



CGS Luncheon Presentation

Heat Exchange between the Ground and the Shallow Foundations by Considering the Effect of Seasonal Frost

Presented by:

Dr. Pooneh Maghoul, P. Eng.

Assistant Professor, University of Manitoba

Presentation Abstract:

Nowadays, a well-built house is so energy efficient above ground that the ground-coupled heat losses can account for 30% to 50% of the total heat loss, showing the importance of a detailed analysis of ground coupled heat transfer.

The temperature changes generated by the building heat loss from the foundation to the ground may result in strongly coupled and nonlinear moisture and energy transport. In Northern countries, cold climates may lead to the freezing of soil pore-water near the ground surface. Freezing process under temperature gradient may generate moisture migration in the soil due to the development of suction. This phenomenon, with or without frost heaving, has important consequences in foundation engineering in both seasonal frost and permafrost areas. However, the impact of phase change between water and ice (freezing/thawing) on the thermo-hydraulic regime of unsaturated soils surrounding building foundations is not well known.

In this lecture, the distribution of temperature and ice water content in the soil surrounding a foundation will be discussed and it will be shown that the heat loss from the basement walls in cold months is 4 to 6 times greater than the one from the slab. Also, during the cold period, a high rate of heat transfer between the ground and the upper part of the basement wall causes a sudden change in temperature.

Date: Friday, November 25, 2016
Time: Lunch at 12:00 PM, Presentation at 12:20 PM
Location: Holiday Inn South, 1330 Pembina Highway
RSVP: 12:00 PM, Tuesday, November 22, 2016

Registration Fee (cash or cheque):

Students: \$20
CGS Members: \$25
Non-members: \$35

About the Presenter:

Dr. Pooneh Maghoul is an Assistant Professor in the Department of Civil Engineering at the University of Manitoba. She received her M.Sc. in Soil and Rock Mechanics (2007) and her Ph.D. in Geotechnical Engineering (2010) at Ecole des Ponts Paris Tech (Paris Institute of Technology) in France. She received postdoctoral fellowships from NSERC-Hydro-Quebec Industrial Research Chair at Laval University (2010-2012) in Canada. Before joining the University of Manitoba, Dr. Maghoul worked as a project manager in Geotechnical Engineering (2013-2014) in Montreal. She also worked as a sessional lecturer at Polytechnique of Montreal and Ecole de Technologie Supérieure (Engineering school of the University of Quebec in Montreal).

Dr. Maghoul's main scientific research interests are in analytical and numerical modeling of the multiphase porous media under thermal, quasi-static and dynamic loadings. A few of the vast set of applications in this regard include multiphase transfer of heat, moisture (water and vapor) and air in porous media, cold regions engineering, CO₂ sequestration modeling, study of the combined effects of topography and sediments on the amplification of seismic movements etc. She has published several research papers in leading journals and international conference proceedings.

Dr. Maghoul was nominated for several best Ph.D. awards in France. She is a registered professional engineer (P. Eng.) in the provinces of Manitoba and Quebec and served as the secretary (2013-2014) and the program director (2014-2015) at the Canadian Geotechnical Society - Western Quebec Section.

To attend, please supply names to:

Earl Marvin B. De Guzman, M.Sc., E.I.T.
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- 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. No shows will be invoiced. Cancellations should be made no later than 24 hours prior to the event.