

Germany's first permanent reinforced soil bridge abutment constructed at Ilsenburg, using Fortrac®-geogrid



K 1355 bridge over River Ilse at Ilsenburg

Background

The City Council at Wernigerode invited tenders to build a replacement bridge over the River Ilse as part of the upgrading of the K1355 district road at Ilsenburg. The design was based on a bridge abutment with a bored pile foundation. The original proposal had been designed as an anchored gabion structure with the piles passing through the gabions.

Construction

The consulting engineer, Herold & Partner of Weimar, proposed a geosynthetic reinforced soil (GRS) solution as an alternative form of abutment construction. Instead of load transfer through the piles, it would take place through the GRS structure, onto which the abutment bearing shelf would be directly cast. The GRS structure consisted of several layers of recycled, crushed, compacted concrete fill and Fortrac® geogrid, type R 140/30-30 MP. The geogrid was positively attached to the gabion baskets by being looped around and turned back



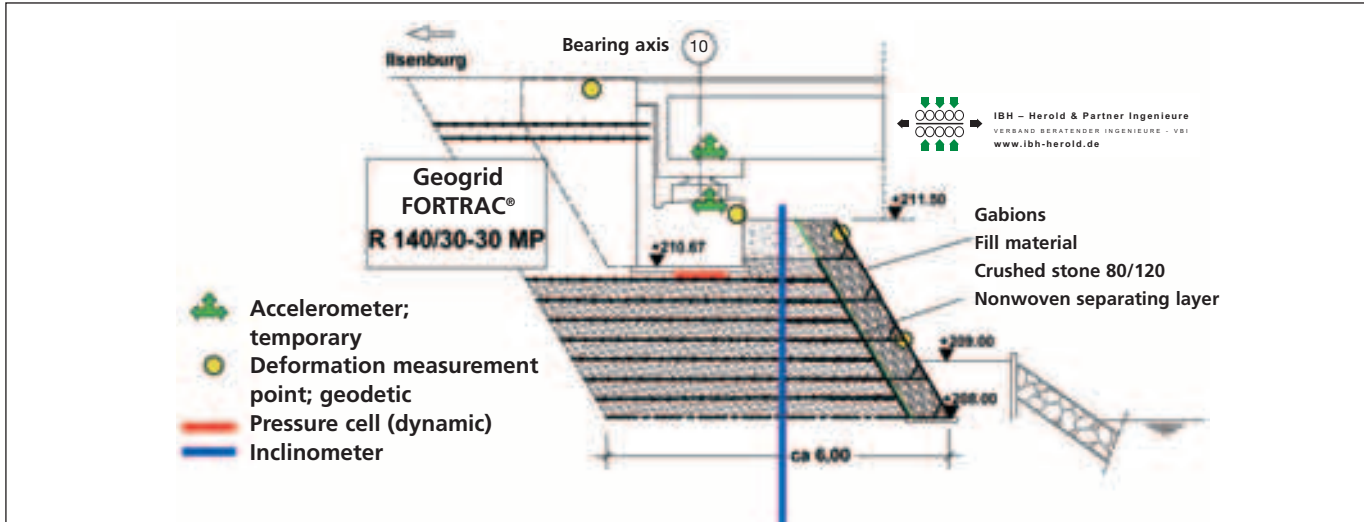
Load transfer takes place through the GRS structure onto which the abutment bearing shelf is directly cast.

underneath. The flexibility of Fortrac® makes it very easy to use.

GRS construction offers several advantages: The geogrid product range, Fortrac® M and Fortrac® MP, is manufactured using the high alkali-resistant, low-creep and low-extension polymer PVA (polyvinylalcohol). These properties were important for the directly loaded bridge abutments with their extremely low deformation tolerance and the use of crushed concrete fill.

The construction was carried out quickly and economically with the completed abutments offe-

Germany's first permanent reinforced soil bridge abutment constructed at Ilsenburg, using Fortrac®-geogrid



Cross section of bridge abutment at Ilsenburg

ring excellent static and dynamic load-carrying characteristics.

GRS designs are based on structural calculations and subject to a certification process. Being the first permanent GRS bridge abutments in Germany, vertical inclinometers were installed, allowing the horizontal movements in the GRS structures to be accurately recorded. Settlement measurement points were set up on the bearing shelf to enable vertical deformation surveys of the structures to be carried out. In addition, soil pressure gauges and

accelerometers were installed to examine the behaviour of the structures under dynamic loading.

The abutments were completed in October 2000 and approved to carry traffic in December 2000. Since being brought into use, the structure has been monitored and surveyed by IBH-Herold & Partner.

Up to now mean vertical deformation values only reached 4-8 millimetres. The horizontal movements were in the range of 1-2 millimetres. In addition the use of Fortrac® MP geogrid also makes structure more flexible than the traditional form of construction. Cracking, that often occurs in a stiff concrete structure as a result of deformation or movement, were avoided.



The facing is constructed from galvanised gabion cages filled with crushed stone / armour stone.

Project/location: K 1355 at Ilsenburg, Germany

Client: Wernigerode City Council

Alternative proposal and final design: IBH-Herold & Partner, Weimar
www.ibh-herold.de

Contractor: Matthäi, Magdeburg

Construction: October to December 2000

Product: Fortrac®, type R 140/30-30 MP

HUESKER Synthetic GmbH

Fabrikstraße 13-15 • D-48712 Gescher/Germany
Phone: +49 (0)25 42 701-0 • Fax: +49 (0) 25 42 701-499
Internet: www.huesker.com • E-mail: info@huesker.de

