

Infrastructure construction

Diaphragm Walls, Jet grouting, Civil Works

LE GRAND PALAIS DES CHAMPS ÉLYSÉES

PARIS - FRANCE



Underpinning the “Grand Palais”, built in 1900 and protected as a National Heritage monument, and creating a new retaining wall for a future underground structure in the main hall

Completed in 1900, the “Grand Palais des Champs Élysées” was founded on alluvial soils of varying quality, deteriorating towards the south approaching the Seine river. The south part of the building was founded on wood driven piles supporting the foundation masonry. The recent lowering of the water led to rotting of the upper parts of the wood piles, and resulted in significant settlements. These reached up to 15cm, creating problems for the structure. In order to save this Historical Monument, the decision was taken to underpin the whole structure, whilst avoiding further distress.

It was also decided to use this opportunity to install the required retaining wall for a proposed future underground structure to be constructed under the main hall.

Soletanche Bachy designed and installed a complex underpinning programme combining civil works, jet grouting and diaphragm walls whilst respec-

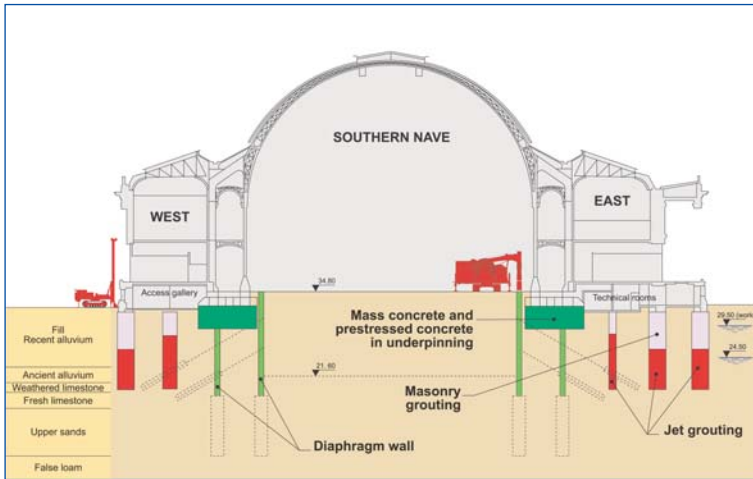


View of the building in 1900 and in 2000

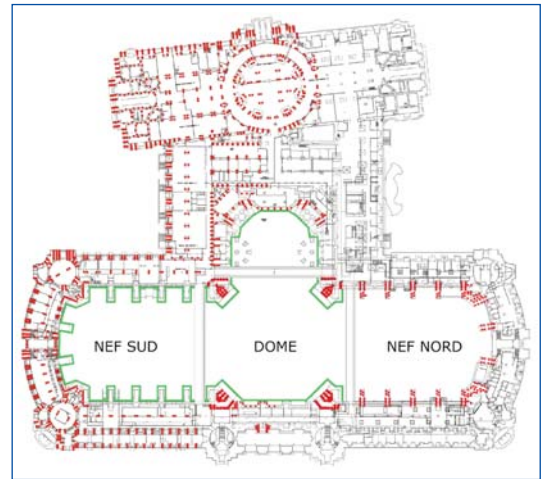
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| INVESTOR: | THE FRENCH MINISTRY OF CULTURE |
| ARCHITECT OF THE HISTORICAL MONUMENTS: | A.C. PERROT |
| ARCHITECT OF THE NATIONAL PALACES: | J.L. ROUBERT |
| ENGINEER: | SETEC TPI |
| GENERAL CONTRACTOR: | SOLETANCHE BACHY |
| CONSTRUCTION PERIOD: | DECEMBER 2001 - JULY 2003 |

MAIN QUANTITIES:

- Underpinning of the metallic structure by means of 30 prestressed concrete blocks, connecting the columns and the diaphragm walls.
- 8,900 m² of diaphragm walls installed under 7 m limited headroom
- 20,000 lm of jet grouted columns for underpinning the masonries



Cross Section



Plan View

ting two major constraints requested by the Owner:

- No additional settlement allowed.
- Keeping the adjacent Museum in operation during the works.

The structure was monitored with a Cyclops system operated by Soldata (an independently operated affiliate of Soletanche Bachy), which controlled the three dimensional position of 65 targets in real time.

The diaphragm walls were installed hard up against the existing foundations, under 7 m headroom. The panels were keyed 1m into the limestone, without generating any vibration. This was made possible with a compact hydrofraise and a mud treatment plant located outside the building.



Jet grouting

The jet grouted columns were installed under the existing structures. The machines operated in very restricted areas, frequently with only 2.5m headroom.

The civil works structurally linked the existing structure and the new foundations. Typically this involved reinforced concrete structures clamped to existing foundations by post-tensioning, allowing the transfer of load to the diaphragm walls or jet

grouting. This method allowed the transfer of load without additional settlement.

After completion of the foundation programme, the rehabilitation of the metallic structure and the replacement of the glass roof were carried out safely.



Installing the diaphragm wall