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GDM

Optimum analysis of cell size for square-shaped geocell in pullout test

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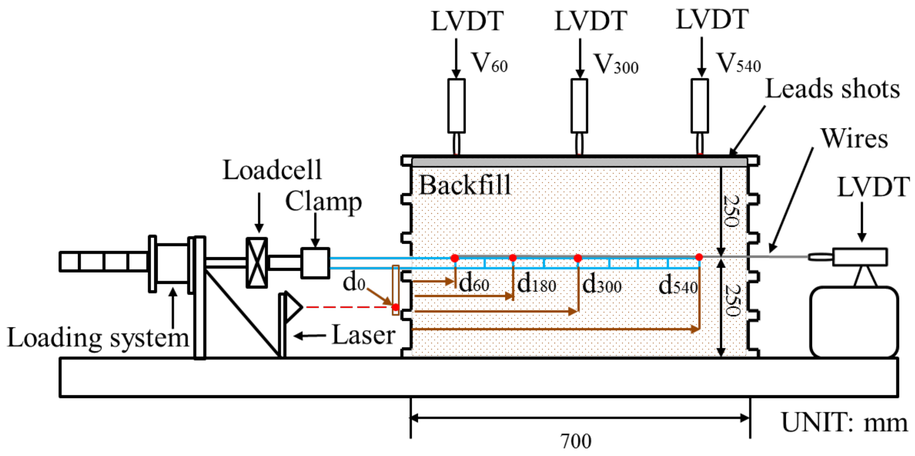
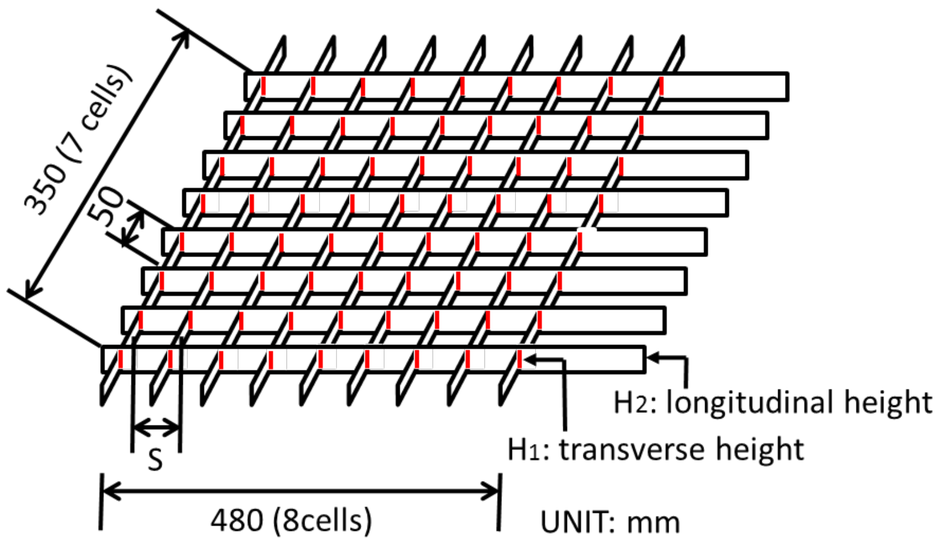
Research Outline

Since the most important advantage of square-shaped geocell is an ability of three-dimensionally confining large particles in the cells exhibiting a **large anchorage strength** when pulled laterally, the height of geocell (**H**) and the spacing between transverse members (**S**) would be two key influential factors. In this study, the optimum analysis for cell size was conducted considering H and S.



Schematic diagram of pullout test apparatus



Test cases	H_1	S	Backfill material
1	12.5mm	60mm	Gravel No.1
2	25mm	60mm	Gravel No.1
3	25mm	120mm	Gravel No.1
4	40mm	60mm	Gravel No.1

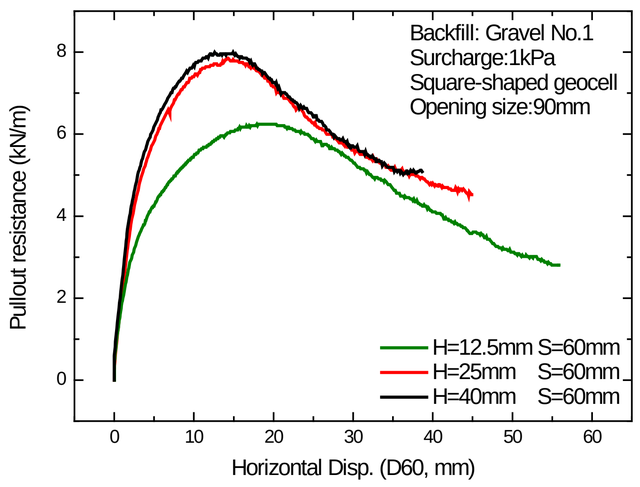
Pullout Test Results

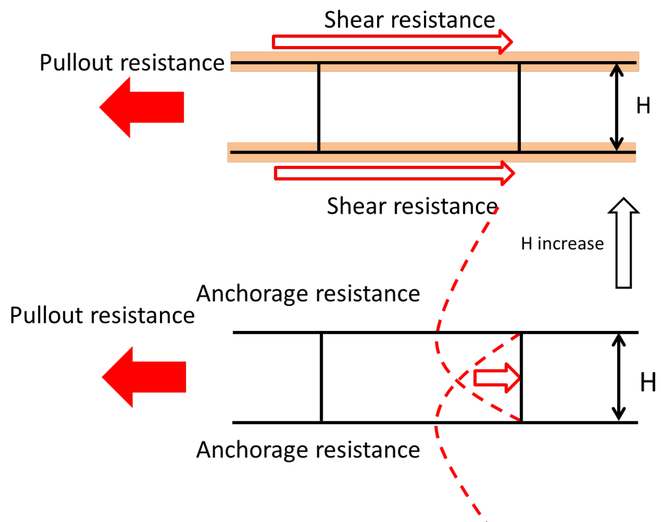
❖ Influence of height (H)

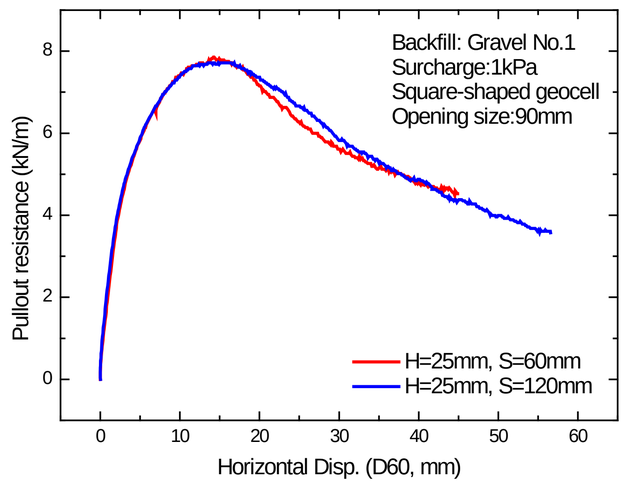
- The pull-out resistance increases with an increase in the member height from 12.5 mm to 25 mm. However, with further increase in the member height, the pull-out resistance exhibits only a very small.
- As the height of geocell increases, the total pullout resistance is firstly determined by the **anchorage resistance** and increases with an increase in the height of geocell. When the height of geocell reaches a certain value, the anchorage resistance reaches the **shear resistance**.

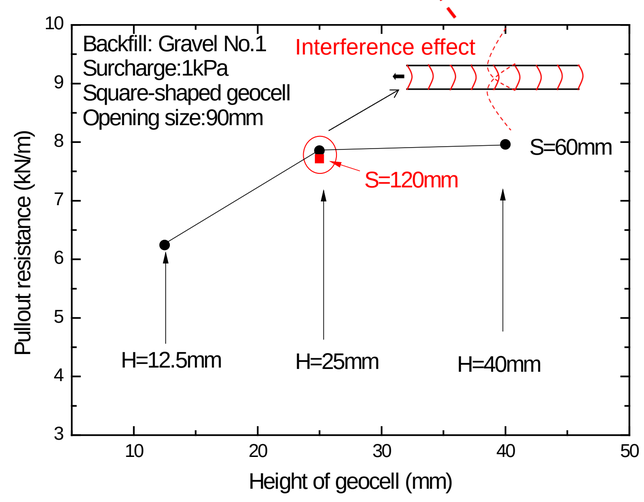
❖ Influence of transverse spacing (S)

- When increasing the spacing between transversal members from 60mm to 120mm, the pullout resistance almost keeps the same value.
- This may be contributed to the **interference effect** of the transverse members. When the spacing is relative small, the anchorage resistance may not be fully mobilized.









❖ Conclusion:

For Gravel No.1, the optimum size of geocell is 25mm (H) and 120mm (S), with which the geocell can not only provide higher pullout resistance but also save the cost of materials.

➢ **The height of geocell is of prime importance to the pullout resistance; the spacing between transverse members may result in an interference effect which reduce the pullout resistance.**