Missouri Asphalt Pavement Association (MAPA) Endowed Professorship Update

By: Magdy Abdelrahman, Ph.D.
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 Mixes

<table>
<thead>
<tr>
<th>No.</th>
<th>Sample Name</th>
<th>Core No.</th>
<th>Air Voids (%)</th>
<th>Virgin AC PG</th>
<th>Contract Grade</th>
<th>Virgin AC (%)</th>
<th>Total AC (%)</th>
<th>RAP%</th>
<th>RAS%</th>
<th>Additives</th>
<th>Core Sample Weight (g)</th>
<th>Extracted AC (%)</th>
<th>Date of E&amp;R**</th>
<th>Extracted Asphalt Binder Wt. (g)</th>
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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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