

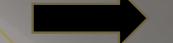
A yellow asphalt paver machine is shown in the background, laying asphalt on a construction site. The machine has a large yellow drum and a black wheel. The asphalt is dark grey and appears to be wet. The background shows a grassy area with yellow flowers.

# Best Practices in Selection, Quality Assurance and Construction for Seal Coat Aggregates

# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Selection**

- ✓ Item 316, 318 → Item 302



**Table 1**  
**Aggregate Types**

Type	Material
A	Gravel, crushed slag, crushed stone, or limestone rock asphalt (LRA)
B	Crushed gravel, crushed slag, crushed stone, or LRA
C	Gravel, crushed slag, or crushed stone
D	Crushed gravel, crushed slag, or crushed stone
E	Aggregate as shown on plans
L	Lightweight Aggregate
PA	Precoated gravel, crushed slag, crushed stone, or LRA
PB	Precoated crushed gravel, crushed slag, crushed stone, or LRA
PC	Precoated gravel, crushed slag, or crushed stone
PD	Precoated crushed gravel, crushed slag, crushed stone
PE	Precoated aggregate as shown on plans
PL	Precoated lightweight aggregate



## Test Method Tex-200-F, Part I, Cumulative % Retained<sup>1</sup>

	Grade									
	1	2	3S <sup>2</sup>	3		4S <sup>2</sup>	4	5S <sup>2</sup>	5	
				Non-Lightweight	Lightweight					
Sieve	-	-	-	-	-	-	-	-	-	
1"	0	-	-	-	-	-	-	-	-	
7/8"	0 - 2	0	-	-	-	-	-	-	-	
3/4"	20 - 35	0 - 2	0	0	0	-	-	-	-	
5/8"	85 - 100	20 - 40	0 - 5	0 - 2	0 - 2	0	0	-	-	
1/2"	-	80 - 100	55 - 85	20 - 40	10 - 25	0 - 5	0 - 5	0	0	
3/8"	95 - 100	95 - 100	95 - 100	80 - 100	60 - 80	60 - 85	20 - 40	0 - 5	0 - 5	
1/4"	-	-	-	95 - 100	95 - 100	-	-	65-85	-	
#4	-	-	-	-	-	95 - 100	95 - 100	95 - 100	50 - 80	
#8	99 - 100	99 - 100	99 - 100	99 - 100	98 - 100	98 - 100	98 - 100	98 - 100	98 - 100	

1. Test values rounded to nearest whole number

2. Single Size Gradation





Seal Coat Material Selection Table

Instructions to the Contractor:

1) Provide materials according to the alternates selected for the roadway tier designations specified at various roadway locations shown on the plans;

**Tier I: Heavy Use (>5,000 ADT)** - Use only the selected materials.

**Tier II: Moderate Use (500-5,000 ADT)** - Use these materials or any selected Tier I material combinations of the allowed types.

Type	Asphalt Cement (AC)			Asphalt Emulsion		
	<input type="checkbox"/> AC Only			<input type="checkbox"/> Emulsion Only		
Asphalt	<input type="checkbox"/> AC-10-2TR	<input type="checkbox"/> AC-5 w/2% SBR		<input type="checkbox"/> CHFRS-2P	<input type="checkbox"/> CRS-2P	
	<input type="checkbox"/> AC-20XP	<input type="checkbox"/> SP 300-		<input type="checkbox"/> HFRS-2P	<input type="checkbox"/> SP 300-	
	<input type="checkbox"/> AC-10 w/2% SBR	<input type="checkbox"/> AC-15P				
Aggregate Type	<input type="checkbox"/> Ty PA	<input type="checkbox"/> Ty PB	<input type="checkbox"/> Ty PC	<input type="checkbox"/> Ty A	<input type="checkbox"/> Ty B	<input type="checkbox"/> Ty C
	<input type="checkbox"/> Ty PD	<input type="checkbox"/> Ty PE	<input type="checkbox"/> Ty PL	<input type="checkbox"/> Ty D	<input type="checkbox"/> Ty E	<input type="checkbox"/> Ty L
	Allow uncoated aggregate					
Aggregate Grade	<input type="checkbox"/> 3S	<input type="checkbox"/> 4S	<input type="checkbox"/> 5S	<input type="checkbox"/> 3S	<input type="checkbox"/> 4S	<input type="checkbox"/> 5S
	<input type="checkbox"/> 3non-lw	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 3non-lw	<input type="checkbox"/> 4	<input type="checkbox"/> 5
	<input type="checkbox"/> 3 lw	<input type="checkbox"/> SP 302-		<input type="checkbox"/> 3 lw	<input type="checkbox"/> SP 302-	
Aggregate SAC	<input type="checkbox"/> A	<input type="checkbox"/> B		<input type="checkbox"/> A	<input type="checkbox"/> B	

Season 2: ABL, ATL, BWD, DAL, FTW, LFK,  
ODA, PAR, SJT, TYL, WAC, WFS

May 1 to Aug 31

Season 3: AUS, BMT, BRY, ELP, HOU, SAT, YKM

May 1 to Sept 15

Season 4: CRP, LRD, PHR

Apr 1 to Sept 30

Note: Seal coats on routine maintenance contracts must be completed by August 31 unless otherwise shown on the plans.

[Contact/Help](#)



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Selection**

- ✓ Item 316, 318 → Item 302
- ✓ Wet Surface Crash Reduction Program



# ✓ Wet Surface Crash Reduction Program (WSCRP)

- Skid Testing
- Wet Surface Crash Analysis
- Aggregate Selection
  - Surface Aggregate Classification (SAC)



- **Surface Aggregate Classification (SAC)**

- “B” or better for final surface (316.2)
- Do not blend (302.2.A)
- Criteria (contact CST/M&P)
  - ✓ SAC A – non-carbonate aggregates
    - 55% min acid insoluble residue
    - 25% max loss 5-cycle Mg sulfate soundness
    - 85% min crushed faces (2 or more)
  - ✓ SAC B – carbonate aggregates
    - 30% max loss 5-cycle Mg sulfate soundness
    - 85% min crushed faces (2 or more)



Low      Moderate      High



## Surface Aggregate Selection Form

 Form 2088  
 (Rev. 05/12)  
 Page 1 of 1

CSJ:

 -  - 

Date:

Highway:

Limits:

County:

District:

Designer's Name:

Macro Texture of proposed surface	(Such as: HMAC Type 'D' and 'F')	(Such as: HMAC Type 'C', CMHB, SuperPave, Microsurface)	(Such as: PFC, SMA, Seal Coat, NovaChip)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Aggregate MicroTexture	SAC C	SAC B	SAC A	<input type="text"/> <input type="text"/> <input type="text"/>
<b>Summary of Total Friction Available</b>	0			
Does total available friction equal or exceed total frictional demand?	<input type="text"/> Yes <input type="text"/> No			

\*Parameters set by the designer that affect pavement friction.

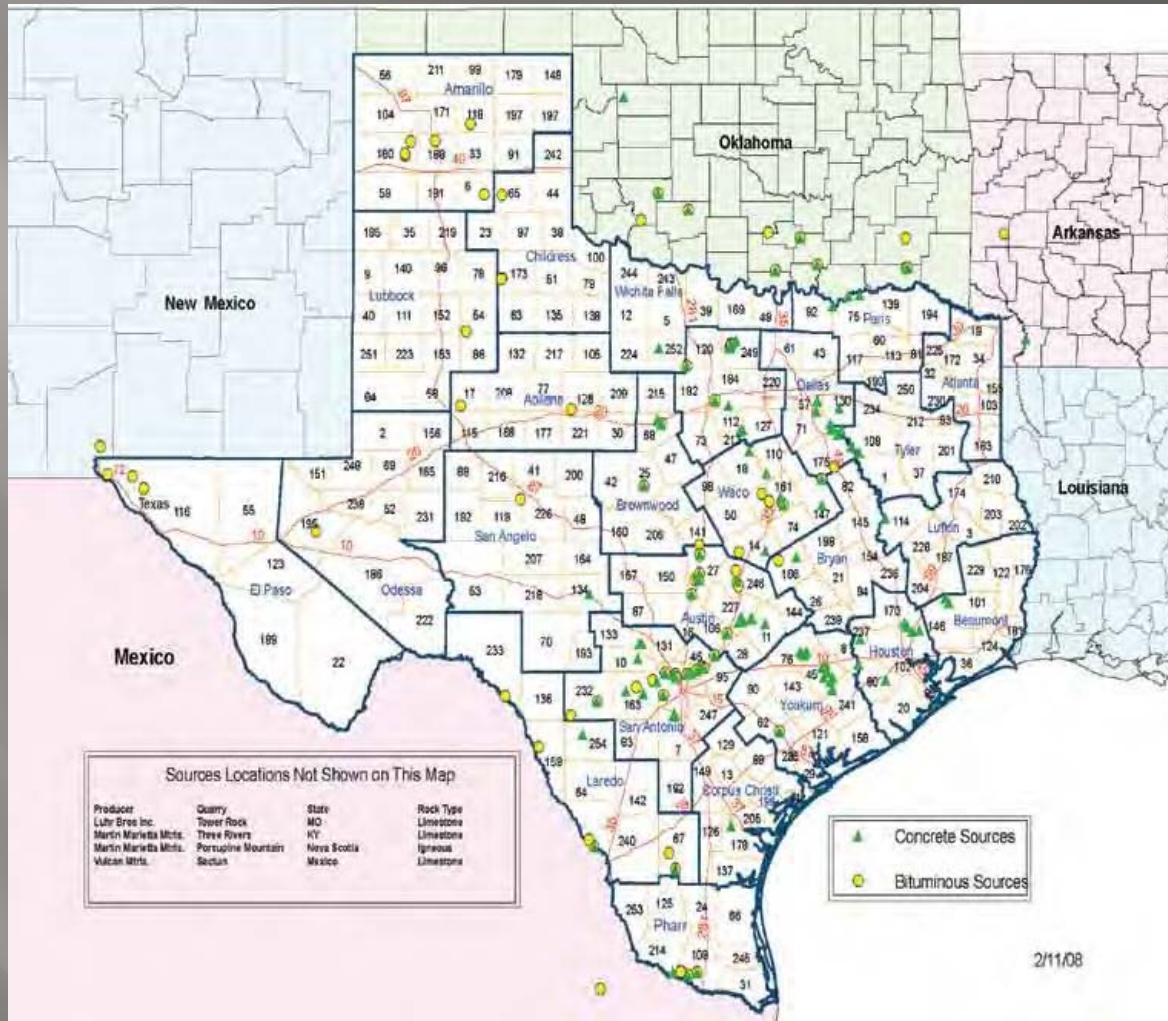
Total friction available should always exceed total frictional demand.



# ✓ Wet Surface Crash Reduction Program (WSCRP)

- Skid Testing
- Wet Surface Crash Analysis
- Aggregate Selection
  - Surface Aggregate Classification (SAC)
  - Aggregate Quality Monitoring Program (AQMP)





# ✓ Wet Surface Crash Reduction Program (WSCRP)

- Skid Testing
- Wet Surface Crash Analysis
- Aggregate Selection
  - Surface Aggregate Classification (SAC)
  - Aggregate Quality Monitoring Program (AQMP)
  - Bituminous Rated Source Quality Catalog (BRSQC)



## Limestones-Dolomites

Producer	Producer Code	Quarry	Material Code	SAC	RSLA	RSSM			RSMD	CA-RSAI	Comments
						HMAC	ST	MS			
Hanson Aggregates	1402701	Burnet	019	B	25	4	3		9	5	
Hanson Aggregates	0224901	Perch-Hill	018	B	25	9	8		13	1	
Hanson Aggregates	1504603	Servtex	018	B	27	14	14		19	1	
H. L. Zumwalt Construction, Inc.	1516317	FM 1283 Ranch Quarry	018	B	34	24	21		27	1	
Industrial Asphalt, L.P.	1410608	Nehemiah Pit	018	B	29	12	11		19	1	
Jobe Materials, L.P.	2407220	Butterfield	018	B	23	14	15		12	14	
Jones Brothers	0623102	Rankin	018	B	27	22	20		22	1	
Killeen Crushed Stone	0901408	Gibbs	018	B	29	10	9		17	1	
Knife River, Corp	1402706	Lampasas	018	B	25	7	6		9	3	
Lattimore Materials	1516315	Mico # 68	018	B	31	17	15		24	1	
Lattimore Materials	0050407	Stringtown, OK	019	A	21	8	8		13	66	
Lindsey Materials	1402711	Naruna	018	B	25	10	10		11	2	
Martin Marietta Mtrls.	1501503	Beckmann	018	B	31	30	*		29	1	See Legend
Martin Marietta Mtrls.	0224921	Chambers	018	B	27	19	19		20	1	
Martin Marietta Mtrls.	1504606	I-35 @ Solms Rd.	018	B	29	17	14		18	1	
Martin Marietta Mtrls.	0050448	North Troy	019	B	22	9	9		8	7	
Martin Marietta Mtrls.	0050501	Three Rivers	018	B	25	19	17		17	7	
South Texas Aggr.	1523211	Chapman	018	B	40*	27	*		34	1	See Legend
Texas Crushed Stone	1424602	Feld	018	B	33	21	19		24	2	
Texas Industries	0224904	Bridgeport	018	B	27	16	15		17	1	



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Selection**

- ✓ Item 316, 318 → Item 302
- ✓ Wet Surface Crash Reduction Program
- ✓ Other considerations

- Cost

- Type of roadway

- Traffic volume and type

- Noise



# Top 5 Things to Do While Waiting for a Pilot Car

1. Check Google Earth
2. Form an RMA
3. Convince census worker
4. Open a food stand
5. Move up in line

# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Quality Assurance**

- ✓ Aggregate Properties Effecting Performance
  - Mineralogy
  - Particle size
  - Particle shape
  - Cleanliness
  - Toughness / soundness
  - Absorption



**Table 3**  
**Aggregate Quality Requirements**

Property	Test Method	Requirement	Remarks
Surface Aggregate Classification	Department AQMP	As shown on the plans	
Deleterious Material, %, Max	Tex-217-F, Part I	2.0	Not required for lightweight aggregate. For LRA, deleterious material includes iron pyrites.
Decantation, %, Max	Tex-406-A	1.5	
Flakiness Index, Max	Tex-224-F	17	Unless otherwise shown on the plans.
Los Angeles Abrasion, %, Max	Tex-410-A	35 40	All aggregates except LRA LRA
Magnesium Sulfate Soundness, 5 cycle, %, Max	Tex-411-A	25	
Micro-Deval Abrasion, %, Max	Tex-461-A	—	Not used for acceptance purposes. Used by the Engineer as an indicator for further investigation.
Coarse Aggregate Angularity, 2 Crushed Faces, %, Min	Tex-460-A, Part I	85	Unless otherwise shown on the plans. Only required for crushed gravel.

**Additional Requirements for Lightweight Aggregate**

Dry Loose Unit Wt., lb./cu. ft.	Tex-404-A	35 – 60	
Pressure Slaking, %, Max	Tex-431-A	6.0	
Freeze-Thaw Loss, %, Max	Tex-432-A	10.0	
Water Absorption, 24 hr., %, Max	Tex-433-A	12.0	Unless otherwise shown on plans.

**Additional Requirements for Natural LRA**

Naturally Impregnated Bitumen Content, % by Wt.	Tex-236-F	4.0 – 7.0	
White Rock Content, % by Wt.	Tex-220-F and Tex-236-F	15 – 35	Applies to aggregate retained on the No. 4 sieve



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Particle Size**
  - Gradation – Tex-200-F, Part 1





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Particle Size**
  - Gradation – Tex-200-F, Part 1
  - Maximum particle size



Grade 3  
Sealcoat Aggregate



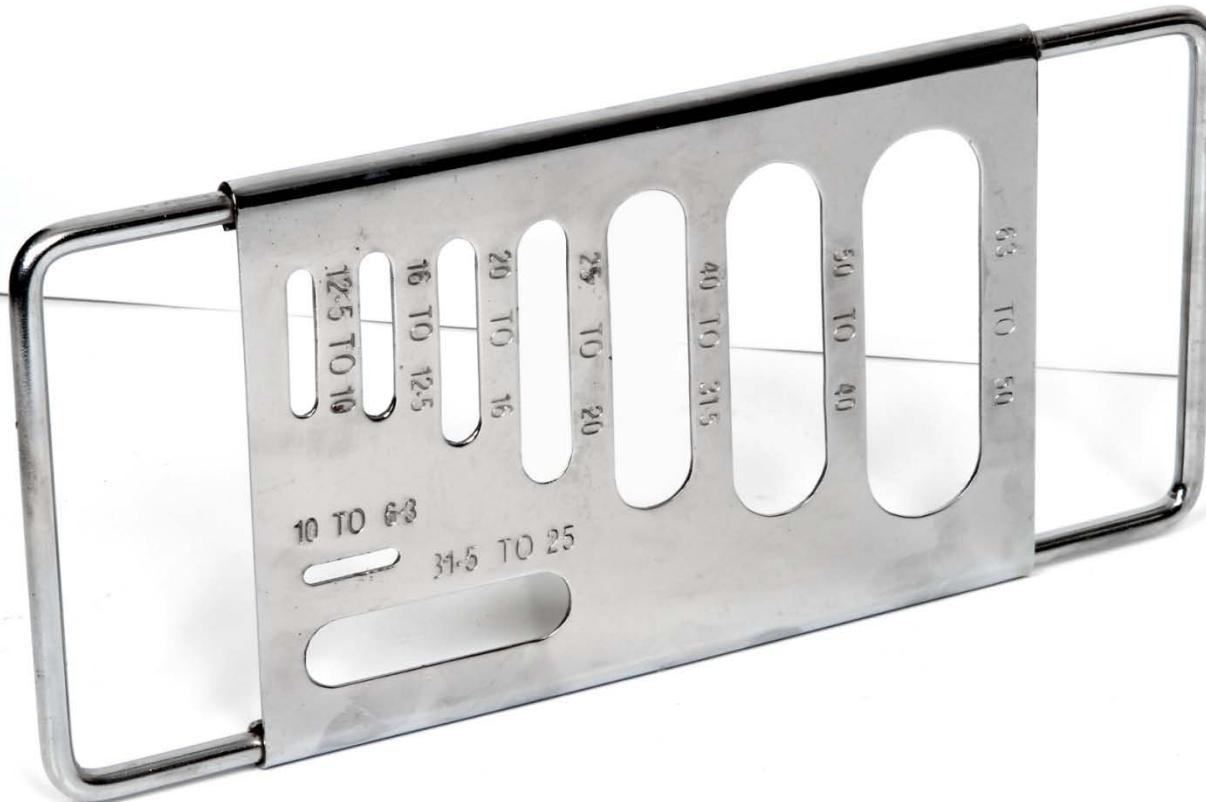
Grade 4  
Sealcoat Aggregate



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Particle Size**
  - Gradation – Tex-200-F, Part 1
  - Maximum particle size
- **Particle Shape**
  - Flakiness Index – Tex-224-F





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Particle Size**
  - Gradation – Tex-200-F, Part 1
  - Maximum particle size
- **Particle Shape**
  - Flakiness Index – Tex-224-F
  - Coarse Aggregate Angularity – Tex-460-A, Part 1





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Cleanliness**

- Deleterious materials – Tex-217-F, Part I**
  - Decantation – Tex-217-F, Part II**





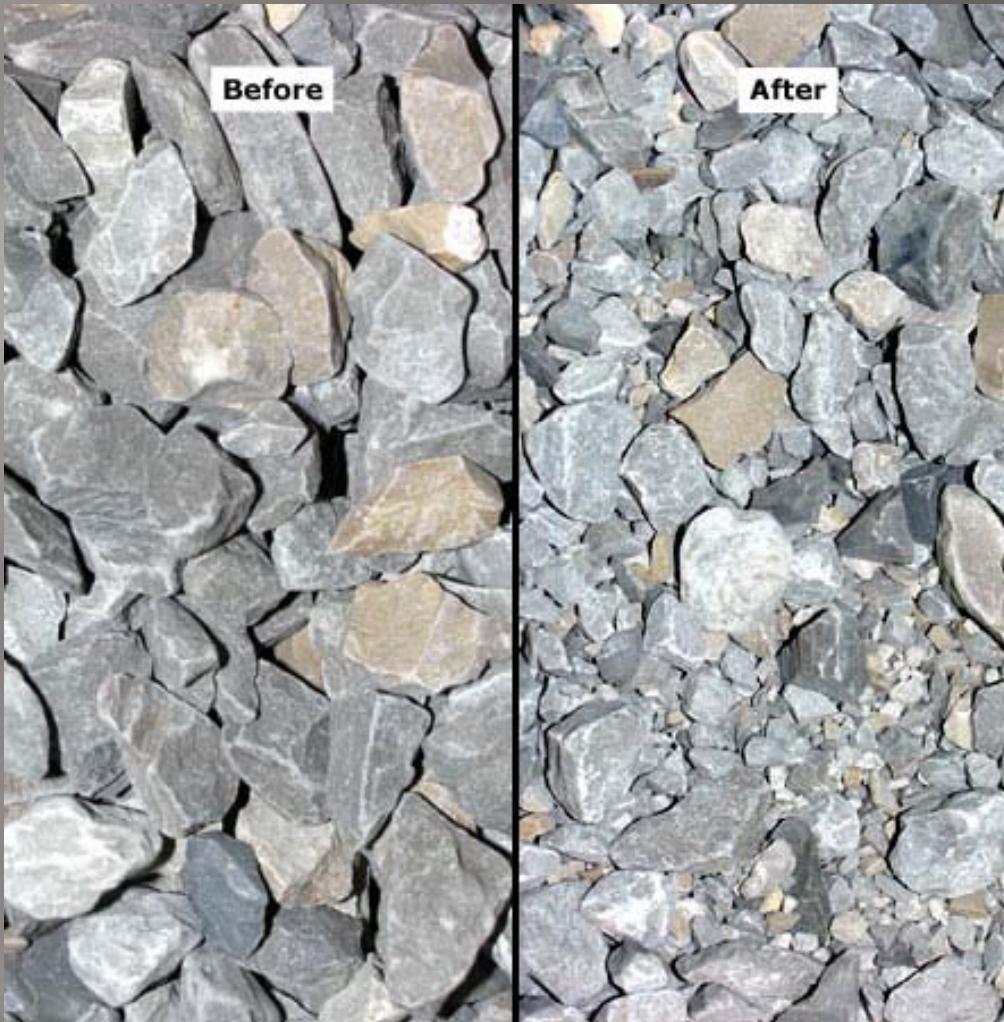
# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Cleanliness**
  - **Deleterious materials – Tex-217-F, Part I**
  - **Decantation – Tex-217-F, Part II**
- **Toughness/Soundness**
  - **LA Abrasion – Tex-410-A (ASTM C 131)**









# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Cleanliness**
  - **Deleterious materials – Tex-217-F, Part I**
  - **Decantation – Tex-217-F, Part II**
- **Toughness/Soundness**
  - **LA Abrasion – Tex-410-A (ASTM C 131)**
  - **Magnesium Sulfate Soundness Loss – Tex-411-A**





# Things I Learned Living in Texas

1. Sweet tea
2. Vocabulary is important
3. Five seasons
4. Walmart is fun
5. Armadillos nap in the road

# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Construction**
  - ✓ **Conditions to Avoid**





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Construction**
  - ✓ **Conditions to Avoid**
    - Shelling







# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Construction**

- ✓ Conditions to Avoid**
  - Shelling**
  - Bleeding / Flushing**





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Construction**
  - ✓ Aggregate Production





# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Aggregate Production
  - Gradations
  - Asphalt Content for Pre-Coat



# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Aggregate Production
  - Gradations
  - Asphalt Content for Pre-Coat
- ✓ Stockpiling
  - Location, location, location





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Construction**

- ✓ Aggregate Production**
  - Gradations**
  - Asphalt Content for Pre-Coat**
- ✓ Stockpiling**
  - Location, location, location**
  - Placement**





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Construction**

- ✓ Weather**

- Desirable conditions**
- Spec requirements for temperature (316.4.D)**
- Moisture**



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Construction**

- ✓ Terminology**

- Spread rate (1 CY per X SY)**
- Rock land**
- Shot length**



# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- **Construction**
  - ✓ Loader operation





# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Loader operation
- ✓ Paper joints





# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Loader operation
- ✓ Paper joints
- ✓ Chip Spreader





# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Loader operation
- ✓ Paper joints
- ✓ Chip Spreader
- ✓ Rolling





# BEST PRACTICES FOR SEAL COAT AGGREGATES

- **Construction**

- ✓ Patching
- ✓ Sweeping





# **BEST PRACTICES FOR SEAL COAT AGGREGATES**

- Construction**

- ✓ Patching**
- ✓ Sweeping**
- ✓ Opening to traffic**







# QUESTIONS ?

**Jesse Fleming, PE**  
**WFS – Graham Area Office**  
**(940) 549-0676**  
**[Jesse.Fleming@txdot.gov](mailto:Jesse.Fleming@txdot.gov)**

**CST – M&P**

**Seal Coat and Surface  
Treatment Manual**

**[http://gsd-  
ultraseek/txdotmanuals/scm/index.htm](http://gsd-ultraseek/txdotmanuals/scm/index.htm)**



**THANK YOU!**