday Inn, Metrotown

The subject matter fits in very well with our current theme for 2008 of sustainability