

Recycled Asphalt Pavement used in Pavement Maintenance

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What We Know

- ❑ Asphalt has always been Recyclable
- ❑ Valuable material in Hot Mix Asphalt
- ❑ Used when and where feasible



RAP -typical usages - non HMA

- ❑ RAP Base
- ❑ Shoulder Backing
- ❑ CIR
- ❑ Road Bed Stabilization
- ❑ Hot in place recycle
- ❑ On site Cold Mix

RAP History Pavement Maintenance



Pavement Maintenance Products

Chip Seals



Pavement Maintenance Products

Slurry Seal and Micro Surfacing



RAP – Caution !!!!!

- Not all HMA aggregates are good for PM
- History on Binder would be good homework



RAP Chip and RAP Slurry Aggregates Produced Simultaneously



Common Pavement Maintenance Aggregate Testing

- LA Abrasion
- Sodium Soundness
- Specific Gravity
- SE
- Fines Durability
- Gradation
- Absorption



RAP Slurry Material Consistent Residual Asphalt



Slurry Dust

Very few conglomerations
Residual asphalt remains very consistent

Mixing RAP aggregates



- Residue AC affects mix design
- Need emulsion
- % of blend with virgin Aggregates

RAP Slurry Seal

Component	RAP Slurry Seal	ISSA Type II
	Amount	Amount
Emulsion	10% - 14%	12% - 18%
Residual AC	12.5% Min.	7.5% - 13.5%

Minimum
12.5% Residual @
10% Emulsion

Minimum
7.5% Residual @
12% Emulsion

RAP Utilization example

Crushing Utilization

- Chip Seal 48%
- Slurry Dust 40%
- 12% waste



RAP Chip Material

Residual Asphalt



Chips

Single stones and conglomerations
Residual asphalt content will vary by sample

3/8" Chips



Some RAP crushing operations can create excess dust, which will contain asphalt residue

RAP Chips are lighter

Adjust for the lighter material

Typical

5/16 chip - 14 to 20 lbs per SY

3/8 chip - 20 to 24 lbs per SY

1/2 chip - 24 to 30 lbs per SY



Tests on Emulsion Compatibility

- ✓ Penetration
- ✓ Ductility
- ✓ Elastic Recovery
- ✓ Stripping
- ✓ Sweep Test - cohesion

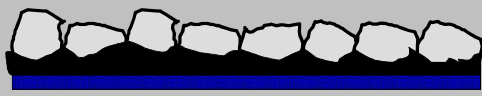


RAP Management - Embedment

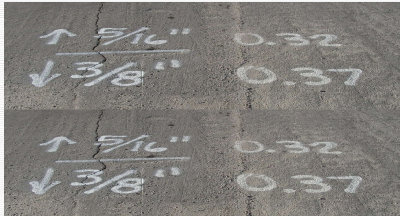
Multiple Sizes



Single Size



Spreading Emulsion

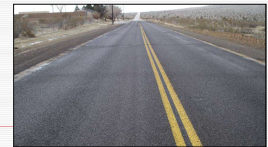


Determine proper application rate for road surface and traffic conditions and climatic conditions

RAP Chip Seal

RAP chip seals will have lower absorption rates

Slower Cohesion



Scrub Seals



Remember

- ❑ Not all RAP is created equal
- ❑ Do your homework
- ❑ Utilize RAP management
- ❑ RAP material will have lower Absorption Rates
- ❑ RAP material is lighter than Virgin Aggregate
- ❑ Step out slow – consider your climate