Shoring System for Toronto Light Rail Project

Eglinton LRT, Calls for Innovative Equipment Supplied by ADSC Associate Members

By S. Scot Litke

A good deal of the information upon which the following article is based was provided by Bill Birch, General Manager of ADSC Associate Member firm, Casagrande U.S.A., Inc. Newton, New Jersey. Most specifically Bill provided the important project details. We thank him for bringing this project to our attention and for providing essential information. (Editor)

There are a number of very high profile, and challenging light rail projects currently underway in Toronto, Canada. The Toronto metroplex relies heavily on public transportation. Due to rapid population growth in the heart of the city and its outlying suburbs and adjoining metro areas there has been a constant and large scale subway extension program underway for the past ten years. During this period Toronto's transit authority has funded a dynamic transit extension program by adding new lines, new stations, refurbishing existing stations, and in all ways has created a very positive construction environ-

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ment, particularly as it relates to geo-industry focused projects. At this time the government of Toronto is moving ahead on an $8.4 billion Light Rail Transit (LRT) program. The undertaking features 52 km of light rail expansion. This will be accomplished as underground tunneling as well as rail lines constructed at grade. This is the largest program of its type in the history of Toronto and has spawned a great deal of work for ADSC Members in both the Geotechnical Engineering and Geo-Construction components of the multi-phased program. One such project is known as the "Eglinton Crosstown LRT-West Launch Area." Of particular interest is the launch shaft construction aspect that will be used to accommodate Tunnel Boring Machines (TBMs) that will advance the tunnels eastward from Blackcreek Drive to Kennedy Station. It is scheduled for completion in 2020.

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One of the most interesting and challenging tasks is the construction of a Continuous Drilled Shaft Wall Shoring System. The wall which was constructed by Bermingham Foundation Solutions, the construction arm of the ADSC Associate Member company, called for 280 drilled shafts with diameters ranging from 880-1300 mm with depths of up to 38 m. The construction started in October, 2011 and was completed in July, 2012. The geologic conditions are typical of a glacial, river valley environment and were characterized by silts, sands, and sub-artesian groundwater. The shafts called for permanent casing to tip elevation. Massive reinforcing cages as well as full depth casing required that special hoisting equipment be employed in order to facilitate the installation. Over 10,000 cubic meters of tremie-poured concrete, with retarders, were needed. The logistics and timing of the installation and concrete pours were daunting as construction took place underneath Eglinton Avenue requiring precise traffic staging and control of access areas.

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The Metrolink Expansion program is clearly one of the most ambitious, as well as costly, Light Rail projects in North America. The good news is that there will be opportunities aplenty for the members of the ADSC and the variety of technologies that they provide. In this regard it is interesting to note the range of highly technologically advanced equipment that is being employed on these projects. There is a train of thought that suggests that developments in equipment can drive the evolution of new capabilities for geo-designers and constructors. The demands of geo-construction, especially in urban environments, has spawned a new generation of foundation and earth retention systems the installation of which relies on new, and in most cases, improved, drilling machines, tooling, and supporting materials. This could be a bit of a "chicken and egg" phenomenon in which one could assert that design and construction needs drives the evolution of equipment to meet those needs. Or, as previously stated, advances in equipment bring on new construction capabilities. It is an interesting discussion to have, but whatever the root cause, as it relates to the Metrolink project these trends go hand-in-hand.

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Equipment Used on the
Eglinton Crosstown
LRT-West Launch project

Casagrande C850 with GCL 1300
Casagrande B400
Hütte HBR605

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