



Reduction of rutting
with HUESKER'S HaTelit

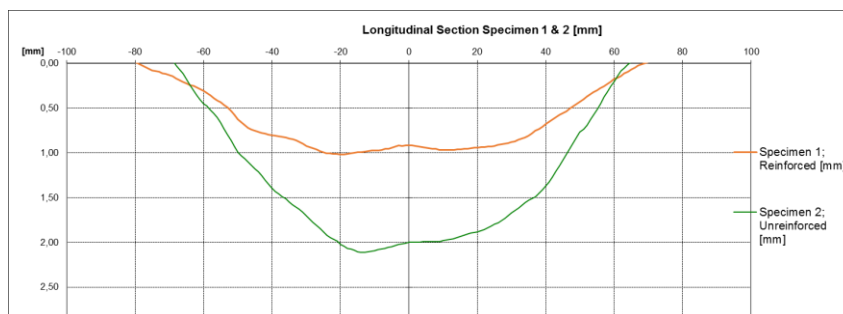
Rutting

One of the important problems associated with asphalt pavements is rutting. This phenomenon is mostly illustrated as a surface depression in the wheel path due to load-induced conditions as well as improper mix design of hot-mix asphalt. Rutting is also a serious safety issue for road users especially when the surface is wet.

In many projects we observed that HaTelit reinforced pavements show less rutting compared to unreinforced pavements. Herewith we would like to explain some reasons for this.

Effectiveness of HaTelit

In a Diploma thesis at the University of Dresden [1] the original target was "Proof of the effectiveness of asphalt reinforcement grids to prevent reflection cracks in the superstructure of asphalt and concrete structures". The effectiveness of HaTelit against reflective cracking again has been impressively proven. As the effect was tested in the modified rutting depth simulator it was additionally found that HaTelit distinctly reduces the rutting depth.



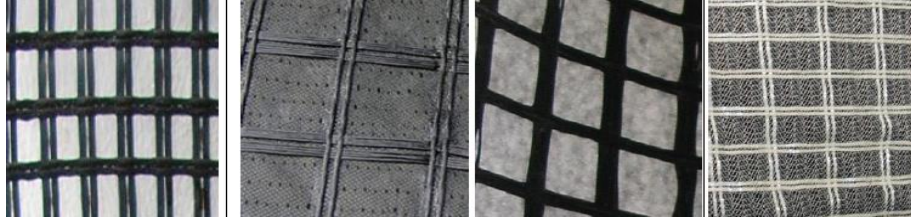
Rutting depth in mm after 60.000 wheel passes

Comparison of the effectiveness of different asphalt reinforcements

In the study "The Effects of Geosynthetics on Mitigation of Rutting in Flexible Pavements" [2] four different types of geosynthetics have been used as reinforcement to provide resistance against rutting. In the tests to understand the effect of the pavement type, three types of mix designs has been used: 1) Stone Mastic Asphalt (SMA), 2) Dense Graded Hot Mix Asphalt (HMA), and 3) Dense Graded Binder HMA. Mix gradation of all Asphalt Specimens was designed according to EN standards.



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Raw material	1 Fiber Glass	2 Polyester	3 Fiber Glass	4 Fiber Glass
coating	coated	Bitumen coated	coated	uncoated
Ultimate tensile strength	100 kN/m	50 kN/m	100 kN/m	100 kN/m

Comparison of technical specifications of geosynthetic materials

Fifteen specimen pairs were prepared for the wheel tracking test program and three different asphalt mixes have been used.



Rutting test of two identical specimens



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Results

Specimen No.	Dense graded asphalt 4 cm		Gap graded asphalt 4 cm		Ultra thin asphalt 2 cm	
	Av. rut depth [mm]	Improvement [%]	Av. rut depth [mm]	Improvement [%]	Av. rut depth [mm]	Improvement [%]
Control	3,08	-	2,98	-	1,53	-
1	2,86	7,1	2,37	20,5	1,05	31,4
2 HaTelit	2,69	12,7	2,16	27,5	1,01	34
3	3,06	0,6	2,75	7,7	1,3	15
4	3,62	-17,5	3,51	-17,8	1,9	-24,2

Rut depth values of all specimens

In all single tests HaTelit provided the best improvement. The thick non-woven in product 4 shows a negative effect with regard to rutting.

Conclusions

- The in-isolation tensile strength of the reinforcement is not the major parameter that effects the pavement behavior.
- In [3] it is described that the mobilization of tensile forces in the asphalt for HaTelit out of PET is much higher compared to glass and HaTelit with 50 kN/m tensile strength is much more effective against reflective cracking than a 100 kN/m reinforcement from glass. This also counts for the reduction of rutting.
- Even if we can't calculate the exact value yet, from this study and our experience we know that HaTelit reduces the formation of rutting in the range of 12 % to 34 %.

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References

- [1] Höptner, A. 2010. "Nachweis der Wirksamkeit von Asphaltbewehrungsgittern zur Verhinderung von Reflexionsrissen", Diplom Thesis, Dresden University of Applied Sciences, Dresden, Germany.
- [2] Professor Erol Guler, Ismet Atalay. The Effects of Geosynthetics on Mitigation of Rutting in Flexible Pavements, 6th Euroasphalt & Eurobitumen Congress, June 2016, Prague, Czech Republic.
- [3] Elsing, A., Leite-Gembus, F. Parameter to Ensure a Durable Grid-Reinforced Asphalt Pavement, 7th International Conference Bituminous Mixtures & Pavements, June 2019, Thessaloniki, Greece.