

# Successful Marketing of Pavement Preservation Techniques

How to make them work for you!

JUN 23 2

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## TXI



- 2002 – Current, TXI Highway Sales/Marketing Manager; Lightweight Aggregate Division
- 2003 -2005 TxAPA Seal Coat Committee Chairman
- 2003-Current TxDOT/TxAPA Advisory Sub Committee Liaison
- 2003-Current TxDOT/TxAPA Seal Coat Program Coordinator
- 1998 – 2001, Lion Oil Company, Ergon Asphalt and Emulsions. Area Sales Manager TX-LA
- 1993 – 1998, TxDOT District Maintenance Superintendent, Bryan District
- 1989 – 1993, TxDOT District Seal Coat Project Manager, Tyler District
- Industry Affiliations- TxDOT, TxAPA, TACERA, NACE, TCJCA, LTRC, LADOTD, LAPA, AGC of TX, TPPC, TTI, CTR, ISSA



“Good judgment comes from experience; experience comes from bad judgment”.



-Wise Old Indian Proverb

# Keys to Successful Pavement Preservation

- Knowing what matters most to the customer, the end user and the agency that is paying the bill!
- Understand the expectations of your chip seal.
- Cost
  - Chip and Fog Seal Economics
    - The cost effect of aggregate size
    - Emulsions vs. AC Binders
  - Cost Comparison to other Treatments
    - Surface treatment options, i.e. chip, strip, edge and fog

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# Seal Coat Economics

- Assumptions: 20 mile program @ 24' wide is 281,600 square yards.
- Aggregate Spread Rates:
  - Grade 3(1/95), Grade 4(1/110), Grade 5(1/125)
  - Grade 3=5/8", Grade 4=1/2", Grade 5=3/8"
- Asphalt Rates:
  - .50; Grade 3, .40; Grade 4, .30; Grade 5

## Economics (cont')

- Aggregate Volumes and Costs:

- 2,964 CY's Grade 3=\$74,100
- 2,560 CY's Grade 4=\$64,000  
(-\$10,100) (-404 CY) 3 down to 4
- 2,253 CY's Grade 5=\$53,325  
(-\$7,675) (-307 CY) 4 down to 5  
(-\$17,775) (-711 CY) 3 down to 5

Assume that aggregate costs \$25 per CY.

Add \$7-\$15 per CY for Pre-Coating when AC binders are used.

# Economics (cont')

- Asphalt Volumes:
  - .50 for Grade 3, 140,800 gals.(\$211,200)
  - .40 for Grade 4, 112,640 gals.(\$168,960)
    - -\$42,240 (3 to 4)
  - .30 for Grade 5, 84,480 gals. (\$126,760)
    - -\$42,200 (4 to 5), -\$84,440 (3 to 5)

Assume that emulsion costs \$1.50 per gallon

## Economics (cont')

- Seal Coat Material Budget - \$200,000
  - 14.2 mile program with Grade 3
  - 17.2 mile program with Grade 4
  - 22.2 mile program with Grade 5

Just for comparison sake...at today's prices, \$200,000 will get you approx. 3.13 miles of 1.5 inch hot mix overlay if you lay it yourself! (based on \$55 per ton mix)



## Cold vs. Hot

- Hot AC's, i.e. AC 20-5TR, AC-15P, AC-20 XP etc. typically cost 25-40% more per gallon.
- Pre-Coated aggregate is recommended for use with hot AC; pre-coating costs an additional \$7-\$15 per CY.

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# Grade 4 Seal - Cold vs. Hot

- Asphalt rates decrease 25% to .30 gallons per square yard
- Asphalt required decreases to 84,480 gallons @ \$2 per gallon = \$168,960
- Pre Coated Aggregate increased costs equate to \$92,160
- Total system cost = \$261,120 or \$.93 per square yard, \$13,056 per mile.

# Grade 4 Seal - Cold vs. Hot

- When considering only material costs, the hot applied grade 4 seal coat is a full \$.10 per square yard more expensive
- In Texas, contractors often skew that number because the hot applied binders allow them to maintain a higher production rate in heavy traffic.

# Aggregates

## Pre-Coated vs. Uncoated

- Emulsion binders work best with uncoated aggregate. There is a surface chemistry between the two products that helps achieve the bond.
- Hot AC binders require pre-coated aggregates for best results. The primary reason is dust control as the hot binders cool quickly after application.

# Fog Seal Economics

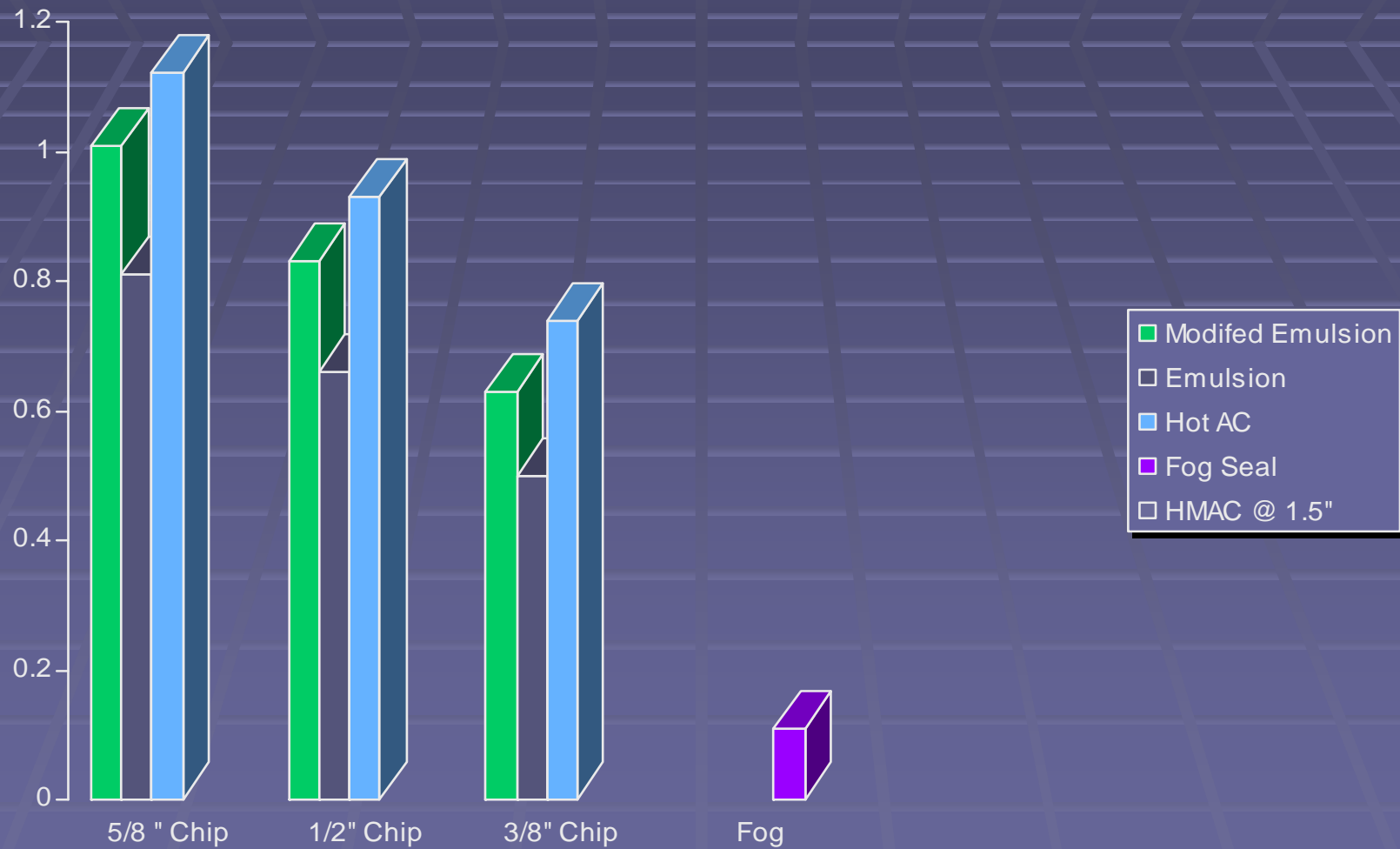
- Using CSS-1H @ 50% dilute (MAX) placed at .15 gallons per square yard (MAX) your are looking at \$1478.40 per mile or \$.11 per sq yd.

- More than likely the dilution rate and application rate will both be less depending on pavement conditions.

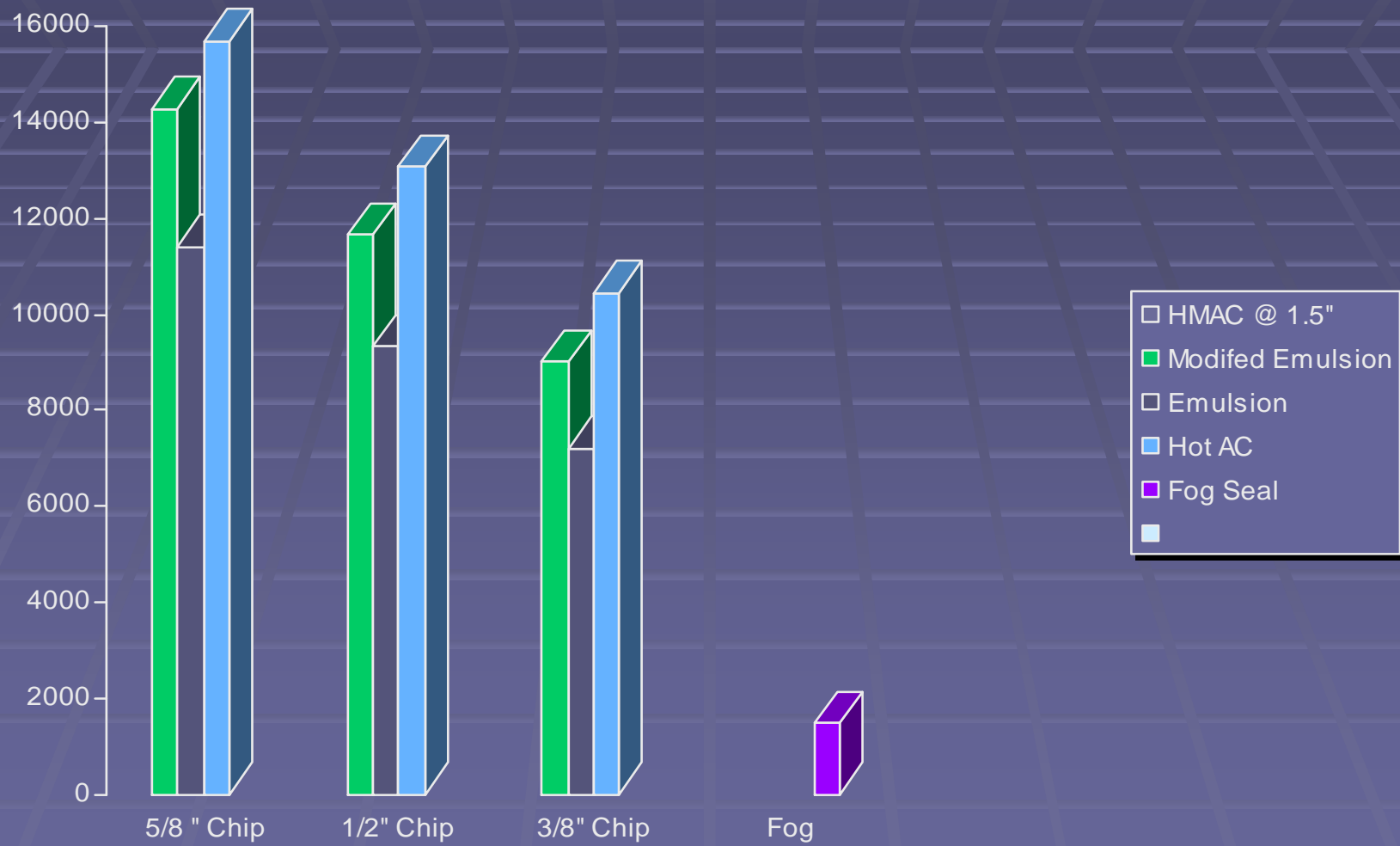
lex Trail  
Trailer Parts  
703-374-650

LEFT  
LANE  
FOR  
PASSING  
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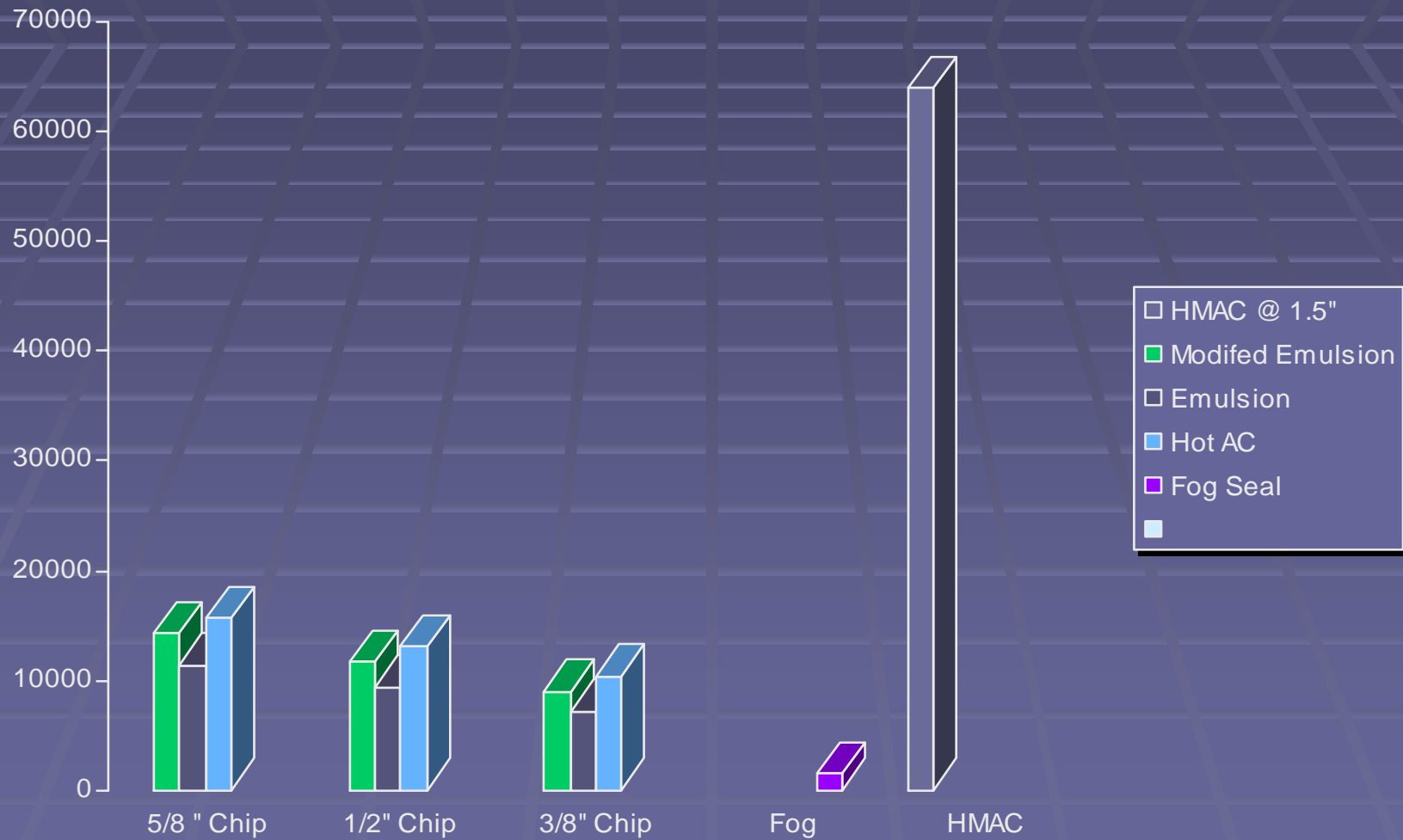
# Dollars per Square Yard



# Dollars per Mile



# Dollars per Mile





# Keys to Successful Marketing

- Goals of your new seal coat...
  - Life expectancy
  - Sell on safety thru better skid values, fresh striping, natural roadway delineation
  - Know what a seal coat will and will not fix!
  - Understand public perception, i.e. noise, appearance, etc.

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# Preparing for a Surface Treatment

- Timing of prep work
- Deficiencies that will sabotage your good seal coat



## Pavement Condition Prior to Chip Seal

Very often seal coat failures are misdiagnosed to be a material or rate problem where in fact, it was the pavement condition prior to chip seal that made the impact. These conditions are very difficult to avoid but trained engineers/inspectors can locate these areas and make adjustments.



# Same Road, 180 degree view



# What pavement conditions...?

- Rutting over 1/2" deep
- Hot or cold mix patches less than 90 days old
- Hot or cold mix patches without proper compaction during application
- Multiple seal coats applied in years past
- Poor drainage in adjacent ditches
- Weak sub grade

# Potential solutions...

- Use the variable rate or double spray bar
- Strip seal wheel paths or do micro surfacing/slurry seal with a rut box
- Do your “quality” prep work 90-180 days ahead of seal coat application
- Consider milling old seal coat layers off as part of your prep work-make sure to fog seal these areas in the interim period, this will correct rutting also
- Address drainage issues as part of prep work, get the water away from the edge of pavement



Deep rutting and flushed wheel paths prior to new seal coat application. This seal was "flushing" before I left the jobsite.

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# Hints About Repairs

- Do repairs 90-180 days ahead of seal coat
- Make sure level up and patches have adequate compaction. This includes mill and inlay.
- Hot or cold mix patches need adequate curing time
- If that isn't possible, then consider fog sealing before chip seal
- Smooth patches reduce impact loading
- Crack seal properly(3" max, 2" preferred)!



# Keys to Successful Treatments...


- Construction practices
  - Asphalt and aggregate rates
  - Timing of aggregate placement
  - The effects of the aggregate rate on asphalt rates
  - Rate adjustments in the field
  - Variable Spray Bar
    - Penetration Design Report
  - Equipment application *Speed*

# Timing of Aggregate Application

- Chapter 8, Section 14-TxDOT Seal Coat/Surface Treatment Manual
  - For best results, aggregate should be applied to emulsified asphalt or hot AC immediately. Applying the aggregate while the asphalt is very liquid maximizes embedment depth. As emulsion breaks and cures, the residue is deposited up on the sides of the aggregate particles and a meniscus is formed.

# Aggregate Application

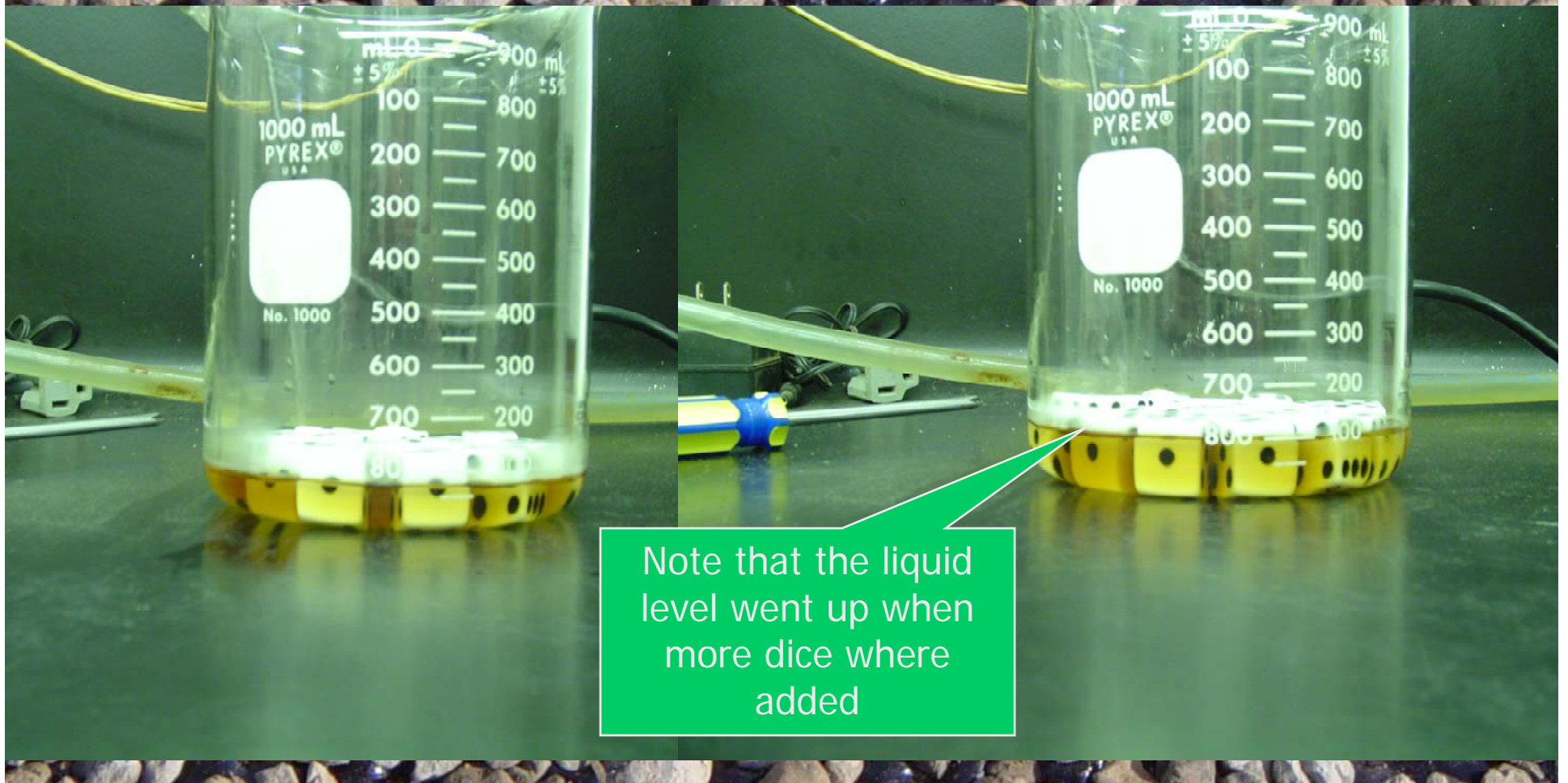
- When you reduce the aggregate spread rate in order to increase the % voids, it is very likely that you will need to increase your asphalt rate in order to achieve the desired embedment rate. The opposite effect applies if you are increasing the aggregate spread rate.



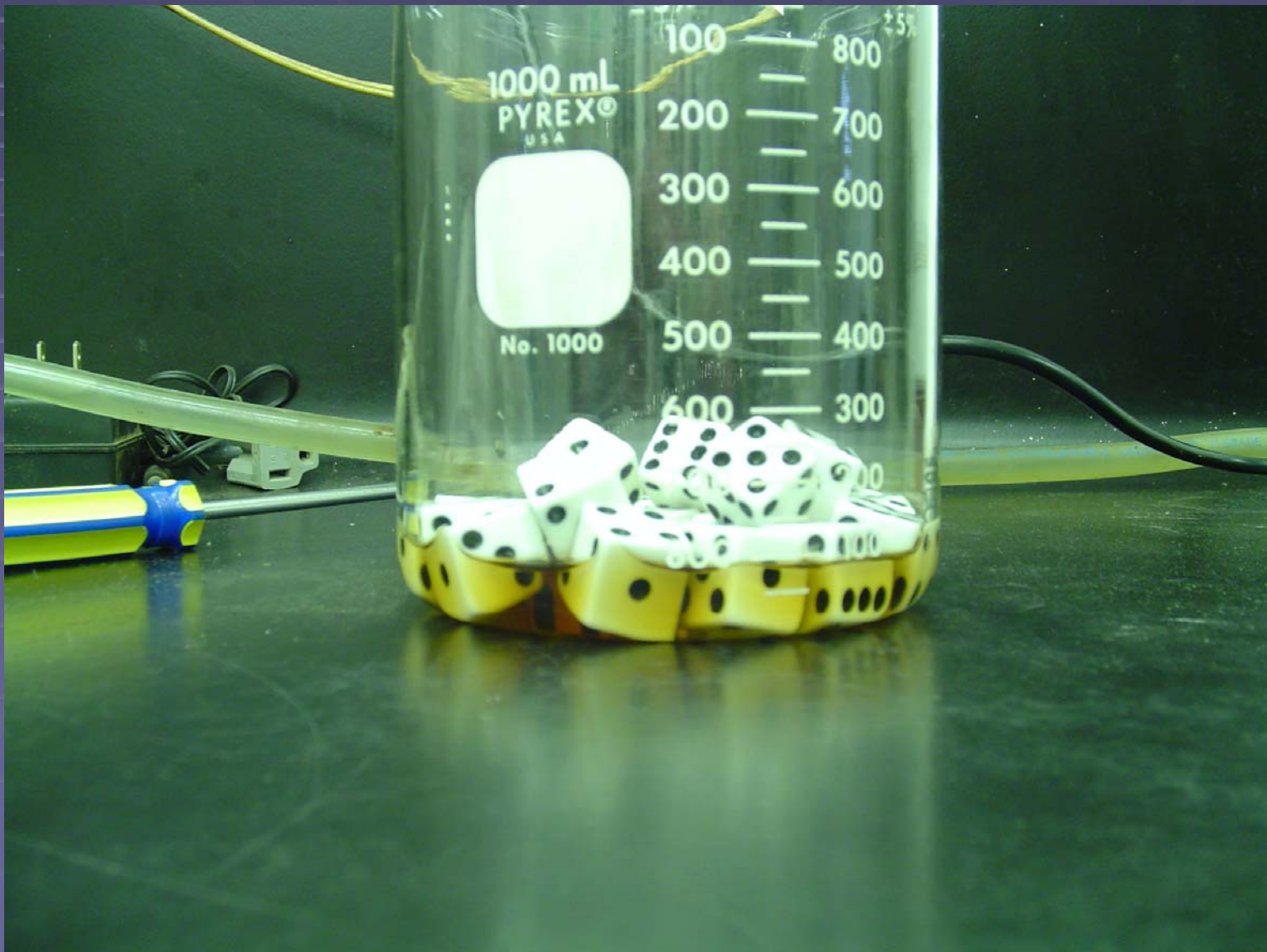
You want to see some  
black...if you cannot,  
you more than likely  
have excess aggregate  
on the road.

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# EFFECT OF AGGREGATE RATE ON BINDER RATES



# EFFECT OF AGGREGATE RATE ON BINDER RATES



# Asphalt Rate Adjustments

- TxDOT Brownwood developed a seal Coat design method that combines lab testing and actual field conditions. They design for the aggregate size as though you are applying the seal coat on glass. Then they calculate adjustments based on several factors. Hunger factor (from  $-.03$  to  $+.09$ ) is determined base on roadway conditions. Traffic factor based on Vehicles Per Day.

File Actual

Aggregate Type     PB4     /     PB4     Proj     CPM 7-4-102, etc.         CPM 7-4-102      
 Producer     Vulcan Industrie/Vulcan Industrie     CSJ     000704102         000704102      
 Asphalt Type     AC20-5TR     /     AC20-5TR     Hwy     SH 6         SH 6      
 Producer     Marlin Asphalt, /Marlin Asphalt,     Co.     Eastland Co.         Eastland Co.    

Ref No.	Crse	Width	LOCATION	Noz Set	% Var	Configuration	ADT Per Lane	Hunger Factor Code #
1	1	12	FR:US 183 in Cisco E. to FM 490 (OL)		30.0	6 9 9 9 4	1530	0.32
2	1	12	2FR:US 183 in Cisco E. to FM 490 (IL)		30.0	6 9 9 9 4	1020	0.37
3	1	12	FR:FM 490 to Ammerman St.in Eastland(OL)		30.0	6 9 9 9 4	960	0.39
4	1	12	FR:FM490 to Ammerman St.in Eastland(IL)		30.0	6 9 9 9 4	620	0.40
5	1	Var.	Shoulder		00.0	0000000000	00000	0.43
6								
7								
8								
9								

Average asphalt rate ranges from .32 gallons per sq yd up to .43 gallons per sq yd  
 Same roadway, same materials.

**ASPHALT AND AGGREGATE RATE DISTRIBUTION**

Description	Reference No.					
	1	2	3	4	5	6
Computed Asphalt Rate for % Emb	0.24	0.24	0.25	0.25	0.27	
Adjustment for Traffic	-0.02	-0.01	0.00	0.01	0.03	
Adjustment for Hunger Factor	0.03	0.06	0.06	0.06	0.04	
Above 60°F Volume Adjustment	0.03	0.03	0.03	0.03	0	
<b>Subtotal</b>	<b>0.28</b>	<b>0.32</b>	<b>0.34</b>	<b>0.35</b>		
Asphalt Volatile Adjustment	0.00	0.00	0.00	0		
ASPHALT APPLICATION RATE						
Inside WP	0.28	0.32	0.34		0.43	
Outside WP	0.36	0.42	0.44	0.46	0.43	
Average Rate	0.32	0.37	0.39	0.40	0.43	
Spread Ratio (SR)		1.64	1.64	1.64	1.62	
Recommended Distribution Rate	125	125	125	125	125	
Desired Embedment	46.0	46.5	47.0	47.5	50.5	

Remarks: \_\_\_\_\_ Prepared By \_\_\_\_\_ Date \_\_\_\_\_  
 \_\_\_\_\_ Approved By \_\_\_\_\_ Date \_\_\_\_\_



# Top 5 Reason Seal Coats Fail

- Road being treated is not ready
- No asphalt or aggregate rate adjustments in the field
- Poor timing of aggregate application
- Too much aggregate, not enough asphalt!
- Cool nights

# Resources

[www.ergonasphalt.com/resources.php](http://www.ergonasphalt.com/resources.php)

Texas Chip Seal Study  
Complete Gransberg Report  
Hot vs. Cold Gransberg Report

[www.utexas.edu/research/tppc/index.htm](http://www.utexas.edu/research/tppc/index.htm)

Texas Pavement Preservation Center

[www.dot.state.tx.us](http://www.dot.state.tx.us)

TxDOT Seal Coat Manual 2004  
(select business, then online manuals, then Seal Coat and Surface Treatment)

[www.semmaterials.com](http://www.semmaterials.com)

Maintaining

[www.asphaltinstitute.org](http://www.asphaltinstitute.org)