Welcome

2015 NDOR City/County Asphalt Update Webinar


Bob Rea


Matt Beran

Nebraska Asphalt Update

Updates

Longitudinal Joint Density
Notched Wedge and Beveled Edge
Thin Lift Overlay – SLX
Non-Nuclear Testing
Warm Mix Update

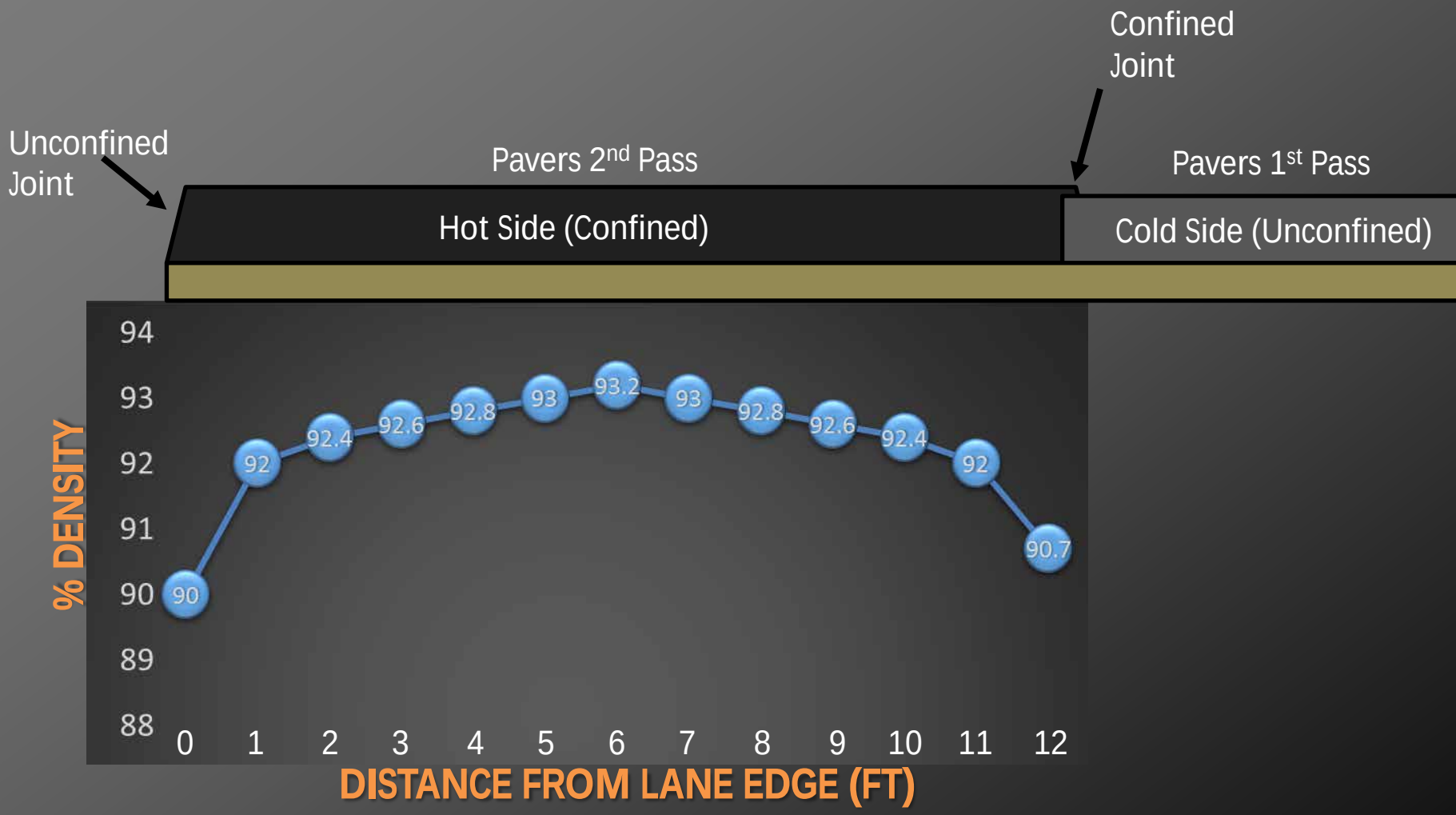
New Topics

SRM Mix
Hot Pour Sealers
Bridge Deck Membranes
Superpave Software
UNL Research

Longitudinal Joint Density

Longitudinal Joint Density

Longitudinal Joint Density

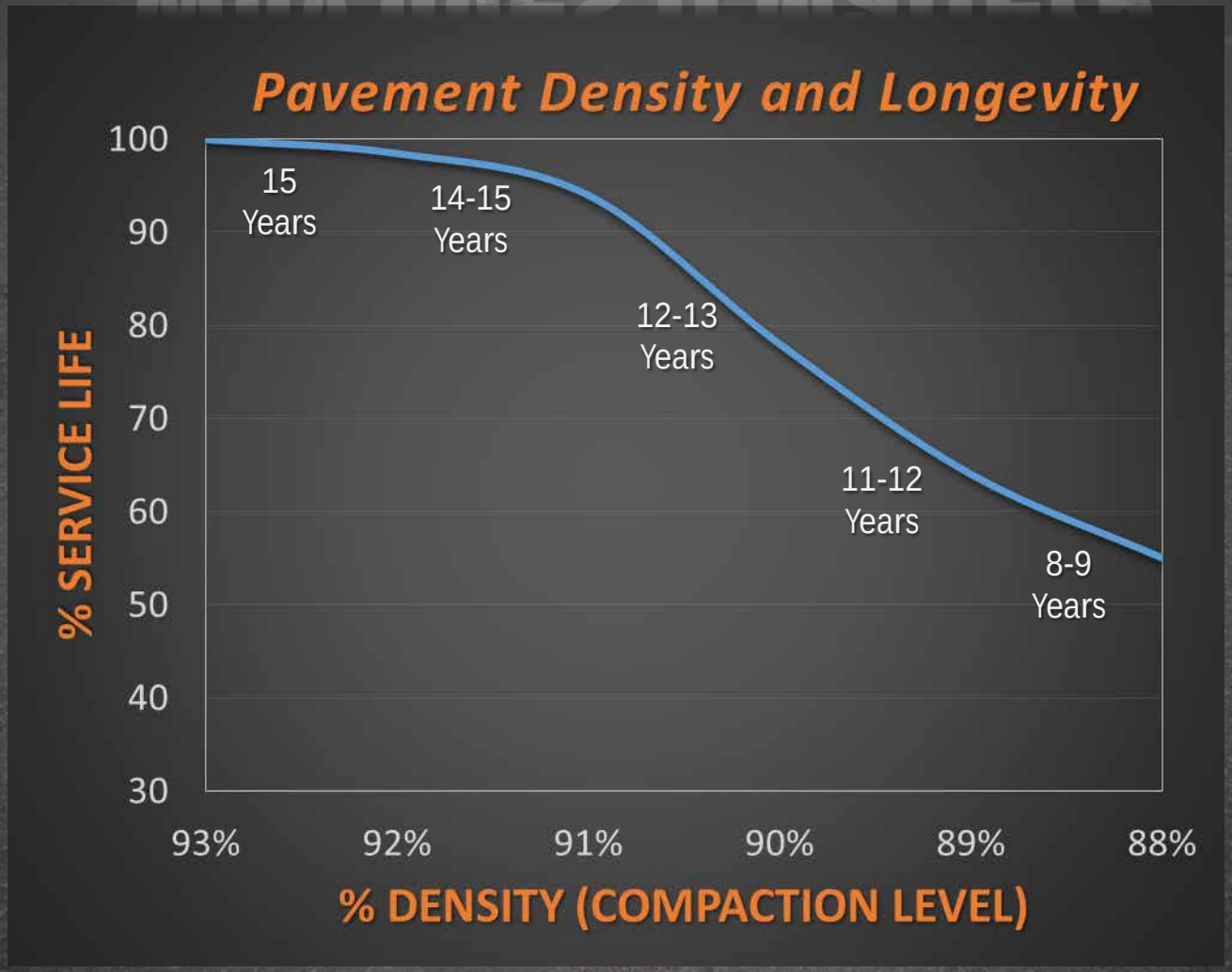


Why does it Matter?

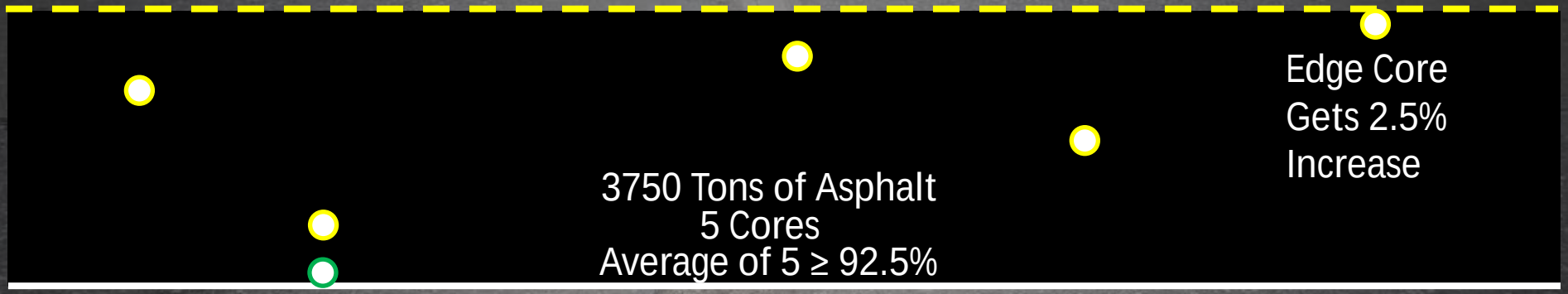
"For every 1% drop in density, relative fatigue life decreases by 8-20%"

-NCHRP Report

Why does it Matter?



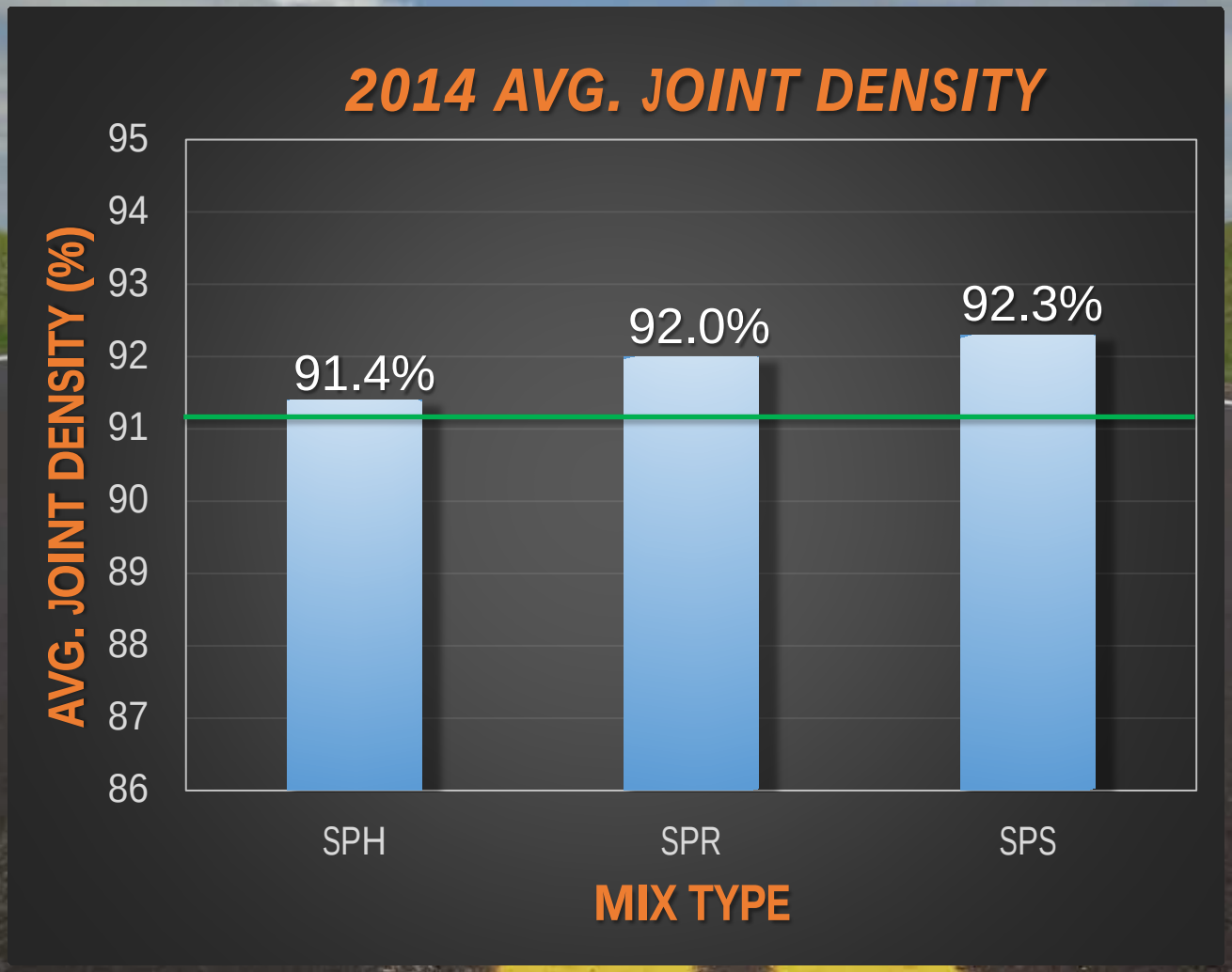
NDOR Specification



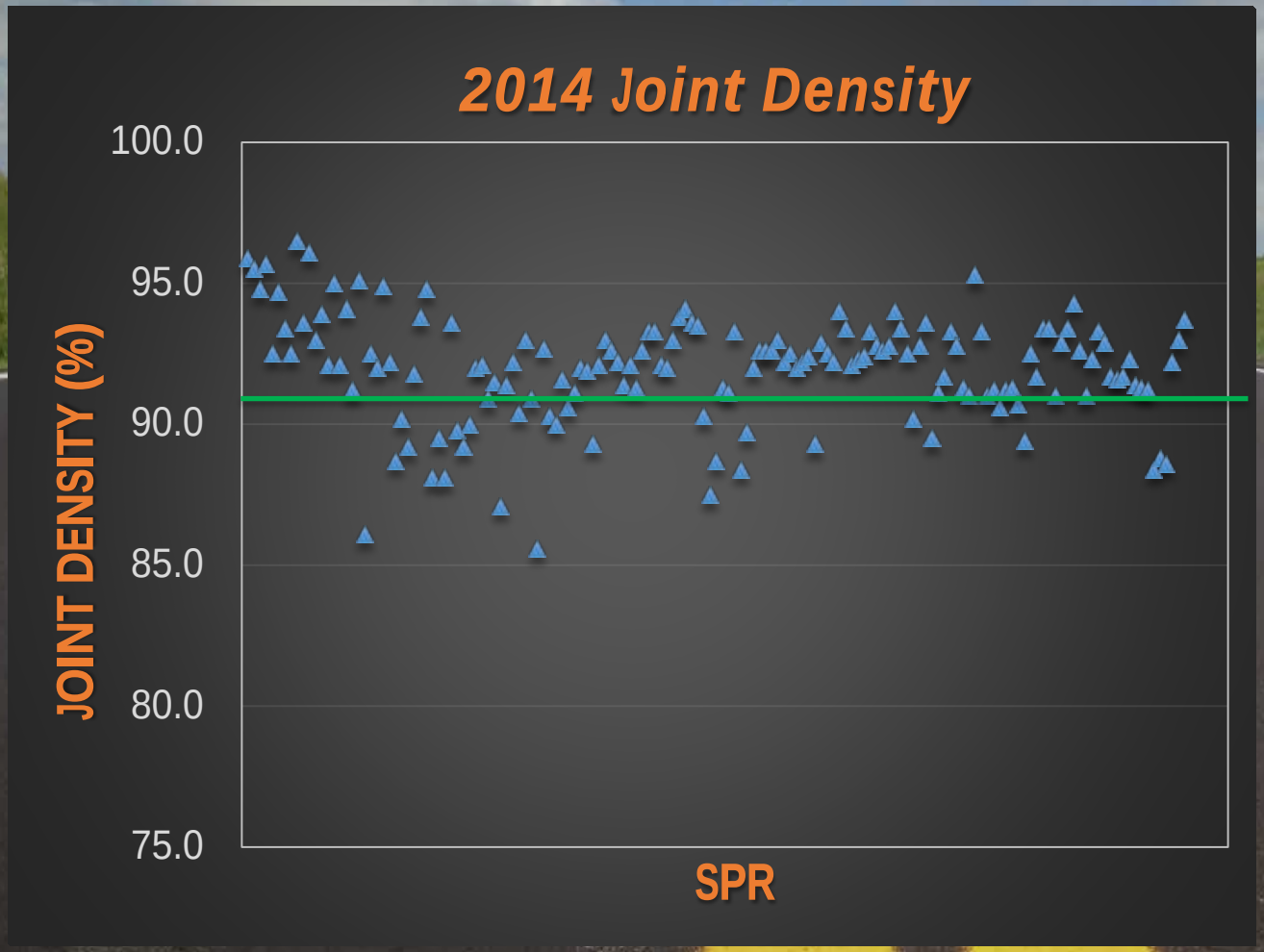
2014

Joint Density Test Lot Pay Factor			
Joint Density	**SPS**	**SPR**	**SPH**
93.0 or greater	102%	102%	102%
92.0 to 92.9	100%	102%	102%
91.0 to 91.9	98%	100%	102%
90.0 to 90.9	98%	98%	100%
89.0 to 89.9	98%	98%	98%
88.9 or Less	98%	98%	98%

2014 Results

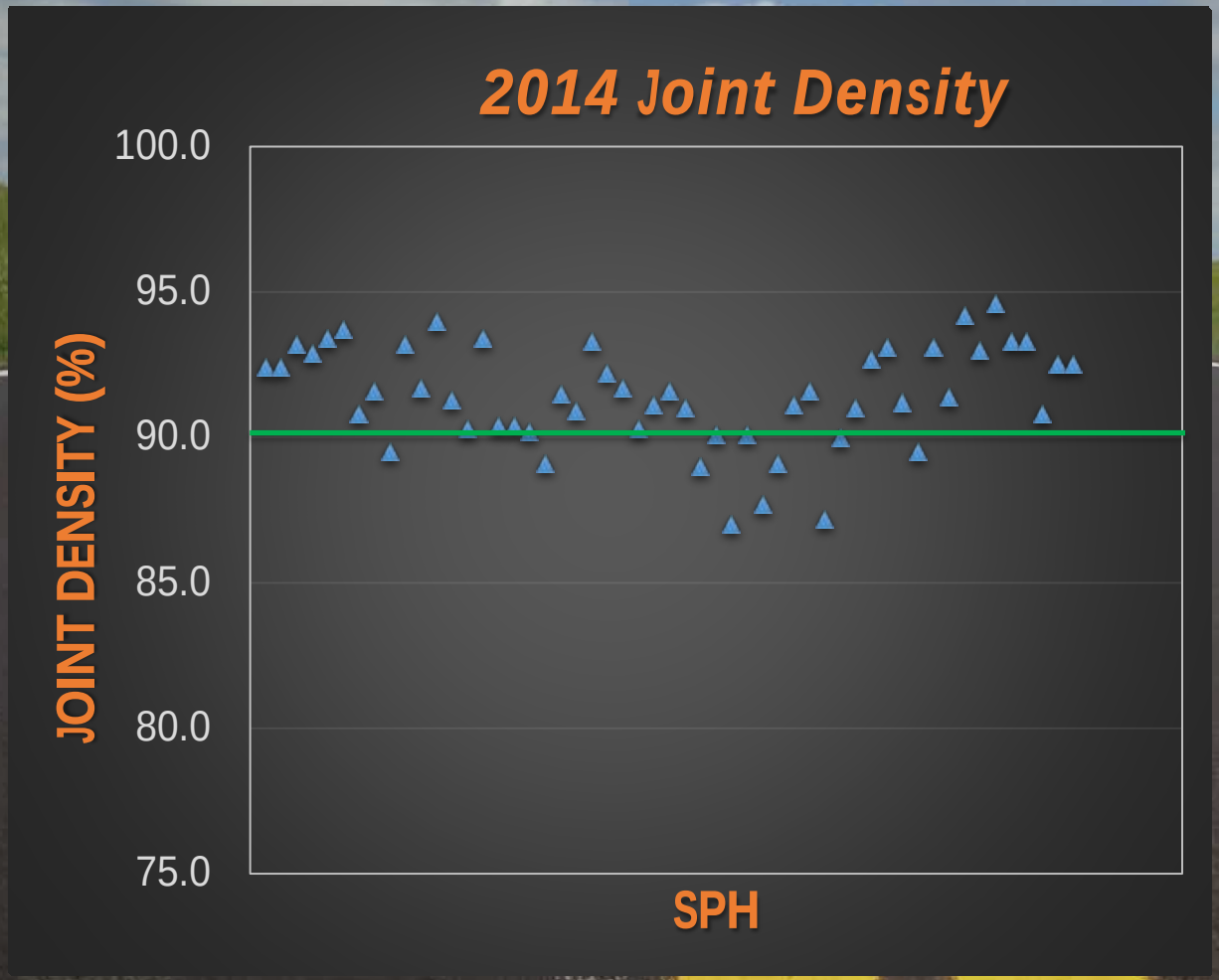


SPR DATA



Joint Density	SPR
93.0 or greater	102%
92.0 to 92.9	102%
91.0 to 91.9	100%
90.0 to 90.9	98%
89.0 to 89.9	98%
88.9 or Less	98%

SPH DATA



Joint Density	SPH
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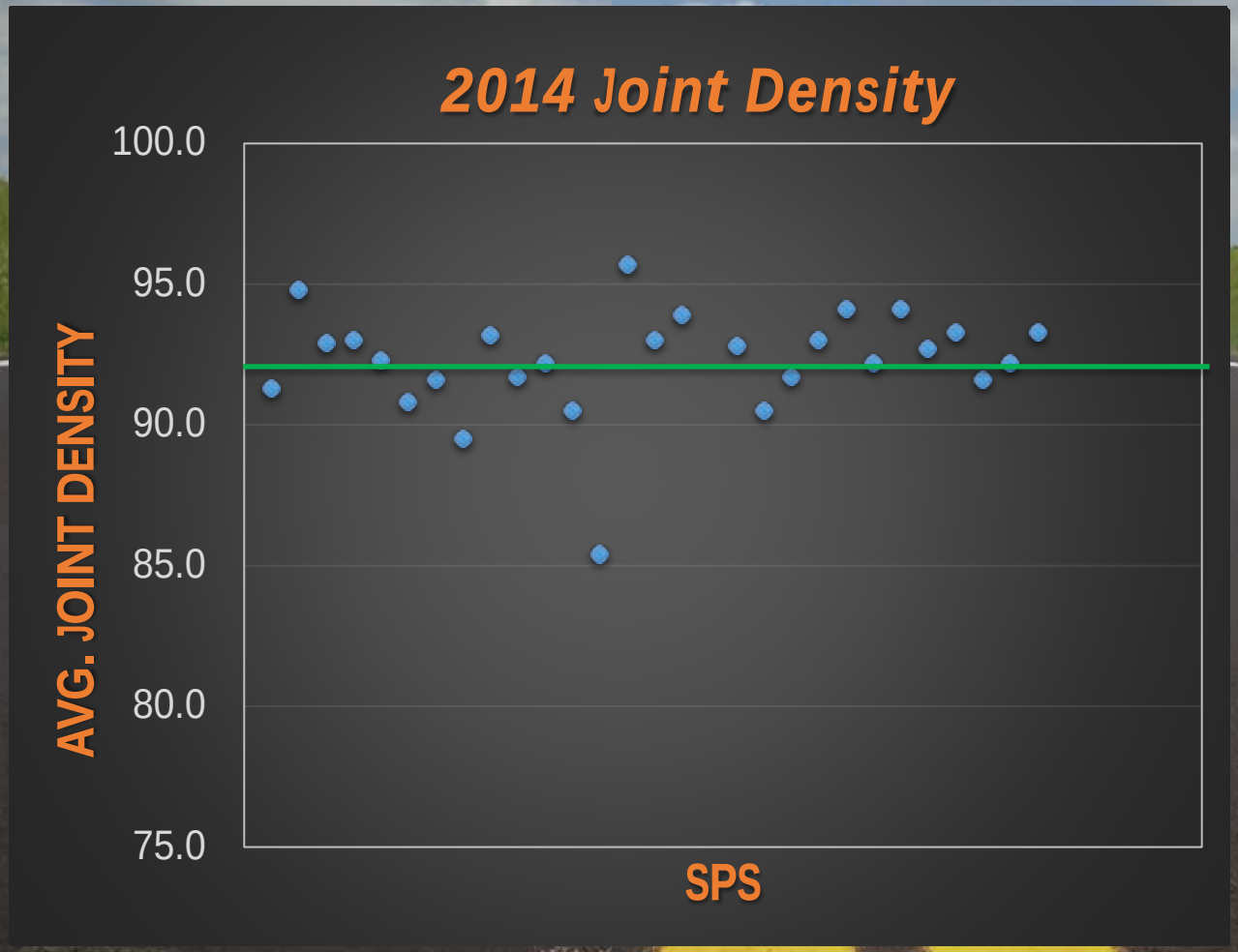
91.0 to 91.9	102%
90.0 to 90.9	100%
89.0 to 89.9	98%
88.9 or Less	98%

SPS DATA



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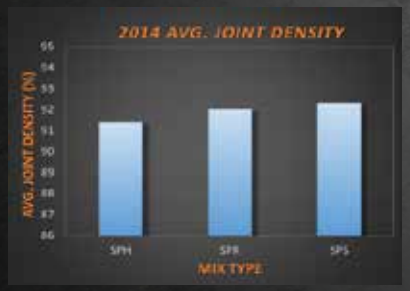
91.0 to 91.9	98%
90.0 to 90.9	98%
89.0 to 89.9	98%
88.9 or Less	98%

Thoughts

- Critical to Maintain Best Practices
  - May seem simple, yet most aren't doing all of it
    - Still see bridging, end gates up, etc.

- Two things every contractor should have:
  - Notched Wedge Joint
  - Non-Nuclear Gauge



- Nice Job done by the Industry

Random Sampling Schedule (RSS)

NEBRASKA DEPARTMENT OF ROADS

Asphaltic Concrete Pavement Random Sampling Schedule

Project No: EXAMPLE | Name of Road: Wayne East | Page: 1 of 1

Control No. 33333 | Asphalt Weight: 30000 | Asphalt Type: SP4 | Lot Size: 3750 Tons

12 ft

Lot Number	Sublot Number	Ton to be Sampled: Lot	Ton to be Sampled: PJT	Distance from Edge	Distance to Core	FAA/ CAA Cold Feed	Recuts: Distance to Core	Field Density	Joint Density*	TSR
1	1	270	270	4	59		-2		IN	X
1	2	1233	1233	3	33		-37			
1	3	1892	1892	5	23		1			
1	4	2348	2348	2	-75		-60			
1	5	3194	3194	2	-47	X	-58	X		
2	1	715	4465	0	18		-19			
2	2	1366	5116	0	66	X	44	X		
2	3	2099	5849	8	84		-82			
2	4	2859	6609	4	88		-81			
2	5	3650	7400	9	-56		-21		IN	
3	1	459	7959	2	78	X	-73	X		
3	2	816	8316	12	25		38			
3	3	1659	9159	6	63		-17		OUT	
3	4	2340	9840	11	-60		-79			
3	5	3559	11059	9	70		51			X
4	1	194	11444	12	77		40			
4	2	927	12177	0	-80	X	-41			
4	3	2017	13267	6	4		-9			
4	4	2516	13766	6	-72		95			
4	5	3543	14793	8	12		-77		IN	
5	1	154	15154	11	-57		-37			
5	2	1449	16449	0	45		-67			
5	3	1824	16824	4	21	X	97			
5	4	2491	17491	1	-78		48			
5	5	3134	18134	3	72		-58		OUT	
6	1	732	19482	6	8		23			
6	2	1245	19995	3	-89	X	26			
6	3	2111	20861	5	-59		-10			
6	4	2562	21312	9	-92		37			
6	5	3268	22018	11	-12		17		OUT	
7	1	364	22864	3	-34	X	94			X
7	2	1256	23756	12	-67		25			
7	3	1555	24055	9	25		-79		OUT	
7	4	2938	25438	3	25		65			
7	5	3339	25839	3	76		22			
8	1	64	26314	10	-92	X	-29	X		
8	2	872	27122	7	68		23			
8	3	2204	28454	6	-17		-94			
8	4	2831	29081	12	50		13		IN	
8	5	3159	29409	7	-47		-58			
9	1	562	30562	0	-57		49			
9	2	1151	31151	2	11	X	84	X		
9	3	1628	31628	3	56		1			
9	4	2787	32787	10	-26		73		IN	
9	5	3305	33305	2	-16		99			
10	1	222	33972	1	31		-3			
10	2	1452	35202	5	-6		70			
10	3	1894	35644	9	45	X	-13	X		
10	4	2941	36691	7	10		72			
10	5	3132	36882	2	-51		58		OUT	

12 ft

Lot Number	Sublot Number	Ton to be Sampled: Lot	Ton to be Sampled: PJT	Distance from Edge	Distance to Core	FAA/ CAA Cold Feed	Recuts: Distance to Core	Field Density	Joint Density*	TSR
11	1	204	37704	12	-78		-21		OUT	X
11	2	1381	38881	1	91		-36			
11	3	1684	39184	3	-48		87			
11	4	2724	40224	0	62	X	4	X		
11	5	3651	41151	8	12		-39			
12	1	310	41560	9	52		78			
12	2	1274	42524	5	52	X	-2	X	IN	
12	3	1513	42763	6	-15		47			
12	4	2795	44045	5	80		3			
12	5	3036	44286	5	73		91			
13	1	317	45317	9	-91	X	-5	X		
13	2	916	45916	10	6		-6		IN	
13	3	1680	46680	1	-26		-85			
13	4	2532	47532	5	-75		26			
13	5	3061	48061	10	-48		82			
14	1	421	49171	3	-67	X	-91		IN	
14	2	1141	49891	8	53		86			
14	3	2155	50905	4	-67		7			
14	4	2863	51613	8	5		16			
14	5	3692	52442	10	-48		47			
15	1	736	53236	4	88		-37			
15	2	1091	53591	12	97		-26			
15	3	1608	54108	8	97		-13			
15	4	2369	54869	9	58		15			
15	5	3233	55733	11	36	X	-70	X	IN	X
16	1	714	56964	4	3	X	65	X		
16	2	1251	57501	3	-60		94			
16	3	2094	58344	11	-24		-71			
16	4	2283	58533	2	-26		-53		OUT	
16	5	3077	59327	7	-61		53			
17	1	318	60318	9	82	X	41			
17	2	867	60867	0	-36		65			
17	3	1731	61731	9	-67		46		IN	
17	4	2618	62618	8	36		24			
17	5	3728	63728	1	-52		51			
18	1	476	64226	3	97		-74			
18	2	1324	65074	2	91	X	-48	X		
18	3	2020	65770	2	33		64		IN	
18	4	2917	66667	1	11		-88			
18	5	3412	67162	9	-75		54			
19	1	196	67696	5	10		46			
19	2	1301	68801	4	-46	X	-57	X	OUT	
19	3	1815	69315	7	1		-25			
19	4	2428	69928	7	53		85			
19	5	3446	70946	4	61		-41			
20	1	591	71841	8	-8		-24			
20	2	1018	72268	0	17	X	57	X		
20	3	1789	73039	0	75		-76			
20	4	2644	73894	12	56		76		OUT	
20	5	3096	74346	5	39		-95			

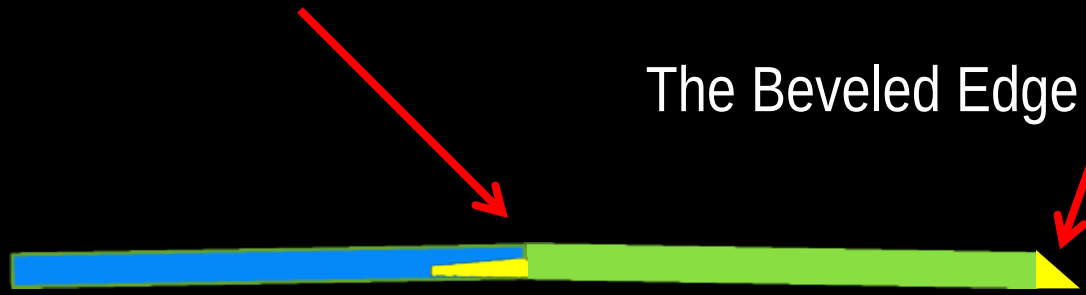
Date: 2/24/2014

** For Joint Density Column, OUT=Outside Edge (0' Offset) and IN=Inside Edge (Ex. 12' offset on 12' Roadway) See Special Provisions for Joint Density Requirements*

Notched Wedge & Beveled Edge

The Notched Wedge at Centerline

The Beveled Edge on outside Edge



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The Notched Wedge

NOTCHED WEDGE JOINT

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NOTCHED WEDGE JOINT

NOTCHED WEDGE JOINT

The Beveled Edge

BEVELED EDGE

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BEVELED EDGE

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Thin Lift Overlays - SLX

Thin Lift Overlays - SLX

- 300 Miles
- 13 Projects
- All 8 Districts

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Thin Lift Overlays - SLX

- 1 Inch thickness
- ¼ “ Minus Aggregate
- PG 64-34
- 20-35% Fractionated RAP

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Thin Lift Overlays - SLX

- More coming soon !

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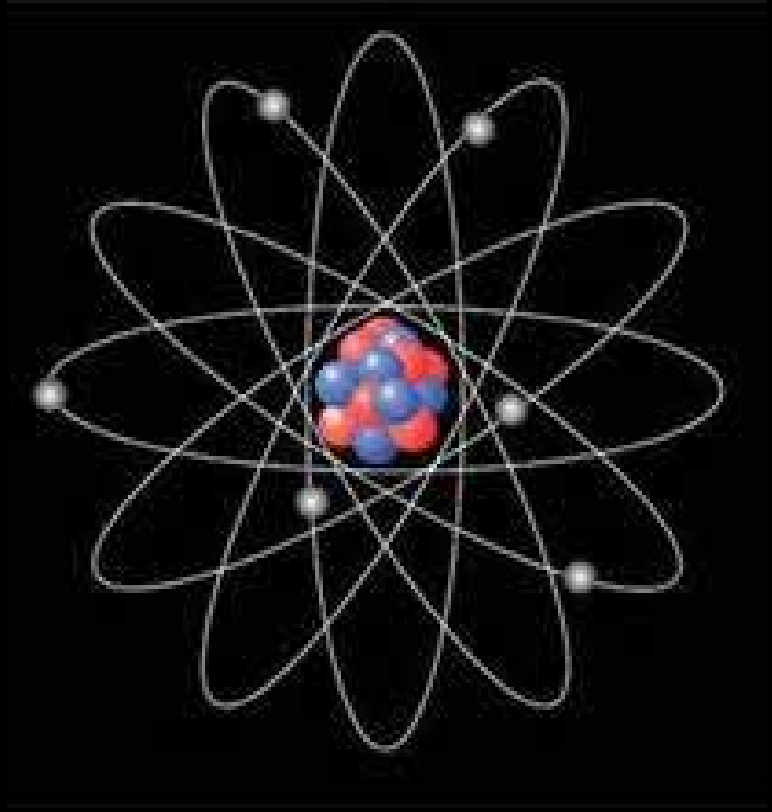
Non-Nuclear Testing

NDOR Going Non-Nuclear



- PQI (Asphalt Density)

- LWD (Soils Density)

Pavement Quality Indicator (PQI)

- Test run according to AASHTO TP 68 and as directed
- First 3 density locations on project cored for correction factor, every 15th density after that
- Average of 5 readings at each location:

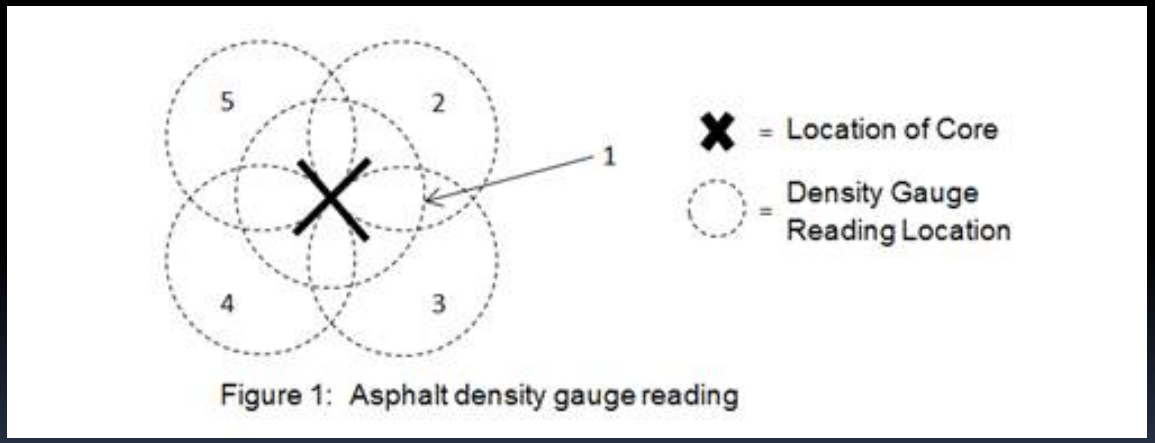
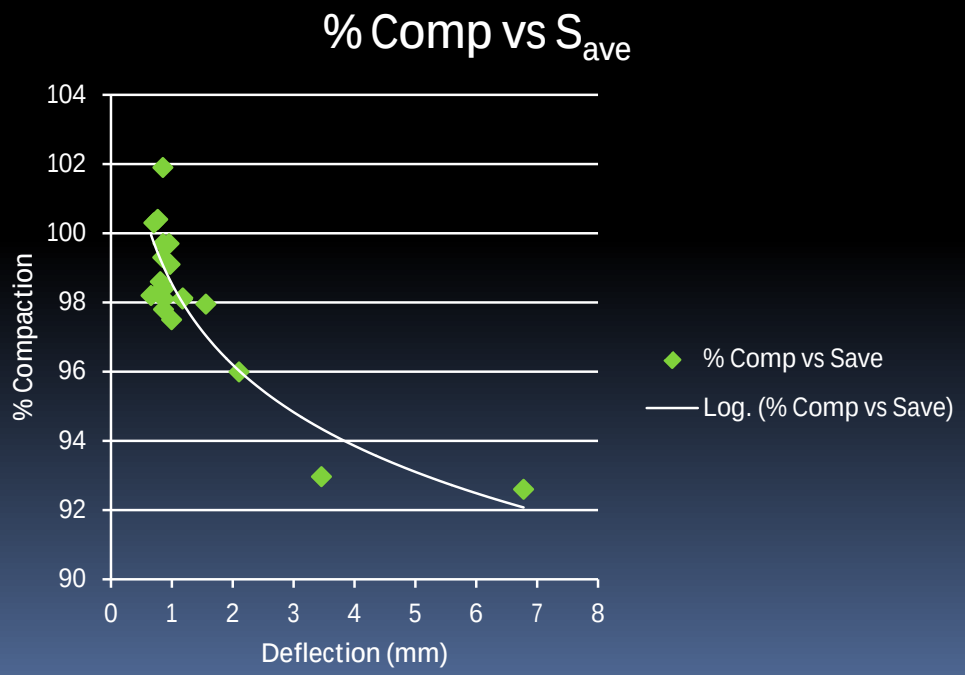


Figure 1: Asphalt density gauge reading

- Any density reading below 90% will require a core cut to be used for density at that location

Lightweight Deflectometer (LWD)

- Non-Nuclear
- Testing and Acceptance based on Moisture and Deflection
- Each District in 2013
- Implementation over next 2 years



Soil Moisture Testing Kit

Warm Mix Asphalt Update

WMA Update

2014

- 85% of Projects utilized WMA
  - Over 1.5 Million Tons

- 95% Evotherm
- 5% Water-Foaming

WMA Update

- New Approved Additive: Cecabase RT 945
  - Chemical Additive – Similar to Evotherm
- Utilized on Hwy. 75 – Decatur South

<u>Approved Additives:</u>

- Zeolite
- Sasobit
- Evotherm
- Akzonobel Rediset
- Cecabase RT 945

- Water Injection

New Type “SRM” Mix

SRM – Special (Warm) Reclamation Mix

SRM

- SRM = **S**pecial (Warm) **R**eclamation **M**ix
- Used on Roads as base in lieu of Hydrated Lime Slurry Stab. or Cold Foam
- Typically placed 4-5" in one lift
- Allows for 35%-65% RAP
- Coarser Mix (High Strength Modulus)
  - Min. of 10% Crushed Rock (3/4" with max. of 20% passing the #4 Sieve)

	Control Points (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**
3/4 inch (19 mm)	92.0	98.0
3/8 inch (9.5 mm)	80.0	92.0
No. 8 (2.36 mm)	42.0	60.0
No. 50 (300 µm)	10.0	22.0
*No. 200 (75 µm)	4.0	12.0

- Min. FAA of 42, CAA of 65, Dust to Binder of .7-1.9
- Target Air Void of 2.5%, 65 Gyration, 4.5 Min. Binder
- 0.9% WMA Additive Required
- Initial compaction can start at 200F or above

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- Hot Pour Sealers
- Expansion Joints – Bridge Deck Overlays
- Thin Lift Overlays - SLX
- HFE-300/HFE-1000 Demo

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Hot Pour Sealers

Hot Pour Sealers

Sealant Selection Chart

	NE - 101	NE - CR18B	NE - 3405	NE - 3405LM
Bituminous Pavement				
Cracks	X	X	X	X
Best when majority of cracks are longitudinal. (Tracking and Pullout Issues)	X	X		
Selection by crack width dimension. (Routing is recommended for cracks up to 3/8")	UP TO 3/8"	MORE THAN 3/8"	UP TO 1/2" ROUTING IS REQUIRED FOR THESE TWO TYPES. ROUT FOR ANY TYPE TO 1/2" WIDE AND 3/4" - 1" DEPTH.	
Concrete Pavement				
Cracks and Joints			X	X
For all cracks over 1/4" wide, remove old crack sealer and all foreign material by sand or air blasting. Full depth of edge surfaces need to be dry and clean.			OTHER PRACTICES ROUT TO 1/2" MIN. WIDE AND 5/8" MIN. DEPTH. (ONLY WITH NEWER PAVEMENT) SAWCUT CRACKS LESS THAN 1/4" WIDE.	
Longitudinal Joint of Mainline to Bituminous Shoulder		X		
Viscosity: Low = thin, High = thick	MEDIUM	MED. - HIGH	MED. - LOW	LOW

- Eliminated CR22
- 4 Sealers Available
- Most Common are CR-18B and NE 3405

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Expansion Joints – Bridge Deck Asphalt Membrane Overlays

Asphalt Bridge Deck Membrane

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Asphalt Bridge Deck Membrane

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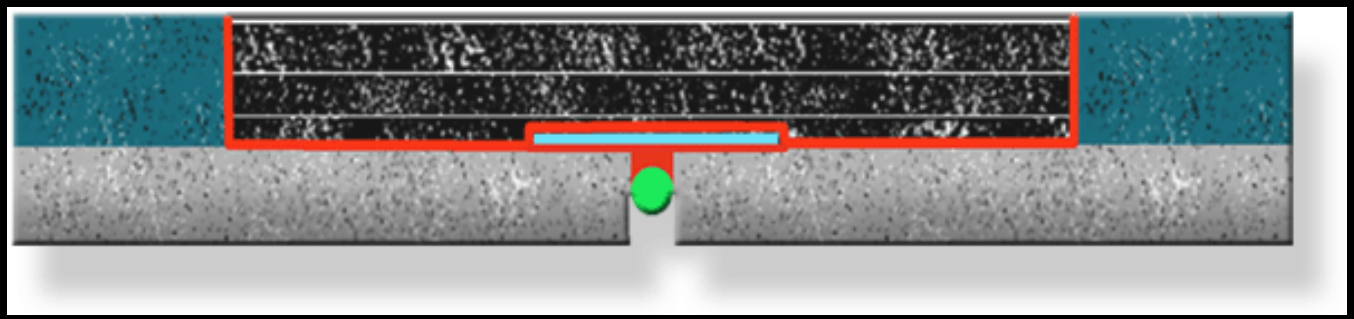
Asphalt Bridge Deck Membrane



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Asphalt Bridge Deck Membrane

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Bridge Deck Membranes

Asphalt Bridge Deck Membrane

300 + Bridges over next 2 years

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Asphalt Bridge Deck Membrane

2 Options:

1) Prep with Primer
2) Hot Applied

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Looking at going back to allowing pick up machines ?

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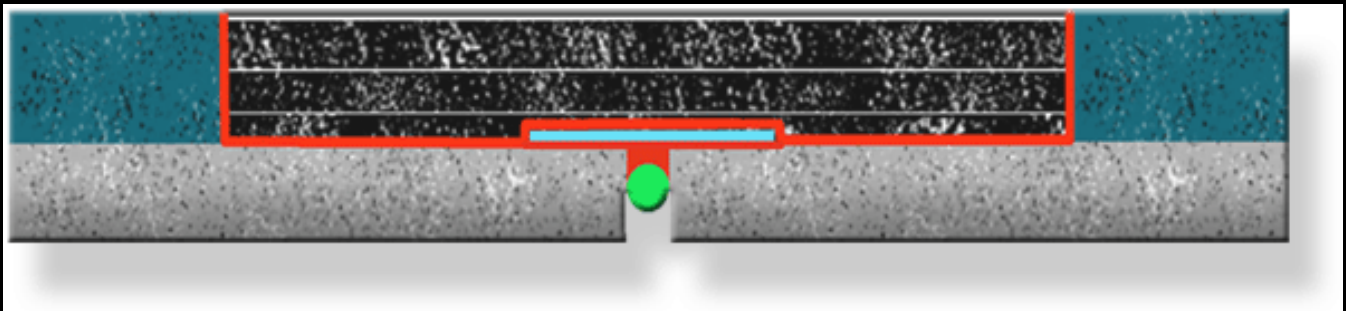
Asphalt Bridge Deck Plug Joint



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Asphalt Bridge Deck Plug Joint

On Project or District Wide ???

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2015 Research Areas of Study

UNL Research Group out on project

Tack Coat Research

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Tack Coat Research

- Emulsions
- Emulsifiers
- Cut Rates
- Hot Applied PG Binders
- Bonding
- Cohesion
- Adhesion

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AGC
SKILL RESPONSIBILITY INTEGRITY

U.S. Department of Transportation
Federal Highway Administration

Thin Lift SLX vs Standard Lifts of SPH

- ¾ to 1 inch lifts
- Compare 2 inch
- Life Cycle
- Better fit for overlays that have continuous Concrete Repair Problems

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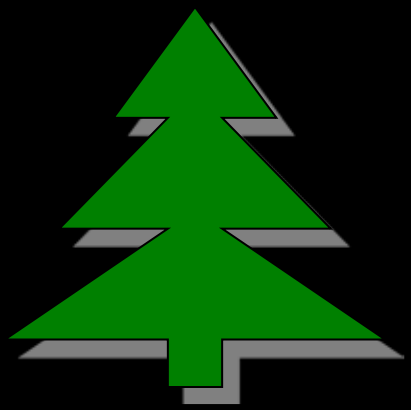
Federal Highway Administration

Rejuvenators for use in Hot Mix and RAP intensive Mixes

1. Natural Bio-Mass Product
   Name: Hydrogreen



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Federal Highway Administration

Rejuvenators for use in Hot Mix and RAP intensive Mixes

2. Petroleum Based
   Maltene Phase Balancer
   Name: Hydrolene

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Federal Highway Administration

Rejuvenators for use in Hot Mix and RAP Mixes

3. Agricultural Based Product – Highly Refined Soybeen Oil
   Producer: Cargill / ADM

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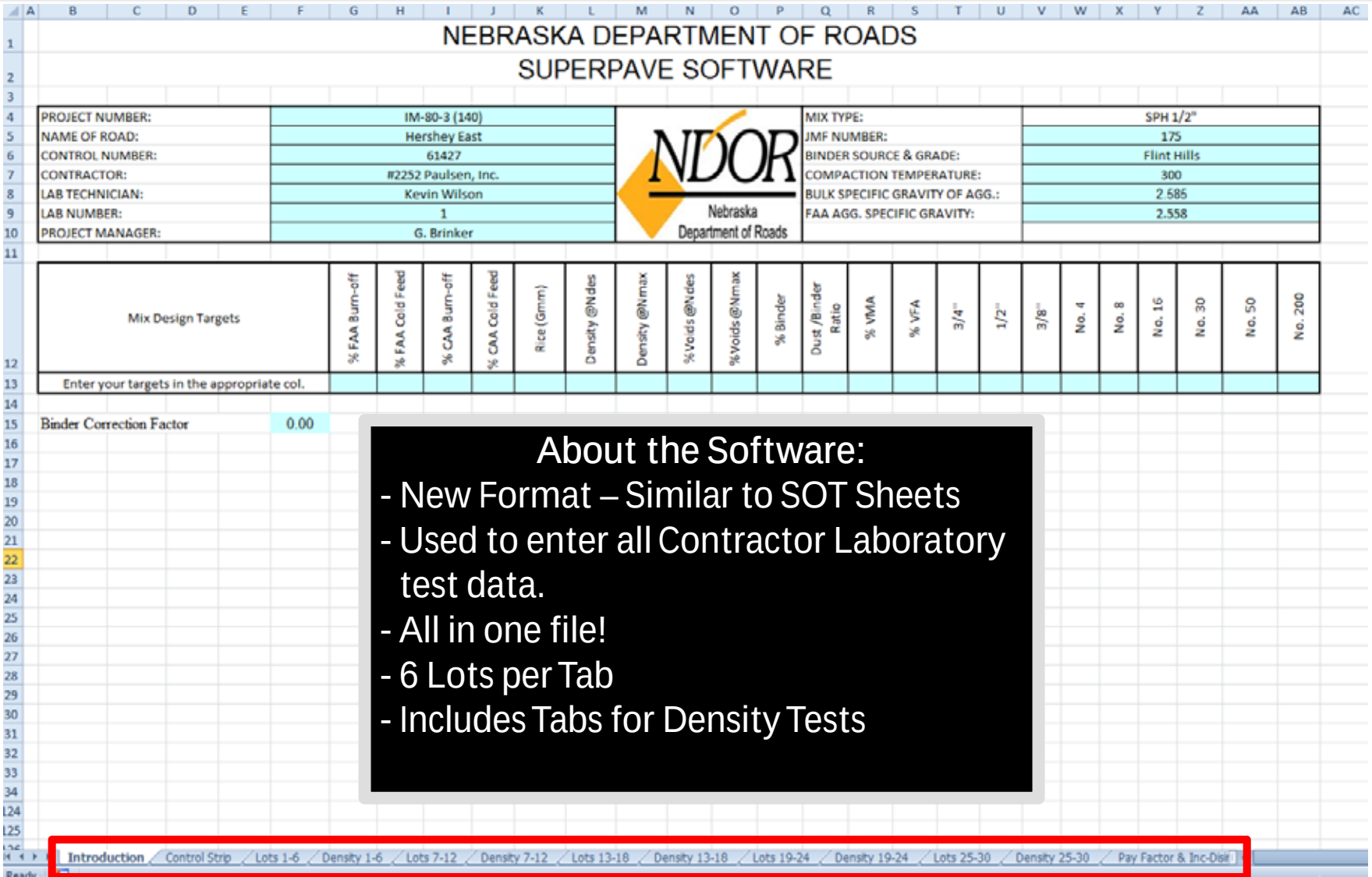
U.S. Department of Transportation Federal Highway Administration

2015 SuperPave Software

2015 Superpave Software



NEBRASKA DEPARTMENT OF ROADS

SUPERPAVE SOFTWARE

PROJECT NUMBER:	IM-80-3 (140)	MIX TYPE:	SPH 1/2"
NAME OF ROAD:	Hershey East	JMF NUMBER:	175
CONTROL NUMBER:	61427	BINDER SOURCE & GRADE:	Flint Hills
CONTRACTOR:	#2252 Paulsen, Inc.	COMPACTION TEMPERATURE:	300
LAB TECHNICIAN:	Kevin Wilson	BULK SPECIFIC GRAVITY OF AGG.:	2.585
LAB NUMBER:	1	FAA AGG. SPECIFIC GRAVITY:	2.558
PROJECT MANAGER:	G. Brinker		

NDOR Nebraska Department of Roads

Mix Design Targets	% FAA Burn-off	% FAA Cold Feed	% CAA Burn-off	% CAA Cold Feed	Rice (Gmm)	Density @Ndes	Density @Nmax	%Voids @Ndes	%Voids @Nmax	% Binder	Dust /Binder Ratio	% VMA	% VFA	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 200
Enter your targets in the appropriate col.																						

Binder Correction Factor 0.00

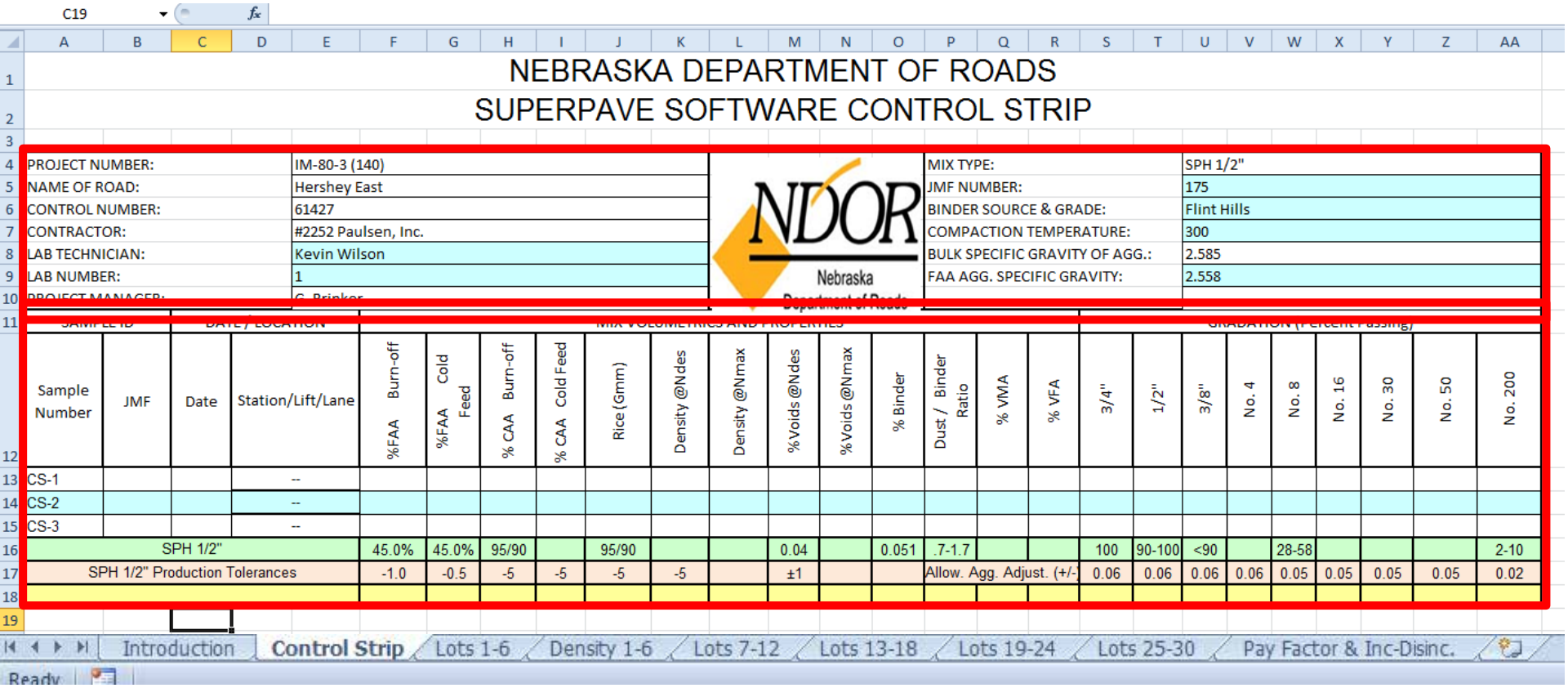
About the Software:

- New Format – Similar to SOT Sheets
- Used to enter all Contractor Laboratory test data.
- All in one file!
- 6 Lots per Tab
- Includes Tabs for Density Tests

Introduction | Control Strip | Lots 1-6 | Density 1-6 | Lots 7-12 | Density 7-12 | Lots 13-18 | Density 13-18 | Lots 19-24 | Density 19-24 | Lots 25-30 | Density 25-30 | Pay Factor & Inc-Disi

2015 Superpave Software

Control Strip



NEBRASKA DEPARTMENT OF ROADS
SUPERPAVE SOFTWARE CONTROL STRIP

PROJECT NUMBER:	IM-80-3 (140)	MIX TYPE:	SPH 1/2"
NAME OF ROAD:	Hershey East	JMF NUMBER:	175
CONTROL NUMBER:	61427	BINDER SOURCE & GRADE:	Flint Hills
CONTRACTOR:	#2252 Paulsen, Inc.	COMPACTION TEMPERATURE:	300
LAB TECHNICIAN:	Kevin Wilson	BULK SPECIFIC GRAVITY OF AGG.:	2.585
LAB NUMBER:	1	FAA AGG. SPECIFIC GRAVITY:	2.558
PROJECT MANAGER:	G. Brinker		

Sample Number	JMF	Date	Station/Lift/Lane	%FAA Burn-off	%FAA Cold Feed	% CAA Burn-off	% CAA Cold Feed	Rice (Gmm)	Density @Ndes	Density @Nmax	%Voids @Ndes	%Voids @Nmax	% Binder	Dust / Binder Ratio	% VMA	% VFA	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 200
CS-1			--																						
CS-2			--																						
CS-3			--																						
SPH 1/2"				45.0%	45.0%	95/90		95/90			0.04		0.051	.7-1.7			100	90-100	<90		28-58				2-10
SPH 1/2" Production Tolerances				-1.0	-0.5	-5	-5	-5	-5		±1			Allow. Agg. Adjust. (+/-			0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.02

Introduction | Control Strip | Lots 1-6 | Density 1-6 | Lots 7-12 | Lots 13-18 | Lots 19-24 | Lots 25-30 | Pay Factor & Inc-Disinc.

Ready

NEBRASKA DEPARTMENT OF ROADS
SUPERPAVE SOFTWARE LOTS 1-6 SUMMARY

PROJECT NUMBER:	IM-80-3 (140)	MIX TYPE:	SPH 1/2"
NAME OF ROAD:	Hershey East	INITIAL JMF:	175
CONTROL NUMBER:	61427	INITIAL BINDER SOURCE & GRADE:	Flint Hills
CONTRACTOR:	#2252 Paulsen, Inc.	INITIAL COMPACTION TEMPERATUR	300
LAB TECHNICIAN:	Tony Dietz	BULK SPECIFIC GRAVITY OF AGG.	2.585
LAB NUMBER:	2	FAA AGG. SPECIFIC GRAVITY	2.558

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SAMPLE ID		DATE / LOCATION		MIX VOLUMETRICS AND PROPERTIES													GRADATION (Percent Passing)								
Sample Number	JMF	Date	Station/Lift/Lane	%FAA Burn-off	%FAA Cold Feed	%CAA Burn-off	%CAA Cold Feed	ice (Gmm)	Density @Ndes	Density @Nmax	%Voids @Ndes	%Voids @Nmax	% Binder	Dust / Binder Ratio	% VMA	% VFA	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 200
Mix Design Targets																									
Sublot 1-1	175	10/1/14	3564+00-1st-EBPL	44.4		97/92		2.424	2.385	2.399	1.6	1.0	5.26	0.8	12.6	87.0	100.0	91.6	86.5	74.8	47.8	32.4	23.0	15.6	4.0
Sublot 1-2	175	10/1/14	3620+00-1st-	44.4		96/91		2.441	2.378	2.395	2.6	1.9	5.1	1.0	12.7	79.7	100.0	94.9	92.4	82.3	54.3	36.6	25.9	17.6	5.3
Sublot 1-3	175	10/1/14	3642+58-1st-EBPL	44.4		96/92		2.551	2.368	2.389	7.2	6.4	4.97	1.0	13.0	44.6	100.0	93.8	89.8	78.6	52.0	34.9	24.5	16.5	4.9
Sublot 1-4	175	10/1/14	3684+83-1st-EBPL	44.4		96/92		2.442	2.370	2.391	3.0	2.1	5.1	1.0	13.0	77.2	100.0	93.1	89.2	78.4	51.8	35.0	24.8	16.7	5.0
Sublot 1-5	175	10/2/14	3734+66-1st-EBPL	44.4	45.2	95/91	96/93	2.446	2.373	2.394	3.0	2.1	5.21	1.0	13.0	77.2	100.0	94.5	89.1	80.1	53.9	36.1	25.6	17.5	5.4
Sublot 2-1	175	10/2/14	3790+21-1st-EBPL	44.4	45.0	96/92	96/93	2.449	2.370	2.391	3.2	2.4	5.18	1.0	13.1	75.3	100.0	94.8	89.8	80.6	55.3	37.6	26.7	18.0	5.3
Sublot 2-2	175	10/2/14	3862+49-1st-EBPL	44.5		95/91		2.444	2.371	2.392	3.0	2.1	5.05	1.0	12.9	77.0	100.0	95.3	89.8	80.0	53.4	35.9	25.5	17.2	5.2
Sublot 2-3	175	10/3/14	3552+15-1st-EBDL	44.4		95/91		2.443	2.364	2.385	3.2	2.4	5.24	1.0	13.3	75.7	100.0	95.6	89.5	75.1	55.9	37.8	26.5	17.8	5.2
Sublot 2-4	175	10/3/14	3598+25-1st-EBDL	44.4		96/92		2.450	2.365	2.385	3.5	2.6	4.97	1.0	13.1	73.5	100.0	95.1	89.6	80.7	53.6	35.8	25.4	17.1	5.1
Sublot 2-5	175	10/4/14	3700+23-1st-EBDL	44.4		96/92		2.442	1.015	1.024	58.4	58.1	5.19	1.1	62.8	6.9	100.0	94.6	89.5	78.7	53.4	36.1	25.6	17.5	5.5
Sublot 3-1	175	10/4/14	3735+04-1st-EBDL	44.4		95/92		2.443	2.370	2.389	3.0	2.2	5.13	1.0	13.0	77.3	100.0	94.4	89.6	79.6	52.9	35.5	25.2	17.5	5.1
Sublot 3-2	175	10/4/14	3766+35-1st-EBDL	44.4	45.1	95/91	96/91	2.446	2.374	2.393	3.0	2.2	5.185	1.0	12.9	77.1	100.0	94.7	89.4	80.2	55.4	37.7	27.1	18.8	5.4
Sublot 3-3	175	10/4/14	3865+85-1st-EBDL	44.4		95/92		2.448	2.373	2.392	3.1	2.3	5.15	1.0	12.9	76.3	100.0	94.1	88.8	78.4	52.5	35.8	25.6	17.6	5.2
Sublot 3-4	175	10/6/14	309+74-1st-EBOFF	44.5		95/91		2.436	2.351	2.374	3.5	2.5	5.14	0.9	13.7	74.6	100.0	94.6	89.7	81.8	54.9	36.1	24.6	16.1	4.8
Sublot 3-5	175	10/6/14	312+70-1st-EBOFF	44.6		95/91		2.440	2.354	2.375	3.5	2.7	5.17	1.0	13.6	74.2	100.0	94.7	89.6	79.8	52.8	35.4	24.7	16.7	5.0
SPH 1/2"				45.0%	45.0%	95/90	95/90				0.04		0.051	.7-1.7			100	90-100	<90		28-58				2-10
SPH 1/2" Production Tolerances				-1.0	-0.5	-5	-5				±1			Allow. Agg. Adjust. (+/-			0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.02

AASHTO T30, T168, T209, T245, T269, T304, T308, T283, T312, D3821

All Specifications are minimums, except for Air Voids and Gradations.

Lab Calculations 1-1

PROJECT NUMBER:	IM-80-3 (140)	MIX TYPE:	SPH 1/2"
NAME OF ROAD:	Hershey East	JMF NUMBER:	175
CONTROL NUMBER:	61427	BINDER SOURCE & GRADE:	Flint Hills
CONTRACTOR:	#2252 Paulsen, Inc.	GYR. COMPACTION TEMPERATURE:	300
LAB TECHNICIAN:	Kevin Wilson	BULK SPECIFIC GRAVITY OF AGG.	2.585
LAB NUMBER:	1	FAA AGG. SPECIFIC GRAVITY	2.558
STATION NUMBER:	3564+00 DATE: 10/1/2014	LIFT:	1st LANE: EBPL

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Gyratory Bulk Gravity

Wt. Air	4748.1
Wt. SSD	4750.6
Wt. Water	2771.7
Volume	1978.9
Gmb	2.399

Maximum Mix Gravity

Container and Mix w	2013.9
Container in air	0.0
Mix in Air	2013.9
Container/mix in wate	2538.1
Container in water	1354.9
Mix in water	1183.2
Mix Volume	830.7
Gmm	2.424

Gmm	Gmb	D/B	%VMA	%VFA
2.424	2.399	0.76	12.6	87.0

Fine Aggregate Angularity (FAA)

	Burn-off		Cold Feed	
Cylinder Volume	100.0			
Cylinder Weight	0.0			
Specific Gravity	2.558			
Cyl. & Agg. Wt. #1	141.9	44.5		
Cyl. & Agg. Wt. #2	142.5	44.3		
Average FAA		44.4		

Coarse Aggregate Angularity (CAA)

	Burn-off		Cold Feed	
	Wt.	%	Wt.	%
Sample Wt.	320.0			
1 fractured face	309.0	97		
2 fractured face	297.0	92		

Grad. Sample Wt:	1273.4		
Sieve	Wt., gm	% Ret.	% Pass
1"		0.0	100.0
3/4"	0.0	0.0	100.0
1/2"	106.9	8.4	91.6
3/8"	171.8	13.5	86.5
# 4	320.4	25.2	74.8
# 8	664.5	52.2	47.8
#16	860.5	67.6	32.4
#30	980.1	77.0	23.0
#50	1074.5	84.4	15.6
#100	1147.2	90.1	9.9
# 200	1222.6	96.0	4.0

	Ht mm	Gmb	%Gmm	%Air Voids
N initial =	121.2	2.233	92.1	7.9
N design =	113.5	2.385	98.4	1.6
N max =	112.8	2.399	99.0	1.0

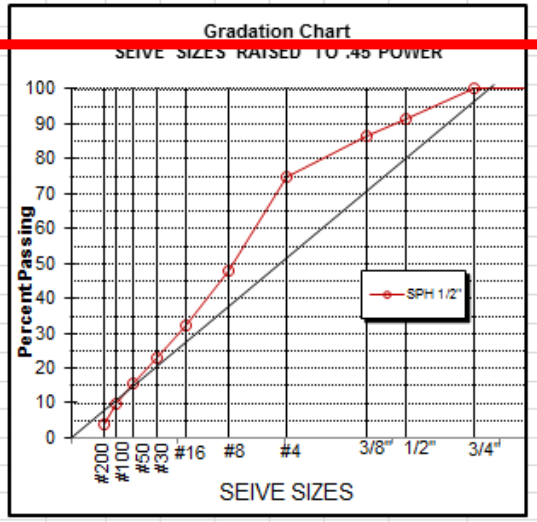
Burn Off Oven Results

Calibrated Binder Content	5.26	From Ticket
Correction Factor	0.00	
Total Binder Content	5.26	

DO NOT fill in unless directed by NDOR.

NDOR Air Void Results:					
NDOR Binder Results:					
NDOR Dust/Binder Results:				One	Two
NDOR FAA Results:	Burn		CAA Burn:		
NDOR FAA Results:	CF		CAA CF:		

Gradation Chart



Remarks: Remarks. SB

Lab Calculations 1-2

Density Results

Field Report of Density Tests for Asphalt

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Nebraska Department of Roads

Project:	IM-80-3 (140)	Control No.	61427
Location:	Hershey East	Mix Type	SPH 1/2"
Type of Work:	Mainline	JMF #	175

Gauge Model	Beveled Edge	Notched Wedge Joint	Rolling Pattern: 2 Static, 2 Vibratory, 1 Static
SF-101	Not Used on	Not Used on Project	

	Lot Average of 5 Density					Joint Density
Date	10/2/2014	10/2/2014	10/2/2014	10/2/2014	10/3/2014	10/2/2014
Lot/Sublot Number	1-1	1-2	1-3	1-4	1-5	1-1
Gmm (Rice SG)	2.424	2.441	2.441	2.442	2.446	2.424
Voidless Density (Rice SG x 62.3)	151.02	152.07	152.07	152.14	152.39	151.02
Req. % of Voidless Den	92.5	92.5	92.5	92.5	92.5	90.0
Station	3564+14	3719+35	3643+00	3685+00	3735+00	3564+14
Offset (ft) from edge Lt/Rt Centerline	8' Rt.	0' Rt.	3' Rt.	4' Rt.	4' Rt.	Out
Thickness	2.0	2.0"	1.9"	2.0"	1.8"	1.8
Lift (Bottom, Top, etc	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
	Density Cores					
A) Weight in Air	1741.5	1819.5	1777.4			1493.1
B) S.S.D. Weight	1742.5	1821.8	1779.0			1495.2
C) Weight in Water	972.1	979.5	995.4			823.4
D) Roadway Core SG (A/(B-C))	2.261	2.160	2.268			2.223
E) Roadway Core Density (D) x 62.3	140.83	134.58	141.31			138.46
% of Voidless Density	93.3	88.5	92.9			91.7
	Field Report of Density Tests for Asphalt (Density Gauge)					
Density 1 (lb/ft³)	143.2	140.6	141.1	142.6	143.6	141.8
Density 2 (lb/ft³)	142.5	141.0	142.2	142.2	143.1	142.4
Density 3 (lb/ft³)	143.3	140.7	142.2	142.1	144.0	141.7
Density 4 (lb/ft³)	142.0	140.5	142.4	142.8	143.1	141.4
Density 5 (lb/ft³)	142.7	141.7	142.6	142.3	143.1	141.8
Average Density	142.74	140.90	142.10	142.40	143.38	141.8
Correction Factor (+/-)	-1.70	-1.70	-1.70	-1.70	-1.70	-3.40
Corected Density	141.04	139.20	140.40	140.70	141.68	138.40
% of Voidless Density	93.4	91.5	92.3	92.5	93.0	91.6
	Field Report of Nuclear Density Tests for Asphalt					
Density Standard Cour						
Density 1 (lb/ft³)						
Density 2 (lb/ft³)						
Average Density						
Correction Factor (+/-)						
Corected Density						
% of Voidless Density						
	Final Density Calculations					
Edge Density?	No	Yes	No	No	No	Unconfined Edge
Final Density	93.4	92.5	92.3	92.5	93.0	91.6
Lot Average	92.7					----------
Pay Factor	1.00					1.02

Notes:

Contractor:	#2252 Paulsen, Inc.	Technician:	Kevin Wilson
Inspector:	D. Clouatre	Proj. Manager:	G. Brinker

Distribution: Project Manager, QA Manager, District Engineer, Materials & Research Division

Beveled Edge, Notched Wedge Joint, Edge Density, and Confined/Unconfined Edge boxes must be filled if for Pay Factor to calculate correctly.

Pay Factor and Incent/Dis.

NEBRASKA DEPARTMENT OF ROADS
SUPERPAVE SOFTWARE PAY FACTOR SUMMARY

PROJECT NUMBER:	IM-80-3 (140)
NAME OF ROAD:	Hershey East
CONTROL NUMBER:	61427
CONTRACTOR:	#2252 Paulsen, Inc.
MIX TYPE:	SPH 1/2"
PROJECT MANAGER:	G. Brinker

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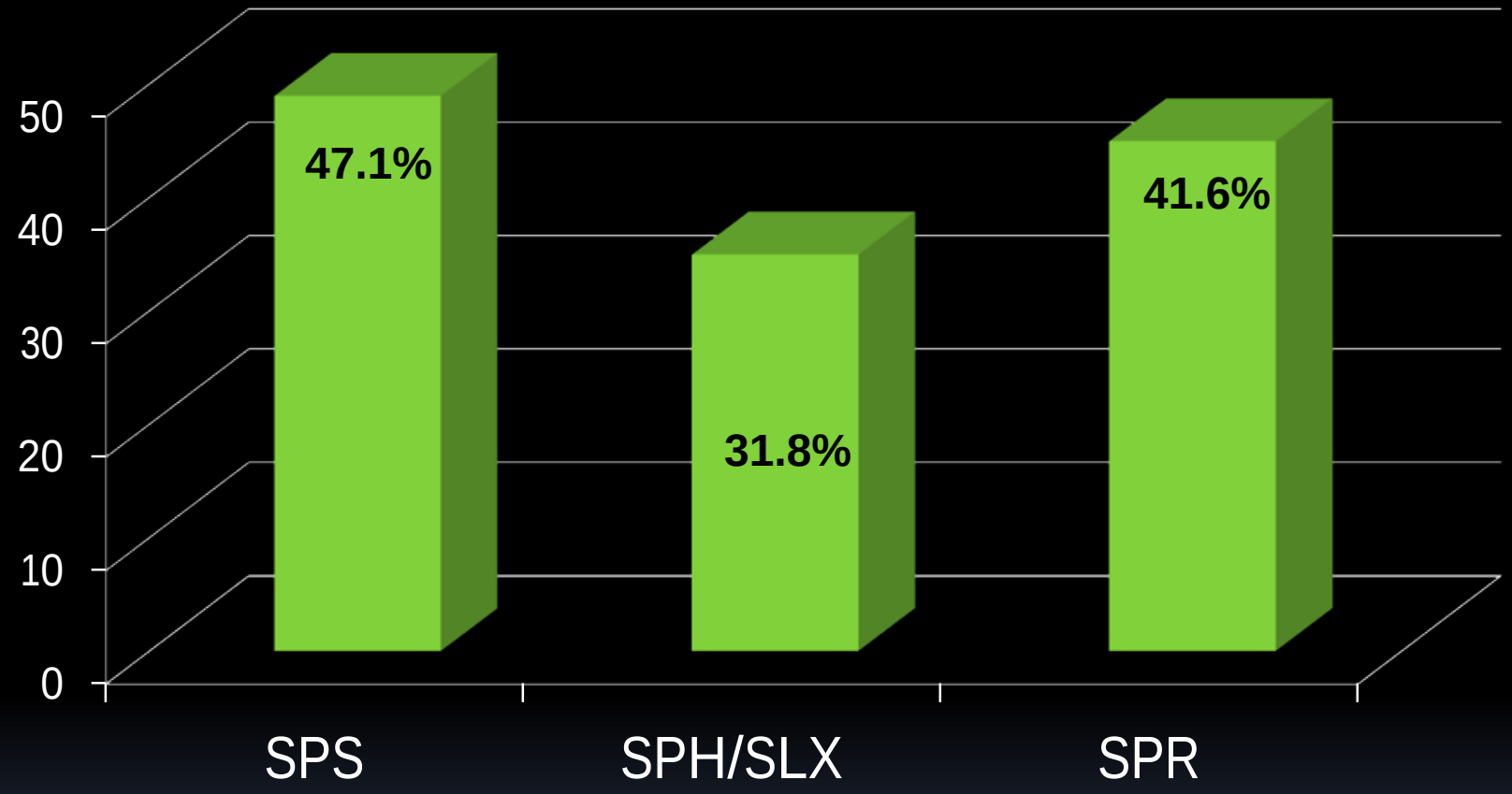
Asphaltic Concrete Unit Price:	$38.2700
Incentive/Disincentive %	2.68
Incentive/Disincentive $/Ton	$2.3300
Total Tons	11250.0
Incentive/Disincentive Total, $	$26,212.50

		TEST RESULTS										PAY FACTORS %										INCENTIVE/DISINCENTIVE			
Sample Number	Date	Ndesign Voids	4 Test Ave. @ Ndesign	Density Individual	Density Lot Average	Joint Density	FAA	CAA One Face	CAA Two Face	% Binder	Dust /Binder Ratio	Ndesign Voids	4 Test Ave. @ Ndesign Voids	Density	Joint Density	FAA	CAA	% Binder	Dust/Binder	Production Specs Total	Sub Lot Pay Factor	Sub Lot Tons	Cumulative Incentive/ Disincentive %	Individual Adjustment ($/Ton)	Cumulative Adjustment ($/Ton)
Control Strip		See Control Strip Tab for Results																							
Sublot 1-1	10/1/14	2.9		93.4			44.4			5.3	0.8	0.95	1.00	1.00	1.02	1.0		1.0	1.0	1.02	96.90%	750	-3.10%	-1.19	-1.19
Sublot 1-2	10/1/14	2.6		92.5			44.4			5.1	1.0	0.95	1.00	1.00	1.02	1.0		1.0	1.0	1.02	96.90%	750	-3.10%	-1.19	-1.19
Sublot 1-3	10/1/14	4.0		92.3			44.4			5.0	1.0	1.04	1.00	1.00	1.02	1.0		1.0	1.0	1.02	106.08%	750	-0.04%	2.33	-0.02
Sublot 1-4	10/1/14	3.0	3.1	92.5			44.4			5.1	1.0	1.00	1.00	1.00	1.02	1.0		1.0	1.0	1.02	102.00%	750	0.47%	0.77	0.18
Sublot 1-5	10/2/14	3.0	3.1	93.0	92.7	91.6	44.4	96	93	5.2	1.0	1.00	1.00	1.00	1.02	1.0	1.0	1.0	1.0	1.02	102.00%	750	0.78%	0.77	0.30
Sublot 2-1	10/2/14	3.2	3.3	92.5			44.4	96	93	5.2	1.0	1.00	1.00	1.00	1.02	1.0	1.0	1.0	1.0	1.02	102.00%	750	0.98%	0.77	0.38
Sublot 2-2	10/2/14	3.0	3.0	94.0			44.5			5.1	1.0	1.00	1.00	1.00	1.02	1.0		1.0	1.0	1.02	102.00%	750	1.13%	0.77	0.43
Sublot 2-3	10/3/14	3.2	3.1	94.0			44.4			5.2	1.0	1.00	1.00	1.00	1.02	1.0		1.0	1.0	1.02	102.00%	750	1.23%	0.77	0.47
Sublot 2-4	10/3/14	3.5	3.2	93.9			44.4			5.0	1.0	1.04	1.00	1.00	1.02	1.0		1.0	1.0	1.02	106.08%	750	1.77%	2.33	0.68
Sublot 2-5	10/4/14	3.7	3.4	93.4	93.6	92.5	44.4			5.2	1.1	1.04	1.00	1.00	1.02	1.0		1.0	1.0	1.02	106.08%	750	2.20%	2.33	0.84
Sublot 3-1	10/4/14	3.0	3.3	93.8			44.4			5.1	1.0	1.00	1.00	1.00	1.02	1.0		1.0	1.0	1.02	102.00%	750	2.19%	0.77	0.84
Sublot 3-2	10/4/14	3.0	3.3	93.5			44.4	96	91	5.2	1.0	1.00	1.00	1.00	1.02	1.0	1.0	1.0	1.0	1.02	102.00%	750	2.17%	0.77	0.83
Sublot 3-3	10/4/14	3.1	3.2	93.4			44.4			5.2	1.0	1.00	1.00	1.00	1.02	1.0		1.0	1.0	1.02	102.00%	750	2.16%	0.77	0.83
Sublot 3-4	10/6/14	3.5	3.1	94.8			44.5			5.1	0.9	1.04	1.00	1.00	1.02	1.0		1.0	1.0	1.02	106.08%	750	2.44%	2.33	0.93
Sublot 3-5	10/6/14	3.5	3.3	93.7	93.9	97.5	44.6			5.2	1.0	1.04	1.00	1.00	1.02	1.0		1.0	1.0	1.02	106.08%	750	2.68%	2.33	1.03

Density 1-6 | Lots 7-12 | Density 7-12 | Lots 13-18 | Density 13-18 | Lots 19-24 | Density 19-24 | Lots 25-30 | Density 25-30 | Pay Factor & Inc-Disinc.

Post Consumer Recycle Savings from RAP in 2014

Ø Average % RAP in 2014 (by Mix)



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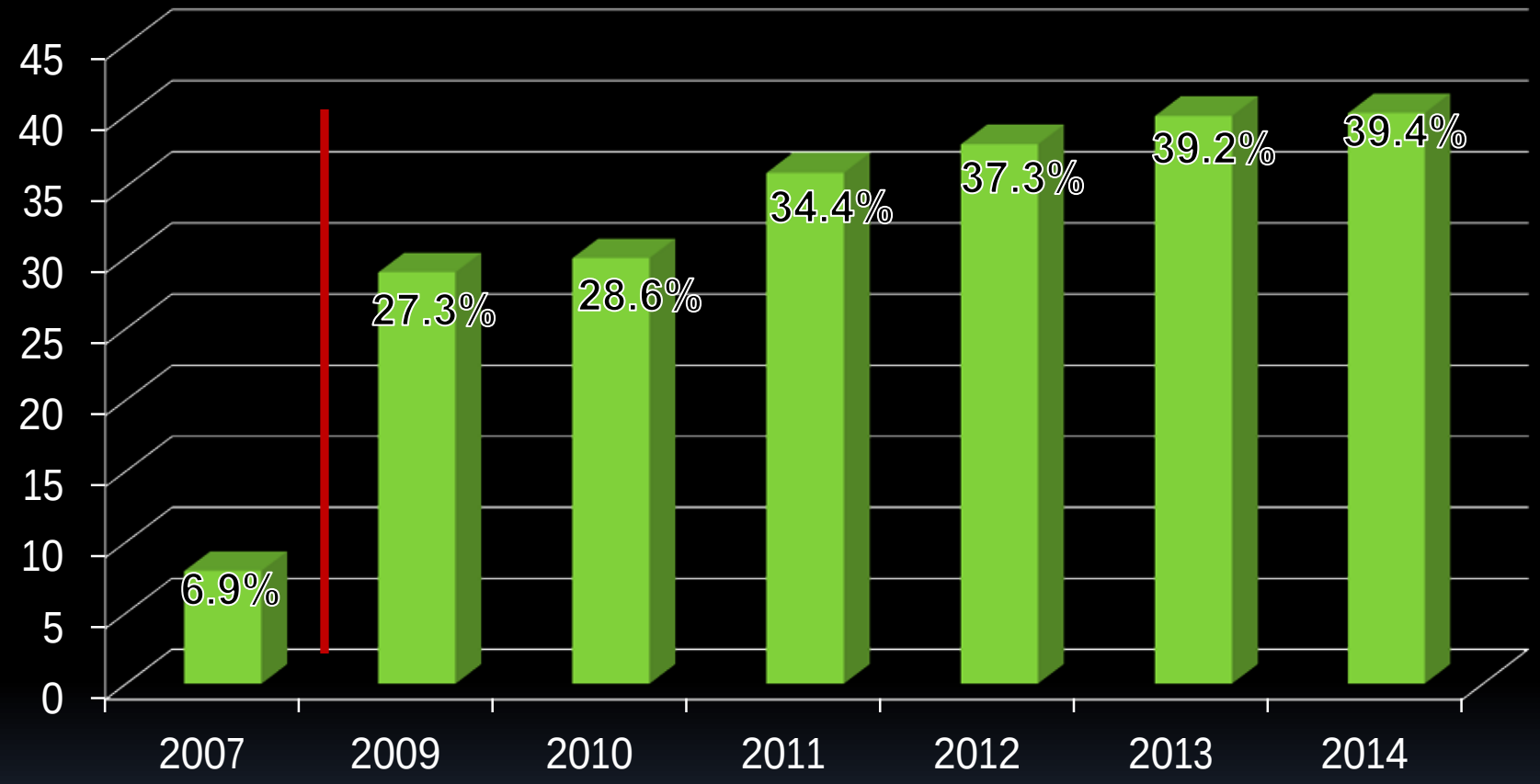
Ø Average RAP Contents (Overall)



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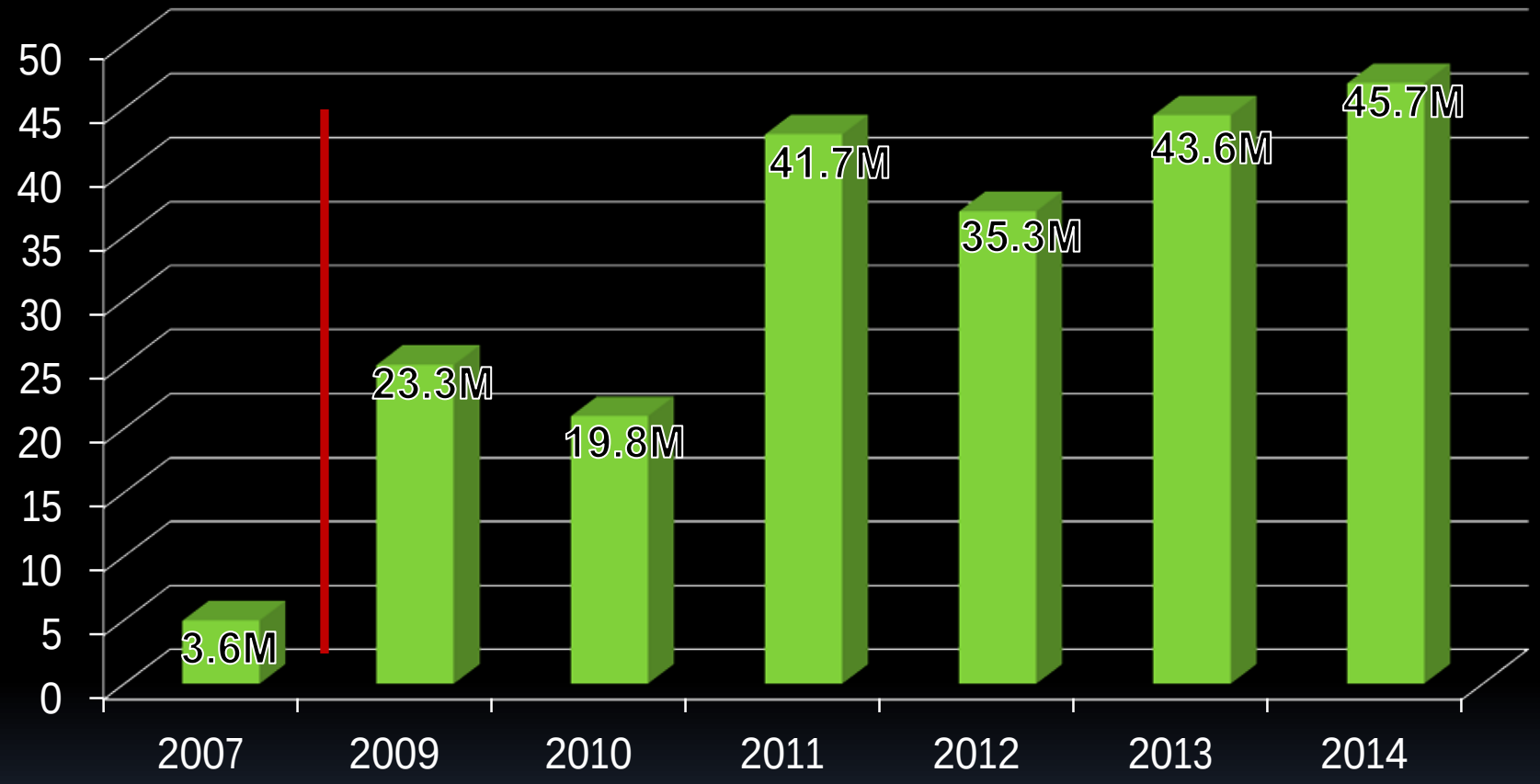
Ø RAP Savings ($ millions)



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Projected Asphalt Tons in 2015

Ø Projected Tons in 2015 (1,000 tons)

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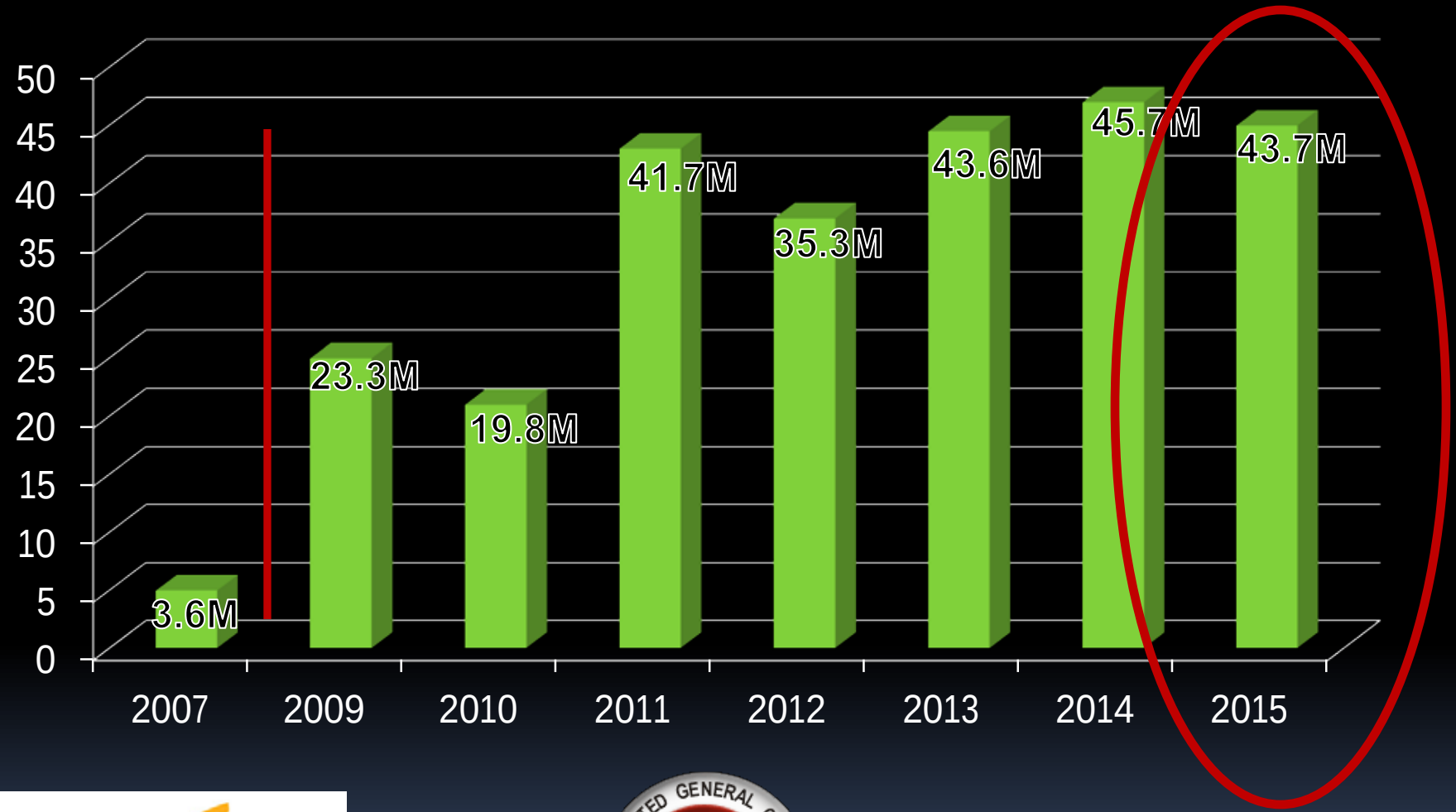
Projected Savings in 2015

Ø Projected RAP Savings ($ millions)



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On Project Plan Sets in 2014

Project Raw Materials (Tons)

2,344,281

Post Consumer Recycle Content in Project Raw Materials (Tons)

901,294

Post Consumer Recycle Content

38%

Estimated Value of Post Consumer Content Recycled

$43,693,552

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Questions
&
Open Discussion

Updates

Longitudinal Joint Density
Notched Wedge and Beveled Edge
Thin Lift Overlay – SLX
Non-Nuclear Testing
Warm Mix Update

New Topics

SRM Mix
Hot Pour Sealers
Bridge Deck Membranes
Superpave Software
UNL Research