

Polymer technology for resilient roads

An innovative construction method uses a polymer binder to repair road damage permanently and in a resource-efficient manner – opening up potential for sustainable infrastructure, even under difficult ground conditions.

Increasing heavy goods traffic and heavy rainfall are putting strain on our roads. In Germany alone, one in ten kilometres of the municipal transport network is in poor condition, according to the German Institute for Urban Studies. A new construction method developed by STRABAG using polymer binders offers a solution for fundamental and permanent road repairs that prevents recurring damage such as potholes and cracks.

Cover An innovative construction method using polymers opens potential for a sustainable infrastructure. © Gert Beer



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For a robust road surface

STRABAG's innovative construction method focuses on strengthening the road: in addition to cement, a polymer binder is used. The combination results in a superstructure that is significantly more load-bearing, water-repellent and less susceptible to cracks.

In many cases of road damage, it is not enough to simply renew the asphalt surface, as the damage extends deep into the lower layers.

The entire superstructure has then lost its load-bearing capacity and no longer provides adequate protection against water penetration and frost. To prevent recurring damage to the road surface, the superstructure must be extensively renewed. The use of ROADFLEX RF® provides roads with better protection – for example against erosion, washouts and frost – and means that costly repairs are required less frequently.

1 If the damage extends deep into the road, the road is no longer protected against frost and can be permanently and cost-effectively renewed with ROADFLEX RF®. © Gert Beer



Slim construction reduces carbon footprint and costs

In contrast to conventional consolidation, polymer-treated base courses allow for a thinner road structure. This is also referred to as slim construction. The existing building material mixture does not need to be removed, but is processed on site with the polymer and cement. Even road material that is not normally suitable for recycling can be reused in this way. This conserves the use of primary raw materials, reduces transport and disposal costs – and thus lowers CO₂ emissions.

A layer reinforced with polymers can be covered with a new road surface after only a short time – and does not have to be left to rest for several days, as is usually the case, until the layers have settled and are load-bearing. This construction method is therefore particularly efficient and economical. Compared to a complete reconstruction, manufacturing costs can be reduced by up to 50 per cent, depending on material, landfill and transport costs.

Road renovation in the municipality of Windorf

STRABAG has rehabilitated a two-kilometre stretch of road in the municipality of Windorf near Passau using ROADFLEX RF®. The existing municipal road was no longer frost-resistant, the asphalt was cracked and the subgrade severely deformed – meaning that repair with asphalt was not possible. For the renovation, the team mixed the polymer- e binder with cement under the previously milled road surface and then compacted it. The new asphalt surface was then laid after just 24 hours. The innovative process reduced the construction time by around four weeks and cut CO₂ emissions by around 20 percent by eliminating the need for transport.



2 The polymer binder is individually dosed, mixed with cement into the building material mixture and then compacted. © Gert Beer

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Compared to a complete rebuild, we were able to reduce construction costs in Windorf by 43 percent while also improving the carbon footprint. The project is a prime example of how polymers are fundamentally changing construction methods, opening up new opportunities for renewing transport routes in an economical and resource-efficient manner.

Andreas Fuchs, value stream manager at STRABAG

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Polymere in road construction

Polymers are chemical compounds consisting of long, chain-like molecules. They act like a flexible adhesive that binds cement and soil particles together while remaining elastic. Similar to polymer-modified mortars in building construction, polymer binders in road construction create a robust yet elastic structure.

ROADFLEX RF® is a joint development by STRABAG, Wacker Chemie AG and H2BQ. The binder is harmless to soil and groundwater in accordance with the guidelines of the German Institute for Building Technology (DIBt). The polymer content in the cement-bound mixture is less than one percent and is therefore not classified as microplastic.

Opportunities for sustainable infrastructure

The use of polymers in road construction opens up new perspectives for resilient and sustainable infrastructure. Thanks to the more flexible construction method, even difficult-to-work soils – such as fine-grained desert soils – can be developed into load-bearing roads that are less susceptible to damage and cracks.

Road shoulders – the areas at the sides of the carriageway – can also be rehabilitated with ROADFLEX RF® without replacing the material. This conserves resources, reduces pressure on scarce landfill capacity and promotes sustainable road construction.

This approach offers road authorities the opportunity to rehabilitate transport routes more quickly, with greater durability and lower emissions – a timely alternative given the high rehabilitation needs of the European transport network.

ROADFLEX RF® at a glance



Better construction

permanently load-bearing, water-repellent, flexible and crack-bridging roads, significantly slimmer construction



Areas of application

suitable for almost all types of soil, consolidation and renovation of roads, verges, commercial and industrial areas



Protecting the environment

less CO₂ through reduced transport, conservation of resources, savings in landfill space



Lower costs

lower construction costs thanks to shorter construction times and lower material costs



3 Road shoulders can be rehabilitated using polymer binders without material replacement.
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