

Metro Budowa

Warschau, Poland



Metro Warschau

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During the extension of the metro line 2 in Warsaw, a strong ground slab had to be sealed. This lies at a depth of 15 metres below the ground level and about 12 metres below the upper edge of the groundwater table.

In autumn 2019, the 3.1 km extension of the Warsaw Metro Line M2 was opened. This is the first extension of this line, which was inaugurated in 2015. It starts at the previous terminus Dworzec Wileński and runs completely underground. In the western section behind station C06 Księcia Janusza to the stopping tracks of station C04, the sub-structure waterproofing system Zemseal® was used in combination with other waterproofing products.

The realisation of the sealing measures was extraordinarily demanding.

The shaft chamber for the dismantling of the tunnel boring machine of the new section, with a foundation slab up to 2 metres thick, had to be sealed against groundwater.

The Zemseal® 12 waterproofing membrane permanently protects the base slab against water penetration.

A major challenge was the sealing of the connection between the base slab and the barette wall, as well as the barette wall tiebacks. In the transition areas, Zemseal® PA was used as a supplement to Zemseal® sub-structure membrane.

Cresco® GR expanding waterstop was installed as a construction joint sealant in these areas. As secondary joint sealing, two injection hoses Intec® Premium, which is suitable for multiple grouting, were installed in the floor slab-wall construction joints and injected with PUR resin Intectin® Plus.

Despite the additional stress caused by rainwater during the construction phase and extremely unfavourable installation

Type of building:

Transport & communications

Clients and Developers:

METRO WARSZAWSKIE Sp. z o.o.
www.metro.waw.pl

Architect:

AMC – Andrzej M. Chołdzyński Sp. z o.o.
www.amcholdzynski.pl

Engineers/ Specialist Planners:

ILF CONSULTING ENGINEERS POLSKA Sp. z o.o.
ILF Polska ILF Transportation projects

Building contractor:

Gulermak Agir Sanayi Insaat Taahhut A.S. S.A. Oddział w Polsce
Ul. Grzybowska 80/82, 00-844 Warszawa, Polska
Sub-Contractor:
SERW Sp. z o.o. Marszałkowska 111, 00-102 Warszawa [Project](#)

Completion:

10/2020

Project link:

<https://www.metro.waw.pl/linia-m2>

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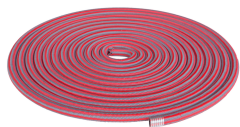
conditions, the MAX FRANK waterproofing products have proven themselves outstandingly.

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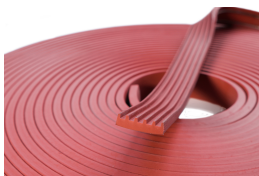
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Products used:



Injection hose system Intec®
Premium



Expanding waterstop Cresco®
GR



Sub-structure waterproofing
system Zemseal®



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Waterproofing system Zemseal® in combination with Intec®
injection hose system
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Work on barett wall
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Wrinkle-free layer of Zemseal® sub-structure waterproofing
membrane
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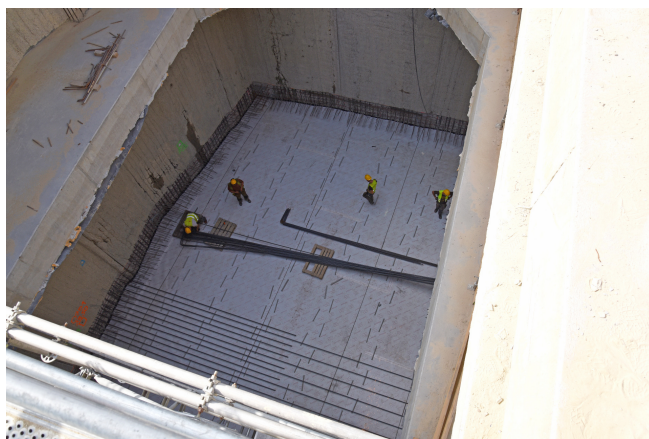
Simple butt joint formation of Zemseal® membranes
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Shaft chamber with laid Zemseal® waterproofing membrane
© www.maxfrank.com



Access to the M2 metro line shaft chamber
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Start of reinforcement laying on surface spacers
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Laying the lower reinforcement layer
© www.maxfrank.com



Zemseal® material very robust in construction site use - massive reinforcement work possible on the track
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Fibre concrete bar spacer between sub-structure membrane and reinforcement
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Sealing of the highly reinforced connection area with two grouting circuits of Intec® Premium injection hose
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