UPDATE

Utah's Hi-MOD Asphalt

December 17, 2025

Zoom Call

Utah Asphalt Pavement Association (UAPA)

Rick W Johnson
Executive Director

House Keeping Items

We ask that everyone keep their phones muted.

Questions can be asked through the chat feature.

We are scheduled to run from 1-3 today.

If there are follow up questions feel free to reach out to your states Asphalt & Pavement Association.

We will send out responses to all questions after the call to the emails you registered with.

My email is rickwjohnson@utahasphalt.org

Partnership – Key to Success

"When I started early on, the guiding light was always about performance — having dashboards, schedule, budget, all those things,"

"As I have grown more seasoned, I've realized it's really more important how you see things, how you treat people, the values that you follow in your day-to-day decision making."

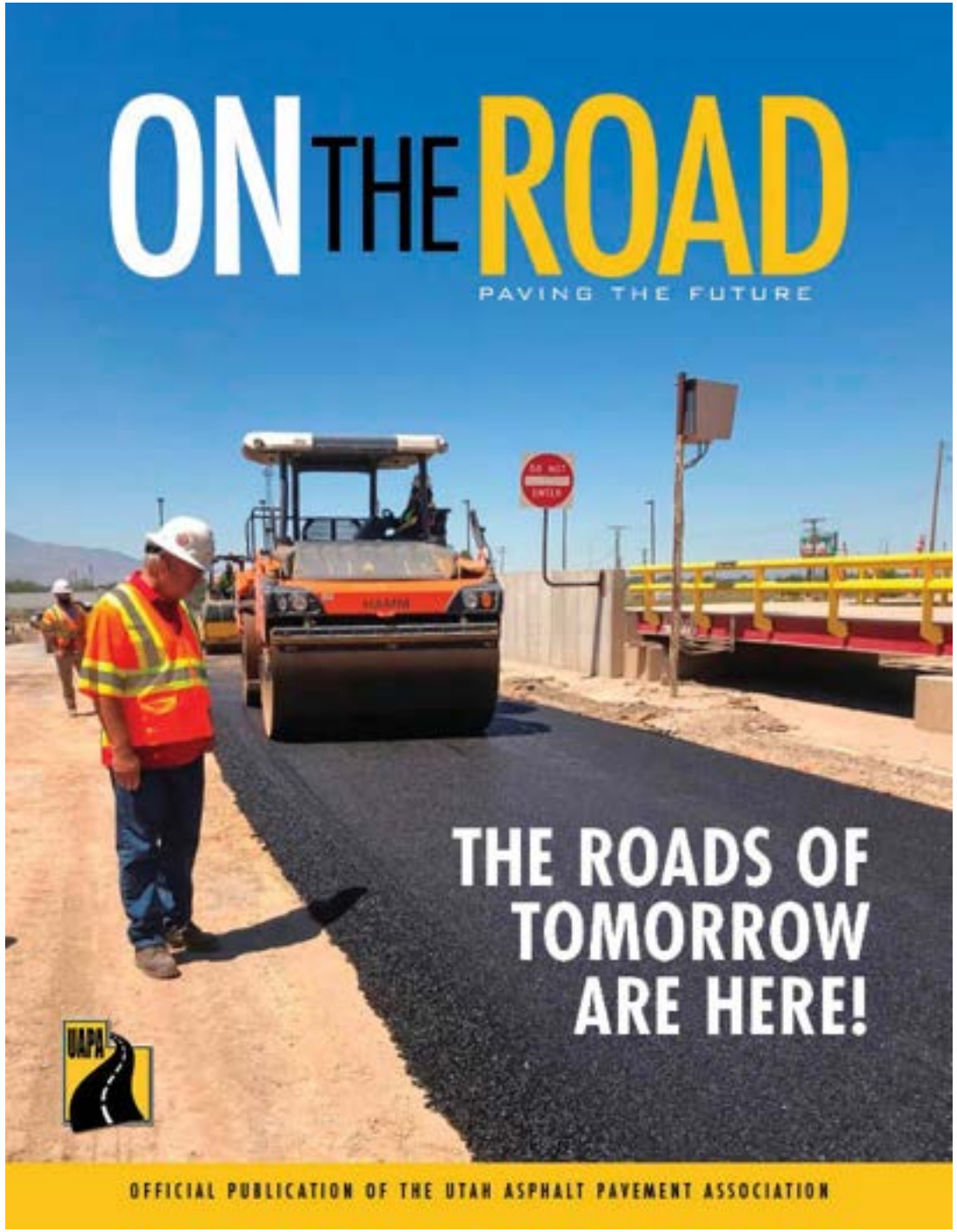
Carlos M. Braceras, PE,
Executive Director of the Utah Department of Transportation

Flow of Call

- ❑Howard Anderson – UDOT , State Asphalt Engineer
- ❑Jared Dastrup – UDOT Region 4, RME
- ❑Brody Young (Oils) – Peak Asphalt
- ❑Chris Campbell (QA/QC) - Granite Construction
- ❑Skylar Droubay (Transportation) – Double D Distribution
- ❑Victor Johnson & Dan McDaniel (Construction)– Geneva Rock

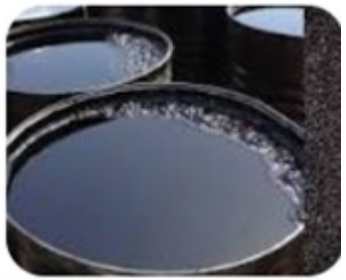
Howard Anderson, PE

UDOT - State Asphalt Engineer



- Density target is an easy 96 percent of the measure maximum for thick or thin lifts.
- Pavement is more rut resistant than our previous Superpave mixes
- HiMod binder allows higher binder contents
- Recycled asphalt pavement allowed in the surface course
- Regular dense graded aggregates used

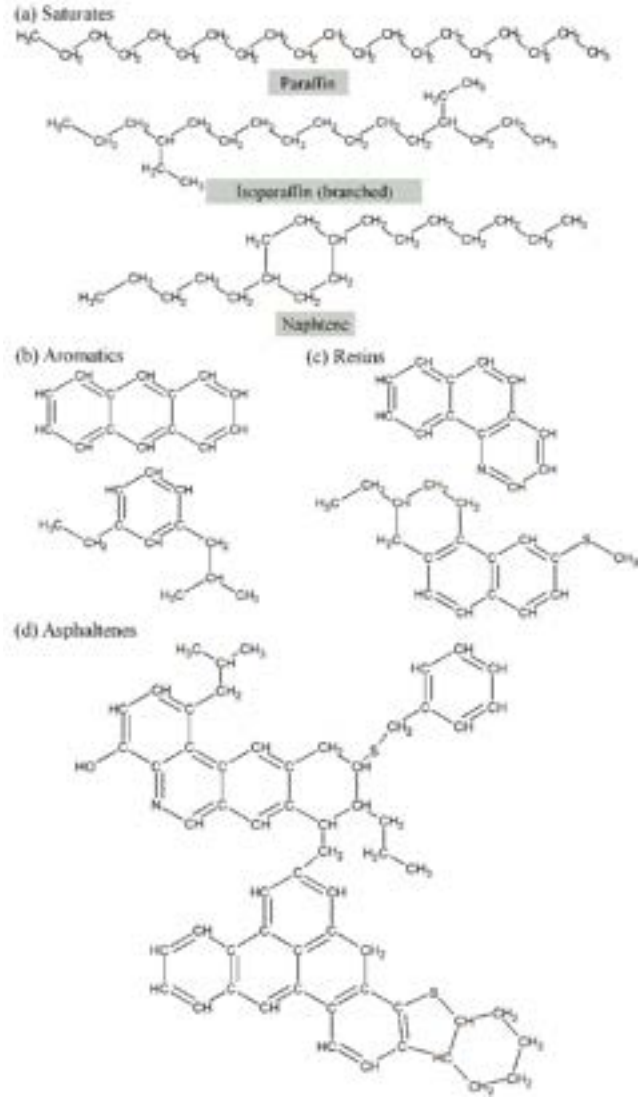
Asphalt Binder:



- Asphalt cement or binder is a dark brown to black sticky, semi-solid (viscoelastic), oil-based material that binds together the aggregate components of asphalt concrete.
- It’s a mixture of hydrocarbons that come from crude petroleum, the leftovers after the higher cost volatile fractions are distilled off .

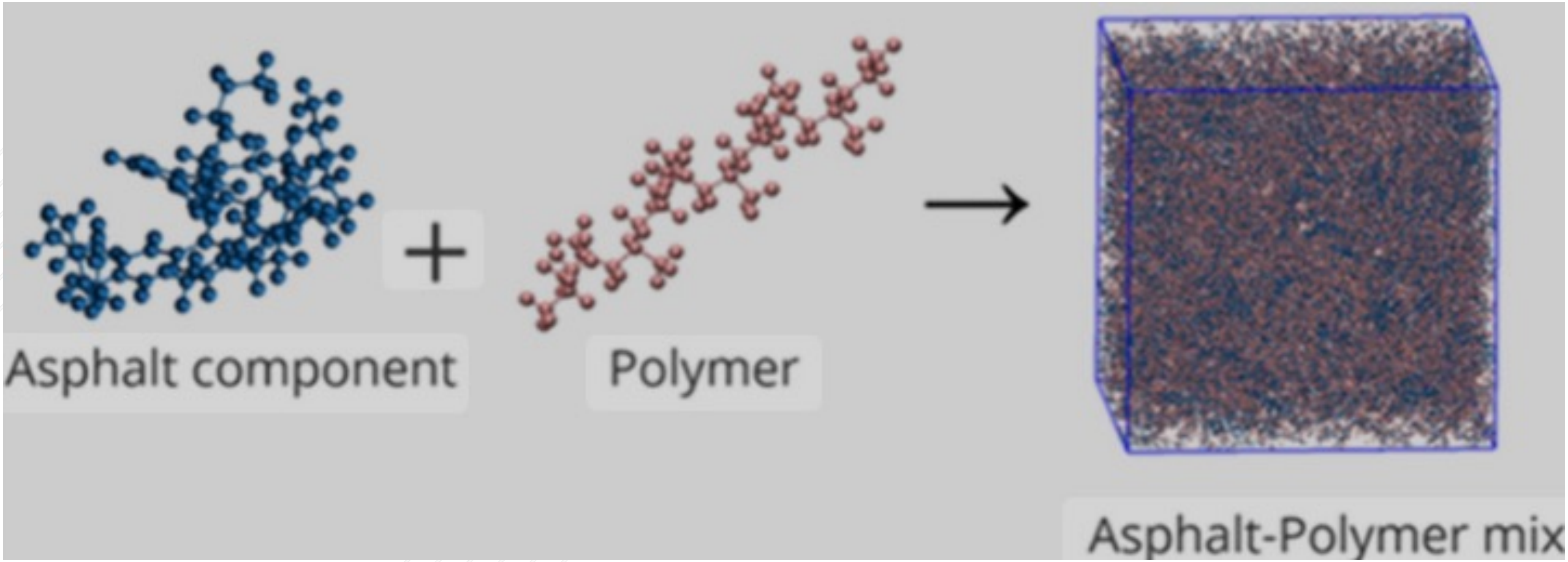
Typical Asphalt Molecules

- A chemist understands this….
- What can engineers see that may help?
- We have Hydrogen and Carbon atoms.
- We can learn the names and the basic properties of each.
- Asphalt is a hydrocarbon



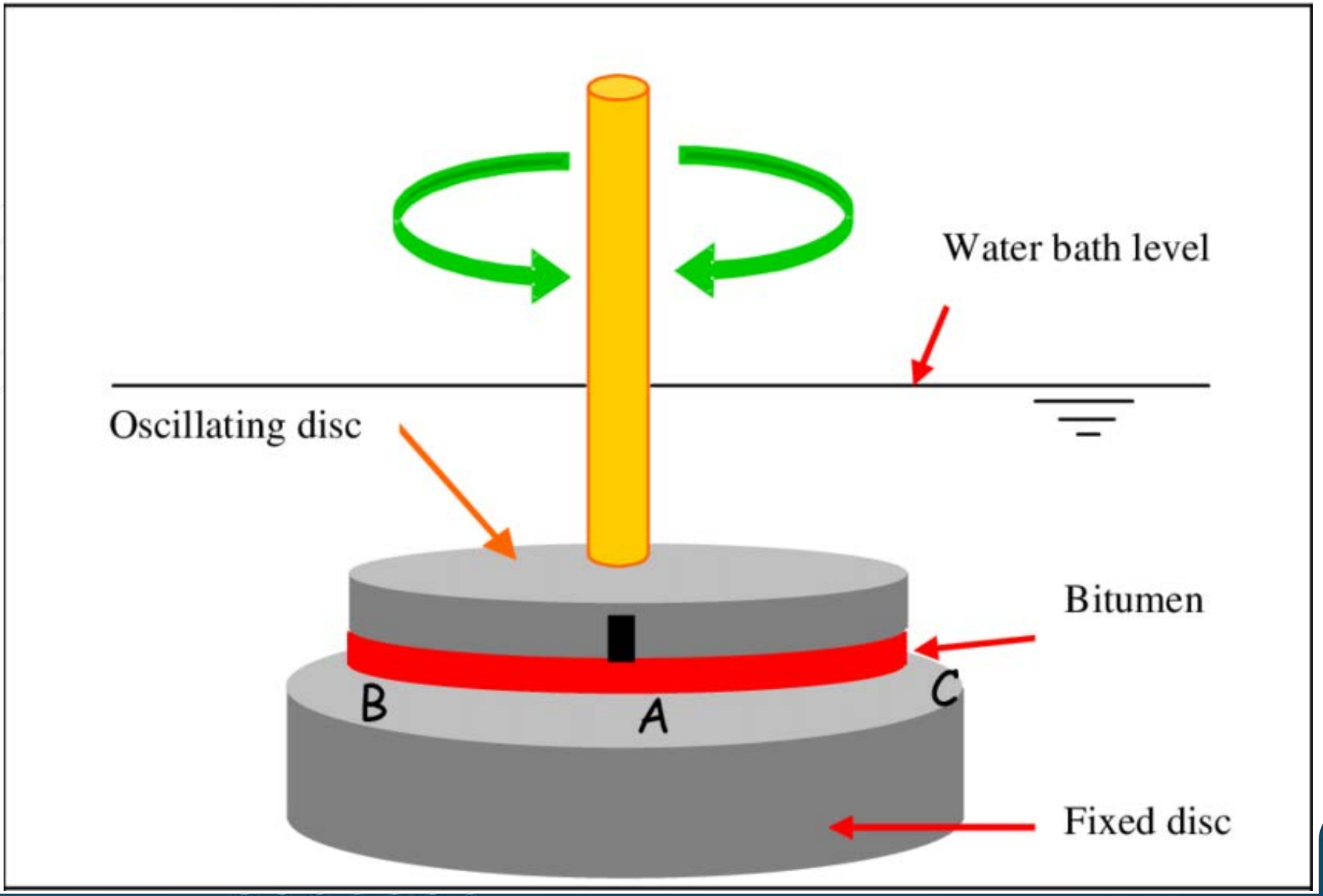
SBS comes in different types. It is generally combatable with asphalt with a little help from the chemist.

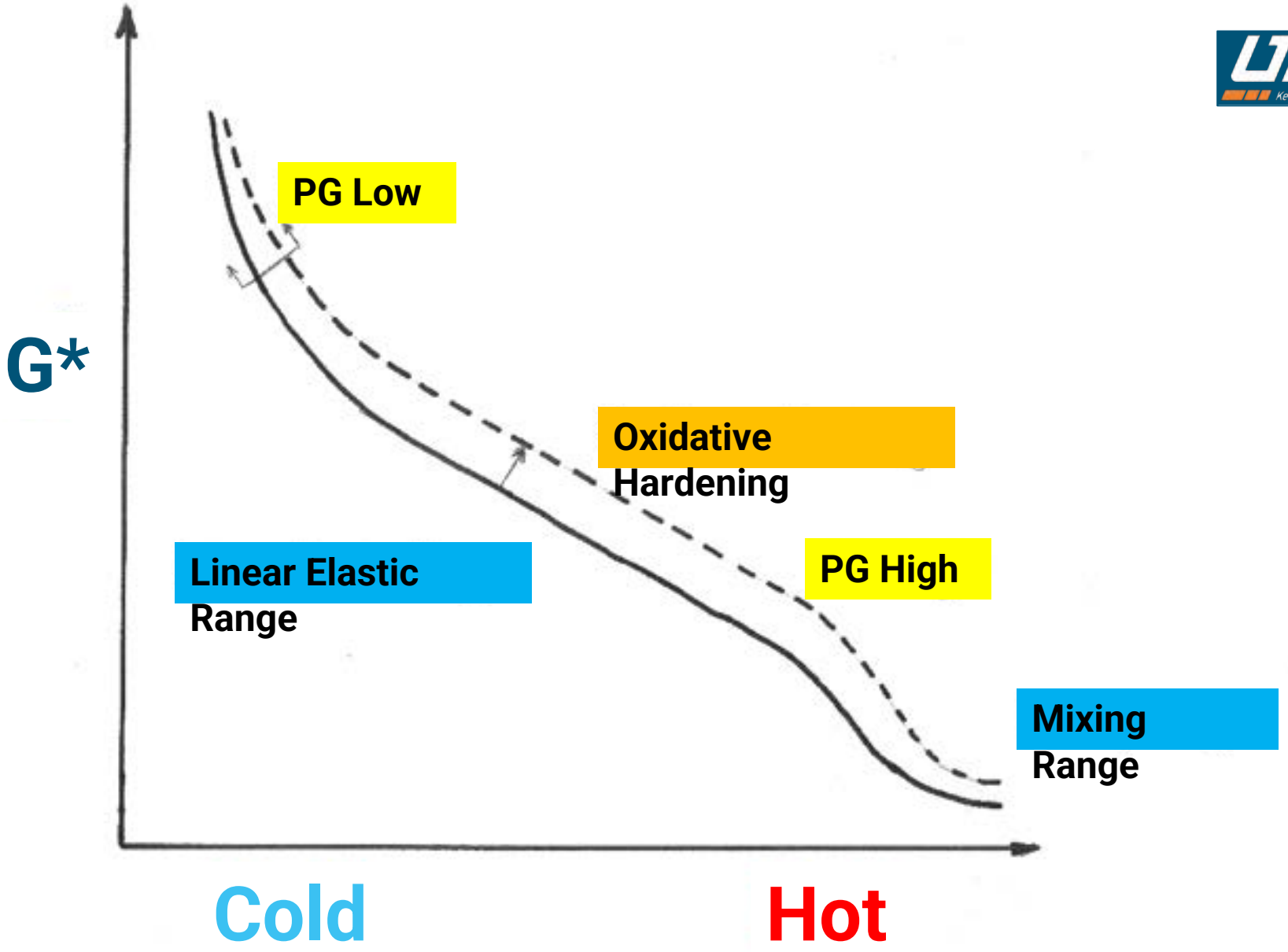
Styrene-Butadiene-Styrene is a block copolymer ($C_8H_8 - C_4H_6$ - C_8H_8) , SBS = $C_{20}H_{22}$


Asphalt component
Polymer
Asphalt-Polymer mix

Dynamic Shear Rheometer, (DSR)

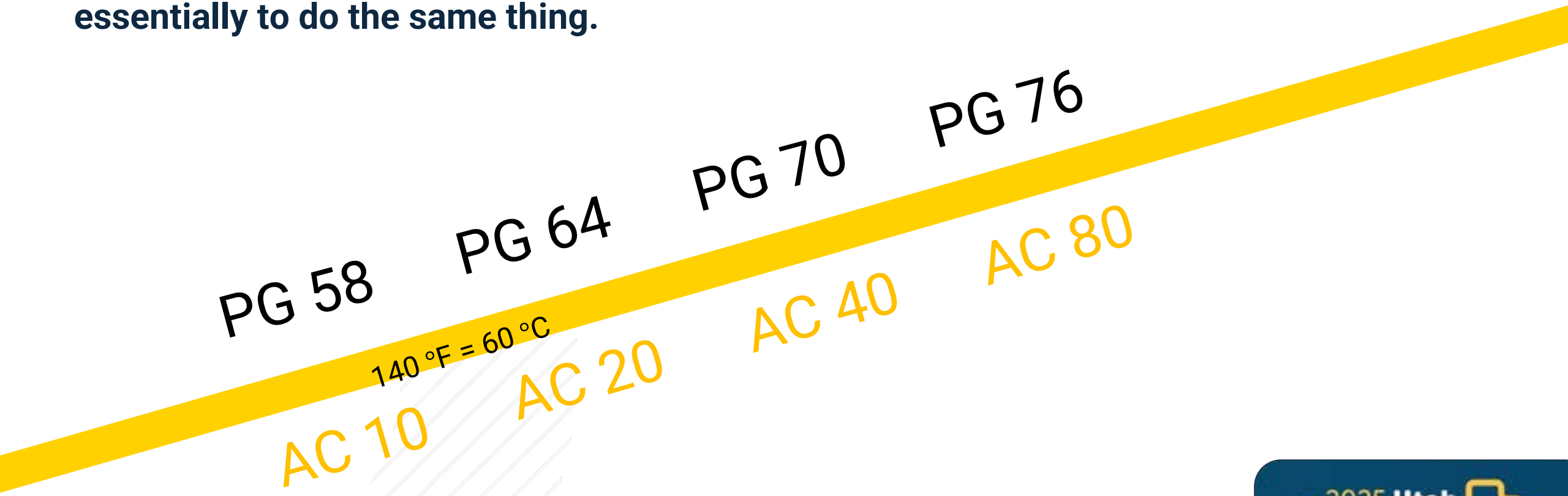
Gives us G* and the Phase Angle


Water bath level
Oscillating disc
Bitumen
B
A
C
Fixed disc


G*
PG Low
Oxidative
Hardening
Linear Elastic
Range
PG High
Mixing
Range
Cold
Hot

AC grading system, absolute viscosity doubled from grade to grade at 140°F.

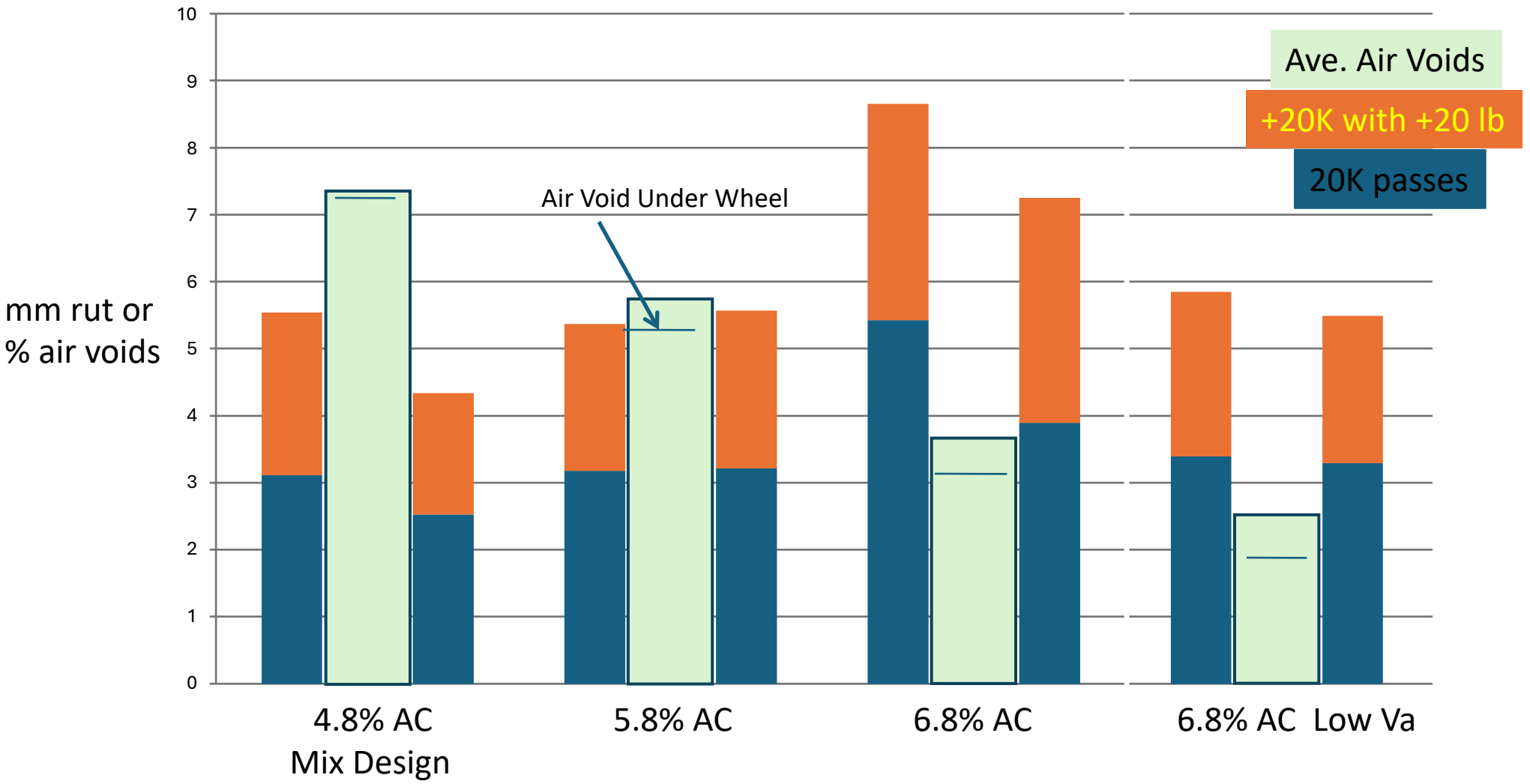
PG grades change 6°C with 1.0 kPa G* requirement held constant. It was set up to essentially to do the same thing.



This is ≈14 days after coins were placed.

Double Hamburg Test

PG 76-34



Staker Plant Test Strip

June 2, 2021

STAKER PARSON
MATERIALS & CONSTRUCTION
A CRH COMPANY

UDOT
Keeping Utah Moving

2025 Utah Transportation Conference

Skid Testing Results

- British Pendulum Test (AASHTO T-278)
- Existing Pavement
  - **41** average skid number
- New Pavement
  - **53** average skid number

TABLE 1 Volume Reduction to 15°C

Observed Temperature, °C	Volume Correction[A,B] Factor to 15°C	
	A	B
0	1.0095	1.0108
0.5	1.0092	1.0104
1.0	1.0088	1.0101
1.5	1.0085	1.0097
2.0	1.0082	1.0094
2.5	1.0079	1.0090
3.0	1.0076	1.0086
3.5	1.0073	1.0083
4.0	1.0069	1.0079
4.5	1.0066	1.0076
5.0	1.0063	1.0072
5.5	1.0060	1.0068
6.0	1.0057	1.0065
6.5	1.0054	1.0061
7.0	1.0050	1.0057
7.5	1.0047	1.0054
8.0	1.0044	1.0050
8.5	1.0041	1.0047
9.0	1.0038	1.0043
9.5	1.0035	1.0039
10.0	1.0031	1.0036
10.5	1.0028	1.0032
11.0	1.0025	1.0029
11.5	1.0022	1.0025
12.0	1.0019	1.0022
12.5	1.0016	1.0018
13.0	1.0013	1.0014
13.5	1.0009	1.0011
14.0	1.0006	1.0007
14.5	1.0003	1.0004
15.0	1.0000	1.0000
15.5	0.9997	0.9996
16.0	0.9994	0.9993
16.5	0.9991	0.9989
17.0	0.9987	0.9986
17.5	0.9984	0.9982
18.0	0.9981	0.9979
18.5	0.9978	0.9975
19.0	0.9975	0.9971

Observed Temperature, °C	Volume Correction[A,B] Factor to + 50°C to 15°C
	A
25.0	0.9937
25.5	0.9934
26.0	0.9931
26.5	0.9928
27.0	0.9925
27.5	0.9922
28.0	0.9918
28.5	0.9915
29.0	0.9912
29.5	0.9909
30.0	0.9906
30.5	0.9903
31.0	0.9900
31.5	0.9897
32.0	0.9893
32.5	0.9890
33.0	0.9887
33.5	0.9884
34.0	0.9881
34.5	0.9878
35.0	0.9875
35.5	0.9872
36.0	0.9869
36.5	0.9865
37.0	0.9862
37.5	0.9859
38.0	0.9856
38.5	0.9853
39.0	0.9850
39.5	0.9847
40.0	0.9844
40.5	0.9841
41.0	0.9837
41.5	0.9834
42.0	0.9831
42.5	0.9828
43.0	0.9825
43.5	0.9822
44.0	0.9819

How much can the binder increase in volume with hot weather?

Let the VMA be 15 percent,
And the Air voids 2 percent,
Then we have 13 percent effective binder volume.

Take binder from 25°C
To 60°C (realistic limit for a mix)
13*1.0225=13.29%

(1/0.9937) = 1.0063 @ 25° C
(1/0.9720) = 1.0288 @ 60° C
1.0288-0.0063 = 1.0225 from 25 to 60° C

TABLE 1 Continued

Observed Temperature, °C	Volume Correction[A,B] Factor to 15°C	
	A	B
50.0	0.9782	0.9752
50.5	0.9779	0.9748
51.0	0.9775	0.9745
51.5	0.9772	0.9741
52.0	0.9769	0.9738
52.5	0.9766	0.9734
53.0	0.9763	0.9731
53.5	0.9760	0.9727
54.0	0.9757	0.9724
54.5	0.9754	0.9720
55.0	0.9751	0.9717
55.5	0.9748	0.9713
56.0	0.9745	0.9710
56.5	0.9741	0.9706
57.0	0.9738	0.9703
57.5	0.9735	0.9699
58.0	0.9732	0.9696
58.5	0.9729	0.9692
59.0	0.9726	0.9689
59.5	0.9723	0.9685
60.0	0.9720	0.9682
60.5	0.9717	0.9678
61.0	0.9714	0.9675
61.5	0.9711	0.9671
62.0	0.9708	0.9668
62.5	0.9704	0.9664
63.0	0.9701	0.9661
63.5	0.9698	0.9658
64.0	0.9695	0.9654
64.5	0.9692	0.9651
65.0	0.9689	0.9647
65.5	0.9686	0.9644
66.0	0.9683	0.9640
66.5	0.9680	0.9637
67.0	0.9677	0.9633
67.5	0.9674	0.9630
68.0	0.9671	0.9626
68.5	0.9668	0.9623
69.0	0.9665	0.9619
69.5	0.9661	0.9616
70.0	0.9658	0.9612
70.5	0.9655	0.9609
71.0	0.9652	0.9605
71.5	0.9649	0.9602
72.0	0.9646	0.9599
72.5	0.9643	0.9595
73.0	0.9640	0.9592
73.5	0.9637	0.9588
74.0	0.9634	0.9585
74.5	0.9631	0.9581

Observed Temperature, °C	Volume Correction[A,B] Factor to 15°C
	A
75.0	0.9628
75.5	0.9625
76.0	0.9622
76.5	0.9619
77.0	0.9616
77.5	0.9613
78.0	0.9609
78.5	0.9606
79.0	0.9603
79.5	0.9600
80.0	0.9597
80.5	0.9594
81.0	0.9591
81.5	0.9588
82.0	0.9585
82.5	0.9582
83.0	0.9579
83.5	0.9576
84.0	0.9573
84.5	0.9570
85.0	0.9567
85.5	0.9564
86.0	0.9561
86.5	0.9558
87.0	0.9555
87.5	0.9552
88.0	0.9549
88.5	0.9546
89.0	0.9542
89.5	0.9539
90.0	0.9536
90.5	0.9533
91.0	0.9530
91.5	0.9527
92.0	0.9524
92.5	0.9521
93.0	0.9518
93.5	0.9515
94.0	0.9512
94.5	0.9509
95.0	0.9506
95.5	0.9503
96.0	0.9500
96.5	0.9497
97.0	0.9494
97.5	0.9491
98.0	0.9488
98.5	0.9485
99.0	0.9482
99.5	0.9479

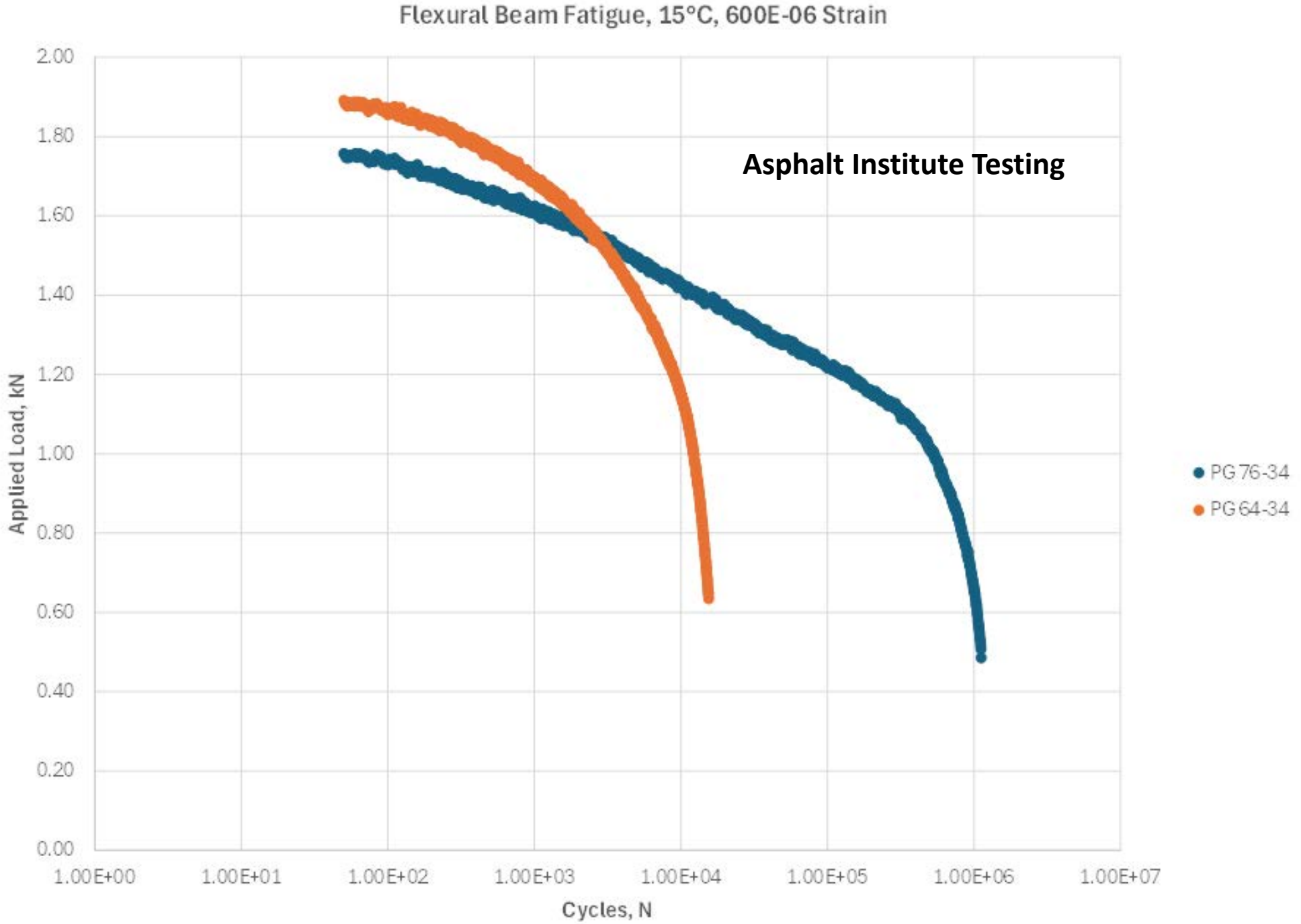
[A]Use column A factors for asphalts with density at 15°C of 966 kg/m³ or higher.

Specific Heat, Time to Cool Down/Heat Up

- Water: 4.187 kJ/Kg°C
- Liquid asphalt: 2.176 kJ/Kg°C
- Solid asphalt binder: 1.675 kJ/Kg°C
- Gravel: 0.84 to 0.92 kJ/Kg°C
- Sand: 0.67 to 0.84 kJ/Kg°C

AI Beam Fatigue Testing

Mixture	Specimen	Air Voids (%)	Strain (με)	Flexural Modulus at 50 cycles, MPa	Cycles to Failure (N_f) Cycles*Modulus (AASHTO T321)
				Test Data	Test Data
PG 64-34 - Typical Mix	1	7.7	300	7,491	1,199,504
	2	7.1	400	7,879	162,013
	3	6.9	475	7,542	171,958
	4	6.8	525	7,482	23,894
	5	7.4	600	7,360	12,162
PG 76-34 - HiMod Mix	1	4.2	475	6,104	7,817,272
	2	3.8	525	6,320	1,200,843
	3	3.9	600	5,882	913,716
	4	4.0	675	5,655	276,589
	5	4.3	750	5,030	20,180


Flexural Beam Fatigue, 15°C, 600E-06 Strain
Asphalt Institute Testing
Applied Load, kN
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1.00E+00
1.00E+01
1.00E+02
1.00E+03
1.00E+04
1.00E+05
1.00E+06
1.00E+07
Cycles, N
PG 76-34
PG 64-34

UDOT Mix Design Summaries

PG 76-34

	Project	CT Index	Hamburg (mm)
2023	SR-196; MP 24 to I-80	563.6	6.24
	SR-196; MP 24 to I-80	596.0	3.40
	I-80 at Echo and Wanship Bridge Preservation	762.9	6.36
2024	US-6 Improvements in Spanish Fork	1531.7	3.54
	SR-276; SR-95 N Wash to Park & SR-95 MP 34-41	-	5.08
	SR-162 & SR-262 Safety and Energy Corridor Project	-	5.53
	US-89; Passing Lanes Near Buckskin Wash	-	2.45
	SR-171; 700 W. to State Street	-	4.99
	US-40; Duchesne W City Limits to Antelope Creek	-	4.16
	US-6; Tucker to Soldier Summit	1243.3	6.24
	I-80; MP 41 to MP 50	376.6	3.01
2025	SR-30; SR-23 to SR-252	378.2	2.38
	I-15; Shepard Ln Intchg & Ped Overpass	891.3	5.45
	SR-36 SB; Sunset Ln to Stansbury Pkwy	575.0	6.98
	SR-162 & SR-262 Safety and Energy Corridor Project	-	4.26
	SR-209; Bangerter Highway to Redwood Rd.	822.6	7.36
	SR-30; SR-252 to US-91	704.9	8.08
	US-6; Grassy Trail Creek to Icelander	-	4.16
	SR-257; Cattle Guard to MP 61	998.6	7.73
	I-80; MP 131.4 to 134.0	960.5	8.08
	I-80; Kimball's Junction to US-40	426.5	4.60
	I-80; Kimball's Junction to US-40	499.7	4.56

PG 64-34

	Project	CT Index	Hamburg (mm)
2023	US-91, 3200 S, & 2000 W Intersection Realignment	255.6	7.09
	US-89; Farmington to I-84	214.7	4.44
	500 West; 3300 South to 3900 South	226.8	3.94
	US-40 Connector Road	263.8	5.00
	I-80; 1300 E to 2300 E and I-215; 3300 S to 4500 S	68.4	4.66
	PG Interchange Area Capacity Improvements	63.0	5.88
	SR-114; US-89 to Geneva Road	170.0	6.10
	SR-68: 6200 South to I-215	250.2	5.47
	3300 South and 900 West	155.8	4.71
	I-80; Emory to Castle Rock	168.2	5.19
	US-40 and SR-121 Pavement Preservation	-	4.84
	US-40 and SR-121 Pavement Preservation	-	3.98
	US-189; SR-113 Charleston to US-40 Heber	123.9	3.96
	SR-264; Electric Lake Boat Ramp to SR-96	153.8	4.73
	US-6; SR-55 to 100 W Wellington	-	3.83
	Heber City Bypass - Cemetery Section B	199.0	6.50
2024	4700 South; 4000 West to 5600 West	194.5	4.83
	SR-177, West Davis Hwy; I-15 & SR-67 to SR-193	-	4.40
	I-15; SR-97 (5600 South), widening of 5600 South	57.5	4.78
	I-15; SR-97 (5600 South), widening of 5600 South	114.2	3.44
	US-6 Improvements in Spanish Fork	63.0	5.88
	PG Interchange Area Capacity Improvements	118.4	4.73
	PG Interchange Area Capacity Improvements	55.5	3.17
	PG Interchange Area Capacity Improvements	55.5	3.17
	SR-9; East Zion Roundabout & Improvements	-	7.14
	SR-7; Airport Pkwy to Sand Hollow Rd	-	5.38
	Cottonwood Wash Bridge Replacement (0C 301)	-	4.48
	I-70; Sinbad to Brake Test	-	5.47
	I-70; Sinbad to Brake Test	-	5.04
	Springville/Spanish Fork Interchange Phase 1	248.2	4.96
	SR-132; Canyon EB Passing Lane Connection	176.0	5.90
	US-89; SR-12 to Panguitch	-	6.42
	SR-24; Hanksville Airport to I-70	-	4.48
2025	Riverton - 13400 So Bike Lanes; 2700 W to 3200 W	198.6	3.79
	I-15; SR-97 (5600 South), widening of 5600 South	153.0	3.56
	BFP: Holladay City Bridge Replacement 035131D	190.5	7.31
	Parkway Blvd (2700 S); MVC to 6400 West	54.2	3.18
	Parkway Blvd (2700 S); MVC to 6400 West	-	4.06
	SR-273; US-89 to I-15	160.0	3.72
	Undercrossing in Saratoga at Redwood Rd & MP 25.1	266.1	4.48
	SR-186; North Temple to 400 S	184.9	4.24
	Bangerter Highway South Interchanges	230.4	7.73
	I-80; Kimball's Junction to US-40	153.8	6.16

UDOT Mix Design Summaries (HiMod)

PG 76-34

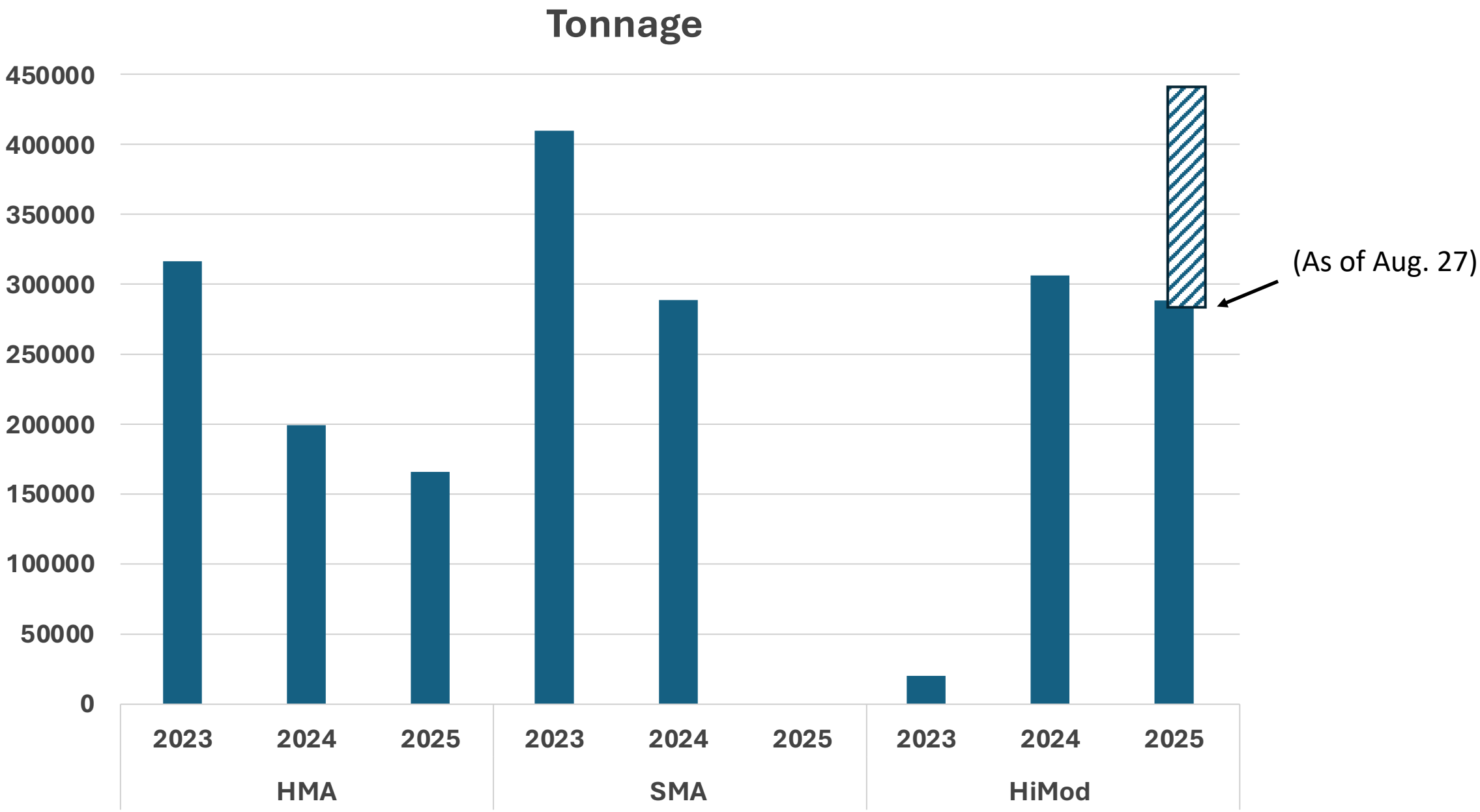
	Project	CT Index	Hamburg (mm)
2023	SR-196; MP 24 to I-80	563.6	6.24
	SR-196; MP 24 to I-80	596.0	3.40
	I-80 at Echo and Wanship Bridge Preservation	762.9	6.36
2024	US-6 Improvements in Spanish Fork	1531.7	3.54
	SR-276; SR-95 N Wash to Park & SR-95 MP 34-41	-	5.08
	SR-162 & SR-262 Safety and Energy Corridor Project	-	5.53
	US-89; Passing Lanes Near Buckskin Wash	-	2.45
	SR-171; 700 W. to State Street	-	4.99
	US-40; Duchesne W City Limits to Antelope Creek	-	4.16
	US-6; Tucker to Soldier Summit	1243.3	6.24
	I-80; MP 41 to MP 50	376.6	3.01
2025	SR-30; SR-23 to SR-252	378.2	2.38
	I-15; Shepard Ln Intchg & Ped Overpass	891.3	5.45
	SR-36 SB; Sunset Ln to Stansbury Pkwy	575.0	6.98
	SR-162 & SR-262 Safety and Energy Corridor Project	-	4.26
	SR-209; Bangerter Highway to Redwood Rd.	822.6	7.36
	SR-30; SR-252 to US-91	704.9	8.08
	US-6; Grassy Trail Creek to Icelander	-	4.16
	SR-257; Cattle Guard to MP 61	998.6	7.73
	I-80; MP 131.4 to 134.0	960.5	8.08
	I-80; Kimball's Junction to US-40	426.5	4.60
	I-80; Kimball's Junction to US-40	499.7	4.56

PG 76-34 Performance: Higher Cracking Durability Without Increased Rutting

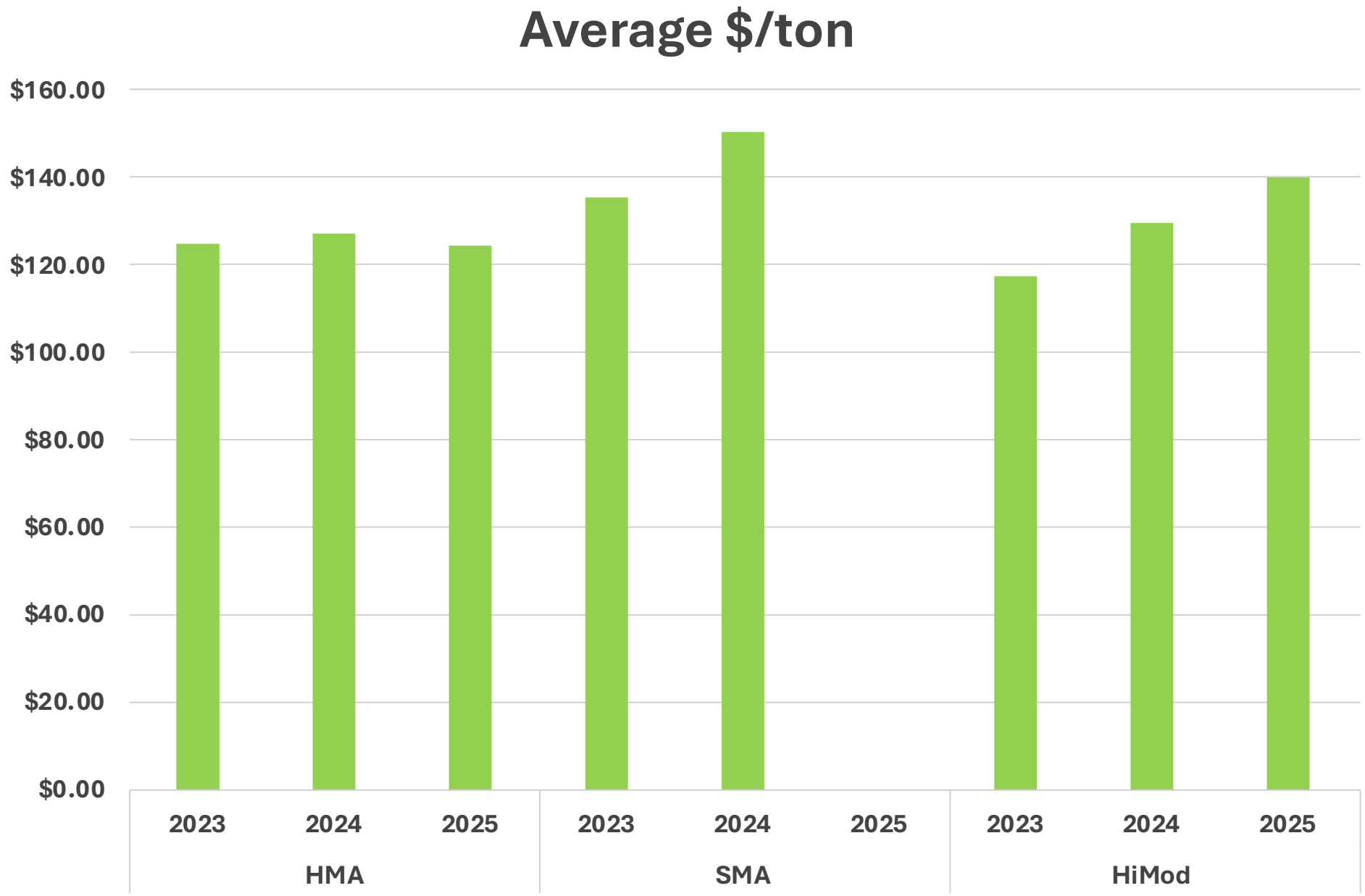
- **PG 76-34 demonstrates improved cracking resistance without a rutting penalty:**
  - **CT Index increased significantly across projects**
  - **Average Hamburg rutting depth remains consistent with PG 64-34**
- **Performance contradicts the traditional cracking-rutting tradeoff**

Mix Design Data	PG 76-34	PG 64-34
CT Index Range	377-1532 (avg ~755)	54-266 (avg ~161)
Hamburg Rutting Depth Range (mm)	2.4-8.1 (avg ~5.2)	3.2-7.7 (avg ~4.9)

Utah Mixture Trends (Highway Only)



Utah Mixture Trends (Highway Only)



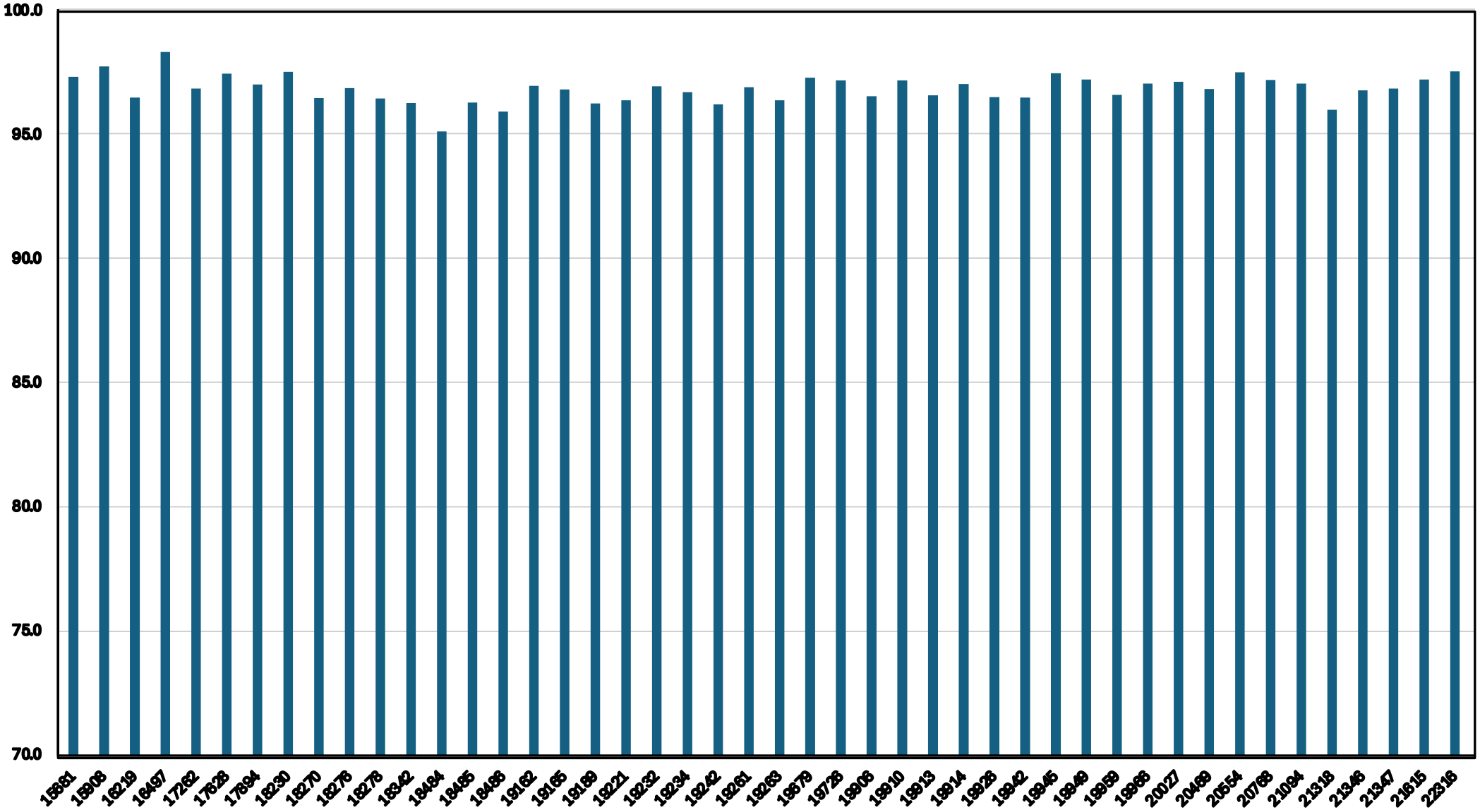
Pin	Recent HiMod Projects Page 1	Project Number	Average Mat Density	
15681	SR-30; SR-23 to SR-252	F-0030(69)102	97.4	
15908	1300 East; 2100 South to Southern City Boundary	F-2076(2)4	97.8	
16219	SR-196; MP 24 to I-80	F-0196(7)24	96.5	
16497	US-6 Improvements in Spanish Fork	F-0006(230)174	98.4	
17262	SR-276; SR-95 N Wash to Park & SR-95 MP 34-41	F-R499(457)	96.9	
17628	SR-36 SB; Sunset Ln to Stansbury Pkwy	S-0036(50)61	97.5	
17894	SR-162 & SR-262 Safety and Energy Corridor Project	F-R499(367)	97.1	
18230	US-89; Passing Lanes Near Buckskin Wash	S-0089(572)35	97.6	
18270	I-80; Stillmans Bridge to SR-65	F-I80-3(213)129	96.5	
18276	SR-171; 700 W. to State Street	F-0171(72)9	96.9	
18278	SR-173; 4800 W. to Bangerter Hwy	F-0173(42)4	96.5	
18342	US-191 Realignment near Simplot	F-0191(194)365	96.3	
18484	SR-243; US-89 to Beaver Mountain	S-0243(1)0	95.2	
18485	SR-200; SR-61 to Idaho	S-0200(1)0	96.3	
18486	SR-81; SR-30 to Fielding	S-0081(2)0	96.0	
19162	US-40; Duchesne W City Limits to Antelope Creek	F-0040(224)86	97.0	
19165	SR-35 & SR-87 Pavement Preservation	F-0035(14)45	96.9	
19189	SR-35; MP 0 to 12.35	F-0035(13)0	96.3	
19221	US-89; Kanab Creek Bridge to MP 72.355	F-0089(603)69	96.4	
19232	SR-190; Pavement Preservation	F-0190(29)2	97.0	
19234	SR-209; Bangerter Highway to Redwood Rd.	F-0209(58)8	96.8	
19242	US-89; 9400 S. to I-215	F-0089(319)367	96.3	
19261	SR-106; 1700 South to US-89	F-0106(31)5	96.9	
19263	SR-30; SR-252 to US-91	F-0030(86)110	96.4	

Pin	Recent HiMod Projects Page 2	Project Number	Average Mat Density	
19679	Cougar Lane; Niagara Way to Kearns High Drive	F-2146(1)8	97.3	
19726	Cottonwood Wash Bridge Replacement (0C 301)	F-0095(18)115	97.2	
19906	US-6; Tucker to Soldier Summit	F-0006(245)204	96.6	
19910	I-15; Arizona State Line to Cottonwood Creek	F-I15-1(142)0	97.2	
19913	US-191; Dry Valley to Hatch Wash	F-0191(206)89	96.6	
19914	US-6; Grassy Trail Creek to Icelander	F-0006(252)222	97.1	
19926	SR-257; Cattle Guard to MP 61	F-0257(8)46	96.6	
19942	I-80; MP 41 to MP 50	F-I80-2(82)41	96.5	
19945	SR-186; North Temple to 400 S.	F-0186(50)2	97.5	
19949	SR-201; 900 W to State Street	F-0201(58)17	97.3	
19959	US-40; Antelope Creek to to Pole Line Rd	F-0040(232)97	96.6	
19966	SR-28; I-15 S of Nephi to I-15 N of Nephi	F-0028(19)38	97.1	
20027	SR-175; Pavement Restoration at Various Locations	F-R299(439)	97.2	
20469	US-40; I-80 to SR-248	F-0040(219)0	96.9	
20554	Ramps on I-215; State, Fashion	F-R299(458)	97.6	
20768	SR-96; Clear Creek to MP 18.0	S-0096(8)0	97.2	
21094	US-191; Improvements North of Summit	S-0191(212)272	97.1	
21318	US-89; SR-204 to SR-134	F-0089(595)417	96.1	
21346	I-80; MP 131.4 to 134.0	F-I80-3(216)131	96.8	
21347	I-80; Kimball's Junction to US-40	F-I80-4(184)143	96.9	
21615	I-80; Parley's Way Ramps	F-I80-1(70)0	97.3	
22316	I-80; MP 53-55 Pavement Repairs	F-I80-2(84)53	97.6	
	Overall Project Average Density from Cores:		**96.9**	

HiMod Project Average Mat Densities

Ave Density
96.9% Gmm

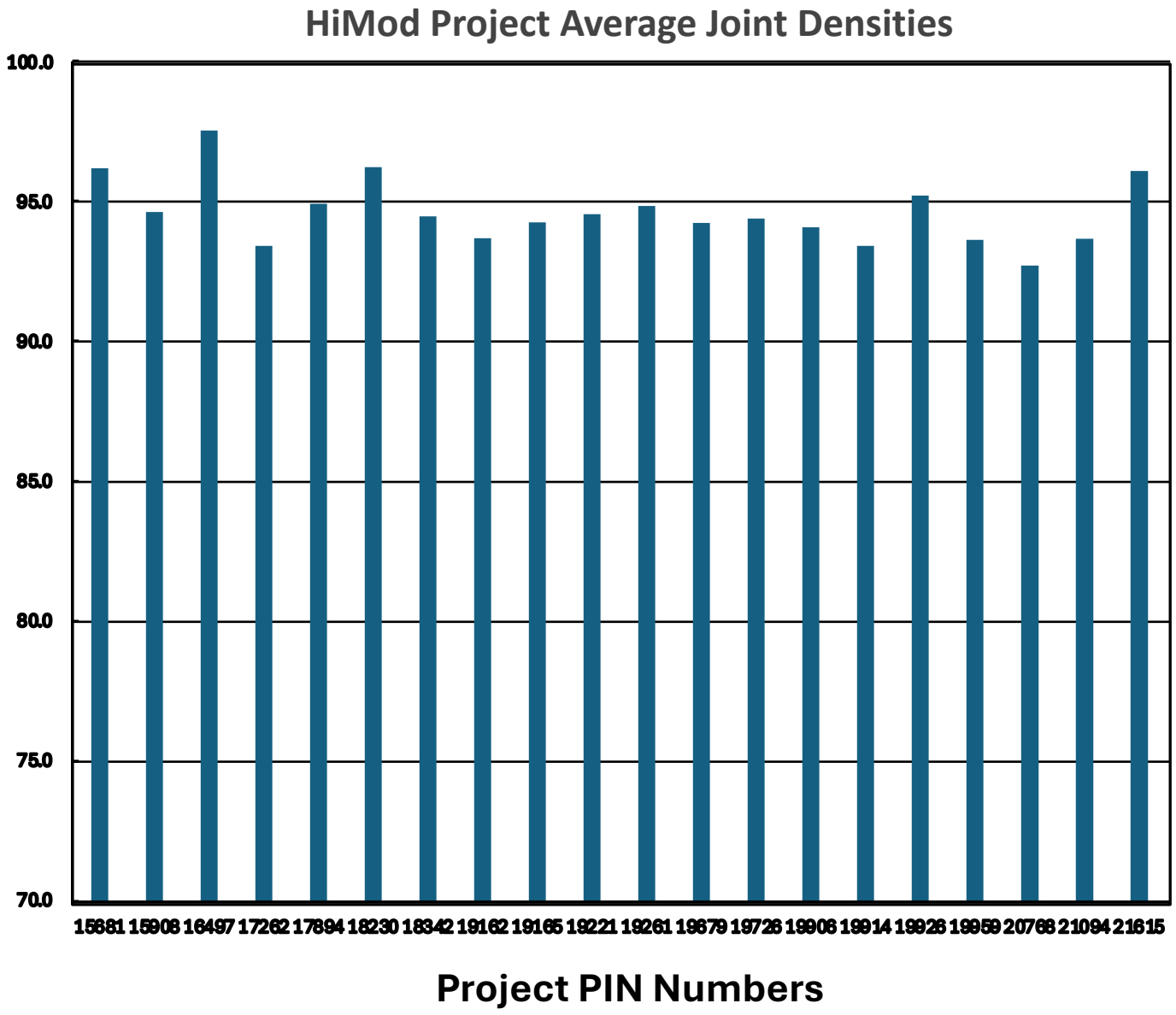
High: 98.4%
Low: 95.2
Std: 0.55



Project PIN Numbers

Ave Joint Density
94.7% Gmm

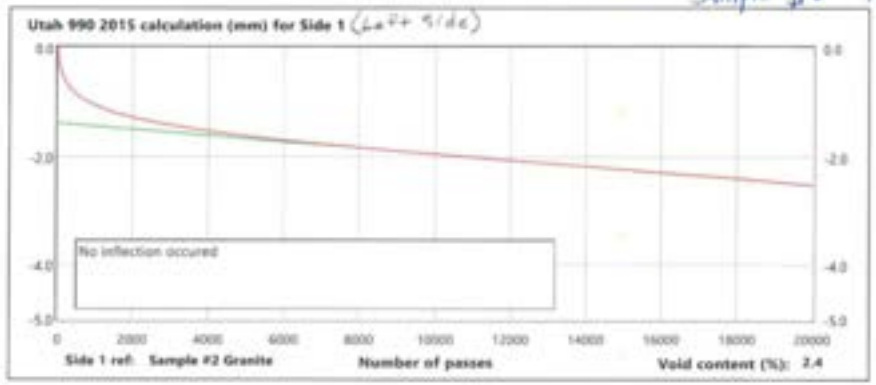
High: 97.6%
Low: 92.8
Std: 1.2

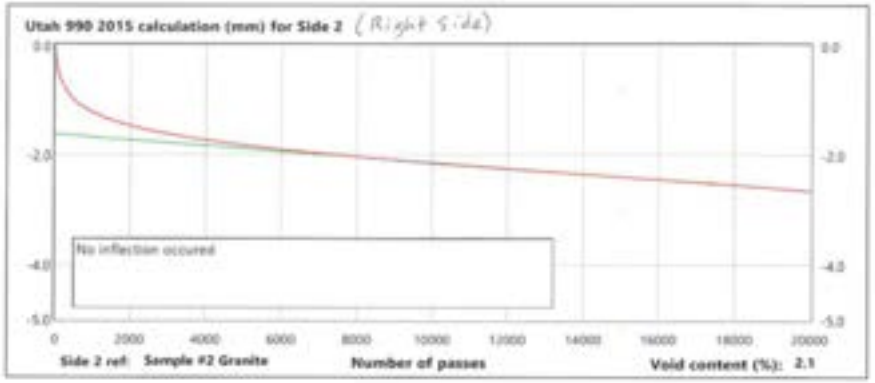


Hamburg Wheel-Tracker Test Results

UDOT 990 2015		Date sampled:	11/4/2025
Date/time of test:	11/4/2025 6:06 AM	Job number:	PIN 15689
Laboratory number:	Central Materials 47	Project number:	N/A
Project name:	Granite I-215	Project Engineer:	N/A
Submitted by:	Julian	Threshold:	50%

Sample #2 42"





Rut depths (mm)

Pass No.	Side 1	Side 2
5000	-1.62	-1.82
10000	-1.95	-2.15
15000	-2.24	-2.40
20000	-2.52	-2.66

Mix type:	HMHMA 62 mm
Asphalt grade:	76-34
HMA production:	Field
Compaction method:	Slab
Mix source:	
Test temperature (°C):	54.0
Mix Depth (mm):	42.00

Signature

Report version V1.4.0

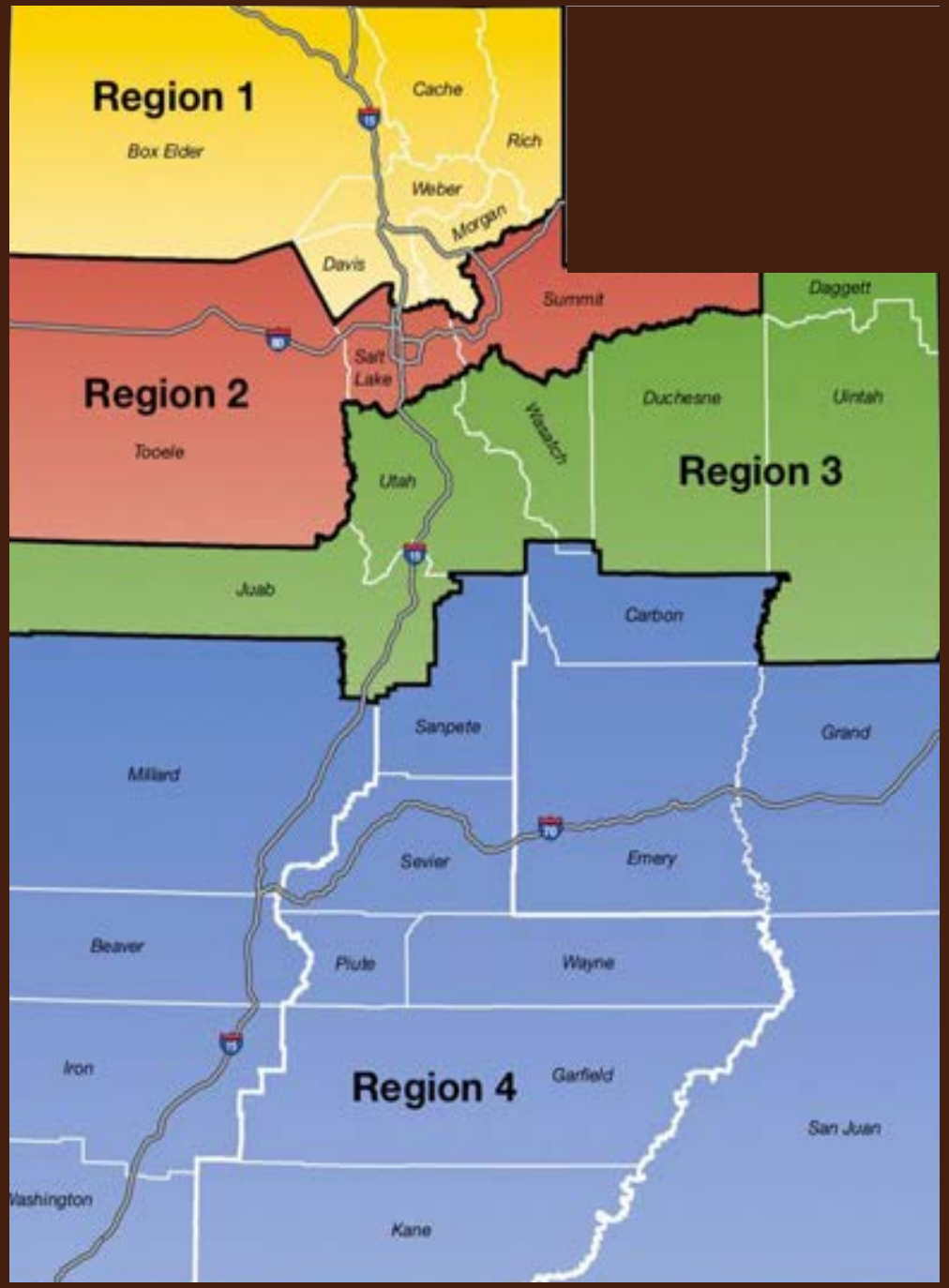

S#1
S#2
UDOT
Central Lab
Sample 2 Left
Granite I-215
76-34 Peak
Air Voids: 2.5
Rut Depth: 3.92
UDOT
Central Lab
Sample 2 Right
Granite I-215
76-34 Peak
Air Voids: 2.1
Rut Depth: 3.66


HiMod, thin lift
I-80, MP 41 to 50
August 2024

Jared Dastrup

UDOT

Regional Materials Engineer



High Modified Asphalt HMHMA

Jared Dastrup
Region 4 Materials Engineer

UDOT Keeping Utah Moving

- Thin overlays
- Mill and fills
- Widenings
- Reconstruction
- Bridge deck

UDOT
Keeping Utah Moving

- Thinner Pavement Sections
- Better Compaction
- Lower Cost Mix Than SMA
- Low Rutting
- Low Cracking

Original

- 1.5" SMA / 12.5" HMA / 12" UTBC / 14" GB
- 2" SMA / 11" HMA / 14" UTBC / 16" GB
- 13" HMHMA (old model) / 12" UTBC / 14" GB
- Chip / 10" HMA / 16" UTBC / 17" GB

HMHMA

- 11" HMHMA / 12" UTBC / 14" GB
- 10" HMHMA / 12" UTBC / 14" GB
- 10" HMHMA / 12" UTBC / 14" GB
- 8" HMHMA / 10" UTBC / 12" GB

UDOT
Keeping Utah Moving


UDOT
Keeping Utah Moving

Brody Young

Peak Asphalt

Director of Quality

Hi-Mod Asphalt

Binder Supplier Perspective

Brody Young

PEAK ASPHALT

IDAHO ASPHALT SUPPLY, INC. 50 THREE DECADES

Idaho Asphalt Supply, Inc

Content

- What is Hi-Mod Asphalt
- Binder Specification
- Manufacturing Lessons Learned
- Storage and Handling Lessons Learned
- Collaboration

PEAK ASPHALT

Idaho Asphalt Supply, Inc

What is a Hi-Mod Binder

- Binder modification with high SBS polymer > 6% polymer versus 2-4% SBS polymer in traditional PMAs.

- It can be implemented nicely within AASHTO M320 PG+ or M332 specification parameter framework

  - High modulus asphalt binder
    - High G* (> 1.30KPa)
  - High Polymer Content
    - Elastic Recovery > 90% @25C
  - High Durability
    - Delta Tc > -1.0C
  - Regular Workability
    - Viscosity <3.0 Pa-s @135C

PEAK ASPHALT

IDAHO ASPHALT SUPPLY, INC. 50 FIRST CHOICE

Idaho Asphalt Supply, Inc

Hi-Mod Specification

Test	Method	Temp	SHRP Spec.
Specific Gravity	ASTM D70	15.6°C	Report
Rotational Viscosity @135˚C, (Pa.s)	AASHTO T316	135°C	3.0-
Dynamic Shear, G* modulus, (kPa)	AASHTO T315	76°C	1.3+
Flash Point, COC, (˚C)	AASHTO T-48	N/A	260+
Mass Loss, (%) RTFO	AASHTO T-240	N/A	1.0-
Dynamic Shear (G*/sin d), (kPa) RTFO	AASHTO T315	76°C	2.2+
PAV Dynamic Shear (G*sin d), (kPa)	AASHTO T315	28°C	5000-
BBR Stiffness, (MPa)	AASHTO T313	-18°C	150-300
BBR m-value	AASHTO T313	-18°C	0.300+
Delta Tc	ASTM D7643	-24°C	-1.0°C

Special Test Parameters:

Test	Method	Temp	Spec.
Phase Angle, (°)	**AASHTO T315**	**70°C**	**71-**
Elastic Recovery*, (%) (RTFO)	**AASHTO T301 mod**	**25°C**	**90+**

*** 20cm elongation, cut immediately**

References: AASHTO M320

PEAK ASPHALT

Idaho Asphalt Supply, Inc

Manufacturing Hi-Mod

Producing Hi-Mod Binders requires precise mixing, temperature control and robust process equipment

It’s NOT any different than producing other traditional modified binders e.g. PG76-28

No special equipment or modification to process required.

Storage and Handling Hi-Mod

- Finished binder storage 325-340F
- Good mixing and recirculation capability
- Proper heating capacity for Tanks, Pumps and Lines
- Horizontal Tanks are OK

Collaboration Is Key

Collaboration between DOTs, contractors, and suppliers ensures that specifications are practical, cost-effective, innovative, and achievable—leading to safer, higher-quality, and longer-lasting pavements.

Without DOT input establishing performance & acceptance criteria may not be a success

- Willingness to try new technology and outreach to industry

Without Supplier input meeting binder spec may not be a success

Repeatable and Reproducible

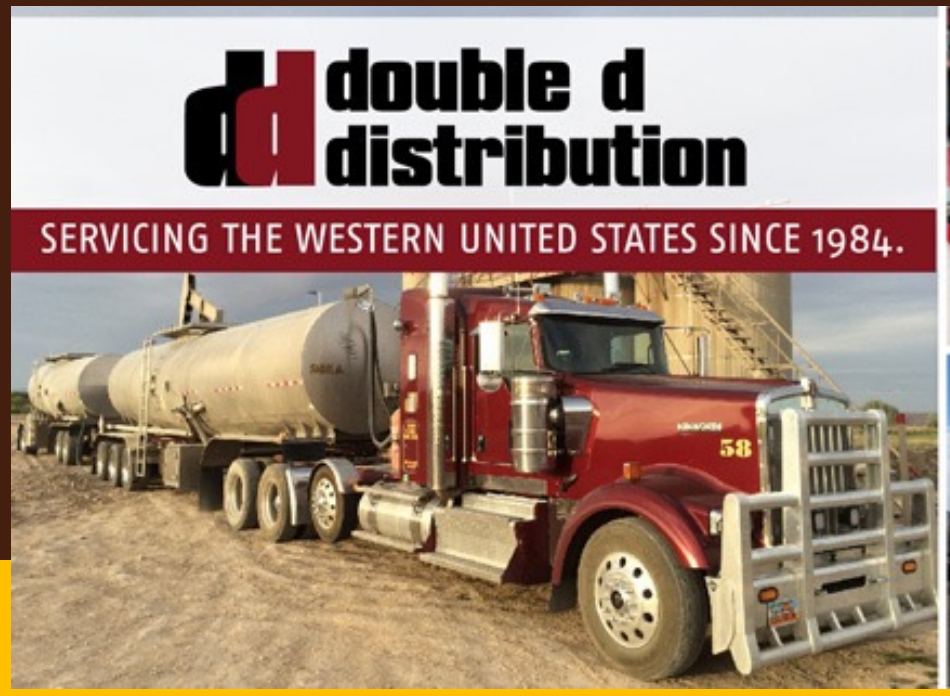
Without Contractor input constructability may not be a success

Mixing and Compacting

--SUCCESS--

Skyler Droubay
Double D Distribution

Vice President



Not Your Grandpa's Asphalt

Evolution of Asphalt

High-mod asphalt is an advanced technology designed

Handling Differences

Thicker binder means you have to change your mindset a bit from dispatch to delivery

How is your Equipment?

You don't need specialized equipment; you just don't want bad equipment.

Adapting to New Technology

Just as mechanics adapt to new cars, construction practices should evolve so you don't get frustrated.

Keep It Warm – Temperature Considerations

Suppliers we need it hot

Seriously, this oil doesn't like to move below 300 degrees. All asphalt binder *should* be hot, but hi-mod binder **must** be hot.

Trailer Insulation is important

Don't use trailers from the Red Green show. You don't need special trailers, just use good insulated equipment.
Insulation rating ÷ Transport time = how easy it will unload

Overnight pre-loads, not my favorite

Reduce time the oil is in that trailer. We have decided we won't pre-load it the night before and sit on it until morning.

Equipment Matters – Large Pumps and Hoses

Importance of Pumps

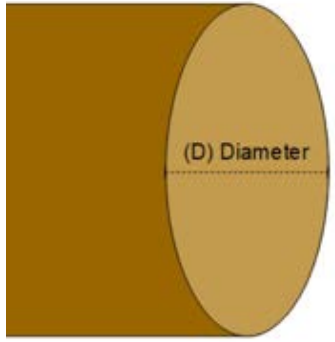
I would recommend a 4” pump or larger at minimum

Hoses

3” hose is likely to clog. Use 4” hoses.

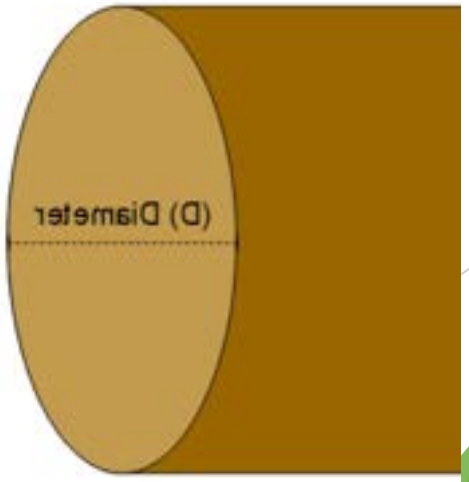
Pipes

3” heated traced piping is fine, bigger is always better



Benefits of Proper Equipment

You want your suppliers and vendors to have a good experience hauling this product



Sampling – Thicker Material Tips

Small Pipes are Challenging

Be prepared for a much slower sample flow

Hand held torch a very good idea

May need a torch to pre-heat the pipe so it flows out easily

Slope & anti-strips – Easier Unloading

Get a lot of slope

I would recommend a minimum 12” height difference.

Avoid Retain

You need to avoid retain that builds up and mixes products and dilutes future binder deliveries

Anti-strips are helping

If your state allows anti-strip dosing at the supplier loading rack I would consider it.

Evotherm Testing Coming

2026 season we will be doing so time tests to see what difference in unload times are when anti-strip is dosed at the rack vs after unloaded at the plant

Binder Transportation Conclusion

No doubt, it is sticky

This oil is so good and so strong.

Don't bring a knife to a gun fight

Make sure you have good tools in place, upgrade Grandpa's toolbox

Keep it warm

This is a powerful product…when handled correctly. Don't be casual in your approach.

Good Luck!

Let's pave the world with the best asphalt. Hi-mod will give you an amazing road.

Victor Johnson

Operations Manager

Geneva Rock Products Inc

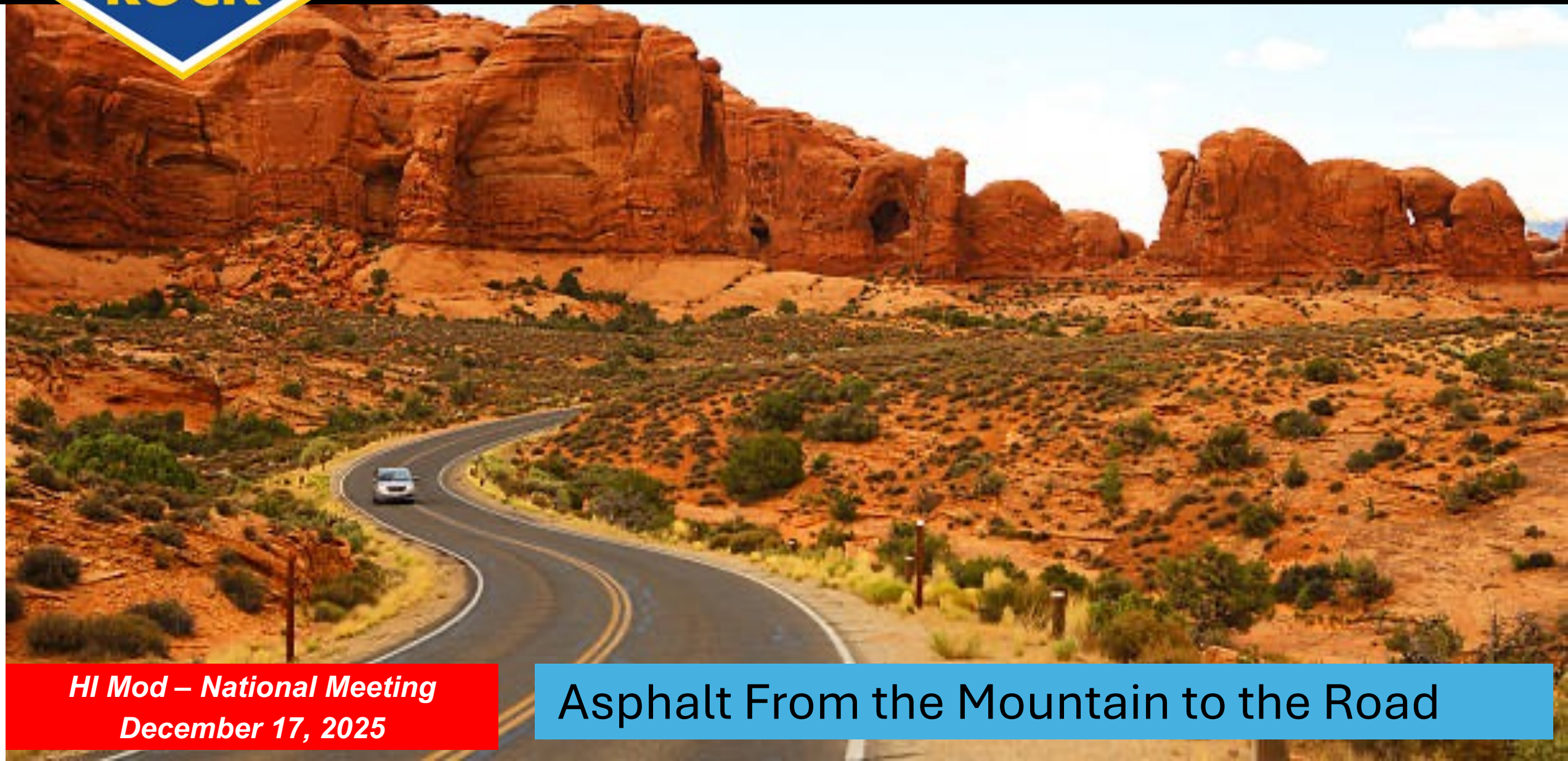
Utah State Advisor for NAPA

Dan McDaniel

Construction Quality Control Manager

Geneva Rock Products Inc

Asphalt



HI Mod – National Meeting
December 17, 2025

Asphalt From the Mountain to the Road

Objectives

- Bridge engineering innovation with real-world contractor execution
- Share the contractor's perspective on producing and placing HMHMA

- Highlighting
  - Aggregate production
  - Asphalt Production
  - Asphalt Paving

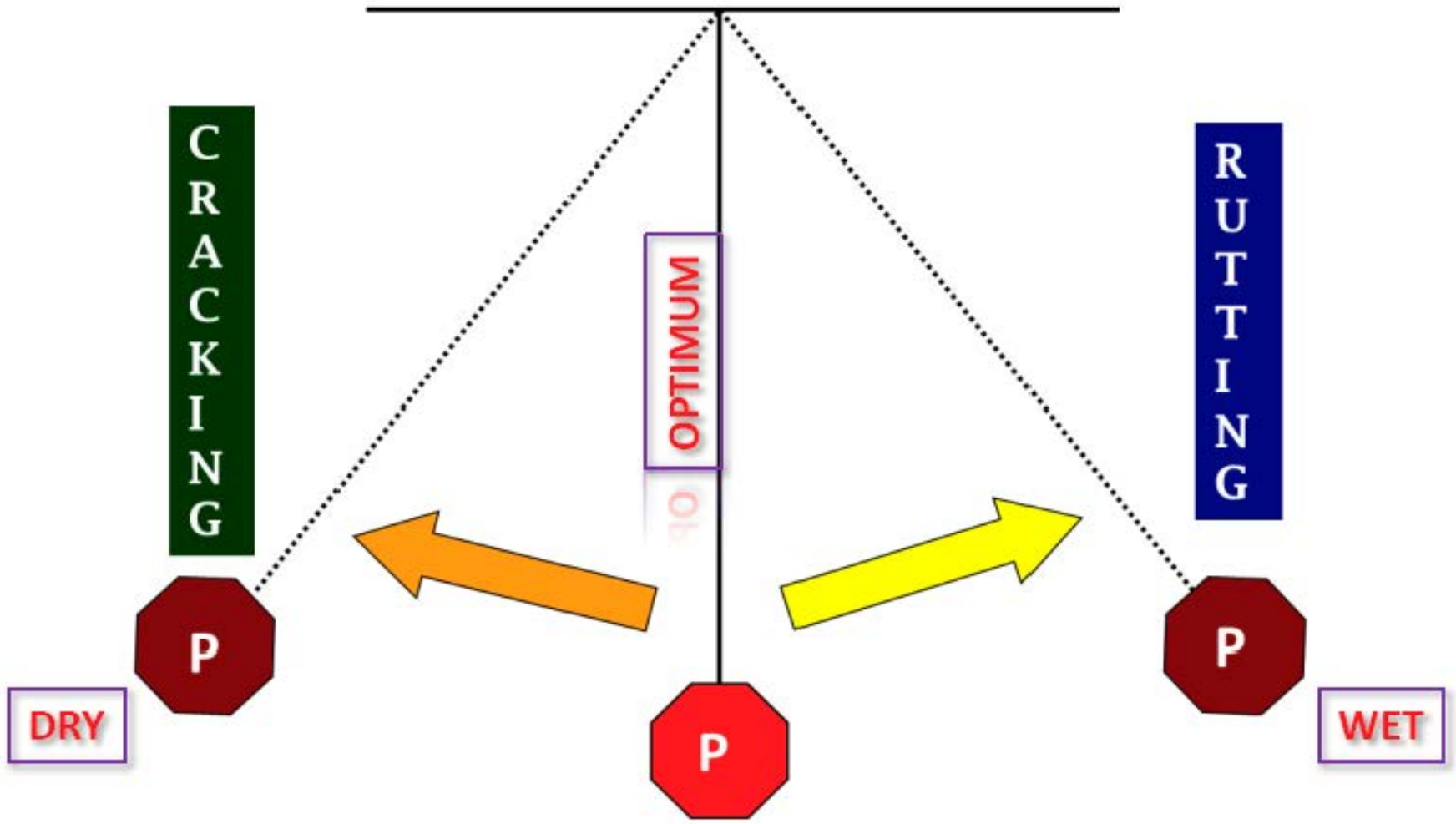
Relevant

Choices

From the Mountain to the Road

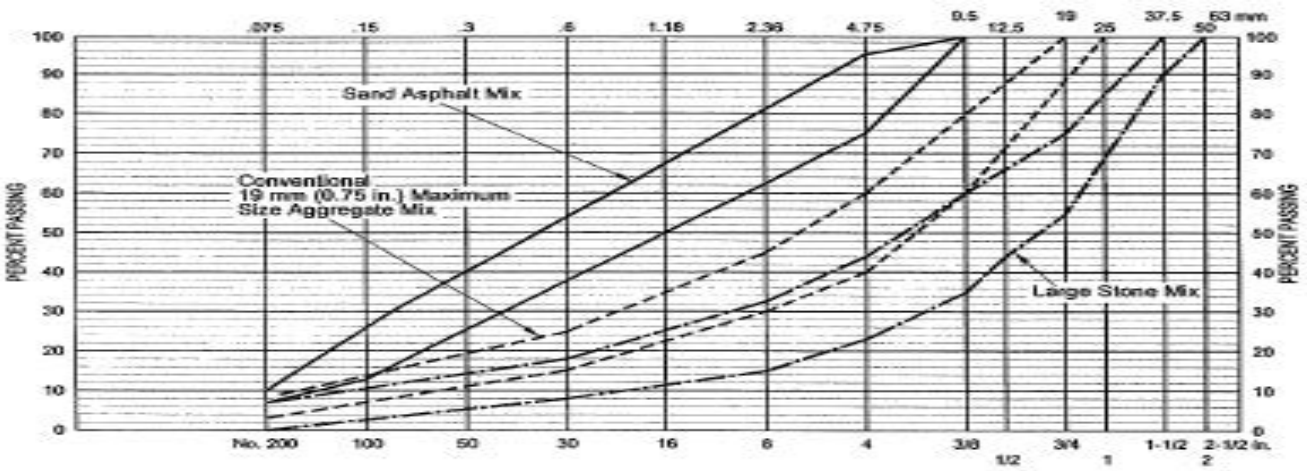
Mix Design

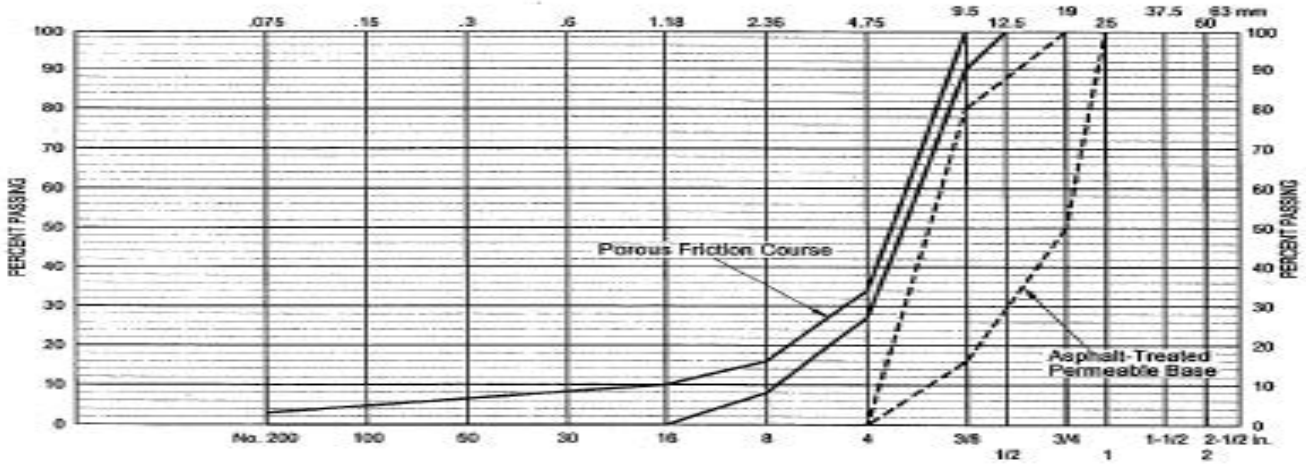
Pendulum of Asphalt Mix Performance

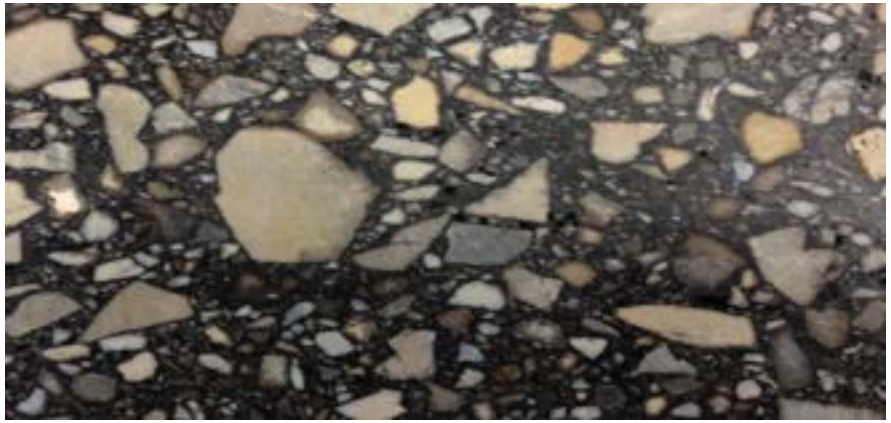


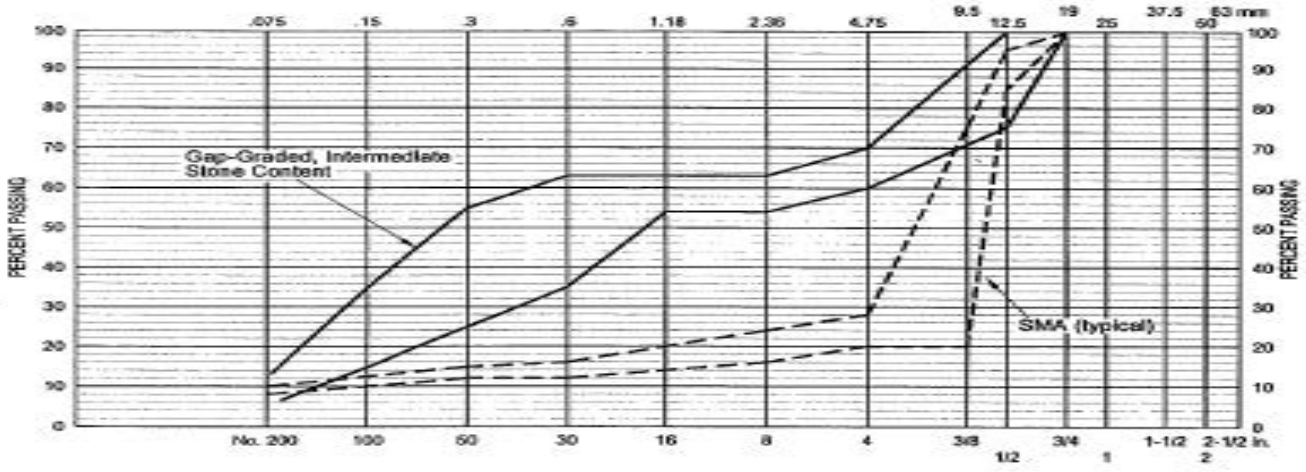
Aggregate Production

Method, Man Power, Environmental, Material, Machine


.075 .15 .3 .6 1.18 2.36 4.75 9.5 12.5 19 25 37.5 63 mm
Sand Asphalt Mix
Conventional
19 mm (0.75 in.) Maximum
Size Aggregate Mix
Large Stone Mix
PERCENT PASSING
No. 200 100 50 30 16 8 4 3/8 1/2 3/4 1 1-1/2 2 2-1/2 in.


.075 .15 .3 .6 1.18 2.36 4.75 9.5 12.5 19 25 37.5 63 mm
Porous Friction Course
Asphalt-Treated
Permeable Base
PERCENT PASSING
No. 200 100 50 30 16 8 4 3/8 1/2 3/4 1 1-1/2 2 2-1/2 in.



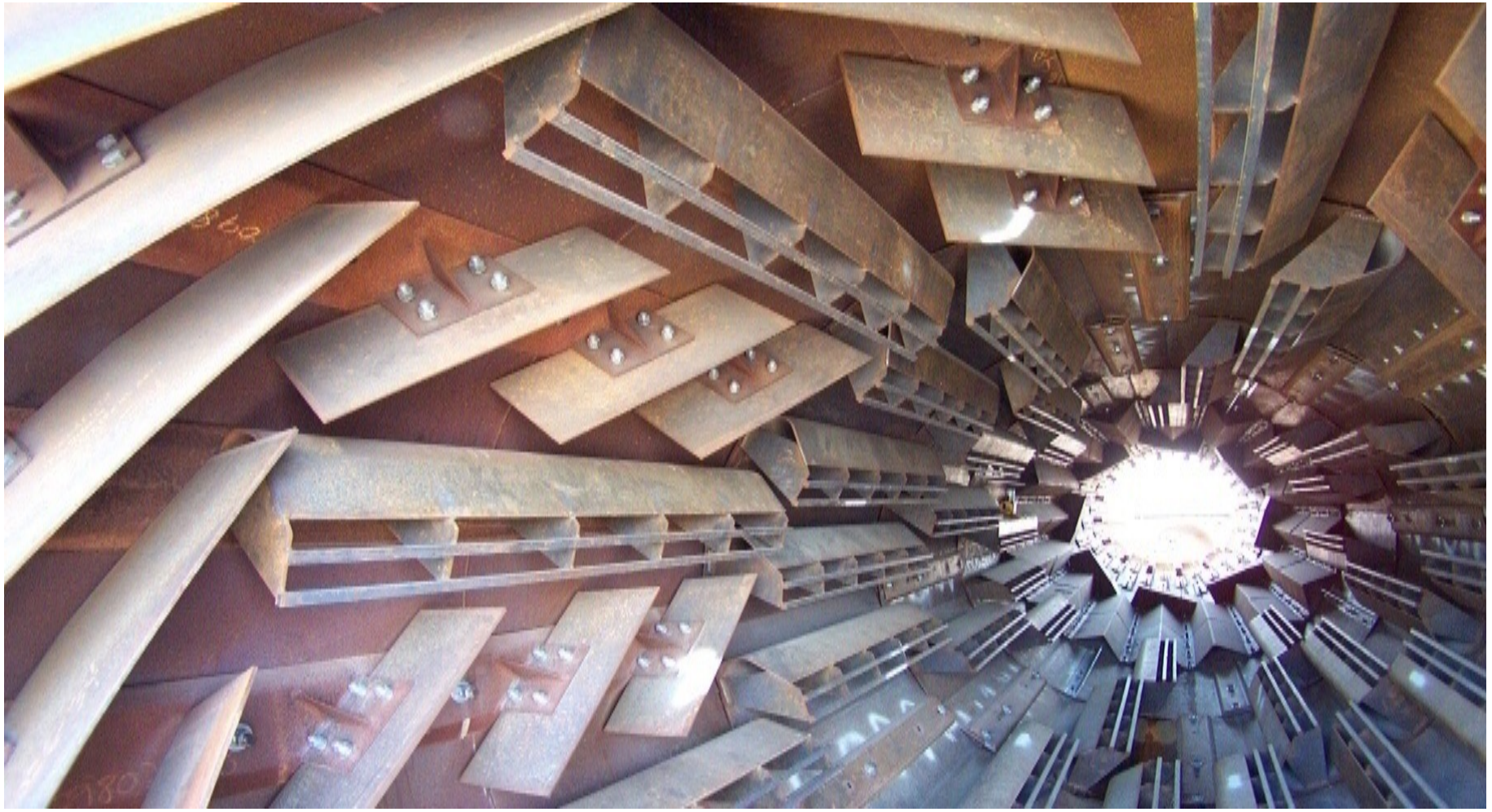

.075 .15 .3 .6 1.18 2.36 4.75 9.5 12.5 19 25 37.5 63 mm
Gap-Graded, Intermediate
Stone Content
SMA (typical)
PERCENT PASSING
No. 200 100 50 30 16 8 4 3/8 1/2 3/4 1 1-1/2 2 2-1/2 in.

Aggregate Production

- Responsible use of aggregates
  - Pit/Quarry Balance: no high-grading of aggregate sources
  - Use of Reclaimed asphalt (RAP)
- No need to make a one-off mineral filler
- Overall lower aggregate cost

Asphalt Production

Method, Man Power, Environmental, Material, Machine



Asphalt Plant Production

- Less Labor (No fiber chucker)
- No SMA mortar (need more feeders or auger)
- Tons per hour increase vs. SMA
  - Reduced drag slat amp overload
  - Drum vailing is more efficient because of the gradation structure
- Eliminates drain-down and stringers
- Bag House efficiency – less carry through

Asphalt Paving

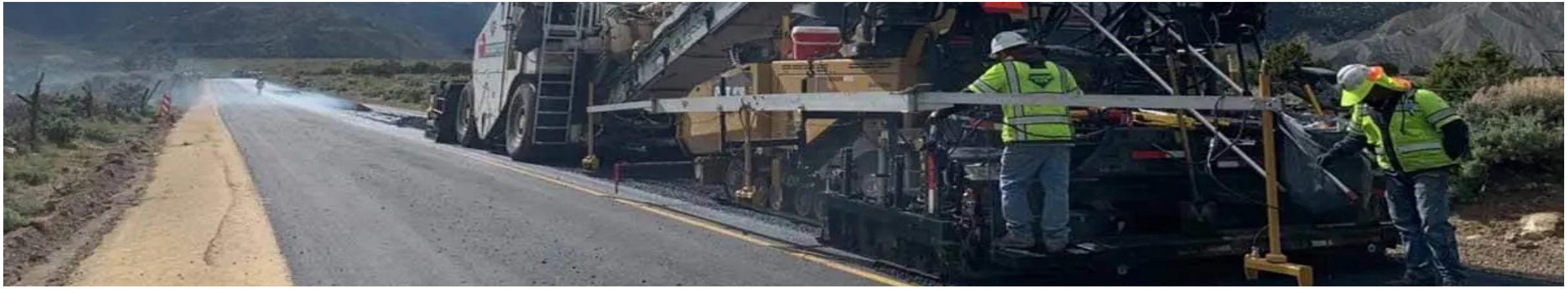
Method, Man Power, Environmental, Material, Machine

Asphalt Paving

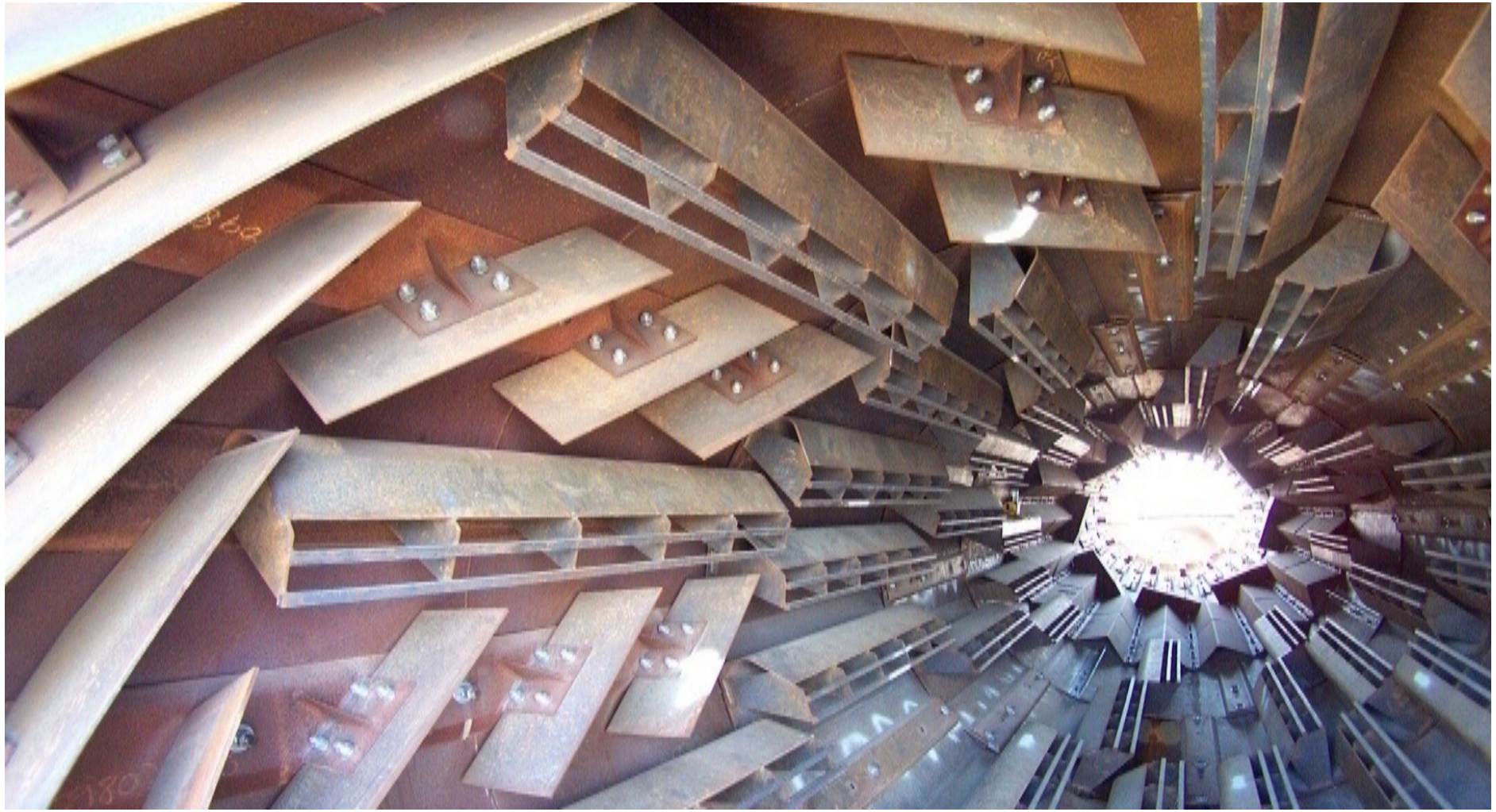
- **Density:**
  - Achieved faster — lower air voids (50 Nd).
  - Even bridge decks reach compaction with minimal to no vibration.

- **Joint Compaction:**
  - Requires new best practices, but results are excellent once refined.

- **Smoothness:**
  - Tougher at deeper depths, but improved with experience and strong crews.



Questions?



Chris Campbell

Granite Construction

Utah QC Manager

HMHMA vs SMA

Production

- HMHMA does not require the use of fibers or mineral filler
- Less plant equipment (fiber machine)
- 76-34 tends to pump easier than a 70-28
- HMHMA can be produced at higher production rate without amping out the drag slat
- HMHMA does not have drain down issues
- HMHMA not as gap graded as SMA resulting in better agg pit balance
- Use of Rap allowed (environmental considerations)

Quality Control

- Both mixes sampled at the plant
- HMHMA has less segregation due to agg structure
- Can use a riffle splitter vs quartering on table
- Better lab to lab correlation

GRANITE®

HMHMA vs SMA

Density

- HMHMA requires less effort to achieve mat densities vs SMA (while still targeting higher % compaction)
- HMHMA densities more consistent across the mat and especially along unconfined pavement
- Joint Compaction required for HMHMA and not for SMA leading to better joint performance
- Able to achieve density with no vibration on bridge decks
- Higher density target (96% vs 94%) has potential to increase the life of pavement

GRANITE®

HMHMA Best Practices

- Similar Best Practices to HMA
- Ensure splitting at hotter temps
- Breakout Rice's as soon as possible
- Mix will hold heat at thicker lifts. Factor in for coring and traffic opening

GRANITE