# Vancouver 2003

Technical Programme

## SS2: Dangerous Ground: Assessing The Risk of Natural and Man-Made Hazards

***Organizers / Organisateurs:*** **Bruce Broster (University of New Brunswick), Henrietta Mann (Dalhousie University), Jeanne Percival (Geological Survey of Canada), Bert Struik (Geological Survey of Canada) and Robert Turner (Geological Survey of Canada)**
***Room / Salle:*** **Foyers around Pavilion and Junior ballrooms**
***Date:*** **5/26/2003**
***Time:*** **3:00 PM**
***Presenter:*** **Bruce E. Broster**

### The assessment of landslide risk in unconsolidated glacigenic deposits

Stumpf, A.J. and Broster, B.E., Quaternary and Environmental Studies Group, Department of Geology, University of New Brunswick, PO Box 4400, Fredericton, NB E3B 5A3, broster@unb.ca

On site surficial mapping and sample collection are mandatory steps in the overall assessment of landslide risk. As forestry operations and transportation routes have expanded into remote areas and mountainous terrain, anthropogenic activities have accelerated slope failures. Nevertheless, areas of high failure-risk can easily be anticipated and avoided when the surface deposits are studied and the glacial stratigraphy is known. Where these sediments cannot be avoided, the surface deposits should be sampled and examined for mineralogical content and engineering properties. Stratigraphy, unit thickness and slope angles should be recorded during mapping so that size and modes of possible failures can be predicted in advance of ground disturbance.

In Canada, the most problematic slopes are commonly those that are glacially over- steepened U-shaped valleys, filled with glaicomarine or glaciolacustrine deposits, and subsequently re-intrenched by postglacial fluvial erosion. For example, in British Columbia coastal regions, estuaries, shallow river systems and fjords along the Pacific coast were flooded during marine transgression and experienced deposition of glaciomarine clay and silt deposits. The potential for mass movement is highest in coastal areas below 250 m asl (the elevation of maximum sea-level during deglaciation). However, in the interior of the province, large proglacial water bodies served as sites for the deposition of thick deposits of fine-grained sediments. Glacilacustrine islt and clay deposits have been mapped to elevations as high as 1000 m asl and are often encountered unexpectedly during road construction and excavation for foundations.

Fine-grained waterlain sediments behave differently when disturbed, due to differences in plasticity, stability and activity of the sediment. Flocculated glaciomarine sediments are often considered the most sensitive to disturbance, but glaciolacustrine silts and clays can be equally as problematic depending on their mineralogy or expandable clay contents. Variation in size and mode of failure can occur due to natural factors such as; thickness of deposit, dip of strata, permeability and drainage, engineering properties of underlying units, topographic relief and slope. Once disturbed the sediments may continue to experience retrogressive failures until stabilized by nature or engineering design. Stabilization by unaided natural processes often requires re-vegetation, adjustment of the slope to a critical angle, and unlimited amounts of time.

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