

SUSTAINABILITY IN GEOTECHNICAL ENGINEERING COMMITTEE

Virtual Speakers List

Presentation Title: Sustainability Studies and Assessments of Ground Modification Works for Civil Infrastructure

Abstract: This presentation covers a novel framework that evaluates sustainable elements of various ground improvement studies performed for civil infrastructure. Studies dealing with ground improvement of slopes, embankments and pavement infrastructure will be main focus of this talk. Sustainable elements will describe different subtopics among environmental, economic and societal benefits.

Speaker: Prof. Anand J Puppala, Ph.D., P.E., D. GE, F. ASCE
Professor | A.P. and Florence Wiley Chair
Zachry Department of Civil and Environmental Engineering
Texas A&M University

Presentation Title: Addressing Sustainability as a Ground Contractor

Abstract: At Keller we have taken on the challenge of addressing sustainability through focusing on the UN Sustainable Development Goals for which we believe we can have the largest impact. From an environmental perspective we focus on doing less harm; from a social perspective we focus on having a positive impact on our employees and communities. This talk will describe case studies where we have successfully decreased our emissions, our initiatives in the environmental and social areas, the challenges we have in affecting change in our industry, and the goals we have for the future.

Speaker: Dr. Kimberly Martin, Ph.D., P.E.
Senior Engineer - Innovation and Sustainability
Keller – North America

Presentation Title: Sustainable Practices in Geotechnical Engineering

Abstract: Sustainability is a normative concept that focuses on managing resources in such a way that guarantees welfare and promotes equity of current and future generations. Naturally, sustainability attempts to prevent the detrimental effects of anthropogenic development on the environment and society at multiple levels, and promotes development that balances the three Es – environment, economy, and equity. Resilience is a descriptive concept often closely associated with sustainability. Resilience is mostly understood as the ability of a system to “bounce back” to normal functionality when subjected to disruptions. In the context of infrastructure, resilience can be understood as the ability of a system to withstand disruptions and continue to function by

rapidly recovering from and adapting to the disruptions. It is necessary to develop resilience in civil infrastructure systems as the effects of climate change are becoming more and more apparent, and the frequency of natural disasters are increasing. Geotechnical engineering practices contribute significantly to global pollution and consume significant amount of natural resources. At the same time, geotechnical engineers play a significant role in disaster mitigation. Thus, sustainable practices within geotechnical engineering are extremely important. In this presentation, the perspectives on sustainability and resilience and their connection to geotechnical engineering will be provided. How practices can be made sustainable within geotechnical engineering will be briefly outlined.

Speaker: Prof. Dipanjan Basu, Ph.D., P.Eng., P.E., C.Eng
Associate Professor
Civil and Environmental Engineering
University of Waterloo

Presentation Title: Sustainable remediation of polluted sites: New concept, assessment tools, and challenges

Abstract: This presentation will provide a brief overview of the concept of sustainable remediation along with triple bottom line sustainability assessment of the potential remedial alternatives in contaminated site remediation. A list of existing tools for sustainable remediation will be identified and their relative effectiveness in sustainability assessment of remediation technologies will be discussed. Finally, some of the major challenges and opportunities associated with implementation of sustainable remediation will be highlighted.

Speaker: Prof. Krishna R. Reddy, PhD, PE, BCEE, DGE, FASCE, ENV SP
Professor
Department of Civil, Materials, and Environmental Engineering
University of Illinois at Chicago

Presentation Title: Geothermal Energy: A Renewable and Sustainable Source to Heat and Cool the Building's Envelope

Abstract: This research analyzes heat exchange in the ground and through geothermal piles by developing a numerical model that can capture all key features of heat transfer through these piles. The developed model effectively simulates complex heat and fluid flow in the ground surrounding a heat source. In this presentation, the heat transfer mechanism in dry, saturated, and unsaturated soils will be discussed. In saturated soil with high permeability (e.g., sand), temperature increments change groundwater density and therefore might create thermally driven pore fluid flow. The thermally induced pore fluid flow in sand facilitates heat transfer in the ground and results in heat convection even under hydrostatic conditions. However, in unsaturated soil, thermal loading induces moisture and vapor flow and results in soil drying close to the geothermal heat exchangers. Therefore, a precise hydro-thermal model must be considered

to accurately simulate the heat transfer in the ground. Besides, in this presentation, the efficiency of the ground source heat pump systems and the relative effect of different input parameters on the thermal performance of these systems will be discussed.

Speaker: Prof. Omid Ghasemi Fare, Ph.D.

Assistant Professor
Department of Civil and Environmental Engineering
University of Louisville