

## **The geogrid stiffness from small to large strain under tensile loading**

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### **Abstract**

To sustain wave forces and traffic loads, some of the coastal structures are constructed with geosynthetics. Limited equilibrium analysis is widely used to analyze the stabilities of these structures. It can provide safety factor at probable failure surface but can not predict the deformation of retaining structure. The working stress analysis (WSA) has been developed and attempt to solve this problem. According to the results measured from in-situ tests and laboratory tests, WSA uses finite element method or finite difference method to estimate external deformation, distribution of internal stress and strain. The stress-strain curve for a geosynthetic material is nonlinear. In small strain level, the stiffness of geosynthetics could be varied rapidly. In order to apply WSA reasonably, the stiffness of geosynthetics at different strain level should be established. Equipped with servo motor and highly resolution measurement system, a series of tensile loading tests is performed using PET geogrids to discuss their behaviors under different strain rates. This paper introduces this equipment, presents the results, and discusses the performance of geogrids.

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