WMA Implementation
National Overview

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PAPA

2018 Annual Conference

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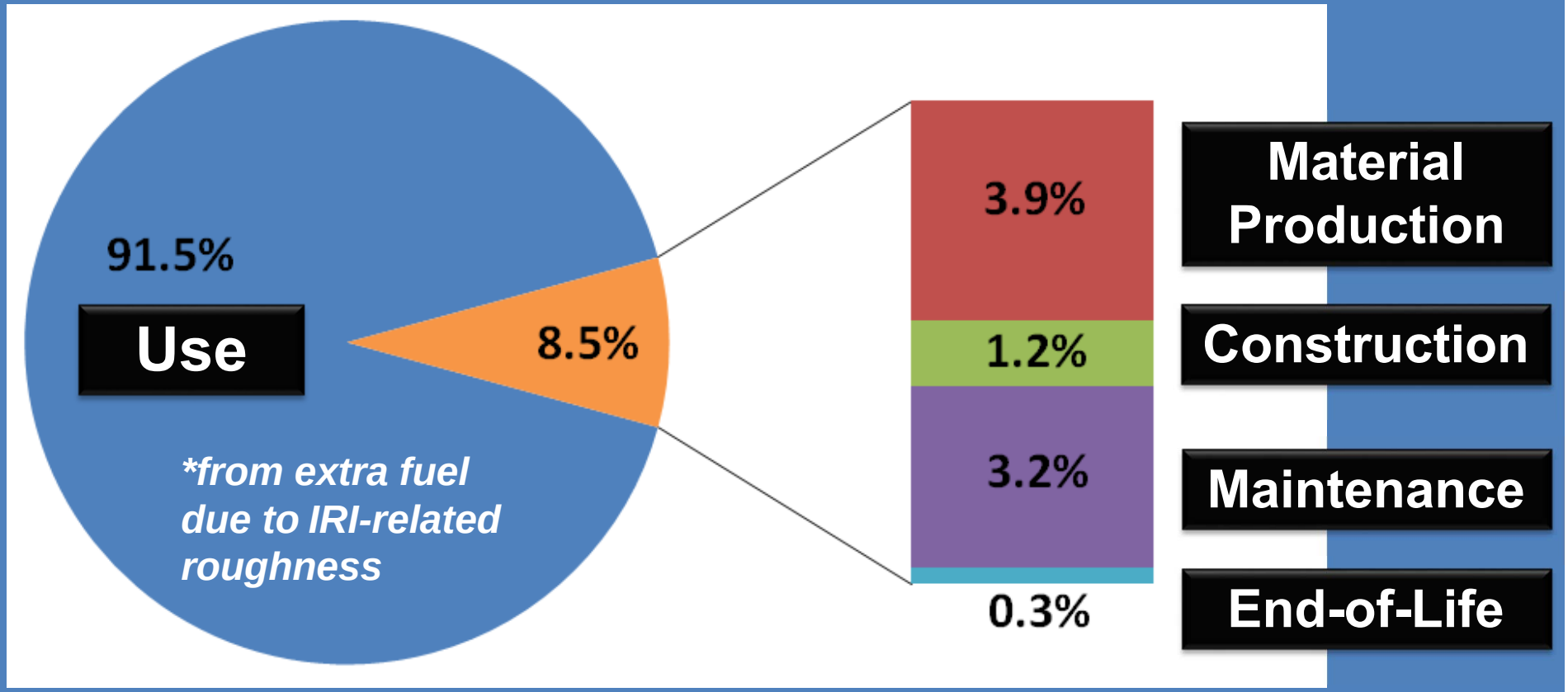
Why are we talking about WMA…again?

Energy Consumed in an Asphalt Pavement Life Cycle



NCHRP Project 20-44(01): *Increasing WMA Implementation by Leveraging the State-of-Knowledge*

PROJECT OBJECTIVES

- Identify barriers to broader use and implementation of WMA
- Review definition for WMA and details of WMA specifications
- Update performance criteria for WMA based on feedback from agencies and industry
- Improve and expand tracking mechanisms for WMA usage

Project Team and Panel

Project Team

Dr. Leslie Myers McCarthy
Villanova University

Dr. Jo Sias Daniel
University of New Hampshire

Ms. Lee Friess
University of New Hampshire

Project Panel Members

Mr. Harold (Skip) Paul, Consultant

Dr. Audrey Copeland, NAPA

Mr. Tim Aschenbrener, FHWA

Dr. Rebecca McDaniel, Purdue Univ.

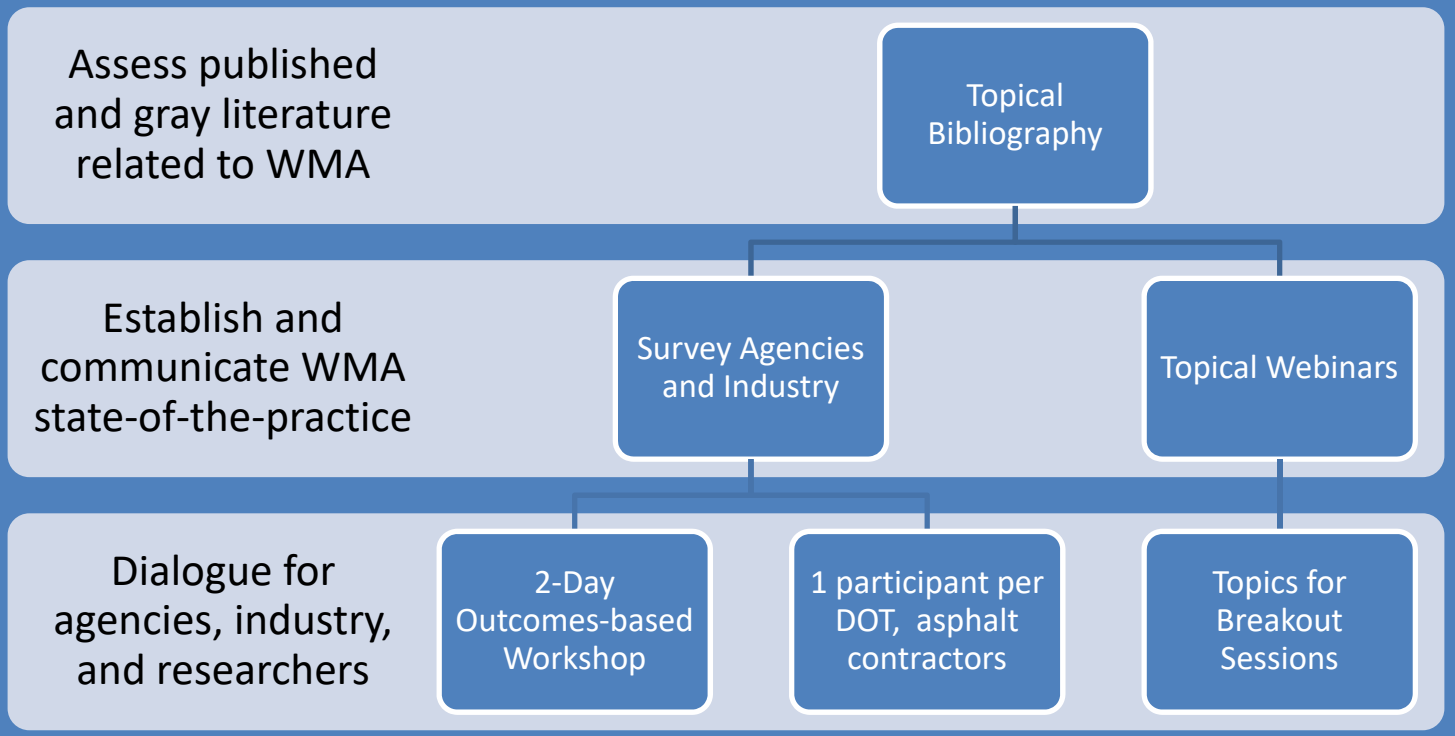
Dr. Ervin Dukatz Jr., Mathy Construction

Mr. Frank Fee, Consultant

Dr. Nelson Gibson, TRB

Project Approach

NCHRP 20-44(01) Elements: *Project Approach*

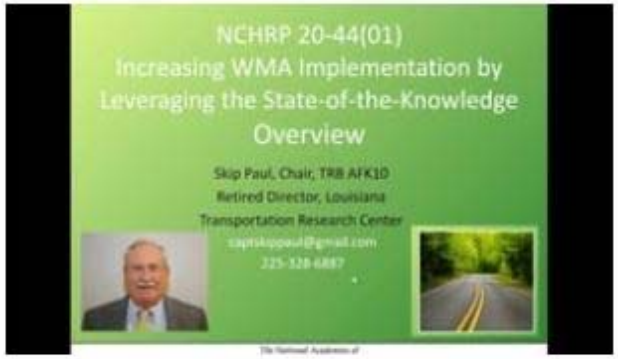


Warm Mix Briefs

Available online at:
http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectI

NCHRP Project 20-44: Increasing WMA Implementation by Leveraging the State-of-the-Knowledge

Sort: Preset | Date | Alphabetical | Plays | Likes | Comments | Duration



Introduction to NCHRP Series

1 week ago

NCHRP Project 20-44, Module 1: Overvie...

1 month ago

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1 Following

Survey of Agencies and Industry

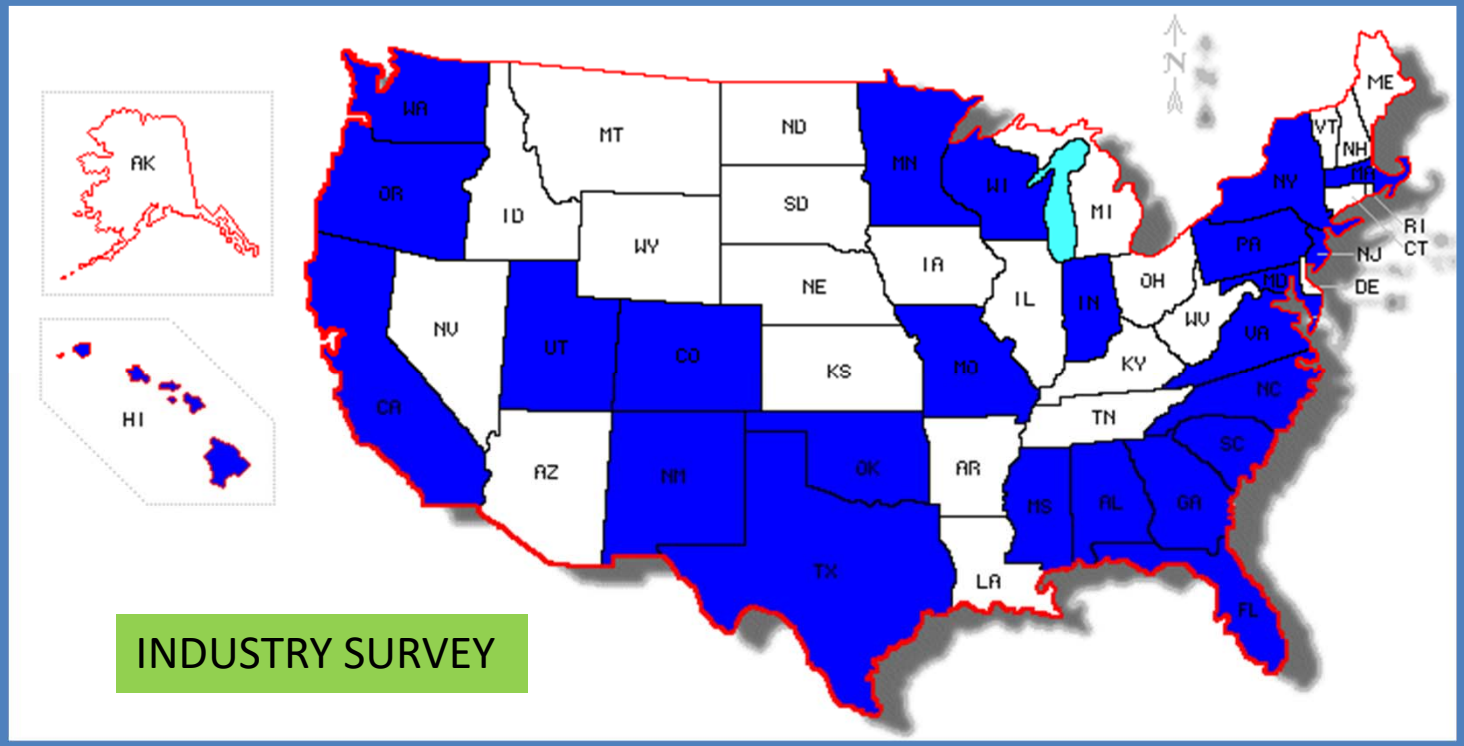
<u>Establish the State-of-the-Practice:</u>

- Definitions of WMA
- Practices related to use and performance of WMA
- Identify barriers to better adoption of tools for WMA implementation
- Identify observed or perceived challenges to increased usage of WMA
- Identify best management practices (BMPs) for successful use of WMA on paving projects

Survey of Agencies and Industry

Response Rates:

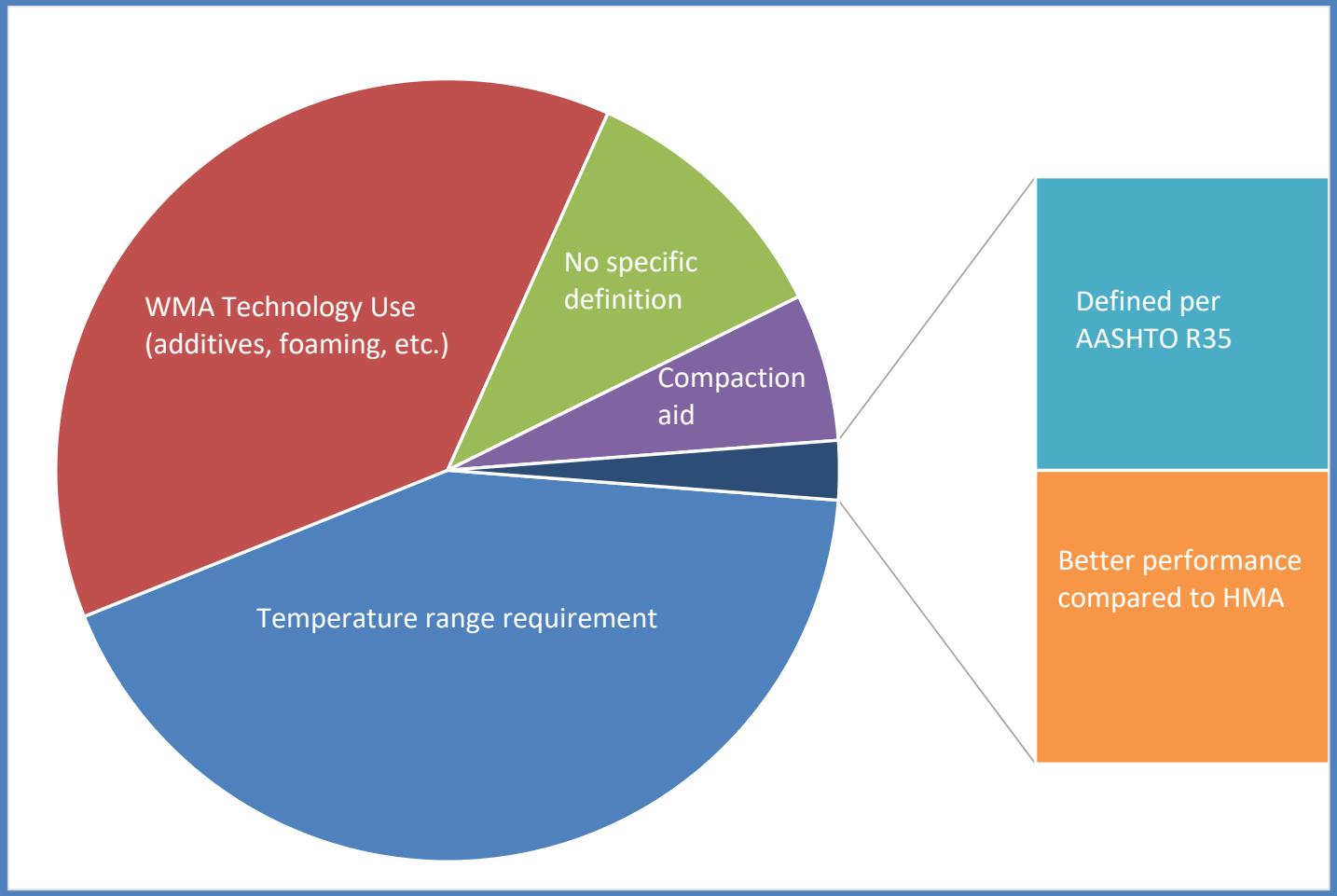
- 55 Agencies (fed, state, local, provincial, turnpike authority)
- 41 Industry members (14 SAPA execs, 27 contractors/producers)



What really is Warm Mix Asphalt?

- Agency survey

55 agencies - - 51 different definitions for WMA



SURVEY RESULTS: Why Use WMA?

Agencies		Industry
Improve workability and quality	1	Achieve better compaction
Extend paving season	2	Extend paving season
Increase haul distance or haul time	3	Reduce fuel consumption & emissions at plant
Reduce fuel consumption & emissions at plant	4	Increase haul distance or haul time
Reduce aging of the binder	5	

Mix Variations used with WMA

Agencies & Industry		Agency Rating of Performance, Compared to w/HMA
RAP	1	41 No Difference; 2 Better; 1 Worse
Polymer-modification (SBS, PPA, etc.)	2	37 No Difference; 10 Better; 1 Worse
Antistrip additives (lime, cement, etc.)	3	28 No Difference; 3 Better; 0 Worse
RAS	4	13 No Difference; 1 Better; 3 Worse
SMA	5	12 No Difference; 2 Better; 0 Worse
Rubber	6	7 No Difference; 2 Better; 0 Worse

2-Day National Workshop
May 2017
Irvine, California

Defining Warm Mix Asphalt: Past and Future

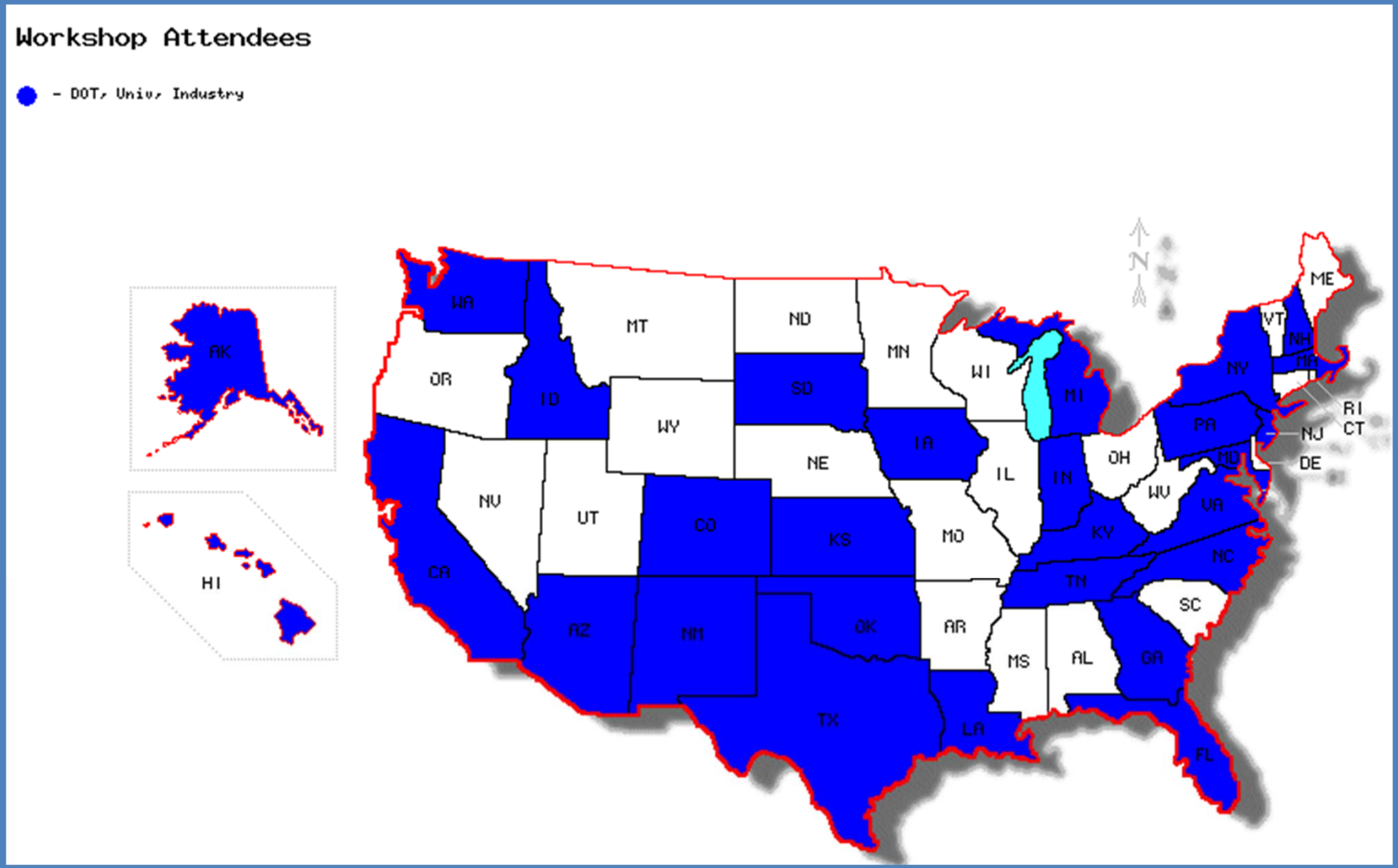
Barriers to and Disincentives Against Expanding the Use of WMA

GOAL:
What do State DOTs need to advance in truly implementing WMA?

Cooperative Actions by Agencies and Industry to Expand the Future Use of WMA

Quantifying the Impacts of WMA over the Long Term: Ways and Means

2-Day Workshop Participants



2-DAY WORKSHOP ON WMA

Discussion and Outcomes

Definition of WMA: Your Thoughts?

- **Should 'warm' continue to be included in the definition of WMA?**
  - Yes, the lower temperature benefits of worker safety and lower emissions are important
  - Yes, other reasons
  - No, the important issues are the different technologies and applications
  - No, other reasons

Group Discussion on WMA Definition

- Focused on who the audience is for the WMA definition: Agency, Industry, Public?
  - All need to be included in some fashion
- Continued use of “warm”?
  - Removing reference to temperature “warm” or “hot” altogether in specs, and instead simply using “asphalt mix” (ASTM moving this direction)
- Tiered approach:
  - Construction/performance – defining usage
  - Public perception/environmental benefits
  - Marketing approach (compaction aid/warm mix)

Definition of WMA: Your Thoughts?

- **Please check the one definition that you think is most appropriate to use for WMA moving forward in the box.**

Select	Options for Redefinition for Warm Mix Asphalt
	1. Continue using NAPA's WMA definition: Warm-mix asphalt is the generic term for a variety of technologies that allow the producers of asphalt pavement material to lower the temperatures at which the material is mixed and placed on the road by 10 to 100 degrees F.
	2. WMA (warm mix asphalt) = Modified asphalt mixes produced with various technologies—including water foaming, chemical additives, and organic waxes—to achieve improved compactability, in-place density, and sustainability over an expanded range of working temperatures and haul distances, and without a diminution of short- and long-term performance.
	3. WMA (warm mix asphalt) = Modified asphalt mixes produced with various technologies—including water foaming, chemical additives, and organic waxes— that have the capacity to be used with lower production temperatures (below 300 deg F), but can also be used at normal production temperatures to achieve improved compactability, in-place density, and sustainability

Barriers to Implementation of WMA

- Limitations in agency specifications & bidding environment
- Lack of sufficient agency support or interest
- Challenges with economics
- Knowledge gaps
- Education gaps

Agency Support

- Suppliers can't get mix approved unless they have a job
- Updating APL/QPL process can be time consuming
- Who is certifier for WMA additive? – depends if it happens at plant or terminal
- No champion in position to make decisions
- Upper management concerns about new products, risk
- Lack of agency staff or experience, high turnover puts more pressure on contractors

Bidding Environment

- No incentives for using WMA in some cases
  - If there is an incentive, how do you verify use of WMA?
- Lack of a WMA specific bid or line item
- Challenges with realizing full savings in a low-bid environment
- Cost of additives, production changes

Challenges with Economics

- No clear quantification of economic savings
- WMA implementation driven by economics
  - Contractors not as motivated as in the case of RAP/RAS
  - Temperature reduction doesn't always translate to savings
- Economic advantages may be understated if full production, placement, and performance aren't considered

Knowledge Gaps

- Lack of tech*nology* transfer, especially to some end users (LPAs, other DOTs, DOT districts)
- Myths about WMA that aren't supported by research findings
- "Research in other places, but not our state"

- More research exists for some technologies (additives) than others (foamers)
- Specimen conditioning for testing – what's the appropriate temp for performance testing?

Education Gaps

- Need to manage the perception of risk
  - Communication gap between design and materials engineers at DOT, and between state and LPAs
- Training needs to be brief and to the point
  - Lack of education on proper dosage rates, especially with new products
  - "WMA is not a magic tool" and… still need sound production and paving practices

Production & Construction Challenges

- Fear of the unknown or change to existing techniques, lack of experience with materials
- Aggregate moisture concerns & condensation in silos or baghouses
- Switching between HMA and WMA in production

Questions on Performance

- Long-term performance & research needs wider dissemination
  - Better documentation of early trial sections that have longer performance history
- Updates on technologies that failed in the past, but may have been improved or reformulated
  - Performance history doesn't exist for newer technologies, so agencies are reluctant to use them
- Who is responsible for tracking (doing and paying for effort)?

Other Barriers or Challenges?

Your Thoughts…

What are the most important barriers from your point of view (check all that apply):

- Doubts about performance
- Education gaps (myths, misinformation, lack of training)
- No clear economic benefits
- Lack of familiarity with WMA
- Restrictive specifications
- No contract incentives for Industry to bid WMA

WMA Guide Specification

Questions…

- Is a guide specification enough? WMA item called out specifically?
- Loosen up the spec, incentivize the contract (LEED-type credits)?
- How do local agencies procure asphalt mix?
- What contract types are available for local agencies to use WMA?
- Is the state's APL clearly written for local agencies to access?
- What should the performance criteria be for other spec types?

Quantifying WMA Impacts

- Cooperative efforts at the regional level *are needed* to track impact and establish a standard of practice for when tracking no longer needs to be done
  - **e.g., states like VA, TX, and KS use significant amounts of WMA and *no longer track its use***
- Fact sheets on Long- term impacts should be disseminated through LTAP/APA
- Communication between departments within an agency *must be a priority*
  - **e.g., Capital Projects department should be aligned and communication with the Operations unit that does maintenance**

Quantifying WMA Impacts

- Environmental benefits/impacts (i.e., all environmental benefits predicated on mix design lives being equal) = joint effort between agencies, contractors, and academia

  - Agencies can use the information to estimate carbon footprint & industry can use as part of Enviro. Product Declaration

- Performance metrics *should be* in place: penalties/incentives paid, density, smoothness, public complaints
- Cost savings *should be quantified*: reduced equipment needed, work zone duration, emissions reduction, and energy savings

Quantifying WMA Impacts

- From your perspective, what would be the three most effective efforts to pursue in your region to quantify WMA impacts (select 3 options):
  - Cooperative efforts
  - Development of Fact Sheets on WMA
  - Communication between departments
  - Quantifying environmental benefits
  - Database platform integration
  - Performance metrics
  - Quantifying cost savings

NEXT STEPS

- Outreach ideas
  - Provide basic training materials to LTAP
  - AASHTO TC3
  - Community of practice
  - Grant programs
  - AASHTO chief engineer presentations, APWA, other target audiences (pavement preservation & user/producer groups)
  - Contractor outreach/education to customers
  - Local agency coordinators

OTHER FEEDBACK

If your agency or company is using WMA on a consistent basis, please provide thoughts on why it is successful.

Products of NCHRP Project 20-44(01)

- Publish workshop proceedings, including results and a vision for the future of WMA, and final project report
- Suggested plan of action for future research and implementation of WMA
- Suggestions for establishing a WMA Community of Practice
- Develop research needs statements for TRB, AASHTO, NAPA and FHWA

PROVIDE FEEDBACK!

- Please answer the brief handout – your thoughts count!

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