



[www.drillpac.com](http://www.drillpac.com)



*ROCK - SOIL TECHNOLOGY AND EQUIPMENTS*

**WATERPROOFING**



**CIUDAD DE LA JUSTICIA VALENCIA (SPAIN)**

## CIUDAD DE LA JUSTICIA VALENCIA (SPAIN)

### PROJECT:

Construction of a waterproof screen using the Jet Grouting system under a reinforced bulkhead, to permit excavation - below the water table - of the foundations of the new Courthouse of the city of Valencia.

### PERIOD OF EXECUTION:

August – September 2000

### CLIENT:

Joint-Venture FCC Construcción, ACS, EDIFESA



Fig. 1. View of the site and 3D sketch of works.

## Lithology.

The site presents deposits of the quaternary age, made, in stratigraphic sequence, by clay and partially sandy silt, sandy silt, sandy-silty gravel and clay (Fig. 2).

## Purpose of the work, difficulties encountered and solutions applied.

The Ciudad de la Justicia is a neighborhood of the city of Valencia where the new courthouse is under construction (Fig. 3). The foundation soil of the building is characterized by the presence of a water table with a piezometric area at a height of about -8 m from the ground level (Fig. 2). The foundation floor of the building (which will have a rectangular layout: 240 x 90 meters) is at a height of -11 m from ground level, and thus below the water table.

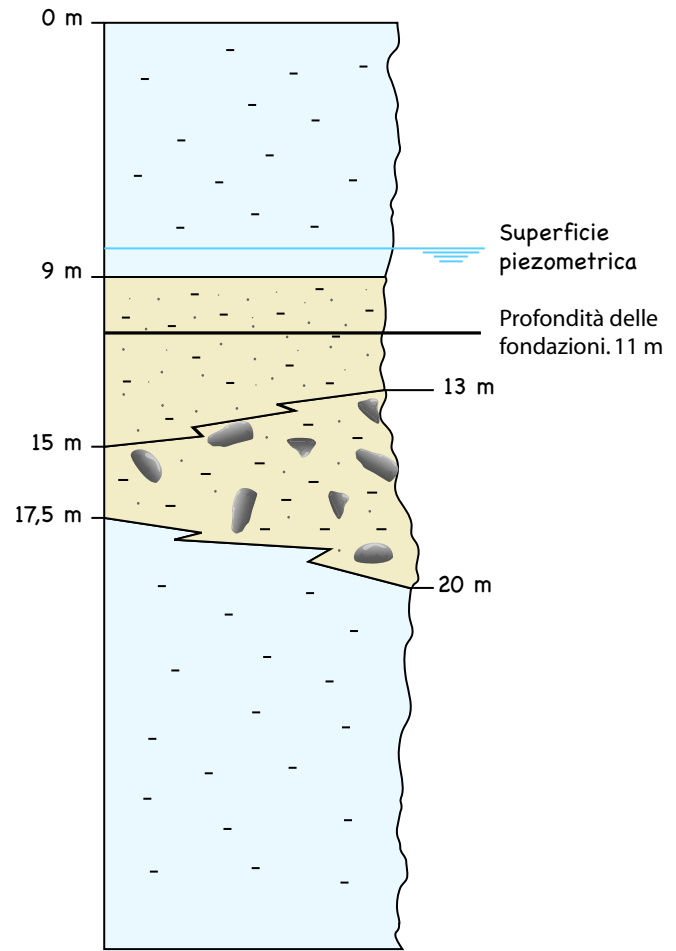


Fig. 2. Stratigraphic dscription of ground.



Fig. 3. Fondazione area of the new courthouse.

Initially the works of consolidation and waterproofing required two types of interventions:

- a construction of reinforced concrete diaphragm walls (with a thickness of 800 mm) all around the perimeter of the future building, down to a depth of about 16 m from ground surface, headed in sandy-gravel deposits.
- a installation of 21 wells at the interior of foundations' rectangle (Fig. 4), dug into the gravel layers and used to lower the piezometric level of the water table allowing a dry excavation of the building foundations.

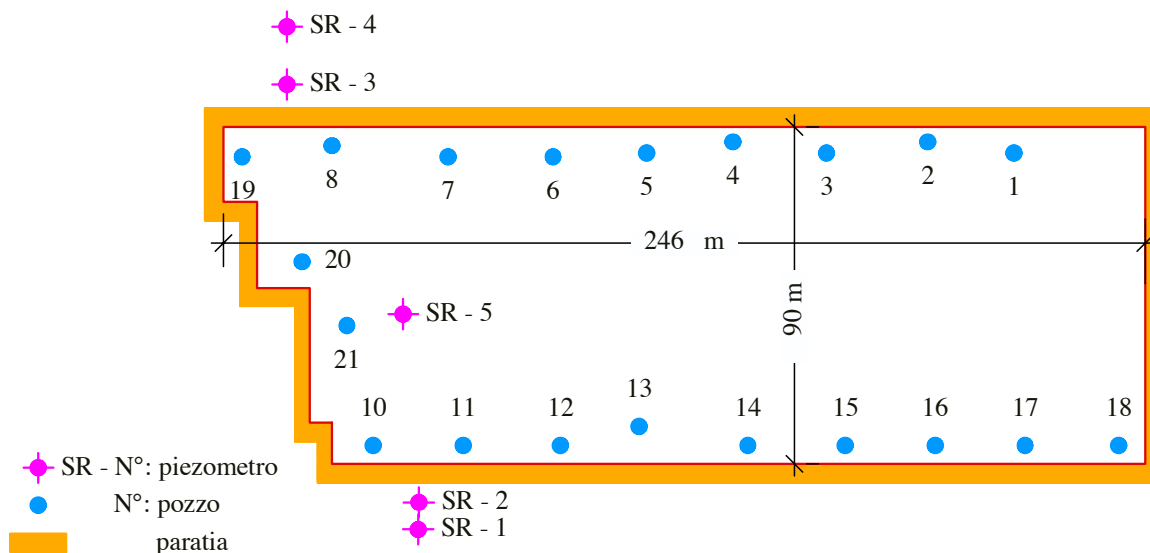


Fig. 4. Layout of the foundations showing the wells and the piezometers.

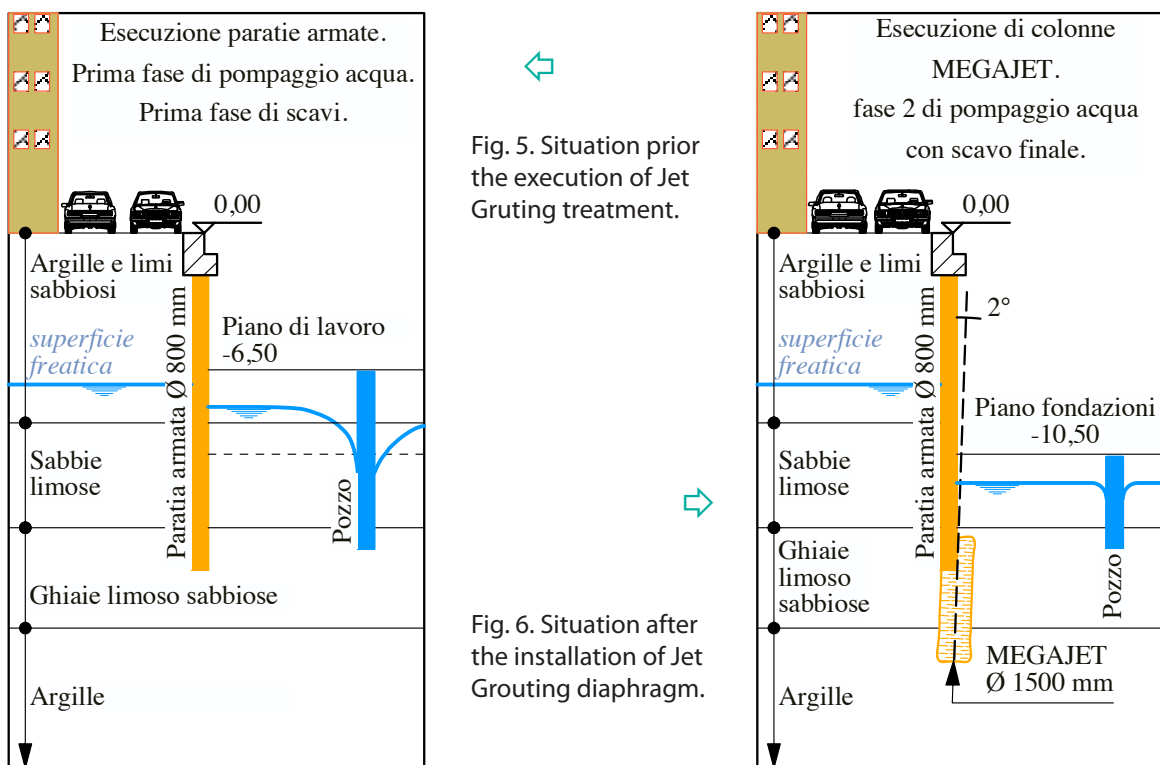


Fig. 5. Situation prior the execution of Jet Gruting treatment.

Fig. 6. Situation after the installation of Jet Grouting diaphragm.

- The excavation was, however, interrupted at about  $-6.50$  m from ground level, as the water table level did not drop, in spite of uninterrupted pumping of the water from the shafts (average capacity 900 liters/sec.) (Fig. 5). The permeability of the aquifer ( $K=1 \times 10^{-1}$  cm/sec.) was so great that the layer of sandy-silty gravel, not tre

- ated by the bulkheads, allowed a large amount of water to penetrate inside the foundation perimeter. The Works Management therefore decided to construct a waterproof screen that would make waterproof the gravel layer, along the entire perimeter of the slurry walls (Fig. 6), headed 1.50 meters inside the clay layer beneath and topped, to the same extent, by the bulkheads. The thickness guaranteed for the screen must be 1 m.

## Description of works.

The waterproof screen was built using the Pacchiosi Jet Grouting System 1 known as **Megajet (PS1 M)**.



Fig. 7. P 1500 EC e PRP 105 drill rig during the execution of Jet Grouting.



Fig. 8. PRP 105 drill rig at work.





Fig. 9 - 10. P 1500 EC drill rig performing Jet Grouting.



The work was carried out starting from a height of  $-6.50$  m from ground level, with a row of columns having a diameter of  $150$  cm, spaced  $100$  cm from each other, built beside the bulkhead (at a distance of  $50$  cm), with an inclination of  $2^\circ$  on the vertical and variable length depending on the depth of the clay.

The subsequent pumping of the shafts made it possible to lower the level of the water table permanently below  $-11$  m from ground level. Excavation of the building foundation was then duly completed; the excavated soil was dry, indicating that the remedy applied was successful (Fig. 11).



Fig. 11. Excavation of the foundation.



Fig. 12. Laser pump 1700 C.



Fig. 13. Turbomixer MA 500 C.



Fig. 14. Installation plant.



---

ROCK - SOIL TECHNOLOGY AND EQUIPMENTS

---



**COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001:2015 =**

Branches

AMERIQUE DU NORD PACCHIOSI INC, Canada

PACCHIOSI DRILL USA INC, USA

**Drill Pac S.r.l.** – Società soggetta a direzione e coordinamento di Ghella S.p.A  
Sede Legale: Via Pietro Borsieri, 2/a - 00195 Roma (RM)  
Tel. +39 06 45603.1 – Fax +39 06 45603040 – e-mail: [info@drillpac.com](mailto:info@drillpac.com)  
**Sede Operativa:** Frazione Borgonovo, 22 – 43018 Sissa Trecasali (PR)  
Tel. +39 0521 379003 – Fax +39 0521 879922 - Sito web: [www.drillpac.com](http://www.drillpac.com)

