

MESSAGERIES EMBANKMENT REINFORCEMENT CHALONS-SUR-SAONE, BOURGOGNE, FRANCE

HYDRAULIC WORKS

Product: Gabion Mattresses

Problem

The Saint-Laurent bridge spans the River Saone, the connected island of Saint Laurent and the district of Chalon Centre. The dock of Messageries is located to the right side of the Saone. The River Saone experiences high use by barges and river cruise ships which use propulsion systems and especially bow thrusters which create strong eddies. These had caused significant erosion beneath the quay to a depth of 1.5m, despite the presence of a rip-rap protection layer.

In order to not aggravate the situation, the Voies Navigables de France (V.N.F.) decided to create a spur to the right of the scour hole, thereby protecting it from further erosion. The solution adopted was to make the spur from gabion mattresses. Due to the potential for future settlement or localized scour, the gabions had to be made from double twist wire mesh, as this mesh type can accommodate differential settlement without sustaining damage. Indeed, the flexibility of these structures would allow the completed work to adapt, without any problems, to any additional deformation while still protecting the foot of the pier.

Solution

A prefabrication area was set-up on the dock to prepare the cages and to fill them before stockpiling them ready for deployment into the works. The teams from France Maccaferri assembled the cages, the placement of the geotextile filter fabric (with suitable overlaps) and filled the units with rock.

Two types of gabions were used for the site: 300mm thick gabion mattresses at the base of the spur and regular 500mm thick gabions for the upper parts of the spur.

Temporary formwork frames eased the filling of the structures and increased the efficiency and quality of prefabrication. As the prefilled units were to be lifted into place, the assembly of the unit and placement of the stones within it has to be well controlled and to a good quality, compared to in-situ constructed gabions.

Once completed, gabions were closed on all edges with staples and stockpiled.

To deploy the gabions into the works, a 10mx20 m pontoon barge equipped with a 45-ton crane was used. A dockside crane lifted the units onto the barge. Once positioned over the

Client:

VOIES NAVIGABLES DE FRANCE 71

Company:

BAULAND TP/FRANCE MACCAFERRI

Products used:

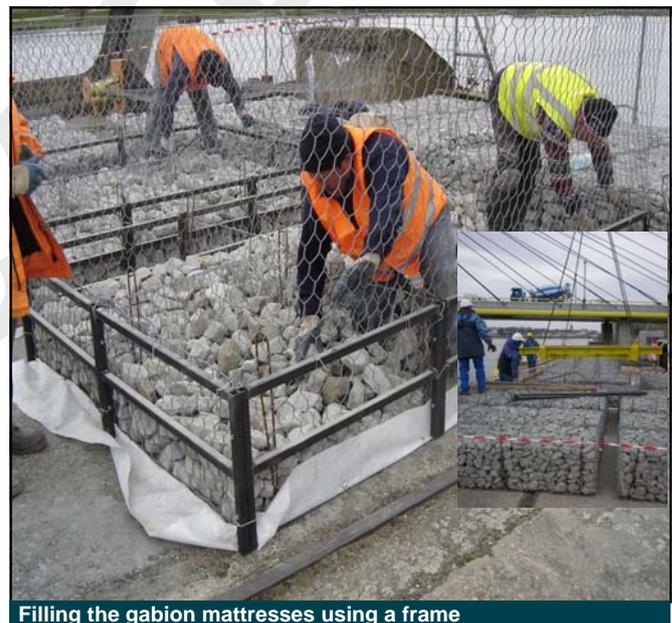
70m² GABION MATTRESS DOUBLE TWIST MESH
95m³ GABIONS DOUBLE TWIST MESH

Date of construction

APRIL 2008-MAY2008



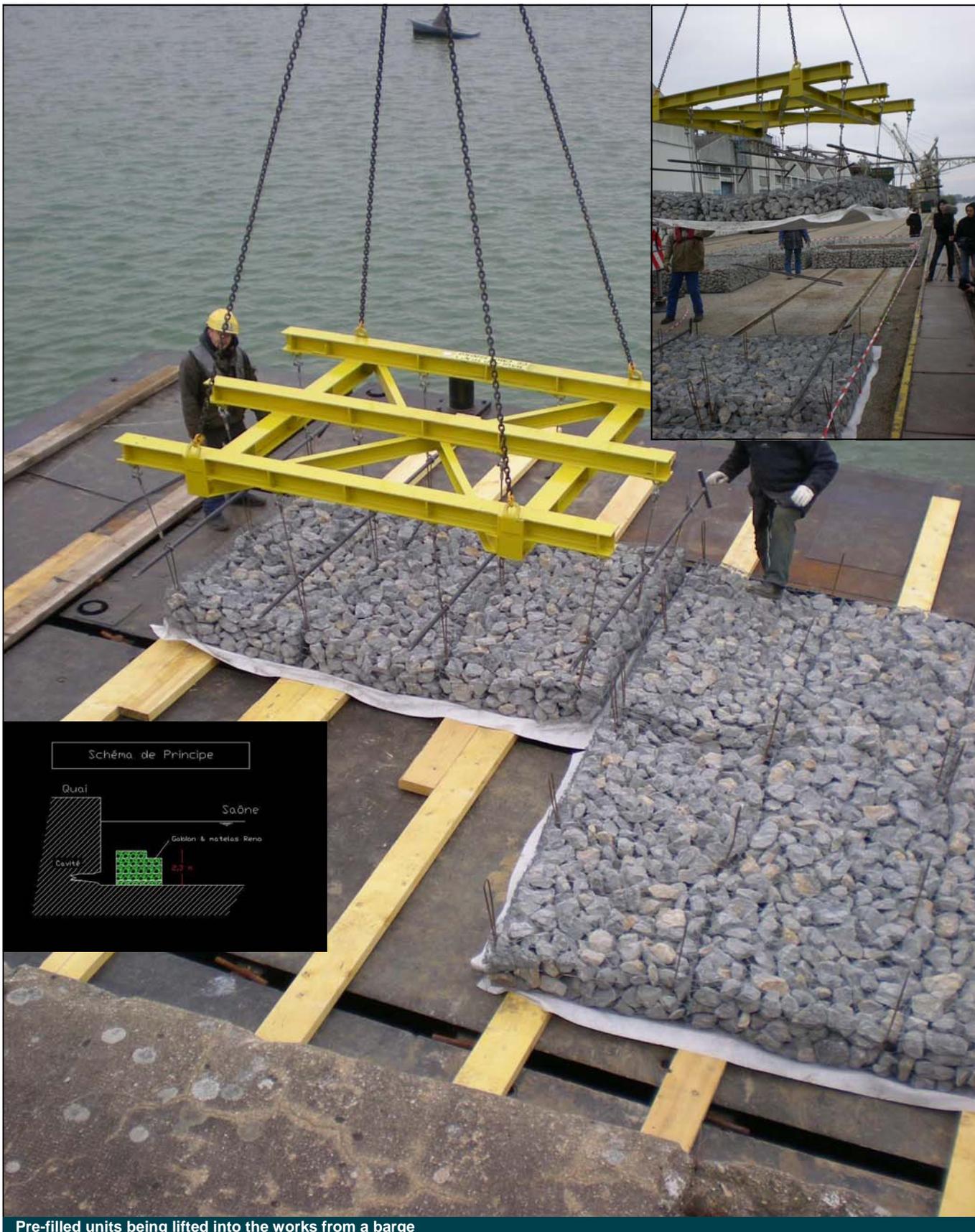
Assembly of the gabion units



Filling the gabion mattresses using a frame

work area within the river, the units were placed using a lifting frame. A team of divers attended the laying to ensure the implementation for each row.

When using gabions and mattresses in hydraulic works (river works, weirs, culvers, bank protection etc), it is essential that double twist mesh units are specified. This is because the double twist mesh is flexible, and maintains its protection when exposed to differential settlement. Welded mesh gabions are not able to accommodate differential settlements to the same extent without sustaining damage and are therefore not appropriate for hydraulic works.



Pre-filled units being lifted into the works from a barge

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