

**D1 MOTORWAY HRICOVSKE
PODHRADIE, SLOVAKIA**

BASAL PLATFORMS

Product: ParaLink®, MacGrid® EG 40, MacTex® BN

Problem

A project to extend and improve the D1 Motorway in Hricovske, Podhradie necessitated the need for the construction of an 8.5m high embankment supporting the highway between km 32.550 and 33.400.

The embankment would be founded on soils with very low bearing capacity (poor wet clays) and additionally the groundwater was high at this location. To limit differential settlement, basal reinforcement of the embankment would be required as well as measures to reduce the problems caused by the presence of the high ground water.

Solution

Vertical wick drains were specified to reduce the effect of the high water table. However, the ground was too soft to enable the heavy plant to access the site in order to install the wick drains.

Maccaferri were approached by to propose solutions to;

- Overcome the temporary access problems
- The long-term embankment stability

A working platform formed by a 0.5m thick layer of gravel, stabilised with extruded polypropylene geogrid, MacGrid® EG 40 was proposed. Additionally, to prevent the quality gravels from being contaminated by the poor soft soils beneath it, the gravel layer was constructed upon a non-woven geotextile separating layer, MacTex® BN. The construction of this reinforced raft enabled the access of the plant and thus the installation of the vertical wick drains to speed up the consolidation of the foundation.

To address the long-term stability of the embankment and to limit differential settlement, basal reinforcement was required. Designing in accordance with EC7, Maccaferri used MacBARs and MacSTARs software to propose the high-strength, low-strain geogrid, ParaLink® 300 as the basal reinforcement.

This basal reinforcement for the embankment was constructed on top of the working platform at the base of the highway embankment, further simplifying construction.



The geosynthetics to be used in the project



Wick drains being installed



Close-up of layers - MacGrid® seperator on soft soil, MacGrid® within gravel layer of working platform, ParaLink® on top

Client:

NATIONAL ROAD AUTHORITY

Main contractor:

JV, OVCIARSKO & STRABAG

Designer:

JV. D1 HP-LL WITH DOPRASTAV, GEOCONSULT &

Products used:

PARALINK® 300, MACGRID® EG 40, MACTEX® BN

Date of construction

AUGUST 2015



ParaLink® is an ultra strong reinforcement geogrid

The MacGrid® EG used within the working platform is an extruded polypropylene biaxial geogrid. These types of geogrids stiffen the granular materials within which they are installed through two functions:

- Interlocking with the granular material
- Membrane effect

They limit the differential settlement of the granular platform and enable the short-term access over the soft ground, whilst consolidation occurs.

However, they are unsuitable for long-term structural reinforcement of the highway embankment as they strain too much in the medium-long term. This long term structural reinforcement is provided by the ParaLink®.

ParaLink® is one of the most tried and tested geogrids in the global soil reinforcement marketplace. It consists of polyester fibres as the tensile reinforcement encased within a tough polyethylene sheath, providing excellent protection. This protection, the long history of performance and the third-party certification of ParaLink®, means it has excellent long-term design strength, compared to other geogrids. This delivers efficiency not only in design, but also during the construction phase as less geogrid needs to be installed to offer the same reinforcing function.



Laying of ParaLink® - note vertical wick drains in place



ParaLink® in place ready to receive embankment construction

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