

Hawbaker's Warm Experiences

**Presented at NEAUPG
October 8, 2009
South Portland, Maine**



GLENN O. HAWBAKER INC.

Heavy Construction Services & Products



Background...

- Early spring of 2008, we met with Gencor representatives about their Foaming System.
- In April, two Ultrafoam units were ordered.
- May 15, 2008 apparent low bidder on a PennDOT WMA Pilot Project.
- Dan Hawbaker, CEO says “Do it...do it right, and show everybody how it can be done”.

Be the Lead Dog... the view is better.



2008 Warm Mix Bid Data

Dist.	Let Date	Course	Bid Qty.	Bid Price	Contractor
2-0	5/15/08	WMA Wearing	1,976 Tons	\$83.00/Ton	Glenn O. Hawbaker, Inc.
		HMA Wearing	5,678 Tons	\$54.00/Ton	
3-0	4/17/08	WMA Wearing	1,584 Tons	\$85.00/Ton	HRI, Inc.
		HMA Wearing	2,416 Tons	\$56.60/Ton	
8-0	4/17/08	WMA Wearing	48,375 SY	\$7.00/SY	Pennsy Supply, Inc.
		HMA Wearing	N/A	N/A	
12-0	5/1/08	WMA Wearing	3,220 Tons	\$75.00/Ton	The Lane Construction Corp.
		HMA Wearing	1,830 Tons	\$62.00/Ton	

District 2 – SR 2012 Centre Co.

Prime Contractor:



- Paving deferred until 2009
- Requires 4 of 5 different technologies be used
- 1621 ADT

Getting Started With Gencor's foaming system



- Installed and ran 30 ton of mix through plant to see what would happen...





...and it was still black,
Good start!

and Warm.



What's next?

- How do we use our new toy?
 - Produce material and test it by Paving driveways?
 - Try some bigger “Private/Commercial” jobs?
- Lets make people aware that we can do this!
 - How?
- We asked Dave Newcomb from NAPA to come and give a presentation at the Local Council of Government luncheon meeting. Provided handouts and hands-on samples.

Warm Mix Asphalt

The Future of Flexible Pavements

Central
Pennsylvania
Local Governments
August 27, 2008

Invited PennDOT and Local transportation officials to an Open house.



Went to see the material...





Moving forward with Warm Mix Asphalt





- SR 879 Clearfield County
- Temporary Bridge Runaround
- November 10, 2008



34.5 degrees when paving started



Gathering Field Data

379

	Load Time	Arrival Time	Ticket Temp.	Delivered Temp.
Truck 1	7:21	9:35	NA	240°
Truck 2	7:27	9:10	256°	224°
Truck 3	7:31	9:14	270°	233°
Truck 4	7:48	9:18	256°	228°
Truck 5	7:54	9:22	256°	230°
Truck 6	8:01	9:26	269°	229°
Truck 7	8:26	9:49	262°	223°
Truck 8	8:33	9:56	249°	231°
Truck 9	8:40	10:02	256°	237°
Truck 10	8:53	10:10	256°	227°
Truck 11	9:00	10:15	250°	222°
Truck 12	9:16	10:19	263°	247°
Truck 13				
Truck 14				
Truck 15				
Truck 16				
Truck 17				

Paver Type CAT AP655

Roller Type Bomag 266 (10 ton)

Roller Type Bomag 266 (10 ton)

Compacted Thickness 4 1/2"

Type of Material 25mm Mix 107

Total Tons 815 Ton "± or -"

Comments - Observations 8:35 am Air-Temp on Job 34.5°

All Temps taking by Heat GUN

MTD and GOH Extraction results

25mm <0.3 ESAL PG64-22 15% RAP

Loose box samples collected behind the paver.

		PennDOT Lab			GOH	PD-Lab	GOH	PD-Lab	GOH		
Sieve	JMF	Sublot 1	Sublot 2	Sublot 3	Comp.3	Sublot 4	Comp. 4	Sublot 5	Comp. 5	PD-avg	GOH-avg
200	3.5	4	4.1	4.3	4.6	3.7	4.7	3.6	3.1	3.9	4.1
100	5	5	5	6	6	5	6	5	4	5	5
50	7	6	6	7	7	6	7	6	5	6	6
30	11	8	9	9	9	7	9	8	10	8	9
16	16	12	12	13	13	10	13	11	14	12	13
8	22	18	19	20	22	17	21	16	21	18	21
4	36	29	31	33	37	28	38	26	34	29	36
3/8 "	55				60		58		54		57
1/2"	65	53	61	61	69	58	70	49	63	56	67
3/4"	82	67	72	76	81	71	86	62	81	70	83
1"	96	85	82	88	93	91	96	78	93	85	94
1.5"	100	100	100	100	100	100	100	100	100	100	100
AC	4.4	4.1	4.2	4.4	4.6	4	4.7	3.7	4.3	4.08	4.53



Production vs. Delivered Temps



Warm Mix Pilot Centre County, PA

Project ECMS # 82737 Group 2-08-ST12

May and June 2009



GLENN O. HAWBAKER INC.

Heavy Construction Services & Products®



Sasol Wax
Wax is all we do. So we do it best.
Sasobit®



U.S. Department of Transportation
Federal Highway Administration



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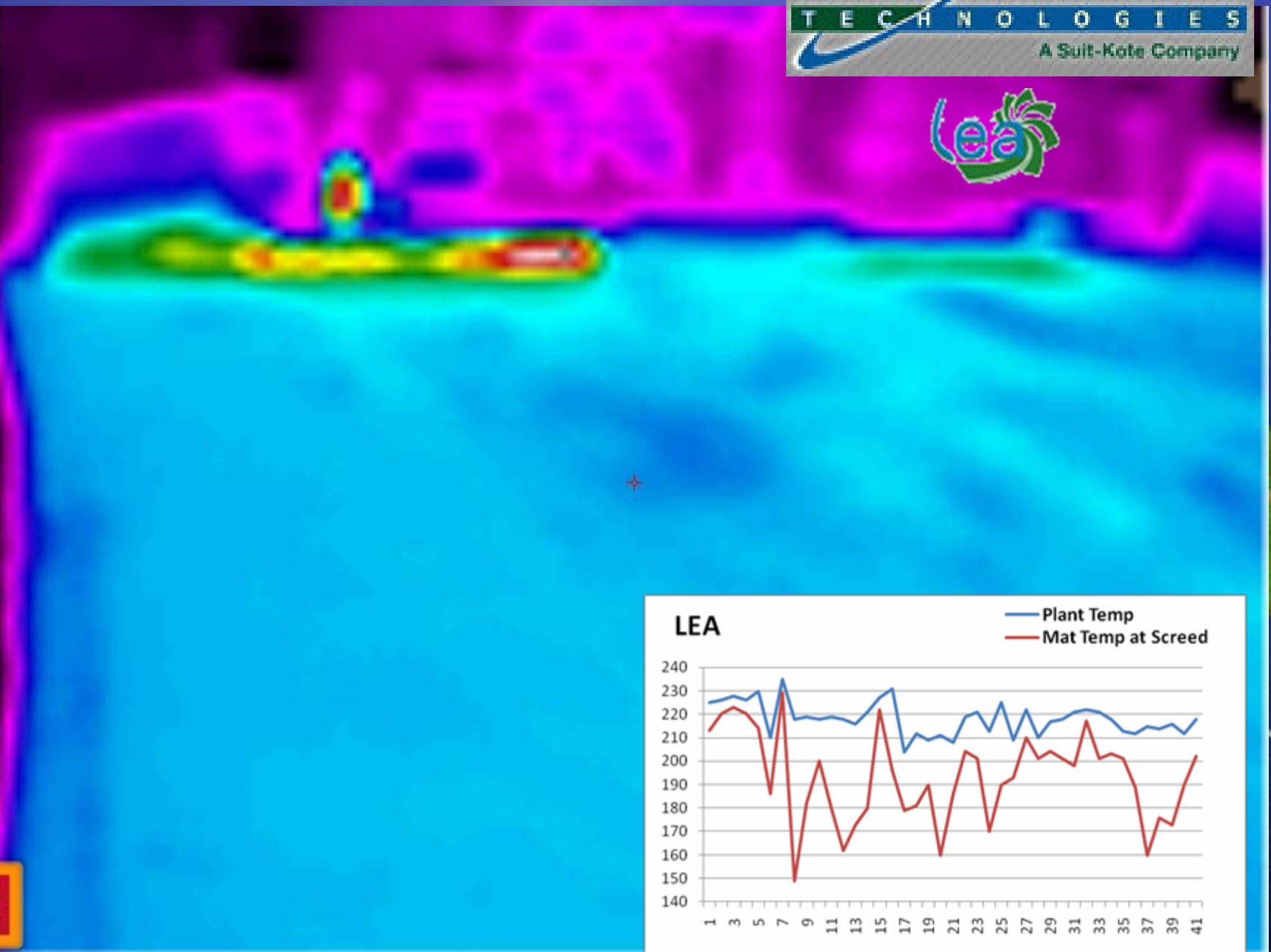
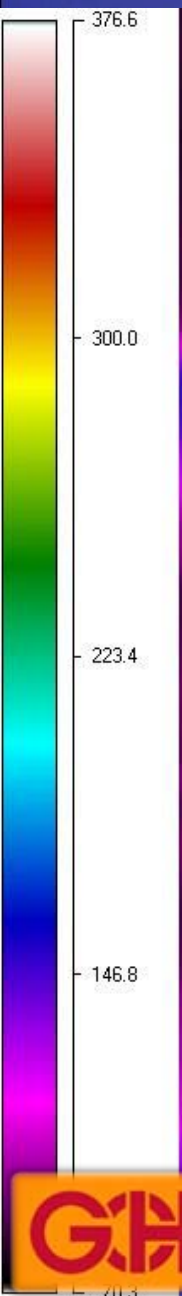
Low Emission Asphalt

Sui-Kote



A Revolutionary
Mix of Asphalt
Technology
and "Green"
Science.





LEA

— Plant Temp
 — Mat Temp at Screed





Advera WMA

Warm Mix Asphalt



Advera WMA

Warm Mix Asphalt

Benefits:

- Improves compaction of water mixes
- Increased RAP content
- Extends haul distances
- Extends paving season
- Reduces blue smoke/dust at the plant and jobsite
- Reduces fuel consumption
- Reduces emissions 60% at plant and jobsite

Advantages:

- Effective mix workability at the plant and jobsite over a broad temperature range
- No mix design change is needed
- Use with all asphalts
- Inorganic technology - GRAS (Generally Recognized as Safe) with the EPA

Manufacturing Sites:

- Augusta, GA
- Jeffersonville, IN
- Kansas City, KS
- South Korea
- Thailand



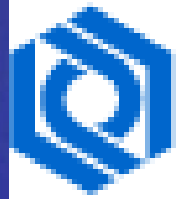
What is Advera WMA?

Advera WMA is an aluminosilicate or hydrated zeolite powder.

Properties:

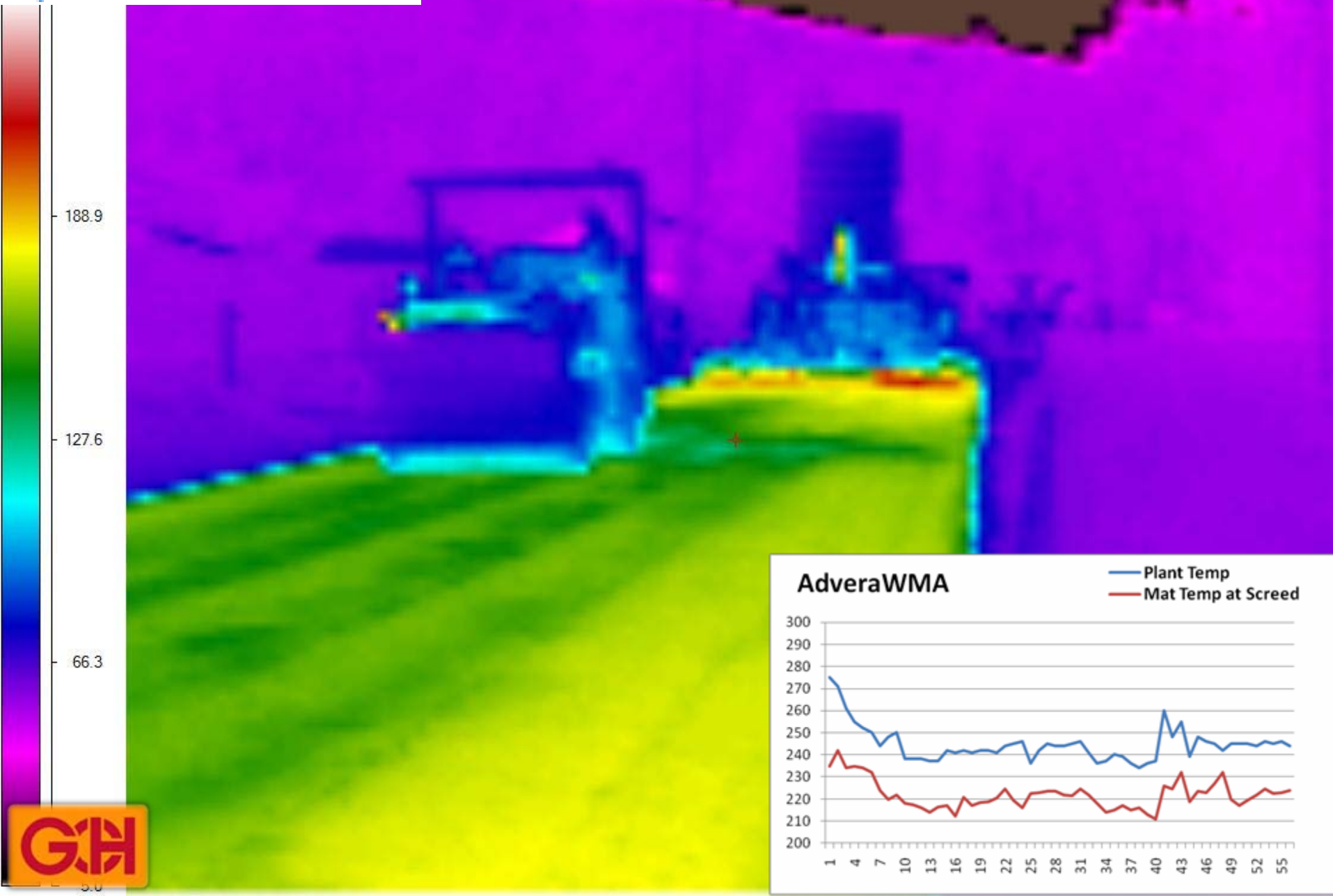
- Free Flowing Powder
- White to Grey
- 100% wt %





PQ Corporation





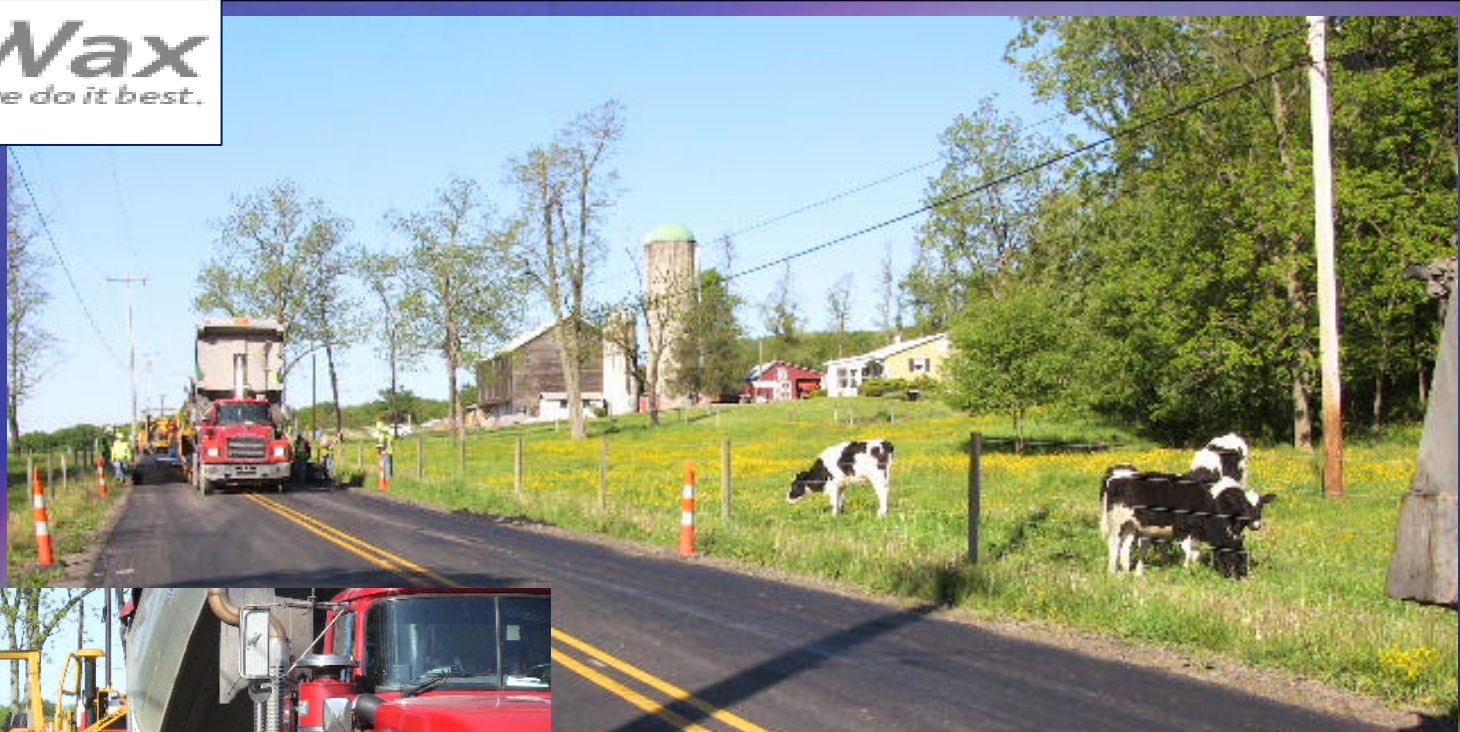
Warm-Mix Asphalt

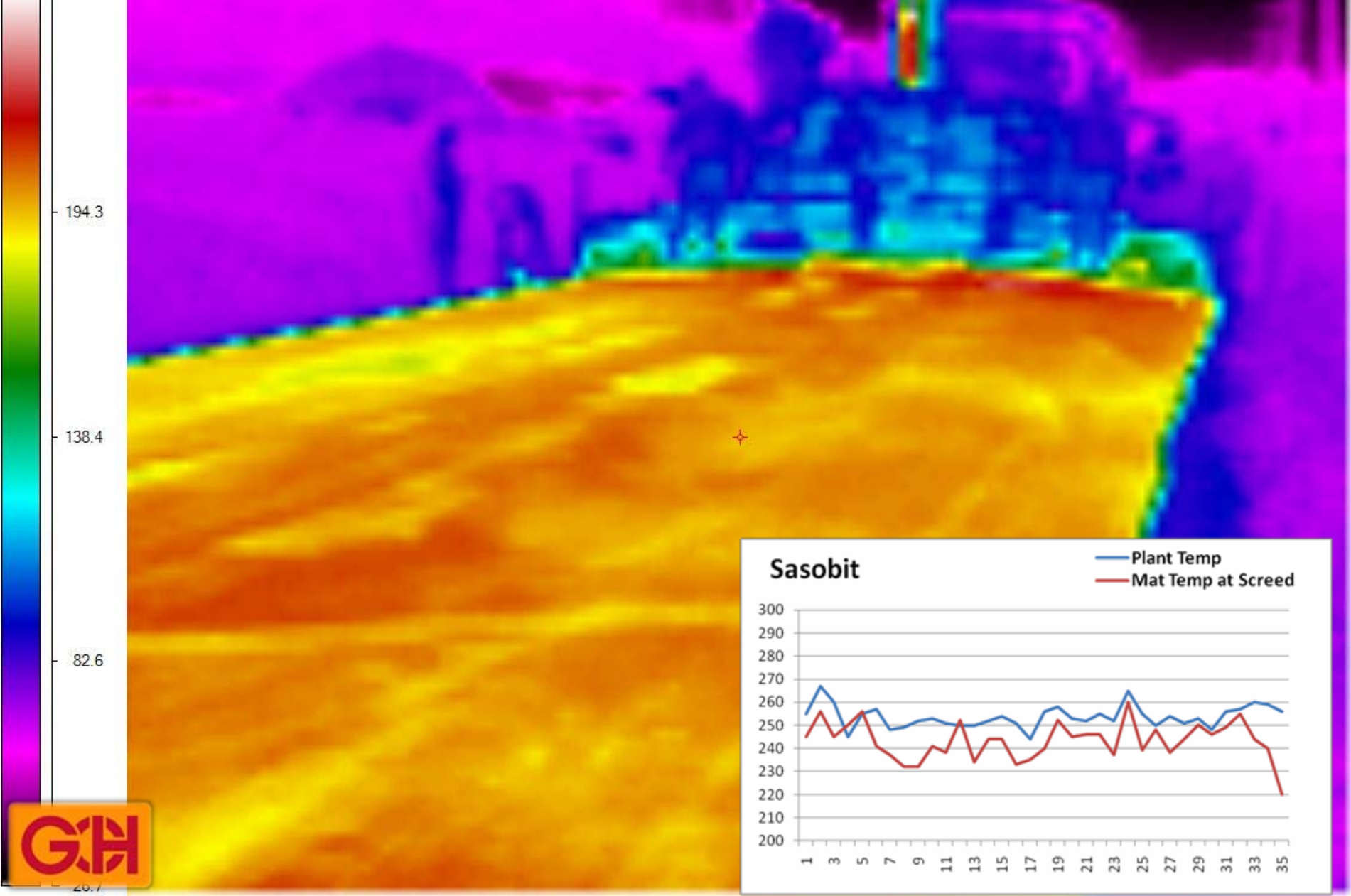
Sasobit®

W4
Sasobit
#16

Sasol Wax

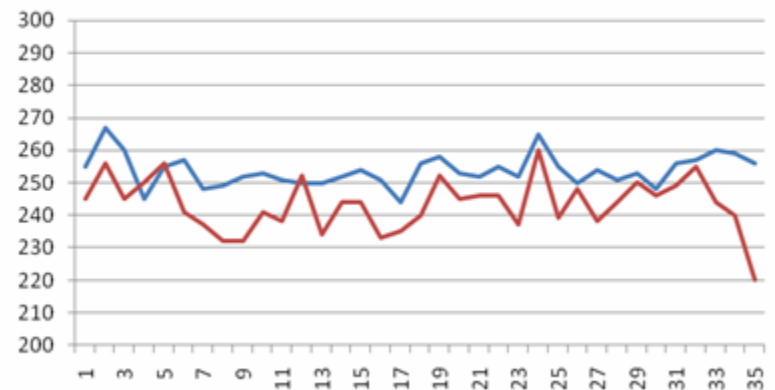
Wax is all we do. So we do it best.





Sasobit

— Plant Temp
— Mat Temp at Screed



THE GREEN MACHINE

Ultrafoam GX System

TO GET GREEN, VISIT: WWW.GH.COM

BACKGROUND

Foaming of Asphalt Cement and placing it on hot aggregate is certainly not a new process. In the early 70's, the Boeing Construction Equipment Company, later known as Bituma Corporation, patented a number of processes for warm foam mixtures which later became known as "turbulent mass mixers" which achieved great commercial success. Hundreds of thousands of tons of foamed warm asphalt were laid utilizing this process, and as a result, foaming of asphalts was demonstrated as an effective means of reducing viscosity and mix temperatures without affecting mix quality.

One of the most economical and environmentally friendly techniques is to introduce some water into the process to cause the AC to foam. The foaming results when the hot AC contacts the water causing conversion to a steam while being contained within the asphalt cement in the form of small bubbles. The process of foaming aids in uniform distribution of the AC across the aggregate surfaces to obtain maximum coating and temporarily lower the AC viscosity, improving the coating and workability of the mixture at lower temperatures. To

hold the steam in the AC foam, the AC must retain enough viscosity



EQUIPMENT

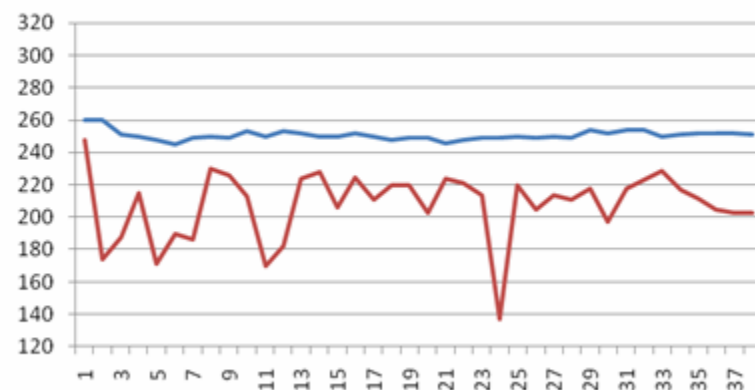
The Ultrafoam GX™ system includes the special Gencor foaming generator which can be easily bolted to a 3" or 4" existing asphalt injection line going to the drum mixer. The Ultrafoam GX™ is hot oil jacketed for proper heat retention and includes (two) hot oil jumpers. A variable speed drive (VFD) and positive displacement water pump are mounted on a unitized skid which includes an inlet strainer, pressure switch, relief valve, flow meter, and steam hose. Other components consist of a 1/2" NPT outlet line.





Gencor

— Plant Temp
— Mat Temp at Screed



187.6

152.9

118.2

83.5



Testing...







2008 Warm Mix Bid Data

Dist.	Let Date	Course	Bid Qty.	Bid Price	Contractor
2-0	5/15/08	WMA Wearing (4 technologies) x=	1,976 Tons (494 tons)	\$83.00/Ton	GOH
	5 / 18 / 09	Advera WMA	1366.91	Tonnages actually placed in 2009. "Hot Mix" quantities from other Wearing courses lessened to have a better representation for the Warm Mix Technologies.	
	5 / 19 / 09	Sasobit	850.08		
	6 / 4 / 09	LEA	1014.58		
	6 / 8 / 09	Gencor	954.77		
		Total WMA =	4186.34		
	5/29/09	Control HMA	869.61		



Moving forward...



Warm-Mix Asphalt





DUBOIS WARM MIX TEST RESULTS

09-105W 19MM .3-3 15% RAP

EXTRACTION AVG. OF 35 TESTS

	Pb	200	100	50	30	16	8	4	3/8	1/2	3/4	1
AVG.	4.43	4.8	6	8	11	17	28	45	68	80	96	100
DESIGN	4.4	4	6	8	12	18	28	45	69	79	95	100

EXTRACTION AVG. OF 10 BOX SAMPLES

	Pb	200	100	50	30	16	8	4	3/8	1/2	3/4	1
AVG.	4.54	5.4	7	9	12	18	29	47	69	81	96	100
DESIGN	4.4	4	6	8	12	18	28	45	69	79	95	100

AVG. OF 33 TESTS

	Gmm	VOIDS	Gmb	VMA	VFA
AVG.	2.524	5.1	2.402	16.4	68
DESIGN	2.518	4.0	2.417	14.0	71

AVG. TEMP. # OF TEMPS. STATE TONS PRODUCED

253.4	319	22103.65
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Myths;
Roadblocks;
Problems;

Unknowns.





NCHRP 09-43 [Active]
Mix Design Practices for Warm
Mix Asphalt



Foaming
systems add
too much
water to the
mix.



- 300 ton of mix x 6.0% ac
 - 18 liquid ton x ~1.25%
 - Equals 450 lbs. water
 - Or...54 gallons
- 

- Allowable moisture in completed mix = $< 0.5\%$.
- 300 ton of mix x 0.5% = 3000 Lbs. of water
- Or...360 gallons.

– Almost **7** of these.



Warm Mix Asphalt...

- **Too much Good for this “Not” to happen!**
 - Better Air Quality
 - Better Energy efficiency
 - Better performance
 - Better-Easier Compaction
 - Better Working Conditions
 - Allows for the easier use of Higher RAP percentages



Keep on
Paving
Forward

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Heavy Construction Services & Products

