

# Canadian Geotechnical Society Notice

The Kingston Chapter  
of the  
Canadian Geotechnical Society  
invites you to a luncheon on:

**April 14, 12:00 PM**

at the

**Kingston Brewing Company (Brew Pub)**

**Don Hayley** will be presenting:

## **Ice Road Truckers and the Geotechnical Engineer**



### **Luncheon pricing will be:**

\$15 for paid CGS members

\$10 for student CGS members

\$20 for non-members

\$14 for student non-members

**Lunch is included in this price!**

Please RSVP Melissa Chappel at [chappel@ce.queensu.ca](mailto:chappel@ce.queensu.ca) by **April 9<sup>th</sup>**.

## Presentation Summary

Winter roads have a long history of use by provincial and territorial transportation departments to provide seasonal access to remote northern communities. There is also a history of their use for harvesting resources such as timber and fish. More recently, winter roads are contributing to the national GDP as well as that of some provinces and territories by providing vital resupply links for large-scale resource development. The most notable is the Tibbitt to Contwoyto Winter Road (TCWR) that services three operating diamond mines in the Lac de Gras region of the Northwest Territories, some 400 km from highway end east of Yellowknife. These roads typically follow old trails with a route comprised of interconnected lakes or rivers together with overland portages. The winter road to Lac de Gras has the greatest utilization of heavy haul trucks of any ice road in the world. The concept of trucking heavy loads at high frequency over floating lake ice on the TCWR was intriguing enough to the general public to have spawned a well know television series on the History Channel: "Ice Road Truckers". This presentation examines the role of the geotechnical engineer in dispelling some of the safety myths and recent progress in managing the safety of those workers travelling on floating ice.

Public winter roads in Canada are typically constructed and operated following provincial guidelines that draw on research by Dr. Lorne Gold, dating back to the 1960's. His work was published in a classic paper in 1971, "Use of Ice Covers for Transportation" (CGJ, Vol 8). These general guides vary somewhat between jurisdictions in their interpretation of Gold's work but have been effective at mitigating risk over the past 3 decades on public roads. Industrial roads however, push the envelope on interpretation of ice capacity for long multi-axle trucks such that they no longer fit the interpretation commonly taken in the published guidelines. The Tibbitt to Contwoyto winter road has provided an opportunity to re-examine the fundamentals of both Gold's work and to collect operating data that would allow standard operating procedures to be developed that are customized to fit the current usage. These must recognize the importance of maintaining an appropriate balance between the uncertainties associated with ice capacity determination and the need to monitor and control all aspects of operation over ice. The result has seen a substantial increase in operating efficiency coupled with an exemplary safety record.

The experience gained by the author and colleagues over the past 10 years on the TCWR has provided a basis for rewriting guidelines for operations on ice. The revisions recognize that hazard management must be treated holistically with a strong focus on effective control of operations to reduce risk. A new best practice guide was produced for the Province of Alberta in October, 2009, and a guide that could potentially achieve national recognition is currently in progress under contract for the Transportation Association of Canada.

## Presenter Biography

Don Hayley is a founding partner of EBA Engineering Consultants Ltd. where he has been a consulting engineer for 41 years. His focus throughout this period has been developing design and construction practice for northern regions where permafrost, snow and ice are particular challenges. His work has focused on northern infrastructure, oil and gas exploration and mining. He has applied his technical knowledge across the entire northern hemisphere by active participation in major projects including mining at Svalbard, Norway, oil fields in Siberia and exploration platforms in the Beaufort Sea.

Don received his B.Eng. (Civil) from Carleton University in 1966, followed by an M.Sc. (Civil-Geotechnical) in 1968 from University of Alberta. He was appointed as a Fellow of the Engineering Institute of Canada in 2002 and received the Julian C. Smith Medal from the EIC for contributions to the development of Canada in 2005. He has played an active role in support of permafrost research in Canada as Chairman of the Canadian National Committee for the International Permafrost Association and subsequently was a member of the Executive of the International Permafrost Association from 2003 to 2008. He has presented keynote papers on northern engineering at a number of international and national conferences. He spent five years as a Director of the Canadian Geotechnical Society and assisted with organizing the Cold Regions Division. He received the Roger Brown Memorial Award from CGS for contributions to permafrost science and engineering in 1991, and delivered the R.M. Hardy lecture at the annual conference in 1998.

More recently, Don has developed recognized expertise in design and construction of winter roads and roads over floating ice. He is frequently called upon to develop improved procedures for managing the hazard of working on ice and directed the technical content for a new guideline published in Alberta in 2009. He has contributed his expertise to improving worker safety on floating ice by assessing the causes of ice failure incidents in Manitoba, Alberta and Northwest Territories.

