ROBERT O. (BOB) PETERSON (1918-1969)

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Bob Peterson graduated in Civil Engineering with Great Distinction from the University of Saskatchewan in 1939. He joined the Prairie Farm Rehabilitation Administration (PFRA) on water conservation projects and developed a great interest in soil mechanics during his first year with them. He took graduate studies under Karl Terzaghi and Arthur Casagrande at Harvard University, earning a M.Sc. Degree in Civil Engineering in 1941.

Upon returning to PFRA he became Chief Soil Mechanics and Materials Engineer responsible for all investigations and research in soils and concrete, and for the design of earthworks for numerous projects. He was one of the first engineers designated as a Soil Mechanics Engineer for a Canadian agency engaged in building dams. He developed a highly expert Soil Mechanics Division which carried out geotechnical investigations and designed over 500 dams and projects. By 1951, the Division had grown to more than 100 employees.

However, the instability of slopes in swelling shales due to rebound posed very difficult problems which could not be solved effectively using recently developed ideas on 'residual strengths' developed principally in the UK. He stated "In the solution of practical problems the use of empirical methods and personal experience with similar situations is often more reliable. A confirm-as-you-go approach may be more appropriate than a design-as-you-go approach". He intensified studies in the field and laboratory. Undisturbed samples were thoroughly inspected for geological defects, with special emphasis on bentonite layers and slickensided surfaces.

As performance data accumulated, Bob Peterson developed an approach to dam design that was based on experience, thorough field investigations, careful laboratory testing, good judgement and comprehensive monitoring of the performance of structures during and after construction.

Applications of this approach led to the successful completion of many prairie dams including the Gardiner Dam in Saskatchewan and the Shellmouth Dam in Manitoba. The Gardiner Dam has a crest length of 5 km, a very flat downstream slope that was redesigned during construction. It has experienced large movements of 2.5 m seated in a low-friction bentonite zone in the hard clay shale foundation but continues to function well.

Bob Peterson was a pioneer who made a great contribution to the development of soil mechanics in Canada. The Canadian Geotechnical Society (CGS) honoured him posthumously by presenting him its first R.F. Legget Award in 1970. In the same year, the engineering building at the University of Saskatchewan was renamed the "Robert Peterson Building" in his honour.

[Bob Peterson's contributions to Canadian geotechnical engineering were documented by Nick Peters in *Geotechnical Engineering in Canada: An Historical Review,* 1997, a document that resulted from the CGS's Canadian Geotechnical Heritage Project in 1986. Both the 1997 document and more information on the 1986 project can be found elsewhere in the Canadian Geotechnical Virtual Archives on the CGS website].

By (J.D. (Jack) Mollard)
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I met Bob Peterson in the spring of 1947 when PFRA engineers were investigating the St. Mary dam site southwest of Lethbridge, Alberta, and the South Saskatchewan River dam site (now the Gardiner Dam) south of Outlook, Saskatchewan. I was searching for aggregate sources to construct the St. Mary dam project and determining factors that created the landslide terrain at Gardiner Dam, where glacial sediment mantled and masked underlying slide-prone Upper Cretaceous bentonitic marine shale on long, relatively gentle slopes. At the time, Bob was assembling what many consider was the first, largest and best soil mechanics and foundation laboratory and organisation in Canada.

Bob, a graduate with 'great distinction' from the University of Saskatchewan and a Master's graduate of Karl Terzaghi and Arthur Casagrande at Harvard, was not only an extraordinarily good soil mechanics engineer, but one with a true scientist's bent. Quiet and unassuming, honest and modest, he was completely dedicated to his specialty and keenly interested in practical research on soil mechanics problems of the day. Moreover, he had a knack for picking talented and dedicated staff. They thought highly of him, as did everyone who ever met him.

Some of Bob's many pioneering laboratory and field research projects in the 1940s and 1950s were directed to shale rebound in deep excavations, the analysis of failed shale slopes to test the validity of laboratory strength data, possibly the first installation of slope indicators to check movements in earth fills and the foundations below them, irrigating dry clay in borrow pits, the compaction of highly overconsolidated very dense till in fills, the strength of soft lacustrine and alluvial clays in foundations, and the design of sand dikes on frozen and unfrozen peat and clay in discontinuous permafrost.

I sat in on a number of consulting board meetings that Bob ran, initially with Dr. John Alan, professor of geology, and Professor Bob Hardy, University of Alberta; and then with Drs. Karl Terzaghi and Arthur Casagrande, Harvard University. Bob relished and directed those meetings with great enthusiasm, tackling a variety of geotechnical problems on earth dam design and construction. In fact, Bob's whole life seemed to revolve around earth dam problems. Even when he took holidays, which I think were rare, one of his greatest thrills was

visiting Corps of Engineers and Bureau of Reclamation dams on the Missouri and Columbia rivers, and discussing dam foundation, design, and construction problems.

In a very short time, he became recognized internationally as an authority on earth dams and especially the causes of dam failures, including some of those on dams he and his staff had constructed. What is more, he had the insight and courage to describe those failures in the international geotechnical literature.

I recall trying to get Bob to use the term ‘till’, but I was never very successful. Bob, preferring ‘glacial clay’, thought ‘till’ covered too wide a spectrum of geotechnical properties to be useful.

One of my early memories of Bob was at the 1949 Canadian Geotechnical Society meeting in Lethbridge, where he led the defence on the importance and application of soil mechanics theory and practice against sceptical and questioning dam-building and highway-construction contractors, and even employers, who at that time were unfamiliar with the emerging field of geotechnical engineering. Arguments flew back and forth, and became testy at times. I thoroughly enjoyed the exchanges.