Robert Lee, P.E., CRH Texas Region QC Director

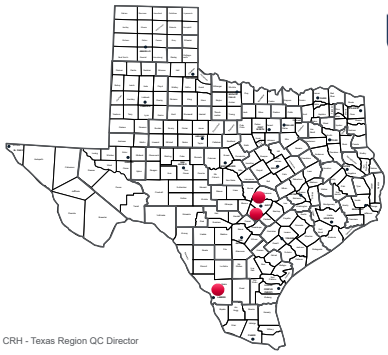
Discussion

- Challenges
- Projects
- Mix Types & Design
- Binder
- Plant
- Construction
- Summary

Challenges

- New Technology (at least to TxDOT and us)
- Stiffer Mix
- Night Work
- Project Sequencing
- Belly Dumps & Windrowed Mix
- Gravel Aggregate – Design did not include Lime

Projects



Projects…

IH 35 Webb Co.

- SMA *Type C*
- Test Section
- Rehab – Multiple Mix Layers
- March, 23
- 1800 tons

IH 35 Hays Co.

- SMA *Type D*
- Mill & Fill
- May – July, 23
- 26K tons

US 183 Williamson Co.

- TOM (Thin Overlay Mix) *Type C*
- Mill & Fill
- September, 23
- 5000 tons

Mix Types & Design

Laredo (Webb)

JMF – Gradation (SMA C)

Sieve size	Master gradation limits % passing	Current JMF Cumulative % passing
3/4"	100.0 - 100.0	100.0
1/2"	80.0 - 90.0	85.4
3/8"	25.0 - 60.0	59.4
#4	20.0 - 28.0	22.7
#8	14.0 - 20.0	18.0
#16	8.0 - 20.0	15.5
#30	8.0 - 20.0	14.2
#50	8.0 - 20.0	12.0
#200	8.0 - 12.0	10.1

AC Content 6.7%

Austin (Hays)

JMF – Gradation (SMA D)

Sieve size	Master gradation limits % passing	Current JMF Cumulative % passing
3/4"	100.0 - 100.0	100.0
1/2"	85.0 - 99.0	89.3
3/8"	50.0 - 75.0	67.9
#4	20.0 - 32.0	31.5
#8	16.0 - 28.0	20.8
#16	8.0 - 28.0	13.3
#30	8.0 - 28.0	10.6
#50	8.0 - 28.0	8.7
#200	8.0 - 12.0	8.2

AC Content 6.8%

Austin (Williamson)

JMF – Gradation TOM C

Sieve size	Master gradation limits % passing	Current JMF Cumulative % passing
3/4"	100.0 - 100.0	100.0
1/2"	100.0 - 100.0	100.0
3/8"	95.0 - 100.0	98.5
#4	40.0 - 60.0	54.7
#8	17.0 - 27.0	23.0
#16	5.0 - 27.0	17.5
#30	5.0 - 27.0	14.3
#50	5.0 - 27.0	11.8
#200	5.0 - 9.0	8.1

AC Content 6.5%

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Test Section – IH 35, Webb Co.

Binder - Description

KRATON

High Performance-Graded (PG) Binder. Provide a high performance-graded asphalt binder with a high-temperature grade of PG 76 and low-temperature grade as shown on the plans in accordance with Section 300.2.10., "Performance-Graded Binders," and Table 2.

ERGON

MARTIN

Polyco ENGINEERED TO PERFORM

Binder – Specification Table

Table 2	
High Performance Graded (HPG) Binder	
Property and Test Method	HPG
Original Binder	
Flash Point, T 48, Min. °C	230
Viscosity, T316, Max. 5.0 Pa-s, test temperature, °C[1]	135
Separation, ASTM D7173, Dynamic Shear, T315, % G*/sinδ Difference[2], Max. 10%, test temperature, °C	76
Polymer Content, Tex-533-C[3], Min. %	7.5
Rolling Thin-Film Oven (Tex-541-C)	
Mass change, Tex-541-C, Max. %	1.0
Multiple Stress Creep Recovery, T350, Jnr, 3.2, Max. 0.10 kPa-1, test temperature, °C	76
Multiple Stress Creep Recovery, T350, % recovery, Min. 90.0%, test temperature, °C	76
Pressure Aging Vessel (PAV) Residue (R 28)	
PAV aging temperature, °C	100
Dynamic shear, T315 G*sin(δ), Max, 4,000 kPa test temperature @ 10 rad/sec., °C	25
Creep Stiffness, T313 @ 60 sec S, Max. 300mPa, m-value, Min. 0.30, test temperature, °C	-18

Binder – Specification Table

3.0 to 5.0

ER to Polymer Content

RTFO DSR to MSCR

5k to 4k

-28

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High Performance Graded (HPG) Binder	
Property and Test Method	HPG
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Flash Point, T 48, Min. °C	230
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Binder – Table Notes

Viscosity

1. This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. Use Spindle 21 when testing for rotational viscosity.

Separation

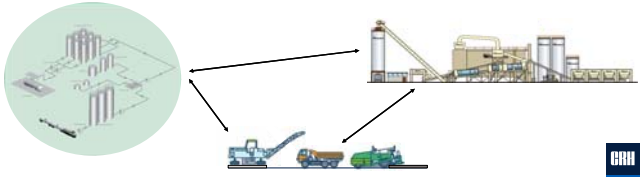
2. Determined as the absolute value of the percent difference in G*/sinδ measured on samples taken from the top and bottom: 100*(G*/sinδ (top) - G*/sinδ (bottom))/ G*/sinδ (top)

3. In Tex-533-C, the SBS peak is changed to 699cm^{-1}, representing the polystyrene band.

Polymer Content

Binder Logistics

- **5 Day Window**
  - From the time the binder is produced until mix is placed
  - Binder viscosity increases as time nears day 5



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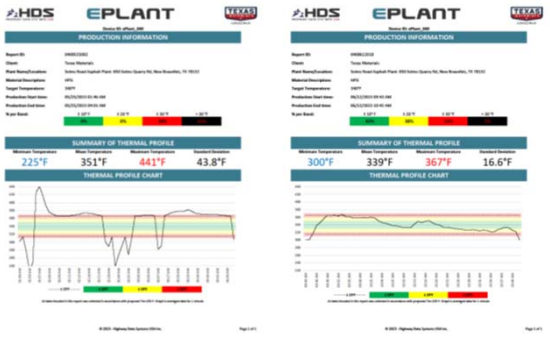
HMA Plant – Take Aways

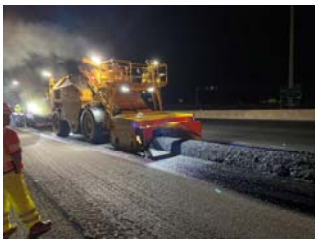
- **Plant production rate lowered**
  - ~ 200 tons/hour
- **Tighten production temperature variability**
- **Plant temps raised from**
  - 325°F to 345°F
- **Ensure enough trucks to the project**
  - balanced production



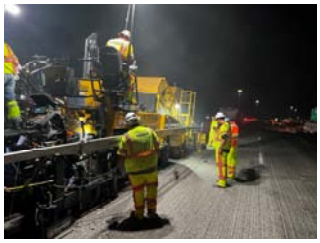
Construction – Take Aways

- **Minimize hand work**
- **Dump half a load at a time – conserve mix temperature**
- **Keep paver moving - speed 20 to 30 ft./min**
- **Roller needs to stay close to paver – mat temperature**
- **Mix needs to cool before opening to traffic – pick up issues**

Construction – IH 35, Hays Co.



Construction – IH 35, Hays Co.



Construction – US 183, Williamson Co.

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Summary

- **TxDOT partnered with us throughout all projects**
  - Team approach – TxDOT, Ergon, CTR and TM
  - Lenient related to binder properties (direct and indirect)
- **Communication is key**
  - Daily testing & communication
  - Debrief – with TxDOT after projects
    - The Good, the Bad & the Ugly
    - Possible changes to the Specification

Questions?