

# What is the FHWA-UNR Coop doing on BMD?



Adam Hand, PE, PhD

University of Nevada Reno

Timothy Aschenbrener, PE

Federal Highway Administration

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*FHWA is the source for all images unless otherwise noted.*



U.S. Department of Transportation

**Federal Highway Administration**



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# Acronyms

- Applied Research Associates (ARA)
- Balanced Mix Design (BMD)
- Department of Transportation (DOT)
- Federal Highway Administration (FHWA)
- Job Mix Formula (JMF)
- National Center for Asphalt Technology (NCAT)
- Paragon Technical Services Inc. (PTSi)
- University of Nevada Reno (UNR)



# Expected Outcomes

- Recognition of the various BMD-Related activities products from the FHWA-UNR cooperative agreement through December 2023
- Awareness of on-going and future planned BMD-related efforts associated with recently awarded FHWA-UNR cooperative agreement
- Knowing where to find:
  - Publications and recorded Webinars
  - Who to contact regarding BMD Workshops, Peer Exchanges, & Other

# Outline



U.S. Department of Transportation  
Federal Highway Administration

- Introduction & Background
- Activities to Date
- Summary of Products
- Where to Find Products
- Who to Contact on Workshops, Peer Exchanges, ...
- Wrap Up



U.S. Department of Transportation  
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# Introduction

- DDIAPT Cooperative Agreement Established Fall 2017
- Team
  - FHWA
  - UNR
  - PTSi
  - ARA
- Agreement Structure
  - Six Innovation Areas
  - Tasks Under Innovation Areas – SOW's Annually/Review/Approval/Do Work
  - Activities & Deliverables
  - Access & Communications



**SCAN ME**  
FHWA CO-OP



# Innovation Areas

## **A. Materials**

## **B. Resource Responsible (RR) use of Materials for Flexible Pavement Systems**

## **C. Design, Specifications, and Practices (DS&P)**

## **D. Pavement Preservation (PP) Specifications and Practices**

## **E. Real-Time Pavement Production and Construction Controls**

## **F. Forensic Support and Asphalt Testing to Support Stakeholders**

- *6 Innovation Areas*
- *15 Work Plan Task Areas Total*
- *1 to 8 Subtask Areas Work Plan Tasks in Innovation Areas*



# Work Plan Tasks & Titles

| Innovation Area  | Work Plan Task | Title   |
|--|----------------|---|
| <b>A. Materials</b>  | A.1            | Advancement of Innovative Binders for Asphalt Pavement Systems                        |
|  | A.2            | Other New & Innovative Materials as Agreed Upon                                       |
| <b>B. Resource Responsible (RR) use of Materials for Flexible Pavement Systems</b> | B.1            | High Reclaimed Asphalt Pavement (RAP) Mixtures  |
|  | B.1.1          | Document Field Performance and RAP Best Practices                                     |
|  | B.1.2          | Document Field Performance and Cold Asphalt Recycling Best Practices                  |
|  | B.2            | Reclaimed Asphalt Shingles (RAS) Modified Binders and Mixtures                        |
|  | B.3            | Asphalt Rubber-Modified Binders   |
|  | B.3.1          | Resource Responsible Use of Recycled Tire Rubber in Asphalt Pavements                 |
|  | B.3.2          | Effective use of GTR modified asphalt binder in asphalt mixtures                      |
|  | B.4            | Other New & Innovative RR Systems   |
|  | B.4.1          | Responsible use of Re-refined Engine Oil Bottoms (REOB) and Polyphosphoric Acid (PPA) |
|  | B.4.2          | Recycled Materials and Warm-Mix Asphalt Usage (2020)                                  |
|  | B.4.3          | Recycled Materials and Warm-Mix Asphalt Usage (2021)                                  |
|  | B.4.4          | Recycled Materials and Warm-Mix Asphalt Usage (2022)                                  |





# Work Plan Tasks & Titles

## C. Design, Specifications, and Practices (DS&P)

| C.1   | Asphalt Mixture Performance Based Design Technical Refinement and Deployment Support        |
|-------|---|
| C.1.1 | AMPT and PRS Training   |
| C.1.2 | Barrier Analysis to AMPT and PRS  |
| C.1.3 | Informational Brief on Performance and Index Based Tests                                    |
| C.1.4 | Document Case Studies and Practices for Implementation of BMD                               |
| C.1.5 | Asphalt Performance-Related Specifications (PRS) – A 2020 RoadMap for Moving Forward        |
| C.1.6 | Document Practices for Asphalt Mixture Adjustments to Meet Performance Test Requirements    |
| C.1.7 | Balanced Mix Design (BMD) Case Studies Virtual Workshop: Moving Forward with Implementation |
| C.1.8 | <del>Balanced Mixture Design Peer Exchange – PART I &amp; II</del>                          |
| C.2   | Deployment and Technical Support of Refined Superpave Binder Specification                  |
| C.2.1 | Incorporate MSCR, $\Delta T_c$ , etc. into the Specification                                |
| C.3   | Technical Support of Refined Superpave Volumetric Mixture Design & Specification            |
| C.4   | Increased Pavement Density Initiative Support   |
| C.4.1 | Asphalt Density Educational Materials   |
| C.4.2 | Support Delayed Asphalt Density Efforts   |
| C.4.3 | Density Specification Focused Review  |
| C.5   | Deployment and Technical Support of MSCR Binder Specifications                              |
| C.6   | Deployment and Technical Support of Delta Tc Binder Parameter and Specifications            |
| C.7   | Asphalt Materials Quality Assurance Practices   |
| C.8   | Other New and Innovative DS&P As Agreed Upon  |
| C.8.1 | Advances in the Design, Production, and Construction of Stone Matrix Asphalt (SMA)          |
| C.8.2 | National Asphalt Plant Quality Control Plan Template  |
| C.8.3 | Asphalt Quality Assessment Production Model   |



# Work Plan Tasks & Titles

|  |            |  |
|--|------------|--|
| <b>D. Pavement Preservation (PP) Specifications and Practices</b>      | <b>D.1</b> | <b>New and Innovative PP Specifications and Practices</b>  |
|  | D.1.2      | Reduce Cutbacks in Pavement Maintenance and Preservation   |
| <b>E. Real-Time Pavement Production and Construction Controls</b>      | E.1        | New and Innovative Real-Time Production and Construction Controls                                  |
|  | E.1.1      | Review of Paver-Mounted Thermal Profiler and Density Profile System Using Ground Penetrating Radar |
|  | E.1.2      | Intelligent Construction Equipment QA Data Validation  |
| <b>F. Forensic Support and Asphalt Testing to Support Stakeholders</b> | F.1        | Asphalt Pavement Analysis, Binder and Mixture Testing, and Data Analysis                           |
|  | F.2        | On-Site Field Investigations   |
|  |            | Marketing and Communication Plans  |



# BMD Related Activities & Products

- 2020 Workshop: A path forward including BMD.
- Collaborate with NCHRP Project 10-107 team for Consistent Tasks to BMD Implementation.
- Multiple Related Publications.
- BMD Lead States Site Visits.
- BMD Case Study Workshops (State DOTs).
- Peer Exchanges (Regional and Mega States).
- Webinars.

- FHWA Leads: Tim Aschenbrener, Derek Nener-Plante
- UNR Leads: Elie Hajj, Harold Von Quintus  
Tom Bennert, Don Christiansen



# BMD Related Activities & Products

- Multiple Related Publications

- [Tech Brief: Balanced Asphalt Mix Design: Eight Tasks for Implementation](#) (FHWA-HIF-22-048).
- Technical Report: [Index-based tests for performance engineered mixture designs for asphalt pavements](#) (FHWA-HIF-19-103).
- [Tech Brief: Adjustment of Asphalt Mix Design/Job Mix Formula to Satisfy Mechanical Test Properties](#) (WRSC-TB-22-01).
- Technical Report: [Positive Practices, Lessons Learned and Challenges When Implementing Balanced Design of Asphalt Mixtures: Site Visits](#) (WRSC-TR-22-11).
- [1-Pager: Adjustment of Asphalt Mix Design/ Job Mix Formula to Satisfy Mechanical Test Properties](#) (WRSC-1P-23-01).
- [2023 Southeast Peer Exchange on Balanced Mix Design \(BMD\): Outcomes Summary](#) (FHWA-HIF-23-031).
- [2023 North Central Peer Exchange on Balanced Mix Design \(BMD\): Outcomes Summary](#) (FHWA-HIF-23-032).
- [2023 Northeast Peer Exchange on Balanced Mix Design \(BMD\): Outcomes Summary](#) (FHWA-HIF-23-042).

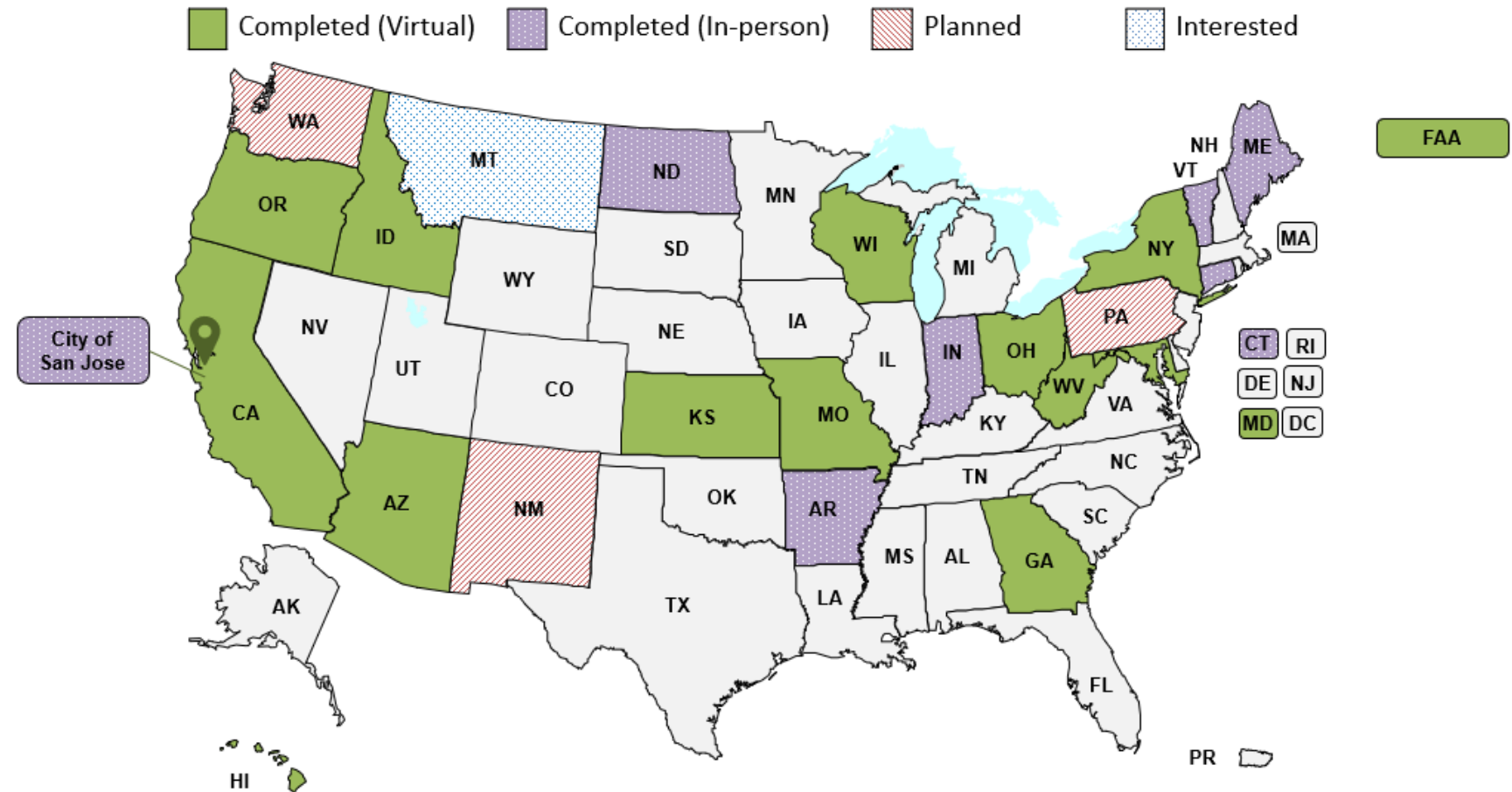
# FHWA Balanced Mix Design Case Studies Virtual and In-Person Workshops



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- 14 Virtual
- 7 In-Person
- 3 Planned
- 2 Interested

## FHWA Balanced Mix Design Case Studies Virtual/In-Person Workshop





# BMD Case Studies Workshop



## Balanced Mix Design (BMD) Case Studies Virtual Workshop: Moving Forward with Implementation



### Description

This free Federal Highway Administration (FHWA) workshop will provide State DOTs with knowledge on how to get started and/or move forward with the implementation of BMD as learned from in-depth case studies of key State DOTs. It is **customized** to a State DOTs current situation with its BMD implementation program.

This unique workshop includes providing managers and practitioners with knowledge on:

- a. the overall BMD process and its benefits;
- b. the planning and activities needed for the selection, evaluation, and implementation of performance tests for routine uses in a BMD process; and
- c. positive practices and lessons learned by key State DOTs.

**The workshop will focus on a BMD implementation process that was developed and conducted from in-depth case studies of key State DOTs.**

### Outcomes

Upon completion of the workshop, participants will be able to:

- Understand the overall benefits of BMD.
- Recognize the planning and coordination effort associate with the implementation process of BMD.
- Identify the tasks that need to be completed for the development and implementation of BMD.
- Recognize successful key State DOTs practices and experiences related to BMD.
- Recognize available external technical information and support.

### Location

The **free virtual workshop** will be delivered using Microsoft Teams or any other virtual meeting platform accepted by a State Department of Transportation (DOT).

### Length

The workshop is a total of six hours and will include multiple segments with a maximum of three hours per segment. The workshop can be delivered over the course of several days.

### Target Audience

The successful implementation of BMD will need to be a team effort. Thus, the target audiences for the workshop are managers and practitioners interested in the implementation of BMD from State DOTs, industry, academia, and consultants. This involves participants from various offices of a State DOT, such as materials, pavement design, construction, and pavement management.

### Register Today

Contact **Derek Nener-Plante** at [derek.nenerplante@dot.gov](mailto:derek.nenerplante@dot.gov) for more information.

- **FREE**
- **Customized to a State DOT current situation.**

| Modules      | Title  | Time              |
|--------------|--|-------------------|
| <b>Day 1</b> |  |                   |
| General      | Introduction                                 | 12:30 pm–1:15 pm  |
| Core 1       | Benefits and Overall Planning                | 1:15 pm–2:00 pm   |
| Break        |  | 2:00 pm–2:15 pm   |
| Core 2       | Performance Tests Selection and Equipment    | 2:15 pm–4:30 pm   |
| <b>Day 2</b> |  |                   |
| Core 3       | Establishment of Baseline Data               | 8:00 am–9:45 am   |
| Break        |  | 9:45 am–10:00 am  |
| Core 4       | Program Development & Initial Implementation | 10:00 am–11:30 am |
| General      | Closing Discussion                           | 11:30 am–12:00 pm |

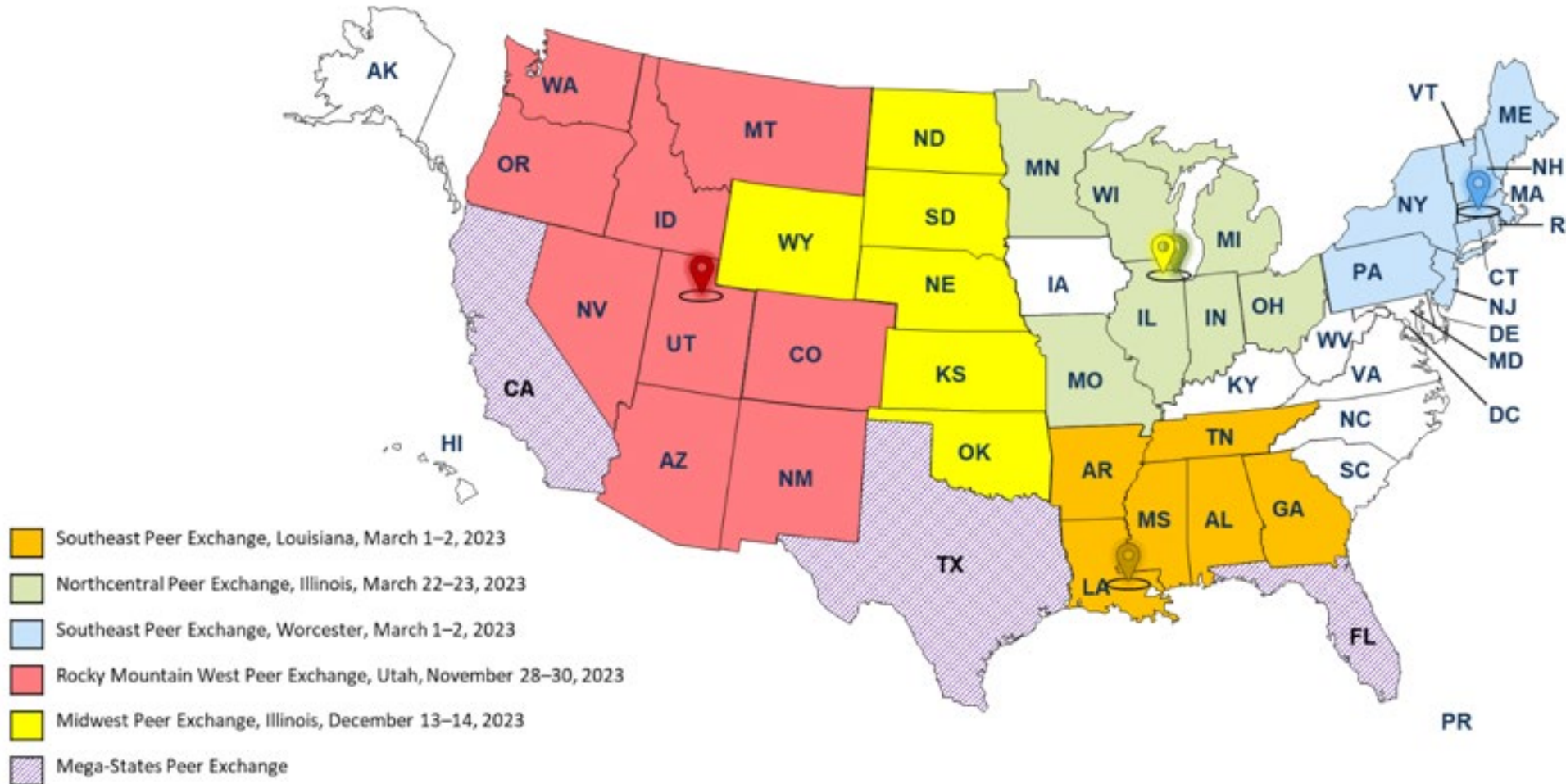


# BMD Case Study Workshop Reports

- Case studies on the Implementation of BMD and performance tests for asphalt mixtures Technical Reports:
  - California DOT (WRSC-TR-21-02) (<http://hdl.handle.net/11714/7981>)
  - Illinois DOT (WRSC-TR-21-03) (<http://hdl.handle.net/11714/7982>)
  - Louisiana DOT (WRSC-TR-21-04) (<http://hdl.handle.net/11714/7983>)
  - Maine DOT (WRSC-TR-21-05) (<http://hdl.handle.net/11714/7984>)
  - New Jersey DOT (WRSC-TR-21-06) (<http://hdl.handle.net/11714/7985>)
  - Texas DOT (WRSC-TR-21-07) (<http://hdl.handle.net/11714/7986>)
  - Virginia DOT (WRSC-TR-21-08) (<http://hdl.handle.net/11714/7987>)
- Overall Summary Report:
  - [Positive Practices, Lessons Learned and Challenges When Implementing Balanced Design of Asphalt Mixtures: Site Visits](#) (WRSC-TR-22-11).



# FHWA Peer Exchanges



Coming up in Fall 2024  
**PART III Mid-Atlantic  
Peer Exchange**

**BMD peer exchanges Part I and Part II.**



# Peer Exchanges Agenda

## DAY 1; NCAT NCHRP 10-107 WORKSHOP

|              |   |
|--------------|---|
| 8:00–4:30 PM | Guide for Implementing Performance Specifications |
|--------------|---|

## DAY 2– BMD PEER EXCHANGE FOCUS ON EXISTING EFFORTS

|                |   |
|----------------|---|
| 8:00–8:15 AM   | Check-In  |
| 8:15–8:30 AM   | Welcome/Introductions (Facilitated by Jason Bittner, ARA)                                     |
| 8:30–9:00 AM   | Peer Exchange Meeting Primary Focus (Tim/Derek, FHWA)   |
| 9:00–10:00 AM  | Group Discussion/Round Table #1: BMD Status [Based on questionnaire sent to each participant] |
| 10:00–10:15 AM | BREAK   |
| 10:15–12:00 PM | Group Discussion/Round Table #2: BMD “Why”, Scope, & Approach                                 |
| 12:00–1:00 PM  | LUNCH   |
| 1:00–2:30 PM   | Group Discussion/Round Table #3: Benchmarking   |
| 2:30–2:45 PM   | BREAK   |
| 2:45–4:00 PM   | Group Discussion/Round Table #4: Validation   |
| 4:00–4:30 PM   | Wrap Up and Review of Day 2 Agenda  |

## DAY 3–LOOKING TO THE FUTURE / FOCUS ON FUTURE EFFORTS

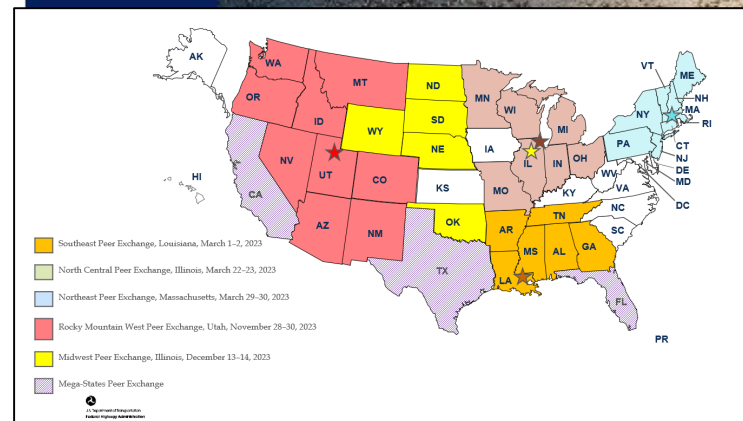
|                |  |
|----------------|--|
| 8:00–8:15 AM   | Opening Remarks  |
| 8:15–10:00 AM  | Group Discussion/Round Table #5: Role of Sustainability                                    |
| 10:00–10:15 AM | BREAK  |
| 10:15–11:15 AM | Group Discussion/Round Table #6: Challenges and Lessons Learned                            |
| 11:15–11:45    | Summary: Next Steps towards Implementing BMD within each Agency & Needs for Moving Forward |
| 11:45–12:00 PM | Wrap Up Feedback<br>Adjourn – Thank You and Safe Travels                                   |



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# Regional Peer Exchange Outcomes

- Networking contacts.
- Individual regional peer exchange reports.
  - Discussions.
  - Presentations.
  - **CHALLENGES!**
- One summary tech brief (under development).





# Regional Peer Exchange Outcomes Challenges

## Management Challenges

- Change Management.
- Cost-Benefit Analysis
- Specifications & Risk Management.
- Resource Allocation.
- Implementation Planning.
- Stakeholders Engagement.

- Integration with Existing Practices.
- Education, Training, & Skill Development.
- Information Sharing & Collaboration Among Peers

## Technical Challenges

- BMD Tests Validation
- Testing Procedures & Protocols
- Variabilities
- Database Setup, Collection, Analysis, & Management.
- Pathway for Use in Field Quality Assurance (QA).
- Volumetrics Historical Usage

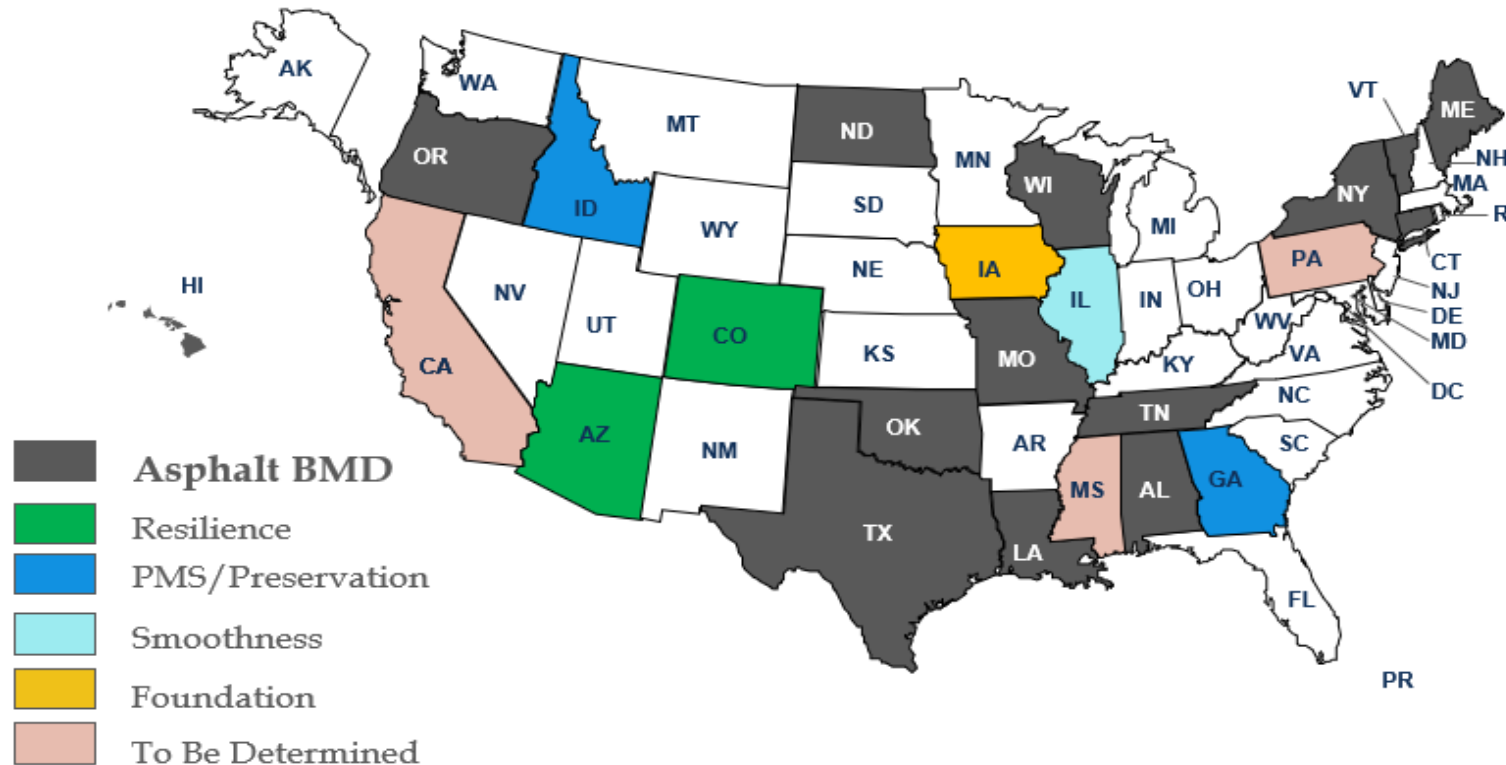


# BMD Peer Exchange Reports

- Peer Exchange on Balanced Mix Design (BMD) Outcomes Summary Reports:
  - 2023 Southeast Peer Exchange on Balanced Mix Design (BMD): Outcomes Summary (FHWA-HIF-2023-031)  
([https://www.fhwa.dot.gov/pavement/pub\\_details.cfm?id=1163](https://www.fhwa.dot.gov/pavement/pub_details.cfm?id=1163)) &  
(<http://hdl.handle.net/11714/10501>)
  - 2023 North Central Peer Exchange on Balanced Mix Design (BMD): Outcomes Summary (FHWA-HIF-2023-032)  
([https://www.fhwa.dot.gov/pavement/pub\\_details.cfm?id=1163](https://www.fhwa.dot.gov/pavement/pub_details.cfm?id=1163)) &  
(<http://hdl.handle.net/11714/10500>)
  - 2023 Northeast Peer Exchange on Balanced Mix Design (BMD): Outcomes Summary (FHWA-HIF-2023-042)  
([https://www.fhwa.dot.gov/pavement/pub\\_details.cfm?id=1163](https://www.fhwa.dot.gov/pavement/pub_details.cfm?id=1163)) &  
(<http://hdl.handle.net/11714/10502>)
  - 2023 Rocky Mountain West (Under Review)
  - 2023 Midwest (Under Review)



# FHWA AIDPT Pooled Fund Peer Exchange on BMD (March 12–14, 2024)



## PAST:

- Site Visits: **Identify 8 Tasks.**
- Regional Peer Exchanges: **Challenges.**

## THIS WEEK:

- AIDPT BMD Peer Exchange.
  - Purpose: for each challenge, what are:
    - **Successes.**
    - **Current research/activities.**
    - **Research gaps.**



# Mapping BMD Implementation Effort to 8 Tasks for BMD (after Epps-Martin, A.)

| Task  | Description + Notes                | Status      | Completion        |
|---|------------------------------------|-------------|-------------------|
| 1 Providing Motivation                                      | Benefits – Sustainability          | Complete    | 2019              |
| 2 Overall Planning  | Collaboration – TxDOT Industry WG  | Ongoing     | Semi-Annually     |
|   | Goals, Tasks, Timeline – IACs      | Complete    | 2019, 2022        |
| 3 Selecting Performance Tests                               | Distress – Cracking, Rutting, Skid | Complete    | 2019              |
| HWT, OT, CT, RT, (Texture/Friction)                         | Validation – Lab vs Field          | Ongoing     | Annually          |
| 4 Acquiring Equipment                                       | Evaluation – Contractor Package    | Complete    | 2023              |
|   | Inter-Lab Studies – CTIS, NCAT     | In Progress | 2022 +            |
| 5 Establishing Baseline Data                                | TX Benchmarking                    | Complete    | 2023              |
| <b>TxDOT BMD Overview w/ FHWA 8 Tasks</b> (FHWA-HIF-22-048) | WesTrack                           | In Progress | 2024              |
|   | Shadow Projects                    | In Progress | 2024 construction |
|   | Variability                        | Ongoing     | 2022, 2025        |
|   | Strategies – AASHTO SP             | In Progress | 2024              |
| 6 Developing & Piloting Spec                                | Revised SS 3074                    | Ongoing     | 2023, 2025 +      |
|   | Lead District Projects             | Not Started | 2026              |
|   | Acceptance                         | Ongoing     | 2025 +            |
| 7 Training & Certification                                  | Training & Accreditation           | Not Started | 2026              |
| 8 Initial Implementation                                    |                                    | Not Started | 2026              |



# BMD Test Videos

## Pavements

|                   |                             |                |                                   |                                 |
|-------------------|-----------------------------|----------------|-----------------------------------|---------------------------------|
| Design & Analysis | Materials Quality Assurance | Sustainability | Pavement Management & Performance | <b>Pavement &amp; Materials</b> |
| Asphalt           | Concrete                    | Aggregates     | Materials                         |                                 |
| Trailer           | In-place Pavement Density   | Analysis       | MATC                              |                                 |

Home / Programs / Pavements / Pavement & Materials / Asphalt / Videos

## Videos

- Asphalt Mixture Performance Tester (AMPT) Video Series
  - [AMPT Video 1: Fabrication of Small and Large Specimens](#)
  - [AMPT Video 2: Dynamic Modulus Small Specimen Test](#)
  - [AMPT Video 3: Cyclic Fatigue Small Scale Specimen Test](#)
  - [AMPT Video 4: Stress Sweep Rutting Test](#)
- BMD Asphalt Performance Testing Video Series
  - [BMD Video 5: Semi-Circular Bend Test \(SCB\)](#)
  - [BMD Video 6: Indirect Tensile Cracking Test \(IDEAL-CT\)](#)
  - [BMD Video 7: Illinois Flexibility Index Test \(I-FIT\)](#)
  - [BMD Video 8: Hamburg Wheel-Track Test](#)

<https://www.fhwa.dot.gov/pavement/asphalt/videos/>  
<https://www.unr.edu/wrsc/tools/asphalt/dapt-publications>



# DAPT Webinars

## DAPT webinars

**+ Adjusting Asphalt Concrete Mix Designs to Optimize Laboratory Performance | Available on-demand**

**+ Eight Tasks Towards Implementation of Balanced Mix Design for Asphalt Mixtures | Available on-demand**

**+ Industry Practices and Suggestions for Adjusting Asphalt Mixtures to Meet Balanced Mix Design (BMD) Specifications | Available on-demand**

**+ BMD Peer-To-Peer Exchanges: Findings and Challenges to Implementation | Feb. 15, 2024**

**+ DDIAPT Products: Overall Review and Impact on Strategic Goals | March 7, 2024**

<https://www.unr.edu/wrsc/tools/asphalt/webinars>

[Webinar Series on Deployment of Asphalt Pavement Technologies \(DAPT\): 1-page description and access](#) FHWA-HIF-24-010 2024



# ACCELERATED IMPLEMENTATION AND DEPLOYMENT OF ASPHALT PAVEMENT TECHNOLOGIES



The Federal Highway Administration (FHWA) has an ongoing Accelerated Implementation and Deployment of Pavement Technologies (AIDPT) Program, which includes the deployment of innovative technologies to improve pavement performance and reduce agency risk. A constant challenge in the transportation community is timely and efficient deployment of these new and innovative technologies.

## FEATURED PRODUCTS IN THE FOLLOWING AREAS

- **Asphalt Binders**
- **Asphalt Pavement Design and Construction**
- **Balanced Mix Design**
- **Quality Assurance for Asphalt**
- **Recycled Asphalt Materials**

### TECHNICAL RESOURCES AVAILABLE:

- To stimulate, facilitate, and expedite the deployment and rapid adoption of new and innovative technology relating to the design, production, testing, control, construction, and investigation of asphalt pavements.
- To provide Congress and the U.S. Department of Transportation with valuable real-life data and feedback to inform future decision making.

### VIEW COOPERATIVE AGREEMENT MATERIALS:

<https://www.fhwa.dot.gov/pavement/asphalt/coopmaterials/>

For more information or technical assistance, please contact: **Tim Aschenbrener, FHWA, [timothy.aschenbrener@dot.gov](mailto:timothy.aschenbrener@dot.gov)**.

More information about the cooperative agreement is at: <https://www.unr.edu/wrsc/tools/asphalt>. This material is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange under agreement number 693JJ31850010 Development and Deployment of Innovative Asphalt Pavement Technologies. The U.S. Government assumes no liability for the use of the information in the non-FHWA-branded documents.

# DEPLOYMENT OF ASPHALT PAVEMENT TECHNOLOGIES (DAPT) WEBINAR SERIES

**WHAT IS IT?** The Deployment of Asphalt Pavement Technologies (DAPT) webinar series is your gateway to the latest information and implementation aspects of various asphalt pavement technologies.

**HOW?** Hosted by the University of Nevada, Reno and moderated by the FHWA, these webinars cover several topics such as resource responsible use of materials, quality assurance, and balanced mix design of asphalt mixtures.

**WHAT SETS APART THESE SESSIONS?** Open access for all, active participation in Q&A sessions, and the added benefit of earning professional development hours/continuing education units (PDH/CEU).

### ASPHALT BINDER

- ▶ [Delta Tc \( \$\Delta T\_c\$ \) Binder Specification Parameter](#)
- ▶ [Multiple Stress Creep and Recovery \(MSCR\) Implementation and Transition](#)
- ▶ [Responsible Use of Re-refined Engine Oil Bottoms and Polyphosphoric Acid Modifications of Binders](#)

### BALANCED MIX DESIGN

- ▶ [Adjusting Asphalt Concrete Mix Designs to Optimize Laboratory Performance](#)
- ▶ [Eight Tasks Toward Implementation of Balanced Mix Design for Asphalt Mixtures](#)
- ▶ [Industry Practices and Suggestions for Adjusting Asphalt Mixtures to Meet Balanced Mix Design \(BMD\) Specifications](#)
- ▶ [BMD Peer-To-Peer Exchanges: Findings and Challenges to Implementation](#)

### PAVEMENT DESIGN AND CONSTRUCTION

- ▶ [Demonstration Projects, Related Specifications, and Techniques for Improving Density](#)
- ▶ [Overcoming Obstacles to Achieve Mat Density and Improve Joint Performance](#)
- ▶ [SMA Mixtures: Advances in Design and Construction](#)

### QUALITY ASSURANCE FOR ASPHALT

- ▶ [Asphalt Materials Quality Assurance Practices](#)
- ▶ [Intelligent Construction Equipment for Use in Quality Assurance Programs](#)

### RECYCLING

- ▶ [Asphalt Mixture Considerations for Use of GTR Modified Asphalt Binders](#)
- ▶ [Resource Responsible Use of Recycled Tire Rubber in Asphalt Pavements](#)
- ▶ [Resource Responsible Use of High RAP \(up to 50%\) Asphalt Mixtures](#)
- ▶ [Successful Practices and Lessons Learned When Using Reclaimed Asphalt Shingles in Asphalt Mixtures](#)
- ▶ [Asphalt Pavement Recycling Technologies: Overview of Successful Practices](#)

### SUSTAINABILITY

- ▶ [Asphalt Pavement Carbon Footprint Reduction: Overview of Techniques, Needs and Opportunities](#)

### OTHER

- ▶ [DDIAPT Products: Overall Review and Impact on Strategic Goals](#)

Visit the FHWA website for additional information and related publications at <https://www.fhwa.dot.gov/pavement/asphalt/coopmaterials/>.

For more information or technical assistance, please contact: **Tim Aschenbrener, FHWA, [timothy.aschenbrener@dot.gov](mailto:timothy.aschenbrener@dot.gov)**.

**IT'S NOT JUST A WEBINAR—IT'S AN OPPORTUNITY FOR GROWTH AND STAYING AT THE FOREFRONT OF ASPHALT PAVEMENT TECHNOLOGIES!**

**ALL WEBINARS ARE AVAILABLE ON-DEMAND**

Click on each title to watch the webinar



# The Future

- New DDIAPT Cooperative Agreement Established Fall 2023
- Team
  - FHWA
  - UNR
  - NCAT
  - AI
  - Additional Partners
- Agreement Structure
  - Innovation Areas
  - Tasks Under Innovation Areas – SOW’s Annually/Review/Approval/Do Work
  - Activities & Deliverables
  - Access & Communications
- Year 1 SOWs
  - Submitted
  - Several Approved & Effort Started
- Significant BMD Efforts Included
  - Continuation of 2017 Coop Items (i.e. BMD)
  - Additional BMD Efforts Expanded



# What Else?

- Want information?
- Want to do a Workshop?
- Want other Support?
  - Specification Reviews
  - ...
  - Contact Tim Aschenbrener
- Input has been informative and helpful for others
- Excited about future activities



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# Resources



**SCAN ME**  
FHWA CO-OP  
AGREEMENT SITE



**SCAN ME**  
UNR-FHWA CO-OP  
SITE



**SCAN ME**  
NAPA BMD  
RESOURCE GUIDE



**SCAN ME**  
TRB E-C280



# Thank you to All Involved

- FHWA
- Coop Agreement Team Entities & individuals
  - UNR
  - ARA
  - PTSi
- Others: DOTs, Industry, NCAT
- Deliverables Have Been Impactful
- Thank you All for Your Contributions

# Thank You!

Adam Hand

University of Nevada Reno

[Adamhand@unr.edu](mailto:Adamhand@unr.edu)

## Key Contacts

Tim Aschenbrener

FHWA

[Timothy.aschenbrener@dot.gov](mailto:Timothy.aschenbrener@dot.gov)

Derek Nener-Plante

FHWA

[derek.nenerplante@dot.gov](mailto:derek.nenerplante@dot.gov)

Elie Hajj

UNR

[elieh@unr.edu](mailto:elieh@unr.edu)

