

Nonwoven Geotextile Interlayers for Concrete Pavements and Overlays

National Concrete Consortium
March 28, 2012 – Oklahoma City



THE TRANSTEC GROUP
The World's Pavement Engineering Specialists.

National Concrete Pavement Technology Center
U.S. Department of Transportation Federal Highway Administration

Robert O. Rasmussen, PhD, INCE, PE (TX)
Robotto@TheTranstecGroup.com

CP Road Map

■ Concrete Pavement Construction, Reconstruction, and Overlays



CP ROAD MAP
shaping the future of concrete pavement

www.CPRoadMap.org

National Concrete Pavement Technology Center

Germany



Richtlinie für die Standardisierung des Oberbaues von Verkehrsflächen !!!

Depth to Frost Line

Zeile	Bauklasse	SV	I	II	III	IV
	Äquivalente 10-l-Schichtdicke in Mio.	> 32	> 10 - 32	> 3 - 10	> 0,8 - 3	> 0,3 - 0,8
	Dicke des Frostschuttschichtes in Mio.	1,92 1,65 1,75 1,85 1,55 1,65 1,75 1,85 1,65 1,75 1,85 1,65 1,75 1,85 1,65 1,75 1,85	1,25 1,35 1,45 1,55 1,65 1,75 1,85 1,95 2,05 2,15 2,25 2,35 2,45 2,55 2,65 2,75 2,85 2,95	1,50 1,60 1,70 1,80 1,90 2,00 2,10 2,20 2,30 2,40 2,50 2,60 2,70 2,80 2,90 3,00 3,10 3,20	1,70 1,80 1,90 2,00 2,10 2,20 2,30 2,40 2,50 2,60 2,70 2,80 2,90 3,00 3,10 3,20 3,30 3,40	1,90 2,00 2,10 2,20 2,30 2,40 2,50 2,60 2,70 2,80 2,90 3,00 3,10 3,20 3,30 3,40 3,50 3,60
	Vliesstoff auf Tragfläche mit hydraulischem Bindemittel					
	Schicht aus frostunempfindlichem Material					
1.1	Verbunddeckschicht					
1.2	Verbunddeckschicht					
1.3	Schicht aus frostunempfindlichem Material					
2	Asphalttragschicht auf Frostschuttschicht					

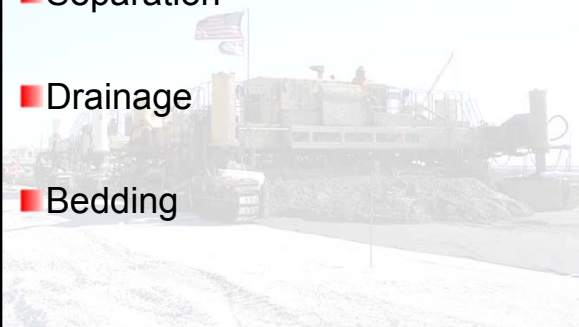
Traffic Category and Loading (SV = Freeways, millions of 22-kip axles)

Nonwoven Geotextile Interlayer

Base Type Options (Cement, Asphalt Stabilized)

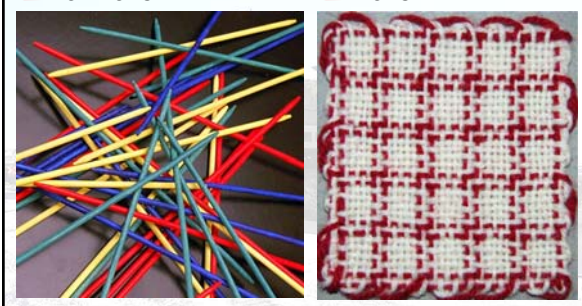
What does it do?

- Separation
- Drainage
- Bedding



What is it?

- Nonwoven
- Woven



Property	Requirements	Test Procedure
Geotextile Type	Nonwoven, needle-punched, no thermal treatment (calendering or IR)	EN 13249, Annex F (Certification)
Color	Uniform/nominally same color fibers	(Visual Inspection)
Mass per unit area	$\geq 500 \text{ g/m}^2$ (14.7 oz/sq.yd) $\leq 550 \text{ g/m}^2$ (16.2 oz/sq.yd)	ISO 9864 (ASTM D 5261)
Thickness under load (pressure)	[a] At 2 kPa (0.29 psi): $\geq 3.0 \text{ mm}$ (0.12 in.) [b] At 20 kPa (2.9 psi): $\geq 2.5 \text{ mm}$ (0.10 in.) [c] At 200 kPa (29 psi): $\geq 1.0 \text{ mm}$ (0.04 in.)	ISO 3863-1 (ASTM D 5199)
Wide-width tensile strength	$\geq 10 \text{ kN/m}$ (685 lb/ft)	ISO 10319 (ASTM D 4595)
Wide-width maximum elongation	$\leq 130\%$	ISO 10319 (ASTM D 4595)
Water permeability in normal direction under load (pressure)	At 20 kPa (2.9 psi): $\geq 1 \times 10^{-4} \text{ m/s}$ ($3.3 \times 10^{-4} \text{ ft/s}$)	DIN 60500-4 (mod. ASTM D 5493)
In-plane water permeability (transmissivity) under load (pressure)	[a] At 20 kPa (2.9 psi): $\geq 5 \times 10^{-4} \text{ m/s}$ ($1.6 \times 10^{-3} \text{ ft/s}$) [b] At 200 kPa (29 psi): $\geq 2 \times 10^{-4} \text{ m/s}$ ($6.6 \times 10^{-4} \text{ ft/s}$)	ISO 12958 (ASTM D 4716)
Weather resistance	Retained Strength $\geq 60\%$	EN 12224 (ASTM D 4355 @ 500 hrs. exposure)
Alkali resistance	$\geq 96\%$ Polypropylene/Polyethylene	EN 13249, Annex B (Certification)

Vendor	Material
BECO Bermüller & Co. GmbH	Betex TP 50
Heusker, Inc.	HaTe B 500
NAUE GmbH & Co.	Secutex R 501 (PP white)
Propex, Inc.	Geotex 1341
TenCate	Polyfelt P 50 Mirafi 1160N Mirafi 1450B

Why use it?


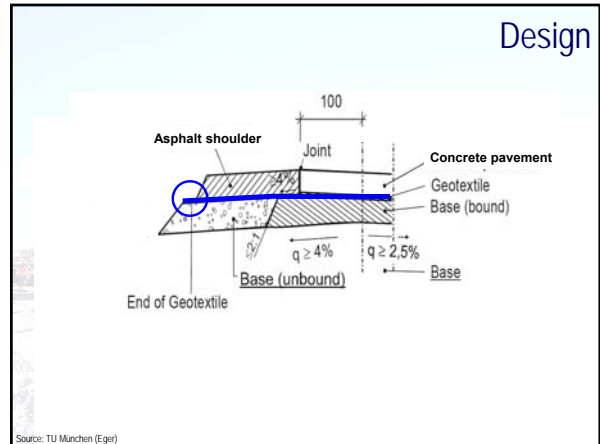
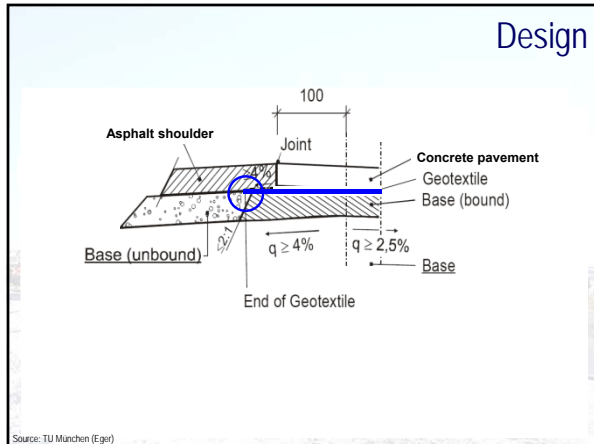
\$1.00 to \$2.00 / sq.yd. installed



How much does the alternative cost???

How is it placed?

- Overlays
- New Construction

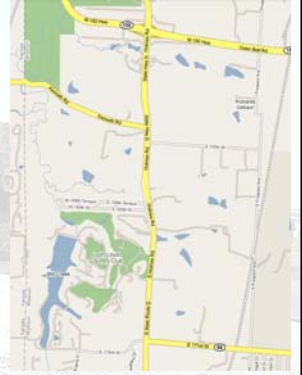
Field Trials

- Missouri – Overlay
- Oklahoma – New Construction



Field Trial – Missouri

- Route D – Cass/Jackson Co., S. of Kansas City
- 5-inch overlay of 8-inch existing (D-cracked) concrete
- Summer 2008 construction



Field Trial – Missouri



Field Trial – Missouri



Field Trial – Missouri



Field Trial – Missouri



Field Trial – Missouri



Field Trial – Missouri



Field Trial – Missouri

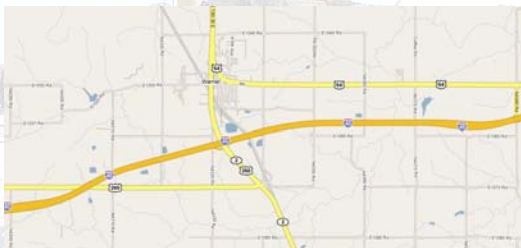


Field Trial – Missouri



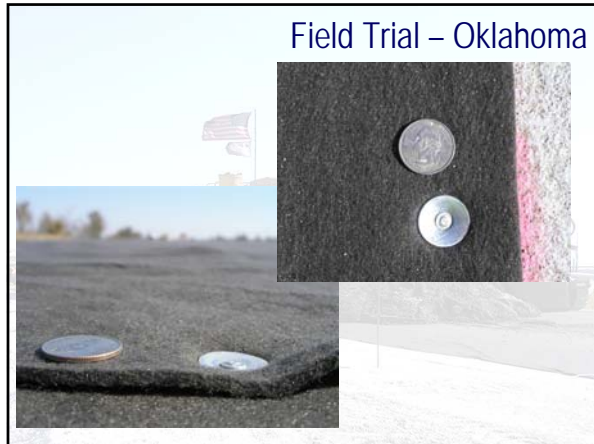
Field Trial – Oklahoma

- WB I-40 near Warner
- New concrete pavement on CTB
- Fall 2008 construction



Field Trial – Oklahoma





Lessons Learned

- Don't over-saturate the geotextile
- Be sure the material meets the recommended specifications

What's next?

- More projects!
- ETG
 - To develop guidance and specifications
 - To help identify projects past, ongoing, and planned
 - To facilitate technology transfer

National Concrete Pavement
Technology Center



Uniting agencies, industry and researchers
to advance concrete pavement technology

ConcreteOnTop.com

Robotto@TheTranstecGroup.com