

Why Tack Coats and Bond Coats?

- Asphalt Emulsion is the best binder to be used
- Hot asphalt cement (Georgia)
 - Safety issues
- Cut-backs
 - Asphalt cement + kerosene
 - Kerosene evaporates
 - VOC issues?



Structural Design Aspects


- In 2002 IBEF did a study worldwide
- Here is the mechanistic design approach using the LCPC design system ALIZE
- The idea was to compare the same structure: one with bonded layers, the other one with unbonded layers

Structural Design Aspects


French approach based on ALIZE LCPC SETRA software for road pavement design

CHARACTERISTICS	CALCULATION 1 Bonded structure	CALCULATION 2 Non-bonded structure
Flexible structure Traffic range : 1,3 to 2,6 million axles 5% risk	Service life 20 years	Service life 7 to 8 years

Structural Design Aspects



- Some owners in Europe in the 80's due to the oil crisis decided not to use tack coats any more
- This was the beginning of cold in place recycling five years later
- This was the best system to restore the bonding due to the high fatigue effects of the unbonded layers



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Recommendations




- Machine applied
 - Better homogeneity for the dosage per square yard
 - Better application on the pavement
 - Homogeneous film





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Recommendations



- Machine applied
 - Type of emulsion used
 - CSS 1h
 - CRS 2
 - CRS 2p (late modified)
 - » High traffic
 - » Modified PG
 - HFMS

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Recommendations




- Machine applied
 - Check the rate per residual asphalt cement
 - Percentage of asphalt cement varies
 - Thicker for thin overlay (less than 1" overlay thick)
 - Like the glue of the rug
 - 200g /m2 or 0.05 gal/sy of residual asphalt cement




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Recommendations



- Machine applied
 - Cracked pavement
 - Higher rate to penetrate the cracks
 - On top of porous asphalt
 - Like a chip seal type
 - Sometimes slurry to insure the waterproofing effect
 - Thin overlay
 - NOVACHIP machine or some VOGELE pavers
 - Tack coat included in the process



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Recommendations



- Machine applied
 - New techniques and innovations
 - Track less tack coat
Blackledge
Colnet...
 - Spray bar integrated
NOVACHIP
VOGELE PAVER

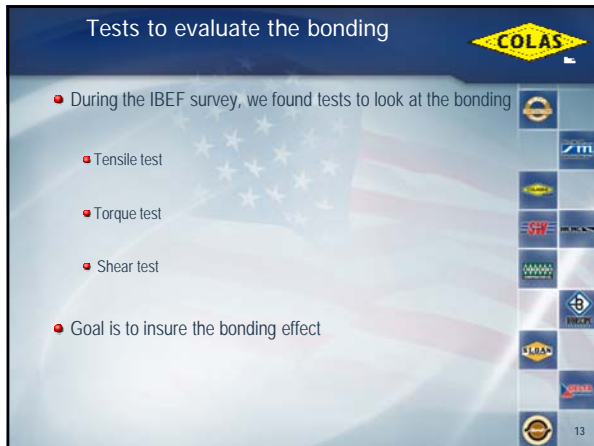






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Tests to evaluate the bonding

- During the IBEF survey, we found tests to look at the bonding
 - Tensile test
 - Torque test
 - Shear test
- Goal is to insure the bonding effect

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Swiss Standard SN 671 961

- 150 mm core
- Thin surfacing pushed off substrate in shear mode
- Minimum shear force requirement :
 - 15 kN between thin surfacing and binder course
 - 12 kN between binder course and road base







Austrian Method

- Metal plates bonded to each end of core taken from site
- Core pulled apart in tensile mode
- Specifications :
 - < 1.5 n/mm² for polymer modified bond coat
 - < 1.0 n/mm² for non-polymer modified bond coat
- For each 0.1 N mm² below specifications
 - Severe penalty imposed

