Sika® at work
Modernization with Contrack technology

Sika technologies:
SikaGrout®, Sikadur®-53, Sikafloor® CureHard LI, Sikafloor® ProSeal-12, Sikagard®-700 S, Embedded Rail System with Sika® Icosit® KC 340/45.

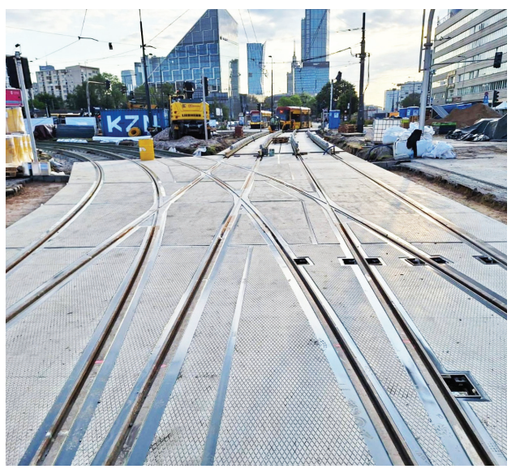
conTrack POWERED BY Sika®

RENOVATION OF TRAM TRACK AND STOP PLATFORMS, ZAWISZY SQUARE, WARSAW

SIKA TECHNOLOGIES: railfixing: Sika® Icosit® KC system, grouting mortar SikaGrout®-4 R, curing agents Sikafloor® CureHard LI and Sikafloor® ProSeal-12, hydrophobic impregnation Sikagard®-700 S

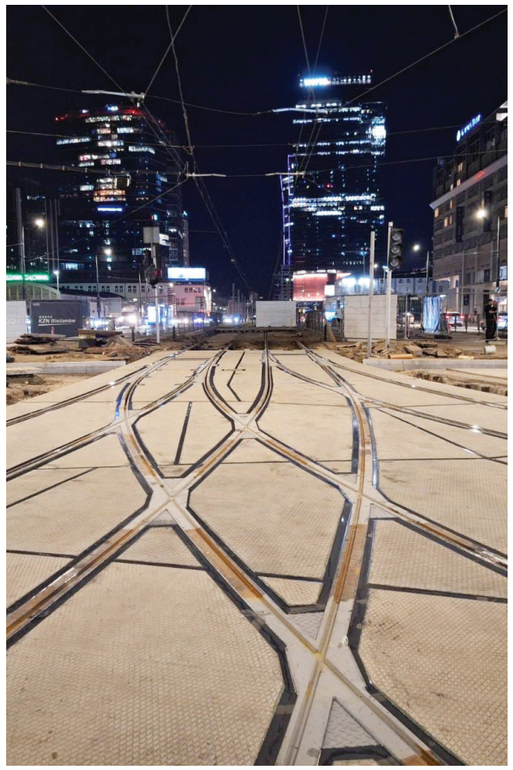
DESCRIPTION
Zawiszy Square in Warsaw is located in the city center and serves as a key transport hub. Three tram routes intersect here, with peak traffic reaching 30 to 45 trams per hour at each entrance. Over 600 trams pass through Zawiszy Square daily, carrying 138,000 to 177,000 passengers. It is also an important crossroads for road traffic.

The renovation included about 737 meters of a single track and three tram stops along Jerozolimskie Avenue on the eastern side of the intersection. The aim of the renovation was to improve urban infrastructure and improve streamline traffic flow, enhancing comfort and safety for passengers. Source: Urzad m.st. Warszawa



PROJECT REQUIREMENTS
Renovation works in such a critical location required special attention during planning and design to minimize disruptions to both tram and road traffic. To achieve this, the reconstruction of the tram track at Zawiszy Square was carried out using an innovative technology of prefabricated turnout slabs – CONTRACK.

The scope of the project included, among others, the reconstruction of the track in the area of intersection in three phases, each involving: removal of the existing surface, preparation of the subgrade, setting of prefabricated slabs in the plan and profile, grouting with early, high strength mortar, priming,



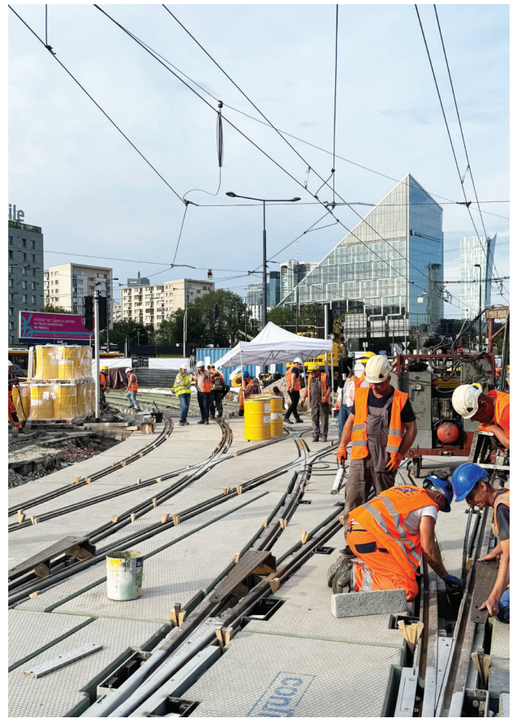
assembly and welding of rails and turnouts, application of elastic polyurethane materials for fixing rails and filling joints between the slabs, as well as performing any additional works related to the reconstruction of tram traction, road pavement surfaces, sidewalks, etc.

SIKA SOLUTIONS
Maximum acceleration of works and minimization of traffic disruptions during tram track reconstruction were achieved thanks to the innovative CONTRACK prefabricated slab technology. The use of innovative CONTRACK technology required precise preparation. Each slab was individually designed to match track geometry, curves and turnouts, and then made in a precast concrete plant. The project used 121 large-size prefabricated slabs with a total area of about 1 600 m^2, and the largest of them was 23 m2. About 540 m^3 of concrete were used. Prefabricated modules include not only reinforced concrete slab and steel track structure, but also full equipment – including sensors, drainage, switch drives and heating systems.

The next stage of the preparatory work was a trial assembly, carried out at the KZN plant in a scale of 1:1, using a modular system specially developed for this investment. Then, the finished elements were transported from the siding of the production plant in Krakow to the siding of Warsaw Trams and assembled on the construction site within a few hours. This precise preparation and trial assembly ensured safe and efficient execution of subsequent works.

To meet the schedule, all materials used had to allow fast and easy application and rapid achievement of required properties. After positioning the slabs in the plan and profile, grouting with a high-strength mortar **SikaGrout®-4R** was made. SikaGrout®-4R is a ready-to-use, expansive, shrinkage compensating, self-levelling cement mortar with 0/4 mm grain size, with high strength and resistance to vibration and impact after curing.

For rail fixing and joint sealing, the proven Sika® Icosit® KC system was applied, ensuring durability and tightness. It consists of: **Sika® Icosit® KC 340/45** a flexible material based on polyurethanes with high elastic recovery, characterized by excellent insulation properties, eliminating the formation of



stray currents and thus corrosion of steel elements located nearby. Sika® Icosit® KC 340/45 reduces vibration and secondary noise. It is designed for both manual and machine application, which allows for significant acceleration of work and obtaining the highest quality. A single component polyurethane primer **Sika® Icosit KC-330 Primer** is used to prepare the substrate and improve adhesion. Rails and rail channels before bonding the filler blocks with **Sika® Icosit® KC 330 FK**, was primed with the epoxy resin **Sikadur®-53**.

To ensure the longest possible service life of the prefabricated slabs in adverse environmental conditions, their surface were sealed with **Sikafloor® CureHard LI** and **Sikafloor® ProSeal-12**, which reduce the absorption of the concrete, improving abrasion and UV resistance. Additional protection was provided by **Sikagard®-700 S** hydrophobic impregnation, reducing chloride ions penetration and migration as well as contamination from daily use.

The use of innovative CONTRACK technology shortened reconstruction time significantly. In the case of Zawiszy Square, all the works were completed within 5 weeks, compared to at last 3 month using conventional technology.

CONTRACK technology sets new standards for tram track construction in Poland and Europe, enabling fast and efficient modernization with minimal environmental impact while ensuring long-term durability through high-quality materials and precision workmanship.

PROJECT PARTICIPANTS
Owner: Tramwaje Warszawskie
Investor: Tramwaje Warszawskie
Contractor: KZN rail Sp. z o. o.
Sika Poland: Tomasz Wesołowski, Wiktor Karpała

MODERNIZATION OF THE ROAD-TRAM CROSSING ALONG TELIMENY STREET, KRAKOW

SIKA TECHNOLOGIES: railfixing: Sika® Icosit® KC system, grouting mortar SikaGrout®-4 R

DESCRIPTION

The replacement of the road-tram crossing along Telimeny Street in Krakow located at the intersection of Telimeny, Cwiklinska and Aleksandry Streets was part of the implementation of large-size CONTRACK slabs in the renovation of communication infrastructure in large cities. Due to the course of the tram line in the arch, in the reconstruction of the passage using standard prefabricated concrete slabs, it would be necessary to lay 25 panels. The use of the CONTRACK technology allowed to reduce the number of plates to 4.
The CONTRACK technology increases durability and improves surface quality, at the same time allows to accelerate construction and reduces to a minimum the time needed for maintenance work related to critical road crossings and elements of tram tracks. It is supposed to relieve residents, drivers and city authorities of the need for long-term use of substitute communication and the organization of detours of the busiest streets – the construction, replacement and repair of key infrastructure elements is to take up to 72 hours (so-called weekend works).
Source: Transport Publiczny

PROJECT REQUIREMENTS

The renovation works carried out in large cities, in dense urban areas, require special attention at the planning and design stage to ensure that disruptions to both tram and road traffic are as limited and short as possible, and that their impact on the surroundings is as minimal as possible.
An important element of the work was to test alternative logistics and technological solutions in the conditions of limited space and under an active traction network.
The scope of the project included demolition of existing structure, preparation of the subgrade, setting of prefabricated slabs in the plan and profile, grouting with early, high strength mortar, priming, assembly and welding of rails and turnouts, application of elastic polyurethane materials for fixing rails and filling joints between the slabs, as well as performing any additional works related to the reconstruction.

SIKA SOLUTIONS

The maximum acceleration of work and reduction of traffic disruptions during the replacement of road-tram crossing in cities is possible thanks to the innovative technology of prefabricated turnout slabs CONTRACK. The use of innovative CONTRACK technology required precise preparation. Each slab was individually designed for tracks geometry, curves and turnouts, and then made in a precast concrete plant. The project used 4 prefabricated slabs. Prefabricated modules may also include not only reinforced concrete slab and steel track structure, but also full equipment – including sensors, drainage, switch drives and heating systems.

The next stage of the preparatory work was a trial assembly, carried out at the KZN plant in a scale of 1:1, using a modular system specially developed for this investment. Then, the finished elements were transported from the siding of the production plant in Krakow to the installation area and assembled on the construction site within a few hours. This precise preparation and trial assembly ensured safe and efficient execution of subsequent works.

During the replacement of the road crossing along Telimeny Street in Krakow, logistical solutions for loading, delivery and unloading of prefabricated elements were also tested. For loading in the precast factory, a large-size three-wheel gantry was used. The plates were then transported in a semi-trailer to the construction site, where the plates were unloaded and laid. For this work, not only standard equipment (crane) was used, but also specialized equipment, such as the PWP gantry and a self-propelled industrial crane with a lifting capacity of 100 t, which enabled logistics operations under the tram traction. The technologies were used as interchangeable and supportive, so that it was possible to check the possibility of working with a large and heavy prefabrication in a narrow building space (source: Transport Publiczny).

To meet the schedule, all materials used the other materials used during the installation of CONTRACK panels had to allow fast and easy application and rapid achievement of required properties.

After positioning the slabs in the plan and profile, grouting with a high-strength mortar **SikaGrout®-4R** was made. SikaGrout®-4R is a ready-to-use, expansive, shrinkage compensating, self-levelling cement mortar with 0/4 mm grain size, with high strength and resistance to vibration and impact after curing.

For rail fixing and joint sealing, the proven Sika® Icosit® KC system was applied, ensuring durability and tightness. It consists of: **Sika® Icosit® KC 340/45** a flexible material based on polyurethanes with high elastic recovery, characterized by excellent insulation properties, eliminating the formation of stray currents and thus corrosion of steel elements located nearby. Sika® Icosit® KC 340/45 reduces secondary noise and absorbs vibration. It is designed for both manual and machine application, which allows for significant acceleration of work and obtaining the highest quality. 1-component polyurethane primer **Sika® Icosit KC-330 Primer** is used to prepare the substrate and improve adhesion. Rails and rail channels before bonding the filler blocks with **Sika® Icosit® KC 330 FK**, was primed with the epoxy resin **Sikadur®-53**.

The use of innovative CONTRACK technology during works significantly reduces the time needed for the modernization of road–tram crossings and minimizes the duration of tram service interruptions.

CONTRACK technology sets new standards for tram track construction in Poland and Europe, enabling fast and efficient modernization with minimal environmental impact while ensuring long-term durability through high-quality materials and precision workmanship.

PROJECT PARTICIPANTS
Owner: Zarzad Drog Miasta Krakowa
Investor: Zarzad Drog Miasta Krakowa
Contractor: KZN rail Sp. z o. o.
Sika Poland: Tomasz Wesołowski

MODERNIZATION OF THE ROAD CROSSING WITHIN THE TRAM TRACK AT THE INTERSECTION OF POWSTANCOW SLASKICH AND JASTRZEBIA STREETS, WROCLAW

SIKA TECHNOLOGIES: railfixing: Sika® Icosit® KC system, grouting mortar SikaGrout®-4 R

DESCRIPTION
The replacement of a road crossing at the intersection of Powstancow Slaskich and Jastrzebia Streets in Wroclaw is part of broader modernization of the tram track, which will also include new platforms, green track and pedestrian crossing. The aim of the project is to improve traffic capacity and the aesthetics of this part of the city. The investment will enhance comfort and safety for both tram passengers and pedestrians.

PROJECT REQUIREMENTS
The renovation works carried out in a critical traffic location required special attention during planning and design, to minimize disruptions for both tram and road traffic and to reduce them to the shortest possible duration. The replacement of the road crossing was scheduled for a single weekend. To make this feasible, the works were executed using the innovative CONTRACK prefabricated turnout slabs technology.

The scope of the project included demolition of existing structure, preparation of the subgrade, setting of prefabricated slabs in the plan and profile, grouting with early, high strength mortar, priming, assembly and welding of rails and turnouts, application of elastic polyurethane materials for fixing rails and filling joints between the slabs, as well as performing any additional works related to the reconstruction.

SIKA SOLUTIONS
The maximum acceleration of work and reduction of traffic disruptions during the replacement of road crossing in Wroclaw were possible thanks to the innovative technology of prefabricated turnout slabs CONTRACK. The use of innovative CONTRACK technology required precise preparation. Each slab was individually designed for tracks geometry, curves and turnouts, and then made in a precast concrete plant. The project used 6 prefabricated slabs with a total area of about 130 m^2. Prefabricated modules include not only reinforced concrete slab and steel track structure, but also full equipment – including sensors, drainage, switch drives and heating systems. The next stage of the preparatory work was a trial assembly, carried out at the KZN plant in a scale of 1:1, using a modular system specially developed for this investment. Then, the finished elements were transported from the siding of the production plant in Krakow to Wroclaw and assembled on the construction site within a few hours. This precise preparation and trial assembly ensured safe and efficient execution of subsequent works.

To meet the schedule, all materials used had to allow fast and easy application and rapid achievement of required properties.

After positioning the slabs in the plan and profile, grouting with a high-strength mortar **SikaGrout®-4R** was made. SikaGrout®-4R is a ready-to-use, expansive, shrinkage compensating, self-levelling cement mortar with 0/4 mm grain size, with high strength and resistance to vibration and impact after curing.

For rail fixing and joint sealing, the proven Sika® Icosit® KC system was applied, ensuring durability and tightness. It consists of: **Sika® Icosit® KC 340/45** a flexible material based on polyurethanes with high elastic recovery, characterized by excellent insulation properties, eliminating the formation of stray currents and thus corrosion of steel elements located nearby. Sika® Icosit® KC 340/45 reduces secondary noise and absorbs vibration. It is designed for both manual and machine application, which allows for significant acceleration of work and obtaining the highest quality. 1-component polyurethane primer **Sika® Icosit KC-330 Primer** is used to prepare the substrate and improve adhesion. Rails and rail channels before bonding the filler blocks with **Sika® Icosit® KC 330 FK**, was primed with the epoxy resin **Sikadur®-53**.

The use of the innovative CONTRACK technology during the work shortened the intersection modernization time and limited the interruption of tram traffic to the necessary minimum.

CONTRACK technology sets new standards for tram track construction in Poland and Europe, enabling fast and efficient modernization with minimal environmental impact while ensuring long-term durability through high-quality materials and precision workmanship.

PROJECT PARTICIPANTS
Owner: MPK Sp. z o. o. Wroclaw
Investor: MPK Sp. z o. o. Wroclaw
Contractor: KZN rail Sp. z o. o.
Sika Poland: Wiktor Karpała

SIKA® AT WORK

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