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The ChallEnge

THE NEWSLETTER OF THE WESTERN CANADA GROUP OF CHARTERED ENGINEERS

Message from the Chairman

Here it is, a summer edition of the Challenge thanks to hard work of **Dick Perry**, our newsletter editor. I hope that you will enjoy reading this issue, find useful information about the group activities and get inspired to participate in our programs. For the last six months the Committee has been focusing on three main areas. **Alan Kay** has been spearheading our outreach program to increase awareness of Western Canada Group of Chartered Engineers activities among young engineers and students. **George De Ridder** has been working hard on delivering high quality technical program and coordinating efforts on redesigning our webpage. This year we had a number of outstanding speakers who presented very diversified and interesting topics. The second half of the year also looks very exciting; please check our website for details. I encourage every member of WCGCE living in the Vancouver area to take advantage of this excellent opportunity to learn by participating in our technical program. It is free and it is fun! You also have a chance to network with new people and meet old friends. We have made a substantial progress in redesigning our website and I'm hoping that by the time you read this newsletter our new website will be available on-line. Last year we started recording Technical meetings. These videos should be available on-line once the new website is up and running. With a great sadness we learned in February about the death of our friend **Aria Ganesan.** He was a Chartered Electrical Engineer and a member of the Instituion of Engineering and Technology (IET). For many years Aria was a very active member of the WCGCE and made many valuable contributions to our group. Please read Aria's obituary written by his lifelong friend **Arul Raja.** I would like to take this opportunity and introduce new Committee members who joined us recently. **Marina Li** has been elected as the Honorary Treasurer of the WCGCE during the last AGM. She is a Chartered Civil Engineer specializing in Geotechnical Engineering and has been in engineering consulting for 10 years. Marina relocated to British Columbia with her family in February 2012. She is very passionate about collaborating with young people and fellow

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engineers. In her spare time she enjoys venturing the great outdoors of Canada.

Kris Gadareh is a Fellow of the Institution of Mechanical Engineers (IMechE) and also the IMechE representative for Western Canada Region. His background is in education and in research and development in the Biomedical Engineering field. Kris research interests are in the application of mechanical engineering in rehabilitation and neurology.

Andrzej Nawrocki MIET

Annual General Meeting - 2013

Professor Andrew Weaver was the **Keynote Speaker** at the **Annual General Meeting** of the **WCGCE**. He gave the audience an interesting illustrated talk on the arguments regarding the subjects of **Climate Change** and **Global Warming**. His initial charts and tables illustrated the bias relative to political preference in the USA. **Democrats** are more likely to believe that change is taking place, whereas the **Republican** supporters, mainly in the **Southern States** are much more likely to deny that its happening. Divisions by sex or education are more balanced in the division of support or scepticism. **Canada** is, in the main, more agreeable to the premise across the country. He discussed with illustrations from newspaper clippings, the subtle influences that the media reporting plays in presenting scientific data and in the interpretation of data. He illustrated the apparent indifference of young generation voters and compared it to the high participation by senior voters, a situation which causes much concern when it comes to policy direction relating to climate change. 70% of people with ages in the 60's show up to vote as compared to only 35-40% of those in the 18 to 25% groups.

He talked about the **Greenhouse Effect**. This has increased because of **CO2** and other **Greenhouse Gases**, **Methane** and **Water Vapour**, which was noted as far back as the 1700s by **Fourier** who noticed that the sun's energy entered the atmosphere quite readily, but that heat radiation from the ground could not radiate back out into space. Later scientists worked out that the longer infrared energy from the re-radiation was absorbed by the water vapour in the atmosphere. He also commented that the best way to control the CO2 would be to have some kind of carbon tax, similar to the one in B.C., which is cost neutral.

He also noted that atmospheric temperature readings by **Climate Modelling** studied around the world have, consistently, arrived at a 1.5 to 4.0 C increase due to the **CO2** increasing in the atmosphere over the next 40 years. The reduction in the summer ice coverage in the **Arctic** has been well documented and published in journals, magazines and the media. Winter ice is now so thin that the summer heat and increased albedo of the open water has increased the rate of melting to the point that ships can now traverse the arctic during the summer months, particularly through the **NE Passage** adjacent to **Russia**.

He provided numerous tables and illustrations of the seriousness and need to act. The **Kyoto Accord** may have been implemented, to some extent in **Europe**, while **North America** has done very little implementation. **China's** rapid industrialization and massive building of electrical power generation plants, primarily coal, has accentuated the situation to the point that it is rapidly becoming the biggest world source of greenhouse gases. **Europe** has invested extensively in alternative electrical generation in order to reduce its dependence on coal and is using more natural gas and, as well, subsidizing solar and wind power generation.

George De Ridder FIStructE
David Harvey FIStructE

Obituary

June 9, 1929 - February 1, 2013

Aria Ganesan MIET

After several months of bravely battling illness, **Aria** passed away on **Friday, 01 Feb 2013**.

Remembered by his **wife Padma**, **son Dushyenth and daughter, Sri Bhavani**.

Aria was born in **Malaysia**, grew up in **Sri Lanka** (**formerly Ceylon**), and qualified as an **electrical engineer** in **England** after attending **Brighton Tech**. He immigrated to **Canada in 1965**, and worked at **BC Hydro, in Vancouver and Hudson Hope** until the early 70's. He then went to work in **Brazil** for about four years, and later to the **Philippines** to work for the **Asian Development Bank**. He returned to **Vancouver** after about nine years, and settled in **West Vancouver**.

He enjoyed travelling and socializing with friends in **Europe, UK, S/E Asia, India, Sri Lanka, Australia, South America and North America**.

He was a **Committee Member of the WCGCE** for several years

Arul Raja MIET

Technical Program Notes

John Holland, C.Eng., LEED[R]AP, FEC, Pres. PHH ARC Environmental Ltd.

March 20, 2013

The Emerging Role of The Engineering Consultant - How to Find And Deliver Value

The speaker was introduced and again thanked at the end by George De Ridder. 22 persons attended. No video recording was taken.

In summary, the speaker explained that engineering consulting companies are expected to be more and more involved in many disciplines, as the scope of work has become greater with increasing inter-disciplinary complexity in recent years. Environmental considerations require a holistic approach, calling on all engineering disciplines. A more complex business model is required, and the P3 model is becoming popular, particularly in government partnerships. The role of the engineer has become more central and a greater role in order to ensure technical, financial, environmental and social success of the projects.

The following suggestions were gained from the speaker's experience…

- Expect a higher and wider degree of diligence than traditionally. In many instances, the engineer's fundamental training boundaries will be exceeded.
- Know your subjects, grow in knowledge, draw boundaries and stay inside your area of competency.
- Know your value; is your fee lower than the client's benefit? Clients must obtain the right value for your billing.
- Manage cash flow; bill what's done when it's done.
- Regulator and regulations are your friends. Understand what they want.

- Understand the vectors of economy; energy (oil, gas), real estate, community.
- Be aware of political cross winds; environment, energy, forestry, transportation.
- Uncertainty is your friend; modern codes allow interpretation, however more risk or uncertainty. Always assess the risk.
- Frequently re-state the problem(s): what, why, how, who, when?
- Simplify solutions, but beware of simplistic (missing first problem) solutions.
- 3 Essential tools for every project: sketch(es), budget, time-line.
- Express solutions in client's language (jargon, lexicons).
- Understand client's pressure point; his due diligence, his mandate, his boss.
- Publish solutions.
- Read wide; journals, conference papers.
- Work with competent peers you.
- Always be ethical to everybody; bad news travels faster and wider than good news.
- Be amicable and promote a sense of engagement with people.

George De Ridder FIStructE

New Pitt River Cable-Stayed Bridge

Craig Schaper, C.Eng. P.Eng.
Associated Engineering, Burnaby, BC

April 17, 2013

Pitt River Cable-Stayed Bridge

Design & Construction

This interesting talk was presented by **Craig Schaper**, **P.Eng., PE, C.Eng., MIStructE**, who is a **senior bridge engineer** at **Associated Engineering**. Craig coordinated the design-build submissions and was the lead independent check engineer for **the 380m long Pitt River Cable-Stayed Bridge.**

The Gateway Program, initiated by **BC Ministry of Transportation and Infrastructure** in 2006, was the context of the **Pitt River Cable Stayed Bridge** project, which was one of the first crucial links to be implemented in this program. As part of a design-build project, this 506m continuous river bridge included approach spans and a 380m cable-stayed portion with a 190m central span. The 40m wide bridge required a unique stay arrangement of three cable planes. The overall **Mary Hill Interchange project** cost was around $200 million, of which **Pitt River Bridge** was approximately $120 million.

During the concept development, the design needed to accommodate construction within a mere 65m space between the existing bridges (with central swing spans), and account for 100m deep foundations

through liquefiable soils with seismic and large ship impact forces of 40MN. Not a small challenge! There were two potential solutions, a steel haunched girder bridge and a cable-stayed bridge, selected due to its advantage of eliminating two expensive river piers. A further advantage was possible construction of the deck from above without interruptions from to traffic. The deep foundations included 1.8m diameter piles, for which a static load test of up to 45MN (10,000 kip) was conducted. The river foundation pile cap was constructed in three parts, with precast concrete panels forming the first stage to ensure economy, while protecting the environment with positive containment of concrete pours.

Focusing on some design aspects, it was mentioned that a cable-stayed bridge on a site with deep compressible soils was only made feasible by considering the whole structure as an integral unit. The approach and main spans work together via a continuous deck diaphragm to achieve a more efficient overall structure. This allows the pylons and approached span piers to provide a stiff structural response in the transverse direction. An economical cable-stayed system was developed with relatively short spans for a cable-stayed structure, using a "stiff pylon flexible girder" configuration. In turn, the light steel framework required less specialized erection procedures, resulting in a more economical solution. Economy was further achieved through repetition, using standard sized 10m deck modules, with stay support every 10m, cross-beams at 3.3m centers, and almost full-depth precast panels between cross-beams.

Reviewing the main construction activities, pictures and time-lapse videos were presented to describe the balanced cantilever construction method used for the cable-stayed spans, and to show the pre-stressed girder approach spans which completed the 506m long integral structure. The design-build Construction schedule included a competitive bid period in the second half of 2006, with construction bids submitted in November the same year. In a pre-design phase, after a limited notice to proceed in January, 2007, the pile design was finalized to allow the piles to be ordered, milled and fabricated in time for piling starting in June. The final design of the bridge commenced in March, 2007, and overlapped with the construction and fabrication. The bar chart presented, illustrated that the successful opening of the bridge to traffic in November, 2009 was only made possible with good planning, the overlap of the final design, fabrication and construction of the various elements, including the foundations, the substructure, pylons, deck, cables, approach span, and deck overlay.

George De Ridder FIStructE

Catherine Roome, P.Eng. FEC

President and Chief Executive Officer, BC Safety Authority

May 15, 2013

The topic for the evening was the BC Safety Strategy as it relates to Risk Management as it applies to the work force and was presented as a slide show. Catherine received her degree in Electrical Engineering from the University in Victoria and is, already, the recipient of several business and leadership awards. As President and Chief Executive

Officer she is focusing on ensuring safety throughout industry in British Columbia. Her representation consisted of a series of slides interspersed with questions and answers from the audience.

The initial goal of BCSA is to advance the understanding of the Safety Risks and the development of optimal means to manage them. Demonstration of achievement is obtained by learning from incidents and assessments, sharing the information obtained and applying the knowledge to address further unsafe conditions. The accident prevention model is the belief that, on the whole, people rely on information technology. The overall plan is to build confidence in support of the BCSS Plans for the future. The Risk Macro begins with Probability. The plan, initially, is to build up a Technical Risk Registry using an Algorithm for the risk attached to each Assessment. A library will be set up describing each 'as found' condition and the Assessment filed in categories labeled under a range from Critical to Low with a description of the each type. This list category will be further broken down into Elevating, Electrical, Boilers & Pressure Vessels, Refrigeration Equipment, Gas Equipment, Ropeways, Amusement Park and Railways. The Technical Risk factors in each category will be broken down into Technical Risk Categories. The Risk Factors have already been assigned to these categories. As an example, the Algorithm for Gas will now include the Permit Risks and Gas Fitter Risks. When scoring, the candidates abilities will include Permit Class, Appliance Type, Prior Disciplinary Actions, Previous Inspection Rejections, When Last Inspected, and the Hazard Assessment upon Inspection.

The Business Sequence will be very simple. The Contractor takes out a permit and, on completion, the Contractor asks for an Inspection and the project is assessed.

Richard P. Perry FIMechE FCIBSE

Message from the Editor

I would like to thank everyone who has contributed reports to our technical meetings and other activities. Members should know to refer to our web site, **www.wcgce.org,** managed by **Tim Ma,** for current activities and to see back issues. **Challenge available by e-mail in pdf format.** Just e-mail **Editor** to receive it this way in the future and save on time, printing and postage.

Richard Perry, C.Eng., P.Eng., F.I.Mech.E., F.C.I.B.S.E.
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Upcoming Events

The Annual Barbeque Meeting will again be hosted by the Sea to Sky Branch of the Association of Professional Engineers and Geoscientists of BC at the Vaughn Residence in West Vancouver. For those that were at last years occasion you will remember that we had a number of distinguished guest including two Provincial MLAs, a Federal Member of Parliament, a Past President of APEGBC and 50 engineers and guests, 20 of whom were Members of WCGCE. There was plenty of food for all so come along and enjoy the outing. Date and time for the occasion is Saturday, July 20, 2013 at 3:30 PM.