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Effect of particle size of backfill on the seismic resistance of GRS-RW

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Experimental Outline

To analyze the influence of the particle size of the backfill on the seismic performance of a GRS-RW, eight shaking table tests were conducted separately using three types of reinforcements, embedded in silica sand No.7 (D_{50}=0.25mm) and gravel No.5 (D_{50}=14.2mm). The reinforcements used in this study are geogrids (Fig. 1b and 1c) and a newly-developed square-shaped geocell (Fig. 1d, Han, 2014). Two different types of geogrids were used with different aperture sizes. Note that the aperture size of the large geogrid and the square-shaped geocell is larger than the soil particles of the backfills, while the small geogrid is 6.3mm × 6.3mm, which is smaller than gravel No. 5 and larger than silica sand No. 7.

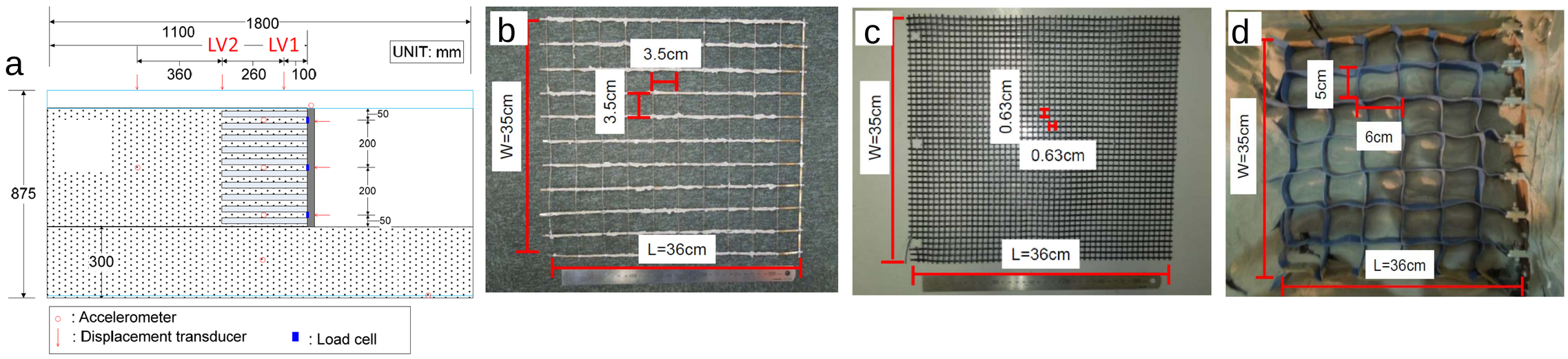

Fig. 1 a) Schematic diagram of GRS-RW **b)** large geogrid, **c)** small geogrid **d)** square-shaped geocell

Seismic Performance of Reinforced Retaining Walls

The results shows that the seismic performance of the square-shaped geocell is the highest despite the different backfill materials. However, for the geogrids, the trend of the results with an increase of the base acceleration is different between silica sand and gravel backfill. As shown in Fig. 2, the small geogrid shows higher or similar seismic resistance than the large geogrid for the silica sand backfill, while it is the opposite for the gravel backfill. It seems that the ratio of particle size of the backfill to aperture of the geogrid has a substantial effect on the seismic resistance performance of the GRS-RW system.

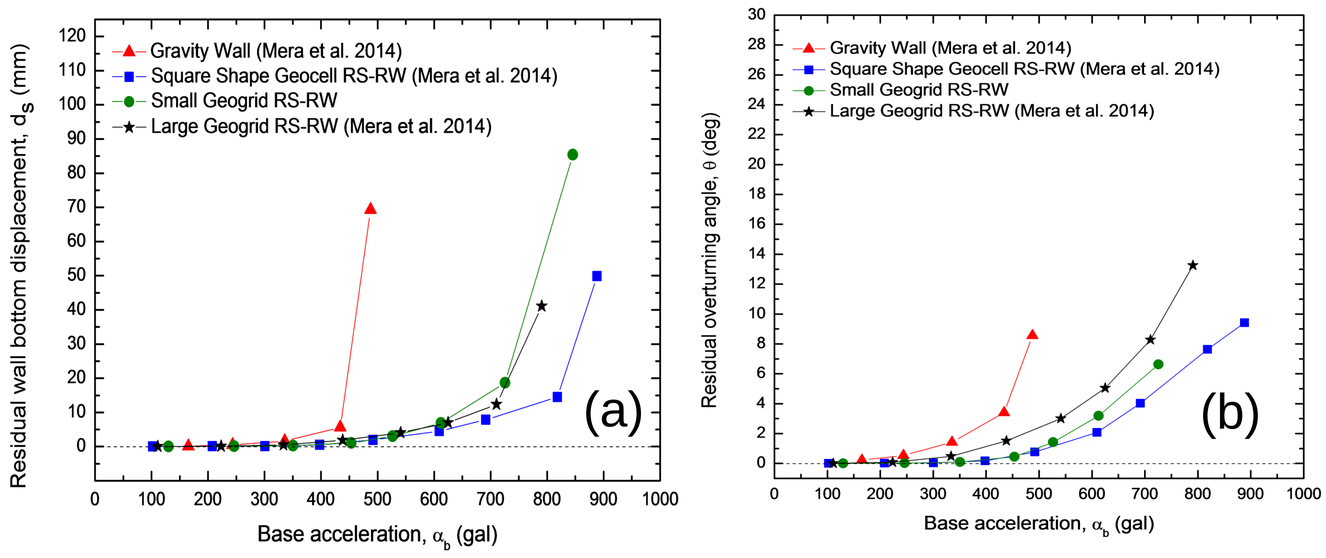

Fig.2 Sand backfill: **(a)**wall bottom displacement; **(b)** overturning angle

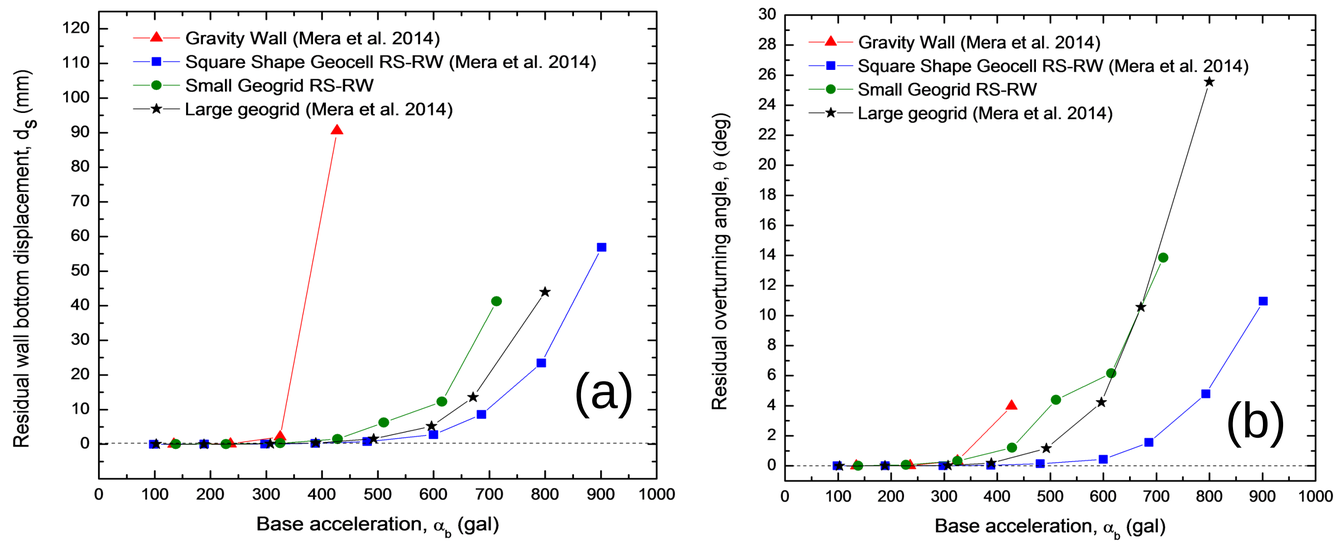

Fig.3 Gravel backfill: **(a)** wall bottom displacement; **(b)** overturning angle