



# Seymour Falls Dam

## Geotechnical Design and Seismic Upgrade

### Geographical location

North Vancouver, British Columbia

### When it began or was completed

The dam was built between 1958 and 1961; earthquake upgrades were completed in 2007.

### Why a Canadian geotechnical achievement?

Seymour Falls Dam is an integral part of the Metro Vancouver water supply system. The earthfill section of this composite concrete and earthfill dam is founded on a compressible and pervious foundation. The work, as reported by C.F. Ripley and D.B Campbell (1963) won the Engineering Institute of Canada's 1964 Casimir Gzowski Medal for best paper in civil engineering.

The presence of the loose pervious Cougar Creek fan deposits in the dam foundations required special treatment, while upstream lake deposits made portions of the dam prone to large settlements. The original design successfully met these challenges with a carefully constructed upstream impervious blanket.

Later understanding of the seismicity of the area, however, introduced a new concern – seismic stability of the fan deposits. A combination of excavation, explosive compaction (EC) and dynamic compaction (DC) was selected for the remediation work. The unique combination of EC and DC resulted in 200 mm to 2500 mm of designed settlement over a 20 m foundation depth (2.5% to 15%). The remediation was completed in 2007 and the work remains one of the few examples of such a large compaction program on an operating dam. The seismic upgrade project won awards both provincially and nationally from the Association of Consulting Engineering Companies in 2007.

### Submitted by

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### Key References

Murray, L, Singh, NK, Huber, F and Siu, D, 2005. **Seismic Upgrade of the Seymour Falls Dam using Explosive and Dynamic Compaction**. Association of State Dam Safety Officials, Annual Conference 2005, pp 218-237.

Ripley CF and Campbell, DB. 1963. **Earth Dam on Compressible and Pervious Foundation**, Division of the Engineering Institute of Canada EIC-63-Geotech 1, Vol 1, No 19.

### Photographs



Aerial view of dam in 2006.



Dynamic compaction densified dam's foundation (2005).