

Summary Report
Northwest Region Peer Exchange
Portland, OR
June 13–14, 2019

The FHWA is providing this material for informational purposes only. This is not a verbatim transcript of the Peer Exchange. Distribution of this report is not an FHWA endorsement of views described in the report.



Notice

This document is disseminated under the sponsorship of the U.S. Department of Transportation (USDOT) in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in this document.

The U.S. Government does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this report only because they are considered essential to the objective of the document. They are included for informational purposes only and are not intended to reflect a preference, approval, or endorsement of any one product or entity.

Non-Binding Contents

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide clarity to the public regarding existing requirements under the law or agency policies.

Quality Assurance Statement

The Federal Highway Administration (FHWA) provides high-quality information to serve Government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. FHWA periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

Contents

- Summary 1
- Introduction 3
 - Session Format..... 3
- Peer Exchange Notes 5
 - Mission, Strategies & Barriers..... 5
 - FHWA Presentation & Open Discussion on Regulation & Policy 7
 - What can FHWA do for you? 10
- Current Practice Exercise 12
 - Pavement Design Procedures 12
 - Structural Pavement Design Use 12
 - Pavement Design Methodologies 12
 - Traffic Inputs 12
 - Pavement Foundations 12
 - Shoulder Structure 12
 - Rehabilitation 13
 - Safety 13
 - Environmental Considerations..... 13
 - Economic Analysis..... 13
 - Addresses Economic Analysis 13
 - Basis for Determining Need for Economic Analysis 13
 - Methodology for Cost-Effective Design 13
 - Alternate Bidding 13
 - LCCA Considerations 13
 - Tools and Documentation..... 14
 - Policy Review & 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 Northwest Region Peer Exchange on Pavement Design Policy sponsored by the Federal Highway Administration (FHWA). The peer exchange took place in Portland, OR, on June 13–14, 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 representatives from State departments of transportation (DOTs) and FHWA Division Offices in Alaska, California, Idaho, Kansas, Montana, Nebraska, Oklahoma, Oregon, and Washington.

The 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.

Representatives feel their State’s missions are in line with the Policy, but seek improved consistency. Their agencies missions are to meet public needs through improved safety, reduced user delays, increased mobility, reduced costs, and reliability of the network. Agencies discussed commerce and economic movement, modernization, innovation, efficiency, sustainability, transparency, and performing data driven decisions.

Overall, participants said the Policy is good and most of what is in it is in the States’ design manuals. There were concerns that removing policy may lower the standard of minimum design. Participants concluded that if the policy is meant to be used, it needs to remain regulatory. States find it useful to have the FHWA Policy to help local agencies meet standards, even if Federal funds are not used for that specific project.

The group discussed life cycle costs and Life Cycle Cost Analysis (LCCA), and agreed that exact wording should be added to the Policy regarding LCCA. Many States in this region have their own policies for design, however, some do not. It was identified that FHWA Division Offices interpret policy differently, which was recognized as a communication and interpretation concern. Currently, participants thought FHWA Divisions are not consistently interpreting life cycle costs in the definition or in the supplement. Improved clarification of life cycle costs and LCCA in the Policy could provide flexibility and consistency for future projects. If LCCA/life cycle costs are going to remain in the policy, communication should be transparent. Some States have life cycle costs clearly defined in their policies, but others do not. Many States in this region do not consider life cycle costs on all projects. Clarity and communication were identified as keystones to policy.

During discussion on flexibility in policy, States said the Policy is “too ambiguous” and needs to be clarified in areas. However, flexibility needs to be maintained, and in some cases added. For example, adding the word “may” so that it reads “factors considered *may* include.” There was general agreement that the supplement will be helpful to agencies with minor changes to the definition and clarifying language.

Participants discussed pavement type selection, referring to the supplement for life cycle cost. Agencies deliberated on whether a project must be bid as one for asphalt and one for concrete, however, discussion clarified that a bid could include one of each (asphalt or concrete), or include two different types of asphalt or two of concrete.

States said they can meet the Policy goals but requested consistent funding. A stated concern was how to maintain best practices for better use of taxpayer dollars, for which they requested additional guidance from FHWA. One challenge participants consistently raised was availability of quality construction materials. Additionally, clear policies and transfer of knowledge can aid DOTs.

The DOT participants discussed challenges they face with tools and models for rehabilitation and preservation, and they noted current pavement design methods do not accurately model in-service asphalt pavements for extending service life. Uncertainty with AASHTOWare® Pavement ME Design calibrations and general design qualifications was discussed. Participants said past methodologies were more flexible, but Pavement ME Design results are perceived to be more exact.

When working with contractors and consultants on pavement preservation, agencies have discovered that not all contractors/consultants know each State's individual life cycles for asphalt and concrete, which can be a challenge to quality project completion.

Participants reported that, in most cases, funding for projects is an issue. Establishing dedicated truck lanes as well as increasing density specifications in materials were discussed to help improve overall pavement life. Limitations were mentioned for States where contractors are not familiar with new techniques or processes.

During the discussion on strategies, participants noted the importance of recycling, keeping in mind what economic and environmental effects and what materials are available in each State. Reusing existing materials is important for States that lack a good aggregate source; therefore reusing materials was identified as a potential strategy, but it should be better supported with improved pavement design tools. Participants commented that available tools are not well suited for design of treatments to extend or renew service life.

Noted good practices in place in the States concern socio-economic impact, sustainability, and network wellness. Improving documentation of experiences and research evaluation on projects and sharing the results/judgments can increase knowledge transfer in agency departments and to the next generation of engineers.

Participants discussed that State DOTs need to spend their money on the right road at the right time using performance management principles. Project bundling was referenced as a strategy to keep the per-mile cost down for State budgets, allowing that bundled projects may have more upfront costs at the next financial commitment cycle. Maintaining good working relationships with staff in other State agencies and with contractors was suggested as a way to help keep all parties on the same page. State DOTs and FHWA Division Office representatives discussed surface treatments and determining what local inputs to use on types of materials. Participants agreed that improved communication within a State agency is critical.

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 is 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 discussed 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. The 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 day 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 DOT 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.

In general, representatives feel their State's missions are in line with the Policy, but seek improved consistency. The agencies missions are to meet public needs through improved safety, reduced user delays, increased mobility, reduced costs, and reliability of the network. Agencies discussed commerce and economic movement, modernization, innovation, efficiency, sustainability, transparency, and performing data driven decisions. There is a need for more education, innovative research, and resource sharing. States currently have good practices for socio-economic impact, sustainability, and network wellness. They can meet the Policy goals but need consistent funding. Additional FHWA guidance may help States maintain best practices for better use of taxpayer dollars. One challenge is the availability of quality construction materials. Knowledge transfer and clear policies can help. Available tools are not well suited for design of treatments to extend or renew service life.

Strategies

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

- Focus on proper design with maintenance.
 - There is a need for new pavement designs, which could potentially have different design methods, as well as for looking into different ways to build pavement. Look into models that perform better and how to design with them.
 - Designing with available construction materials: Participants mentioned the importance of recycling, while considering economic and environmental effects and material availability in each State.
 - When using fabric in pavement layers, the pavement later cannot be used as reclaimed asphalt pavement (RAP). States discussed which materials can be overlaid in this process.
 - It is important to plan, design, and specify right fix at the right time.
 - The available tools are not well oriented beyond 20- to 30-year pavement designs unless supplemented with mechanistic principles.
 - One State uses corridor-level planning for 50-100 years (especially in urban areas), which appears to be a good strategy.
 - Maintain the systems by designing to the appropriate design life.
 - Long life pavements, inverted pavements, and pavements with a thick base were noted as strategies.
- Increase cost-effectiveness.
 - An asset management approach based on performance management can ensure an agency is spending money on the right road at the right time.

- Some States are designing roads that require 15-year serviceability, yet the agency/contractor knew it would only last about 5 years. It was suggested to bring life expectancy down in these cases.
- Reusing existing materials is important for States that lack a good aggregate source.
- Project bundling can lower the per-mile cost.
- Maintaining good working relationships with contractors keeps everyone on the same page. There is less chance of complaints, and problems can be avoided ahead of time.
- Incorporate life-cycle thinking into design by designing pavement layers including base, subbase, and surface for reuse.
- Focus on safety.
 - For road closures and faster road construction, there is a need for a better product for completing repairs and getting out sooner.
 - Materials used in pavement design specific to surface friction course: States are looking at surface treatments and local inputs on types of materials.
 - Friction is mostly an issue where aggregates susceptible to polishing are used.
 - Some States noted friction limits using the skid number between 30-35. However, it was mentioned that having friction limits would be challenging in states that use studded tires.
- FHWA can play a supportive role.
 - FHWA should be a partner to help meet the state agency missions.
- Take a proactive approach to education and outreach.
 - There was consensus that improving communication within the State agencies is critical, for example, between the districts and central office. Participants agreed this is a key to success.
 - Establish good relationships with Industry.
 - Communicate experiences within agency and various stakeholders.

Barriers

- Industry and political pressure.
 - Participants discussed limitations in States where contractors are not familiar with new techniques or processes. When agencies go out-of-State for these techniques, they receive complaints from local contractors.
- Budget and workforce constraints.
 - In most cases, State agencies do not have enough money to cover all the needed projects.
 - A concern with project bundling is that bundled contracts may have more upfront costs at the next financial commitment cycle.
 - In States that lack certain materials and equipment, contractors do not usually offer that type of work, therefore, the expertise is not there to inspect and ensure a quality product.
 - Consistent quality and enforcement of specifications.

- Inadequate communication.
 - There is a need to improve both documenting experiences and research evaluations on projects and sharing results/judgments with current department staff and the next generation of engineers.
- Historical data.
 - In-service pavement and using falling weight deflectometer (FWD) data and core thicknesses to assess distress: For rehabilitation and preservation designs current pavement design methods do not accurately model in-service asphalt pavements. States use fatigue testing and use core samples to determine what life is left in the pavement.
- Pavement design procedures.
 - Establishing dedicated truck lanes and increasing density specs in materials can improve overall pavement life.
 - Uncertainty with calibrations and general design: Past methodologies were more flexible, but Pavement ME Design results are more exact. The results cause uncertainty, and so States can be uncomfortable using the software.
 - Challenging keeping the specifications up to date with innovations.
 - Tools are not reflective of the work and what we need to be designing for today, which is mostly rehabilitation and preservation.

FHWA Presentation & Open Discussion on Regulation & 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.
 - Definition of non-regulatory: If policy is taken away, or is not law, or does not specifically state what must be done to receive Federal funding, a DOT will probably not do it.
 - Some participants knew about the Policy but were using their own version for pavement design; while a few agreed they did not need the Policy. Other participants said they had not seen the Policy or did not know it existed before this peer exchange.
 - One participant said the Policy is good, and DOT policies and procedures are consistent with the Policy.
 - If FHWA wants an agency to use a policy, keep it as a regulatory policy.
 - Clarity and communication were identified as key points needed in the Policy; it is currently too ambiguous to work for all States.
 - Add the word “may,” as appropriate. For example, “Factors considered may include.”
 - If the Policy is completely removed, the only authority FHWA would have to ensure consistent pavement design standards would be under title 23, U.S.C 109.
 - This Policy is in place to ensure States do minimum design. Each State is different; therefore practices are going to be different. A participant suggested that as long as there is a design process in place (i.e., manual or best practices), this would be acceptable.

- FHWA Division Offices may be interpreting the Policy differently; this was identified as a communication and interpretation issue.
- Most States have their own pavement design policy, while a few others do not have a policy at all.
- The Policy could be reviewed by lawyers for clarification on the definition within the Policy as it pertains to the cost analysis section. Currently, States are not consistent because some think “life cycle costs” means “LCCA.” Improved clarification of life cycle costs and LCCA in the Policy could provide flexibility and consistency for future projects.
- If life cycle cost and LCCA are going to be kept in the Policy, communication should use exact wording and be transparent.
- As long as each State has a pavement design policy, that would be enough to satisfy industry.
- One participant said people in higher levels of supervision probably want to do away with it, but the pavement designers want to do the right thing, so having some sort of pavement design or engineering process would be good.
- One participant commented States may not do what they were supposed to do without a Federal policy in place.
- One participant expressed concerns about weak pavement design policies if policy was “just” a State policy and not federally mandated—tax payers deserve engineers to be at the top of their game and really get the best bang for their bucks.
- Cost analysis, cost-effectiveness, and competition.
 - One participant interpreted that LCCA was required for every pavement design per the policy.
 - When working with contractors and consultants on pavement preservation, agencies have discovered that not all contractors/consultants know each State’s individual life cycles for asphalt and concrete.
 - One participant suggested considering life cycle cost through engineering judgment or projects that are over a certain threshold. Some States have life cycle costs clearly defined in their policies, while other States do not. Many States in this region do not consider life cycle costs on all projects.
 - Discussion on cost effectiveness and removing “life cycle cost” from the definition while writing a statement about cost within the Policy.
 - An agency could use life cycle cost in some manner, but it would not have to be LCCA. In this way, every State could have a different cost-effectiveness acceptance process, as long as it is a defensible process that proves an analysis for that project was conducted.
 - One participant said their State uses LCCA as justification for project decisions; however, if LCCA does not give a satisfactory strategy, they will write an exception for the project.
 - Sustainability: Recyclable materials are now being used to save money while constructing more roadways. It is cheaper, and agencies are encouraged to use more recycled materials in their pavement design.
 - Reasonable inputs and numbers for setting up LCCA: a participant suggested guidance be available for using States’ local numbers to get a more accurate analysis.

- Agency impacts.
 - Some States find it useful to have the Policy in place to help local entities on some projects, even if Federal funds are not used.
 - Policy flexibility vs. consistency across States: If consistency is required, it should be enforceable. Participant stated that FHWA ensures that it is applied consistently.
- Miscellaneous specific items within the Policy.
 - Wording on new construction, maintenance, and rehabilitation should be considered and added into the Policy.
 - Service life criteria should also be defined in the Policy.
 - Consider future needs, within the next 20 years, and develop a plan for any challenges that agencies may face. State agencies need strategies for dealing with the issues and opportunities that arise from the forward thinking industry is doing. Asset management with pavement design needs to be addressed.
 - Autonomous vehicle pavements: Pavement policies are being addressed by Google. States need to learn what is expected of pavement design in the future for these vehicles.

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.
 - Need to clean up ambiguity in the supplement, and if it is matched with each item in the Policy, it would be clearer. This would allow the focus to be on the best practices for life cycle cost.
 - There was misunderstanding on project type. Participants deliberated whether a project must be bid as one for asphalt and one for concrete. Discussion clarified that a bid could include one of each (asphalt or concrete), or include two different types of asphalt or two of concrete.
 - This supplement could be helpful to agencies with a few small changes to go along with the definition—change a few words to make it less ambiguous but still flexible.
 - The Policy is good but better boundaries should be created so that work is not always done in the “gray areas” of pavement design.
 - Sustainability should be in this supplement.
 - With the Transportation Asset Management Plan (TAMP) requirements under Title 23, the Policy, and the supplement, the FHWA has the ability to look at the States’ pavement design process at any time and see they are doing the job right.
 - Use careful wording so unintended consequences or regulations are not created during the process of removing or adding content.
 - One participant said the supplement holds many important concepts and supports the pavement design process, so FHWA could make it a separate regulation.
- Software program usage, Pavement ME Design, AASHTO 93 or older.

- Wording could be added pertaining to use of 3D engineered models, which can include construction history or condition history, to animate and design pavements, considering that such technology will be available and in use in the future.
- Miscellaneous specific items and future considerations.
 - A participant would like to see information gathered from the peer exchanges analyzed and incorporated into the supplement as needed. This participant considers the supplement to be an important document that can help grow the future of pavement design.
 - This guidance needs to have the right tools in it to help workers in the field; something that will help them do the job right.
 - Minimal requirements should be established that can be met without a high level of difficulty or being “taken down by rules.” This will motivate States to move forward with tools and with funding for projects 10 years out instead of just 1 or 2 years ahead as they are now. Instead of taking tiny steps, the States need to focus on the future so that taxpayers are satisfied with progress and do not turn against the DOTs.
 - It would be good if findings during pavement design were used to modify asset management strategies.
- LCCA and alternate bidding.
 - Regarding life cycle cost, either eliminate that or better define it in this supplement. Make it a full LCCA, or let it be an engineering judgment.
 - Some States have a policy on LCCA, while others do not.
 - Some States require a certain threshold before LCCA use; other States have 20 percent of project work go to concrete and the remaining work to asphalt.
 - The FHWA does not tell the States how to use life cycle cost (or LCCA). It is left up to the individual State’s processes.
 - Regarding LCCA, FHWA should provide engineering guidance for considering asphalt versus concrete on new freeway builds.
 - There was a discussion regarding what is considered two different designs. Majority interpreted this as concrete versus asphalt designs.
 - Some states that allow alternate bidding feel they are not seeing the benefit since industry is cutting corners to win the bid and the pavement performance suffers.
 - A peer exchange provides a good opportunity for DOTs to clarify items that satisfy industry without tight restrictions on LCCA.

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.
 - There is a need for education on “pavement type definition,” as at least one agency was doing it wrong due to misinformation passed down from supervisor to supervisor.

- Regarding research needs, best practices could be shared so agencies can see proof-of-concept and uses that could benefit their State.
- More information could be provided on alternate bidding, including how other States use this process and what kind of success they have had with it.
- The supplement, even though it is very detailed, should conform to policy but still be flexible for States to use daily.
- Research past projects to investigate maintenance and rehabilitation routines and determine how much money was used for those activities, then, convert that value to today's dollars for a complete-picture view of the project. This might be useful for present projects to justify LCCA costs.
- Research is needed on upcoming or new strategies in recycling, such as in-place recycling, cold-in-place, hot-in-place; some of them work and some do not. This needs to be addressed for the next 20 years.
- Guidance on how to use data and what data is needed for decision making.
- Training and education.
 - Peer exchanges facilitate communication by allowing States an opportunity to discuss future needs for pavement design. It is commendable that States are working together as a group rather than individuals.
- Policy, supportive role, and miscellaneous needs.
 - For one participant, better clarification/communication on the peer exchange was needed from FHWA to justify travel. Suggested having a webinar prior to meeting to clarify goals and help ensure states send the proper personnel.
 - One State does not do alternate bidding because it found that contractors were lowering product quality and cutting corners with materials in trying to keep within the margin of lowest bid.
 - One participant noted their State has a good selection process for pavement design that helps with the arguments between asphalt and concrete. Their surface selection committee selects pavement type and, along with a life cycle cost, this helps the agency decide on the selection type for a project.
 - Engineers in each State need to be able to design using materials that exist in their State, are sustainable, and are recyclable.
 - One participant noted that FHWA's role is changing. There is less project oversight and more is needed to help facilitate information exchange (via peer exchanges and workshops) to address and stay abreast of current issues such as recycling, sustainability, and help deal with industry dynamics.
 - Allow for flexible contract mechanisms.
 - Share resources between agencies and FHWA to take risks on new technologies innovations.

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 Use

States in this region typically require structural design for new, reconstruction, and rehabilitation projects. States have some expectations for rehabilitation projects, for example, overlays are engineered but not for all projects or only for major rehabilitation. In one State, consideration is dependent on existing condition. The same States noted concrete has a standard design, but asphalt may require more design processes. Most States also do not use a structural design for preservation, and some mill and fill projects are performed as a “check” method. In general, most States do not require structural design for mill and fill activities. Design may be conducted out of regional offices for decentralized States.

Pavement Design Methodologies

Most States use AASHTO 93 or DARwin methodologies. Local and global calibrations vary from State to State – Some States use the Mechanistic-Empirical Pavement Design Guide (MEPDG) and supplement with historical mix data. One State’s methodology is not calibrated locally, as they are lacking staff.

Traffic Inputs

States in this region typically include traffic volume, classification, and truck weight data in their policies. However, one State does not directly use truck weight data. When available, States use weigh-in-motion data (WIM) for growth factor. One State uses equivalent single axle load (ESAL). Factors are usually based on WIM data, or ESAL factors are based on traffic classification.

Pavement Foundations

Most States in this region address subgrade conditions and stabilize the base with a variety of methods. In general, they stabilize the subgrade with lime, aggregate, or cement. States in this region typically address sub-base conditions using design-build methods. Sometimes a frost layer is considered. Some States have policy on stabilizing the base. States typically use French drains, pipe drains, daylighting methods, and other positive draining systems, or use cement over an asphalt base. One State’s process for positive draining systems is kept in its material manual for evaluation of economics.

Shoulder Structure

Typically, States will address shoulder structure where the structural capacity is usually the same as mainline. On occasion, there are full-depth reclamation activities and consideration for mountain thoroughfare or public traffic roads. One State does not consider this in its policy. States will typically use similar materials to the mainline with some differences in depth (if cost is an issue) or binders (again, an issue of cost of materials). States use rumble strips in certain areas, but there are limitations for each State. Some States have a safety division that chooses when and where to apply them. Some States use average daily traffic counts to consider location. One state noted issues with maintenance when shoulders have different pavement designs.

Rehabilitation

Generally, States use pavement management systems to determine current/existing pavement conditions. States will core, bore, or trench as well, but there are variances here because not all States do all three. One State cores and has cores for its network, but some guesswork is needed on older roads. In general, States use FWD data. They typically use engineering and economic analysis, but not necessarily LCCA.

Safety

Most States in this region address requirements for skid resistance regardless of funding source. Some chip seal every road or have good/robust aggregates in their State. Generally, States are conducting nighttime work to save disruptions in daytime traffic. Most States do not have specific guidelines in policy, or the Bureau of Traffic Engineering (or similar) will manage these tasks.

Environmental Considerations

States do not typically have environmental considerations in policy but will use recycled materials.

Economic Analysis

Addresses Economic Analysis

States in this region use economic analysis in pavement projects. One State has requirements currently being developed. One State does not use LCCA on all projects, but rather a condensed consideration per-lane mile.

Basis for Determining Need for Economic Analysis

States consider economic analysis for size and types of projects. The majority of States in this region rely on engineering judgments.

Methodology for Cost-Effective Design

States in this region use LCCA and historical experiences as methodologies to ensure a cost-effective design; however, each State uses different standards to justify design. For example, some States use it (LCCA or historical data) on large or specific projects. One State expects designers to consider design alternatives and cost them out. Some will occasionally use LCCA or analyze on a cost per-lane mile.

Alternate Bidding

States typically leave the decision to alternate bid up to the agency. States will allow alternate bidding when industry makes a case for it. Some States use a surface selection committee to select pavement types based on factors other than just initial and life cycle costs. Information from FHWA on how to use alternate bidding properly would be helpful.

LCCA Considerations

States will typically use agency costs related to initial, rehabilitation, and maintenance costs. Some States do not have a formal LCCA program and rely on engineering judgment. Some States consider work zone and user costs, and they obtain discount rates from government websites, from the State's value, or from the Office of Management and Budget. The majority of States in this region do not use material price adjustments, remaining service life, or inflation rates for asphalt or concrete. States' analysis period ranges between 20 and 80 years, and determining design is based on project size or location and other State-specific criteria. States in this region typically include at least one rehabilitation cycle in their analysis

period. States use a variety of tools to help conduct LCCA, including in-house software, RealCost, and Excel spreadsheets. States assess uncertainty using probabilistic and deterministic methods. States in this region were evenly divided in reviewing LCCAs—some States have LCCA reviewed, while others rely on engineering judgment.

Tools and Documentation

States in this region typically store their LCCA policy/requirements or guidelines in their pavement design policy manual. Other States either do not have a formal policy in place, or do not conduct LCCA.

Policy Review & Updates

Updates to Pavement Policy Manual

In this region, most States have updated their policy/manual within the last 5 years. Generally, updates are made on an annual or as-needed basis, or when there is political changeover.

Review/Approval of Revisions by FHWA Division Office

Typically, FHWA division offices will approve updates to the policy/manual.

Attendee List

Alaska Department of Transportation & Public Facilities (DOT&PF) – Jeff Currey, Northern Region
Materials Engineer

Alaska FHWA Division Office – Al Fletcher, Safety, Pavements, and Materials Engineer

California DOT – Tom Pyle, Chief, Office of Asphalt Pavement

California FHWA Division Office – Chu Wei, Asset Management/Pavement Engineer

Idaho Transportation Department (ITD) – Michael Santi, Pavement Materials Engineer

Kansas DOT –

Nat Velasquez, Jr., Pavement Design Engineer

Ryan Barrett, Pavement Design Leader

Montana DOT – Miles Yerger, Pavement Design Engineer

Nebraska DOT – Brandon Varilek, Roadway Asset Management Engineer

Oklahoma DOT – Amanda Warren, Pavement Design Engineer

Oklahoma FHWA Division Office – Waseem Fazal, Pavement and Materials Engineer

Oregon DOT –

Justin Moderie, State Pavement Engineer

Karen Strauss, Pavement Design Engineer

Oregon FHWA Division Office – Anthony Boesen, Operations Engineer

Washington State DOT – Mark Russell, Pavement Design Engineer

Washington FHWA Division Office – Angel Rivera, Area Engineer

Moderators:

Jennifer Albert, Pavement Materials Engineer – FHWA

Heather Dylla, Sustainable Pavement Engineer – FHWA

Shree Rao, Principal Engineer – Applied Research Associates

Nadarajah Sivaneswaran, Senior Research Civil Engineer – FHWA

Note-Takers:

Jose Chavarria, Instructional Systems Designer – Applied Research Associates

Brandi Tagirs, Administrative Support – Applied Research Associates