

Protecting Geo-Infrastructure from Climate Change

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Abstract

We are facing a climate emergency, with significant changes in weather patterns and more extreme weather events, both storms and drought. These changes can have significant deleterious effects on our geotechnical infrastructure. While intense storms are important as potential triggering events for landslides, there needs to be an awareness that seasonal wetting-drying cycles can cause deterioration of soils, leading to failures; the magnitude of these cycles is likely to increase with climate change. In the UK there has been an increased frequency of landslides occurring on slopes forming the national railway network, often leading to temporary closures of railway lines and significant disruption to rail passengers. Laboratory and field testing to investigate these effects shows that there is a shift in soil water retention curves with drying/wetting cycles, resulting in a progressive loss in suction at the same water content point within each cycle. Triaxial tests on unsaturated specimens demonstrate significant losses in strength, at the same water content, as the material is subject to drying/wetting cycles, due to this loss of suction. The result is a progressive deterioration in strength with seasonal cycles. This lecture will propose a novel solution of water-holding barriers that can isolate the soil from environmental impacts.