



UAA Professional Development Seminar Series

Liquefaction Hazard in Thawing Permafrost – Considerations for the Practicing Engineer



Presented by: John Thornley, PhD, PE, BC.GE

ABSTRACT: Liquefaction is a well-known natural hazard related to earthquakes and its characterization has been studied for more than 50 years. It is also understood that permafrost soils are generally not considered liquefiable. While seismically induced liquefaction is generally ignored for infrastructure in permafrost, there is a growing need to change that practice due to climate change impacts. Thawing permafrost can be loose with excess moisture and may be highly liquefiable. Because the ground is frozen at the time of a site exploration, it is not possible to rely on traditional techniques, such as SPT blow counts, to estimate liquefaction potential. This presentation will begin with background on liquefaction, site characterization, and climate impacts to permafrost. Two case studies will be presented, along with thoughts and considerations for engineering design as we grapple with proper characterization of currently frozen ground that may thaw in the future.

BIO: John Thornley, PhD, PE, BC.GE is a Vice President and Technical Fellow at WSP in Anchorage, Alaska. He has 19 years of geotechnical and earthquake engineering experience. Recently John was a co-lead for the EERI Learning from Earthquakes Reconnaissance effort for the November 30, 2018, M7.1 Anchorage, Alaska Earthquake. John is currently the chair of the Municipality of Anchorage Geotechnical Advisory Commission and is active in several organizations including ASCE, EERI, and SSA. He has

served as field manager of geotechnical studies and prepared recommendations for a variety of infrastructure projects including buildings, roads and airports, large liquefied natural gas and water storage tanks, pipelines, wind and cellular towers, and utilities. As part of John's work, he has been involved in seismic hazard studies, seismic site response analyses, studies for large infrastructure buildouts, and cold regions and permafrost engineering. His design work includes ground improvement in liquefiable soils, deep and shallow foundations, slope stabilization, retaining structures, and embankments.

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11:45 am - 12:45 pm

EIB 211 or Online Via [YouTube Live](#)