TRB Safety Performance and Analysis Committee (ACS20)

User Liaison Subcommittee (ACS20(2))

Co-chairs: Daniel Carter (NCDOT) and Kim Kolody (Jacobs)
Mentors: Geni Bahar (Navigats) and Mike Dimaiuta (Genex)

June 29, 2023

1:00 to 2:50 pm PST

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Agenda

- **Welcome and Meeting Objectives** *(5 min)*
  - ***Sign-in sheet***
- **ACS20 Committee Chair Update**
  - (Karen Dixon) *(5 min)*
- **Green Book 8: Interplay with the HSM**
  - (Ingrid Potts / Doug Harwood) *(15 min)*

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Agenda

- **Working Groups - On-going Initiatives Discussions**
  - **Overview** (5 minutes)
  - **Draft RFP Language** (Bonnie Polin / Stephen Read) (10 min)
  - **Practical Approaches to Applying HSM Part C Methods** (Bonnie Polin / Mike Dimaiuta) (25 min)
  - **HSM User Support & Training** (Kelly Hardy / Jacob Farnsworth) (10 min)
  - **Safety Performance Function Clearinghouse** (Derek Troyer / Mike Dimaiuta) (5 min)

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Agenda

- **Working Groups - On-going Initiatives Discussions**
  - **HSM Part C Tools** (Mike Dimaiuta / Bonnie Polin / Stephen Read) (5 min)
  - **Road Safety for Local Agencies** (Tim Colling / Cong Chen) (5 min)
  - **Workshops** (Mike Dimaiuta, Kim Kolody (5 min)
- **Research and Synthesis Topics** (Stephen Read) (10 min)
- **FHWA Update** (Matt Hinshaw / Derek Troyer) (5 min)
- **Closeout and Actions** (5 min)

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ACS20 Committee Chair Update

- Karen Dixon

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Green Book 8: Interplay with the HSM

- Ingrid Potts / Doug Harwood

- GB8 representation and interaction with the HSM; Schedule and timing of publications
- Anticipated user needs
  - Feedback from committee overview
  - Additional user needs
- Future ULSC working group
- Potential TRB Annual meeting workshop

Working Groups - On-going Initiatives *Overview*

- **Working Groups**
  - Legal Aspects & Policy: Priscilla Tobias
  - International Research: Jennifer Ogle

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Working Groups - On-going Initiatives *Overview*

- **Temporary Working Groups**
  - Practical Approaches: Bonnie Polin, Tim Barnett
  - Tools: Mike Dimaiuta, Bonnie Polin
  - Local Roads: Tim Colling, Cong Chen
  - Workshops: Mike Dimaiuta, Kim Kolody
  - Frequently Asked Questions: Jacob Farnsworth
  - Discussion Forum: Tariq Shihadah, Daniel Carter
  - HSM Website: Stephen Read

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Policy and Legal Aspects

- Priscilla Tobias, Bre Gowan

- AASHTO and TRB partnerships
- TRB Webinar: Liability Neutral Language—Best Practices
  - Wednesday, June 21, 2023
  - Discussed the concepts of liability neutral language and its use in engineering publications, press releases, e-mails, and other forms of communication.
  - Based on *NCHRP's Legal Research Digest 83: Guidelines for Drafting Liability Neutral Transportation Engineering Documents and Communications Strategies*.
  - TRB Webinar Liability Neutral Language—Best Practices | National Academies

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International Safety Research

- Jennifer Ogle

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Working Groups - On-going Initiatives *Discussions*

- **Draft RFP Language**

  Bonnie Polin / Stephen Read
- **Practical Approaches to Applying HSM Part C Methods**

  Bonnie Polin / Mike Dimaiuta
- **HSM User Support & Training**

  Kelly Hardy / Jacob Farnsworth
- **Safety Performance Function Clearinghouse**

  Derek Troyer / Mike Dimaiuta

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Draft RFP Language Discussion

- Bonnie Polin / Stephen Read

- Considerations for Ensuring Practical Application of Research Results Related to the AASHTO HSM
  - Compatibility with existing research.
  - Model scope, sensitivity testing and edge cases.
  - Tools for performing calculations.
  - Availability of collected data.
  - Pilot testing of models and tools.
  - Frequently asked questions.
  - Implementation planning.
  - Liability-neutral language.

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Draft RFP Language

- **Compatibility with existing research.**
  - New research should produce outcomes which (A) are consistent and compatible with existing research products or (B) clearly define divergences from existing research, explain their purpose and relative value, and provide guidance for practitioners and future researchers to reconcile differences and harmonize relevant applications and approaches.

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Draft RFP Language

- **Compatibility with existing research.**
  - Reasons for divergences from existing research should be reviewed by practitioners and may include correcting erroneous methods, updating methods in response to changes in technology, or evolving methods to better serve the goals of practitioners.
  - Researchers should *document* how the scope of developed models relates to existing models and provide guidance on how practitioners should select between new and existing models where their scopes overlap.

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Draft RFP Language

- **Model scope, sensitivity testing and edge cases.**
  - Relevant analysis models developed under new research should include thorough *documentation* of the full scope of their application and sensitivity analysis of the models within this scope.
  - New research should provide *documentation* for the impacts of use cases outside the scope of the models, assess common edge cases, and provide quantitative metrics for the precision and significance of the models.

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Draft RFP Language

- **Tools for performing calculations.**
  - Spreadsheet, web-based, and other types of tools developed for practitioners to use when applying models developed by a research effort should meet the functional needs of state DOT and other practitioners.
  - These include accessibility as it relates to format (spreadsheet vs. web), delivery method (file sharing site, download from website, etc.), and other factors; ability of an agency to customize the tool (calibration, report function); and level of effort needed to use.

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Draft RFP Language

- **Availability of collected data.**
  - Data collected and archived during the project should be delivered to NCHRP prior to the end of the project and should be accessible to future users to the extent practical and appropriate, following a data archiving and sharing plan developed by the researcher in accordance with National Academies policy regarding data use by others and approved by the panel.

Draft RFP Language

- **Pilot testing of models and tools.**
  - When relevant, analysis models developed under new research should be pilot tested by a geographically diverse working group of practitioners who reflect the target audience of the models prior to finalizing the research.
  - Pilot testing should cover diverse test cases and help to refine the models and related developed tools, produce examples and case studies to supplement documentation, and ensure that developed models are practical to apply (e.g., accessible, understandable, not overly burdensome data requirements).

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Draft RFP Language

- **Pilot testing of models and tools.**
  - When relevant, pilot tests should include comparisons between new and existing models when applied to the same or similar facilities.

Draft RFP Language

- **Frequently asked questions.**
  - New research should produce supplemental documentation for practitioners in the form of frequently asked questions which address anticipated technical questions.
  - Questions should be general and reflect common use cases, and answers should be thorough but concise, avoiding technical jargon.

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Draft RFP Language

- **Implementation planning.**
  - NCHRP guidance on active implementation should be referenced when conceptualizing and developing implementation plans.
  - Plans for implementing research results should consider strategies both prior to and after completion of the research.

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Draft RFP Language

- **Implementation planning.**
  - Plans for implementing final research results should:
    - Present strategies and activities appropriate for the objectives of the research.
    - Be directly relevant to the type of research products and the intended users of the research products.
    - Consider and accommodate potential implementation barriers and facilitators.

Draft RFP Language

- **Liability-neutral language.**

- Documentation of research results, including text used in reports, guidelines, tools, case studies, or other products, should use liability-neutral language.

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Practical Approaches to Applying the HSM

- Bonnie Polin / Mike Dimaiuta
- Working group volunteers

- Purpose and anticipated outcomes:
  - Discussion to maintain list of known HSM user issues or areas for future growth
  - Identify areas for collaboration with Analytical Methods SC
  - Identify potential user needs, research needs

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Practical Approaches to Applying the HSM: Future Needs

- HSM1 and HSM2 analysis results
  - Comparison and transition challenges (in some cases, HSM2 results vary greatly from HSM1)
  - Calibration and readiness (e.g., before an agency calibrates HSM2 models, better to use uncalibrated HSM2 or calibrated HSM1 models?)
- Existing tools and impacts of new models

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2023 MYM

IHSDM Update

Software

- Concluded software development in Sept. 2021 (IHSDM 2021; v. 17.0.0)
- Tech Support by FHWA Geometric Design Lab (GDL) will continue through at least September 2024, but essentially as long as agencies are still using the IHSDM software
- See "*FHWA's Future Plans for the Interactive Highway Safety Design Model (IHSDM)*": https://highways.dot.gov/sites/fhwa.dot.gov/files/FHWA-HRT-23-017.pdf

Training (FHWA-NHI-380100)

- Virtual training in a blended web-conference training format (self-paced modules + instructor-led modules via webinar)
- Est. course length is 14 hours
- Cost is $75
- LINK

Also, GDL plans to offer free training webinar(s) to walk users through how to use IHSDM to apply HSM2 models (including limitations).

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IHSDM: HSM2 Implications

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- **Freeways (Ch. 17) – workarounds required for:**
  - Change from bi-directional to unidirectional models
    - Changes could be applied in IHSDM via the IHSDM Administration Tool (Model Data Sets) by modifying the intercept (and other) coefficients of the SPFs. IHSDM data input would still need to be bi-directional, with the direction to be evaluated 'duplicated' in the other direction.
  - Changes to the freeway segmentation process (e.g., speed-change lane segments longer than 0.3 miles, and treatment of horizontal curves):
    - For IHSDM "location-based" data input (which automatically segments the highway), it is likely that segmentation process changes can be incorporated, but with additional effort required by the user.
- **Single-state calibration:**
  - IHSDM Administration Tool can be used to input new coefficients for models currently in IHSDM.

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IHSDM: HSM2 Implications

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2023 MYM

- **New HSM2 models:**
  - Models developed under NCHRP projects 17-58 (6+ lanes and 1-way urban/suburban arterials), 17-68 (intersections not covered in HSM1) and 17-70 (roundabouts) were previously implemented in IHSDM. Any recent updates to SPF coefficients can be incorporated via IHSDM configuration files.
  - New (RAP-based) pedestrian and bicycle models (NCHRP 17-84) cannot be incorporated into IHSDM. Also, some changes will be needed to exclude 'old' pedestrian and bicycle models from IHSDM.
- **Part C Calibration:**
  - The IHSDM AdminTool includes a Calibration Utility to assist users in estimating and/or entering calibration factors. Users will still be able to enter/ estimate calibration factors for SPFs already in IHSDM, but not for the new ped and bike models. It is unlikely that the updated calibration procedure (future HSM2 Ch. 13) can be incorporated.

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Practical Approaches to Applying the HSM: Future Needs

- Bicyclist / pedestrian models
  - Lack overdispersion parameters
  - Comparing EB adjusted predictions to predicted
  - HSM2: can use observed crashes when significantly higher than predicted(?)
- Severity models
  - HSM1 total crash prediction with distribution
  - HSM2 severity models combine to obtain total crashes
  - Expected differences, validation of results

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Practical Approaches to Applying the HSM: Future Needs

- Intersection analysis comparison
  - Roundabout predictions may be different from traditional intersections (draft HSM2 text says RAB models will be adjusted)
  - Next steps for analysis and communication for users
- Guidance needed on unexpected outcomes?
- Simplification of prediction methods needed?

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Practical Approaches to Applying the HSM: Future Needs

- Issues related to application of EB method, e.g.,:
  - HSM2 says uncalibrated models can be used with EB, but results will be less reliable.
  - Bike/ped models: HSM2 says can use observed crashes when significantly higher than predicted.

HSM User Support & Training

- Kelly Hardy / Jacob Farnsworth

- HSM2 Training update
- Approach for addressing questions and user needs
  - User Forum
  - Frequently Asked Questions
  - Practitioner technical user group calls
  - Office hours

Safety Performance Function Clearinghouse

- Derek Troyer / Mike Dimaiuta

- Objectives
  - Make SPFs available, accessible
  - Provide guidance on use and application
  - Rating System
- Starting point
  - NCHRP 54-10 synthesis complete in 2024
  - CMF Clearinghouse
  - HSM Pooled Fund

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SPF Clearinghouse

- FHWA had internal discussions in March & May:
  - Positive feedback.
  - Not a trivial effort > and more so if a rating system is included.
- Matt Hinshaw and Derek Troyer mentioned briefly at HSM Implementation Pooled Fund meeting (May 8)
  - IPF members want to see results from Synthesis Topic 54-10 first (2024)
- Next steps:
  - Discuss at ACS20 MYM
  - Wait for HSM IPF; see if it is of interest to IPF working groups
  - CMF CH:
    - Explore possibility of linking/integrating the CMF CH with an SPF CH
    - Could expand and make more accessible the CMF CH page on 'how to develop SPFs'; could start with a spreadsheet.

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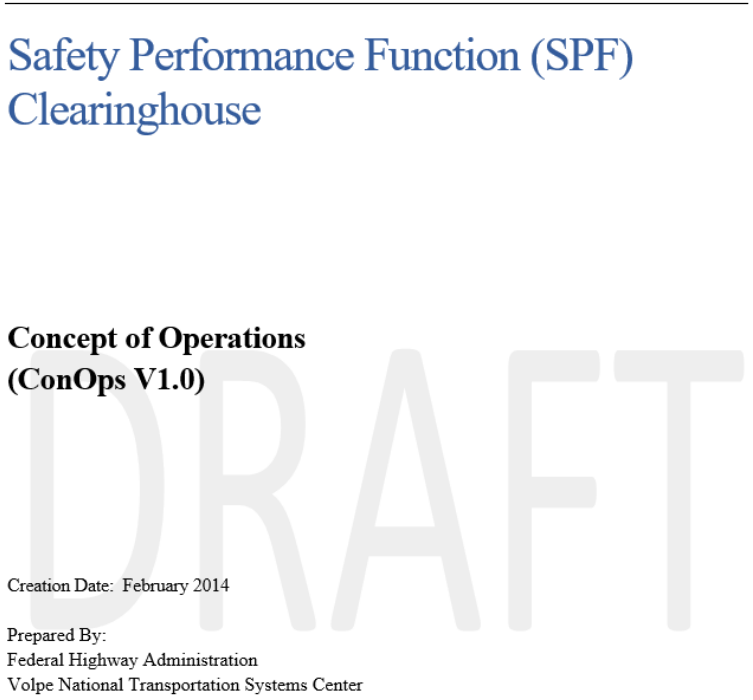
Idea of SPF Clearinghouse

- Initiated by FHWA through HSM Implementation Pooled Fund **February 2014**: *Safety Performance Function (SPF) Clearinghouse (Concept of Operations (ConOps V1.0)*)
  - The document (download here) provided scope, existing systems and processes, capability needs, system concept, operations and support description, and system overview.



Safety Performance Function (SPF) Clearinghouse

Concept of Operations (ConOps V1.0)

DRAFT

Creation Date: February 2014

Prepared By:
Federal Highway Administration
Volpe National Transportation Systems Center

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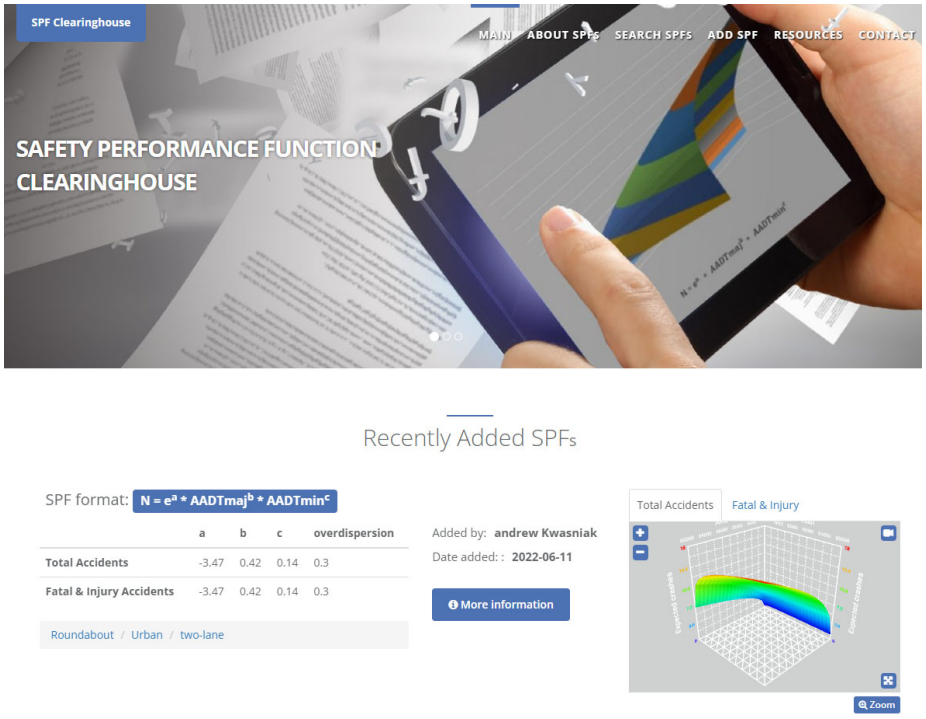
Idea of SPF Clearinghouse (Cont.)

- http://spfclearinghouse.org run by a private entity (Andrew Kwasniak) since **2015**
  - It is active but with **limited** SPFs & information about them.
  - ***No rating system***: Without standardization, transportation professionals may encounter difficulties in comparing SPFs from different jurisdictions, leading to inconsistencies in their use and interpretation.



Idea of SPF Clearinghouse (Cont.)

General benefits of a functioning SPF CH

- A centralized SPF Clearinghouse could play a crucial role in improving the effective application of DDSA and the Safe System Approach:
  - Would provide transportation professionals with easy access to these tools, allowing for more efficient and effective roadway safety analysis and decision-making.
  - Would facilitate the standardization of SPF development and implementation, ensuring consistency in the application of these tools across various jurisdictions.
  - AASHTO/FHWA/TRB could promote the use of these tools more widely and ensure that they are being used appropriately.
  - An SPF Clearinghouse could be used to identify gaps in SPF development and implementation, and to develop strategies to address these gaps.

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Idea of SPF Clearinghouse (Cont.)

Potential effects of a functioning SPF CH on future editions of HSM

- HSM Part C could eventually be restructured so that it does not contain any SPFs/models at all, but rather guidance on first how to select an appropriate safety analysis approach; and then, when applicable, how to select and apply SPFs/models (e.g., from a future SPF Clearinghouse) – similar to the way HSM2 Part D will not include specific CMFs. Of course, this is very dependent on the development of a rating system for SPFs.
- As with HSM2 Part D and the CMF Clearinghouse, this type of Part C restructuring has the advantage of providing access to SPFs/models "soon" after they are developed, rather than waiting for years to add a subset of new SPFs to the next edition of the HSM.

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Predictive Tools

- Bonnie Polin / Mike Dimaiuta
- Develop comprehensive index of tools currently available
  - NCHRP 20-05 / 54-10 synthesis complete in 2024
  - Gaps in currently available tools
  - The objective of this synthesis is to document state DOT current practices on calibration factors and development of jurisdiction-specific SPFs.
  - NJDOT “HSM Predictive Safety Tool Research” (Jan. 2023)

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Predictive Tools

- Future tool development
  - Considerations: Validation, customization, flexibility
  - How can we provide guidance for what tools should do, or be like, in future projects?
  - HSM User Needs and Preferences related to tools
  - AASHTO webinar upcoming
- Reconvene ULSC volunteers

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Road Safety for Local Agencies

- Tim Colling / Cong Chen
- Workshop for LTAP on HSM basics
- Synthesis

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Road Safety Training for Local Agencies

- Synthesis: Best Practices for Incentivizing HSM Best Practices by Local Governments
  - Identify and summarize techniques that incentivize local government use of quantitative safety analysis techniques outlined in the HSM.
  - The study will focus on techniques that can be applied on a state level and will provide resources to state and federal agencies with a vested interest in traffic safety on the efficacy and resource requirements for these types of incentivizing programs.

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Research and Synthesis Topics

- Stephen Read

- New synthesis, research needs
- Other initiatives
- Potential discussion items
  - Simplification of crash prediction models
  - VRU prioritization overlaps with equity needs
  - Synthesis on non-traditional data set applications

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Workshops

- Mike Dimaiuta / Kim Kolody

- Safe System Approach workshops in 2022, 2023
- Safe System Approach webinar in Dec. 2022

- Future workshops
  - GB8 and HSM for 2025, TRB AM 2025
  - Workshop for LTAP on HSM basics, LTAP

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Workshops – TRB AM 2024

Road Safety Impacts of Vehicle Size on VRUs

Growth in passenger vehicle size is a key contributing factor to the increase in pedestrian and bicyclist deaths and injuries over the last few years. Larger vehicles encourage a "race to the bottom" for traffic safety by increasing crash severity and diluting the effectiveness of prior safety efforts. This workshop will examine recent research related to vehicle size and VRU crashes, as well as potential legislative, technology, and traffic design solutions to mitigate this increased risk.

ASC10 Lead, Co-sponsor: Pedestrians (ACH10), Bicycle Transportation (ACH20), Safety Performance and Analysis (ACS20), Human Factors of Infrastructure Design and Operations (ACH40), Human Factors of Vehicles (ACH30), City Transportation Issues Coordinating Council (A0030C), Performance Effects of Geometric Design (AKD10)

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FHWA Update

- Matt Hinshaw / Derek Troyer

Other Items/Wrap-up

- Next ULSC meeting -- in October?

Thank you!

- Co-chair contact info:
  - Daniel Carter: dlcarter4@ncdot.gov
  - Kim Kolody: kim.kolody@jacobs.com
- Mentor contact info:
  - Mike Dimaiuta: Michael.Dimaiuta.ctr@dot.gov

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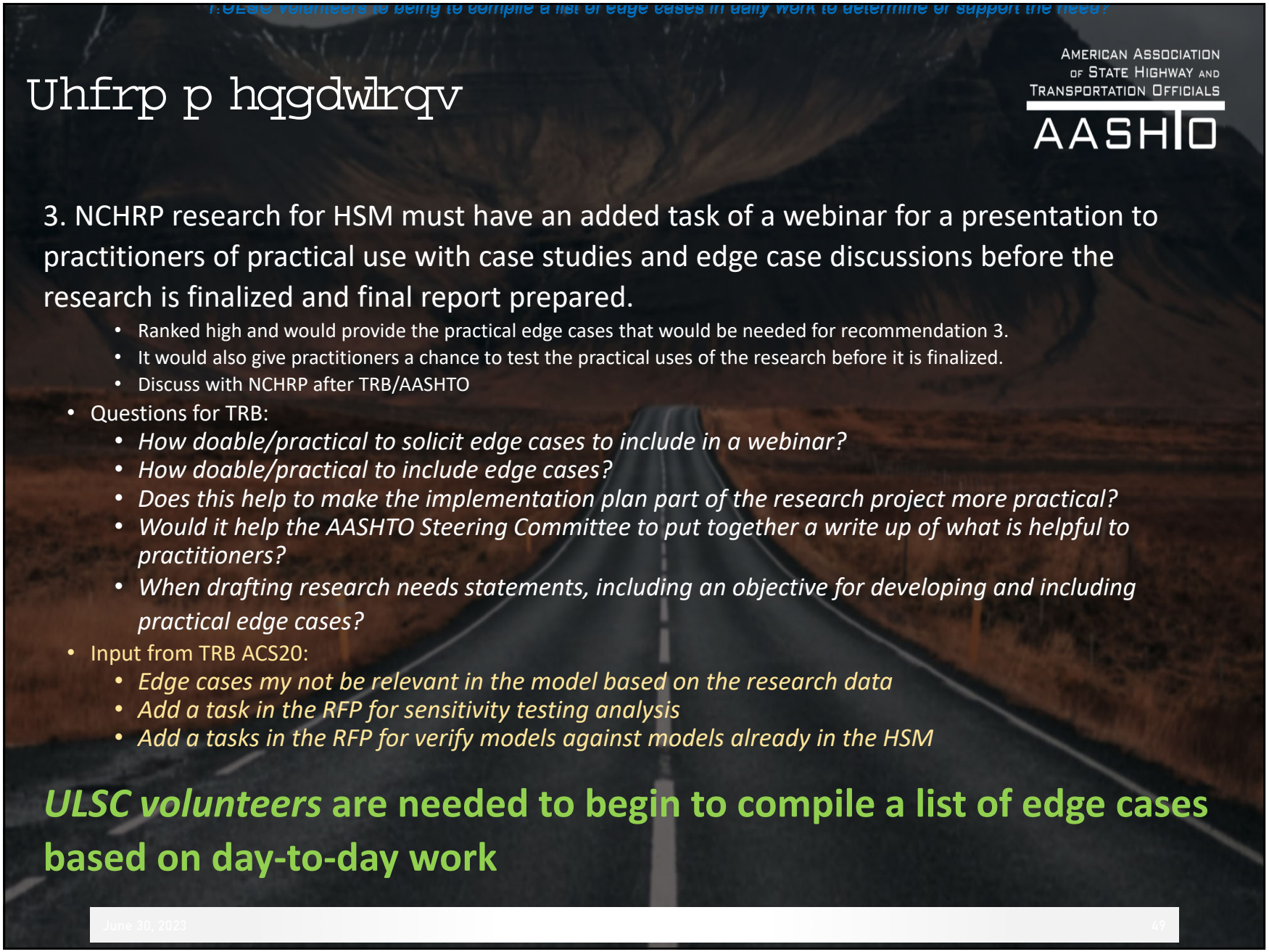
ULSC volunteers to begin to compile a list of edge cases in daily work to determine or support the need?
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American Association of State Highway and Transportation Officials
AASHTO
3. NCHRP research for HSM must have an added task of a webinar for a presentation to practitioners of practical use with case studies and edge case discussions before the research is finalized and final report prepared.
Ranked high and would provide the practical edge cases that would be needed for recommendation 3.
It would also give practitioners a chance to test the practical uses of the research before it is finalized.
Discuss with NCHRP after TRB/AASHTO
Questions for TRB:
How doable/practical to solicit edge cases to include in a webinar?
How doable/practical to include edge cases?
Does this help to make the implementation plan part of the research project more practical?
Would it help the AASHTO Steering Committee to put together a write up of what is helpful to practitioners?
When drafting research needs statements, including an objective for developing and including practical edge cases?
Input from TRB ACS20:
Edge cases my not be relevant in the model based on the research data
Add a task in the RFP for sensitivity testing analysis
Add a tasks in the RFP for verify models against models already in the HSM
ULSC volunteers are needed to begin to compile a list of edge cases based on day-to-day work
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AASHTO
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6. NCHRP research for HSM includes factors in CPM (crash prediction models) for similar types of jurisdictions (similar to the level, rolling, mountainous terrain in some Level of Service calculations).
Research need and a RNS will need to be prepared.
Medium because we may need to wait until the synthesis is completed.
Questions for TRB
Do we need to wait for the synthesis to be completed?
What is the feasibility of conducting this research and what would be some challenges?
Would this change the way we think of calibration?
Input from TRB ACS20:
Will need to develop and prepare a research needs statement
Concern that the goal of being able to adjust for differences between jurisdictions, etc. based on available attributes (e.g., reporting thresholds) may not yield effective results
ULSC support is needed to develop the RNS
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American Association of State Highway and Transportation Officials
AASHTO
11. National / NCHRP has a requirement that data must be available so it can add to a database for others to use.
• Need a uniform way of accepting all data in a repository (Bureau of Transportation Statistics, HSH, etc.)
• Ranked high recommendation to pursue.
• What does NCHRP do with the data, do they need to provide a schema so it can all be collected uniformly so it can be used by others?
• Discuss with NCHRP after TRB/AASHTO
• Questions for TRB
• How often do researchers' data come from previous NCHRP projects data?
• Is that typically the starting point and is it easy to access?
Input from TRB ACS20:
• Contentious discussion on only using data that is then available to all to use because otherwise it is too costly and not reproducible. But data providers insist on not making it available while researchers and those trying to duplicate the research need it.
• Check with other committees on data how this is done
ULSC support or group needed to explore the experiences of other committees on data
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