TENCATE
Polyfelt

PGM & PGM-G
Case History

TenCate Polyfelt PGM & PGM-G

Investigation of a road rehabilitated with TenCate Polyfelt PGM 14 after a service period of seven years

Introduction

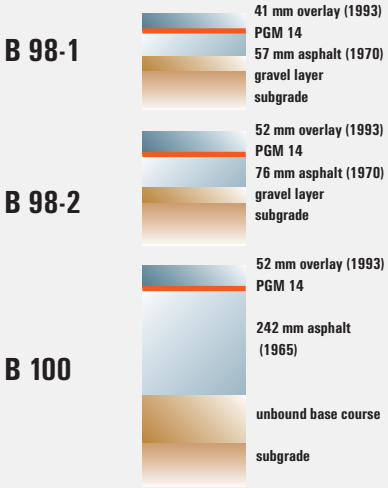
In 1993 some sections of the B 98 and B 100 federal roads in Carinthia / Austria were rehabilitated using PGM 14. After 7 years in service, drilling cores were taken from three sections in order to evaluate the effectiveness of the chosen mainenance method.

The B 98 during the maintenance works (1993): PGM 14 installaed on one lane.

The same section after seven years in service (2000).

The structures of the investigated road sections are illustrated in the diagram below. On the B 98, an old mastix asphalt constructed in 1970 was the basis for therehabilitation works. This type of structure is not longer in use, due to its lack of frost restiance. The structure of the B 100 constructed in 1965 corresponds to the regulations of Type 1 auf the Austrian standard RVS 3.63.

In 1993, all three sections showed severe surface cracking. The traffic load corresponds to loading class III (4.600 heavy vehicles per year) for the B 98, and loading class II (14.300) for the B 100. The calculated total amount of standard axle load passes since 1993 can be calculated as 220.000 (B 98) and 720.000 (B 100).



Cross sections of the investigated road sections, with the avg. thicknesses of the layers measured at the drilling cores.

Project Details

Road sections:
1. B 98 Millstadt Road
   Feld/See - Wiesen, km 24,6 - 25,2
2. B 98 Millstadt Road
   Wiesen - Gassen, km 28,2 - 29,6
3. B 100 Drautal Road
   Northern bypass Villach, km 0,1 - 1,0

Year of maintenance: 1993

Product / Quantity:
B 98: 13.000 m² PGM 14
B 100: 15.000 m² PGM 14

Tack coat: 70% emulsion

New overlay: 40 - 50 mm bituminous overlay (see diagram)

Traffic load:
B 98: Loading class III
B 100: Loading class II

Contractor: Strabag

Supervisor: Straßenbauamt Villach

Drilling core investigations:
Carinthian Gov., Civil Engineering Dept.

TENCATE
Polyfelt

TenCate Polyfelt PGM & PGM-G - Millstadt Road / Austria

Damage configuration

In the year 2000 the condition of the roads was inspected visually, and the length of the cracks was measured. Section B 98-1 was severely damaged (with clear single and alligator cracks. Section B 98-2 was slightly damaged (with just single cracks), whereas section B 100 showed not one single crack at all.

On various spots also the crack depth was measured. In all cases, the crack was limited to the overlay, the interlayer with PGM 14 was still intact.

Bonding strength

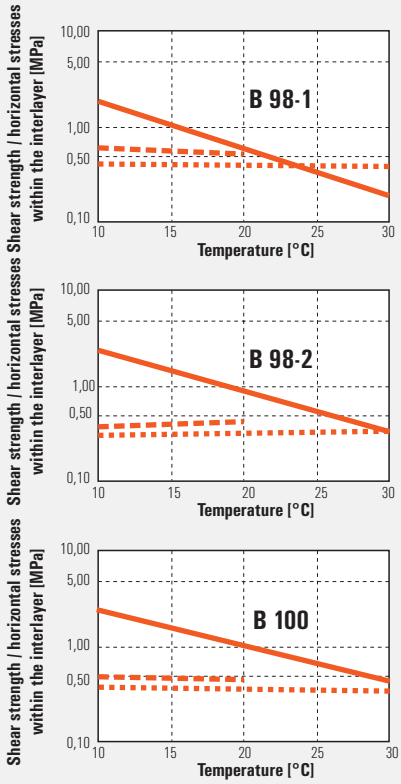
The drilling cores were investigated with regard to their shear strength between the layers at different temperatures, according to RVS 11.065. The results showed that the variation of the values within one test temperature was much lower when PGM was used as interlayer, compared to sections without interlayer.

Assessment of the road structure, stress calculations

In order to assess the effectiveness of the road structure, the bearing capacities were measured by means of defelction tests acc. RVS 11.069. Based on these tests and the defeormation moduli if the bituminous layers, stress calculations were carried out, taking traffic load and climatic conditions into account. The results of this calculations showed that both sections of the B 98 was under-designed, which was obviously the reason for the severe cracking. The design of the B 100 was sufficient.

The calculated horizontal stresses within the interlayer are compared to the bonding shear strength values in the diagram on the right. Just in section B 98-1, at higher temperatures in summer the horizontal stresses exceed the bonding shear strength, which is another clear evidence for the insufficient design.

Top: The B 98 during maintenance works (1993): Bituminous chippings were sprayed onto the PGM 14 in order to allow traffic temporarily.
Below: The same section after seven years in service (2000)



Bonding shear strength and horizontal stresses within the interlayer.

Conclusions

- The bonding shear strength between old road surface and new overlay is much more even when PGM 14 is used as interlayer. Spots with lack of bonding can be eliminated.
- Single surface cracks are limited to the overlay. This proves the crack-bridging effect of PGM, the fabric was intact in all cases.
- Even in the under-designed sections, a clear reduction of cracking was observed.

TENCATE GEOSYNTHETICS AUSTRIA GMBH
Schachermayerstr. 18
A-4021 Linz, Austria
Tel. +43 732 6983 0, Fax +43 732 6983 5353
service.at@tencate.com, www.tencate.com/geosynthetics

The information given in this brochure is to the best of our knowledge true and correct, however new research results and practical experience can make revisions necessary. No guarantee or liability can be drawn from the information mentioned herein. Furthermore, it is not our intention to violate any patents or licences.

BeNeLux	Tel. +31 546 544 811	service.nl@tencate.com
Central Eastern Europe	Tel. +43 732 6983 0	service.at@tencate.com
Czech Republic	Tel. +420 2 2425 1843	service.cz@tencate.com
France / Africa	Tel. +33 1 34 23 53 63	service.fr@tencate.com
Germany	Tel. +49 6074 3751 50	service.de@tencate.com
Italy	Tel. +39 0362 34 58 11	service.it@tencate.com
Near Middle East	Tel. +971 5048 10557	service.nme@tencate.com
Poland	Tel. +48 12 268 8375	service.pl@tencate.com
Romania	Tel. +40 21 322 06 08	service.ro@tencate.com
Russia / CIS	Tel. +7 495 739 12 60	service.ru@tencate.com
Scandinavia / Baltics	Tel. +45 4485 7474	service.dk@tencate.com
Spain / Portugal	Tel. +34 91 650 6461	service.es@tencate.com
Switzerland	Tel. +41 44 318 6590	service.ch@tencate.com
UK / Ireland	Tel. +44 1952 588 066	service.uk@tencate.com

CERTIFIED IQNet MANAGEMENT SYSTEM
qualityaustria SYSTEM CERTIFIED
ISO 9001:2000 NR.00631/0

502 461 | 04.2008

Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites
Geosynthetics
Industrial Fabrics
Grass

TENCATE
materials that make a difference