

Experimental study on the optimal water content for xanthan gum-based treatment sand

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ABSTRACT

Ground improvement using existing materials in geological engineering is a significant cause of excessive CO₂ emissions and environmental pollution. Therefore, research on low-carbon technology and sustainable construction materials is becoming increasingly important. Biopolymers are polymer compounds produced from natural resources. Biopolymer-based soil treatment (BPST) increases soil strength, improves surface erosion resistance, and promotes vegetation growth. Existing durability tests often simulate extreme water content by fully submerging or drying samples. However, to accurately reflect actual environmental conditions, observing changes in BPST strength at different water content depending on temperature and humidity conditions is important. In this study, we investigate the strength of BPST in response to changes in water content and confirm the strength recovery when the water content increases again at a specific point in time. Furthermore, by analyzing the strength variations of BPST under different water contents, we identified the optimal water content for hydrogel to maintain and recover its strength.

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