

### 50 YEAR OLD GABION "HALF-TIDE" STRUCTURE RIVER HUMBER, BROUGH, UK

#### HYDRAULIC WORKS

#### Product: GABION WALL AND RENO MATTRESS APRON

##### Problem

For many years there had been severe erosion to the north bank of the River Humber at Brough, which is some ten miles to the west of Hull.

Much of the land at Brough is below the level of ordinary spring tides in the Humber, and the agricultural land, together with the main railway line to Hull, an aircraft factory, and a timber yard had been protected by an earthen flood embankment.

Erosion continued and the Hull and East Yorkshire River Board considered a number of schemes. It eventually agreed that the remedial works should comprise around 1000m of half tide wall, and a similar length of gabion revetment.

##### Solution

A 'half-tide' gabion wall consisted of a 2m high wall sat upon an 18m wide 0.5m thick gabion apron. The total volume of gabion protection works was around 13,200m<sup>3</sup> of heavily galvanised and PVC coated gabions. As the structure had to be able to accommodate differential settlements without rupture, double twist woven mesh gabions were selected as opposed to any other gabion type. The gabion mesh type selected, 8x10 hexagonal woven mesh, can accept significant deformation and settlement; the mesh structure transfers loads throughout the mesh.

The construction of the wall commenced with the placement of many 200 ton loads of lump chalk from a hopper barge at high water. This was compacted at low water consolidating it.

The flexible nature of the gabion platform enabled it to follow exactly the profile of the foreshore. This flexibility also enables any future erosion around the structure to be accommodated by the gabion structure which would flex to take up the new profile. The main purpose of the gabion wall is to provide sufficient weight to anchor the gabion platform.

The PVC coated gabions, were filled with blast furnace slag.

Client:

YORKSHIRE OUSE & HULL RIVER AUTHORITY

Main contractor:

ROBERT MCGREGOR & SONS LTD.

Products used:

GABIONS

Date of construction

1964



Aerial View in 1964 after construction



During construction in 1964



After construction in 1964

# MACCAFERRI

The work was completed in 1964, and so far no maintenance work has been required on the gabions. The total cost of the works was £260,000. of which £188,000 was for the half-tide wall and £72,000 for the gabion platform and wall.

The wall was built with its crest below the high water level to allow over-topping at high tide and silt to build up behind the wall. (See middle right photo).

As planned, the area behind the wall is now completely built up with sediment and the area has become a natural haven for wildlife (see bottom right photo).

By 1993 silt had built up over the gabion apron, almost to the crest and erosion had been completely halted.

In the 1990's, during the application for a BBA Certificate, Maccaferri exhumed numerous gabion and Reno mattress structures. Assessments on the gabion wall at Brough was one of these investigations and wire mesh was taken from structure for laboratory testing. The testing revealed the robustness of Maccaferri mesh and polymer coating with the conclusion of the granting of the BBA Certificate on Maccaferri double twist mesh products. The relationship with the BBA has continued with certification of Maccaferri's many products e.g.. Gabions, Reno Mattress, Terramesh, Green Terramesh, ParaLink, ParaGrid and ParaWeb.

In 2014, Maccaferri launched a new polymeric coating, Polimac PA6, as a coating to its galvanised wire mesh. This polyamide polymer was introduced not to replace Maccaferri PVC coated products, but to provide a more environmentally friendly polymer coating. PA6 is also a harder and more durable polymer, able to withstand greater abrasion than traditional PVC coated products.

Whatever the exposure conditions of your gabion or Reno mattress structure, Maccaferri can offer a suitable solution!



During construction—showing nature of erosion



Some time after construction in 1986



Some time after construction in 1993

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