



# The Challenge

THE NEWSLETTER OF THE WESTERN CANADA GROUP OF CHARTERED ENGINEERS

## Message from the Chairman



I'm honoured to be given the opportunity to be the new chairman for the Western Canada Group of Chartered Engineers. James Canova has done an incredible job in being the Chairman for two years in a row,

giving our current Vice-Chairman David Harvey the time to take on the very important global role of being the 2006/07 President of the Institution of Structural Engineers.

Now, with new members Scott Fulton (Mechanical) and Timothy Ma (Electrical) on our committee, with the strong perennial support of our other enthusiastic committee members, and with a robust financial position, we have an excellent opportunity to push our group into a successful year of delivering excellent services and programs to our members, currently numbered over 700.

Committee member Arul Raja has graciously stepped into the big shoes of Michael Thornley, our previous technical program coordinator, who is no longer able to discharge those responsibilities due to his health condition. To many of Michael's WCGCE friends, it is heartening to witness the laughter Joan and Michael are adding to each other's life everyday under these circumstances.

At our committee meeting in May, we discussed what we can do to deliver a program that is attractive to more of our members, and relevant to their current outlook. The subject of the engineers' role in sustainability comes up repeatedly. In this regard, we are planning a 'Sustainability in Engineering Forum' in the Fall

2007, inviting as panelists, engineers from both Canada and the UK, and will pitch the discussion on comparing the experience and practices of the UK and Canada. This is a panel discussion which we believe that our group, more than any other engineering group in Canada, is in a strong position to host. Please contact Alan Kay or myself for details.

We would like to hear your suggestions and invite your participation too.

Please also get in touch with me at [wilma@wisa.ca](mailto:wilma@wisa.ca) and let me know of your interest in WCGCE and your vision for our work.

Your 2007 Committee would like to thank you for your continuing support and involvement in the WCGCE.

Have a great summer. We look forward to seeing you, at our Annual Summer BBQ and our annual inspection of a '1950s pattern GPO call box at the Price Residence on July 28.

Kind regards,

*Wilma Leung CEng, MICE, MHKIE*

## In this issue

- Message from the Chairman
- Technical Program Notes
- Sustainability in Engineering
- Current News
- Upcoming Events
- Other Business

**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.

*Chris Richardson, CEng, MIET  
Newsletter Editor*

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

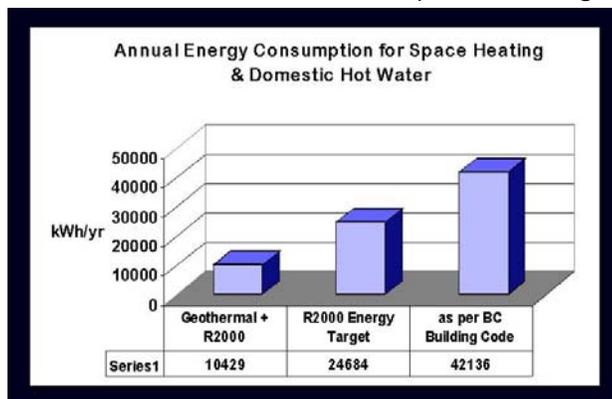
**Technical Program Notes**

**ENERGY EFFICIENT HOUSING**

**24TH January, 2007**

The 20 Members and Guests were given an illustrated presentation on Energy Efficient Housing, by Wilma Leung, C.Eng., MICE, MHKIE. Wilma outlined the different standards and guidelines which are available to assist new home owners in selecting the types of insulation, heating system, windows, appliances and lighting to ensure their new home as a whole is comfortable and healthy to live in.

She showed the criteria for the R2000, the Net Zero home and the Build Green concept with the gradu-



ated evaluation of Bronze, Silver and Gold. The Net Zero house is one in which there is a method of generating electricity such as wind generator or solar panels, which provide at some time more energy than that required by the home. This energy would then be sold to the utility for a credit which would be applied when the house requires the utility supply such as windless or gray days, and dark nights.

Builders have to be certified that they have the knowledge and ability before they can build an R2000 home. This particular program was initiated in the 1980's and has been increasingly accepted since that time. The increased cost of building to

that standard is some 3 to 6% over standard construction.

One of the ways of reducing heating and or cooling energy required is to reduce the amount of infiltration. This has to be done carefully to ensure that there is always adequate fresh air for ventilation and moisture control. The installation of a heat recovery ventilator allows the fresh incoming air to be tempered by the exhaust stale air as they pass through the heat exchanger.

The Energuide system provides a means for consumers to evaluate the efficiency of their appliances such as refrigerators and freezers. With the availability of compact fluorescents much lower amounts of electricity are required for good lighting.

Modern multi-paned windows with inert gas greatly reduces the amount of heat loss through glass areas.

In larger multi-family buildings the LEED system is used to evaluate not only the energy for operating the building, but the energy required to produce the items used in its construction.

Wilma answered a number of questions from the audience then James Canova, our chairman, thanked Wilma for an interesting and informative talk and presented her with our coveted WCGCE umbrella.

*Report by Bob Martin*

**THE CANADA LINE PROJECT**

**14TH March, 2007**

The occasion for the meeting was the presentation by Roger Woodhead Ph.D., P.Eng dealing with the status of the Canada Line, the new rapid transit system currently under construction in Vancouver and Richmond. This is the largest project ever to be undertaken by SNC-Lavalin as a Prime Contractor and the largest Public/Private Partnership in British Columbia. The system will differ from the existing rapid transit in that the units are of the third rail rather than induction type. The correct designation is "Automated Light Metro System". Units will be driverless.

Roger used a series of slides to illustrate the work in progress and the route that is being followed from the downtown Vancouver Terminal, under False Creek, along Cambie Street, across the Fraser River and down #3 Road in Richmond. He de-

scribed in some detail the problems that have been faced such as the supporting of the buildings along Granville Street on either side of the excavation, the double-decking of the narrow sections of Cambie Street, the use of special Frankie Piles under the footings for the bridges across the two arms of the Fraser River, the temporary bridges across Cambie Street to minimize disruption of traffic and the relocation of existing utility lines. The Fraser River bridges were of particular interest in that they will be cable stayed but with the middle section precast, lifted into place, connected to cables at piers on both



**Skytrain approaches Vancouver Airport**

ends and the whole deck pre-stressed in order to take load. The method of construction was used in order to keep the profile as low as possible due to the bridges being on the flight path of incoming aircraft. The portion of the line at the Richmond end will be elevated on piers and

will include a branch line running out to the Vancouver International Airport. The Terminal at the Airport is in the new extension and is already at the point where it and the connecting line to the Fraser River Station will probably be used as a test section. Total length of track is 19 kilometers of which 2 km is bored tunnel, 7 km is cut and cover, 8 km is elevated, and 2 km is at grade. Water crossings make up 3 km of the total. There will be 16 stations in total, 8 of which are underground, 6 elevated and 2 at grade. The Operations and Maintenance Center is located under the Richmond end of the Oak Street Bridge and is presently under construction.

Roger then dealt with the economics of the project. This is a Lump Sum Contract with a bonus clause for finishing on time but with no penalty clause. Opening date is November 30, 2009. The successful bid was predicated on a cost of no more than 1.9 billion dollars and included operation of the system for a period of 35 years. The cost of operation was predicated on an estimated 100,000 riders per day, which equates to the traffic on 10 of the city's traffic lanes. The lead agencies are the Canada Line Co. (CLCO) and the Greater Vancouver Transit Authority. The Concessionaire is InTransit BC, composed of 1/3 SNC, 1/3 BC Government Pension Fund and 1/3 B.C. Government.

Wilma Leung, our chair, thanked Roger for an interesting and informative talk and presented him with one of our coveted WCGCE umbrellas.

*Report by: Bob Martin*

## **PRESIDING OVER THE I STRUCT E.**

**11TH April, 2007**

The Technical presentation which took place at the Arbutus Club, Vancouver, was by David Harvey, C.Eng, P.Eng, who is currently the President of the IStructE in London. He is the second president of the IStructE who is not a resident of the U.K., the first president from overseas was an Australian.

David outlined the activities he has been involved in as the current president in visiting the various branches and divisions of the Institution both in the UK and overseas. He illustrated his talk with a PowerPoint presentation showing the people he met and the projects he has had the privilege of viewing.

He visited the suspension bridge over the Firth of Forth in Scotland, which has corrosion problems with the cables. He also showed a bridge that was designed by Brunel over the River Dee at the entrance to Balmoral Castle the residence of the Queen when she spends time in Scotland.

**Ready to ascend the Firth of Forth Suspension Bridge**



Keith Eaton (IStructE CEO)  
David Harvey (IStructE President)  
Bill Smart (IStructE Scottish Branch Chairman)  
Alex Tait (IStructE Scottish Former Branch Chairman).

David's overseas visits included Hong Kong, Singapore, and the four main cities in India, after which he flew to

Vancouver to describe his presidential year to the WCGCE. He saw a number of very large bridges and buildings under construction in those areas, some of the projects having capital costs in the billions of US\$.

After the presentation he answered a number of questions from the audience. At the conclusion of the questions he made certificate presentations to local structural engineers (P.Eng.) who have become new members of the IStructE and who have passed the IStructE examination required by APEGBC for them to be recognized as Structural Engineers of Record.

Our chair, Wilma Leung, thanked David for his interesting and wide ranging presentation. David is also the current vice chairman of the WCGCE.

*Report by Bob Martin*

**THE SYSTEMIZATION OF THE WOOD-FRAME CONSTRUCTION INDUSTRY**

**16th May 2007**

The Technical presentation was by David Fisher, Senior Vice President of Mitsui Homes Canada Inc. The company is based in Langley B.C., just East of Vancouver, and is a wholly owned subsidiary of Mitsui Homes Co. Ltd. Japan.

David outlined how they manufacture to close tolerance the panels which would normally be constructed on site when building a wood frame house.



**Framing progresses along production line of the Mitsui Saitama Plant Floor in Japan**

The advantages include better working conditions in all weathers, minimum waste in cutting the framing wood and Oriented Strand Board (OSB) or plywood panels, machine nailing and gluing of exterior panels to the frame.

The panels are designed based on the drawings provided by the customer, and windows can be installed in the panels as well. 3D modeling is used to ensure the panel sizes and location fit properly. No wiring or plumbing is included as this still has to be done in the field.

All panels are double checked for dimension and squared before being shipped. If the panels are large a crane is required to assist in their installation. The base on which the panels rest also has to be square to ensure the panels all fit together correctly. If the concrete sub wall is not square a small pony wall has to be made to provide a level base.



**Assembling a House in Tokyo in 24 hours**

The company claims that it can install a complete house framing in less time than skilled conventional framers doing it in the field. As the cost of shop labour is almost half the field labour the savings can be substantial. Their goal is to

allow the builder to do it in one third to one half the normal time with a smaller crew. The roofs of the Japanese houses are made from 6" insulated panels. The roof framing has to be carefully de-

signed to conform to the load transfer points in the framing.

The talk was illustrated with a PowerPoint presentation showing the various stages of construction.

David answered a number of questions from the small but very interested audience of 20 then Wilma Leung thanked the speaker and presented him with one of the coveted WCGCE umbrellas.

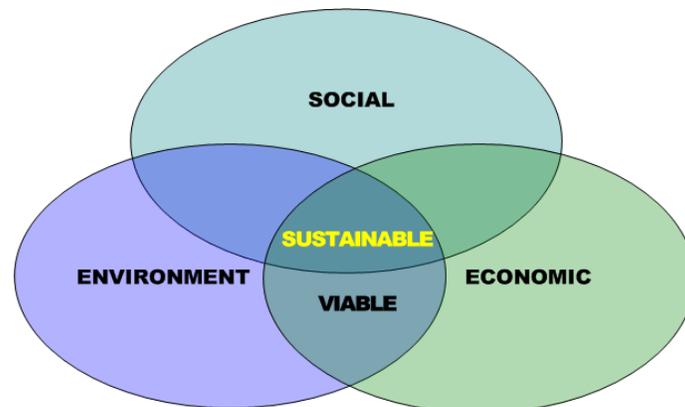
*Report by Bob Martin*

**SUSTAINABILITY IN ENGINEERING**

*“Sustainable Development.... is defined as balancing the fulfillment of human needs with the protection of the natural environment so that these needs can be met, not only in the present, but in the indefinite future” (Brundtland Commission)*

Is sustainability a fashion of the month issue? We are constantly bombarded by slogans and concepts, dreamed up by those who wish to make a point. However, in this case, sustainability is not just a name given to a concept but a far reaching paradigm in the evolution of mankind. The engineer has an ever increasing responsibility and influence relating to the sustainable development of the infrastructure on which our way of life depends.

Previously governed mainly by economic viability, industry is increasingly confronted by the need to consider their activities in relation to social and environmental concerns as well as profitability. In developing and assessing projects the engineer must balance the competing concerns as indicated in in the diagram.



The balance between economic and environmental concerns will determine viability which may only be in short term. Consideration of all three issues will contribute significantly to sustainability in the

long term. Many organizations have now adopted the "Triple Bottom Line" approach to making better business decisions in the understanding that what happens in one area has effects on the others. BC Hydro, in particular, has been in the vanguard of organizational commitment to a path of sustainability whereby performance is balanced, tracked and measured along social, environmental and economic bottom lines. Planning and design of projects must include plans for environmental protection and consultation with community groups and other stakeholders that may be affected by the probable and possible consequences of the project both in long and short term.

The "Guidelines for Sustainability" published in 1995 by the Association of Professional Engineers and Geologists is dedicated to the concept that sustainability is fundamental to the future work of the membership. The guidelines delineate each member's particular tasks and responsibilities in the exercise of professional judgment.

In the planning and design stages of each project or task the Engineer is responsible for considering the social and environmental consequences as well as economic viability of the undertaking. All possible issues must be identified and dealt with through mitigation or alternate approaches. Furthermore, the responsibility extends into the construction, installation and maintenance phases to ensure that sustainability is protected.

"Sustainability in Engineering" will be the theme for our technical meetings during the 07-08 program. We are hoping to start off with a panel discussion with prominent practitioners and follow-up with a variety of speakers and subjects including both proponents and critics.

*Submitted by: Alan Kay, MICE CEng P.Eng*

## Current News

### AGM & DINNER DANCE

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

The band as always, Route 66 were in fine form and kept everyone on their feet, this time with a wonderful mix of lively ballroom dancing and haunting jazz classics. A good time was had by all.

Thanks are due to Alan Kay for organizing this event and for coordinating the reservations, and to Arul Raja for co-ordinating the catering.

## Upcoming Events

### INSPECTION OF THE PHONE BOX

The inspection of the phone box will take place on

**Saturday July 28th 2007**

**at:**

2414 Treetop Lane,  
North Vancouver, BC



**SEE ENCLOSED FLYER**

### ANNUAL FIELD TRIP

**September 15th 2007**

**SEE BELOW—WATCH FOR MORE DETAILS**

#### **VICTORIA SHIPYARDS**

Victoria Shipyards operates the largest ship repair complex on Canada's Pacific Coast, and we will get to visit them.



#### ESQUIMALT GRAVING DOCK

361.5 metres (1,186 feet) overall length  
358.6 metres (1,176 feet) maximum clear inside length  
38.4 metres (126 feet) wide

#### CRANES

Krupp Level luffing crane - 150 tonne capacity  
Colby Hammerhead crane - 45 tonne capacity  
Ebco Level luffing crane - 30 tonne capacity  
Hyster mobile crane - 9 tonne capacity  
Grove mobile crane - 20 tonne capacity

#### SHOPS

Machine shop Pipe fabrication and welding  
Joiner shop Steel fabrication and welding  
Steel assembly and sheet metal  
Sandblasting booth

## Other Business

### **WCGCE Bursary**

The WCGCE 2007 student bursaries have not yet been awarded. Names of recipients will be published in the next issue.