High Recycled Content Asphalt Pavement

THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

DEPARTMENT OF
PUBLIC SERVICE

City of Columbus Supplemental Specification 1505
High Recycled Asphalt Pavement Content

Supplemental Specification 1505 appends the following sections of the City of Columbus, Construction and Material Specifications to provide for the incorporation of Recycled Asphalt Pavement materials exceeding twenty-five percent (25%) in Type I Surface, forty percent (40%) in Type II Intermediate and fifty-five percent (55%) in 301 Base in the job mix formulas for City of Columbus projects where this Supplemental Specification is provided.

Revised RAP by Dry Weight of Mix, (Max) = 60%

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ROAD
WORK
AHEAD

Standard Paving Year- RAP Usage

It's a little less tonnage than previous years since 18-2/18-3 did not get all the paving completed.

Type	Tons	% RAP	RAP Tons
301 Base	18415.58	50.00%	9207.79
64-22 (Medium)	25210.02	20.00%	5042.004
70-22M (Medium)	19703.65	20.00%	3940.73
70-22M (Heavy)	4723.80	10.00%	472.38
	68053.05		18662.904

It comes out to about 27% RAP average for the entire year's asphalt on 2018 Resurfacing Projects.

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Extended RAP Timeline

- April 2016 Received Proposals via ORIL for "*Optimizing the Effective Use of RAP in Local Roadways*"
- September 2018 Placed extended RAP test sections on Hall Road 2018-P3
- October 2018 Presented ORIL extended RAP to OTEC
- November 2018 Contacted by RAP Management and provided tour of new asphalt plant on Fifth Avenue
- December 2018 Presentation to Public Service Management
- May 2019 ORIL Report Issued "*Optimizing the Effective Use of RAP in Local Roadways*"
- June 2020 Received and approved first High RAP asphalt mix design from RAP Management
- July 2020 High RAP asphalt placed on Wright Road
- February 2021 RAP Management Presentation to City NPPC

ORIL Summary

Optimizing the Effective Use of RAP in Local Roadways

This presentation will provide an update on an Ohio's Research Initiative for Locals (ORIL) research study aimed at assessing the feasibility of using higher percentage of reclaimed asphalt pavement (RAP) in surface course mixtures of local roadways. Phase 1 of this study included conducting a comprehensive laboratory testing program to identify the factors that affect the performance asphalt mixtures with RAP. To this end, several mixtures were designed with different RAP contents: 0%, 20%, 30%, 40, and 50% RAP. Two RAP materials that have binders with different rheological properties were selected. The laboratory testing program also evaluated the effect of using recycling agents on the performance of asphalt mixtures with high RAP content. Three different types of recycling agents (rejuvenators) were used, namely, Hyrolene, Sylvaroad, and soybean. Laboratory tests were conducted to evaluate the propensity of the designed asphalt mixtures to fatigue cracking, low-temperature cracking, moisture-induced damage, and rutting. This presentation will discuss the results of the comprehensive testing program conducted in Phase 1 of this study. In addition, the presentation will highlight the method that was developed to design and construct cost-effective, well-performing, and durable asphalt mixtures with higher RAP contents to be used in the surface course of local roadways in Ohio.

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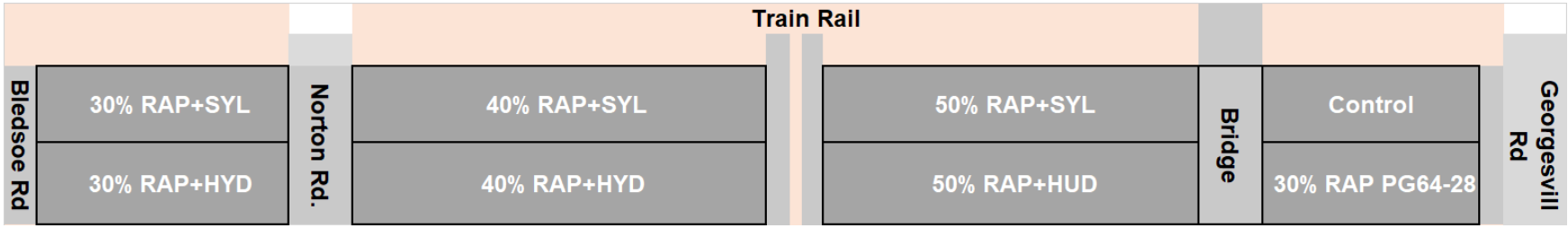
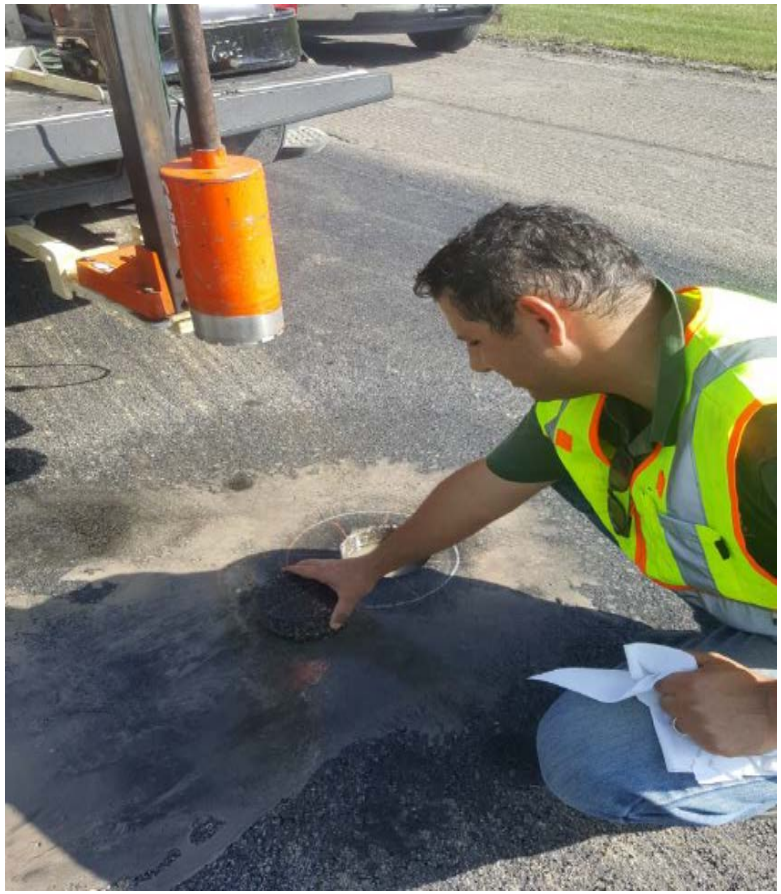
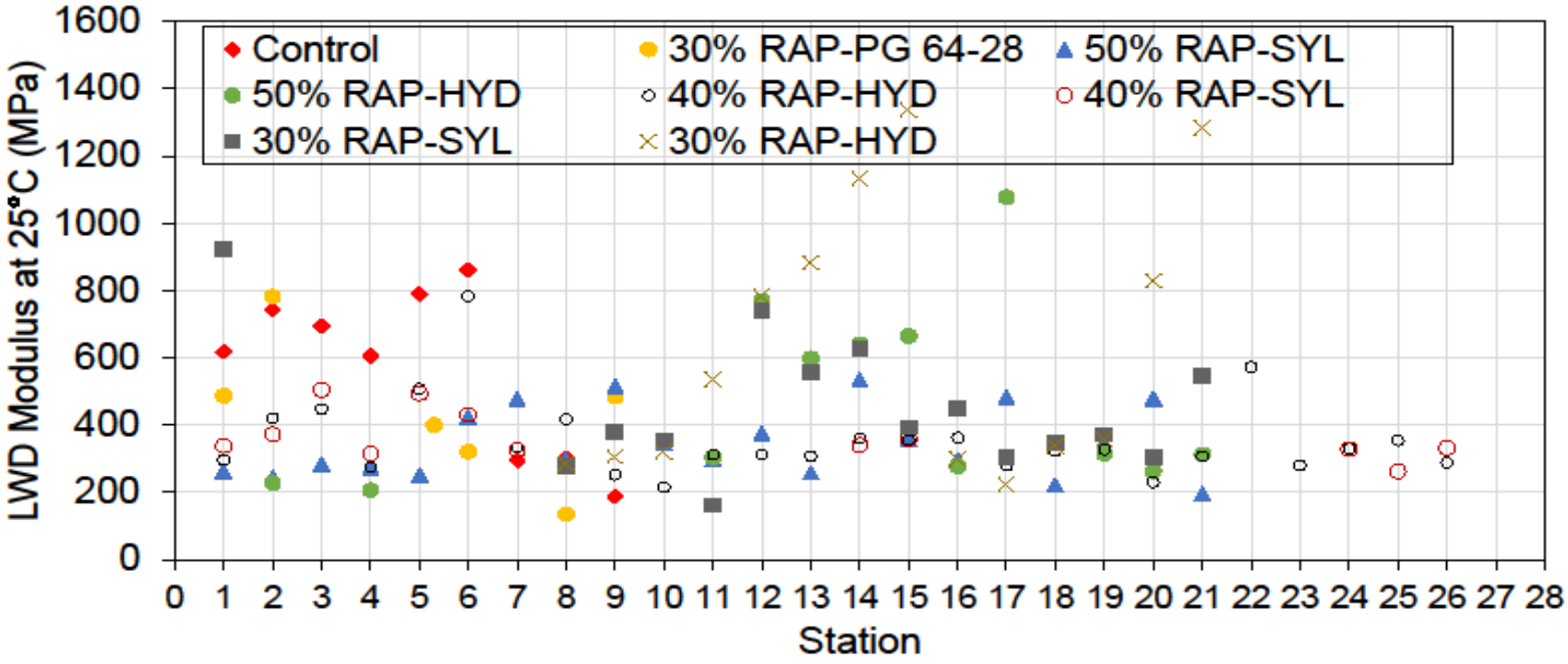
Hall Road Test Sections via ORIL



Hall Road Test Sections via ORIL



Sections Pre-Construction Evaluation



OHIO UNIVERSITY

THE CITY OF COLUMBUS
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2018 Resurfacing Project 3

				KOKOSING		ENG EST
Item #	Desctription	Quantity	Unit	2018 Price	2018 Extended	
46	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, (1.5")	95.00	CY	$ 310.00	$ 29,450.00	$ 128.00	$ 12,160.00
47	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 30% RAP w/Rejuvenator Type A (1.5"), APP	181.00	CY	$ 255.00	$ 46,155.00	$ 136.00	$ 24,616.00
48	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 30% RAP w/Rejuvenator Type B (1.5"), APP	158.00	CY	$ 255.00	$ 40,290.00	$ 136.00	$ 21,488.00
49	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 40% RAP w/Rejuvenator Type A (1.5"), APP	174.00	CY	$ 227.00	$ 39,498.00	$ 136.00	$ 23,664.00
50	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 40% RAP w/Rejuvenator Type B (1.5"), APP	235.00	CY	$ 227.00	$ 53,345.00	$ 136.00	$ 31,960.00
51	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 50% RAP w/Rejuvenator Type A (1.5"), APP	162.00	CY	$ 223.00	$ 36,126.00	$ 136.00	$ 22,032.00
52	Asphalt Concrete Surface Course, Type 1, (448), PG64-22, 50% RAP w/Rejuvenator Type B (1.5"), APP	211.00	CY	$ 223.00	$ 47,053.00	$ 136.00	$ 28,696.00
53	Asphalt Concrete Surface Course, Type 1, (448), PG64-28, 30% RAP (1.5")	112.00	CY	$ 308.00	$ 34,496.00	$ 136.00	$ 15,232.00
54	Contractor Mix Design, Recycled Asphalt Pavement, APP	1.00	LS	$ 50,000.00	$ 50,000.00	$ 8,500.00	$ 8,500.00
			TOTAL		$ 376,413.00		$ 188,348.00
						DIFFERENCE	$ (188,065.00)

**This price inlcudes design & placing surface course on Hall Rd
-Note that the rejuvenators were donated to KMI for this research project

2020 Resurfacing Project 1

- SPECIAL ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), 60% RAP w/ REJUVENATOR, (1.5"), AS PER PLAN CU YD 1,792.00

- Performed on six streets:
  - HAZELMERE DR
  - CROSSBROOK BLVD
  - GLENWILLOW BLVD
  - JOHNSON RD
  - WRIGHT RD
  - BIG RUN SOUTH RD

RAP MANAGEMENT

SUSTAINABLE ASPHALT MATERIALS

Paving Ohio's future.

4647 E 5th Ave
Columbus, OH 43219

ABOUT US

RAP Management is a Columbus, OH paving materials plant producing durable, precisely manufactured asphalt products made from Recycled Asphalt Product. We lower the environmental footprint of infrastructure, at a cost savings to the end user.

WHY CHOOSE US ??

- **High quality.** Recycling means precision manufacturing and the highest quality pavement materials.
- **Save money.** We can recycle and lower our cost to manufacture while still providing industry leading pavement materials.
- **Convenience.** The first asphalt plant of its kind in North America located *right down the road.*

OUR PRODUCTS

No job is too big or small. Whether you are patching a parking lot or paving an interstate, we have the best materials & mix designs ...

HMA - HOT MIX ASPHALT

- 448 Type 1 Asphalt Concrete
- Commercial Surface Asphalt Concrete
- 448 Type 2 Asphalt Concrete
- 402 Surface Mix Asphalt Concrete
- 302 Bituminous Aggregate Base
- 301 Bituminous Aggregate Base

FSB - FOAM STABLIZED BASE

Heavy duty pavement base material or construction working surface.

CMA - COLD MIX ASPHALT

Temporary asphalt patching material. An asphalt repair product used for patching of potholes, cracks and other defects in asphalt and concrete.

1-614-484-7120 info@RAPmanagement.com RAPmanagement.com

RAP MANAGEMENT

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HMA
HOT MIX ASPHALT

Highest quality pavement materials, for roads engineered to last.

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Columbus, OH 43219

HMA MATERIALS AVAILABLE:

- 448 Type 1 Asphalt Concrete
- Commercial Surface Asphalt Concrete
- 448 Type 2 Asphalt Concrete
- 402 Surface Mix Asphalt Concrete
- 302 Bituminous Aggregate Base
- 301 Bituminous Aggregate Base

PROVEN PLANT TECHNOLOGY

Utilizing new technology we can lower the environmental cost while still providing industry leading pavement materials.

QUALITY IS OUR MISSION
PRICE IS YOUR VALUE

We create the most rigorously tested precision engineered asphalt on the market, using up to 70% Recycled Asphalt Product (RAP).

ASSURANCE YOU CAN TRUST

Our regular testing ensures compliance with a*ny specification.*

- *Aggregate Gradation*
- *Binder Volume*
- *Binder Performance Grade*
  - *Resistant to rutting*
  - *Resitant to cracking*
- *Workablity*

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2020 Resurfacing Project 1

- Add'l Quality Control requirements in Lab and field
- Requirement of using Asphalt Concrete Rejuvenating Agent
- Method 3 shall be produced from a High Recycle Technology (HRT) plant
- HRT plant is comprised of a batch tower to heat, dry and reclassify the virgin aggregate and a gravimetrically fed continuous parallel flow dryer to heat and dry the recycling aggregate materials.
- SS 1505 will eventually transition into 441 Method 3 (High RAP);
  (Method 1 = Standard RAP and Method 2= Extended RAP)

RAP MANAGEMENT

2019 CONSTRUCTION SEASON SUSTAINABILITY REPORT

AVERAGED 56% RECYCLED CONTENT

THAT'S ALMOST 3X THE INDUSTRY AVERAGE IN THE UNITED STATES. **3X**

86,300 TONS
OF *RAP DISPLACED FROM LANDFILLS
*Recycled Asphalt Product

Equal To
9 LANE MILES OF ROAD
15' road 1.5" deep

Or
4,795 DUMP TRUCK LOADS
The average dump truck holds up to 18 tons!

All statistics listed are volume calculations

Additional Sustainability Items

- 2015 Resurfacing Project 1-Reclaimed Shingle Asphalt (RAS)

Additional Sustainability Items

- 2017 ORIL study Analysis of Ground Tire Rubber in Mix Design on Local Roadways Ground Tire Rubber Asphalt (GTR)

PROJECT SUMMARY

GTR is a recycled product produced from old vehicle tires. It can be used as an additive to asphalt mixtures, in place of polymers, to improve the durability, longevity and performance of pavements. While GTR has the potential for positive environmental impacts, historically the initial cost of using GTR in asphalt mixes can be so high that many city, townships and counties simply cannot afford to use it. However, over time, advances in technology have increased the options available in regards to products and application methods. This research was initiated to assess the true life-cycle cost of GTR mixes and identify opportunities for GTR to be more affordable and cost-competitive with traditional polymer modified mixes without compromising performance.

Researchers identified three GTR modified binders that, based on lab tests, can be used to promote performance equal to or better than that of traditional polymer modified asphalt mixes at a comparable cost. Each of the binders tested were compared to a PG 70-22 polymer modified binder. A draft specification, designed specifically for use on local roads, was developed along with supplemental QC/QA testing and acceptance criteria. Test sections were constructed in Columbus, OH and Akron, OH for long-term evaluation of their performance.

Additional Sustainability Items

- 2018 Recycled Glass Aggregate worked with Tom Bolon of Novotec

Additional Sustainability Items

- 2020 Resurfacing Project 1- Cold in Place Recycling (CIR) PARTIAL DEPTH ASPHALT PAVEMENT COLD IN PLACE RECYCLING (CIR) SQ YD 52,570.00

Questions?