

## **Study on the Compressive Strength of Seaweed-Consolidated Sand**

### **ABSTRACT**

Seaweed-consolidated sand is a sustainable and environmentally friendly soil improvement technique that utilizes seaweed as the primary binding material. In this study, seaweed powder was used as a consolidating agent to systematically investigate the compressive strength of consolidated sand. The effects of different seaweed particle sizes (P1: <0.425 mm, P2: 0.425–0.85 mm, P3: >0.85 mm), seaweed dosages (30%, 50%, 70%, 90%, 110%), and curing temperatures (50°C, 70°C, 100°C, 130°C) on compressive strength were analyzed. The results revealed that both particle size and dosage of seaweed significantly affect the strength performance of consolidated sand. Specifically, particle size P1 and dosages of 70% and 90% were found to substantially enhance compressive strength. Furthermore, curing temperature exhibited a nonlinear relationship with compressive strength, indicating an optimal temperature range for maximizing performance. This study provides valuable theoretical insights and technical guidance for the practical application of seaweed-based soil consolidation technology.