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Settlement of the Foundation on the Improved Soil: A Case Study

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Abstract : Deep Soil Mixing (DSM) is a soil improvement technique that involves mechanically mixing the soil with a binder material to improve its strength, stiffness, and durability. This technique is typically used in geotechnical engineering applications where weak or unstable soil conditions exist, such as in building foundations, embankment support, or ground improvement projects. In this study, the settlement of the foundation on the improved soil using the wet DSM technique has been analyzed for a case study. Before DSM production, the initial soil mixture has been determined based on the laboratory tests and then, the proper mix designs have been optimized based on the pilot scale tests. The results show that the spacing and depth of the DSM columns depend on the soil properties, the intended loading conditions, and other factors such as the available space and equipment limitations. Moreover, monitoring instruments installed in the pilot area verify that the settlement of the foundation has been placed in an acceptable range to ensure that the soil mixture is providing the required strength and stiffness to support the structure or load. As an important result, if the DSM columns touch or penetrate into the stiff soil layer, the settlement of the foundation can be significantly decreased. Furthermore, the DSM columns should be allowed to cure sufficiently before placing any significant loads on the structure to prevent excessive deformation or settlement.

Keywords : deep soil mixing, soil mixture, settlement, instrumentation, curing age
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