



SIKA AT WORK

MODERNISATION OF A HISTORIC RAILWAY FLYOVER, GORZÓW WIELKOPOLSKI

SIKA TECHNOLOGY: brick structures waterproofing **Sika® Igolflex®-201**,
anticorrosion protection **SikaCor® EG System**,
concrete protection **Sikagard®**,
bridge deck waterproofing **Sikalastic®-841 ST**,
pavement surface **SikaCor® Elastomastic TF**,
rail fixing **Icosit® KC System**

BUILDING TRUST



HISTORIC RAILWAY FLYOVER - PRIDE OF THE CITY

Railway flyover in Gorzów Wielkopolski, running along the banks of Warta, is the longest monument of technology in Poland, was registered in 2009 in the Registry of Objects of Cultural Heritage. It is a one-track object, that has a total length of 2116 meters, 70 brick arches, connected with 5 steel viaducts, running through the city centre. The flyover was made in years 1910-1914 in Royal-Prussian Eastern Railway. It is currently a part of railway line no. 203 Tczew-Kostrzyn. Modernization began in November 2016. The object was rebuild and adapted to new standards of passenger services, while keeping its historical nature. During the task niches and retaining walls were restored, steel viaducts were modernized, about 3 km of tracks were replaced and the railway infrastructure was renovated. The structure was prepared for building a second track and electrification of the line.

Source: Transprojekt Gdański, inzynieria.com

PROJECT REQUIREMENTS

Modernization of a historic railway flyover in Gorzów Wielkopolski was not limited only to technical renovation of the engineering objects. Primary requirement of the Investor was of course the durability, allowing seamless, long-term operation of the flyover and the ability to increase the speed of the railway and improvement of the passenger's comfort. Second, equally important expectation for railway object running through city centre, is to diminish its impact (noise, vibration) on the surroundings. Since the niches are used for business activities, it is a necessity to provide proper working conditions for the tenants. Third important element was the aesthetics that not only would allow keeping the historical value and fulfil the requirements of the Heritage Conservator, but also locate the flyover alongside Warta's boulevards.

Comprehensive modernization of the Gorzów flyover, among others, included:

- modernization of all engineering objects in the flyover – reinforcement, replacement of used construction elements and preservation and adaptation of the flyover construction to the standard loads,
- modernization of the vaults and drainages of all of the niches,
- modernization of the retaining walls and side walls of the flyover,
- construction of a new platform and modernization of the existing railway objects,
- rebuilding the railway track in the whole section.

Source Transprojekt Gdański



CAN A RAILWAY FLYOVER IN THE CITY CENTER BE BEAUTIFUL? WITH SIKA SOLUTIONS IT IS POSSIBLE

SIKA SOLUTIONS

Sika Solutions allow to perform complex renovation of construction objects by the means of compatible materials that fulfil the expectations of investors and designers. In order to ensure sufficient durability it is necessary to use verified and top-quality materials of right strength and functional parameters, and of lasting colours and UV radiation resistance.

During the modernization of the flyway in Gorzów Wielkopolski the following Sika technologies were used:

WATERPROOFING OF THE BRICK STRUCTURES AND THE NEW BRIDGE CONCRETE DECK

Works started with removing the old concrete and inserting 12 mm steel rods for anchoring the new concrete slab into the vaulting. Before concreting the brick substrate was covered with a layer of **Sika MonoTop®-910 N**, a polymer-cement mortar designed to protect the reinforcement from corrosion and create a bonding layer. The concrete slab was made along the course of the brick vaulting and covered with **Sika® Igolflex®-201** waterproofing material. It is a two-component, flexible, fiber-reinforced, thick coating based on polymer-modified bitumen. After filling the groins of the vaultings with foam concrete, a new bridge concrete deck was made. After waterproofing the bridge deck the track surface was laid. The concrete slab was isolated with **Sikalastic®-841 ST**, two-part, elastic, very fast-curing, polyurea waterproofing membrane, that is layered as a liquid by hot-spraying. Setting time at the temperature of +20 °C is 1 to 2 minutes while the curing time is 24 hours, which allows for a significant acceleration of the works or a quick commissioning of the object.



PROTECTION OF THE REINFORCED CONCRETE STRUCTURES

Prepared concrete substrates bases were primed with [Sikagard® 552 W Aquaprimer](#), and later protected with crack-bridging, elastic protection layer [Sikagard® 550 W Elastic](#), that has a perfect resistance for atmospheric conditions, is permeable to water vapor and tight to carbon dioxide, in NCS colours of beige and light-brown shades



ANTICORROSION PROTECTION OF THE STEEL STRUCTURES

Steel structures alongside the flyover were cleaned and protected with anticorrosion coating in system [SikaCor® EG](#). An epoxy primer coating [Sika Poxicolor® Primer HE NEW](#), that tolerates worse prepared surfaces, was used, with epoxy intermediate coating [SikaCor® EG 1](#), containing micaceous iron oxide, and polyurethan top coating [SikaCor® EG-5](#). The coating ensures long-lasting and effective anticorrosion protection in accordance to the project requirements in an environment of corrosivity category C4 according to PN-EN ISO 12944.



PAVEMENT SURFACES

Pavement surfaces were made of [SikaCor® Elastomastic TF](#) chemically cured, tar- and solvent-free, two-component hybrid material, based on a mix of epoxy and polyurethan resin, creating elastic isolating and top layer, with high chemical and mechanical resistance, including dynamic load resistance. Steel elements, before using [SikaCor® Elastomastic TF](#) were protected from corrosion with [SikaCor® Zinc R](#) (fast-setting, epoxy primer coating) and [SikaCor® EG-1](#) (epoxy intermediate coating with micaceous iron oxide).

TRACK SURFACE

According to the project, the classic trackway construction was rebuild all along into a slab track. Elastic fixing of the rails was made with [Icosit® KC 340/7](#) and [Icosit® KC 330 Primer](#) as a primer. Used material [Icosit® KC 340/7](#) is designed for point (direct), elastic fixing of the rails in the railroad tracks. This solution protects the structure from dynamic load and reduces vibration and secondary noise, allowing for an increased comfort of the passengers and limiting the nuisance of the railroad traffic for the surroundings, which is particularly crucial at objects located in city centres. Application of [Icosit® KC 340/7](#) allows for precise arrangement of the rails, material is poured as a liquid and sets without shrinking, which lets for a perfect fit to the surface. After the setting, it characterizes with high resilience. Material does not conduct electricity.

Long durability and very good electrical insulation of the elastic track fastening made with the use of materials from the [Icosit® KC](#) group improves track stability, reduces the phenomenon of stray currents, extends the service intervals and ensures almost maintenance-free use of the track.

The parameters of a wide range of materials from the [Icosit® KC](#) group used to make the elastic track fastening ensure the appropriate deflection of the rail selected for a specific type of rolling stock, which results in an effective reduction of vibrations and secondary noise as well as increasing the comfort of travelers and residents of the area through which the track runs, as well as lower consumption of rolling stock.

The use of [Icosit® KC](#) materials ensures an effective life cycle cost index (LCC) of the track surface and a reduction in structure height (important for tunnels) and weight (important for bridges).



SIKA TECHNICAL SUPPORT

Execution of works was possible because of compatible, verified materials, experience and Sika's long-time cooperation with the contractors. Sika's specialists were supporting at all stages of the investment implementation.



PROJECT PARTICIPANTS

Owner / Investor: PKP PLK S.A.

Project: Transprojekt Gdański Sp. z o.o.

General contractor: Przedsiębiorstwo Usług Technicznych INTERCOR Sp. z o.o.

Subcontractor: POLWAR S.A., Intop Tarnobrzeg Sp. z o.o.

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