Enhancement of geocell by preloading method in pullout test

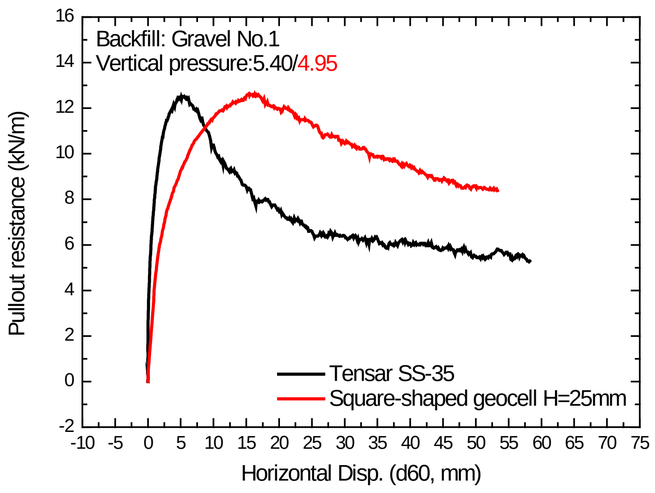
IIS UNIVERSITY OF TOKYO
GDM

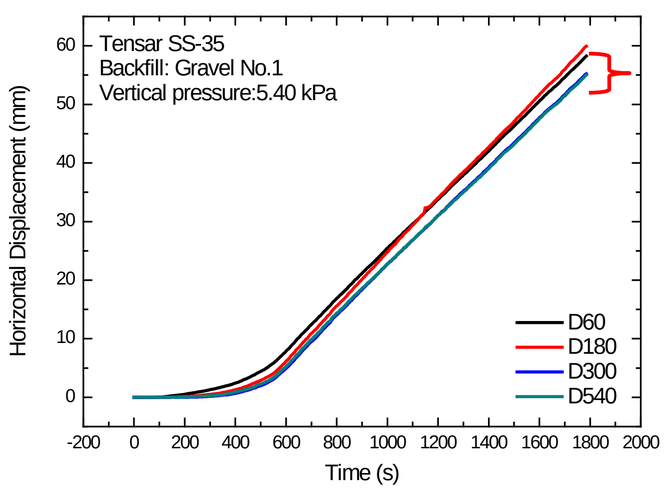
Xinye. HAN

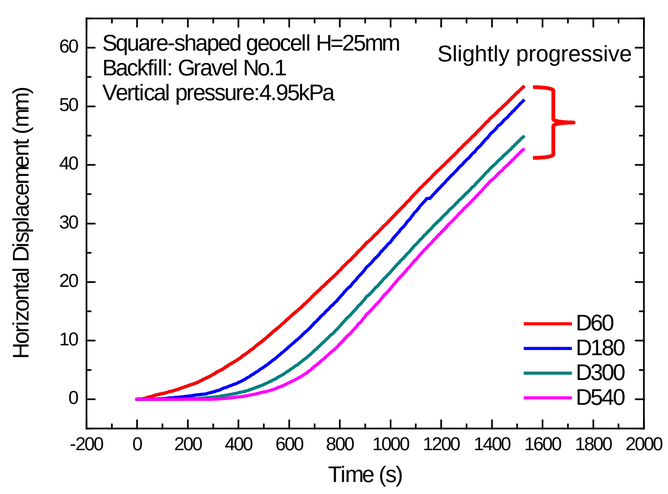
Geo-disaster Mitigation Engineering

Research Objective

With square-shaped geocells, the initial stiffness increases with an increase in the stiffness of transverse members. Previous studies demonstrate that tensar SS-35, which is a kind of geogrids and widely used in actual work, has a very high value of this stiffness; therefore it exhibits a very high initial stiffness. And also the deformation of tensar SS-35 is **non-progressive** as compared with the **slightly progressive** deformation of square-shaped geocell. In order to increase the initial stiffness or decrease the progressive deformation of geocell, this study presents the enhancement of square-shaped geocell by preloading method.

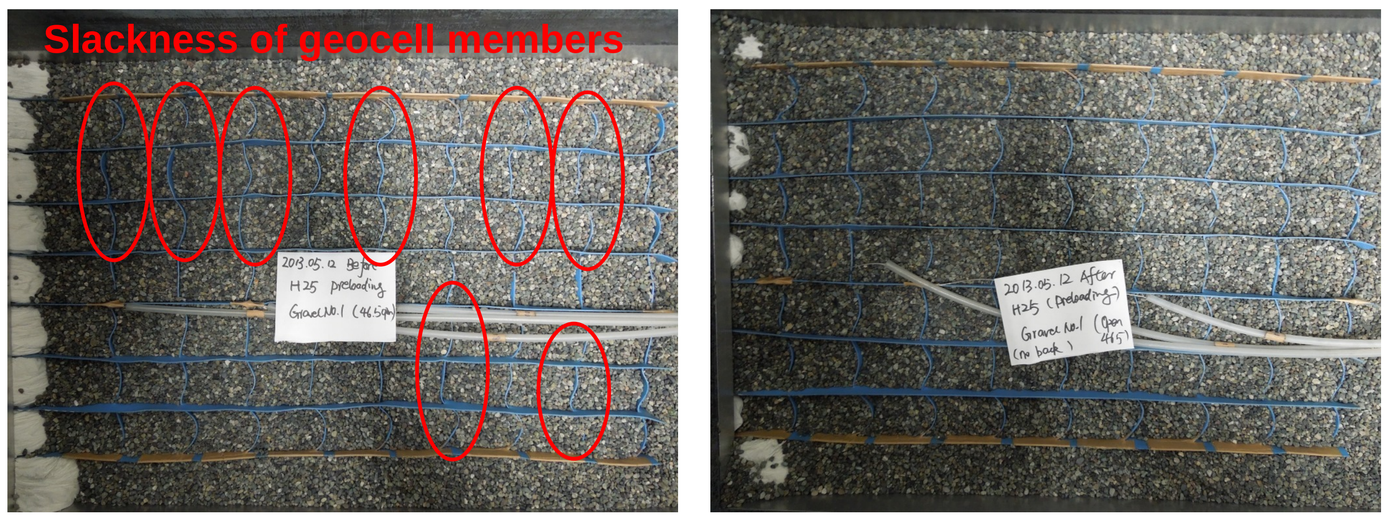




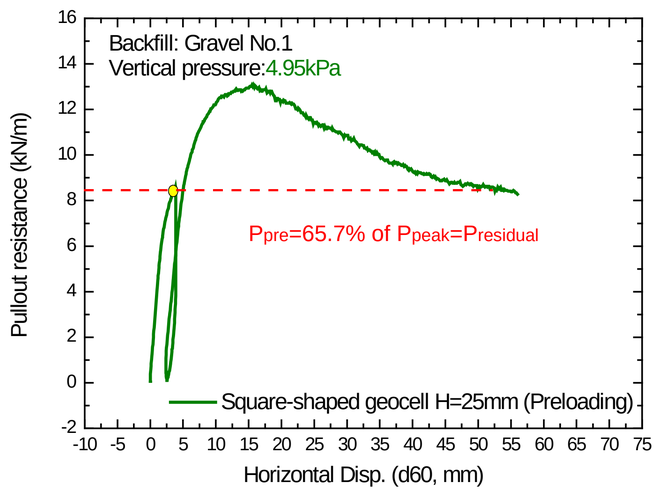


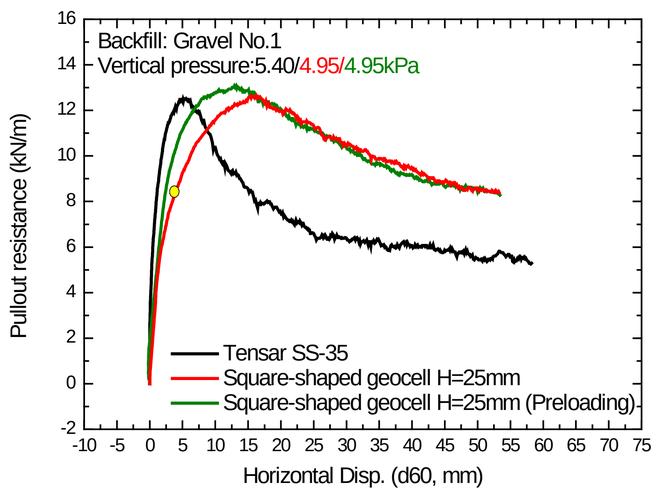
Pullout Test Results

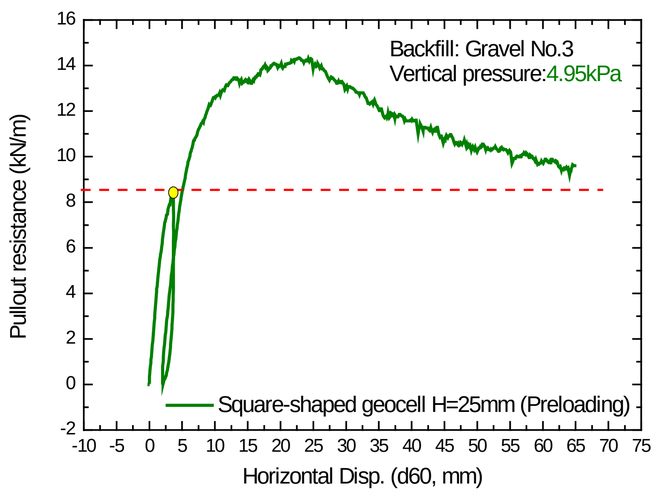
- The **purpose** of preloading method is to reduce the slackness of the transverse members at the initial arrangements.
- The preloading was applied at the point where the pullout resistance reaches the strength of residual state.

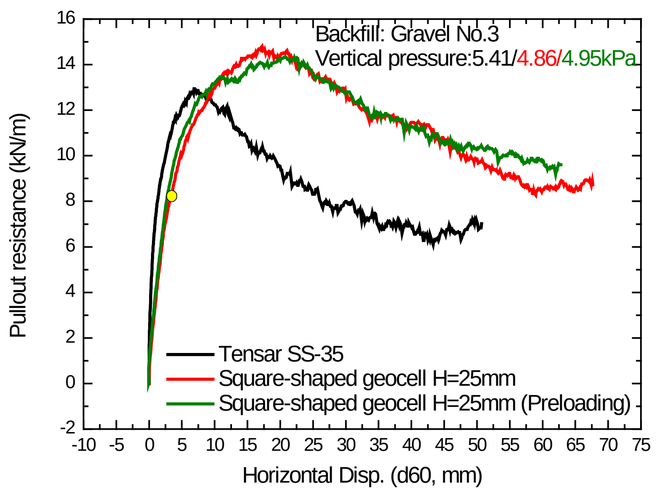


Comparison of arrangements of geocell members before and after pullout test



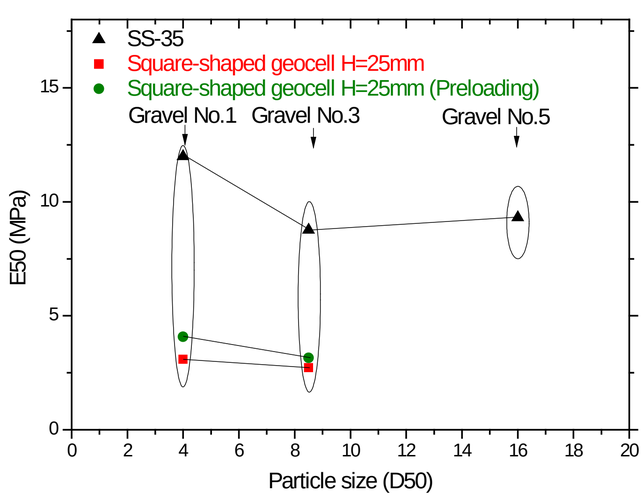






❖ Secant modulus (*E*50).

- The initial stiffness can be evaluated by secant modulus (***E*50**).
- The values of ***E*50** increase ***31.7%*** and ***15.9%*** for Gravel No.1 and No.3, respectively.
- The initial stiffness of geocell is still much lower than tensar SS-35.



➢ **Although the material stiffness of square-shaped geocell (polyester) is much lower than tensar SS-35(high density polyethylene), the preloading method can reduce the slackness of transverse geocell members, thereby increasing the initial pullout stiffness of geocell.**