

Proven improvements in bearing capacity with Tensar geogrids



Data Centre Concrete Culvert Foundation

Port Dickson, Malaysia

CLIENT'S CHALLENGE

The client faced weak subgrade with an undrained shear strength (s_u) 24kPa at the Data Centre site, raising concerns over ground stability under a 260 kPa working load. An engineered solution was required to allow the stable construction of concrete drainage culverts. The ground was required to achieve bearing capacity and settlement targets whilst controlling project costs.

TENSAR SOLUTION

Tensar proposed the design of a Tensar mechanically stabilised layer (MSL) incorporating Tensar stabilisation geogrids. These products have been used extensively around the world to enhance the efficiency of load distribution through granular layers to increase bearing capacity over low strength soils under a wide range of loading conditions. Once installed, the Tensar MSL was tested to confirm it would achieve the required 260kPa bearing capacity to allow stabilised support to the concrete culvert sections. On site plate bearing tests showed the Tensar MSL would sustain loads up to 700kPa with minimal deflection. A project specific settlement criteria of 20mm was also achieved during the testing.

B E N E F I T S

- **Enhanced foundation** bearing capacity performance
- **Reduced risk of** remedial works and construction delays
- **Reduced the risk of** costly foundation repairs
- **Reduced approximate** 55% of aggregate thickness



PROJECT DETAILS

Application

Foundation Support | No. 577

Constructed in

2025

Client

**Pearl Computing Malaysia Sdn Bhd
(Google affiliated)**

Consultant

Dr YG TAN Jurutera Perunding Sdn Bhd

Contractor

Gamuda Engineering Sdn Bhd

Product

Tensar H-Series



Existing soft ground condition

PROJECT BACKGROUND

The Data Centre project located in Springhill Port Dickson, encountered challenging ground conditions characterised by very low undrained shear strength, raising concerns over the ability of the subgrade to support structural loads. The installation of a drainage culvert introduced a working load of approximately 260 kPa, requiring a robust foundation solution to control settlement and ensure long-term performance.

Tensar proposed a mechanically stabilised layer (MSL) incorporating two layers of H-Series geogrid, designed using the Finite Element Method (FEM) to improve load distribution, bearing capacity and settlement performance. Due to the unexpected weak ground conditions, the Tensar MSL was approximately 50% thicker than the originally proposed granular layer. To confirm its performance, plate bearing testing was carried out on the Tensar MSL and a thicker non-stabilised granular layer. Both sections were subjected to two loading cycles at 100% and 200% of the working load, with a failure criterion of 20 mm settlement.

As demonstrated by the plate bearing test results, the Tensar MSL supported 200% of the working load, approximately 520 kPa, without exceeding the 20 mm settlement criterion. The section recorded approximately 18 mm of settlement, demonstrating the effectiveness of the mechanically stabilised layer in increasing bearing capacity over the weak subgrade.



Plate Bearing Test Setup



Plate bearing test report

Failure criteria will be 20mm deformation with 2 times working load

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