ASPHALT BINDER

Section 16 – Seminar Tutorial

Asphalt Seminar Tutorial

1. Define Durability as it relates to asphalt binder. What factors affect durability?

2. Placement of asphalt binder is normally limited to the calendar period from_____to_____

3. As asphalt ages it becomes more brittle. Why?

4. A 12 ft diameter asphalt storage tank has a capacity of 24,000 gallons. If it is filled to a depth of 4 ft, how much asphalt is in the tank?

% of depth = 4'/12' x 100 = 33%; see Section 1-26, % Vol Table, Read 28.78% Capacity
28.78%/100 x 24,000 gal = **6,907gals in tank**

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5. Using the information from No. 4, what is the pay quantity if the asphalt has a specific gravity of 0.963 and a temperature of 300°F?

See Asphalt Vol Correction Table #4, Section 1-19, for 300F read 0.9185 for SG 0.950 & 0.9265 for SG 1.000

$$y = 0.9185 + \left|\frac{0.963 - 0.950}{1.00 - 0.950}\right| \times (0.9265 - 0.9185) = 0.921$$ 6907 gal@300F x 0.921 = 6,358 gal@60F

24,000 – 6,358 = 17,642 gal used

$$y = y1 + \left[\left(\frac{x - x1}{x2 - x1}\right)(y2 - y1)\right]$$

x1 = 0.950	y1=0.9185
x = 0.963	y = ?
x2 = 1.00	y2 = 0.9265

7. Given the following compaction results, calculate the pay factors

a) 93.9, 92.1, 94.7, 95.3, 92.9, 93.3, 94.1

X = 93.76
S = 1.088

$$Q = \frac{x - 92.0}{s} = \frac{93.76 - 92.0}{1.088} = 1.62 \quad PF = 1.00 \text{ (from p. 9-43)}$$

b) 92.1, 91.6, 95.2, 93.4, 95.9, 92.7, 94.1

X = 93.57
S = 1.591

$$Q = \frac{x - 92.0}{s} = \frac{93.57 - 92.0}{1.591} = 0.99 \quad PF = 0.82 \text{ (from p. 9-43)}$$

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8. On a 0.45 power chart, a fine gradation plots _____ (above,below) the maximum density line?

9. On Quality Assurance projects, what method(s) of sampling and testing are acceptable for determining density?

10. Under the Quality Assurance Specifications, what steps are required in the dispute resolution process for correlation of WYDOT and contractor laboratories?

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11. Determine the cost per ton, per cubic yard, and per square yard using the following information. The density is 150lb/ft³ and the pavement thickness is 4".

Solution

Aggregate #1	40%	$6.50/Ton
		0.40 x 6.50 = $2.60
Aggregate #2	30%	$4.50/Ton
		0.30 x 4.50 = $1.35
Aggregate #3	25%	$7.00/Ton
		0.25 x 7.00 = $1.75
Asphalt	5%	$150.00/Ton
		0.05 x 150 = $7.50
		$13.20/ton

$$\frac{\$}{yd^3} = \frac{\$13.20}{ton} \; x \; \frac{150 \; lb}{ft^3} x \frac{1 \; ton}{2000 \; lb} x \frac{27 \; ft3}{yd^3} = \$26.73/yd^3$$

$$\frac{\$}{yd^2} = \frac{\$26.73}{yd^3} \; x \; 4 \; in \; x \frac{1 \; yd}{36 \; in} = \$2.97/yd^2$$

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12. On QC/QA projects, who is responsible for the Quality Verification testing? What about the Quality Control testing?

13. What is the maximum allowed difference between the Contractor's QA density value and the DOT's value?

14. Which is higher, total or effective asphalt content?

15. According to the WYDOT specifications, what is the minimum QC aggregate gradation testing frequency for level II control? What about the asphalt content verification testing?

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16. Can you use PG 64-16 in Cheyenne Wyoming at 98% reliability? What about 50% reliability?

17. What is VMA?

Project _____   **Tested By** _____

A Total Production To be tested	B Beginning Station	C Ending Station	D Total feet Paved (C − B = D)	Width Paved (feet)	E Width Paved Minus 2 (feet)
1400	260+40.00	326+33.00		14	

F Number of Lots Represented (A/1500)	G Tons Per lot (A/F)	H Feet per lot (D/F)	I Feet represented Per test (H/7)	

Number	J Random Number	Section Represented Beginning st. Ending st K	 L	Test Station L-(J * I)	M Random Number	Dist. From Edge Horizontal Distance feet (ExM)+0.3	Lane 1.Right 2.Center 3.Left	Lift 1.Upper 2.Lower 3.Total
1	0.651				0.582			
2	0.283				0.664			
3	0.647				0.647			
4	0.134				0.450			
5	0.919				0.475			
6	0.205				0.021			
7	0.832				0.062			

Project _____   **Tested By** _____

A Total Production To be tested	B Beginning Station	C Ending Station	D Total feet Paved (C − B = D)	Width Paved (feet)	E Width Paved Minus 2 (feet)
1400	260+40.00	326+33.00	**6593**	14	**12**

F Number of Lots Represented (A/1500)	G Tons Per lot (A/F)	H Feet per lot (D/F)	I Feet represented Per test (H/7)	
1	**1400**	**6593**	**942**	

Number	J Random Number	Section Represented Beginning st. Ending st — K	L	Test Station L-(J * I)	M Random Number	Dist. From Edge Horizontal Distance feet (ExM)+0.**1'**	Lane 1.Right 2.Center 3.Left	Lift 1.Upper 2.Lower 3.Total
1	0.651	**26040**	**26982** **263+69**		0.582	**8.0**		
2	0.283		**27924** **276+57**		0.664	**9.0**		
3	0.647		**28866** **282+56**		0.647	**8.8**		
4	0.134		**29808** **296+82**		0.450	**6.4**		
5	0.919		**30750** **298+84**		0.475	**6.7**		
6	0.205		**31692** **314+99**		0.021	**1.3**		
7	0.832		**32633** **318+50**		0.062	**1.7**		

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