Long Life Asphalt Pavement
LLAP

Neal Fannin
Pavement Materials
ISSD
LLAP Current Features

- Written as a series of special provisions.
  - Overlay projects
  - Structural overlay projects
  - Full depth reconstruction

- Will only be used on interstate or interstate look alike projects initially.

- Performance testing is the most important and different part of this specification.
LLAP Current Features

- Disk-Shaped Compact Tension (DCT) testing. (ASTM D7313)
  - Measures fracture energy
  - Samples fabricated from gyratory samples or cores.
  - Test run at $10^0$ C below the low PG mix designation.
  - Fracture energy requirements vary depending on mix type (SMA) and layer (wearing, binder)
LLAP Current Features

- Semi-Circular Bending (SCB) testing. (AASHTO TP 105) For information only during pilots.
  - Measures fracture energy
  - Samples fabricated from gyratory samples or cores.
  - Test run at 10°C below the low PG mix designation.
  - Fracture energy requirements vary depending on mix type (SMA) and layer (wearing, binder)
• Hamburg Wheel Tacking Test. (AASHTO T 324)
  – Measures rutting potential
  – Samples fabricated from gyratory samples or cores.
  – Test run at 131 °F (55 °C)
  – Required cycles and rut depth limits vary depending on mix type (SMA) and layer (wearing, binder)
Wheel Load

High rut and crack resistant wearing course

Base and binder material - moderate rut and crack resistance

Asphalt Rich Base course - High tensile strength (3” to 4”)

Subbase and subgrade foundation

Maximum Tensile Strain
LLAP Current Features

• Wearing Course
  – SMA only
  – Tack all layers
  – MTV required
  – 2% density incentive possible.
  – DCT and Hamburg Wheel track test required as performance testing.

• Need for very high rut and crack resistance.

• Very high DCT fracture energy requirement (690 J/m\(^2\)) for crack resistance.

• Very High Hamburg requirement (6.25mm at 20,000 cycles) for rut resistance
LLAP Current Features

• Binder Course
  – PWT acceptance includes incentive/disincentive.
  – Tack all layers
  – MTV required
  – DCT and Hamburg Wheel track test required as performance testing.

• Need for moderate rut and high crack resistance.

• High DCT fracture energy requirement (460 J/m²) for crack resistance.

• High to moderate Hamburg requirement (12.5mm at 20,000 cycles) for rut resistance.
LLAP Current Features

• **Base Course**
  – Tack all layers
  – PWT acceptance includes incentive/disincentive.
  – DCT and Hamburg Wheel track test required as performance testing.

• Need for low rut and moderate crack resistance.

• Moderate DCT fracture energy requirement (400 J/m²) for crack resistance.

• No Hamburg testing requirement.

Pennsylvania DEPARTMENT OF TRANSPORTATION
www.dot.state.pa.us
LLAP Current Features

- **Asphalt Rich Base Course**
  - PWT acceptance includes incentive/disincentive.
  - Tack all layers
  - Design at 3% voids
  - Design 1 gyration level lower than other courses.

- Need for low rut and high crack resistance.

- High DCT fracture energy requirement (460 J/m$^2$) for crack resistance.

- No Hamburg testing requirement.
LLAP Current Features

- Ride incentive will be required.
- Joint incentive / disincentive will be required.
Items not included in LLAP

• Intelligent compaction.
Many Incentives

- **SMA wearing**
  - Possible 2% incentive for Density.
  - Possible incentive for ride.
  - Possible incentive for joints.

- **Binder**
  - Possible 4% for mix under PWT.
  - Possible incentive for joints.

- **Base**
  - Possible 4% for mix under PWT.

- **Asphalt Rich Base**
  - Possible 4% for mix under PWT.
Questions?