



SARMENTO (POTENZA - ITALY) -

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PROJECT:

Consolidation at a considerable depth using **MEGAJET PS3** technology was performed from the outside to allow the excavation of a section of tunnel to deviate water from the Sarmento river to the Monte Cotugno reservoir in the countryside of Senise Basilicata (Province of Potenza).

EXECUTION PERIOD:

January 2011 - (on-going)

CLIENT:

ENTE IRRIGAZIONE (Local Water Authority) - BARI

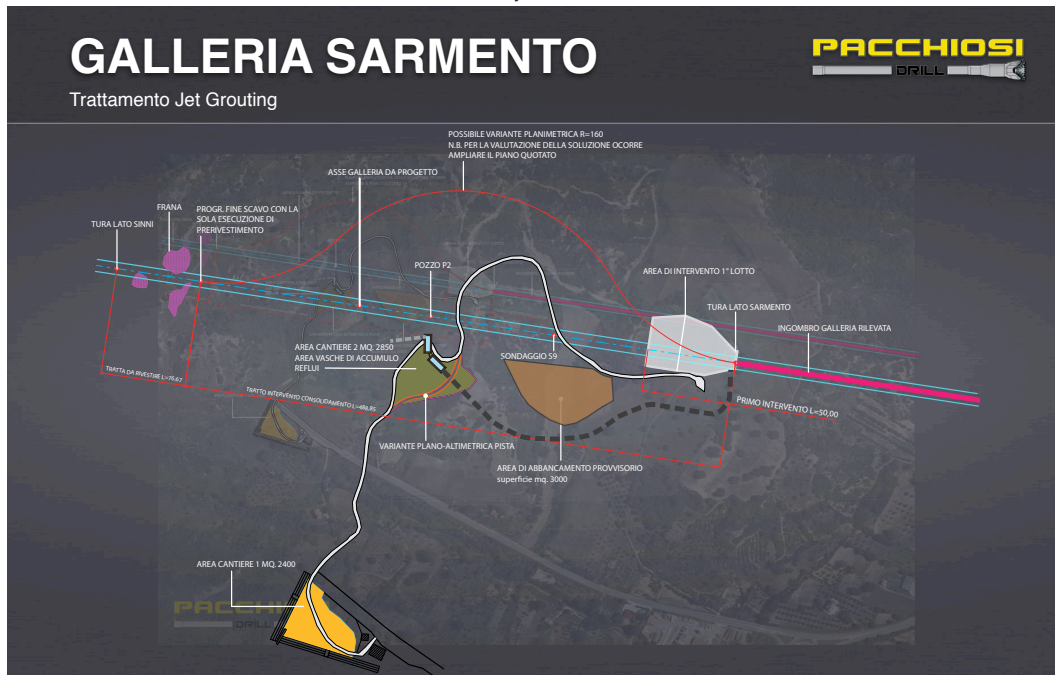


Fig. 1. General view of construction site

Introduction

The Monte Cotugno artificial basin, in the countryside of Senise (Province of Potenza) has always been considered of strategic importance as it supplies water to a large part of Puglia both for civilian purposes as well as agriculture and industry; it includes, through a network of tunnels and conduits, the transfer of significant amounts of water from Lucanian streams.

The central section of one of these galleries on the river Sarmento river remained unfinished since the early 1980s. Recently, an in-depth geological and geotechnical study was carried out to find the most appropriate design solutions for its completion.

Scope of works and solutions adopted.

After countless attempts to complete the 477 meter stretch of tunnel - always performed from the inside - an innovative design solution was adopted that included the consolidation of this section directly from the outside using **MEGAJET**-type jet grouting and **Pacchiosi SISTEM 3 (PS3)** technology.

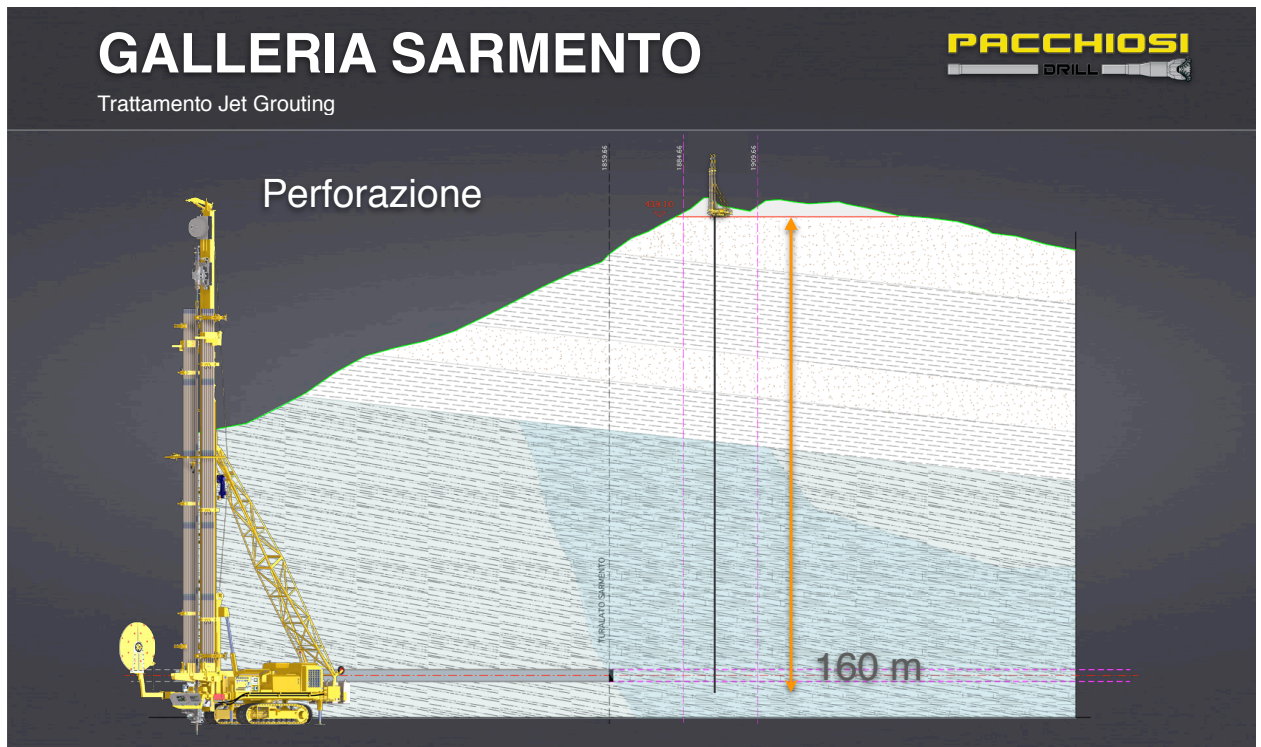


Fig. 2. General longitudinal section showing high depth of intervention from surface

The greatest difficulty was the execution of the columns of jet grouting to a considerable depth, in this case 160 meters; in fact, this work required high precision, above all during drilling to limit the deviation; the project specification required that the deviation at that depth could not exceed 0.5% - 1% in order to reach the precise area to be consolidated.



Fig. 3. PACCHIOSI P1800EC52 drill rig at work

TRONCO 1A2 (prog. 1.872.66÷1.884.66)

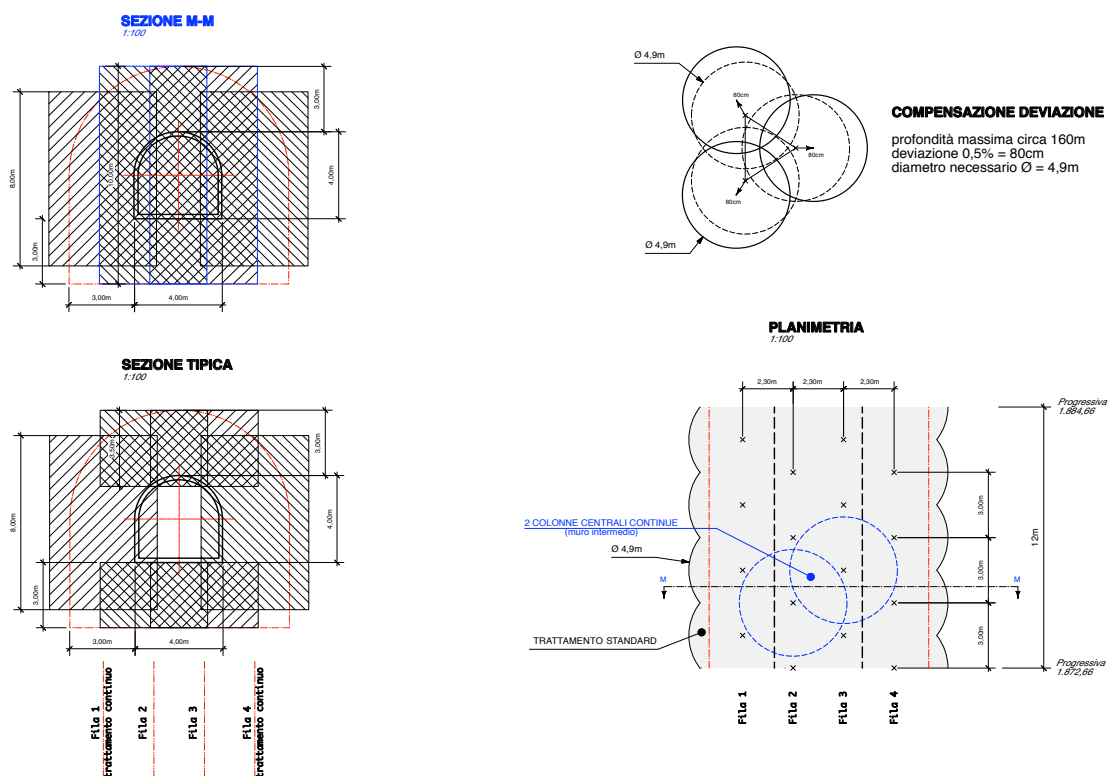


Fig. 4. Plan and cross section sketches of layout



Fig. 5. General view of work platform

Description of the intervention - operational difficulties

The treatment involved the execution of 69 columns of 4.90 meters diameter across four rows at an interaxis of 2.00 meters; the external rows, which theoretically consolidated the gallery's vertical structures, were of a standard 8.00 meters length while the two central rows that affected the core of the future tunnel consolidated only the base and the roof; these were 3.00 meters long for the base and 3.5 metres long for the roof.

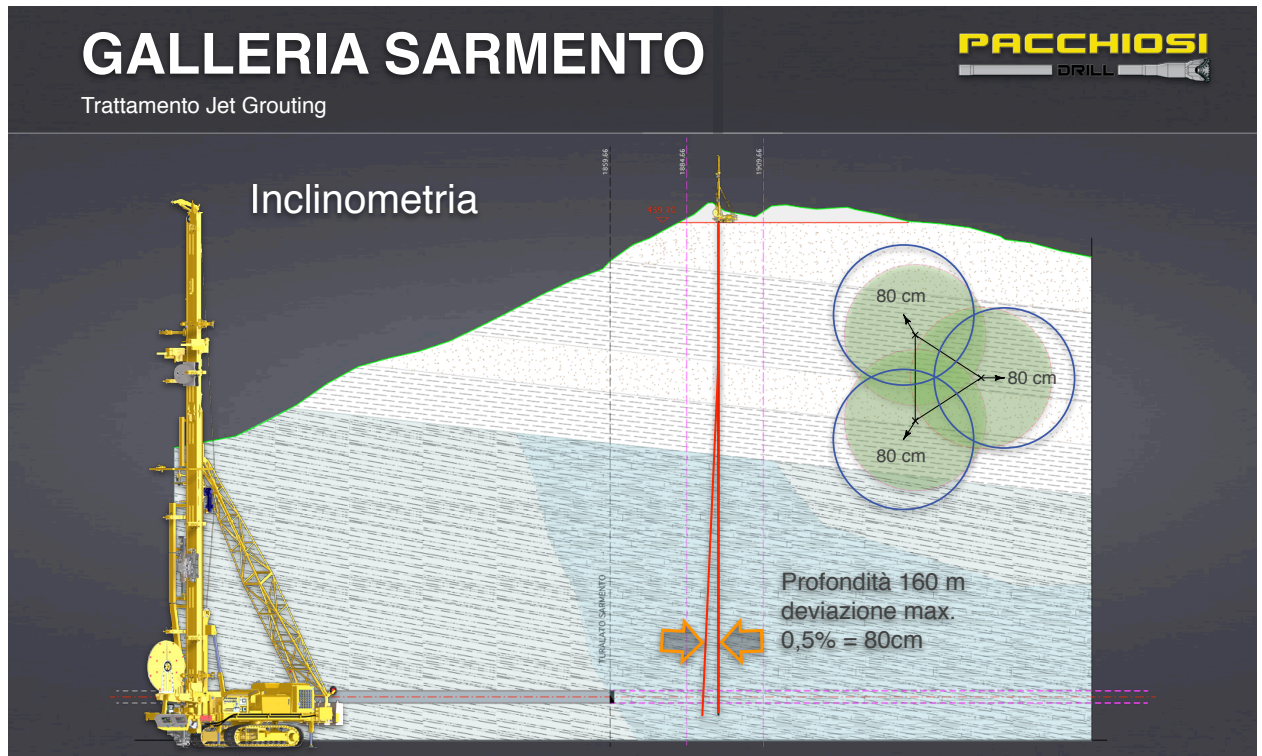


Fig. 6. General longitudinal section showing tolerance of vertical deviation

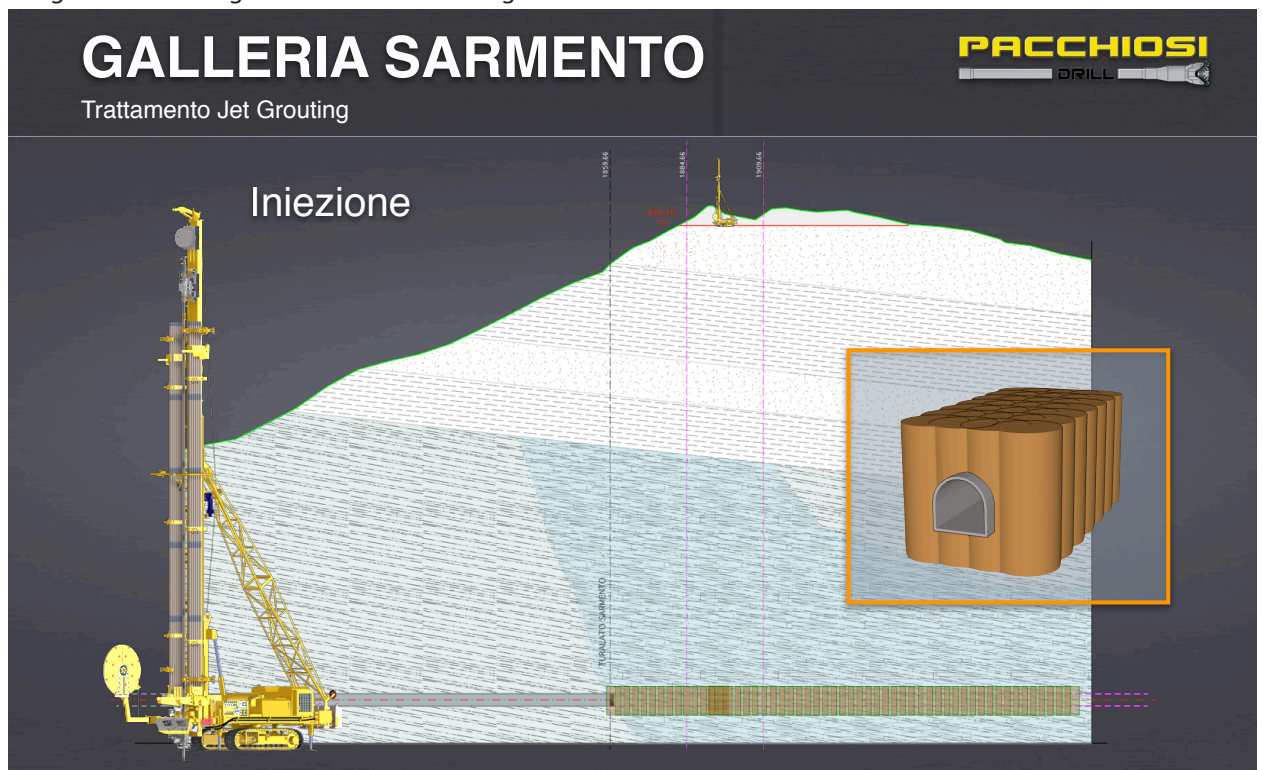


Fig. 7. General longitudinal section showing 3D modeling of Jet Grouting columnary treatments

The drilling machine used was the P1800 2ECS, designed and constructed by Pacchiosi Drill, and equipped with double rod charger for 15.00 m. length rods (maximum depth 200 metres).

Equipped with a sophisticated drilling control and management system, through the aid of sensors mounted on the rotary, subsoil resistance values were transmitted in real time allowing the operator to change the drilling parameters according to the different terrains crossed.



Fig. 8. PACCHIOSI P1800ECS2 drill rig at transfer



Fig. 9. Particular of PACCHIOSI P1800ECS2 control panels

ROCK - SOIL TECHNOLOGY AND EQUIPMENTS



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