



INNOVATION AWARD

GLASS ROAD (VIA VITRUM)

MODERN, COST-EFFECTIVE AND DURABLE ROAD SURFACE COATING.

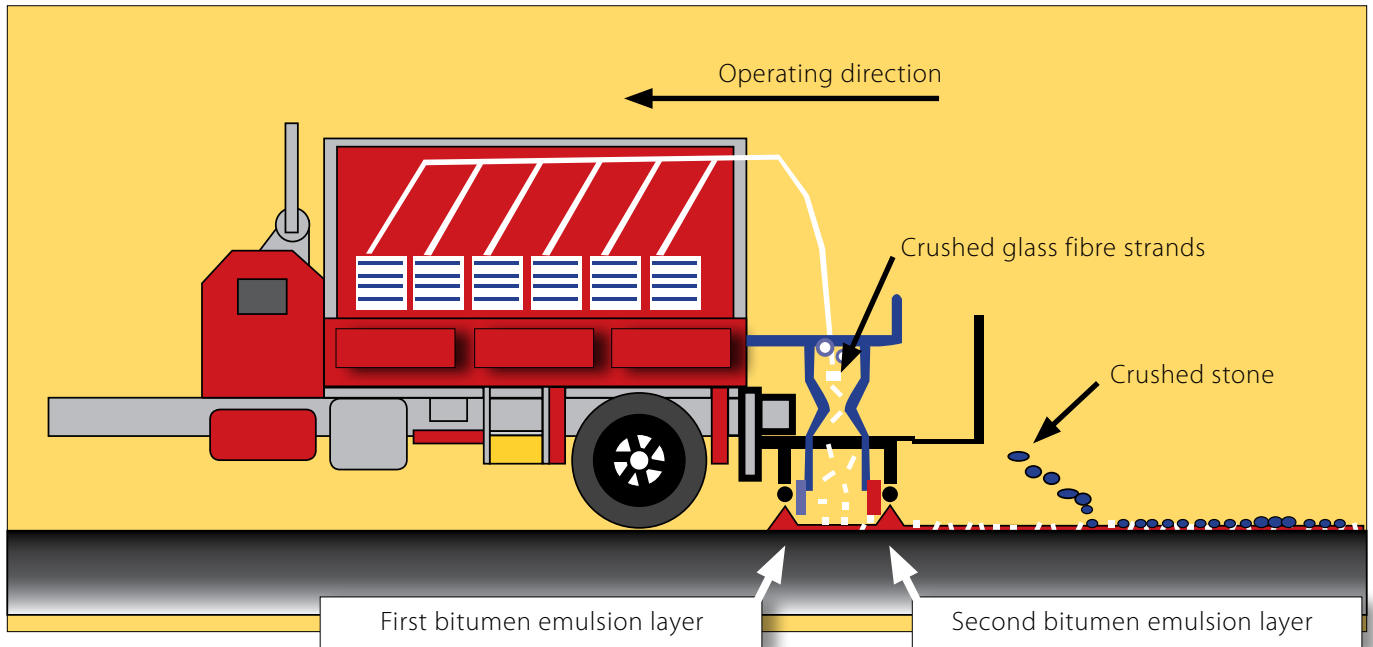
Application of the alternative wearing course installation technology **GLASS ROAD (VIA VITRUM)** instead of the standard road surface coating technology strengthens the worn road surface with modified bitumen emulsion with crushed glass fibre strands and a layer of crushed stone.

- ✓ PREPARATORY WORKS ARE EITHER UNNECESSARY, OR THEIR NEED IS MINIMAL.
- ✓ SERVICE LIFE IS INCREASED BY THE INTERLAYER OF CRUSHED GLASS FIBRE STRANDS AND POLYMER MODIFIED BITUMEN EMULSION.
- ✓ CAN SERVE AS THE WEARING COURSE AND THE INSTALLATION OF THE TOP LAYER IS OPTIONAL.
- ✓ SERVES AS A WATER-RESISTANT MEMBRANE THAT EFFECTIVELY BINDS THE WORN PAVEMENT AND SLOWS DOWN THE CRACKING PROCESS.
- ✓ ANNUAL INVESTMENT IN 1 M² OF THE ROAD SURFACE IS UP TO 2 TIMES LOWER COMPARED TO THE COST OF USING THE STANDARD ROAD SURFACE COATING TECHNOLOGY.
- ✓ THE RENEWED ROAD CAN BE OPENED TO VEHICULAR TRAFFIC WITH SPEED LIMITS AS SOON AS 15 MINUTES AFTER THE INSTALLATION WORKS.

 *Tanevėžio keliai*

TECHNOLOGY

The improved road surface strengthening technology **GLASS ROAD (VIA VITRUM)** was created by combining two technologies used in road maintenance – installation of road surface coating and geotextile fabric. Its basis is the application road surface coating reinforced with crushed glass fibre strands. A special type of machinery that performs four necessary functions was designed for the practical application of this technology.



The new equipment operates by inserting a layer of crushed glass fibre strands between two layers of bitumen emulsion. The process begins with pouring half of the required amount of bitumen emulsion, on top of which the crushed glass fibre strands can be spread around. Then the second bitumen emulsion layer is applied followed by the expansion additive. This tough mixture acts as a water-resistant membrane that effectively binds the worn road surface and slows down the cracking process. Crushed stone layer is added on top of this mixture, which is compacted with a static roller.

TECHNOLOGY

FEATURES OF THE ROAD SURFACE STRENGTHENING TECHNOLOGIES

ADVANTAGES	DISADVANTAGES
STANDARD ROAD SURFACE COATING	
✓ Renews the wearing course; ✓ Isolates the road surface from the moisture effects.	✓ Does not strengthen the road surface; ✓ Cracks of the old road surface recur in the new road surface layer.
GEOTEXTILE FABRIC	
✓ Strengthens the road surface; ✓ Cracks present in the old road surface do not recur in the new one.	✓ It is not the wearing course, therefore an additional layer is required on top; ✓ Complicated installation technology; ✓ Vehicles that pass through during the geotextile fabric installation already damage the road surface before the installation process is complete; ✓ This road surface strengthening method complicates the milling process which is necessary in other stages of the road surface renewal works.
GLASS ROAD (VIA VITRUM)	
✓ Renews the wearing course; ✓ Isolates the road surface from moisture; ✓ Strengthens the road surface; ✓ Prevents old cracks from recurring; ✓ Follow-up milling process is simple enough; ✓ Upper layer is optional; ✓ Installation process is not complicated.	✓ Does not replace the woven geotextile fabric.

GLASS ROAD (VIA VITRUM) TECHNOLOGY CAN BE EFFECTIVELY USED WITH THE FOLLOWING ROAD SURFACE DEFECTS: repairable potholes, interconnected cracks, crumbled portions of the road surface, surface dryness in regards to the binding agent, polished surface of the asphalt particles, slippery road, road surface that develops spots and is supersaturated with the binding agent.



COST-EFFECTIVENESS

COMPARISON OF ECONOMIC INDICATORS

	STANDARD ROAD SURFACE COATING, 2012*	GLASS ROAD (VIA VITRUM), 2012*	GLASS ROAD II (VIA VITRUM II) (DOUBLE-LAYERED ROAD SURFACE COAT- ING REINFORCED WITH CRUSHED GLASS FIBRE STRANDS), 2012*
Preparatory works: (milling, surface replacement, building the levelling layer, re- pairing the cracks)	18 LTL/m ² (All standard preparatory works are carried out)	10 - 15 LTL/m ² Due to the reinforcing quali- ties of the glass fibre strands, the scope of preparatory works can be reduced by up to 90% (forgoing the crack repair works, partial surface replacement and so on)	10 - 15 LTL/m ² Due to the reinforcing quali- ties of the glass fibre strands, the scope of preparatory works can be reduced by up to 90% (forgoing the crack repair works, partial surface replacement and so on)
Installation of the road surface coating (preparatory works not included)	8 LTL/m ² (Majority of the cost covers the raw materials: crushed granite and bitumen emulsion)	11 LTL/m ² (Majority of the cost covers the raw materials: crushed granite, polymer modified bitumen emulsion and glass fibre strands)	17 LTL/m ² Installation of the double-lay- ered road surface coating: The first layer consists of two layers of bitumen emulsion with a layer of crushed glass fibre strands placed in be- tween, followed by a layer of crushed stone which is then compacted; The second layer is placed on top of the previous crushed stone layer and consists of ad- ditional two layers of bitumen emulsion and crushed stone, the latter of which is com- pacted as well. (Majority of the cost covers the raw materials: crushed granite, polymer modified bitumen emulsion and glass fibre strands)
Total cost of the installation of the road surface coating (including the preparatory works, but no trimming)	26 LTL/m ²	21 - 26 LTL/m ²	27 - 32 LTL/m ²
Service life of the renewed surface	5 years	7 years	10 years
Required investment (trimming not included)	5.2 LTL/m ² per year	3 – 3.7 LTL/m ² per year	2.7 - 3.2 LTL/m ² per year

* The preliminary prices (excluding VAT) for 2012 were calculated by estimating the increased cost of bitumen, crushed stone, other building materials and energy resources. The cost for renewing 1 m² of the road surface also depends on the size of the site: the longer the road section undergoing repairs, the lower the cost.

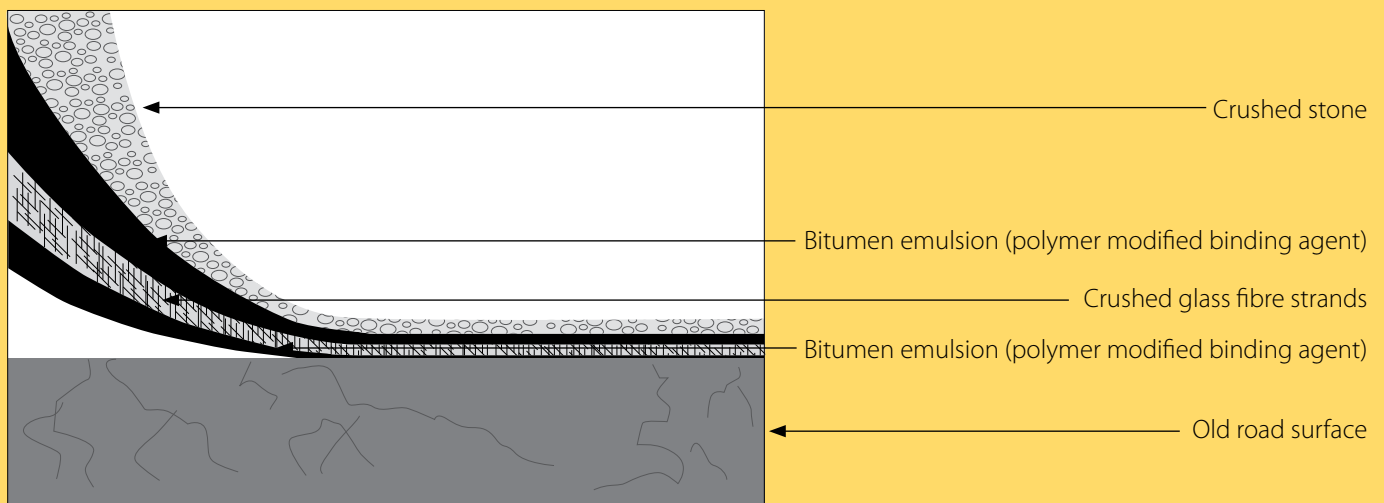
COST-EFFECTIVENESS

GLASS ROAD (VIA VITRUM) TECHNOLOGY CAN BE APPLIED WHEN THE GOAL IS:

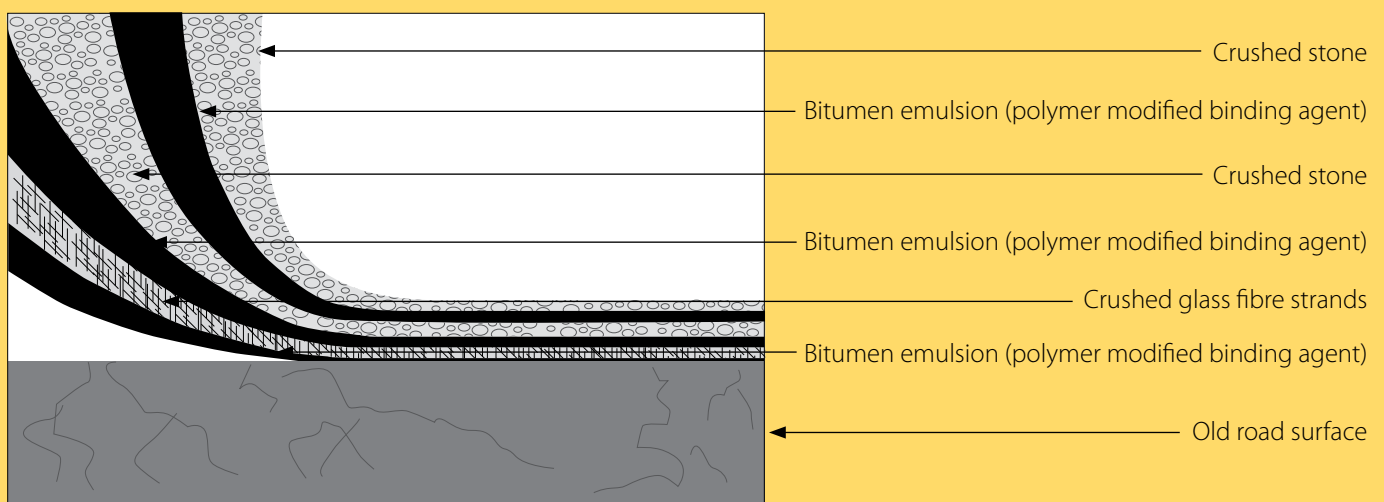
- ✓ To install a road surface coating that has strengthening properties;
- ✓ To install an interlayer that eases the strain and strengthens the road surface;
- ✓ To extend the service life of the road surface in order to reduce the client's expenses for road maintenance when road surface reconstruction is not possible.

GLASS ROAD (VIA VITRUM) is used as **the topmost wearing course** that isolates the layer below. Alternatively it can serve as **the interlayer that eases the strain and strengthens the road surface**, and several weeks, months or years later a layer of hot asphalt-concrete, microsurface, or another type of layer can be added on top.

LAYERS OF THE **GLASS ROAD (VIA VITRUM)**



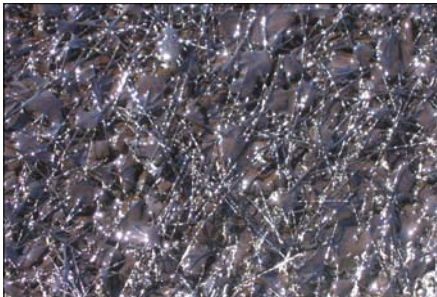
LAYERS OF THE **GLASS ROAD II (VIA VITRUM II)**



HISTORY

ESTONIA, 2006

In 2006 a group of AB "Panevėžio keliai" employees observed the trial installation works of the road surface coating reinforced with crushed glass fibre strands in Estonia. One of the road sections under observation was a concrete production company's service road with high traffic load and intensity. The road surface was severely fractured and displayed interconnected cracks.

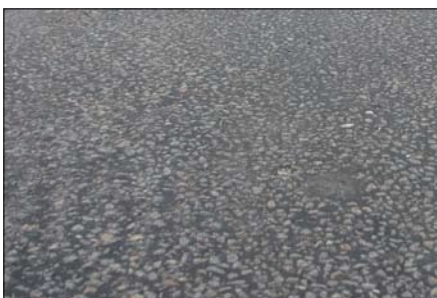


A double layer of road surface coating reinforced with crushed glass fibre strands was installed without any preparatory works:

- ✓ The road surface was covered with the first layer: bitumen emulsion + glass fibre strands, followed by a layer of crushed stone compacted by a static roller.
- ✓ The second layer was added straight away: bitumen emulsion + glass fibre strands, once more followed by a layer of crushed stone compacted by a static roller.

ESTONIA, 2011

A survey of the renewed road section that was carried out after 57 months (almost 5 years later) determined that the concrete production company expanded and the traffic intensity increased significantly as well. During that time the road surface became less coarse but the old interconnected cracks did not re-emerge. After 5 years of intensive exploitation the renewed road did not have any potholes or cracks, neither recurring old ones, or new ones.



NOTES

Construction Director of AB "Panevėžio keliai" Arvydas Zapalskis - +370 686 70340

Deputy Construction Director of AB "Panevėžio keliai" Vilmantas Baciunas - +370 616 52212

LITHUANIA, 2011

GLASS ROAD (VIA VITRUM) installation during the road surface renewal works on Panevėžys-Rokiškis-Zarasai-Daugavpils road section from 82.1 to 86.1 km.

