

Geogrid for Working Platform Construction

GEOTECHNICAL ENGINEERING TECHNICAL DIVISION



by Engr. Richard Ong Tiam Hwa

AN evening talk entitled, "Geogrid for Working Platform Construction" was held on 3 September 2012 at the Auditorium Tan Sri Prof. Chin Fung Kee, Wisma IEM. The talk was delivered by Engr. Richard Ong and attended by an audience of 36 people.

The speaker started his talk with the presentation of some photographs on the effects of poor working platforms on piling rigs and cranes. A series of photographs illustrating the difficulties of mobilising cranes to salvage sinking and collapsing piling rigs or cranes on poorly prepared working platforms were shown.

Based on a news report in the United Kingdom, Engr. Richard Ong highlighted that one third of the accidents in the piling industry resulted from the defects in the working platform. These accidents could be avoided if proper design of the working platform, which is normally constructed of

granular material, had been conducted prior to deploying the tracked plant to the project site. A reference was then made to the Building Research Establishment's (2004) report BR470 on Working Platforms for Tracked Plant. This report provides guidance on working platform design and construction with the aim to improve safety without undue expenditure. Within the report, there is a section dedicated to the use of geosynthetics in working platform design and construction. Subsequently, the speaker discussed about the use of geogrid in working platform construction.

The speaker introduced the mechanisms by which the inclusion of a geogrid may improve the performance of an unbound aggregate layer over soft soil. When granular particles are compacted over geogrid, they partially penetrate and project through the apertures and are mechanically confined by the geogrid to create a stiff composite layer. This interlocking mechanism leads to the quality of the lateral confinement which varies over its thickness as shown in Figure 1.

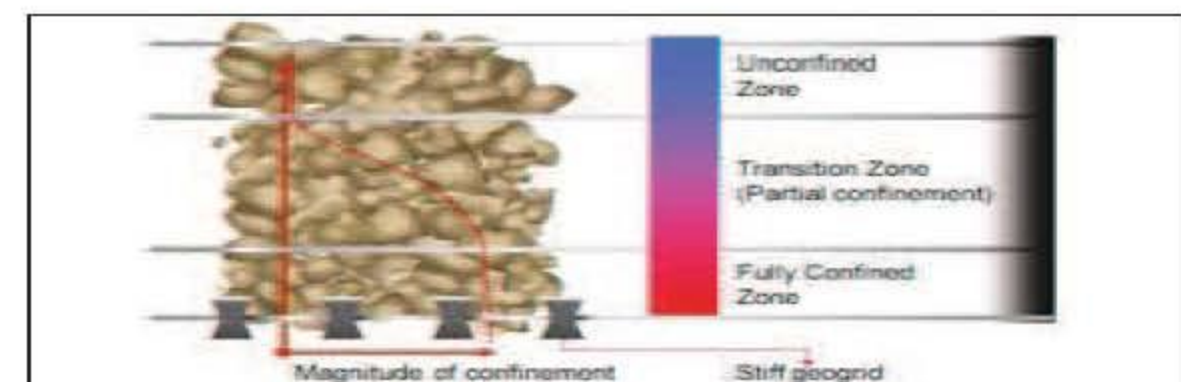
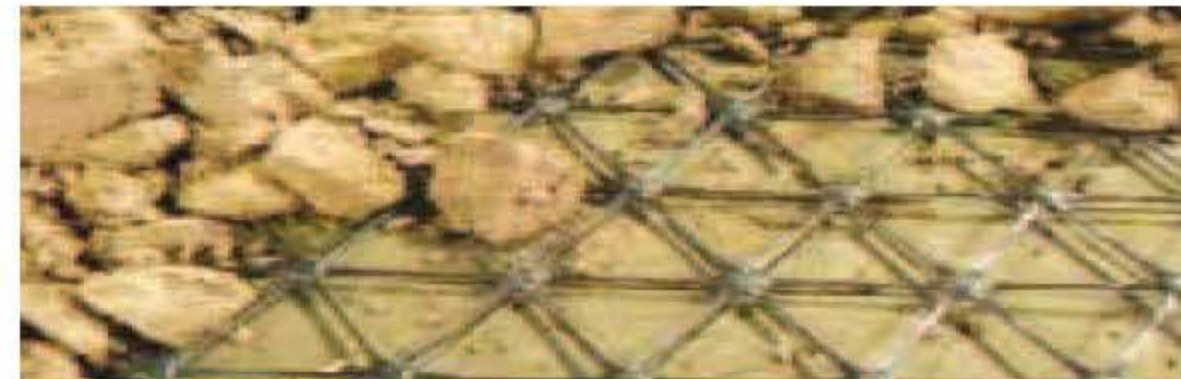


Figure 1: Interlocking mechanism of stiff geogrid providing lateral confinement

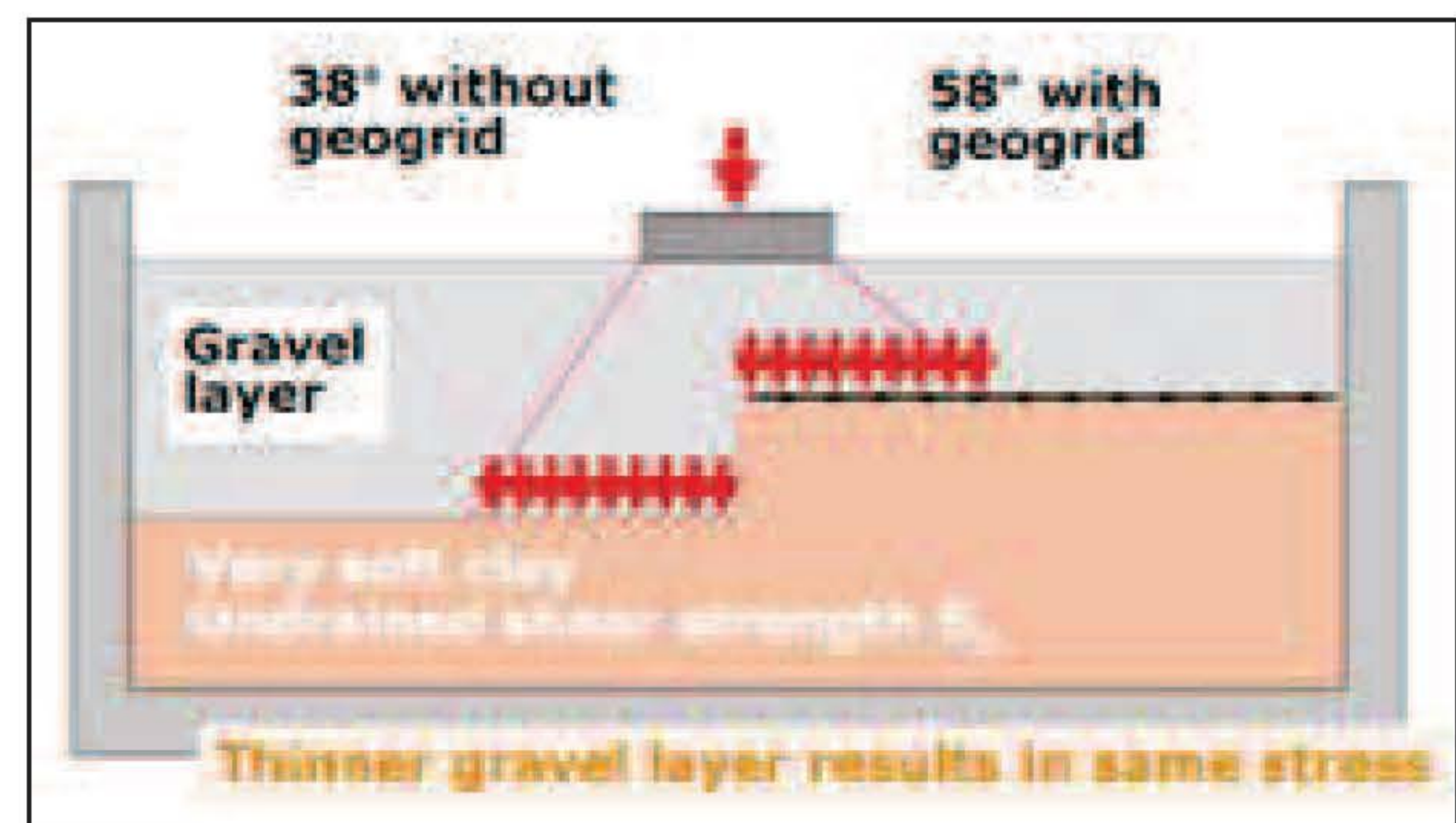


Figure 2: Increase of load spread angle with the use of geogrids

Subsequently, the speaker presented the findings of two research papers conducted on the effectiveness of inserting geogrid into granular load platforms. The research by Milligan and Love (1985), which investigated the interlocking mechanism and load spread via models of static foundation over granular layer with and without geogrid over soft clay, showed that the performance of a geogrid stabilised granular layer was significantly better than a granular layer without geogrid due to the increase of the load spread angle as shown in Figure 2. Similarly, a recent large-scale laboratory test by Watts and Jenner (2008) to assess the performance of a geogrid stabilised granular working platform concluded that the use of two layers of geogrids significantly increased the bearing capacity of working platforms due to the improved load spread achieved by using geogrids.

From the findings of this large-scale laboratory research, the speaker went on to provide two case studies which highlighted the real world application of geogrids in working platform construction. The first case study presented was the construction of a geogrid stabilised working platform for an offshore jacket fabrication yard in Johor which was constructed to support a 225-tonne crawler over soft clay subgrade in 1987. The second case study presented was the construction of a geocell mattress with geogrid stabilised granular layer adopted in the construction of a working platform to support the movement of heavy crawler cranes with loadings of up to 500 kPa in Vung Tau, Vietnam. The speaker ended the evening talk with a remark that the working platform for a tracked plant can be designed with or without geogrid. ■

REFERENCES

- [1] Building Research Establishment (2004), "Working platform for tracked plant", BR 470, BRE, UK.
- [2] Milligan, G.W.E., and Love, J.P. (1985) "Model Testing of Geogrids under an Aggregate Layer on Soft Ground", Polymer Grid Reinforcement, London, UK, pp. 128-138.
- [3] Watts, K. and Jenner, C. G. (2008), "Large-scale laboratory assessment of geogrids to reinforce granular working platforms", Proc. EuroGeo4 Conf., Scotland, UK, Paper #222.