

EAR ***Workshop***

***General Relationships
between Test Data and
Performance***



EAR Workshop

Relationships Between Test Results and Performance

June 2005

Test Results

- Air voids (laboratory compaction).
- Roadway density.
- Asphalt binder content.
- Gradation.
- Permeability.
- Shear testing.

Air Voids (lab compaction)

- **Represents ultimate compaction in roadway.**
 - ◆ Majority of densification occurs within 4 years (summers).
- **Past research: less than 2.5 to 3.0% lab air voids is detrimental to rutting.**
- **Air voids too high:**
 - ◆ Faster oxidation.
 - ◆ More difficult to achieve field compaction.
 - ◆ Potential permeability problem.
 - ◆ Often the result of low AC content.
 - ◆ Faster to crack.

Roadway Density

■ Too low:

- ◆ Consolidation rutting.
- ◆ Permeability for coarse mixes.
- ◆ Stripping potential increases.
- ◆ More oxidation/cracking.

■ Too high:

- ◆ Aggregate breakdown...uncoated particles.

Asphalt Binder Content

■ Too low:

- ◆ Cracking and raveling (FC-5 and dense).
- ◆ Permeability issue if result is high air voids for dense mixtures.

■ Too high:

- ◆ Binder draindown for FC-5.....flushing, fat spots, bleeding.
- ◆ Low air voids and rutting for dense mixtures.
- ◆ Bleeding.

Gradation

■ Dense mixtures:

- ◆ Effect on VMA could reduce fatigue cracking resistance of mixtures....less film thickness.
- ◆ Effect on air voids could affect rutting potential.

■ FC-5:

- ◆ Coarser gradation may lower surface area and cause excessive binder film thickness.....i.e., draindown.
- ◆ Finer gradation may result in less porosity and reduced film thickness.....more serious.

Permeability

- **Dense mixtures:**

- ◆ High permeability....increased stripping potential.

- **FC-5:**

- ◆ Low permeability....reduced effectiveness at water drainage and spray reduction.

Shear Testing

- **Dense mixtures:**
 - ◆ **Low shear strength....strong potential for slippage.**

Comments / Questions?