

MAJOR HIGHWAY EMBANKMENT REINFORCEMENT LEVAN TO DAMES ROAD, ALBANIA

BASAL REINFORCEMENT

Product: Paralink™ 450, MacTex™ N60.1

Problem

Construction of the North-South Corridor in Albania between Montenegro in the North and Greece in the south is a key highway to continue the growth of this South Eastern European country. An important section of these works is between Levan and Dames in Albania. The works consist of 37.5km road with a contract price of €39M.

The alignment of the highway required that the abutments of a bridge had to be built upon low-bearing capacity areas, due to the presence of subsoil with high water content. The ground was unable to accommodate the high loads imposed by these structures. An engineering solution was required to enable the construction of foundations capable of carrying the required loads and to fit the tight timing scheduled for the construction programme.

Of concern was the transition between the bridge itself, which was constructed on piles, and the embankments. These areas could settle at different rates and any embankment /abutment solution had to minimise this differential settlement.

Solution

The chosen solution was a combination of a deep drainage system with piled embankments. The drainage system increased the bearing capacity of the soil by reducing the water content. The system was a grid of vertical drains which provide an unobstructed and rapid pathway for water.

Piled embankments are a common solution when supporting major infrastructure embankments. However, the use of geosynthetic reinforcement products in conjunction with the piles can offer significant time and cost savings on projects.

Client:

MINISTRY OF PUBLIC WORKS TRANSPORT & TELECOMMUNICATIONS, ALBANIA

Main contractor:

TODINI COSTRUZIONI GENERALI S.p.A.

Designer:

CAED International srl.

Engineer:

TECHNITAL / TECNIC / STRETTO DI MESSINA
JOINT VENTURE

Products used:

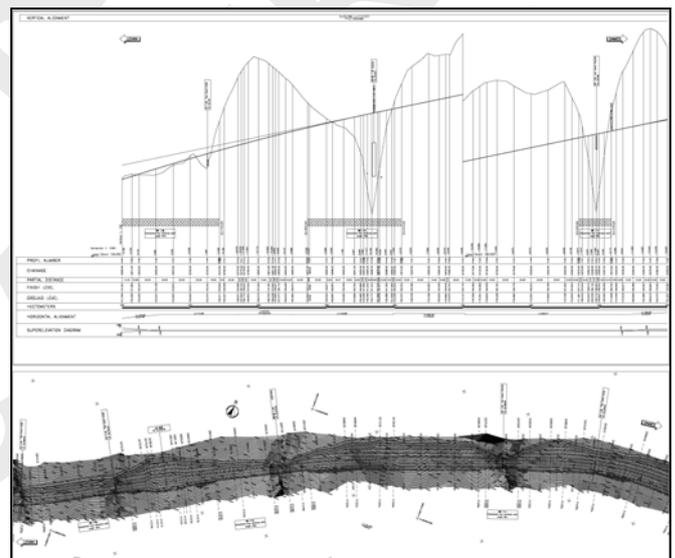
PARALINK™ 450, MACTEX™ N60.1

Date of construction

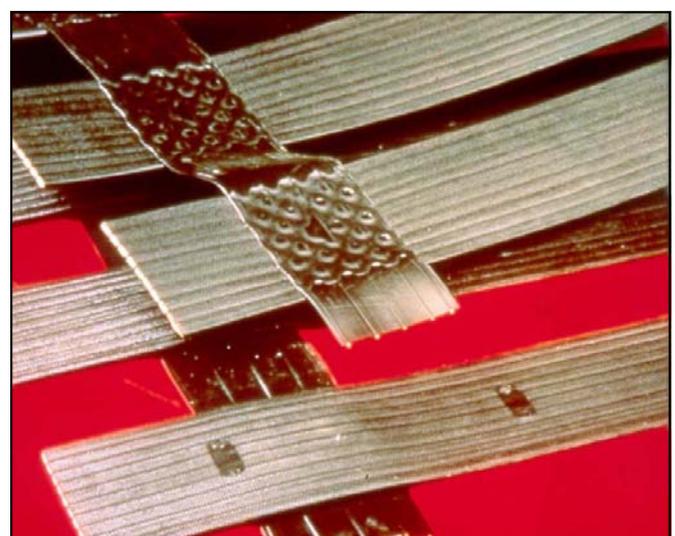
2009 - 2012



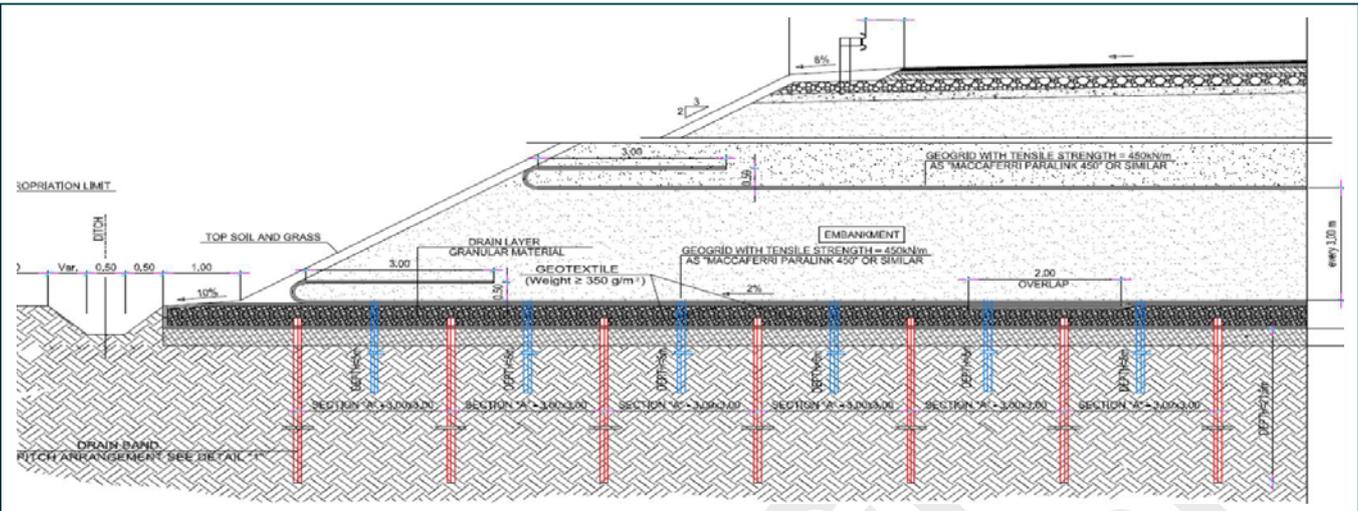
Project location, Albania



Layouts and longitudinal profiles from km 32+600 to 33+400



Detail of Paralink product



Project section

High strength, low strain geogrids, placed low-down in the foundation to the embankment, spread the embankment loads down into the piles more efficiently. This “basal reinforced platform” redistributes the embankment loads efficiently and significantly reduces the potential of differential settlements.

A second advantage is that this reinforcement function often enables the pile spacings to be increased as the geogrids enhance the capability of the soil arching.

The geogrid selected was Paralink™ 450. A unique high strength geogrid of polyester strength elements encased in a robust polyethylene sheath. In use for over 30 years, Paralink™ shows unparalleled Long Term Design Strength reduction factors; i.e. compared to other geogrids, less Paralink™ is required to offer the same performance.

A 500mm thick gravel drainage layer, confined within a MacTex™ N60.1 non-woven geotextile, was placed on top of the pile caps. The MacTex™ protects the gravel drain from becoming contaminated by fine soils transported within the ground water. Paralink™ 450 was placed on top of this layer. A second layer of Paralink™ was installed 3m higher within the embankment to provide stability to the embankment itself.

The side slopes of the embankments were covered in topsoil to encourage vegetation establishment.



During construction—unrolling Paralink



During construction - placing construction layers onto Paralink



During construction - placing construction layers onto Paralink

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