

Summary Report
Northeast Region Peer Exchange
Hanover, MD
April 24 – 25, 2019

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Contents

- Summary 1
- Introduction 3
 - Session Format..... 3
- Peer Exchange Notes 5
 - Mission, Strategies & Barriers..... 5
 - FHWA Presentation & Open Discussion, Regulations and Policy 8
 - What can FHWA do for you? 10
- Current Practice Exercise 12
 - Pavement Design Procedures 12
 - Structural Pavement Design Projects..... 12
 - Currently Utilized Pavement Design Methodologies..... 12
 - Policy Guidance on Traffic Inputs 12
 - Policy Guidance on Pavement Foundations 12
 - Policy Guidance on Shoulder Structure 13
 - Policy Guidance on Rehabilitation 13
 - Policy Guidance on Safety..... 13
 - Policy Guidance on Environmental Considerations 13
- Economic Analysis..... 13
 - Addresses Economic Analysis 13
 - Basis for Determining and Addressing Economic Analysis 14
 - Methodology for Cost-Effective Design 14
 - Allow for Alternate Bidding..... 14
 - Details of the LCCA..... 14
 - Analysis Period and Documented LCCA 14
- Policy Review and Updates 14
 - Updates to Pavement Policy Manual..... 14
 - Review/Approval of Revisions by FHWA Division Office 14
- Attendee List 15

Summary

This report provides a summary of the Northeast Region Peer Exchange on Pavement Design Policy sponsored by the Federal Highway Administration (FHWA). The peer exchange took place at the Maryland State Highway Administration in Hanover, MD, on April 24–25, 2019. It focused on FHWA pavement design policy as defined by Title 23 CFR Part 626 Pavement Policy (the “Policy”), Non-Regulatory Supplement NS 23 CFR Part 626 Pavement Design Considerations, and Technical Advisory T5040.39A Use of Alternate Bidding for Pavement Type Selection. Attendees included staff from State Departments of Transportation (DOTs) and FHWA Division Offices in Connecticut, Delaware, Maine, Maryland, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, and the District of Columbia.

FHWA presented several items for discussion regarding the current state of the Policy, using focus questions and prompts during moderated exchanges that enabled participants to offer comments and recommendations. Participants discussed current practices for designing new and rehabilitated pavements and for performing economic analysis. They were also provided an opportunity to express organizational needs in terms of research areas, training, guidance, etc. for future consideration by FHWA.

The State DOT participants generally agreed with that their missions and values were consistent with FHWA’s Pavement Design Policy. Including safety as a key focus area was suggested, as was a consideration for the efficient use of dollars spent, specifically referring to prioritization, preservation, and preventive maintenance. There was agreement that more focus should be placed on making better decisions to keep the network in a state of good repair. Additionally, DOT participants agreed that prioritization should be on maintaining existing infrastructure, rather than adding new capacity.

Quality of life as it pertains to pavements and as it relates to the traveling public was discussed. DOT’s missions are built upon transportation excellence, sustainability of the transportation system, and quality of service through communities and customers. With this in mind, the DOT participants agreed that operating safely and efficiently is a work of balance. DOT responsibilities include freight, ports, rail, and transit, and their relationship with these entities requires a balancing act. Project selection requires the same kind of balance to ensure a fair bidding process. They suggested that the transportation network should also aid in economic development, considering it as a circulatory system feeding economic vitality to the community.

For project-level activities, State DOTs are doing what is in the Policy but are unsure if the Policy applies only to new pavement designs. DOTs accept that it would be difficult to develop a flexible national policy that ensures consistency, even from State to State. Participants said they like the flexibility the current Policy allows. Several participants said the definition does not have to be in the Policy but they would like to see each State required to have a written policy but recommended that FHWA develop a checklist of minimum requirements to make the requirements clear and consistent. Sustainability and inclusion of environmental impacts and “cost-effective” in life cycle planning were deliberated at length. It was mentioned that “environment” should not have dollar figures associated with it and should be left to engineering judgment.

Participants remarked on FHWA’s role as a steward for quality and a checkpoint for DOTs and recommended FHWA provide additional guidance or communication on best practices, instruction on

how best to use life cycle cost analysis (LCCA), and education and promotion of new technologies that help DOTs become more effective.

Additional discussion focused on future goals in terms of workforce development, educating the public, and investing in pavement performance research to improve innovation and data collection. There was consensus among DOT participants that there is a need for agencies to learn to adapt to new technologies and embrace change. Participants want FHWA to be a leader in helping identify innovations that can help DOTs be more effective. They want FHWA to stay abreast on not just national best practices but also international best practices and to help assess the technologies and transfer that knowledge to the DOTs and other stakeholders.

Topics discussed included threat assessment, sustainability, and user and customer involvement at the project level. According to participants, most States have mechanisms in place to listen to the community. Discussion arose on resiliency, including defining what it means for a roadway to be resilient and managing natural and human-made threats to the network. The DOT participants related that decisions are sometimes politically driven, rather than driven by data that could increase efficiency.

Introduction

[Title 23 CFR Part 626](#) establishes, “Pavements shall be designed to accommodate current and predicted traffic needs in a safe, durable, and cost-effective manner.” Regulations do not specify procedures to follow to meet the requirement. Instead, each State Highway Agency is expected to use a design procedure appropriate for its conditions.

The FHWA hosted a formal listening session in December 2018 to hear industry concerns regarding its pavement design policy and technical guidance. During the listening session, interpretations differed on how cost-effectiveness was considered in pavement design. One interpretation was that an agency must consider performing an LCCA on every pavement design project; another interpretation was that cost-effective does not necessarily mean LCCA as long as cost-effectiveness, or even LCCA, is one consideration in the decision-making process. Other issues mentioned were expected service life of a design, maintenance and rehabilitation, resiliency and sustainability, and relationships with other regulations, such as the asset management rule.

The information from the listening session was used to inform five regional peer exchanges during 2019, in which State DOT and FHWA Division Office representatives were provided the opportunity to discuss and document good practices and barriers to designing cost-effective pavements. FHWA plans to use feedback from the listening session and peer exchanges when it considers the need for future agency action in the pavement design area and to help identify policy changes, program needs, and other initiatives. At the end of the five regional peer exchanges, an executive summary will be developed and used to determine next steps. The FHWA will consider information from the peer exchanges if FHWA decides to pursue actions such as revised regulations, revised/additional technical guidance, proposed research initiatives, website updates, enhanced communication, and implementation activities. The emphasis of the peer exchanges is to identify solutions to the stated challenges that will support agencies in meeting their mission while designing, constructing, and maintaining National Highway System pavements in a cost-effective manner.

Session Format

Peer exchange participants received electronic copies of the following documents in advance of the peer exchange: the Code of Federal Regulations, Title 23, Part 626; the Federal-aid Policy Guide Non-Regulatory Supplement NS 23 CFR Part 626 Pavement Design Considerations, dated April 8, 1999; and Technical Advisory T5040.39A, Use of Alternate Bidding for Pavement Type Selection, dated December 20, 2012. These documents had also been shared with and discussed by industry and FHWA at the industry listening session.

As preparation for the peer exchange, the following five discussion topics were provided in advance to peer exchange participants along with the agenda:

1. What is working with the FHWA pavement design policy and technical guidance? What do you like?
2. What is not working with the FHWA pavement design policy? Where are you having major issues and what challenges do you have?
3. What is needed to address some of the challenges and concerns?
4. Is there anything that, in your organization’s opinion, is missing from the pavement design policy or technical guidance that is needed or needs updating?

5. Is there anything else you would like us to know, or be aware of, or add related to pavement design issues?

Each peer exchange was 1½-days long. The peer exchange format was designed to encourage participants to think outside the box when it comes to pavement design policy and to encourage interaction, dialog, and information exchange with FHWA and each other. The format was based on a “Why-How-What” structure. To start, the “Why” focused on the big picture: Why are we all here? This included the agencies’ high-level missions or goals for their transportation networks, specifically pertaining to pavements. The “How” focused on strategies needed to meet these missions and goals, as well as the barriers participants encounter to doing what is ideal, from a pavement design perspective. The “Why” and “How” helped prime participants for the central purpose of the peer exchange—the “What,” which included discussions on policy, guidelines, research needs, and other tools to achieve their agencies missions and goals.

During the morning session of the first day, following the initial welcome and introductions, the FHWA moderator presented meeting objectives and expectations from participants. The moderator mentioned that “parking lot” pads of paper were placed around the room for participants to note any ideas that needed to be discussed during the peer exchange, such as research needs, technical guidance, education or other issues. Participants were then divided into four groups for the first of three breakout sessions. To enhance dialog and offer a balanced viewpoint, moderators ensured that DOT and FHWA Division Office representatives from the same State were in the same breakout group.

During the first breakout, the groups were tasked with discussing the prompted focus question: “What is the State Department of Transportation’s mission?” An FHWA moderator was present in each group to facilitate the discussion. At the end of the breakout, one member from each group reported out the discussions that occurred within their group to the other peer exchange participants. During the second breakout, each group was tasked with discussing the prompted focus question: “What strategies are needed to meet the goals identified from the first breakout and overcome current barriers to accomplish these strategies?” Again, each of the four breakout groups was facilitated by an FHWA moderator, and one member from each group reported out the discussions that occurred within their group to the other peer exchange participants.

In the afternoon session of the first day, State DOT and FHWA Division Office representatives discussed key points made during the listening session held in December 2018. FHWA explained different tools (statute, guidelines, and future research) and summarized listening session observations. The rest of the afternoon was a moderated open discussion regarding the Policy, including whether the current Policy meets the goals and reflects the strategies discussed previously. Each participant was provided the opportunity to comment on the Policy and on what changes, if any, he or she would recommend be made to any of the Policy documents.

The morning session on Day 2, the final session of the peer exchange, was dedicated to discussing current practices at State DOTs. This took place within the same moderated breakout groups from Day 1, and the current practice information was documented by the FHWA moderators. Finally, each peer exchange participant was provided the opportunity to express his or her agency’s needs in terms of research, guidance, training, etc. and to identify how FHWA could support those needs in the future.

Peer Exchange Notes

Mission, Strategies & Barriers

FHWA Division Office and State DOT representatives noted and discussed their State's mission in terms of pavements and the associated strategies and barriers.

The DOT representatives largely agree with FHWA's pavement Policy. Additional emphasis on safety as a key focus area was suggested. From the DOT perspective, dollars spent should be used more efficiently. They suggested more priority on preventive maintenance versus the current approach of dealing with the worst roads first. They would also like to see more migration toward making better decisions to keep the network in a state of good repair. In addition, they said FHWA should be the steward for quality, efficient use of funds, and how to do things right by providing education and training on new and efficient technologies to the DOTs. States commented on benefits of peer exchanges, in-person meetings, and hand-on experiences, such as through the FHWA mobile trailers.

Strategies

The following strategies were identified by one or more DOT peer exchange participants:

- Focus on proper design with maintenance.
 - Shift from “worst first” approaches toward preservation and maintenance.
 - More prioritization should be on preservation and preventive maintenance versus a worst-first approach. This becomes a challenge when politicians and higher-ups often place more importance on addressing the worst-first. More migration toward making better decisions is needed to keep the network in a state of good repair.
 - Perform the right treatment at the right time.
 - Road diets through lane reduction or rechannelization and associated alternative uses of the roadway affect pavement design, for example: bike/pedestrian, transit, connected and automated vehicles.
 - Agencies are trying to achieve resiliency. Consideration should be given to how to work resiliency into policy and pavement design.
 - Resilience is a challenge in terms of achieving more efficiency, especially for coastal States. Climate change is a concern for coastal States; project scope can change to accommodate these concerns.
 - Perpetual long-life pavement is often a consideration for staying out once the pavement is constructed.
 - The roadway shoulder needs to have sufficient structural capacity for mainline traffic where agencies often use it for staging.
 - Perform data driven decisions.
- Increase cost-effectiveness.
 - Relate cost-effectiveness to economic development.
 - In terms of multimodal transportation networks and prioritization in maintaining existing infrastructure, it can be more cost-effective for DOTs to maintain their current networks than to add new capacity. The priority should be economic development within transportation.
- Focus on safety.
 - Safety is the top priority for the DOTs, especially on interstates.

- Some States are not satisfied with the techniques or use of rumble strips/stripes and SafetyEdgeSM as it relates to performance.
- A safe travel environment includes security from natural and human-caused threats.
- The relationship between preventive maintenance activities, such as pothole patching, and safety is complex.
- High-friction surface treatments are being used where applicable.
- FHWA can play a supportive role.
 - FHWA can lead outreach and be on the forefront of innovation.
 - FHWA should be the steward for quality, efficient use of funds, and how to do things right by providing education and training on new and efficient technologies to the DOTs and conducting more peer exchanges, in-person meetings, and hand-on experiences, such as through the FHWA mobile trailers.
- Take a proactive approach to education and outreach.
 - States are losing expertise and resources
 - Bring national and international expertise to states.
 - The traveling public's tolerance for delays is at an all-time low, and for DOTs, minimizing the impacts of traffic congestion on the public is a top priority. DOTs have mechanisms in place to listen to the community.
 - Future technologies, such as autonomous vehicles and artificial learning, will create or increase divisions between rural and urban areas. DOTs need to be able to adapt and embrace change and technology quickly.
 - Public impatience with traffic delays during construction can be mitigated through communicating early and often regarding construction timeline expectations.

Barriers

- Industry and political pressure.
 - Funds can be better used in general if decisions are data driven, rather than politically based.
 - Traffic congestion can become a problem when performing continuous maintenance. Considering the difficulty of closing lanes in high-traffic areas, pavements should be designed to last longer.
 - Extreme limitations on construction windows are a barrier, and lighting at night in work zones should be a consideration. Sometimes agencies have to consider putting crossovers on interstate roads to accommodate putting one direction of traffic in the other direction.
 - A lack of understanding of pavement design by both decision-makers and the transportation industry could be addressed through education and workforce development.
 - From a DOT's perspective, its quality of life goals and responsibilities are not just for surface transportation for highways, but also include freight, ports, rail, and transit. A balance needs to be maintained. Consider this "balancing act" in relation to project selection and requirements.
- Budget and workforce constraints.
 - Funding was repeatedly identified as a barrier for States.
 - Workforce development: Staff members are ready to retire, and there is no middle tier of supervision set up to take over and no formal way to transfer knowledge as needed.

- Millage management: urban areas have an excess (can't seem to incorporate all the RAP), so there are RAP piles that may cause environmental concerns, while rural areas use all the RAP. Districts are now required to have a RAP management plan.
- Some States struggle with reaching the 20-percent match in preventive maintenance costs due to mill and fill and other preservation techniques not meeting the requirement. It is notable that some States are using lane miles per years of service. States in this region are primarily using an asphalt pavement, which in some cases is attributed to maintenance of traffic (MOT) needs.
- The term "cost-effective" can be interpreted in different ways. Whether a design or measure is cost-effective can be based on safety or pavement service life.
- Consultant use has increased, which can sometimes cost more and be less efficient than using in-house engineers.
- Strategies with performance-based design and navigating the associated risk: Contractors have the short-term risk, but there is long-term risk for the agencies in regard to whether the pavement will perform for the length of period for which it was designed.
- Lack of support from industry or industry seeking to perform their own testing was noted as a barrier.
- Contractors want to be paid on time or will otherwise not want to do pavement work.
- Lack of contractor experience and quality.
- Inadequate communication.
 - Better communication using non-technical terms with customers and decision-makers will help convey pavement design needs. What the public wants may not equate to the best pavement design; they may be focused on ride and not on DOT priorities. We need to communicate that better.
- Historical data.
 - Data is an ongoing theme when talking about the future, both its accuracy and its collection techniques. Some States collect data on the mainline but not on ramps and shoulders.
 - Surface distresses are calculated, but distresses beneath the surface are not collected. If only one mainline run is performed for distresses and the rest are extrapolated, this does not provide a complete picture of distress. Some States are looking at the traffic speed deflectometer for network-level analysis at beginning stages for structural information.
 - Data, data storage, data security, and data integration may rely on IT infrastructures that are old and inefficient.
 - Data needs to become more streamlined and integrated.
 - Changes to policy are more often reactionary (triggered by accidents and other events), rather than proactive and looking into the future.
- Pavement design procedures.
 - Use of AASHTOWare® Pavement ME Design requires engineering judgment, and it may be prohibitively expensive for some States. For this reason, some States have embraced it, while others are not using it.
 - Influencing network change regarding performance management when incremental changes are slow: There needs to be an immediate success or immediate change to gain stakeholder support, but these changes happen over time.
 - Material availability and quality, especially for aggregate and fly ash.

FHWA Presentation & Open Discussion, Regulations and Policy

The following is a summary of participant comments and discussions related to the need for the Policy, and to what States are doing now and the barriers faced.

- General interpretation and overview.
 - For project-level activities, State DOTs are doing what is in the Policy. However, agencies are not sure whether the Policy applies only to new pavement designs.
 - The Policy is flexible and does not require DOTs to have a written pavement policy in place. It would be very difficult to develop a flexible national policy that ensures any level of consistency, even from State to State.
 - Is there a need for this regulation, or is it too prescriptive for engineers who are licensed to design and know all the factors that have to be considered?
 - Clarify that the policy should only be for major rehabilitation or new construction or reconstruction. “When we’re talking preventive maintenance like chip seal, which this could fall under, a lot of this doesn’t make sense.”
 - The policy is not clear as to whether this is just for new pavement, preventive, or reconstructive pavement; this needs to be distinguished.
 - Pavement design definition: Several participants said the definition does not have to be in the Policy but they would like to see each State required to have a written policy. This would provide more flexibility for the States. Alternatively, if this guidance is in the AASHTO manuals, that may suffice.
 - If FHWA decides to maintain the definition, clarify that the Policy is for new pavement design. Remove “life cycle.” Remove “sub-base, base, and subsurface” and refer to all as “pavement materials” as long as it is carrying a load capacity.
 - Remove the word “are” and replace with “may be.” (For example, “Factors which may be considered include...”.) Keep “sub-base, base, and surface materials.” With this in the Policy, it points to only new construction, as it lays out all three materials. This may facilitate preventative maintenance treatments.
 - The last sentence of the definition reads that one must consider six things, one of which is maintenance. Therefore, why are Federal funds not eligible for pavement maintenance? Clarify preventive maintenance versus routine maintenance.
- Cost analysis, cost effectiveness, and competition.
 - Participants discussed adding climatic and economic details to the Policy as there are many differences in climate conditions between States, therefore pavement designs would be entirely different, but acknowledged that some of this was already in the Policy.
 - It may help to remove “life cycle” from in front of “cost,” leaving it as generic cost. Life cycle would be a subset of that, as it is implied.
 - One participant stated that under the Policy, cost-effective means to ensure a certain amount of life out of the cost.
 - Another participant mentioned their State has processes for doing the “cost-effective” part.
 - Sustainability and inclusion of environmental impacts and “cost-effective” in life cycle planning were deliberated at length. It was mentioned that “environment” should not have dollar figures associated with it and should be left to engineering judgment.
- Agency impacts.
 - Pavement design life is covered in the AASHTO guide. Bridge specs also have appropriate specified design life in their specifications and standards.

- Because States regulate design and engineering under State laws, having a pavement design definition in the Policy is redundant. The beginning of the CFR states that all Federal aid work is to be carried out in accordance with Federal and State law, and the Federal Government does not regulate the profession of engineering, the States do.
- If FHWA wants a minimum design life, wording could be added to say, “design could be for 20 or 30 years.” This would make the Policy clear, concise, unmistakable, and unambiguous. The lawyers would be happy, and there is plenty of technical guidance for engineers to use to achieve that.
- The beauty of it now is its flexibility. We have 50 different States that have interpreted that and are executing it. “We have a whole bunch of parameters that go beyond this, but that’s the States’ purview, that’s their ability to do that, so I like it that way.”
- If States are required to have a policy, who would approve it? Participants suggested that FHWA Division Offices should approve it, and that is why they needed a set of rules in this policy. There was consensus among participants that it would have to be consistent because, if not, then industry would argue that the rules were not consistent across the State lines.
- Participants said they like the flexibility the current Policy allows for so that each State can develop a policy that is suitable for it, but it may help to clarify some wording so lawyers do not interpret it wrong. Changing wording to, for example, “may be considered” rather than “are considered” should be looked at so that lawyers do not interpret it as required.
- Miscellaneous specific items within the Policy.
 - Checklist of minimum requirements to make it clear.

Below is a summary of participant comments and discussion related to the Non-Regulatory Supplement NS 23 CFR Part 626 Pavement Design Considerations. Is there a need for this supplement? Are the States using this, or should it go away?

- General Interpretation and overview.
 - Only a handful of DOT representatives said they had seen or knew about this supplement before coming to this peer exchange.
 - The document could be updated with new language or new reference materials.
 - If there is a policy, there should be guidance with it. Possibly clarification is needed in this supplement, and the documents should match to include the same detailed information in both. Some items should be removed because of timeliness, such as rumble strips and items dealing with safety and performance.
 - Add other safety considerations such as open graded friction course; however whether this is needed is determined by another department.
 - Add section on material mix design
- Software usage, Pavement ME Design, AASHTO 93 or older.
 - Two or three participants’ agencies are using Pavement ME Design, the rest are using version 93 or older.
 - Challenges with the Pavement ME Design program: local calibration is a challenge that requires a lot of patience and effort. Provide best practices or strategies for local calibration.
 - One participant is using an un-calibrated version of Pavement ME Design with the 93 method on projects but is not happy with the recalibration process. That agency is doing

local calibrations because, when accounting for scatter on the calibrations, some of the models do not work and do not produce convincing results.

- Another participant said they did work with version 2.2.1 and did local calibration. It did not really incorporate frost-heave analysis, which they do with the 93 method. Next, they used 2.5.3 on new projects, and some of the projects that passed in the older version did not pass with this new version. This gave them cause for questioning the reliability of the new program.
- Miscellaneous specific items and future considerations.
 - Participants agreed that future considerations should not be included in the Policy at this time. This would rely too much on guessing as to what is coming, which there is not enough information for now. Consensus was that this is a guidance document, and guidance documents are not meant to be used to plan for the future. If discussion is needed, this should be addressed every 10 years.
 - It might be beneficial to include information on geotech styles, specifically on subgrade stabilization. Geotech styles are an option for improving sub-base foundation.
 - A participant suggested the States find a way to communicate with each other, possibly quarterly, to share information on handling problems, especially in local calibrations.
- LCCA and alternate bidding.
 - The supplement is good because it provides flexibility and guidance for FHWA Division Offices, but it is too detailed for what it is supposed to be. Sections one through three need to be reviewed and some information omitted. Also, the LCCA for pavement design is in “desperate need of a rewrite.”
 - Few participants have been doing alternate bidding in their States.
 - Alternate bidding can be difficult because each industry has its own version of how bullet points are to be interpreted.
 - Discount rates can be an issue. The discount rates are not consistent, and some States are just assuming what the rates are by averaging the last 5 years of discount rates. Even if rates are updated annually, some older documents still have old rates that States are following.
 - One state commented that they have the most success with alternate bidding in Districts that have healthy competition (multiple asphalt and concrete bidders).

What can FHWA do for you?

The following list summarizes discussions related to FHWA’s role in helping agency pavement designers, particularly as it relates to research, education, or guidance needs in the pavement design arena.

- Research and guidance.
 - Guidance for reviewing all kinds of policy documents, possibly in a checklist format. This would cover all policies, including asset management and data policy management plans. It should be easily accessible to all.
 - Broad guidance on LCCA, on some of the terms and on what makes an impact in that type of analysis. Do not mandate that LCCAs be done on every project, because States will use it in different ways.
 - A website from FHWA showing benchmark projects and pavement policy best practices by States “Best Practice Clearing House”. States could see what is being done and get ideas for what can be done in the future, as well as stay connected.
- Training and education.

- More training on LCCA, since both pavement design and asset management are being emphasized more often.
- LCCA can be useful, but for particular States, it may not be useful when used on a project-by-project basis. “With so many options when it comes to ways of doing things, many States just don’t do LCCA, so training on this would be very beneficial at this point.”
- DOT staff could meet regionally on a regular basis in order to all be on the same page when industry addresses them with some of their issues. Attendees were strongly opposed to webinars and find peer exchanges or in person workshops more valuable.
- Participants discussed starting a pavement design and management group, like the Southeast region, but were unsure how that could be accomplished with current funds. Topics could include design, pavement management, construction, and materials available in the Northeast. Funding for these events could be from a pooled-fund type process.
- A cost analysis tool could help when using Pavement ME Design. Industry may already have some of those tools; NAPA may have a cost analysis tool.
- Policy, supportive role, and miscellaneous needs.
 - Require a state to have a policy.
 - Include innovation in design policy and promote it. As far as guidance, updating the Policy is a good place to start so States can use it as a framework to build their own State policy.
 - A re-write to the LCCA reference guides was suggested. State DOTs would like to see this updated by FHWA as soon as possible.
 - Regularly scheduled regional partnership or peer exchanges will help DOTs hear and exchange ideas about what other States are doing. Participants said this would be very helpful, and they would like to see how FHWA could assist with it.
 - There was consensus that updates and reviews to policies should happen every 10 years or less.
 - LCCA guidance provided by FHWA should promote probabilistic approach.
 - Participants asked to receive meeting notes after the peer exchanges. FHWA representatives stated that an executive summary would be posted on its website. However, participants would like to view other regional peer exchange reports so they can see what other regions are saying or doing.
 - Participants asked if the “Current Practice Exercise” will be open for review, because States would like to see what other States are doing. FHWA will provide access to a spreadsheet in the future. (See “Current Practice Exercise” section.)
 - Provide best practices for developing state policies and design methods.

Participants were asked what is the purpose of performing LCCA. Their responses are listed below.

- By doing LCCA, agencies are using the most cost-effective methods with the longest life.
- One participant mentioned that their State performs a lot of LCCAs, and the only value they get out of it is that it satisfies industry.
- One participant mentioned that their State performs LCCAs because it is in their checklist. It complements life cycle planning.
- LCCAs are used by agencies to determine that they are using the best treatment, the best alternative for the job.
- One participant mentioned that it satisfies industries’ concerns that the DOT is not favoring one or the other.

- One participant mentioned that LCCA is useful when healthy competition exists and want to choose the most cost effective option.
- It was noted by one participant that LCCA may not always lead to design changes.

Current Practice Exercise

The current practice exercise took place within the same moderated breakout groups from Day 1. FHWA moderators noted current agency practices in terms of pavement design procedures, economic analysis, and policy reviews and updates.

Pavement Design Procedures

Structural Pavement Design Projects

States will use a pavement design procedure in new, reconstruction, and rehabilitation projects. One State mentioned that design of mill and fill and other preservation projects are done on a case-by-case basis and/or (depending on the situation). Some States use a pavement evaluation process on distressed roadways. Some States use cores to justify mill and fill projects and, in most cases, States have a structural process for mill and fill and preservation. These are State-specific and are dependent on various guidelines or circumstances. Some States have a design procedure in place for preservation projects.

Currently Utilized Pavement Design Methodologies

Seven out of 10 States use AASHTO 93/DARWIN for pavement design. Some States use Deighton's Total Infrastructure Management System® (dTIMS®) or a catalogue-based method founded on the Asphalt Institute approach. Some States use remaining service life and historical data to determine when previous fixes and functional checks were made. One participant commented that their State is not considering Pavement ME Design due to limited calibration and will instead use their own agency's method. In some cases, if AASHTO 93 is less than the minimum, the State will default to the minimum design done by the consultant.

Policy Guidance on Traffic Inputs

In general, most States include traffic guidance in their policy; additionally, most States use weigh-in-motion (WIM) data. Seven out of 10 States use traffic volume data in policy guidance, and 5 out of 10 States use truck classification data for light or heavy-truck traffic, or for class 4 trucks. States use a variety of methods to include equivalent single-axle load, lane distribution, and other traffic inputs.

Policy Guidance on Pavement Foundations

States will use a variety of methods to determine weaknesses in pavements, but these methods are not always consistent across the States. Some States will use results from modulus resilience (Mr); however, not all States will use Mr on all projects, with the exception of larger projects. States perform coring or use dynamic cone penetration (DCP), while some States mostly perform mill and fill and other preventive maintenance methods. Some States will decide the approach on a project-by-project basis.

States, in general, will consider subgrade in their design policy. Depth of subgrade varies across States in this region. Two out of 10 States will not use a stabilized base, or will mostly perform mill and fill. Three out of 10 States will not use a base course material, as it is not needed in their State, or the work is mostly mill and fill. In general, States in this region have a policy/guidance in place to manage a positive drainage system. Three out of 10 States do not have a policy on drainage.

Policy Guidance on Shoulder Structure

In general, States will address structural design for shoulders in their policy on a project-by-project basis, or in some cases, not at all. When addressing structural capacity compared to mainline, States are inconsistent, dealing with this on a project-by-project basis. Across the board, structural considerations are handled independently based on situation, road type, and projected use of the roadway. Percentage of mainline traffic used for shoulder design was not consistent in this region. Materials used for mainline traffic also varied from State to State.

Policy Guidance on Rehabilitation

In general, States determine current or existing condition obtained by pavement management services using network data, coring, boring, or trenching (or a combination of all, depending on the situation). States will evaluate distress using a variety of methods, depending on their situation or project type. States will site-visit and use surveys conducted by engineers and/or engineering judgment, in addition to ground penetrating radar, international roughness index, falling weight deflectometer (FWD) testing, and DCP tests. However, data from these methods are not always consistent either from project-to-project or by the engineer conducting the work.

Policy Guidance on Safety

Seven out of 10 States in this region have measures in place to address safety, regardless of funding source. Six out of 10 States have guidance to address disruptions in traffic, as well as protecting the motorists and workers. Some DOT participants did not find safety to be an issue in their State; however, safety measures such as photo enforcement and Emergency Responder Move-Over laws are enforced. Some States have found MOT to be an issue and will place restraints on it. In this region, mainline traffic repairs are mostly done during nighttime. Some States follow the Manual on Uniform Traffic Control Devices and the regulations set by State police. Some States use pavement safety performance. Skid resistance surface treatments (no matter the pavement type) and aggregate type used are based on geographic location and traffic volumes. States discussed aggressive driving and other issues, and methods to mitigate high-risk areas. States asked for guidance to minimize traffic disruptions during construction and to protect motorists and workers in the work zone. One State had friction requirements to handle safety.

Policy Guidance on Environmental Considerations

Environmental considerations vary from State to State. Most States in this region do not address environment specifically beyond the National Environmental Policy Act. One State mentioned designing porous and pervious pavements and using Green Rating System. Three States are not clear as to whether their policy addresses environmental considerations. States will also use a variety of recycled materials, including recycled asphalt pavements, recycled asphalt shingles, fly ash, or glass. Warm mixed asphalt is standard for most States.

Economic Analysis

Addresses Economic Analysis

Seven out of 10 States address economic analysis in their pavement design policy. One State does not address economic design, where other States address it contingent on consultant consideration.

Basis for Determining and Addressing Economic Analysis

Most States require economic analysis for certain types and sizes of projects. Some States will use a variety of tools, including using existing manuals, the State's pavement preservation program, or RealCost software to help determine when to use an economic analysis for pavement projects.

Methodology for Cost-Effective Design

In this region, 4 out of 10 States will use LCCA to ensure a cost-effective design on pavement projects. Seven out of 10 will use historical data to ensure cost-effective design. Some States will not use LCCA except on certain larger projects, on major or new construction, but not on mill and fill projects. States discussed using dTIMs[®] software, in addition to using initial cost or unit cost.

Allow for Alternate Bidding

In the region, most States do not allow alternate bidding for pavement design projects. Some States have registration or practices to protect against alternate bidding. When States allow for alternate bidding, it is only under specific circumstances.

Details of the LCCA

In general, States in this region consider initial, rehabilitation, and maintenance costs in addition to work zone/user costs, discount rate and material price adjustments in asphalt and concrete. One participant commented they have met with industry to develop a maintenance strategy. Another said they do not use the LCCA to determine asphalt as a better alternative to concrete in their State. Furthermore, their State is primarily asphalt and, while concrete pavements which are already in place are maintained, no new concrete pavements are being developed. One of the issues with LCCA was handling uncertainty, especially if you have a premature failure and little options for fixes specifically to concrete.

Analysis Period and Documented LCCA

In this region, States generally maintain a 40- to 50-year design period.

Policy Review and Updates

Updates to Pavement Policy Manual

Generally, States will make updates to their policy over a 10- to 15-year period; however, this time period varies from State to State. States that have a policy in place will update it routinely; timeframe for review varies from State to State. Some States that do not have a policy are currently in the process of developing one or have mentions of guidance in the Highway Design Manual. Some States have updated as recently as 2017, or updates will occur when other changes are made to DOT standards.

Review/Approval of Revisions by FHWA Division Office

Six out of 10 States will have their FHWA Division Office representative review and approve revisions to pavement design policy. One participant stated their division office is aware of updates but does not review, and that the focus is on construction quality assurance.

Attendee List

Connecticut DOT – John Henault, Transportation Supervising Engineer

Delaware DOT – Robin Davis, Pavement Design Engineer

Delaware FHWA Division Office – Ryan O’Donoghue, Program Development Team Supervisor

District of Columbia DOT – Rezene Medhani, Deputy, Quality Assurance, Quality Control

District of Columbia FHWA Division Office – Vinh Hoang, Area Engineer

Maine DOT –

Uma Maheshwar Arepalli, Assistant Engineer

Derek Nener-Plante, Asphalt Pavement Engineer

Maine FHWA Division Office – Steven Davis, Transportation Engineer

Maryland Department of Transportation

Sejal Barot, Director, Office of Materials Technology

Geoff Hall, Chief, Pavement and Geotechnical Division

Maryland FHWA Division Office – Azmat Hussain, Team Leader, Technology, Planning and Right-of-Way

North Carolina FHWA Division Office – Bradley Hibbs, Operations Engineer

New Jersey DOT – Robert Blight, Supervising Engineer, Pavement Design

New Jersey FHWA Division Office – Helene Roberts, Pavement Materials Engineer

New York DOT – Thomas Kane, Materials Field Engineer Team Leader

New York FHWA Division Office – Timothy LaCoss, Pavement Materials Engineer

Pennsylvania DOT –

Steve Koser, Chief, Pavement Testing & Asset Management

Lydia Peddicord, Chief, Pavement Design and Analysis Unit

Rhode Island DOT – Mike Byrne, Asphalt Engineer

Rhode Island FHWA Division Office – Anthony Palombo, Area Engineer

Vermont FHWA Division Office – Larkin Wellborn, Construction Materials Engineer

Moderators:

Jennifer Albert, Pavement Materials Engineer – FHWA

Heather Dylla, Sustainable Pavement Engineer – FHWA

LaToya Johnson, Team Leader – FHWA

Milena Rangelov, Visiting Sustainable Pavements Engineer – FHWA

Shree Rao, Principal Engineer – Applied Research Associates

Tom Yu, Pavement Design Engineer – FHWA

Note-Takers:

Jose Chavarria, Instructional Systems Design – Applied Research Associates

Brandi Tagirs, Administrative Support – Applied Research Associates