

Jet grouting

QUAI CARNOT

CONCARNEAU HARBOUR - FRANCE



Reinforcing a quay wall with reinforced Jet grouting columns (double Jet)

Quai Carnot was built between 1932 and 1937. It is made up of two superposed, prefabricated block beds, topped by a concrete wall. The structure is set on rocks, lying on clayey soil, with mediocre geotechnical features.

Problems

The western section of Quai Carnot has been subjected to major disorders since the end of the Eighties: sliding block beds, tipping towards the basin and face distortion.

Since 1990, this structure has progressed more than one metre in its centre.

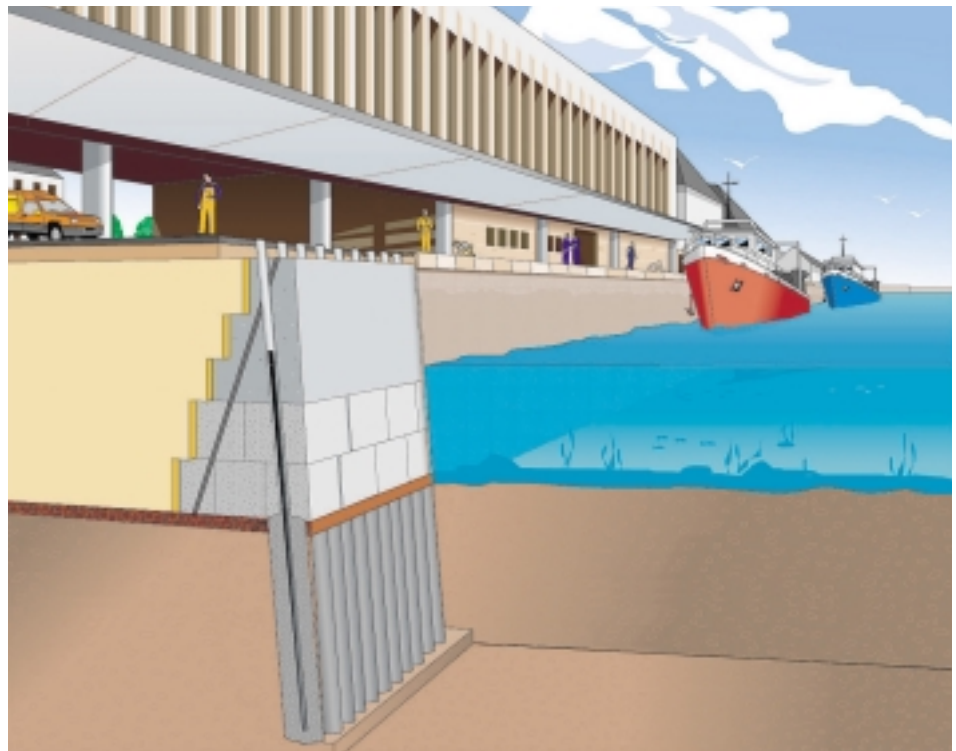
In 1991, this fishing boat quay was closed to commercial operations.

In 1992, the quay magistral moved by several centimetres in a month, in several places. Temporary work (rock cramping, platform coating) was performed to stop damage.

In order to reopen the quay for commercial enterprise, reinforcement work was performed in 1998.

REINFORCEMENT WORK

Included mainly Jet grouting columns, micropiles and pins.

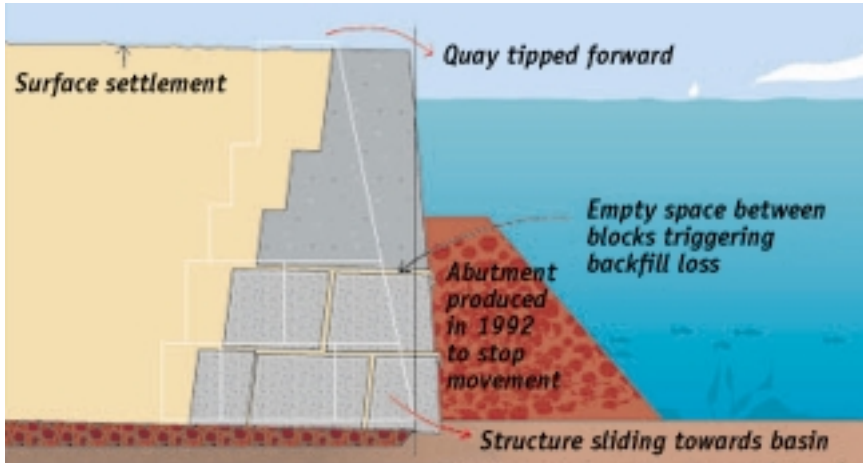


Sketch of finished quay treatment

CLIENT:	FRENCH MINISTRY OF EQUIPMENT, HOUSING, TRANSPORT AND TOURISM
GENERAL PARTNER:	DDE DU FINISTÈRE
SUPERVISION OFFICE:	L.C.P.C. DE NANTES
WORKS PERFORMED BY:	SOLÉTANCHE BACHY
WORKS DURATION:	MAY TO DECEMBER 1998

WORKS PERFORMED:

- 111 preborings \varnothing 250 mm totalising 1 000 ml
- 114 jet columns \varnothing 1 000 mm totalising 740 ml
- 111 micropiles of 178 mm in diameter totalising 350 ml
- 73 HA 40 pins totalising 660 ml



Preboring rig

Jet grouting work

A succession of Jet grouting columns, 1 m in diameter, set out every metre. These columns are 6 metres long and enable to distribute load in depth, in a soil with better features. They were sunk after Ø 250 preboring of quay was performed. When work began, test columns were produced in order to define treatment jetting parameters.

Micropiles

Where each jet column stands, the quay and Jet grouting treatment were

redrilled in order to produce micropiles, by embedding a 12-metre long thick pipe (Ø 153-178) in each bored hole.

Pinning blocks

Pinning of quay blocks was performed every 150 metres by embedded HA 40s, in 80-mm diameter perforations.

RESULTS

After dredging the temporary foot abutment and stabilisation, the quay returned to service at the end of 1998.

Jet grouting rig



Situation plan

