

Seismic performance of square-shaped geocell RS RWs with poorly and well compacted backfill materials

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Experimental Outline

This study aims to investigate the seismic performance of **square-shaped geocell RS RWs** with well compacted and poorly compacted backfills for Silica Sand No.7 and Gravel No. 5. The square-shaped geocell utilized in this study had transverse spacing of 120 mm, 350 mm in width and 360 mm in length. A total of ten reinforcement layers were equally distributed vertically along the wall facing at 50 mm intervals. The compaction degree of the subsoil was kept at 100% for all the tests, while that of the backfill material was varied between 89% (poorly compacted backfill) and 100% (well compacted backfill). Figure 1 shows a schematic diagram of the GRS RW.

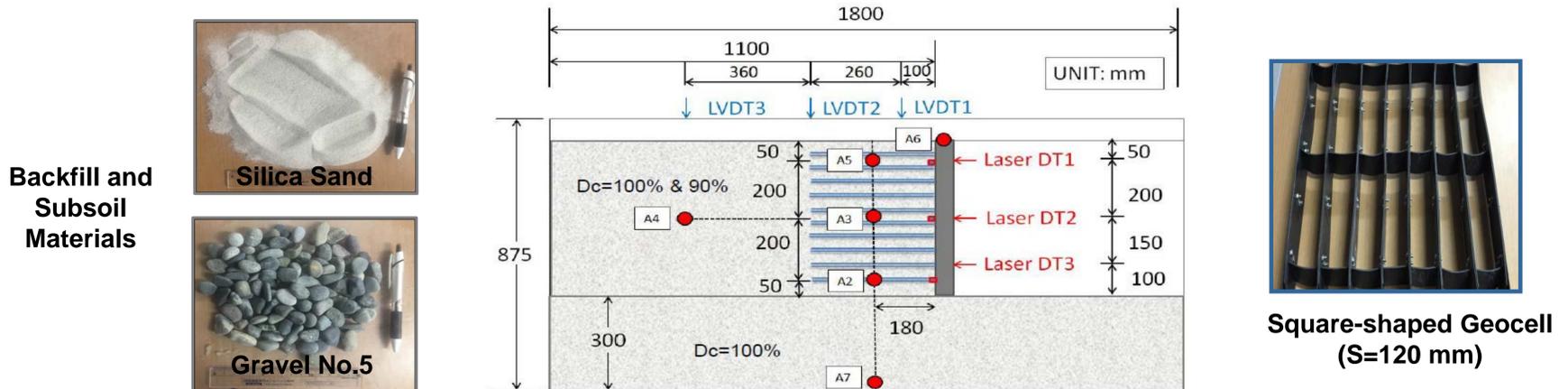


Fig. 1 Schematic diagram of GRS-RS RW

Results and Discussion

Figures 2 and 3 show the deformation of the square-shaped geocell RS RWs at its failure stage. It is evident that the square-shaped geocell with a well compacted backfill (Figure 2a and 2b) accumulated very limited backfill and wall facing residual deformation even at large base acceleration.

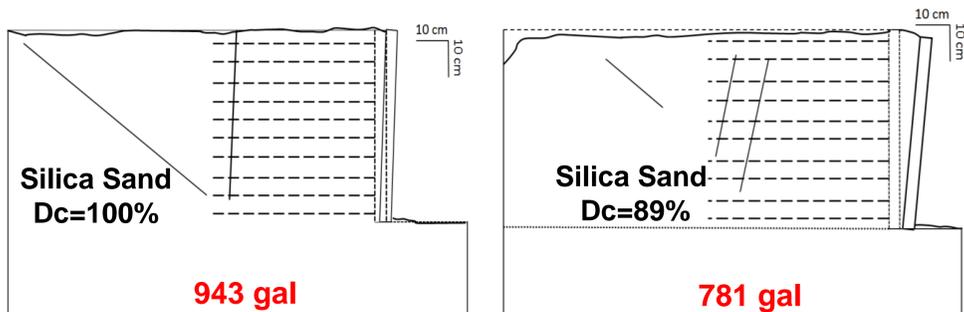


Fig. 2 Residual deformation of Silica Sand Backfill

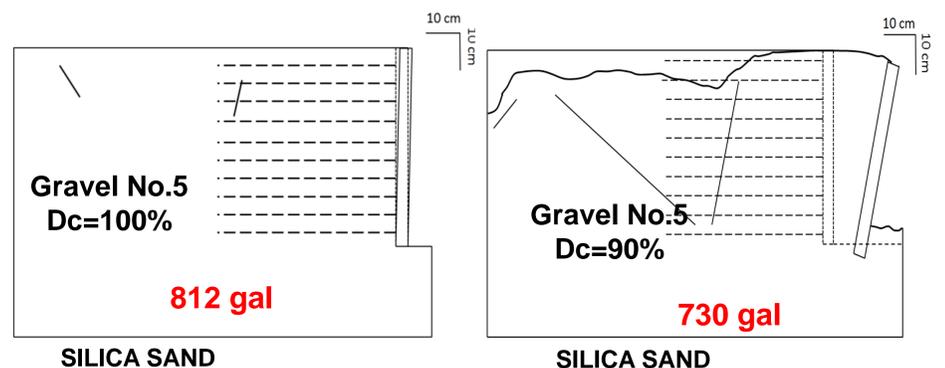


Fig. 3 Residual deformation of Gravel No.5 backfill

Figures 4 and 5 show that the square-shaped geocell RS RWs with a well compacted and poorly compacted backfill demonstrate similar overturning angle (θ) and bottom displacement (d_s) up to an base acceleration of 400 gal. However, as the base acceleration increased, the residual deformation accumulated very rapidly for the poorly compacted backfill, while for the well compacted backfill, a more ductile behavior was shown even at large base accelerations. It is worth pointing out that the RWs with a Gravel No.5 backfill accumulated a larger overturning angle and bottom displacement than that of the Silica Sand backfill, probably due a poor geocell confinement of the larger soil particles of Gravel No.5.

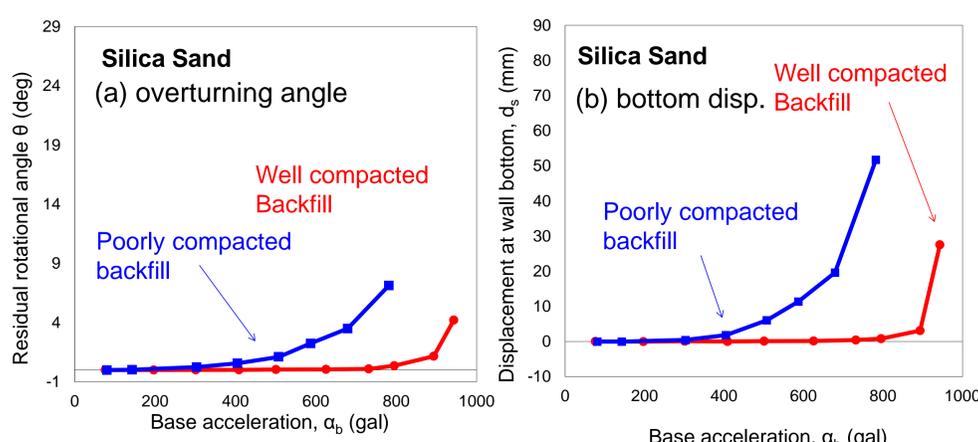


Fig. 4 Deformation of RW for Silica Sand backfill

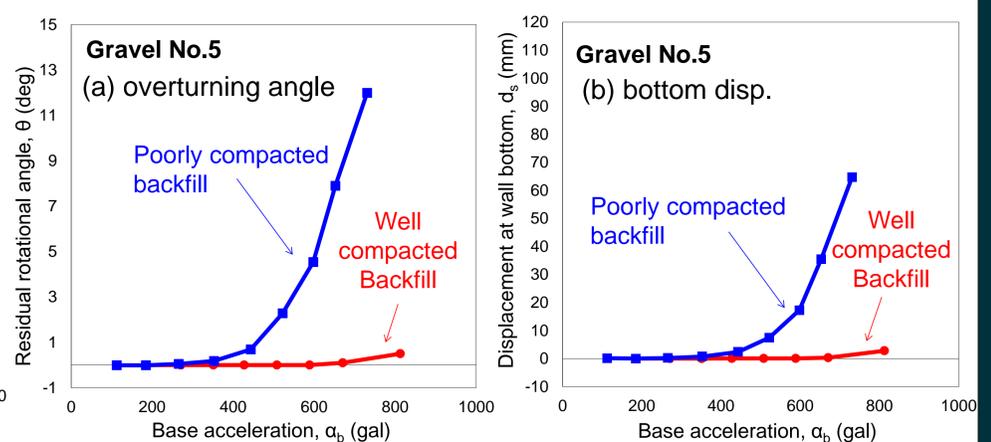


Fig. 5 Deformation of RW for Gravel No.5 backfill