PG Binder Selection

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Superpave Asphalt Binder Spec

- **Performance Based**
  - rutting
  - fatigue cracking
  - low temp cracking

- **Physical Properties**
  - criteria same...temp changes
  - measured on aged binders
Pavement Temperature, °C

-20  20  60  135
PG Binders

- Grading System Based on Climate

**PG 52-40**

- Performance Grade
- Average 7-day max pavement design temp
- Min pavement design temp
Selecting PG Binders

- Selection Based on Climate
- Computer Program- PGEXCEL3.XLS
- Maps
- Changes to (high) Temperature Designation – “grade bumping”
- Experience
- HMAC Specs
Selection by Air Temp

- Superpave Weather Database
  - 6500 NOAA weather stations

- For Each Year
  - hottest 7-day temp (avg and std dev)
  - coldest temp (avg and std dev)

- Use Principles of “Engineering Reliability”

WARNING: BORING DISCUSSION AHEAD!
7-Day Maximum Air Temperature (°C)
D/FW, Texas

50 % reliability
98 % reliability

σ = 1.7 °C

38 41.4
Pavement Temperature (°C), D/FW, Texas
95% Confidence Data
PG Binders and Grade Bumping for Rut Resistance

Rutting
Fatigue
Cracking

Higher Performing

PG 64-22
PG 70-22
PG 76-22
Modified Binders

- ‘PG-Plus’ binders
- Elastic recovery requirement
  - For all PGs with grade span above 90
  - Requirement is tougher for bigger spans
- L, S, E, or TR not included
  - May be shown on the tickets that way
  - Material codes for plain PG only
Other Binder Types
Asphalt Cements

• Grade Based on Viscosity

AC-15P

Asphalt Cement

Modifier

Nominal viscosity/100 in Poise
Emulsions

- Grade contains lots of information

**CRS-2P**

- Ionicity (C=cationic)
- Stability (RS=rapid setting)
- Modifier
- Overall Viscosity
Cutbacks

- Grade Based on Cutback Viscosity

**MC-2400L**

- Volatility (MC=Medium Curing)
- Nominal Viscosity in cSt
- Modifier
Surface Treatments

- AC’s, rapid setting emulsions, high-vis cutbacks (for cool weather)
- Higher Viscosity = Less workability, more durability
- Modifiers can add stiffness and give performance benefits
- Cationic can give better adhesion
Slow setting emulsions
Slower setting time is intended to promote adhesion
Specialty products
Note HMAC Spec Items for tack coats
Prime Coat

- MC-30, AE-P, Emulsions
- MC-30 is historically the most popular
- MC-30 and AE-P best for spray primes
- Emulsions work better when worked in
Binder QA

Getting a good material on the job
Pre-Approved Binder

- Tested by CSTM&P before it gets to the project
  - Must have a lab number ("C" number)
  - Basic report should be available on S.M. or mainframe
- QM materials
  - Joint sealants and other misc
  - May have C number, or may need to look at pre-approved list
Pre-approval process

- Many schemes for supplier sampling
  - Tank by tank
  - Batch sampling
  - Time period sampling with QC
- Suppliers can circumvent
  - We can’t inspect everything
  - Verification on receipt of material is critical!