

Tensar temporary working platforms – validation of mechanically stabilised platforms over granular subgrade soils

Introduction

As part of an ongoing research programme to understand how working platforms behave under load, Tensar have undertaken full scale validation testing at University of Birmingham National Buried Infrastructure Facility (NBIF) in UK. The aim of the study was to test temporary working platform bearing capacity when installed on a granular subgrade.

Test set up

Subgrade soils

Sand was selected to represent a granular subgrade soil. A loose sand layer was placed to a thickness of 2.8m on top of a 2.0m thick layer of "standard" NBIF sand with higher properties (see layout in Figure 4). The Particle Size Distribution for the upper layer of loose sand is shown in Figure 1.

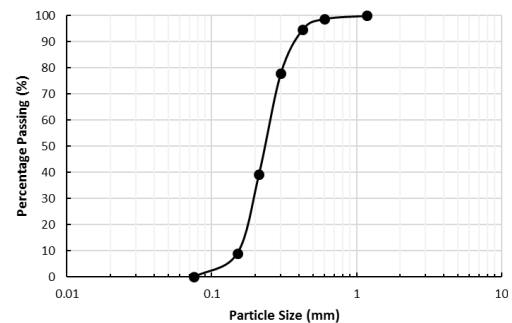


Figure 1. Particle Size Distribution of subgrade sand used in the NBIF testing

Platform fill



Figure 2. 6F5 aggregate used in the study

A UK Class 6F5 material was sourced for the testing to represent platform material typically encountered on site. (Figure 2). This aggregate comprised of recycled aggregate, demolition rubble, ceramics, bricks and minor organic content. Up to 5% of the aggregate was oversized exceeding the 125mm max size limit – which is a commonly seen on UK construction sites.

Loaded plate

The load plate with dimensions of 1m wide by 2m long was designed to be stiff enough to ensure minimal deformation of the plate occurred during the testing. The rectangular shape represents the typical shape of load for tracked plant such as a piling rig or crawler crane for which the majority of temporary working platforms are designed.

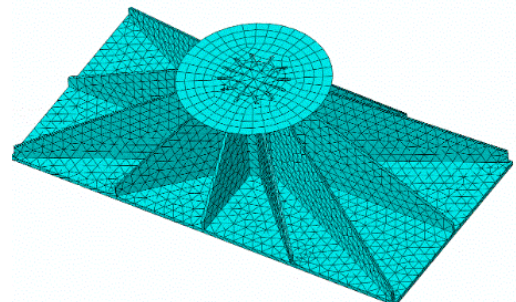


Figure 3. Loading plate design simulation sketch – general view

Test Pit and the Test

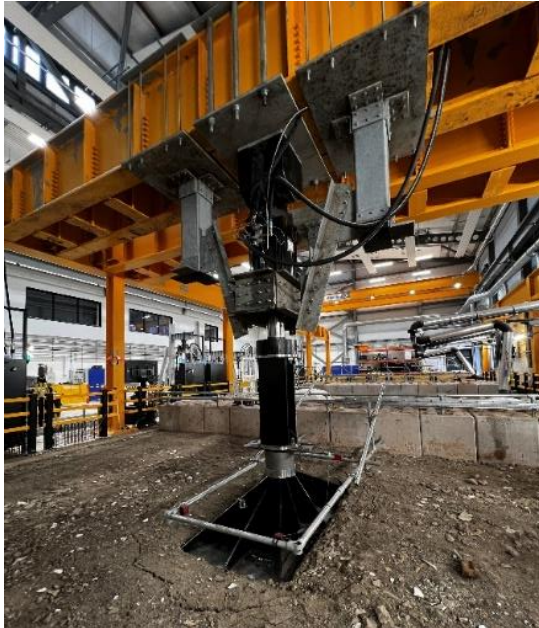


Figure 4. Test set up – the plate view during the test

The test pit size was 10m by 6m. Detailed numerical analyses were undertaken to analyse boundary any condition influence on the test results which confirmed that the vicinity of the pit walls would have a negligible effect on the test results.

Three platforms were to be constructed and tested in turn. The first constructed and tested was the control without a geogrid. The arrangements of two Tensar mechanically stabilised platforms were determined using numerical modelling to ensure the tests could be completed safely without exceeding the load actuator capacity. The mechanically stabilised sections were constructed thinner than the control with each including a different grade of Tensar InterAx geogrid at its base.

Results and conclusions

Testing commenced in December 2023 and by the end of April, the control and one of the Tensar mechanically stabilised platforms had been tested. The final mechanically stabilised platform will be tested in August.

The observations so far suggest similarities to other comparative static load testing that Tensar have carried out on platforms over cohesive soils where the influence of the geogrid offers benefits in terms of increased bearing capacity over low strength soils giving opportunities to reduce platform thickness whilst maintaining required bearing capacity performance.

This information will be updated once the testing has been completed but it can be seen from this information that:

- Tensar have assessed performance of working platforms over granular subgrades
- Performance benefits have been demonstrated to allow confirmation of the design of a mechanically stabilised platform

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