

Missouri Asphalt Pavement Association (MAPA) Endowed Professorship Update

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Missouri University of Science and Technology

30th Annual MAPA Conference

January 6th 2020

Missouri S&T Updates, Research

- Modern Recycled Asphalt Mixes. Led by the University of Missouri-Columbia, Professor W. Buttlar (MoDOT)
- Evaluation of Alternatives to Calcined Bauxite for use in HFST (MoDOT)
- Preparing Interdisciplinary Professional for Rebuilding/Engineering Resilient Infrastructure of the Nation (GAANN)

- Asphalt-Crumb rubber optimization

- Recycled rejuvenators
 - Used motor oil, environmental concerns
 - Guayule resin, as binder additive
 - Significant in recycled mixes

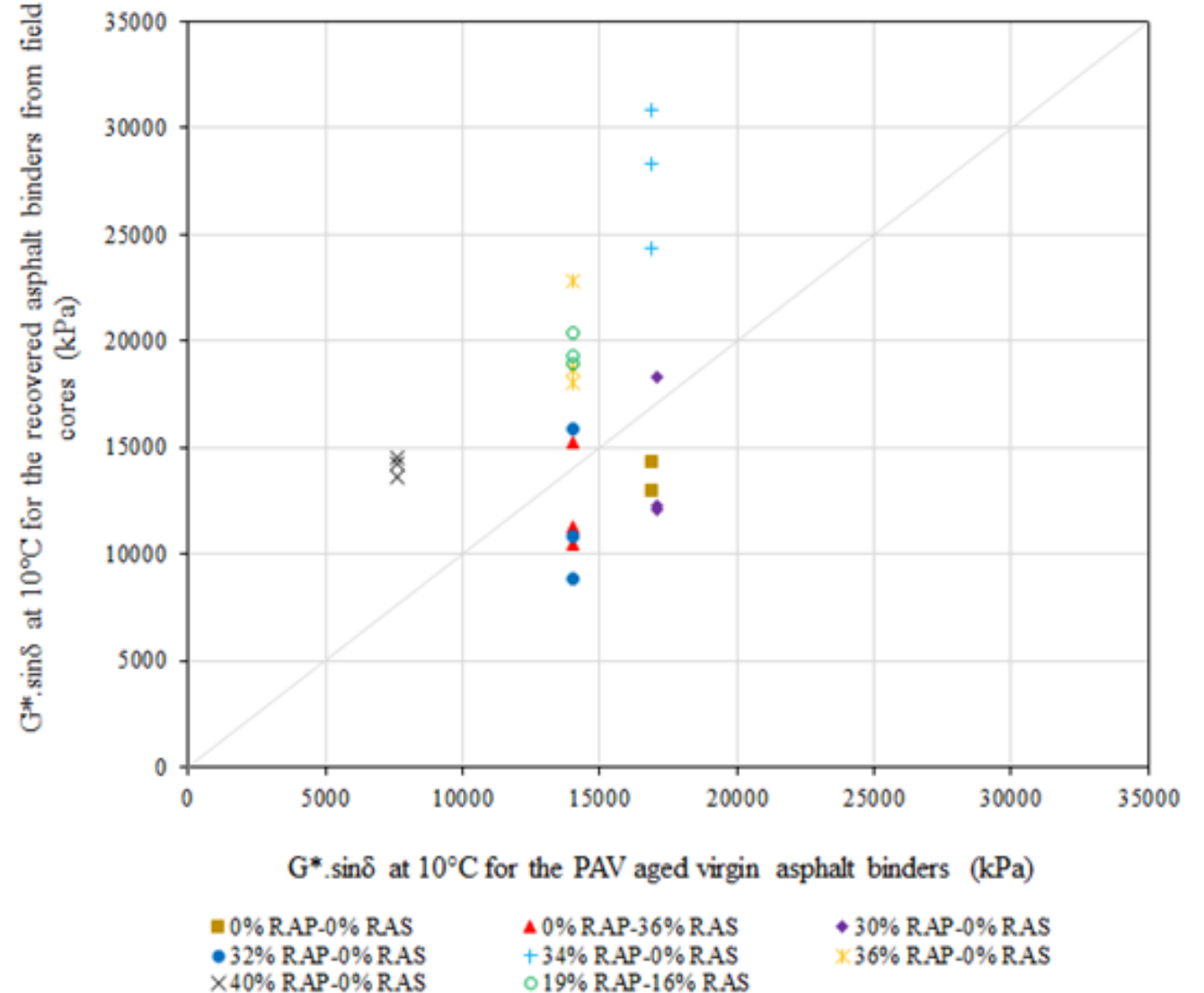
MoDOT Project

Modern Recycled Asphalt Mixes₂

No.	Sample Name	Core No.	Air Voids (%)	Virgin AC PG	Contract Grade	Virgin AC* (%)	Total AC (%)	RAP%	RAS%	Additives	Core Sample Weight (g)	Extracted AC (%)			Date of E&R**	Extracted Asphalt Binder Wt. (g)
												Ashing (1st)	Ashing (2nd)	Centrifuge		
LEVEL (1)																
1	Mo13-1	5	6.8	64-22H	70-22	4.4	5.7	30	0	BHF 1.5%, Mlife T280 0.5% AC	1316.8	4.9	5.4	5.5	8/6/2019	57
2	Mo13-1	7	6.6								1256.6	5.2	5.4	5.6	8/9/2019	56
3	Mo13-1	11	---								1229.4	5.2	5.3	5.3	8/8/2019	52
4	US54-6	9	5.6	58-28	70-22	3.6	5.1	32	0	Mlife T280 1%	1723.3	5.1	4.4	5.1	8/7/2019	74
5	US54-6	7	---								1491	4.8	5.0	5.2	8/8/2019	61
6	US54-6	2	---								1783.1	4.4	4.3	5.0	8/5/2019	74
7	US54-1	2a	3	58-28	---	3.6	5.2	0	36	IPC70 2.5%, PC2106 3.5%, Mlife T280 1%	2100.1	5.1	4.9	5.3	8/12/2019	95
8	US54-1	3a	3								2068.1	5.1	5.1	5.3	8/15/2019	92
9	US54-1	4	--								1906.8	5.1	5.1	5.5	8/13/2019	87
10	US63-1	9	7	58-28	70-22	3.4	5.1	40	0	Ethern 0.5%, Eflex CA 1.75%	1610.1	4.4	4.7	4.8	8/23/2019	63
11	US63-1	5	---								1665.6	4.5	4.5	4.7	8/16/2019	68
12	US63-1	2	---								1635.7	4.8	4.8	4.9	8/20/2019	68

Example, Lab-aged vs. Recovered Field-core Binders

- Are field-cores “PAV” condition?
- End-product binder grade
- Relate to field performance
- Use of recycled components to enhance performance



Missouri S&T Updates, Lab Facilities*

- New asphalt testing “MAPA Asphalt Lab” Proposed, including:
 - Binder/rheology
 - Life-cycle analysis
 - Binder processing
 - Aggregate-asphalt interface
 - Update HMA testing equipment
- Asset and support for the new Missouri Center for Transportation Innovation (MCTI)

* Adding 1600 ft²

Missouri S&T Updates, Course Offering

- Restructuring existing core materials course
- Three Asphalt-Related Courses were Offered in 2018:
 - Sustainability through Recycling, **NEW**
 - Pavement Management and Rehabilitation, **NEW**
 - Bituminous Materials, **RESTRUCTURED**

CE6123 Pavement Management, Evaluation and Rehabilitation

Spring 2020

Advanced knowledge of pavement performance; pavement evaluation; implementation of pavement management at network and project level; maintenance and rehabilitation strategies; life-cycle-cost analysis

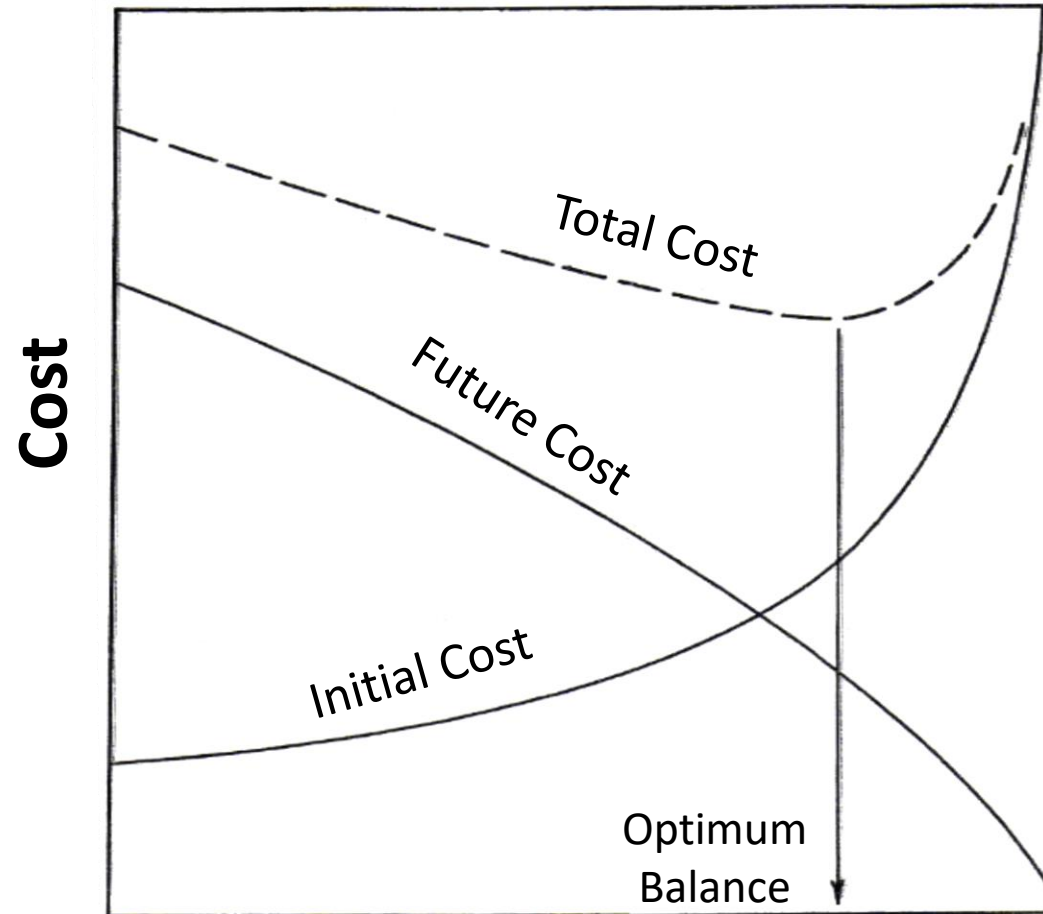
Instruction Mode

- Classroom Based CIV ENG 6123-1A Class Number 73395
- On-line Synchronous CIV ENG 6123-1DIS Class Number 73397

Based on the PAVER system and software (US Army Corps of Engineers)

CE6123 Pavement Management

Balance Between Cost and Quality



Quality of Service,

Concept by M. Abdelrahman

Asphalt Industry Contacts

- Visited asphalt plants
- Collected asphalt, rubber, RAS samples
- Will conduct lab experiments to simulate field mixes & optimize recycled components in asphalt mixes
- Welcome collaborations

Internships and Scholarships in Flexible Pavement

- Thanks to MAPA; The NCAT text-book was provided to seniors and Graduate students enrolled in the Bituminous Materials Course
- MAPA Scholarship(s) to promote asphalt research/studying
- Organize events and connect S&T students with industry/government agencies to host internships

Thanks to MAPA for Supporting my Work

Questions?

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