Ebankment Drainage
High Speed Rail, Pozidrain, Sevilla - Cádiz, Spain

Project Description
The Alto Velocidad Española (AVE) is Europe’s largest high speed rail network. The ambitious construction project was undertaken to improve connections between all of Spain’s major cities, reducing commute time and contributing to socio-economic regeneration. The new Sevilla to Cádiz railway line would be an extension of the Madrid to Sevilla route, connecting Cádiz to Jerez Airport and crossing areas of outstanding natural beauty.

The Challenge
The new route would traverse an area of Bahia del Sur (Cádiz) where an embankment would be constructed to accommodate the railway line. Ground investigations identified soft, wet soils which would be unsuitable for construction without remediation to improve stability. This would traditionally be addressed through a combination of vertical wick drains and a granular drainage blanket to direct the water horizontally to French drains adjacent to the embankment. However, this method required the use of large quantities of costly imported granular material, which would also prove slow to install. These considerations led the designer to consider the use of a drainage geocomposite to act as a horizontal drainage blanket, a methodology which had proved successful in other infrastructure works on soft ground.

Project Information

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<thead>
<tr>
<th>Client</th>
<th>Administrador de Infraestructuras Ferroviarias (ADIF)</th>
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<tbody>
<tr>
<td>Contractor</td>
<td>Acciona Infraestructuras</td>
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<tr>
<td>Consultant</td>
<td>Administrador de Infraestructuras Ferroviarias (ADIF)</td>
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<td>Products</td>
<td>Pozidrain 4SK500/NW8</td>
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<tr>
<td>Quantity</td>
<td>45,000m²</td>
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Benefits
- Rapid installation over a large area
- Significant material and labour cost savings vs granular materials
- Carbon emission reductions

Pozidrain 4SK500/NW8
The Solution

The contractor Terratest approached ABG to assist in the redesign utilising Pozidrain drainage geocomposite. Pozidrain comprises a high-strength drainage core thermally bonded to a filtration geotextile. Using Darcy’s Law allowed ABG to calculate the equivalent in-plane flow of the granular material, and propose a grade of Pozidrain suitable to manage the expected water flows. In-plane flow tests to EN ISO 12958 using soft foam platen to simulate soil overburden proved the required flow capacity. Design calculations, which accounted for the weight of the embankment and the traffic loads, indicated a long term pressure at the base of the embankment in excess of 55 kPa. Pozidrain 4SK500/NW8 was chosen to provide a 9.0 factor of safety. Pozidrain was installed by the contractor in a fraction of the time required for the original granular design, meeting tight project timescales and providing a significant cost saving.

The ABG Service

ABG worked closely with Terratest to provide full design support, comparisons, costing and supply.

Contact ABG today to discuss your project specific requirements and discover how ABG past experience and innovative products can help on your project.