

Europe's largest internal diameter steel fibre reinforced tunnel

Project overview >

The Polish city of Świnoujście extends over the eastern part of the island of Uznam as well as over the islands of Wolin and Karsibór. A major new road tunnel was required beneath the Świna river to address the growing issue of traffic congestion between the islands. Prior to completion of the tunnel, traffic had relied on ferry connections.

Project title: The Świnoujście Road Tunnel

Client: Świnoujście Municipality

Contractor: PORR, Gulermak & Energopol-Szczecin

Designer: SWS Engineering

Segment producer: Cemex

Concrete class: C50/60

Location: Poland

Working environment: Mixed face conditions comprising of sand, clay and chalk layers

Tunnel length: 1.48km

TBM outer diameter: 13.46m

Tunnel lining segment thickness: 500mm

Tunnel lining segment width: 2.00m

Ring segmentation: 8+0

Project duration: 48 months, 2018-2022

ArcelorMittal Fibres used: HE+++ 90/60

Fibres tonnage: 1325 tonnes

Dosage: 43kg/m³ + 2.0kg/m³ micro PP

“Not only the inhabitants of Świnoujście, but also tourists from all over Poland have been waiting for a long time for a road connection under the Świna river. This is the first tunnel built using steel fibre technology in Poland and I am proud that we have been a part of this amazing project.

The contractor was able to rely on us completely for on time deliveries and technical support when required which was certainly one of the drivers of the success of this project.”

Arkadiusz Gaczewski
Head of Fibres Business Poland & CEE Markets

The challenge >

The design and construction of the two-way road tunnel at Świnoujście, beneath the Świna river, required high levels of flexibility and expertise to ensure the development and implementation of a workable solution for each section of the tunnel route.

Geological conditions along the 1.48km route were highly variable with the most demanding section below Świna Strait. In this section the blow-up pressure, that governs the upper threshold, was very low due to the low overburden (minimum 10m) while the stability pressure was high because this was the deepest section of the tunnel. Such conditions demanded greater attention during TBM operation and the design specification for the steel fibre reinforced concrete tunnel lining segments.



The solution >

The Świnoujście tunnel was constructed within the agreed contractual milestones using a large diameter Slurry TBM passing below the Świna Strait. The Slurry TBM excavated the 1.48km tunnel with an excavation diameter of 13.46m with no major settlement issues or problems.

1325 tonnes of ArcelorMittal HE++ 90/60 steel fibres were used in the reinforcement of the 500mm thick tunnel lining segments that were manufactured for this key Polish infrastructure project.

Our Technical Support Team were on hand at each step of the way, providing important technical advice on dosing and mixing specifications and assisting with the production start-up process.

The result >

With an internal diameter of 12m, the Świnoujście two-way road tunnel is the largest internal diameter tunnel in Europe to date that is reinforced with steel fibres only. This major infrastructure project provides a direct connection between Uznam and Wolin, beneath the Świna river, cutting the journey time to just a few minutes and significantly improving connections to and from homes, places of work and popular holiday destinations in West Pomerania.

The world is building on our expertise.

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