Overview of Presentation

- Introduction of SMA in Virginia
- Early Installations of SMA
- 2002 SMA Initiative
- Problems Encountered
- SMA Today
Why SMA?

- 1980's - DOT's struggling with poor performing AC mix
  - Rutting
  - Flushing
- Development of SHRP program to redesign AC mixes
SMA in Virginia

- 1990 AASHTO Scanning Tour
  - Evaluate European Asphalt Practices
  - Identify new technologies to extend service life
  - Returned with SMA
- 1991 Formation of SMA Technical Working Group
- Virginia and other states installed SMA test sections as result of Scanning Tour

Early Installations in Virginia

- 1993 Trial Section
- 1994 Trial Section
- 1995 I-95 Installation
- 1995-96 I-81 Installation
- 1997 I-295 Installation
- Isolated Locations on interstates
Initial SMA Specs

- Designed with Marshall Hammer (75 blow)
- SMA Surface mix equivalent to 12.5 – 16.0 mm NMAS
- Neat and modified binders
- 5.5% + AC content
- Development of SMA Intermediate mix for use with composite pavement

2002 SMA Initiative

- Based on initial performance of SMA
- Focused on high traffic locations around state
- SMA specs moved to 75 gyration designs
- Minimum AC contents for each mix
- Introduction of SMA-9.5, SMA-12.5 and SMA-19.0
- Use of SBS polymer modified binders
Lessons Learned

- Mineral filler matters
  - Dry
  - Consistent gradation
- No cellulosic fiber, expect bleeding
- One size fits all minimum AC content bad idea
- Polymer modification is worth the cost
- Initial SMA-9.5 gradations all wrong
  - VCA did not work
  - Bailey Method did not work
  - Tight gradation bands on #4 and #8 worked
WHERE IS SMA TODAY?

Nationally

- Informal poll of SAPA's
  - SMA not globally used in the US
- Barriers or Reasons for Limited Use
  - Initial material costs
  - Bad experience or performance with SMA sections
  - Industry objections
  - Good performance from traditional AC mixes
Who Is Using SMA?

- ALASKA
- HAWAII

Do Not Use SMA

Routinely Use SMA

Where it is Being Used

- Some DOT’s assign higher layer coefficients
- Some DOT’s give longer initial and overlay service life
- Almost all SMA uses polymer modified binders
- Common surfaces have 9.5 and 12.5 top sized aggregate
VA SMA Tonnages & Bid Prices

- **2012**
  - 342,000 tons
  - Avg. Surface Mix: $81
- **2013**
  - 394,000 tons
  - Avg. Bid Price: $101
  - Avg. Surface Mix: $80
- **2014**
  - 517,000 tons
  - Avg. Bid Price: $98
  - Avg. Surface Mix: $78
- **2015**
  - 162,600 tons
  - Avg. Bid Price: $99.50
  - Avg. Surface Mix: $77

SO, IS THE SMA JUICE WORTH THE SQUEEZE?
Economic Analysis

- Typical cost difference between SMA surface mix and standard Superpave Mix - $20/ton
- Much of the cost is a function of project location, higher binder contents, polymer modified binders, and lower production rates
- Not an Apples to Apples cost comparison!

Consider

- Average Superpave Mix Cost is $75/ton
- The service life is 12 years
- With a $20/ton SMA premium, how long does SMA need to last to break even?
  - 15 years based on materials costs
  - Less than 15 years when administrative and user costs are considered
Virginia Experience

- At least 2 additional years of service life, pavement management data indicates 3 or more years
- Common mix used on interstates and high-volume primary routes
- Recent uses with highly polymer modified binders over composite and jointed concrete pavements
- Very good experience in cities

Conclusions

- Overall experience with SMA has been excellent
- Isolated failures have been investigated and specifications changed
- Move to almost exclusive use of polymer modified binders
The Juice is Worth the Squeeze!

Questions