



## **Serena, DS TBM of Europe's Metro, arrives at destination after excavating 14km of tunnel**

**The Brenner Base Tunnel, a highspeed railway tunnel, will connect Austria and Italy. Once completed, it will be the world's longest underground railway connection. Reducing current travel times to one third, it will play a crucial role in European mobility.**

*24 November 2021* – The railway project, part of the TEN-T Trans-European network, consists of two main tubes and an exploratory tunnel, realized using both mechanical and conventional means: Serena, the first and smallest of the TBMs, precisely a Double Shield with a diameter of 6,85m, began her voyage with the boring of the exploratory tunnel in spring 2018. The objective was to analyze the rock mass and reduce construction times and costs. Today, on the 24<sup>th</sup> of November 2021, she arrives at destination after excavating 14km of tunnel.

At the same time, 12 meters above, since the spring of 2019, the other two TBMs, Virginia and Flavia, are moving in parallel to bore out the railway tubes.

### **Key information on TBM "Serena"**

This machine is a double shielded tunnel boring machine with a diameter of 6.85 m. It has been operational at the Mules construction lot since May 2018 and it excavated a total of 14.13 km of tunnel (exploratory tunnel section northwards) up to the Brenner border. Tubbing rings were used for the tunnel lining. This means that this "underground factory" with a driving power of 2,800 kW not only worked its way through the rock and excavated the exploratory tunnel with its cutting head, but it also used a trailing structure to move prefab concrete elements, known in technical jargon as "tubbing rings", as an inner shell in a single work sequence. To produce these concrete elements, the rock from the excavation is recycled sustainably. A tubbing ring consists of five standard tubbings, a keystone and two bottom tubbing segments (ground elements). TBM "Serena" almost 300 m long and weighs over 1,200

### **About Ghella**

Founded in 1894, Ghella is a leading Company in the construction of major infrastructure projects worldwide, mainly in Europe, the Americas, Oceania and Far East. With its unique skills and experience in underground works, Ghella is involved in the construction of subways, railways, motorways, major roads and significant water and hydraulic works. The use of modern technologies, development of innovative productive methods combined with the highest attention to safety and environmental requirements, have enabled Ghella to complete complex engineering works that have contributed to the Company's dynamic and steady growth as well as the social and economic development of the territories in which it operates.

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