

NIGG DRYDOCK REFURBISHMENT

NIGG, CROMARTY FIRTH, UK

SLOPE REINFORCEMENT

Product: Terramesh & ParaLink

Problem

Barmac, the owners of Nigg drydock, identified a new market for floating production facilities. The Nigg dock could meet those needs but required upgrading. Refurbishment would alter the area of the dock from 176m x 305m to 150m x 350m, making it slightly narrower but longer. This would enable the facility to accommodate larger vessels. A new quay wall 240m long and 16m high would replace the western slope. A reinforced earth wall or slope was required to retain an infill area between the new quay and the existing dry dock round head.

Solution

The Terramesh system offered an economic system whilst providing the optimum amount of 'laydown' space; the area needed for storing vessel components during refurbishments.

The clients requirements were analysed in detail and due to the unprecedented nature of the design, Maccaferri and Ove Arup worked together to satisfy the clients demanding brief.

Maccaferri's preliminary design for the reinforced Terramesh wall was progressed in general accordance with BS8006; Reinforced Earth and Other Fills, checking internal and external stability, using both in-house and commercially available software.

As the dry dock would be filled and emptied of water rapidly, the ground water conditions would be onerous. Combining this with the high loads on the wall, the stability of the structure could only be satisfied with the use of high strength geogrid reinforcement used in conjunction with the Terramesh soil reinforcement.

BBA Roads and Bridges Certified Paralink uniaxial geogrids of 300kN/m strength were used in conjunction with the Terramesh soil reinforcement to form a hybrid structure.

A number of drainage layers were also incorporated into the final design to ensure rapid groundwater drawdown when the docks are dewatered.

Client:

BARMAC

Main contractor:

MORRISON CONSTRUCTION

Designer:

OVE ARUP & PARTNERS

Products used:

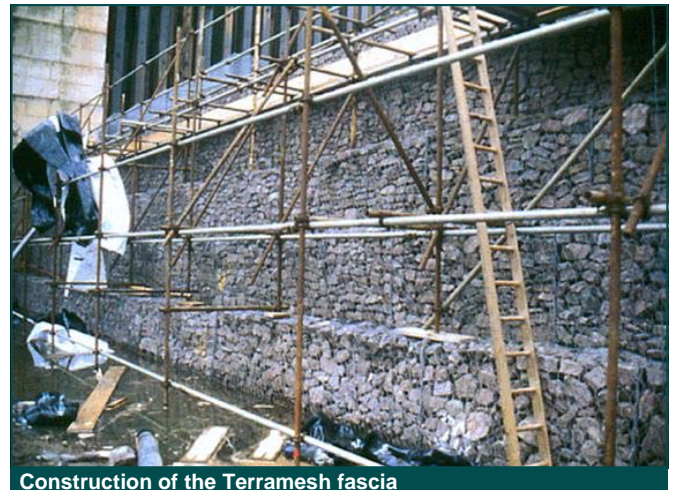
TERRAMESH & PARALINK

Date of construction

MAY 1997



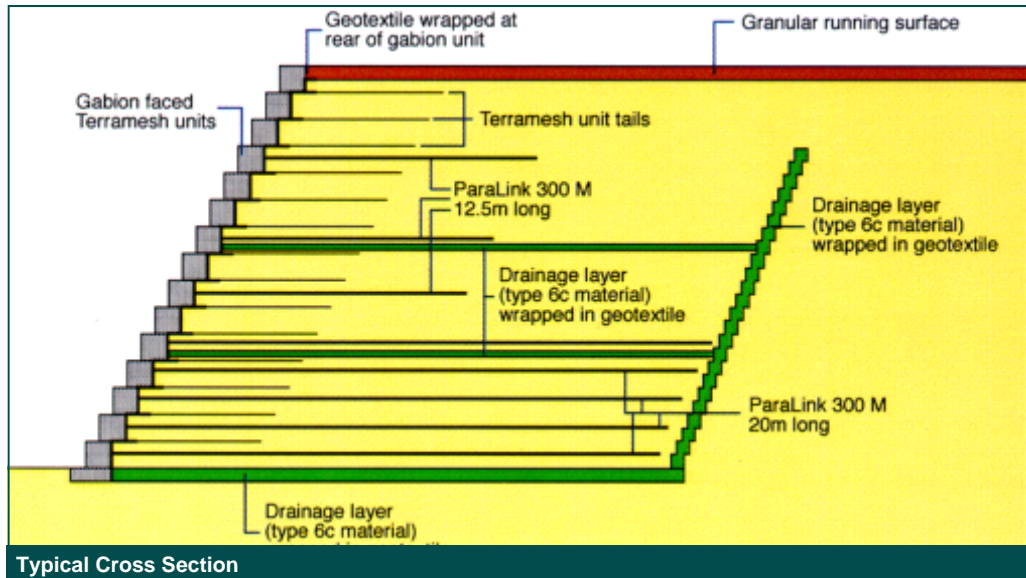
Construction of the hybrid Terramesh & Paralink wall



Construction of the Terramesh fascia



Backfill being placed onto Paralink primary reinforcement



BBA Certified Maccaferri Terramesh units consist of a PVC coated and heavily galvanised gabion unit with an integral steel mesh soil reinforcing geogrid 'tail'. This one piece unit removes any need for fussy connection details between fascia element and geogrid tails. This guarantees quality of connection and offers greater reassurance to the client compared to conventional two-piece systems.

The geogrids are placed in layers within compacted structural backfill to form a monolithic reinforced earth block..

The ParaLink in the lower half of the structure provides high strength to eliminate the risk of deep seated slips. ParaLink 300M was selected for the final design as installation damage with the fine sand structural backfill would be low. ParaLink has a composite structure, comprising an inner core of high modulus, low creep polyester fibres encased in tough polyethylene, making it highly durable and ideal for the harsh environment at Nigg.

The work force received on-site support from Maccaferri throughout the construction period and this, combined with Morrison's site management's commitment to produce a quality structure, ensured that the gabion face of the Terramesh was constructed to a very high standard.

Work was completed in a month, the same week the dock was flooded for the first time.

The completed wall is one of the highest Maccaferri ParaLink reinforced Terramesh structures in Europe, being 15m high and 50m long. In addition, a wall north of the quay wall was constructed 6m high and 60m long.



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