



The Challenge

THE NEWSLETTER OF THE WESTERN CANADA GROUP OF CHARTERED ENGINEERS

Message from the Chairman



If you look at the last page of this newsletter, you will see that during 2006 the committee gained two new members – Mr. Timothy Ma (MIET, formerly MIEE) and Mr. Scott Fulton (MIMechE). We are glad that they have joined us. If you wish to join the committee, please contact Richard Perry (rperry@telus.net, 604-731-1402) or just come to the **AGM** which will be held in **February** this year at the **Royal Vancouver Yacht Club**. Don't forget the Dinner Dance that follows. Contact Alan Kay (alan.akay@shaw.ca, 604-922-6150) for tickets.

If you do wish to become involved, there is an immediate need for assistance on the committee arranging technical presentations and visits. Long-time committee member and program organizer Michael Thornley is still dealing with the effects of a stroke he suffered during October 2005. This has left committee member Arul Raja with the additional responsibility of contacting potential speakers and making all arrangements for the presentations by himself. This is a very heavy load for one person.

This year the Group held six technical presentations, plus organized a field trip to Britannia mines just North of Vancouver and a field trip to Vancouver International Airport. At the mine, we toured a facility for neutralizing acidic water seeping from the now unused mine shafts into Howe Sound. More recently, Brendan Henry (MICE), Chief Engineer for the Canada Line, gave an excellent presentation on the tunneled portion of the Canada Line. Coming up in 2007, tentatively, we will have a speaker on the cut-and-cover portion of the Canada Line. Watch the website (wcgce.org) for details.

Keeping with tradition, the Prices hosted the annual *Inspection of the Phonebox* in August at their home in North Vancouver.

The major event of the year was a joint visit by the ICE and IMechE executive in May. Vancouver was one stop on a tour of North America for the executive to gather opinions from the North American members on the proposed merger of the two Institutions.

Three WCGCE awards of \$500. each were awarded to local undergraduates completing their 3rd year of study of the four year Bachelors of Applied Science program at the University of British Columbia, Vancouver, BC. In 2007 there will be four such awards of \$1000, the fourth for a student in Chemical Engineering.

There has been increased contact with members and potential members in Washington State. Two professional interviews for IMechE candidates are scheduled to take place in Vancouver early 2007. Also, Honorary Secretary, Bob Martin, was contacted by a member in Washington State wishing to become involved with the Group.

Increased involvement of Washington State members in the activities of the WCGCE is greatly encouraged. With most of WCGCE activities occurring in Vancouver, BC, Seattle, in Washington State, is the most geographically accessible, large group of WCGCE members. Hopefully, this year ties with Washington State will continue to

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grow. There has been talk of a field trip to Seattle, possibly to the Boeing factory, which would be a good opportunity for the Canadian and US members of the WCGCE to get to know each other.

It has been my privilege to have served as the WCGCE Chairman for the past two years. A new Chairman will be elected at the AGM in February. I hope to see many of you at the AGM and Dinner Dance.

Best Wishes for 2007,

James Canova, P.Eng. C.Eng. MIMechE

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, C.Eng. MIET

Newsletter Editor 2006

email: backwater@telus.net tel:604-879-9980

Technical Program Notes

Vancouver International Airport

June 20th, 2006

A tour started at 6:00 pm, and was arranged by David Harvey and Arul Raja to tour the



Bob Cowan P. Eng. VP
for Engineering at YVR

new construction underway at YVR, the Vancouver Airport. Because of security concerns everyone on the tour had to have picture ID, which, for most, was their driver's license. Our host was Bob Cowan, Vice President for Engineering for

YVR. To start the visit he gave a power point presentation which outlined the ongoing growth of traffic at the facility which is currently handling some 16 million passengers per year. It has had a steady growth close to the numbers estimated in 1992, and except for the downturn due to 9/11 and the SARS scare it has been increasing every year. The SARS scare had a greater effect on Vancou-

ver than 9/11 because of the high Asian passenger numbers going through the terminal. The improvements underway are estimated to cost some \$800 million and the project is on time and on budget.

The West Wing is the new extension to the international terminal and will add some 14 gates. The first part is being built at present and will cost about \$200 million. Included in this addition will be a large aquarium tank which is being built with assistance from the Vancouver Aquarium and will be designed to house rock fish native to BC, which will provide a place to research these fish. Also to be introduced is eye iris scanning technology for Nexus (fast-track) security clearance for international business travelers to speed up their flow through the terminal. There will also be a set of solar panels on the roof to provide hot water during the summer months.

The new Canada Line rapid transit system will terminate at the air port at a Link Building between the International and Domestic Terminals. Passengers will be able to check in downtown instead of at the airport. A train is planned to arrive and leave the terminal every 6 minutes. The line terminal will be at an elevated station one level above the current building height. The trains will also be able to serve the new terminal buildings proposed for completion in 2015 to handle the increasing passenger load. A taxiway bridge will cross over the Canada Line tracks just before the line reaches the terminal to allow aircraft to take a short cut.

Bob then showed a computer generated animated walk through the new terminal additions.

The Domestic Terminal, next to the Link building, will also be getting an upgrade. A new tray type luggage handling system is to be installed where each bag will be in its own tray to reduce possibility of damage during

transit. A special passageway is to be constructed to speed transfer of passengers arriving on international flights to their connecting domestic flights. For the Air Canada Jazz short haul local flights there will be a special gate, C38, which will load passengers from the tarmac.

After the introductory presentation and answering questions, Bob escorted us to a bus which took us around the arrival side of the terminal to get inside the operational side of the airport. Here everyone had to show photo ID before being allowed entry. We were then shown the various changes actually taking place. One interesting item was the special passenger loading bridge for Westjet which goes over the wing to access the rear loading door. We were then shown the progress of the building construction for the Link Building and the West Wing. In all the construction areas the contractor crews are segregated from the rest of the airport by a chain link fence topped by barbed wire for security purposes. Another innovation currently in use is a special area for cruise boat passenger where busses can be parked to allow US passengers to go directly from the flight to the boat without going through Canadian Customs.

We had an excellent presentation and tour and our Chairman James Canova thanked Bob Cowen for his interesting presentation. A coveted WCGCE umbrella will be presented later.

Report by: R Martin, P.Eng. MIMechE

BRITANNIA MINE WATER TREATMENT FACILITY

September 30th, 2006

The occasion for the meeting was a visit to the Britannia Mine some 60 kilometers north of Vancouver close to the shores of Howe Sound. This copper mine was by 1929 the largest in the British Empire, but was closed in November 1974. The leaching of copper and other metals from the mine due to rain water seepage polluted the foreshore and some kilometers offshore causing a die-off of any sea life. These

environmental concerns were finally addressed about a year ago by plugging all the adits into the mine and piping the accumulated water to a water treatment plant operated by EPCOR, which has a 20 year contract to design, build, finance and operate the plant.

The water from the mine has sufficient head to operate 2- 110 Kw micro hydro generators which are almost enough to provide all the power to operate the plant, as the effluent is piped to the plant. The 5 billion liters/year (1.3 billion gallons per year) of liquid are treated with 2000 tonnes/year of High Density Lime. Some 250 kg/day of copper and 300kg/day of zinc are removed as metal hydroxide precipitate. Up to 100 m³/h of contaminated water can be pumped and treated by the plant. The other chemical used is potassium permanganate.



300psi Filter Press

After the sludge is removed from the treatment tanks, it is transferred to a settling tank and from there the settled sludge is passed through a filter press which uses 3000 psi to dewater the sludge. About 2200 dry tonnes/year of sludge are produced. This is eventually disposed of in the Jane Basin some 11 km up the mountain. The dry material is very stable and tests have indicated that there is no further leaching of the metals. Beside copper and zinc, the sludge also contains iron and aluminum. Removing and recovering the metals has been attempted, but because of the mix has not succeeded.

Our guide Ian McKinnon supervises the plant which has a small staff of only five. It is all automated and except for cleaning out the sludge and the dry material can be remotely controlled by computer.

James Canova, our chairman, thanked Ian for an interesting and informative tour and presented him with our coveted WCGCE umbrella.

Report by: R Martin, P.Eng. MIMechE

BORED TUNNEL SECTION OF THE CAN-ADA LINE

October 25th, 2006

Presented by: Brendan Henry, C.Eng. P.Eng. MICE

The occasion for the meeting was a presentation by Brendan Henry on the status of the boring of the tunnel for the new Canada Line rapid transit system. It runs under False Creek and into the Vancouver downtown core, to eventually join up with the existing Sky Train system.

Brendan used a series of illustrations to show the equipment and route from the south side of the Creek to the downtown core. The overall length of the bored section of the line is about 2.0 km and runs through a mix of glacial till which includes some large boulders which temporarily stop the boring until they are removed.

They have been making very good progress considering they have to dodge the foundations of some of the existing buildings which are in the path of the tunnel, sometimes with very little clearance.

The drilling machine is about 200 feet long and consists of a rotating cutting head about 5.5 meters in diameter, a shield and then the machinery to rotate the head and propel the unit forward. The debris formed by the cutting action is picked up by a screw conveyor which deposits it on to a belt conveyor that moves the material back to a hopper. The hopper is picked up by a train unit that transports it back to the tunnel entrance. There it is lifted up by crane and deposited into a barge in False Creek, which transports it to the deeper section of Georgia Strait for disposal.

Brendan also discussed the rest of the system under construction. The whole line is some 19 km long and runs from downtown

Vancouver to the Airport on Sea Island south of the city. The line consists of some at-grade sections near the airport, then it goes on to an elevated section which goes over and under some bridges before



Preparing the Boring Machine

crossing the North Arm of the Fraser River. As it goes up Cambie St, it enters the tunnel section which is being constructed using a cut and cover procedure until it reaches the bored tunnel under False Creek. Currently the cut and cover operation is taking place simultaneously at various sections along Cambie St. causing great traffic confusion as it is taking up the three east lanes of the 6 lane road.

The excavation has required the existing buried utility lines such as water and sewer to be either supported by temporary bridges or re-located—one being a 43 inch water line running from the Queen Elizabeth Park south to Richmond.

James Canova, our chairman, thanked Brendan for an interesting and informative talk and presented him with our coveted WCGCE umbrella. We had a turnout of 25 members and guests.

Report by: R Martin, P.Eng. MIMechE

CITY OF VANCOUVER TRAFFIC CONTROL CENTRE

November 2006

Presented by: Winston Chou, P. Eng.

Members assembled at the Vancouver City Hall at 3:30 pm for a presentation by Winston Chou P.Eng., of the Traffic Management Department of the Traffic Control Centre for the City of Vancouver.

As the control room was quite small, only 20 members, on a first come basis were allowed to participate. The control room houses a number of computers, nine small monitors and four large monitors which show the view from twelve cameras located at key street intersections in the city. Four of these cameras can be moved and zoomed to see more area and detail as required. Another monitor shows a map of the city with all the intersections which are controlled by traffic signals, illuminated on the screen as green lights.

If there are problems at an intersection, that light will turn red or extinguish so that the maintenance crew can be alerted to attend to the problem. The average cost to install one pedestrian crossing controlled light is about \$85,000.

Winston noted that the city council has prioritized signals in the following descending order; pedestrians, cyclists, mass transit and then cars. Many of the intersections have pedestrian controls. Certain busses can also activate the lights to bias their frequency and the city is looking at automating the use of controls to adjust the lights where busses are running late due to traffic problems. The maintenance budget for the system is in the order of \$80,000.

Winston answered a number of questions from the members and there was discussion over the priorities of cyclists, who don't all obey the traffic signals, but tend to breeze through stop signs. Citizens can access the web site at www.roadahead.ca.

James Canova, our chairman, thanked Winston for an interesting and informative talk and presented him with our coveted WCGCE umbrella. We had a turnout of 15 members and guests.

Report by: R Martin, P.Eng. MIMechE

Current News



Inspection of the Phonebox July 2006

The "phonebox inspection" took place on Saturday 29th July 2006

after the July meeting of the executive. It was duly inspected by the various professions and found to be in good order.

After the BBQ, as usual, some wonderful deserts were offered with whipped cream, and tea and coffee appropriately fortified.

Again, a vote of thanks and appreciation for our host and hostess, Ian and Jane Price, for their hospitality.

Report by: Chris Richardson

Upcoming Events

AGM AND DINNER DANCE

The **Annual General Meeting** will take place at the **Royal Vancouver Yacht Club**

Date: Saturday 17th February 2007

Time: 5:30pm

The **Dinner Dance** will follow at **7pm**.

Guest and spouses of members attending the AGM may join an informal reception prior to the dance.

Contact **Alan Kay** for tickets at 604-922-6150 or alan.akay@shaw.ca

-SEE ENCLOSED FLYER-

Other Business

WCGCE Bursary

The WCGCE student bursaries have been awarded to the following deserving candidates:

Hamidreza Ahmadian in Civil Engineering

Naom Davidson in Mechanical Engineering

Ryan Michael Wallace in Computer Engineering

The editor and executive of the WCGCE extend their hearty congratulations to these three recipients and wish them every success in their future careers in engineering.