Road Surface Rehabilitation

Grabiszyńska Street — Wroclaw, Poland

Reinforced road surfaces achieved a service life that exceeded that of the unreinforced surfaces by at least three times.

PROJECT INFORMATION

Project
Grabiszyńska Street
Wroclaw, Poland

Project Category
Road Surface Rehabilitation

Date
2003

Simpson Strong-Tie Products
Carbophalt™ G pre-bituminized asphalt pavement reinforcement grid

CHALLENGE

Time-sensitive rehabilitation adding asphalt surfacing over historical cobblestones.

SOLUTION

Reinforce the braking and stopping zones to counteract the shear forces and point loads introduced into the thin asphalt layer by decelerating and accelerating traffic.

RESULTS

The surfaces reinforced with Carbophalt G achieved a service life that exceeded that of the unreinforced surfaces by at least three times despite the increased loads and requirements in the intersection areas.

BACKGROUND The city of Wroclaw wanted to repave a cobblestone roadway to ensure a smoother ride for drivers

Grabiszyńska Street is one of the key routes going into and out of the city of Wroclaw in southwestern Poland. As a main thoroughfare in the city, the road was exposed to high volumes of traffic throughout the year. Because of the daily commuter grind, as well as seasonal weather extremes, the road is exposed to a variety of conditions that can easily damage the pavement surface. Adding a new surface layer would both reinforce the road against erosion and create a smoother passage for drivers.

THE CHALLENGE Laying an asphalt overlay on top of cobblestones can quickly lead to problems with cracking of the wearing course

In 2003, the city decided to resurface the existing cobblestone road. Laying an asphalt overlay on top of cobblestones produces numerous benefits for users, including a more comfortable ride and increased driving safety.

However, the asphalt overlay placed on top of cobblestones can easily crack over time from possible differential movements and bonding problems between the asphalt overlay and the cobblestone foundation. In this case, there was also a timing challenge because of the high number of commuters on weekdays as well as a tramline running across it. Road closures needed to be reduced to keep traffic disruptions to a minimum.

THE SOLUTION Reinforce braking zones to counteract shear forces and loads that decelerating and accelerating traffic add to the asphalt pavement

Due to the existing elevation constraints (drainage, infrastructure, etc.), the plan was to cover the cobblestones with a 1"-thick layer of high-strength stone matrix asphalt (SMA). A high-performance leveling course was selected and installed in areas with settlement damage caused by a flood in 1997. This layer provides a smooth and even surface to apply the paving grid onto and ensures a consistent 1" course of pavement.

On Simpson Strong-Tie's recommendation, the road owner decided to reinforce the braking and stopping zones in front of the traffic lights with Simpson Strong-Tie Carbophalt™ G asphalt reinforcement grid. The grid was installed in these specific locations in order to counteract the shear forces and point loads introduced into the thin asphalt layer by decelerating, stopping and accelerating traffic. The high-tensile carbon fibers in Carbophalt G are particularly suitable for this purpose, as they are capable of absorbing considerable forces even at the lowest elongations (> 1.5%) and anchoring them in the bond with the surrounding asphalt.

THE RESULTS The service life of the asphalt overlays reinforced with Carbophalt G was three times that of the unreinforced overlay, despite withstanding increased loads in the intersections

In the following years, Simpson Strong-Tie continued to monitor the condition of the road. The focus here was not only on the areas where Carbophalt G had been installed, but also to compare those with the areas where there was no asphalt reinforcement grid present. During the project tracking, it was clear that the areas with the Carbophalt G asphalt reinforcement grid performed admirably, and the road remained in good condition. On the other hand, the areas where no reinforcement grid was present quickly suffered from excessive cracking and damage.

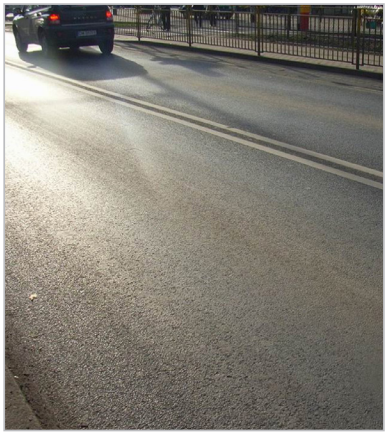
The pictures below illustrate how the Simpson Strong-Tie grid reinforcement performed compared to road sections without the grid.

September 2003 — Simpson Strong-Tie asphalt reinforcement grid installation. *The city of Wroclaw decided to repave the cobblestone road to ensure a more comfortable drive for road users.*

February 2006 — Inspection after 2.5 years. *Substantial cracking could already be seen on unreinforced areas of the road.*

THE RESULTS (cont.)

April 2008 — Inspection after 4.5 years. *In the areas where Carbophalt G was installed, no damage was observed — in sharp contrast to sections of road with no grid.*



November 2009 — Inspection after 6 years. *Even after six years, the road sections where Carbophalt G asphalt reinforcement grid was installed remained in great condition.*

November 2011 — Inspection after 8 years. *Finally, after eight years, the first signs of damage appear, in limited and isolated locations.*

The asphalt overlays reinforced with Carbophalt G achieved a service life that exceeded that of the unreinforced overlays by at least a factor of three despite the increased loads and requirements in the intersection areas. It was not until 2011, eight years after construction, that the first damage to the reinforced areas became visible.

MORE INFO

For complete information regarding specific products suitable to your unique situation or condition, please visit **strongtie.com/asphalt** or call your local Simpson Strong-Tie Pavement Specialist at **(800) 999-5099**.