The Canadian Geotechnical Society — Manitoba Section — La Société Canadienne de Géotechnique

CGS Dinner Presentation

Challenges in the Design of Bridge Pile Foundations Subjected to Negative Skin Friction

Presented by:
Sepehr Chalajour, PhD, P.Eng.
TREK Engineering Inc.

Presentation Abstract:
Negative skin friction is a considerable challenge in the design of piles installed in cohesive soil profiles, particularly for bridge foundation systems. It develops when the surrounding soil settles relative to the pile, generating additional downward shear stresses along the pile shaft. The load imposed on a pile is typically evaluated using empirical/load-transfer methods, as well as static or dynamic load testing. However, the presence of negative skin friction causes the applied load to increase over time as a function of pile length, and site-specific conditions. This time-dependent increase complicates the determination of the maximum load acting on the pile. Furthermore, differences in calculation approaches and inconsistencies in adopted code provisions introduce additional uncertainty in design for piles affected by negative skin friction. This presentation examines variations in ultimate limit state design outcomes according to AASHTO and CHBDC for piles subjected to negative skin friction, using load determinations based on static and dynamic analyses through a case study of a production steel H-pile subjected to bridge construction loading. Additionally, the Unified Design Method, the most widely used approach in practice and referenced in several design codes to assess the structural strength and geotechnical capacity of piles in the presence of negative skin friction, is evaluated by comparing its predictions with the observed results from the investigation.

About the Presenter:

Sepehr Chalajour, PhD, P.Eng., is a Geotechnical Engineer at TREK Engineering Inc. with more than six years of practical, hands-on experience. He holds a B.Sc. in Civil-Structural Engineering, a M.Sc. and PhD in Civil-Geotechnical Engineering. His doctoral research focused on evaluating negative skin friction on piles for bridge structures. Sepehr's areas of expertise include foundation design, embankments and excavations, tunneling, advanced geotechnical numerical modeling /simulations, and advanced geotechnical laboratory testing. He has published his work in several top-tier journals and has delivered presentations at CGS and ASCE conferences. He has also received national and provincial awards during his graduate studies in recognition of his contributions to advancing geotechnical engineering.

Date: Tuesday, December 16, 2025
Time: Presentation at 5:30 PM
Location: Trans Canada Brewing Co.; 1290 Kenaston Blvd #1
RSVP: 12:00 PM, Friday, December 12, 2025
Registration Fee (debit, credit, PayPal):

Membership	Price ($)	Registration and Payment Link[1,2]
Attendee	25	Buy Now

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Colton Wooster, EIT
CGS Manitoba Liaison
P: (204) 583-8797
E: cgs.manitoba@gmail.com

- This event qualifies for 1 Professional Development Hour. The event is classified as 'Informal Activity' under EGM's CPD Program.
- Please note that if you are unable to attend, someone else can be sent in your place. We are accepting walk-ins depending on seating availability.
- If you wish to be added to the mailing list, please send an email to cgs.manitoba@gmail.com