

CLIENT:

Amber Engineering Brno, a.s.

REALIZATION PERIOD:

2002

PRICE:

12 mil. CZK

VOLUMES:

Jet-grouting 1 020 m
(diam. 1 000 mm, 85 pcs, 12 m length)

DESCRIPTION:

At the beginning of 2002, Soletanche Czech Republic, with the assistance of Soletanche Polska, performed in Elblag (Poland) a jet grouting job in order to reinforce the foundations of a double gantry cutter in the Alstom Power AG plant. It could have been a very simple project, since we do this type of work all the time, but due to drastic constraints, it was quite unusual. Wear gloves, a white gown, a mask, and come and see this place which, although neat as a hospital or a watch-maker's shop, is doing jet grouting...



General view of double gantry cutter



Reinforcement



Jet-grouting works

A major mechanical construction plant was set up in Elblag, in the North of Poland, by the Alstom Power Generation AG Group. In the center of the plant, there is a huge double gantry cutter for ultraprecise machining of large gas turbine elements. There are only about ten similar cutters in the world. However, since its setting up in 1998, its work could not be optimal, because the machine mat foundation had serious, up to 50mm, settlements and strains, as well as many cracks which reduced its rigidity. Since the plant is the main source of employment in the region, the company finally adopted a reinforcement solution.

The team was international :

- Project design and management were followed by Amberg Engineering Brno (Czech Republic);
- The job was done by Soletanche Czech Republic, with the assistance of Soletanche Polska ;
- Field test measurements were done by GEOtest Brno (Czech Republic).

Inventory. The floor (12 x 43 x 7m) was in poor state : bad quality concrete, many cracks filled with machining emulsions, watertightness damaged by water seeping from technical galleries. Elblag is located on the Vistula River delta, on the Baltic seaside, which determines the site geology. Under a 5m thick impervious clay and peat layer, there is fine sand (2 to 5m thick) over hard layers. Since the natural ground is located 1,5m above sea and river level, the mat foundation is laying in saturated fine sands very prone to liquefaction.

Technical objectives. The parameters established by the client have nothing to do with normal construction standards and are mainly those of the mechanical and watchmaking sectors. During the work, mat deformation could not be above 0.47mm or 0.005mm/m.

Technical solution. The design office, together with Soletanche Czech Republic, proposed foundation reinforcement by jet grouting columns. In total the project planned 85 columns of 1000mm diameter, 12m long, through the mat. In order to improve rigidity of the whole, each column was equipped with a 12m long reinforcing cage, including 7m in the floor. We previously checked the technical solu-

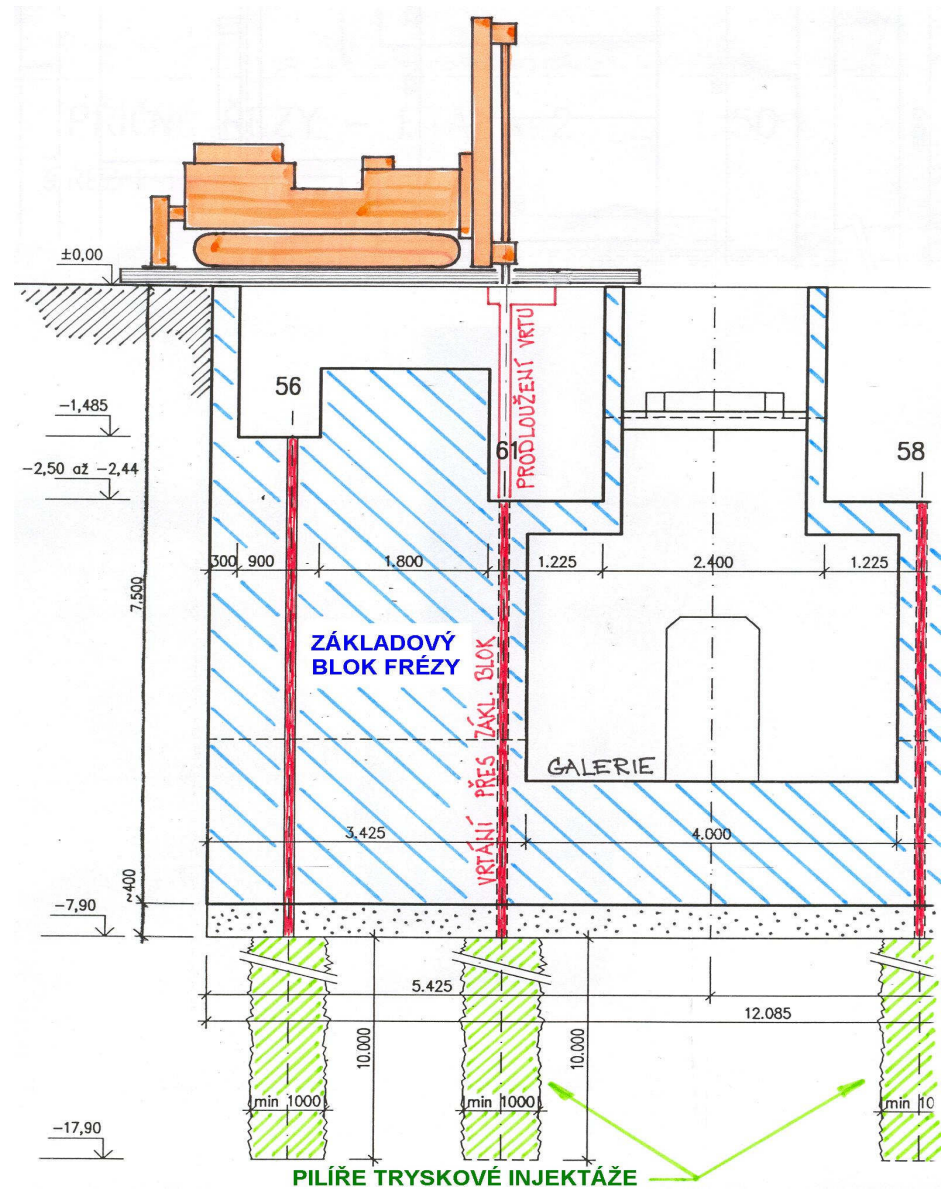
tion near the cutter hall with a 5 column field test.

Drilling and jet grouting operation. Working conditions were similar to those of an operating theater in a state-of-the-art hospital. During drilling, no vibration, shake, shock and dust were authorized. DTH hammer was thus proscribed. Of course, it was impossible to remove the cutter because three shift production was going on and could not be affected. This is why we did some drillings very close to the extremely fragile electronics and elements of this "mechanical jewel". All our operations were permanently closely controlled by the client's "audit army". The slightest error resulting in cutter deterioration or production slow down would have entailed the supervisor's "public execution" !

For this project, the following equipment was used : 3 Minifor drills (2 for predrilling, 1 for jet grouting), 1 GeoAstra 5T 302 jet grouting pump, 1 HP30 spoil pump, 1 Haponic jet pump and corresponding accessories.

Conclusion. Three messages should be remembered :

- 1) GOOD : In spite of all these constraints, we successfully completed this job in 32 days.
- 2) GOOD : All measurements and check ups done after the work show that the floor did not move and strains stopped.
- 3) BAD : Shortly after we left, many Elblag bars went bankrupt.



Principle of underpinning