



SIKA AT WORK

PRECAST TUBBINGS PRODUCTION FOR THE TUNNEL IN GDAŃSK

SIKA TECHNOLOGIES: PRECAST CONCRETE WITH SIKA ADMIXTURES

BUILDING TRUST





THE FIRST ROAD TUNNEL IN POLAND THAT GOES UNDER THE RIVER - A SPECTACULAR INVESTMENT IN GDAŃSK

THE TUNNEL UNDER THE DEAD VISTULA RIVER is a Gdańsk's flag project. It will serve not only the entire region of Pomerania but also Poland's national economy as a port in Gdańsk plays an important role in the Baltic sea transport node, handling a volume of goods worth more than 100 billion PLN each year. The tunnel under the Dead Vistula river in Gdańsk is a first road tunnel in Poland that will go under the river and, even more importantly, one of the first tunnels in our country excavated with the TBM method.



ONE OF THE FIRST TUNNELS IN POLAND EXCAVATED WITH TBM METHOD

PROJECT REQUIREMENTS

Construction of the tunnel in Gdańsk required the use of precast reinforced concrete tubbing segments to lay the tunnel. The highest accuracy in precast elements production and conscientiousness in all concrete works were required. Hence, it was of utmost importance to use concrete technology basing on reliable and state-of-the-art admixtures which would ensure the highest quality of the concrete mix.

PRECAST PRODUCTION

It's worth underlining that precast segment production was a complex process that had to meet high accuracy specifications. Each formwork was checked with the accuracy of 0,1 mm before the concrete was poured in order to ensure that each and every tubbing segment fulfills all the requirements. Altogether almost 7 700 precast segments were produced, which required a very well-planned production and conscientious controlling process, which in the end resulted in meeting schedule requirements.

The tunnel in Gdańsk was excavated with the TBM method, which means that tunnel boring machines were used as an alternative to drilling and blasting methods. In Poland TBM method was previously applied in only two instances: for the construction of a tunnel in Czajka and subway in Warsaw.



All pictures by the courtesy of Leszek Legat, Pekabex Bet S.A



TUNNELING IN GDAŃSK WITH SIKA ADMIXTURES



TUNNEL'S PARAMETERS

The external diameter of the tunnel in Gdańsk is 12,2 m. Each ring of the tunnel consists of 7 segments (6 elements and so-called wedge which is attached as the last and gives the tightness of the structure and stiffens the finished tunnel) and weights up to 110 tones. 537 of such rings constitute one leg of the tunnel with length of 1072,5 m. The tunnel will consist of two legs, each of which will accommodate two lanes of traffic.

SIKA SOLUTIONS

The concrete mix design was developed by Pekabex (one of the largest precast concrete producers in Poland) with use of Sika admixtures:

SIKA® VISCOCRETE® EPL 21

The production of precast elements was based on Sika® Viscocrete® EPL 21. The admixture was selected after very thorough laboratory tests and technical trials in a precast concrete plant in Gdańsk. Sika® Viscocrete® EPL 21 enabled concrete mix to meet all the requirements, including homogeneity and maintaining consistency of concrete mix as well as stable and easy production. For tunneling works in Gdańsk over 120 000 kg of Sika® Viscocrete® EPL 21 were used.

Sika® AER 200S/35

35 000 kg of Sika® Aer 200S/35 was used in order to air entrainment of the concrete mix, which allowed to obtain frost resistance of precast elements.

ADDITIONAL SIKA SOLUTIONS

- Low viscosity injection resin Sikadur®-52 was used to fill possible cracks (max. 0,3 mm wide) on the precast elements surface.
- Fillerised epoxy injection resin Sikadur®-53 was used to fill voids (tiny holes on the precast segment surface).
- Oil and water based release agent Sika®TR 5 was used for protection of formworks.

A very precisely designed concrete mix was a key to success of this project. It enabled fast and easy tubbing production - within less than 12 hours - with the simultaneous high quality of produced precast elements.



PROJECT PARTICIPANTS

Investor: Gdańskie Inwestycje Komunalne

Main contractor: Obrascon Huarte Lain

Precast concrete: Pekabex Bet S.A.

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