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The complexity and requirement for cutting edge construction technology in Trevi's work on the Grand Paris Express project is staggering



Deep innovations

In France, one of the largest and most ambitious infrastructure projects in Europe is ongoing – the Grand Paris Express.

When completed, the new metro network will reduce road traffic in the French capital, improve air quality and, hopefully, make the lives of Parisians a little easier.

The project encompasses the extension of line 14 of the metro and the construction of new lines 15, 16, 17 and 18. Along with approximately 200km of new lines, some 60 new stations are being constructed. In total, the planned investment for the network is more than €35 billion.

CAPITAL SOLUTIONS

Undertakings of this magnitude can only be built on the most robust foundations, which

In construction, nothing goes up before first going down. Mike Hayes looks at some foundations challenges and their imaginative solutions

is where the Trevi Group comes into the equation.

The company is undertaking foundation work as part of the construction of the underground stations of Paris' Le Bourget Airport, Aulnay and Saint-Denis Pleyel, set to be the largest of all the Grand Paris Express stations and crossed by tunnels of lines 14, 15 and 16.

Marcello Varese, project director at the

Saint-Denis Pleyel station says it is "the main station of the whole Grand Paris project, as it connects four metro lines with two railway lines and is located near the Stade de France [the national sports stadium of France]."

What makes the station unique is its 9000m² surface area, as well as the fact that Trevi is undertaking excavation here using the 'top down' method. In fact, in order to allow the 'top down' excavation, it was necessary for the company to add 36 plunge columns, which allow simultaneous superstructure construction and basement excavation.

So, not only did Trevi construct 141 structural diaphragm wall panels, it also fabricated 36 plunge columns, each weighing 90 tonnes and which had to be laid to a depth of 36m. According to Trevi, this is a first.

Trevi is undertaking groundwork across the Grand Paris Express project, with one of the first items on the agenda being land treatment; consolidating the treated soil and significantly lowering the level of groundwater to ensure tunnels can be



Trevi utilising the foundation drilling equipment of its subsidiary company Soilmec during construction work on the Grand Paris Express

excavated safely.

Trevi is also involved in the excavation of a number of service shafts by tunnel boring machines (TBM), which will allow access for rescue and evacuation of passengers, ventilation and power supply.

These shafts run to significant depths and require the construction of reinforced retaining walls through diaphragm walls that can sometimes reach more than 60m in depth.

For these applications, Trevi is using drilling equipment including advanced heavy-duty buckets and hydromills.

Advanced heavy-duty buckets and hydromills

These advanced heavy-duty buckets and hydromills are designed for use in deep excavations and are capable of handling large volumes of material. They are used in a variety of applications, including the excavation of service shafts and the construction of retaining walls. The buckets are made of high-strength steel and are equipped with cutting edges to facilitate the excavation process. The hydromills are used to break up hard materials and are also made of high-strength steel. They are used in conjunction with the buckets to ensure efficient excavation. The use of these advanced pieces of equipment allows for faster and safer excavation of deep shafts and the construction of retaining walls. This is particularly important in urban environments where space is limited and the ground is often very hard. The advanced buckets and hydromills are also used in the construction of large-scale infrastructure projects, such as the excavation of service shafts for the London Underground. The use of these advanced pieces of equipment is essential for the safe and efficient construction of these types of projects.

Drilling in the digital age

Drilling in the digital age is a new way of thinking about drilling. It is a way of using digital technology to improve the efficiency and safety of drilling operations. This is done by using sensors and data analysis to monitor the drilling process in real-time. This allows operators to identify problems before they become serious and to adjust the drilling parameters accordingly. This can lead to faster drilling times and fewer accidents. Digital drilling is also used to optimize the design of drilling equipment. By using computer simulations, engineers can test different designs and identify the most efficient one. This can lead to the development of new drilling tools and techniques that are more effective and safer. Digital drilling is a key part of the Industry 4.0 revolution and is expected to continue to grow in the coming years.

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Construction's knowledge environment

Construction's knowledge environment is a complex and ever-changing landscape. It is a landscape of knowledge, skills, and experience that is essential for the success of the construction industry. This environment is shaped by a variety of factors, including technological advances, changes in the market, and the needs of clients. The construction industry is a highly competitive industry, and companies must have a strong knowledge environment to stay ahead of the competition. This knowledge environment is built through a combination of formal education, on-the-job training, and continuous learning. Companies must invest in their employees and provide them with the resources they need to stay up-to-date on the latest industry trends. This knowledge environment is essential for the construction industry to continue to grow and thrive in the 21st century.

