

## **R.E. (RICHARD) CHADWICK (1885-1966)**

By Fred Matich and Frank Saunders, 2018



Richard Ellard Chadwick, P.Eng. a top ranking foundations engineer and contractor passed away in Montreal on February 17th 1966. His many achievements in the engineering and construction fields included a major role in the development of geotechnology in Canada.

R.E. Chadwick was born in Toronto on February 16, 1885. He received his undergraduate training at the Ontario School of Practical Science, graduating with a Mechanical Engineering Diploma in 1906, just as that school was becoming part of the University of Toronto. After teaching engineering for several years he joined the City of Toronto as Assistant Engineer in charge of bridges and docks. His ambition was to get into construction and in 1911 he joined the Foundation Company in New York City. At the time that company carried out the design and construction of practically all the foundations for the skyscrapers in Lower Manhattan. The company specialized in the pneumatic method of constructing high capacity reinforced concrete caissons to bedrock and had patented special techniques for the use of this method in unusual and difficult ground conditions. One of the great buildings under construction at the time in New York was the Woolworth Building and R.E. Chadwick was placed in charge of construction of its foundations.

In 1910, the Foundation Company was invited to Montreal, QC, by the Canadian Pacific Railway to install 300 caissons to bedrock through difficult ground conditions at the CPR's Windsor Station. When work in New York on the Woolworth Building paused temporarily, R.E. Chadwick was sent to Montreal to take over as Acting Chief Engineer for the Foundation Company's Canadian operations. After the Windsor Station project was completed, the company was retained by the CPR to handle the difficult pier construction work involved in widening the massive CPR bridges to accommodate double tracking of its transcontinental line between 1911 and 1914.

In October 1913, the one million bushel CPR Grain Elevator at Transcona, Manitoba experienced a bearing capacity foundation failure on first filling with grain. The failure resulted in a tilt of 27 degrees from the vertical, although the structure remained intact. The Foundation Company was asked to help the CPR, and in 1914 successfully righted and underpinned the structure. The failure, righting and underpinning has understandably attracted wide interest in the geotechnical profession over many years (see CGS web page [http://www.cgs.ca/virtual\\_archives\\_projects.php](http://www.cgs.ca/virtual_archives_projects.php), "(1913-2003) Failure and Righting of the Transcona Grain Elevator, Winnipeg, MB", accessed December 2018). The project has been

described as one of the most difficult underpinning jobs of all time. Although credit is clearly shared with CPR's engineers and the Foundation Company's personnel involved, the work was carried out during R.E. Chadwick's watch.

By 1919, R.E. Chadwick had become Manager of the Canadian operations and had led the company to diversify into building superstructures as well as foundations. In 1929, backed by a group of Canadian investors, the Canadian operations were purchased and the Foundation Company of Canada Ltd (Foundation Canada) was formed with R.E. Chadwick as President.

R.E. Chadwick formed a number of subsidiaries which had important implications to the future development of Canadian geotechnical engineering. One was the Construction Equipment Company, formed in 1922, and by 1926 it had acquired heavy floating equipment and was carrying out marine engineering construction on wharves and other marine structures. In 1930, a marine salvage subsidiary, Foundation Maritime Ltd was formed.

In 1940, Foundation Canada formed a Soils Engineering Department. During the 1940s the drilling equipment and operating crews from the subsidiary companies were transferred to this department; a soil testing laboratory was established, and civil engineering graduates with specialist qualifications in soil mechanics were added to its staff to complement the company's experience-based capabilities.

During these years the Soils Engineering Department was carrying out site investigations for a wide variety of projects across Canada. One of these projects was the causeway across Canso Strait in Nova Scotia where, in 1949, drilling was carried out in 185 feet of water from a specially designed tower constructed on a derrick boat with all equipment and crews provided by Foundation Canada.

From the start, Foundation Canada included engineers doing specialized design and construction work. In 1953, Foundation Canada formed the Foundation of Canada Engineering Corporation Ltd. (Fenco) with a mandate to provide engineering design services on a consulting basis. In 1954, another subsidiary, Geocon Ltd. was formed to provide services in geotechnical engineering and several specialized construction processes.

R.E. Chadwick retired as President in 1952 and was appointed Chairman of the Board. He then concentrated his efforts on the development of Fenco. Throughout his long tenure of guiding Foundation Canada, he always maintained a "hands-on" interest in engineering design, and particularly in what became known as geotechnical engineering. He was also increasingly referred to as "The Chief", with well-earned affection and justification. He retired from both Foundation and Fenco in 1958, but continued to serve as a Director and consultant.

R.E. Chadwick is recognized as one of Canada's foremost engineers. In 1953, he was awarded the prestigious Julian C. Smith Medal by the Engineering Institute of Canada. In 1983, he was inducted into the University of Toronto's Alumni Hall of Distinction. The citations for both recognized his achievements in the building of Canada.

The authors of this memoir, as young engineers, had the opportunity to work in the engineering department of Foundation Canada, and then with Geocon Ltd. and Fenco, respectively, when these subsidiaries were established. In the process, we had the privilege to meet "The Chief" and to work on projects in which he was directly involved.