BEHIND THE CONSTRUCTION FENCE | CONSTRUCTION DETAILS | SUSTAINABILITY

Brenner: EMBEDDED in NATURE

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Civil engineering/ Infrastructure

As we dig our way through the Brenner Pass, we have also completed the connection to the longest underground railway tunnel in the world. And we did it quickly and in an environmentally friendly manner.

Measuring just 600 metres, section H21 Sillschlucht is one of the shortest sections of the Brenner Base Tunnel. And yet without this connection from Innsbruck main station to the Viller Berg main portal with the adjoining 130-metre tunnel sections, no train would be able to travel as quickly from Austria to Italy in future. And there was no shortage of logistical, engineering, and construction challenges either. The gorge is narrow. Infrastructure such as motorways, power stations, railway tunnels, and even the local recreation area with the Bergisel ski jump are very close to the construction site. And then there is the river that gives the gorge its name, the Sill. But we were able to successfully complete all of the work. Time was a critical factor right from the start.

Best possible

It took almost eight months to review and evaluate the bids. In the demanding bidding process, 55% of the evaluation points were awarded to the price and 45% to environmental aspects, logistics and construction concepts, and deadline optimisation. We drew up the offer together with our colleagues from the foundation engineering and steel construction departments, the tunnel construction department, pde, the prequalification department, and the civil engineering and waterproofing depart ments from our site in Tyrol. We achieved the best possible price and a maximum of other important award criteria and prevailed over our competitors with a bid amount of around EUR 60m. We received the order from BBT SE in June 2020 and started the construction work in August. And we had a lot to do: we built three steel composite bridges and a stress ribbon bridge, a 132-metre cut-and-cover tunnel, a 284-metre retaining wall on bored pile foundations, and two 130-metre tunnel sections using conventional blasting. There was also extensive earthworks and hydraulic engineering work.

(c) Peter Fahrengruber

Connecting

The north portal is the entrance and exit to the Brenner Base Tunnel. The ceremonial start of tunnelling took place for the two tunnel connections in October 2021. The south portal near Franzensfeste was breached back in December 2018. Freight traffic will run there once the railway is up and running. It is mainly passenger trains that will run through the north portal, as freight trains can use the Innsbruck bypass. Following the portals in North and South Tyrol, the Brenner Base Tunnel runs in two single-track tunnel tubes on the 55-kilometre stretch between Innsbruck and Franzensfeste. Together with two new railway bridges and the connecting portal of the Silltal pre-tunnel at the foot of the Bergisel, the main portal forms a structural ensemble in the direction of Innsbruck.

Sustainable

We wanted to enhance the natural and ecological value of the front of the Sillschlucht gorge and connect it with the unspoilt environment of the rear of the gorge. An interdisciplinary team of civil engineers, tunnel and river builders, landscape planners, geologists, and architects worked together with BBT SE to develop a number of solutions to harmonise the structural requirements and the design of the surroundings. We built the visible structures – the retaining wall for the Viller Berg portal and the north and south portals of the pre-tunnel – using high-quality exposed concrete. This was specified in the building permit and architectural design. In addition to restoring the course of the river and widening the foot of the Bergisel slope, we developed an overall concept that harmoniously integrates the engineered structures into the landscape. Using working models and digital 3D modelling, we tested various construction options and surface designs, which we optimised and finally implemented. We are proud to have completed the project so successfully and thus made a significant contribution to the future of European mobility. And we did it quickly and in an environmentally friendly way. Everything on track in the Sillschlucht gorge.