NC S4.75 Thin Lift Asphalt Pavement

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New S4.75 Thin Lift

- Previous mix is sand asphalt SA-1
- Used on roads up to 300,000 ESALs
- New mix is S4.75
- Coarse aggregate in the mix
- Goal higher volume roads – pavement preservation
- Consider use in lieu of Micro Surface
New S4.75 Thin Lift

- Initial rut testing shows promising results
- APA Rut tests indicate results capable of easily withstanding 3 million ESALs
- 3 Million EASLs = NCDOT “B” level mix
- Conservative approach in the beginning
- 64-22 liquid asphalt
S4.75 Mix Gradation

- North Carolina 100% passing the \( \frac{1}{2} \)"
- A few quarries 78m will not work as produced
- Scalp at asphalt plants – waste into 67 pile
- Alabama and Mississippi 100% passing \( \frac{1}{2} \)"
- NCAT recommends 100% passing \( \frac{1}{2} \)"
S4.75 Mix Gradation Cont’d

• 1/2 inch aggregate in 3/4 inch lift will cause problems – drag behind the screed
• RAP is allowed in the mix
• RAS and PRAS are allowed in the mix
• Mix gradation provides great use for screenings
S4.75 Gradation

- 12.5mm (1/2") - 100%
- 9.50mm (3/8") – 95 to 100%
- 4.75mm (#4) – 90 to 100%
- 2.36mm (#8) ~~~~~~~~~
- 1.18mm (#16) – 30 to 60%
- 0.075mm (#200) – 6 to 12 %
S4.75 Mix Volume Targets

• Ndes Gyrations - 50
• Rut Max. – undetermined at this time, 6mm?
• VMA – 16%
• VFA -65 to 80%
• VTM -4 to 6%
• Dust to Binder – 1 min to 2 max
• %Gmm @ Nini – 91.5%
• Density – roller pattern, achieve max
Use on the Right Route

• Pavement Preservation
• Structurally Sound
• Raveling
• Oxidation
• Minor Rutting
Cost Benefit Comparison

• Treatment Life Span (Varies)
  – Road Condition
  – Traffic Loading

• Initial Cost (Varies)
  – Material Cost
  – Bidding Environment

• Compare Cost Per Year - Estimated Life
Cost Benefit Consideration

• Consider Micro Surface vs Thin Lift S4.75
• Micro surface = latex modified asphalt emulsion, mineral aggregate, mineral filler and water, placed at 30-60#
• Thin Lift S4.75 = 64-22 liquid, NCDOT gradation, 3/4 inch lift thickness
Cost Benefit Comparison

Micro Surface
- $14,000 per lane mile
- Lasts 7 years (?)
- $2000 per lane mile/yr

S4.75
- $20,000 per lane mile
- Last 10 years (?)
- $2000 per lane mile/yr
Other State’s Experiences

• Alabama – similar gradation, 10 million ESALs, 67 liquid, 30 million ESALs with 76 liquid, have been using for over 2 years with excellent success

• Mississippi – similar gradation, NCAT test track for 7 years, polymer liquid, over 25 million EASLs to date with 7mm rutting and no cracking
Prepare for Production and Laydown

• Thin lift will cool quicker
• Less time for workability and handwork
• WMA will assist with time for compaction and handwork
• Lighter rollers may be necessary
• Roller marks if roll too early
• Plant and paving crew - aware of issue with 1/2 inch aggregate – watch for drag
Prepare for Production and Laydown

• Quality Tack application critical
• Existing road condition - effect on results
  – Ruts
  – Smoothness
• Ski Pole use – what’s the result considering existing road condition? High spots low spots, ride result?
• Automatics – what’s the result considering existing road condition? Extra thick mat?
• Is leveling necessary first?
Current NC Status

• Rut tests from 4 contractors (2 to 10)
• Rut 2mm – great, 10mm too much?
• NCDOT considering rut requirements
• Rut in ¾” lift, 6mm?
• Pilot projects
Assistance

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