

# 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 ESALs = NCDOT “B” level mix
- Conservative approach in the beginning
- 64-22 liquid asphalt



# S4.75 Mix Gradation

- North Carolina 100% passing the ½”
- A few quarries 78m will not work as produced
- Scalp at asphalt plants – waste into 67 pile
- Alabama and Mississippi 100% passing ½”
- NCAT recommends 100% passing ½”



## 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 Gyration - 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

## \$4.75

- \$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  $\frac{3}{4}$ " lift, 6mm?
- Pilot projects



# Assistance

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