WATER TREATMENT FROM EPB TBM WORKS THROUGH **GHT DECANTER CENTRIFUGE**

SELI OVERSEAS S.p.A. is building the tunnels for the new HS/HC railway line by means of mechanical excavation with TBM.

CO.CI.V. (Consorzio Collegamenti Integrati Veloci) has designed and is carring on the building of the new HS/HC Novi Ligure-Genoa railway line (High Speed/High Capacity), named Terzo Valico dei Giovi. The new line is developed along 53 km overall, 37 km of which are in tunnel, going through 14 municipalities of Alessandria and Genoa provinces. The realisation of a tunnel stretch is commissioned to the company SELI OVERSEAS S.p.A., which is appointed to carry out the work through mechanical excavation with TBM. The high quantity of water, deriving from the excavation works, need to be treated by means of the high-tech decanter centrifuge by Gennaretti®.

SELI OVERSEAS S.p.A.

Founded in the 1950, the company SELI OVERSEAS S.p.A. is specialised in underground works and in TBM Tunnelling for the execution of metro, railway, highway, aqueducts, sewages and hydropower projects. In 1970, it has started operating internationally and, thanks to experience gained over the years, it has reached a high level of specialisation in every phase, from the TBM construction to the underground excavations. Thus, SELI establishes itself all over the world as a leader company in the tunnelling sector. It has taken part in high-calibre projects, building about 800 km of tunnel so far by means of TBM.



View of Radimero building site.

THE WORK AND THE GOALS

SELI OVERSEAS is appointed to build the tunnels from the construction site in Radimero in Arguata Scrivia, Italy. In particular, the task involves the development of two tunnels (extended along 12 km) through mechanical excavation. The operation is carried out in parallel with two EPB TBMs, namely particular machines used for the excavation of grounds made of melted materials, which are hard to work. The goal is to finish the project within the end of the year.



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However, the digging is technically complex because of the subsoil geological conditions. In fact, during the workings, the TBMs bumped into some aquifers. Due to their high quantity of water flow (from 80 m³/h to 100 m³/h), to the difficult management of pressure (5-6 bar) and to the high quantity of suspended solid, the excavating operations got slower, risking to clog up the well of the tunnel digger introduction.

To face these problems, SELI had the necessity to equip with Gennaretti decanter centrifuge, with the aim to manage and treat the high quantity of water and to proceed regularly with the works.

THE SOLUTION

For the treatment of waters deriving from excavation works, the S.P.A.C.I. 6 plant provided with GHT 503VF-75 decanter centrifuge has been supplied. The plant is installed in 40' industrial container and it is suitable to house a decanter centrifuge, an electric panel, an automatic station for the additive preparation, a feed pump for the waters and other components for the correct functioning of the plant.

How does it work?

First, the pump arranged in the well draws the water and sends it to the agitation tanks for the homogenization, thus maintaining constant the concentration (g/L) of dry solid. Then, some organic-based additives are injected in the water feed pump in order to accelerate the separation process, through two different injection points. Thus, the waters and the additives are blended, until their transportation to the decanter centrifuge. Finally, the decanter divides the incoming water into two products, thanks to the centrifugal force: the dry solid and the clarified water. An evacuation screw discharges the dry solid out, while the clean water exits from the decanter's liquid discharge and goes to the water treatment plant.



The clarified water exits from the liquid discharge of the decanter centrifuge.



The advantages

The S.P.A.C.I. 6 is the solution for the treatment of high volume of work, thanks to the decanter centrifuge capacity to separate high range of material (from $5 \text{ m}^3/\text{h}$ to $80 \text{ m}^3/\text{h}$).

All the plant components are arranged to fit to the decanter centrifuge and to the container, guaranteeing a high ratio between treated volume and occupied space. Moreover, it does not need masonry or civil works.

The plant can be simply activated by connecting the waters and the electromotive force, as well as regulating the decanter parameters from the operator panel, depending on the quantities to separate and on the results to reach.

THE DEVELOPMENT AND THE RESULTS

The watering system of the well collects the high quantity of water. Once it goes through the two steps of the mixing and the adding of additives, the material is sent to the decanter centrifuge, which rotates at high speed, enabling the separation of the dry solid and the clarified liquid. The first one is discharged out of the container and managed as waste, while the second one is reused in building site activities or pumped in another plant where it is made adequate for the discharge.

Generally, the solid concentration is low, but sometimes it undergoes strong increases, due to excavation necessities. In these cases, the decanter centrifuge can be regulated to treat 80 m³/h of water by means of few and rapid regulations.

"The Gennaretti[®] plant helped to make the job continuous" declares Ing. Antonio Curto, the construction manager of Radimero building site. "Thanks to the possibility to treat high volumes of work, it has favoured the constant evolution of the works and contributed to make the disposal faster". In fact, the treatment of the full range prevents delays during the excavation works.

WHAT THEY SAY ABOUT US

"We at SELI are very pleased from the technical point of view, as the plant has resolved every problem we had, due to the possibility to manage every range in terms of capacity and of suspended solid quantity. Moreover, with the ease of use: after a few days, our technicians were familiar with the already svstem. Nevertheless, we are satisfied with the assistance we received" says Ing. Antonio Curto. "Gennaretti technicians spent days and nights until the machine has reached the full functioning that we were looking for."



The evacuation screw discharges the solid out.

