

Improvement of Mechanical Properties of Saline Soils by Fly Ash: Effect of Freeze-Thaw Cycles

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Abstract : To explore the effect of freeze-thaw cycles on saline soil mechanical properties of fly ash, this study examined the influence of different numbers of freezing and thawing cycles, fly ash content, and moisture content of saline soil in unconfined compression tests and triaxial shear tests. With increased fly ash content, the internal friction angle, cohesion, unconfined compressive strength, and shear strength of the improved soil increased at first and then decreased. Using the Desk-Expert 8.0 software and based on significance analysis theory, the number of freeze-thaw cycles, fly ash content, water content, and the interactions between various factors on the mechanical properties of saline soil were studied. The results showed that the number of freeze-thaw cycles had a significant effect on the mechanical properties of saline soil, while the fly ash content had a weakly significant effect. At the same time, interaction between the number of freeze-thaw cycles and the water content had a significant effect on the unconfined compressive strength and the cohesion of saline soil, and the interaction between fly ash content and the number of freeze-thaw cycles only had a significant effect on the unconfined compressive strength.

Keywords : fly ash, saline soil, seasonally frozen area, significance analysis, qualitative analysis

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