



Aggregate – An Asphalt Customer's Perspective

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Open Road Asphalt

What were the Customer's Priorities?

1. Safety

2. Production / Profit

3. Quality / Performance

This may have been the order in the Past

What are the Customer's Priorities?

1. Safety

2. Quality / Performance

3. Production

4. Profit *(will be there if other priorities are met)*

Most Likely the Order Today

What is Different Today?

- **Method Specifications (Beginning to 1990...)**
 - IDOT Controlled Program
- **QC/QA (1990-2010)**
 - Contractor Designs and QC in Production
 - IDOT provides Assurance Testing with split samples
 - Mix Samples at Plant / Nuclear Density
 - 100% Pay if results are within QC limits
 - Some specification failures are allowed if corrective actions are implemented...

What is Different Today?

- **End Results Specifications (QCP/PFP)**
 - 30% of Pay → Voids (Mix Property)
 - 30% of Pay → VMA (Mix Property)
 - 40% of Pay → Density (Based on Cores)
- **Quality Control for Performance (QCP)**
 - Step based pay (90, 95, 100, 105%)
 - Mix sampled on road / cores for density
 - Pay based on IDOT results (Windage?)
 - Maximum pay capped at 100%
 - Deficiencies result in penalty or removal / replacement

What is different about today's specifications?

- **End Results Specifications (QCP/PFP)**
 - 30% of Pay → Voids (Mix Property)
 - 30% of Pay → VMA (Mix Property)
 - 40% of Pay → Density (Based on Cores)
- **Pay for Performance (PFP) – Percent within Limits**
 - Incentive / Disincentive based on Statistics of results
 - Mix sampled on road / cores for density
 - Pay based on IDOT results (Windage?)
 - Maximum pay is 105% (5% bonus)
 - Deficiencies result in penalty or removal / replacement

What is different about today's specifications?

- **Hamburg Wheel (Rut Resistance)**
 - Design and Production Specification
 - Potentially a forced shutdown for failures
 - Applies to all mixes (except for N30s)
- **Illinois Flexibility Index (IFIT) – (Crack Resistance)**
 - Design and Production Specification
 - Potentially a forced shutdown for failures
 - Applies to all mixes (expect patching and incidentals)
 - Aging Protocol currently being rolled out for surface

Hamburg Wheel



IFIT



How do we Maintain our Pay?

- **Understanding / controlling what effects Pay Factors**
 - VMA (30% of Pay) – Voids in Mineral Aggregate
 - Aggregate Gradation
 - Particle Shape (Flat & Elongated, Cubical, Round...)
 - Strength
 - Surface Texture (micro-texture) – (smooth or rough)
 - Gsb (Bulk Specific Gravity)
 - Must have an accurate value
 - Used to calculate VMA
 - Variability can cause errors in VMA calculations
 - 0.020 change in combined Gsb = 0.6% change in VMA

How do we Maintain our Pay?

- **Understanding / controlling what effects Pay Factors**
 - Voids (30% of Pay)
 - Controlled by VMA and effective Asphalt Cement Volume
 - More variable than VMA
 - Absorption and AC Content contribute to variability
 - Density (40% of Pay)
 - Need a compactible aggregate structure with adequate AC
 - Underlying conditions
 - Compactive effort

How do we Maintain our Pay?

- **Understanding / controlling what effects Pay Factors (VMA / Voids – 60% of Pay)**
 - Proper Stockpiling / Handling
 - Minimize Change in Aggregate Gradation
 - AGCS is too wide for current HMA specs
 - Variability in material must be monitored
 - Particle Shape
 - Production rate / crusher types / worn parts
 - Dust (Minus #200)
 - 1% Change in Dust = approximately 1% VMA Change
 - Communicate with HMA Customers if changes occur

How do we Maintain our Pay?

- Example of Gradation Variability – VMA
- Estimated Change with Bailey Method

Sieve Size	Current Average	Bailey Method Estimate with new incomings	Change	QC QA Range		Acceptable PFP Limits	
				Min	Max		
12.5mm	100.0	100.0	0.0				
9.5mm	96.9	96.9	0.0				
4.75mm	58.4	58.6	0.2	55.0	66.0		
2.36mm	36.1	37.8	1.7	32.0	42.0		
1.18mm	21.6	23.5	1.9				
0.600mm	14.5	16.5	2.0	12.0	20.0		
0.300mm	9.6	11.2	1.6				
0.150mm	6.3	7.1	0.8				
0.075mm	4.8	5.1	0.3	3.5	6.5		
% AC	6.11	6.11	0.0	5.7	6.3		
VMA	15.2	13.2	-2.0	14.3	-	14.0	18.0
Voids	3.7	1.7	-2.0	2.8	5.2	2.0	6.0

HMA - Daily Issues

- **Internal Communications - Paving Foreman & Plant Operator**
 - Foreseen stops / breakdowns / delays
- **Impact of multiple crews / plants / mixes**
- **Impact of FOB customers**

Internal Sources of Variability

– Aggregate Stockpiling Practices



Internal Sources of Variability

- Aggregate Stockpiling Practices
- RAP – Can be fairly consistent but can still change or may need to switch piles
- Plant – stockpile moisture, 1 mix or multiple, production rate, worn parts, etc..
- Waste
- Weather conditions
- Using a MTD or not?
- Trucks?

How can Aggregate Producers help to Avoid Pay Issues?

- **Consistency**
 - Maintain Aggregate Gradation Targets
 - Aggregate QC Bands may be too wide
 - Maintain Particle Shape
 - Dust is important too
 - Maintain Best Practices for Stockpiling / Handling
 - Be consistent with Stockpiling / Handling
- **Communication**
 - Talk to HMA Producers if changes are expected
 - Provide QC results to HMA customers
 - Discuss upcoming work and specifications

Questions or Comments?

Thank You!