

The Canadian
Geotechnical Society



La Société Canadienne
de Géotechnique

CGS Luncheon Presentation

Design, Construction and Performance Monitoring of Stone Column Reinforced Embankments in Saskatoon, SK

Presented by:

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Presentation Abstract:

The Saskatoon Interchanges Project consisted of design-build construction of two grade-separated traffic intersections. As part of the design for each interchange, approach fills of approximately 8 to 9 m height were required at all four abutments for the two bridges; 5 m high mechanically stabilized earth (MSE) walls were incorporated into the design at each abutment. The soil conditions at each bridge location consisted of 10 to 14 m of firm to stiff clays (Saskatoon Group) or clay tills (Battleford Formation) overlying a very stiff to hard clay till (Floral Formation). The project agreement outlined constraints regarding long-term differential settlement of the approach fills relative to the bridge structure, additionally MSE wall construction required limitations on the differential and total magnitude of settlement. The relatively short construction period specified in the project schedule required that ground improvement measures be utilized to accelerate settlement rates for the approach fills. In order to meet the settlement criteria, and to address global stability requirements for the MSE walls, stone columns were incorporated into the foundation soils.

The initial design of the stone columns used a combination of design manuals and limit equilibrium analysis. A finite element deformation analysis was completed during detailed design to estimate deformations of the approach fill embankments and the MSE Walls. Construction of the stone columns was completed by drilling large diameter shafts which required the use of temporary sleeving to address seepage and sloughing conditions. After drilling, the shafts were then backfilled with a sand and gravel mixture and compaction targets were achieved through vibro-extraction of the sleeves. Settlement monitoring of the approach fills consisted of a combination of settlement plates, piezometers and survey monuments.

This presentation summarizes the design, construction, performance monitoring and lessons learned over the course of the project

About the Presenter:

Kent is senior geotechnical engineer and Vice President of Engineering at TREK Geotechnical Inc. Kent has worked in the geotechnical engineering field for 20 years in both the private and public sectors. He has worked as a consulting engineer out of offices in Manitoba and Alberta. Prior to joining TREK, Kent spent 7 years working for Manitoba Hydro with much of that time as the Head of Manitoba Hydro's Geotechnical Engineering Section. Kent joined TREK in 2012 where, in addition to managing the engineering group, he also acts as a project manager and a technical reviewer for projects. Kent has actively volunteered for the CGS throughout his career and presently serves as the Vice President Finance for the national executive of the Canadian Geotechnical Society.

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Date: Thursday, January 30, 2019
Time: Lunch at 12:00 PM, Presentation at 12:20 PM
Location: Holiday Inn South, 1330 Pembina Highway
RSVP: 12:00 PM, Tuesday, January 28, 2019

- This event qualifies for 1 Professional Development Hour. The event is classified as 'Informal Activity' under EGM's CPD Program.
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