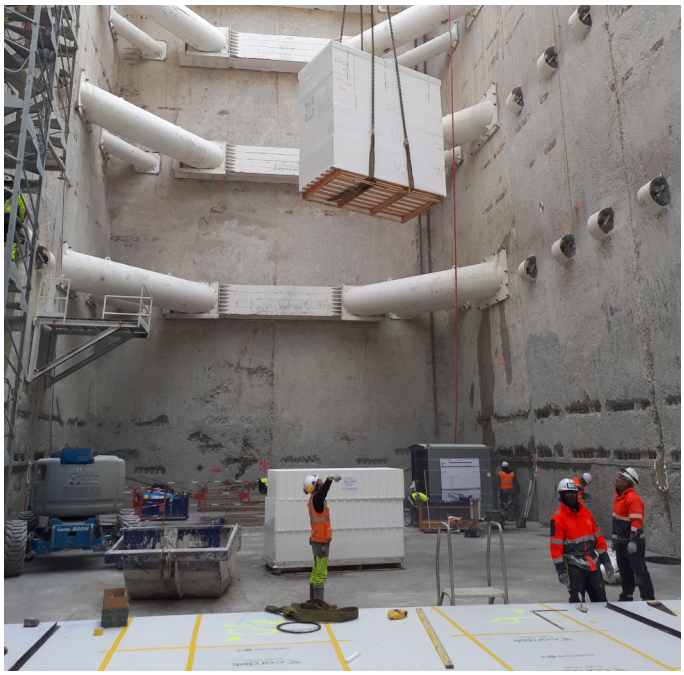
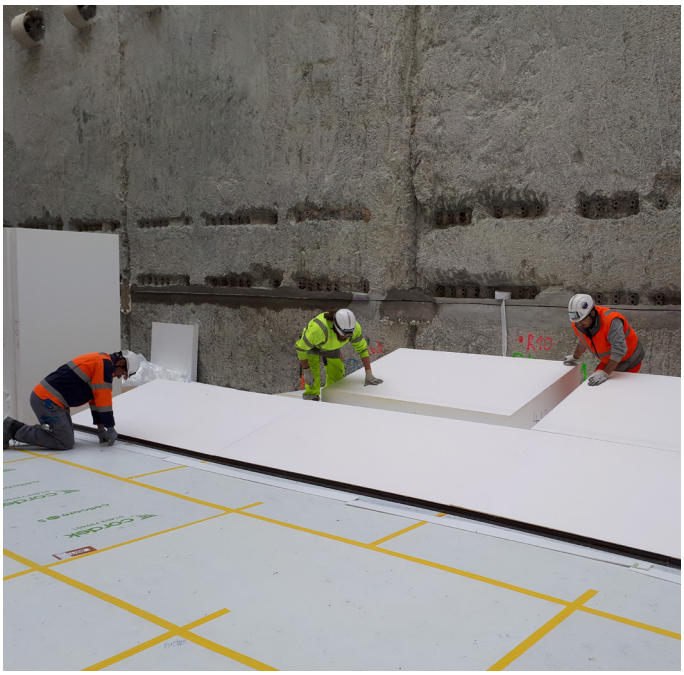
CASE STUDY

Jean Prouvé TBM Launch Shaft

Grand Paris Express, France





Main Contractor:	Vinci Construction France
Market Sector:	Ground Heave Solutions & Void Formers
Products:	Cellcore HG & Filcor 70 FR

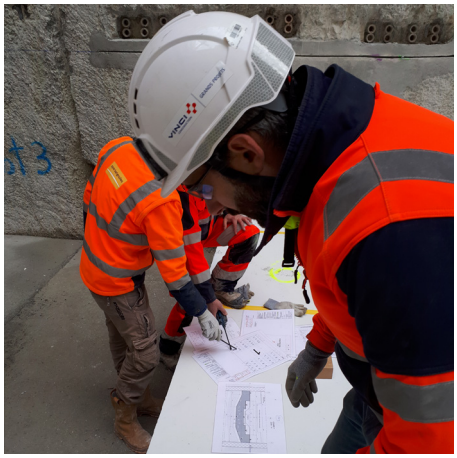
When completed, the Grand Paris Express will form an automated transit network around the French capital. With its 68 new stations and 200 kilometres of additional tracks, the scheme will consist of a ring route around Paris (line 15), new lines connecting outlying suburbs (lines 16, 17 and 18) and the extension of existing metro routes. Its four new lines will circle the capital and provide connections with Paris' three airports, business districts and research clusters. It will service 165,000 companies and transport two million commuters daily.
Cordek was requested to provide a combined ground heave and void former solution beneath the reinforced concrete slab, constructed at the base of the Jean Prouvé Tunnel Boring Machine (TBM) Launch Shaft.

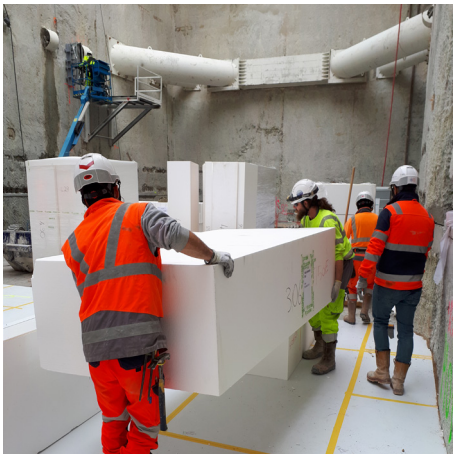
Project Scope

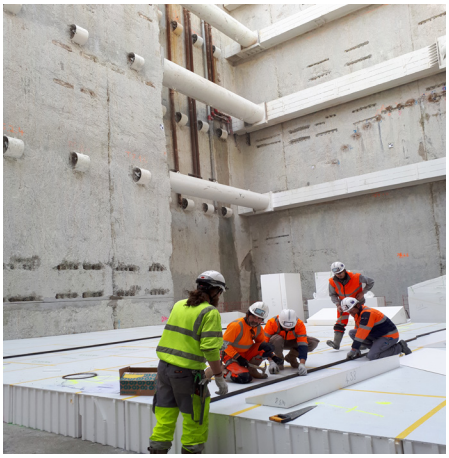
Vinci Construction France, the main contractor responsible for construction of the TBM launch shaft, requested the assistance of Cordek to provide a solution for the ground heave protection required beneath the basement slab. Cordek was called upon to ascertain the appropriate heave protection needed, accounting for the varying depth of the reinforced concrete slab along with the maximum heave potential predicted. Additional constraints included satisfying the overseeing Rail Authority requirements and taking into consideration the practicality of installation in a confined space with limited mechanical handling facilities.

The Solution

The maximum ground heave potential of 150mm, combined with the French Rail Authority's stipulation that a 500mm deep protection layer was required, meant that a standard product could not be considered. Cordek undertook a series of tests to determine the most practical and cost-effective solution based upon a bespoke Cellcore HG specification. The testing identified the required load capacity (both safe and failure loads) and confirmed that an 'equivalent void' in excess of 150mm could be achieved. As the reinforced concrete slab varied in thickness from 1900mm to 2640mm, two different specifications of Cellcore HG panels were proposed for installation in the appropriate locations. To aid the installation process, it was proposed to install a single, flat layer of Cellcore HG panels to be overlaid by a profiled Filcor void former to enable construction of the slab to the appropriate depths.

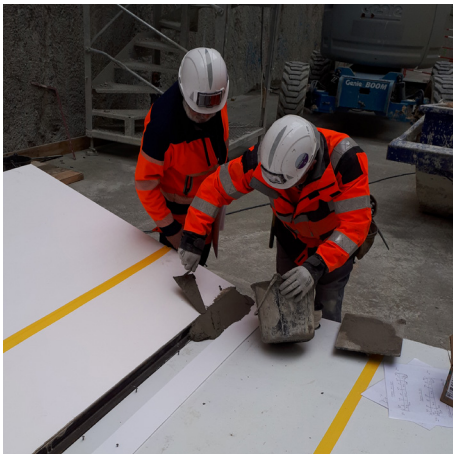






The Process

Once the required testing to determine the appropriate specification of Cellcore HG was completed, Cordek used information provided by Vinci Construction France to produce an installation plan, utilising the optimum number of panels and indicating where panel cutting was required between the piled diaphragm walls.
3D CAD modelling was used to design the profiled Filcor void former, with each individual unit proposed at the appropriate size and weight to comply with manual handling limits. Following production, each unit was identifiable by the reference number applied to it and corresponded with the installation sections / plans provided.
In total, Cordek supplied 210m^2 of Cellcore 500mm HG 50/65 and 490m^2 of Cellcore 500mm HG 70/95 panels in addition to 260m^3 of Filcor 70 FR void former, delivered to the Paris site in order to meet the customers requested delivery and installation schedules.



Summary

Construction of the Jean Prouvé TBM Launch Shaft is now complete, enabling the lowering of the Tunnel Boring Machine into location ahead of the commencement of tunnelling for the construction of the Line 14 extension.
Once tunnelling commences, the TBM will bore a total of 4.6km of tunnels between the launch site at Jean Prouvé and the future Maison Blanche Station within a relatively short time frame before handing over to the track laying team. When complete, the extension of Line 14 will eventually connect the Olympiades Station with Paris-Orly Airport in time for the forthcoming 2024 Olympic Games in Paris.

Please contact us for more information
01403 799600
info@cordek.com