

# Dry dock

Diaphragm wall - Sheet piling - Ground anchors - Civil works - Equipment

## CONCARNEAU DRY DOCK

CONCARNEAU - FRANCE



### Design and construction as main contractor of dry dock, length 130m, width 27m, depth 10.80m

The target contract for construction of the Concarneau dry dock was performed by a consortium of Soletanche Bachy and Le Pape (excavation and fill). The site was a lagoon fed by a stream and open to the sea. The dock was needed to suit modern requirements, to supplement a boat hoist and slipway already in operation at Concarneau.

#### Design

The dry dock is 130m long, 27m wide and 10.80m deep, controlled on the seaward side by a trolley-mounted sliding gate. The remote end has a spiral access ramp for more efficient operational use by the commercial companies operating there. A pump room is provided to control washwater and gate leakage. Three pumps can discharge up to 4000 m<sup>3</sup> per hour to dewater the dock in four hours when a ship is being docked. There are all the usual fittings conventionally found in harbours works such as bollards, capstans and winches.

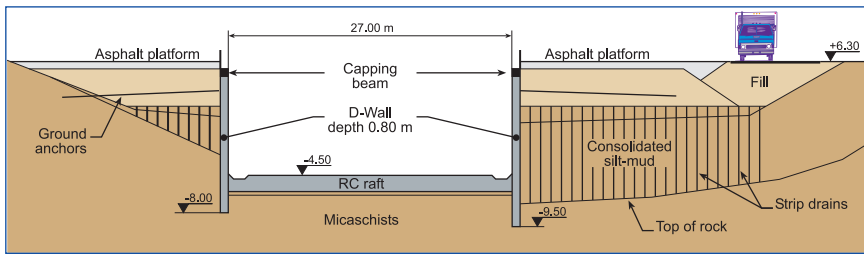


Dry dock and port

OWNER:	CHAMBRE DE COMMERCE ET D'INDUSTRIE DE QUIMPER
ENGINEER:	CHAMBRE DE COMMERCE ET D'INDUSTRIE DE QUIMPER
MAIN CONTRACTOR:	SOLETANCHE BACHY / LE PAPE
CLASSIFICATION SOCIETY:	BUREAU VERITAS
PERIOD:	APRIL 2000 TO DECEMBER 2001
CONSTRUCTION COST:	11.5 MILLION EUROS

#### MAIN WORKS QUANTITIES:

- Diaphragm wall: 4800 m<sup>2</sup>
- Sheet piling: 1200 m<sup>2</sup>
- Ground anchors: 106
- Tie beams: 228t
- Civil works: RC raft (4000 m<sup>3</sup>), spiral access ramp, capping beam, pump room, L walls, etc.
- Facilities: Control building, perimeter road, services (water, electricity, gas)
- Equipment: Sliding dock gate, bollards, winches, pumps (35-4000 m<sup>3</sup>/hr), capstans, keel blocks, etc.
- Earthmoving: 220,000 m<sup>3</sup>
- Strip drains: 60,000 m
- Drained raft: 4000 m<sup>2</sup>



Typical section

## Works

One of the challenges facing the consortium was how to deal with the mud covering the lagoon bed to depths of up to 7 metres, considering that the finished dock was to be surrounded by earth platforms for normal harbour operations, with a specified bearing capacity of at least 3 tonnes per square metre. Excavation of the mud would have been difficult and disposal even more problematical, and it was decided to consolidate it in situ by preloading. Apart from the excavation for the dock itself, therefore, all the mud has been left in place. An interceptor channel was dug to divert the river around the lagoon, then the lagoon was emptied to expose the mud. A geotextile was laid over the whole area and covered with the same thickness of free-draining gravel. Strip drains were sunk from this platform down to bedrock in a 1-metre square array. The subsequent

weight of the fill gradually expelled the water from the mud through sumps collecting the water in the free-draining layer. Settlement of approximately one metre was observed before construction work proper could commence.



Diaphragm wall and sheet pile driving

The dock sidewalls were built as diaphragm walls, tied back at the top with passive anchors to sheet piling and fixed at the bottom by the concrete floor of the dock.



Sinking strip drains

The floor is a drained raft to prevent the build-up of uplift. Works on the dock entrance proceeded behind a watertight cofferdam built in the port: pump room, floor under the gate, gate recess (rock excavation with shotcrete and nail support). The contract required a turnkey graving facility, and ancillary works included a perimeter road around the dock, drinking water, electricity and gas supply, fire-fighting system, two-storey control building and all fittings for ship docking (keel blocks, winched cradles, etc.). One of the last operations was assembly of the dock gate, by assembling four caissons to form a single unit 28m long, 11m high and 4m thick, weighing 170 tonnes. The gate was launched by a nearby boat hoist, towed to station and sunk onto its trolleys, standing ready on their rail tracks.



Capping beam and sidewalls



Dock after pouring reinforced concrete floor