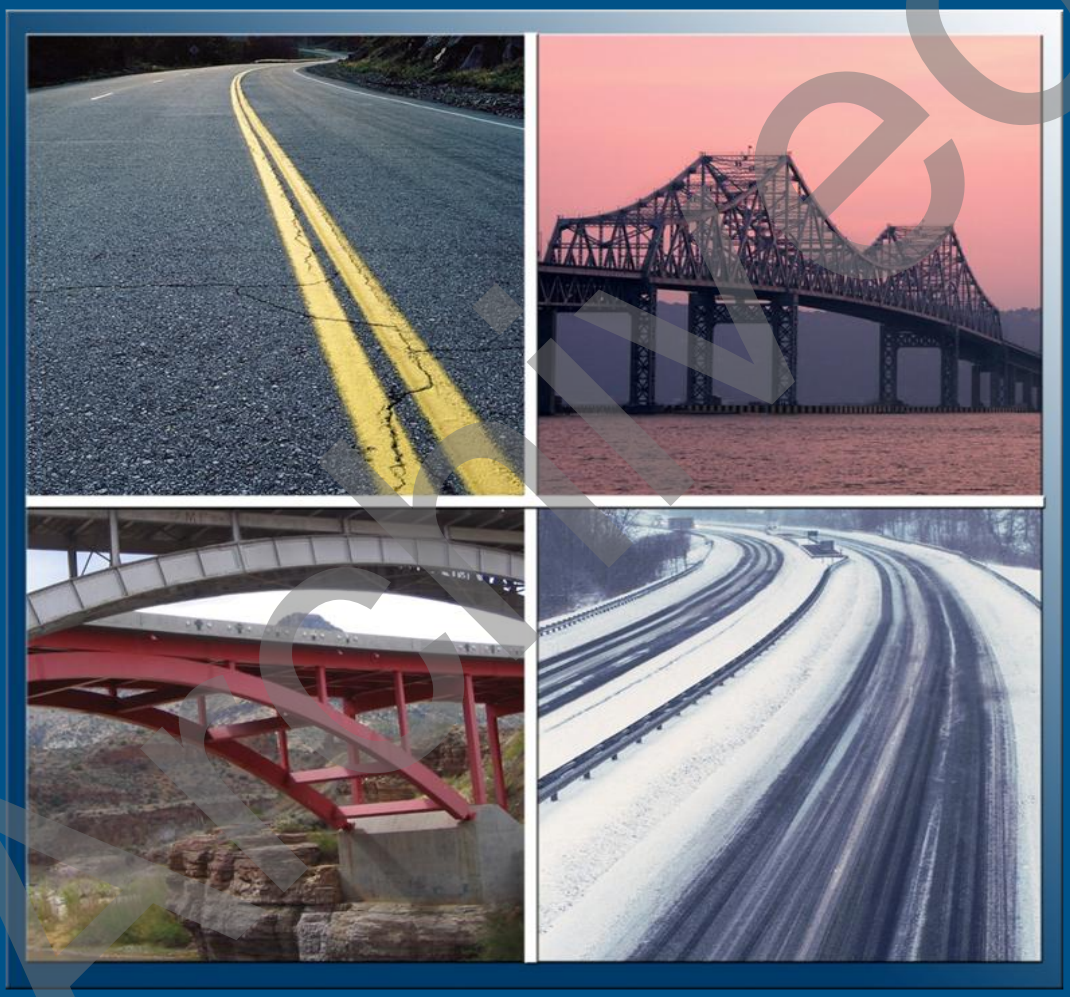
Improving FHWA's Ability to Assess Highway Infrastructure Health

National Meeting Report



U.S. Department of Transportation
Federal Highway Administration

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Ms. Nastaran Saadatmand, P.E., Task Monitor

16. Abstract

The FHWA in coordination with AASHTO conducted a study to define a consistent and reliable method to document infrastructure health with a focus on pavements and bridges on the Interstate System, and to develop a framework for tools that can provide FHWA and State DOTs ready access to key information that will allow for better and more complete assessments of infrastructure health nationally. This report summarizes the proceedings of a national meeting entitled, "AASHTO/FHWA Workshop on the Highway Infrastructure Health Assessment Study." This workshop provided an opportunity for senior-level State department of transportation (DOT) stakeholders to provide input into national performance measures for pavements and bridges and identify challenges and implementation issues. The results of this Workshop including a summary of discussions related to proposed pavement and bridge condition and health metrics are contained in this report.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
		NOTE: volumes greater than 1000 L shall be shown in m^3		
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
^oF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	^oC
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
^oC	Celsius	1.8C+32	Fahrenheit	^oF
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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1.0 Meeting Overview

1.1 PROJECT INTRODUCTION

Over the past several years, the importance of preserving existing transportation infrastructure has received increased focus. A fundamental element of the performance of a transportation system is the physical condition of the assets that comprise it. Consequently, the preservation of existing assets is a critical element of the nation's transportation programs, and the identification of performance measures designed to capture and communicate the physical condition of pavement and bridges are needed.

The primary goals of this project are to:

- Define a consistent and reliable method of assessing infrastructure health with a focus on pavements and bridges on the Interstate Highway System; and
- Develop tools to provide FHWA and State DOTs ready access to key information that will allow for a better and more complete view of infrastructure health nationally.

While initially focusing on the Interstate Highway System, it is the intent of this project to develop methodologies that could be expanded in the future to the National Highway System or any other defined system of pavements or bridges, subject to data availability.

To meet these goals, the scope of this project includes two main tracks:

- Develop an approach for categorizing pavement and bridges as Good/Fair/Poor, which can be used consistently across the country. Performance in this context is based on condition information.
- Develop a methodology for determining the health of a corridor with respect to pavement and bridges. Health in this context is based on factors that go beyond condition.

These tracks are being coordinated with other Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO) and National Cooperative Highway Research Program (NCHRP) projects focused on performance-based transportation programs.

This study has been divided into three phases. Phase I focused on defining an approach for assessing pavement and bridge condition and health. In Phase II, the approach was refined and tested via a pilot study on a sample corridor. The pilot corridor was I-90 through South Dakota, Minnesota, and Wisconsin. Phase III consisted of a national meeting to review the project results with practitioners

from across the U.S., and to discuss the preferred methodology and next steps. This report documents the proceedings from this national meeting. More detailed findings and recommendations from the study can be found in the Phase I report and the Final Report.

1.2 NATIONAL MEETING OBJECTIVES

The objectives of the national meeting were to:

- Present the results of the FHWA Highway Infrastructure Health Assessment Study;
- Solicit feedback on project findings and recommendations, with a particular focus on their benefits, potential implementation challenges, and recommendations for addressing these issues; and
- Identify critical next steps for advancing national performance measures for infrastructure.

The meeting occurred on October 13, 2011 in Detroit, Michigan. The venue and date were selected to coincide with the 2011 AASHTO Annual Meeting hosted by the Michigan Department of Transportation (MDOT). The meeting lasted from approximately 8:30 am until 4:30 pm with a lunch break.

FHWA coordinated with AASHTO and invited transportation professionals from State DOTs. The invitees included a mixture of executives, engineers, planners, and performance management specialists. A list of the over 50 participants is provided in Appendix A. The participants represented 33 DOT's, FHWA and AASHTO.

The agenda of the meeting (which is provided as Appendix B) included an introductory session, a project overview, a discussion of pilot study results, two topic area discussions (Good/Fair/Poor condition ratings and health reporting) followed by separate breakout sessions, and a conclusion/wrap-up session. The following sections of this report document the findings and discussions that emerged during the meeting.

2.0 Good/Fair/Poor

2.1 GOOD/FAIR/POOR PRESENTATION

Following an introduction to the project, the research team presented findings related to the topic area of Good/Fair/Poor condition ratings. The Good/Fair/Poor presentation focused on the vision and draft definitions for Good/Fair/Poor condition ratings and the results of applying Good/Fair/Poor standards to the pilot corridor. Some of the key points of the overview presentation include:

- **The vision for Good/Fair/Poor condition ratings is for a consistent and reliable method that can be applied nationwide.** One of the reasons for engaging the large group of State DOT representatives at the national meeting was to gain a better understanding of where proposed condition ratings are consistent or inconsistent with their own approaches and how a national approach could impact and inform their decisions.
- **The approach first developed qualitative definitions for Good/Fair/Poor and then developed quantitative thresholds to place assets into those "buckets."** Obtaining feedback on the definitions of Good/Fair/Poor was another objective of the meeting. The following proposed definitions were presented to the participants and stimulated discussion:
  - **Good condition** – Pavement and bridge infrastructure that is free of significant defects, and has a condition that does not adversely affect its performance. This level of condition typically only requires preventative maintenance activities.
  - **Fair condition** – Pavement and bridge infrastructure that has isolated surface defects or functional deficiencies on pavements; or minor deterioration of bridge elements. This level of condition typically could be addressed through minor rehabilitation, such as overlays and patching of pavements that do not require full depth structural improvements; and crack sealing, patching of spalls, and corrosion mitigation on bridges.
  - **Poor condition** – Pavement and bridge infrastructure that is exhibiting advanced deterioration and conditions that impact structural capacity. This level of condition typically requires structural repair, replacement, or reconstruction.

These definitions can also be presented in tabular form, as shown in Table 2.1.

Table 2.1 Defining Good/Fair/Poor

	Condition	Typical Work Required
Good condition	• Free of significant defects • Condition does not adversely affect its performance	• Preservation activities
Fair condition	• Isolated surface defects or functional deficiencies on pavements • Minor deterioration on bridge elements	• Minor rehabilitation - Pavement overlays and patching - Bridge crack sealing, patching of spalls, and corrosion mitigation
Poor condition	• Advanced deterioration • Conditions impact structural capacity	• Structural repair, replacement, or reconstruction

- **This effort built on performance measurement work being conducted by AASHTO and FHWA, in particular on NCHRP Project 20-24 (37)G.** That effort provided detailed definitions of performance measures for bridge and pavement condition, as well as other performance areas. The research team for this project started with the recommendations from NCHRP 20-24(37) G, and developed options for specific measures that could be explored using available national data sets. Table 2.2 lists the measures that were addressed in the FHWA Infrastructure Health project. The measures are organized into tiers, which were defined by AASHTO and documented in NCHRP Project 20-24 (37)G.[1] The tiers are defined as follows:
  - Tier 1 measures are considered complete or nearly complete and ready for use at the national level. They meet the criteria of having:
    - » General consensus on the measure's definition,
    - » A common or centralized approach to data collection in place, and
    - » Established availability of consistent data.
  - Tier 2 measures meet one or two of the above criteria and require further work before being ready for deployment.
  - Tier 3 measures are generally still in the proposal stage and require further work before being ready for deployment.

[1] http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-24(37)G_FR.pdf.

Table 2.2 Performance Measurement Options for Good/Fair/Poor Addressed During this Study

Goal Area	Tier 1	Tier 2	Tier 3
Pavement Preservation	IRI	Functional Adequacy Based on HPMS Distress Data	Structural Condition Based on Tier 2 Plus Deflection Data
Bridge Preservation	Structural Deficiency (SD)	Structural Adequacy Based on NBI Ratings	See note 1

Note 1: Although AASHTO has defined a Tier 3 measure based on element-level bridge data, this measure was not addressed in this study.

- **The pilot study confirmed the readiness of Structural Deficiency weighted by deck area as a Tier 1 measure for bridges.**
- **The pilot study illustrated that a measure of structural adequacy based on a weighted average of NBI condition ratings is a viable option for a Tier 2 measure.**
- **The pilot study explored the readiness of HPMS data items such as IRI, rutting, faulting, and cracking; and compared HPMS and State-maintained data to newly collected field data.** The study team concluded that IRI generally provides a good match with field data despite some temporal issues. It also concluded that, though IRI has some limitations, it is the measurement most ready for use. The study team also evaluated options for Tier 2 and Tier 3 pavement measures listed in Table 2.2, and concluded that these measures require significant work before they are ready for deployment nationwide.

During the Good/Fair/Poor presentation, there were several discussion periods that gave participants the opportunity for feedback. In addition, the presentation was followed by a breakout group exercise to solicit more feedback from participants. Participants were separated into four groups and led through a facilitated discussion. The feedback from participants from the breakout groups as well as the general discussion during the plenary presentation is summarized below.

2.2 DISCUSSION AND COMMON THEMES FROM BREAKOUT GROUPS

The following discussion points and common themes emerged as part of the larger group dialogue and among the four breakout groups.

- **There was general comfort with the concept of a consistent national Good/Fair/Poor rating system along the lines of what was proposed in the plenary presentation.** Participants showed an appreciation for the value of a

system to assess condition consistently nationwide. Some participants were more comfortable applying the proposed approach to pavements than to bridges. These participants felt a two level scale deficient/non deficient might be sufficient for bridges.

- **Participants urged caution with prescriptive decisions.** While most participants were supportive of national level condition definitions for planning and for responding to inquiries about infrastructure health, some participants expressed concern over the use of national level measurements for local/regional decision-making and investment decisions. Participants cited the potential for misuse of the condition ratings, such as penalizing States that are doing well by redistributing funding to States that are not. Another concern expressed regarding prescriptive decisions is that condition improvement or treatment strategies may vary from State to State.
- **One group urged national condition measurement should remain confined to the Interstate Highway System (IHS) for now**. One concern raised was that the extent of responsibility for non-Interstate highways on the NHS varies widely by State. Participants suggested that the IHS also has the best data and could serve as an effective platform to refine condition ratings.
- **Some participants expressed concern over consistency with State efforts.** Participants felt it was important for FHWA to recognize that States may have existing condition definitions in place that vary from the proposed national model. Some felt that, while there is a need to assess nationwide condition, State-by-State differences should also be recognized. For example, States may use four classes for condition definition. Another concern was that there are significant differences in pavement needs based on climate. FHWA and AASHTO representatives stressed that the intention was not to replace existing State systems but to work towards a national standard that could be used for multistate assessment.

  One approach that was suggested for dealing with the issue of different State rating systems and the need for a consistent national rating system was to develop a methodology for translating individual State rating systems into the national Good/Fair/Poor ratings while allowing States to continue to use their systems at the State level.
- **Participants felt Good/Fair/Poor condition ratings present an opportunity to tell the story of needed investment.** Participants discussed opportunities for the definitions to communicate customer needs, infrastructure needs, and ultimately the story of investment needs for the transportation system. Participants felt there is an opportunity to use Good/Fair/Poor results as a communication tool for outreach to the general public as well as transportation policy decision-makers. One option for improving the message of the study would be to describe needs in economic terms and emphasize job creation. Another option would be to include images of Good/Fair/Poor and to describe the type of work typically done and why it

is done. Participants noted additional opportunities to coordinate with State efforts to communicate pavement information.

- **Participants stressed the importance of connecting with the customer.** While the intended audience for the Good/Fair/Poor definitions is transportation practitioners, participants noted that any national information would eventually make its way to elected officials and the public. It was therefore suggested that communication tools should ultimately address customer expectations and resonate with the general public. For example, in addition to an engineering-based definition of pavement condition, it may be valuable to understand what the customer would define as "good." Understanding and reflecting the customer perspective was recognized as a potential opportunity to develop more understandable condition ratings and to use them more effectively as a communication tool. One specific concern related to connecting with the customer was that the terms "fair" and "poor" may both sound bad to a customer. It was emphasized that in communications with the general public, it is important to not misrepresent data and make them aware of the limitations of the data.
- **There was a desire to find measures that would indicate the adequacy of condition over time or the timeframe when condition might deteriorate significantly, as opposed to a snapshot of condition at one time.** Participants acknowledged that measures that could flag approaching condition problems may not be fully ready for use (e.g. they are in Tiers 2 and 3). However, they noted the importance of developing these measures moving forward. The concern was expressed that there may be major events occurring, such as a large number of bridges or miles of pavement headed towards deficiency, that are not captured in a snapshot yet require proactive planning and investment. A trend line or a measure of remaining service life might help address this issue.
- **There was general consensus that, while IRI is ready and available for use as a pavement condition rating, it does not tell the whole story of pavement condition.** Some participants expressed a lack of confidence in IRI as the only condition indicator, especially if used to determine where investment is needed. They noted that the key limitation of IRI is that it measures ride quality rather than a full set of pavement condition distresses. A Functional Condition Index (FCI) for pavements involving cracking, rutting, and/or faulting may provide a better indication of pending issues, though the limitation of HPMS only collecting these data on a sample panel makes it challenging to use them nationally. One group felt the near-term goals of FHWA and AASHTO should include moving forward with IRI but continuing to develop a measure of structural adequacy such as an FCI. Some participants mentioned the important role of cracking in their own assessments. Surface friction was also suggested as an important measure for safety purposes. Participants felt that an FCI should be calibrated to the customer experience.

- **Participants were interested in learning more about the purpose of the Good/Fair/Poor system.** There was some desire for FHWA to provide greater clarification on the use of national condition definitions and ratings would be used and particularly the types of decisions they might influence.
- **Participants felt it was important to acknowledge the limitations of the condition ratings.** The condition ratings address physical infrastructure issues but do not address broader performance issues including capacity, operational and safety concerns. These broader performance factors must also be considered in determining investment needs. Disclaimers should be emphasized when using condition ratings.
- **There was a general consensus on the need for better data collection standards and protocol.** Participants acknowledged the limitations of IRI and other existing data collected for HPMS. There are insufficient data to generate RSL for bridges from the NBI. With pavements, there is an opportunity to improve cracking data if a sustained effort is adopted (similar to what occurred with IRI over the past decade). One group highlighted the need to build on the work that has previously addressed data collection needs for performance measurement, such as projects completed by NCHRP. However, some participants noted that most States already have significant data collection efforts, so a national system should either be based on existing data or improved data collection opportunities rather than adding additional data requirements. One participant noted that many States still conduct windshield surveys and that this data collection option should be considered.
- **There are opportunities to coordinate with other national projects.** Participants discussed the need to continue to coordinate further work on the measures across FHWA, AASHTO, and NCHRP efforts.

3.0 Infrastructure Health

3.1 INFRASTRUCTURE HEALTH PRESENTATION

In the afternoon session of the national meeting, the Research Team presented findings related to the infrastructure health component of the project. This presentation included an introduction to the goals of the infrastructure health task, a demonstration of a sample health reporting tool applied to the I-90 pilot study corridor, and conclusions and lessons learned from the infrastructure health exercise. Key points of the overview presentation included:

- **The objective of the health assessment is to provide FHWA with a means to examine the overall health of specific, multistate corridors and to respond to requests for information.** FHWA receives many requests for updates on multistate corridor health for diverse purposes.
- **The health reporting tool is designed to present an overview of several critical factors rather than a single number or grade for an entire corridor.** The analogy that was used for the health reporting tool was a visit to the doctor. When visiting the doctor one does not receive a single health score, but rather an in-depth discussion of several health indicators to present a comprehensive picture. As such, the health reporting tool relies on several metrics including Good/Fair/Poor, age, remaining service, traffic volumes, etc.
- **Two key reporting elements are used in the health tool: green/yellow/red indicators of health, and red flags which indicate a warning or area meriting additional review.** Together these mechanisms are intended to give the reviewer an understanding of the general overall health of a corridor, the critical issues the corridor may be facing, and to direct the reviewer's attention to those areas of greatest concern.
- **The health reporting tool includes three levels of detail: a dashboard level, a summary level, and a technical level (for both pavements and bridges).** The dashboard level contains broad findings without specific technical details and is suitable for broad review and to be shared with non-transportation experts. The summary level contains greater technical details and is suitable for review of some detailed statistics of corridor health. The technical level contains very detailed technical findings and presentation of statistics intended for detailed review. The tool is intended to support varying levels of review from intense technical analysis to a broad understanding.

During the infrastructure health presentation, there were a few discussion opportunities. Also, as before, the presentation was followed by a breakout group exercise to solicit more feedback from participants. Participants were separated into four groups and led through a facilitated discussion. The membership of the four groups remained the same for the morning and afternoon breakout sessions. The feedback from participants from the breakout groups as well as the general discussion during the plenary presentation is summarized below.

3.2 DISCUSSION AND COMMON THEMES FROM BREAKOUT GROUPS

The following discussion points and common themes emerged as part of the larger group dialogue and among the four breakout groups. Several of the themes of the health reporting discussion closely mirror the discussion of the condition ratings presented in the previous section.

- **Several of the participants felt that the health reporting example appeared to be an effective communication tool for FHWA's use.** Some felt there is an opportunity to use the health reports to tell the story of infrastructure needs and return on investment. Several participants found the dashboard interface useful. One group recommended that FHWA proceed forward on developing the health reporting tool, but recognize the potential issues associated with national level health reporting. Participants expressed that the ultimate use of the tool will determine their willingness to support it.
- **Participants were interested in clarity on possible uses for the health reporting tool.** FHWA responded by highlighting the examples of using the tool including:
  - Assessing health for multistate corridors and freight corridors; and
  - Making regional comparisons and looking beyond State borders.
- **Participants expressed concerns over the misuse/misunderstanding of the health reports by the general public.** It was noted that the publishing of red/yellow/green indicators could create issues with media or politicians that take the simple view that a red indicator as unacceptable. Participants noted that it tends to be difficult to keep the findings of such tools private. Some participants were concerned that the national health reporting may indicate a roadway was "red" even though their own more detailed reporting did not and they would be forced to explain the difference. Another issue in interfacing with the public could be that the public tends to view all data as "real-time" when in reality there is a significant delay between collection and health reporting. Therefore, the data collection dates should be clearly communicated. Another possible source of confusion in communications

with the public is use of the term "health," which can often refer to the physical health of transportation users.

- **Some participants expressed concerns over the use of health reporting to drive investment decisions.** While many participants acknowledged the need for such a tool to help FHWA, some expressed fear that incorrect or prescriptive uses may drive poor project decisions. For example, participants suggested that the FHWA Division offices may be tempted to micro-manage State decisions and priorities based on the health reports. Another concern expressed by some participants was the comparison of States to a national average and to each other. They felt the tool would not adequately recognize the many factors at the State level which would influence the outcomes of the health reports and make comparisons misleading. Several participants mentioned that their agencies have existing mechanisms to access the health of their networks and would likely not use a national level health reporting tool.
- **Participants identified opportunities to expand the health reporting to include additional elements such as safety and congestion.** Some participants felt health reporting should go beyond physical infrastructure to address other factors of interest to reviewers. Some felt the term health is misleading unless the tool expands beyond physical infrastructure. One group mentioned a successful data model used for the National Highway Transportation Safety Administration (NHTSA) where 14 key measures were selected and the NHTSA worked closely with States to develop the data collection processes.
- **Participants were interested in seeing more trend analysis where possible in the health reporting tool.** As with the condition ratings, participants emphasized the need to review a trend rather than a snapshot in order to have an effective understanding of investment needs.
- **Some participants felt that the emphasis of the health reporting should be at the summary level rather than the highway segment level.** Some of the concerns described above could be addressed by removing the detailed map and by listing corridor averages and percent distributions.
- **There were some recommendations for improvements to the health reporting mechanisms.** Some participants expressed concern that longer corridors will always tend towards the "yellow" indicator, being neither good nor poor. They also mentioned a potential to link the indicators to State performance targets. There were several comments regarding opportunities for greater complexity in the tool but also several comments urging that the tool be kept simple and straightforward.

4.0 Workshop Conclusions

Following the health reporting discussion, the research team provided a brief presentation on the next steps of the project. The presentation focused on some of the opportunities identified as part of the study, including the opportunities to advance data and measures for both pavements and bridges through this project and other new and ongoing efforts.

FHWA thanked the participants and highlighted some of the key themes of the meeting including the need for FHWA to be careful in explaining their motivations for this work, the need to think about communicating condition and health externally, and opportunities to build on project findings through other project work in advance of reauthorization.

AASHTO leadership commented on their support for the study and the need to tell the story of transportation system needs and not allow others to tell the story for the group.

Finally, the meeting moderator summarized some key messages from throughout the day, including:

- Viewing a national reporting program as an opportunity to tell the story of transportation system needs;
- The importance of continual improvements to the national data sets, which are the foundation for all of the measures being investigated by FHWA and AASHTO;
- The importance of viewing measurement and reporting efforts from the perspective of the traveling public; and
- The need to remember the ultimate goal of performance management which is to improve transportation decision making.

A. Meeting Participants

Last Name	First Name	Agency
Alexander	Angela	Georgia DOT
Baker	Laura	Alaska DOT
Barton	John	Texas DOT
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Pope	Cory	Utah DOT
Reagan	Brian	Missouri DOT
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Schiess	Greg	Florida DOT
Selmer	John	Iowa DOT
Simmons	Doug	Maryland DOT
Slater	Gregory	Maryland DOT
South	Jeffrey	Illinois DOT
Stephanos	Peter	FHWA
Steudle	Kirk	Michigan DOT
Walsh	John	South Carolina DOT
Walus	Kendal	Virginia DOT
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Wlaschin	Butch	FHWA
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Guerre	Joe	Cambridge Systematics
Louch	Hugh	Cambridge Systematics
Neumann	Lance	Cambridge Systematics
Simpson	Amy	MACTEC/AMEC
Van Hecke	Sam	Cambridge Systematics

B. Meeting Agenda

8:00 a.m. to 8:30 a.m.
Workshop Registration

8:30 a.m. to 10:15 a.m.
Plenary Session 1

Welcome and Introductions
Workshop Goals and Objectives: *Lance Neumann, Cambridge Systematics*
Welcome from FHWA: *Butch Wlaschin, FHWA*
Welcome from AASHTO: *Paula Hammond, Washington State DOT*

Q & A

Project Overview
Joe Guerre, Cambridge Systematics

Q & A

Pilot Study Results
Jonathan Groeger, MACTEC

Q & A

10:15 a.m. to 10:30 p.m.
Break

10:30 a.m. to 11:30 a.m.
Breakout Session 1

The objective of these breakouts is to gather feedback on the benefits, challenges, and opportunities for a national performance measurement approach, focusing on the condition of the National Highway System. Groups will be led through a facilitated discussion. Participants will be pre-assigned to groups. There will be four breakout groups each following the same list of questions.

11:30 p.m. to 12:15 p.m.
Reports from Breakouts

Each group leader will have 10 minutes to present key points from their breakout session.

12:15 p.m. to 1:00 p.m.
Lunch

1:00 p.m. to 1:45 p.m.
Plenary Session 2

Infrastructure Health Introduction and Demo
Hugh Louch, Cambridge Systematics

Q & A

1:45 p.m. to 2:45 p.m.
Breakout Session 1

The objective of these breakouts is to gather feedback on the benefits, challenges, and opportunities reporting on bridge and pavement health. Groups will be led through a facilitated discussion. Participants will be pre-assigned to groups. There will be four breakout groups each following the same list of questions.

2:45 a.m. to 3:00 p.m.
Break

3:00 p.m. to 4:30 p.m.
Workshop Wrap-up

Reports from Breakouts

FHWA and AASHTO comment on what they heard

Workshop moderator summary, implementation considerations, and next steps

Final Q & A

4:30 p.m.
Workshop adjourn

U.S. Department of Transportation
Federal Highway Administration

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