

ILT

HMEC
Highway Materials Engineering Course


Lesson 9: Hot Topics

Asphalt Materials and Paving Mixtures

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MODULE
F


Lesson 9 Introduction



By the end of this lesson, you will be able to:

- Summarize some of major issues facing the asphalt industry currently and in the future
- Describe some of the current research topics in areas of asphalt concrete mixture design and pavement performance areas
- Describe some of the research products an agency will need to consider and evaluate for future implementation to improve performance and reduce overall costs of an asphalt pavement
- Identify some of the future changes that are expected in asphalt concrete design, production, and construction equipment

 This lesson will take approximately 45 minutes to complete.


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Lesson 9 – Hot Topics

- Challenges for Today and Tomorrow:
Get Involved to Make a Difference
- Maturing Implementation Topics –
Improving Performance and Reducing
Overall Costs
- Future Changes in Testing, Production,
and Construction of Asphalt Concrete
Mixtures



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National Asphalt Roadmap 



ASPHALT INSTITUTE







NATIONAL STONE, SAND & GRAVEL ASSOCIATION



Natural building blocks for quality of life

 Have you heard of the roadmap? Do you see any evidence of private-public partnerships in your agency?


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National Asphalt Roadmap

A Commitment to the Future Asphalt Pavement Research and Technology

Vision:
Develop improved asphalt pavement technologies that ensure the continued delivery of safe and economical pavements to satisfy our nation’s needs.

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Challenges: Today and Tomorrow


- Staffing and budget
- Transfer of responsibility
- Trained workforce
- More use of new/recycled materials
- Customer-focused construction
- Cost, time, and other contracts

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Research Topics: Getting Involved 

- National Cooperative Highway Research Program (NCHRP)
- FHWA Expert Task Groups (ETG)
- Pooled Fund Studies


 Are you participating in any of these research efforts? How do they seem to be working?

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Research Topics: Getting Involved

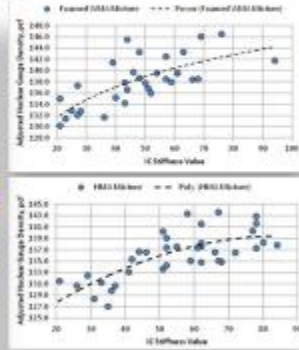
NCHRP 9-40 NCHRP9-40A	Optimization for Tack Coat for HMA Placement
NCHRP 9-43	Mix Design Practices for Warm Mix Asphalt
NCHRP 9-46	Improved Mix Design, Evaluation, and Materials Management Practices for Hot Mix Asphalt with High Reclaimed Asphalt Pavement Content
NCHRP 9-54	Long-Term Aging of Asphalt Mixtures for Performance Testing and Prediction
NCHRP 9-58	The Effects of Recycling Agents on Asphalt Mixtures with High RAS and RAP Binder Ratios
NCHRP 1-55	Porous Friction Course Design and Maintenance

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Intelligent Compaction




- Increased uniformity of rolling pattern
- Knowledge on response of mat to rolling and densification



Has an intelligent roller been used on any of the projects of the participants? If so, how successful was it?

Innovative Contracting Practices 

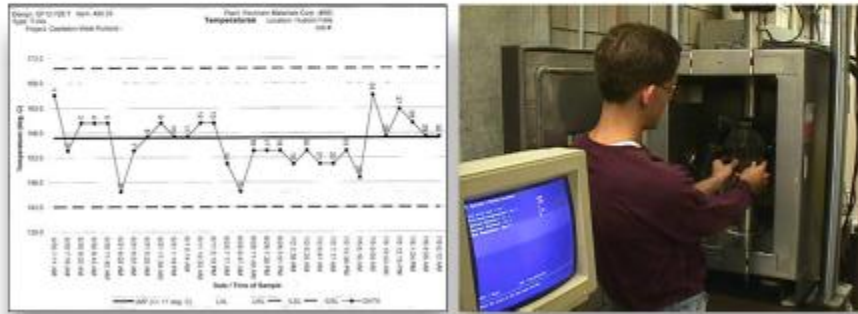
- Low bid approach
- Reward quality/innovation
- Reduced public agency workforce
- Transfer of responsibility

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Performance-Related Specifications

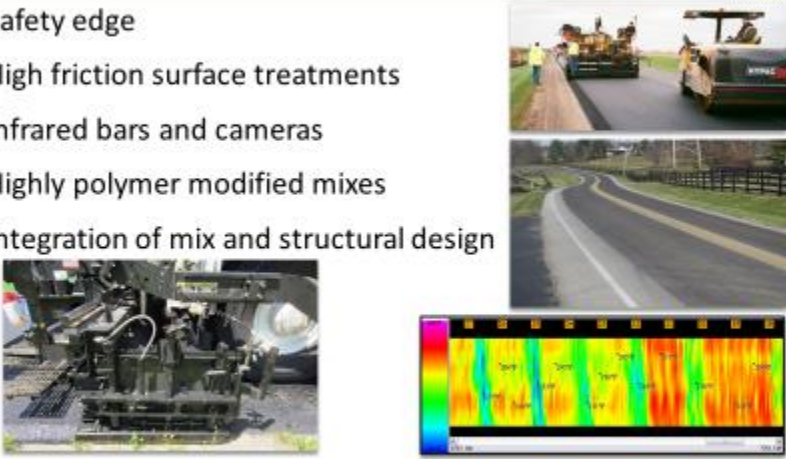


- End result based
- Performance based
- Statistically based



Other Maturing Topics

- Safety edge
- High friction surface treatments
- Infrared bars and cameras
- Highly polymer modified mixes
- Integration of mix and structural design



Q&A Have you used any or all of these devices relative to the construction of asphalt pavements or design of asphalt mixtures?

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Lesson 9 – Hot Topics

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Plant Operation Challenges

- Equipment to meet environmental regulations
- Automation will handle everything from materials handling to plant maintenance



Q&A To what degree is your agency accepting automated asphalt production processes?

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Plant Operations and the Environment



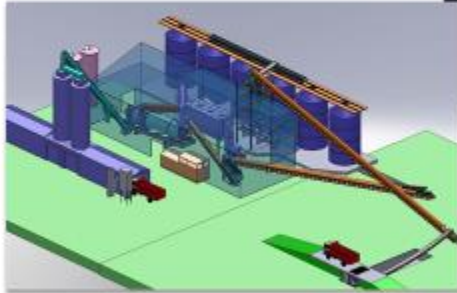
- Plants are now surrounded by residential developments



Changes in Asphalt Production Facilities



Some plants will be completely enclosed in clean attractive buildings in park-like settings.



Other plants may enclose components or groups of components associated by function and proximity.



What are some of the indirect benefits for enclosing all or parts of the plant components—refer back to Lesson 7?

Performance Testing Challenges

• Virtual testing/image analysis

X-ray computed tomography

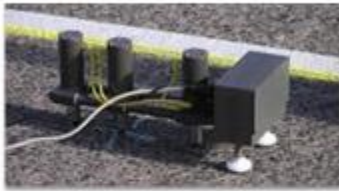
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Quality Assurance Challenges



Portable seismic analyzer

Automated gradation unit



Image analysis of aggregate



Automated asphalt viscosity probe



Automation/Real Time QC Challenges



- Real Time QC
 - Sampling
 - Testing
 - Information systems
 - Adjust operations
- Automation
 - Number of tests performed
 - Location of testing
 - Workforce requirement
 - Benefits of feedback




Laydown and Compaction Challenges




- Automation and new technology
 - Lasers
 - Sonic controls
 - GPS
- Roller/paver operator
 - One-pass rolling
 - Full-width rollers
 - GPS guidance





Keeping in Touch



- Web sites
- Newsletters
- Conferences
- Local Technical Assistance Program (LTAP) centers





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Review Question 

True or false? Warm mix asphalt technology is generally grouped into three categories of additives: chemical, organic, and water injection.

- a) True
- b) False



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Review Question

True or false? There is a well-defined and highly correlated relationship between the IC stiffness value and density of the asphalt concrete mat.

- a) True
- b) False



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