

# Diaphragm wall - Civil works

## HARLAY CAR PARK

PARIS I - FRANCE



### Design and construction of 10-level 295 place underground car park

**H**arlay car park is an extension of the Harlay-Pont Neuf underground car park (3 basement levels, 553 places) on the Ile de la Cité island in the Seine. It lies 7m from the river at its nearest point, and fits snugly between the Palais de Justice (law courts), Maison de l'Avocat, Place Dauphine and the existing car park of which it forms part (and which had to be kept open to customers during the construction work).

It is a cylinder of 33.50m inside diameter, excavated to a depth of 27m, with a 35cm thick cover slab carried on 70 x 70cm beams. The interior structure is a spiral floor supported on the diaphragm wall and a central core housing the lifts, stair, ventilation system, etc.

The main difficulty concerned the intersection of the new car park with the old (especially as the third level was subject to flooding and the old and new car parks could only communicate at levels 1 and 2). This led to significant preparatory work for partially demolishing the existing car park where it encroached on the new:

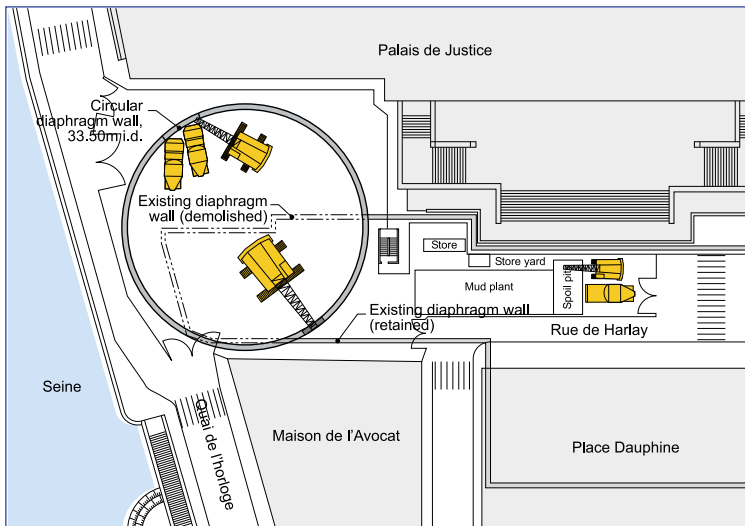


View of car park

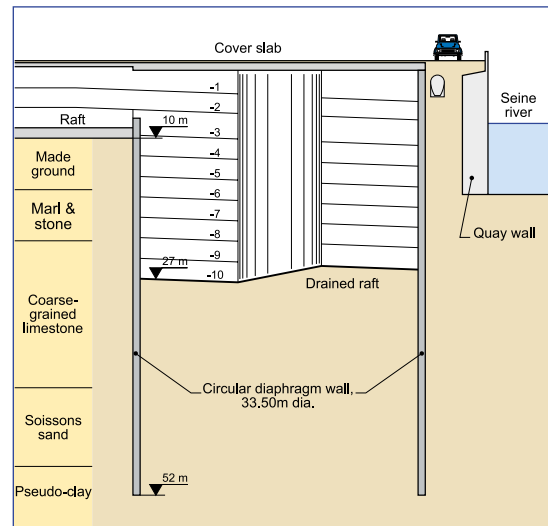
OWNER:	SOGEPARC
ENGINEER:	FERNIER & ASSOCIÉS
CONTRACTOR:	SOLETANCHE BACHY
CONSTRUCTION PERIOD:	MARCH 1996 - JULY 1997

#### MAIN WORKS QUANTITIES:

- Diaphragm wall ..... : 5180 m<sup>2</sup>
- Structural ..... : 3000 m<sup>3</sup> concrete, 260t steel
- Excavation ..... : 22,500 m<sup>3</sup>



Location map



Typical cross section

- The existing structure and diaphragm wall had to be cut back in the three redundant parts (13m deep, of which 5m was below the water table).

- Filter points were installed in the existing car park to be able to cut the concrete below the water table. Temporary concrete struts were needed during the work to support the existing cover slab carrying, among other things, the diaphragm wall construction plant.

52m deep, extending down to a relatively impervious pseudo-clay bed. It was built with a Hydrofraise rig fitted with powerful (8000 m.kg) motors. This is the best type of machine for digging through hard ground (18m of coarse-grained limestone) and the only one capable of achieving the 0.3% verticality specified in the contract with reference to the compressive stress in the diaphragm wall concrete.

Spoil was disposed of by way of the nearby river Seine, the barges being loaded via a portal crane straddling the Quai de l'Horloge road.

Construction of the internal structure began with the central core (less than 10m in diameter), followed by the spiral floor, circling the core from the bottom up.

## Description of works Construction procedure

The retaining wall around the excavation is a circular diaphragm wall needing no support by reason of its cylindrical shape. It is 0.82m thick and

After completing the cap beam at the top of the diaphragm wall and joining the extension to the existing structure, excavation proceeded to final depth while the parts of the existing car park lying within the circular wall were concurrently demolished.



Completed circular diaphragm wall



Spoil disposed of directly by barge