



SIKA AT WORK

VOLKSWAGEN PRODUCTION PLANT IN WRZEŚNIA, POLAND

SIKA SYSTEMS FROM BASEMENT TO ROOF

BUILDING TRUST



ONE OF THE BIGGEST CONSTRUCTION SITES IN EUROPE IN 2015

THE NEW GENERATION OF VOLKSWAGEN CRAFTER COMMERCIAL VEHICLES will be manufactured in a new modern car factory in Września, Wielkopolska, Poland. The plant's production will launch in late 2016. The plant covers over 220 hectares, which constitutes an area of approximately 300 football fields. In this vast area numerous modern production facilities will emerge, including paint shop, body building hall, assembly room, finish hall, raw material supply and storage, and a multifunctional building, which will house a pilot prototypes hall, maintenance workshop, back-up facilities and office, administrative facilities, laboratories, factory medical clinic, quality assurance center, canteen and IT center. Additionally the VW plant will house finished product storage with vehicle loading space for road and rail transport as well as 1.5 km long railway siding connected with the national railway line. Arrangement of buildings was optimized with the production flows. The production capacity of the plant is 100,000 vehicles per year. After reaching full production capacity, the VW plant will be operated by approximately 3,000 people. The plant can make 20 vehicles per hour, which produces 450 cars per day.



PROJECT REQUIREMENTS FROM BASEMENT TO ROOF IN A NEW VOLKSWAGEN PLANT

ROOFING

The investor requested comprehensive solutions with excellent durability at the best price, complying with both Polish and German technical requirements. Additionally, experience, reliability, research-confirmed durability of materials as well as comprehensive technical support were required from the building chemicals supplier. The ability to deliver a large order in a short time and to provide international guarantees was a crucial asset. The main challenges to be addressed to achieve the most economic, high quality results included the following:

The effective supply process of roofing membranes for one of the biggest construction sites in Europe, technical support for five general contractors, and technical on-site training for about 200 roofing subcontractors to ensure qualified installation.

The total size of the roofing project was **394,000 m²**, 330,000 m² of which required roofing installation within four months. Another challenging aspect was a great number of details which made roof installation much more complex including: penetrations through the roof and penthouses on the roof, containing installations and technical equipment such as air handling units, transformer substations and switchgears.

PROTECTIVE COATINGS

About **18,000 tons of steel** with a total surface area of 450,000 m² required corrosion protection in accordance with the requirements of EN ISO 12 944 standard: corrosivity class C2, expected working life: high > 15 years.

CONCRETE TECHNOLOGY

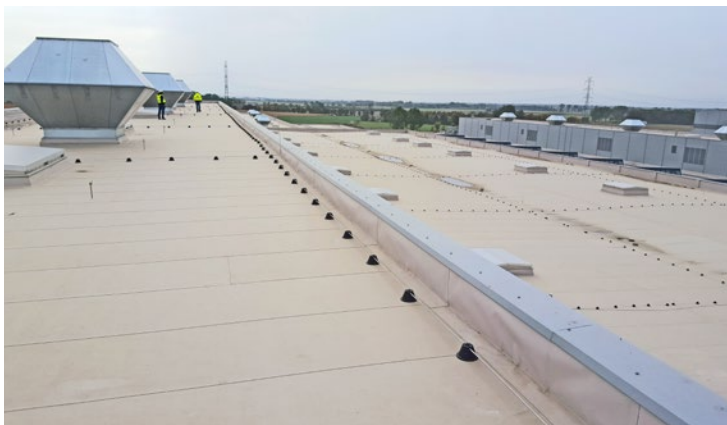
Some internal roads and squares were designed with concrete surface (air-entrained concrete mix). Moreover, concrete floors with surface hardening powder were designed in the production rooms.

FLOORING

The basic requirements for industry floors were to ensure cleanliness and sterility of rooms and protection of groundwater against contamination. Some rooms required also watertight floors and joints.

- **Chemical resistant floors**, for example in the paint shop, warehouse waste and containment were designed to protect the soil and groundwater against ingress of dangerous substances.
- In the paint shop, prototyping, assembly hall, exterior hall, media building and special car assembly hall **resin floors with a WHG certified system to protect groundwater from contamination** were designed.
- Moreover, **conductive floors** safeguarding electrostatic discharge were necessary in protected areas with static sensitive devices, e.g. controlling panels of production lines.
- In addition to the resin floors, in some rooms **concrete floors requiring impregnation** with surface hardening powder were designed.
- Given the rapid pace of application work, it was necessary to ensure the ability to apply **resin coatings on concrete surfaces** with humidity higher than 4%.
- Floor joints required **filling and sealing** with elastic materials.
- **Cementitious grouts** had to be applied for steel plates of production lines.

According to the investor's requirements, flooring works had to be carried out in accordance with the German specifications. Moreover all products intended for floors could not contain silicone compounds.



DURABLE Sarnafil® SOLUTIONS ON 394,000 M² OF ROOF IN A NEW VOLKSWAGEN PLANT

Sarnafil® ROOFING

Sika has applied **Sarnafil®** technology on over 1.5 million m² of roof area for Volkswagen. For many years the investor has trusted Sika's materials and appreciated the comprehensive technical support. The choice of Sika's technology for the new Volkswagen facility in Września was made on the basis of:

- References and good cooperation on previous projects
- Durability of the roofing system confirmed by research
- All required approvals and certificates for the Polish market
- Full and comprehensive technical support of the investments

Sarnafil® TS system was used on all roofing areas which consists of roof waterproofing membrane **Sarnafil® TS 77-15** loosely laid and mechanically fastened to the structural roof, vapor control layer **Sarnavap® 1000E** and all necessary additional accessories.

On the roofs of the new Volkswagen factory in Września, the following materials were applied:

- 410,000 m² of **Sarnafil® TS 77-15** roof waterproofing membrane
- 390,000 m² of **Sarnavap® 1000E** vapor control layer
- 7,200 pcs. of **Sarnafil® T Corner** prefabricated shapes
- 1,500 pcs. of skylights and smoke dampers
- 42,000 meters **Sarnabar®** fastening profile
- 770,000 pcs. of fasteners
- 4,300 kg of **Sarnacol® T 660** adhesive

Sarnafil® TS 77-15 is a polyester reinforced, multi-layer, synthetic roof waterproofing sheet based on premium-quality flexible polyolefins (FPO) containing ultraviolet light stabilizers, flame retardant and an inlay of non-woven glass.

Sarnafil® TS is the only membrane on the market which has a double reinforcement. **Sarnafil® TS** is produced with an inlay of non-woven glass for dimensional stability and a polyester reinforcement for high strength.



SIKA ROOFING SPECIALISTS SUPPORT THE ENTIRE INVESTMENT PROCESS

COMPREHENSIVE TECHNICAL SUPPORT

Sika's aim was not only to deliver high quality products and modern technology, but also to provide all necessary technical support to all participants of the construction process. Sika specialists were fully committed to the Volkswagen project, providing:

- Constant cooperation with the architect office and the investor
- Technical training for subcontractors
- Supervision of works on site

The whole project began with a training of over 200 subcontractors by Sika instructors.

When the application of roofing membrane launched, Sika specialists were systematically solving technical issues related mostly to roofing details. Roofing work was carried out under the supervision of representatives of Sika, who controlled the quality of executed coverage.

Sika has declared control at least once a week on each roof slope, which meant the constant presence of one Sika employee on the construction site. Moreover, the presence of another employee two days a week was ensured. Every two weeks there was an additional visit of an instructor from Sika Germany. During the most intensive two weeks of work, an instructor from Sika Roofing Services also participated on site.

SEMINAR FOR ARCHITECTS ON THE CONSTRUCTION SITE OF A NEW VOLKSWAGEN PLANT

Such a large investment was an opportunity to meet and exchange experience with architects specializing in design of industrial facilities.

The seminar organized by Sika on October 14, 2015 was attended by leading Polish architects who are members of SARP (Association of Polish Architects) and the Chamber of Architects. The program included a presentation by the architect about the organization of construction and the architect's role in the investment process. Additionally Sika's representatives shared their experience about roofing and flooring implementation in the new Volkswagen factory in Września. The seminar participants were also invited to inspect the newly laid roof of the plant.

Leading Polish architects at the seminar organized by Sika on site of a new Volkswagen factory in Września which included a visit to the roof.



SPECIALIST SIKA FLOORING SYSTEMS FOR ROOMS WITH DIFFERENT REQUIREMENTS

Sikafloor® RESIN FLOORING

Thanks to a long-term cooperation with numerous automotive investors worldwide, Sika can provide proven, effective and sustainable solutions in terms of resin flooring for the automotive industry.

In the Volkswagen plant to ensure tight and chemical resistant floor, **Sikafloor®-264** epoxy resin was applied offering a smooth and slip-resistant, so-called "orange peel", surface – colored with RAL 7035 with complementary RAL 9002, 7036 and 7037 colors.

Where necessary, antistatic resin flooring **Sikafloor®-262 AS** was used. Additionally, in the special cars hall, an electrostatic conductive resin with high chemical resistance called **Sikafloor®-381 ECF** was used.

To ensure protection against water contaminating liquids, chemically resistant epoxy coating **Sikafloor®-390** was applied.

On concrete substrates with moisture content over 4% and prior to laying flooring resin, levelling layers of **Sikafloor®-81 EpoCem** (on floors) and **Sikagard®-720 EpoCem** (for walls and other vertical surfaces) were applied to provide a temporary moisture barrier.

IMPREGNATION OF THE CONCRETE FLOORS

To protect concrete floors with the surface hardening powder, **Sikafloor® CureHard-24** was used. It is a clear liquid based on sodium silicate to cure, harden and seal concrete. **Sikafloor® CureHard-24** reduces dusting of concrete floors and improves cleanability.

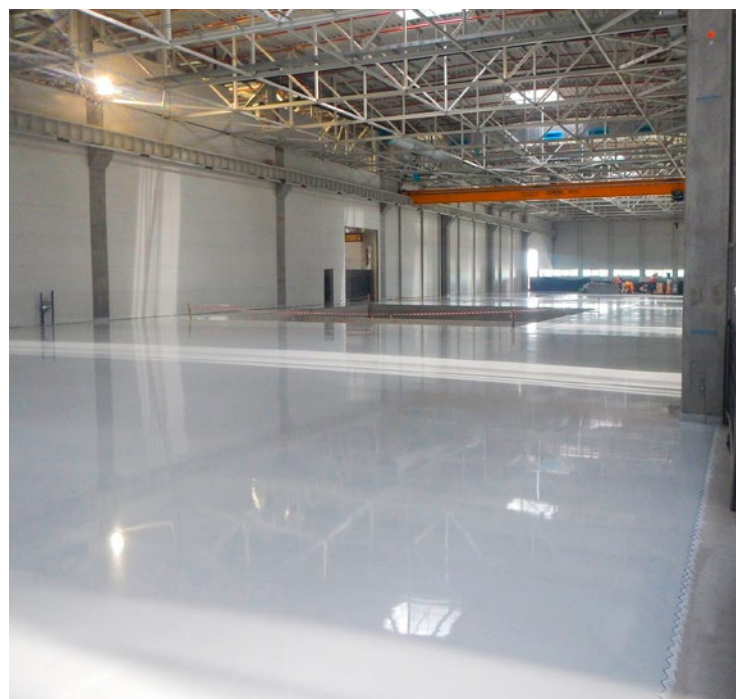
SEALING MATERIALS

All expansion, structural and construction joints were filled with **Sikadur® Combiflex SG System** and **Sikaflex® PRO-3** elastic sealant based on polyurethane with high mechanical resistance.

GROUTING

Under the steel column base plates an expansive, self-leveling cementitious grout **SikaGrout®-4N** was used. Under the steel machine base plates an expansive, self-leveling cementitious grout **SikaGrout®-314** with shrinkage compensating mechanism was used.

- **Sikafloor® RESIN FLOORS WERE LAID ON ABOUT 90,000 M² SURFACE**
- **IMPREGNATION CEMENT FLOORS MADE ON ABOUT 110,000 M² SURFACE**
- **ABOUT 60 TONS OF SikaGrout® CEMENTITIOUS GROUTS WERE USED**



CORROSION PROTECTION OF STEEL CONSTRUCTION AND CONCRETE ADMIXTURES

PROTECTIVE COATINGS

To complete corrosion protection of steel structures two coating systems were used:

- **SikaCor® Steel Protect VHS RAPID** fast-curing, single-layer coating based on alkyd resin in dry film thickness of 120 microns
- A two-layer system consisting of fast-curing, epoxy primer with zinc phosphate **SikaCor®- EP Primer** in dry film thickness of 70 microns and the polyurethane topcoat **SikaCor®-EG 5** with a dry film thickness of 50 microns.

All coatings were applied in the workshop.

The main advantages of Sika corrosion protection solutions are:

- Quick drying time
- Cost-effectiveness
- Optimal balance of price and durability

CONCRETE ADMIXTURES

Sika offers a wide range of approved and cost-effective solutions based on modern admixtures and additives that improve quality, durability and workability of concrete.

To complete pavements and floors in the Volkswagen plant, about 70,000 m³ of concrete mixes from three different manufacturers were used. Depending on the installation place, function, time of laying, expected performance etc., concrete mixes were designed with:

- Plasticizers and superplasticizers from **Plastiment®**, **Sikament®**, **Sika® ViscoCrete®**, **Sika® ViscoFlow®**, **SikaPlast®** ranges
- Accelerating admixtures causing the rapid increase of the early strength of concrete: **Sika® Rapid 2.1** and **Sika® FS-1**

All concrete pavements and some floors were designed as air-entrained concrete. To aerate concrete mixes, air-entraining admixtures were used: **SikaAer® Pro-3** and **Sika® LPS A-94**. As a result, it was possible to obtain a concrete mix with better workability and increased frost and de-icing salt resistance.



VOLKSWAGEN PRODUCTION PLANT FROM BASEMENT TO ROOF



PROJECT PARTICIPANTS

Owner: Volkswagen

Investor: Volkswagen

Architect / Engineering Supervision / Construction Management:

Marek Szczerbaluk, Assmann Beraten + Planen,
Assman Polska Grupa Projektowa,
ICL - Ingenieur Consulting Langenhagen GmbH,
Durr/ Atelier Architektury, PM Group

Main Contractors:

Durr/Hochtief Polska, Strabag, MBN/Freytag , Rembor , Eiffage

Specialist Subcontractors:

Roofing: Pold Plast , Ekotechnika, Poburski Aster Garden

Flooring: Sonnex, Chemobud, PAL-GAZ

Protective coatings: Zublin Stahlbau, Mostostal Słupca,
Smulders Polska, Konstrukcje Stalowe Hyżyk, Metalbark,
Cermont, Banimex

Concrete technology: Strabag, Lafarge, BT Poznań

Sika Poland

Roofing: Maciej Urbanek, Tomasz Zbyszewski, Maciej Borodzicz,
Marek Filipczyk

Flooring: Grzegorz Zajac, Rafał Musiał, Marek Kawalec

Protective coatings: Zenon Kowalczyk

Concrete technology: Krzysztof Wierzbowski, Michał Witkowski

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