MAP-21 Target-Setting Exercise

Background Resources

Document Overview

This document is designed to support the AASHTO SCOPM MAP-21 Target-Setting exercise. It includes material specific to the Bridge Condition performance area. It presents targeted excerpts from documents that have already been developed through previous Task Force activities. This documents also contains selected information from research conducted through NCHRP 20-24(37) Comparative Performance Measurement series. The appendix contains a brief Bridge Condition Performance Measure Factsheet produced through a previous effort of the SCOPM Task Force. This document is organized into three sections:

1. **General Target-Setting Recommendations**
   SCOPM Task Force Findings on MAP-21 Performance Measure Target-Setting (3/13)
2. **Bridge Condition Performance Area Recommendations**
   SCOPM Task Force Findings on MAP-21 Performance Measure Target-Setting (3/13)
   SCOPM Task Force Findings on National-Level Performance Measures (11/12)
   SCOPM Task Force Workshop on National Performance Measures Background Paper (9/12)
3. **Appendix**
   Performance Measure Factsheet

Additional information is available at the Target-Setting Exercise website:
http://sites.spypondpartners.com/targetsetting/bridge

1. General Target-Setting Recommendations

1.1. Target-Setting Overview

The findings on of the SCOPM Task Force with regard to MAP-21 target-setting requirements included in this document are based on the following interpretation of the related MAP-21 target-setting requirements:

- A set of standard, consistent national performance measures will be established, but states will have flexibility to establish the target values of those measures. Thus, the term "consistent" applies to the performance measures, data methodologies (collection, processing and analysis), and performance reporting processes. There is no presumption that targets will be consistent across states – rather they will be specific to local conditions and needs and at set at the discretion of DOTs and MPOs.
- States must submit biennial reports on progress toward target achievement for each national measure.
- For the Highway Safety Improvement Program, states that have not made significant progress towards meeting established targets face reductions in funding flexibility and additional reporting requirements.
- For the National Highway Performance Program (NHPP), states that do not make significant progress towards meeting their established targets for asset condition or performance must report actions that they will undertake to achieve the targets.

1.2. Target-Setting Findings and Recommendations

The findings of the SCOPM Task Force with regard to target-setting center around three general findings and eleven recommendations.

1.2.1. General Findings

- **First**, State DOTs request maximum flexibility when setting performance targets. Every state and municipality faces different constraints and opportunities affecting their transportation system. Funding levels and sources vary, as do environmental conditions, population growth trends, and legislative and gubernatorial mandates and priorities. Flexibility in target-setting allows states and municipalities to face the realities of their unique situations. Furthermore, accountability should be based on what states can accomplish with their shares of federal funding.
- **Second**, consistent with the National-Level Guiding Principle #2 (see page 3), *Specificity and Simplicity*, MAP-21 rulemaking should encourage States DOTs to adopt performance targets that are attainable and realistic. These targets should be periodically reevaluated and adjusted

to reflect risks, revenue expectations, and strategic priorities. In addition, the State DOTs agree that consistent data collection and analysis methods are essential to ensure that national-level measures and reporting use comparable data.

- **Third**, in keeping with National-Level Guiding Principle #3 (see page 3), *Possession is 9/10ths of the Law*, the establishment of performance targets can provide a focal point for action and a basis for accountability. However, it is important to recognize that for several of the national-level performance measures, State DOTs have relatively limited control over outcomes. There are many externalities that could affect a State DOT attaining certain performance targets from economic to social forces. For example, the effect of background changes in traffic related to economic conditions can overwhelm any deliberate actions on the part of a state to improve safety or reduce traffic delay. Generally speaking, State DOTs have more control over achieving targets related to asset condition and less control over performance measures associated with safety and system performance.

1.2.2. Specific Recommendations

The following are specific recommendations of the SCOPM Task Force that should be considered in drafting specific rules for implementation of the target-setting provisions of MAP-21:

Provide maximum flexibility

- Regional, local, or other targets are to be established by states or MPOs as appropriate when necessary. Baseline conditions may vary significantly state-to-state and region-to-region.
- Many factors, such as population growth and environmental conditions affect performance outcomes for metrics like congestion and pavement. Therefore, maximum flexibility is required for target-setting.

Focus on what matters – the right outcome

- Target-setting should not focus on a single target value for a performance measure but on achieving improved performance over time.
- States and MPOs often have to make priority decisions based on customer and stakeholder requirements. Each state and MPO must consider these requirements – which will vary from state to state – within its target-setting process.
- The value of performance management is found in better decision-making, not target achievement. DOTs support the idea of allowing states to establish ranges of acceptable performance outcomes. Use of ranges can provide DOTs with a more nuanced way of discussing performance outcomes across multiple competing objectives.

Align targets with system ownership and funding levels

- Targets set for federal performance measures should be aligned with federal funding levels as state DOTs and local partners may or may not have multiple funding sources in addition to federal funds.
- Diverting state funds to meet federal requirements may not be an option. State funding is typically used to match federal funds and allocated to meet state obligations and priorities set by state government such as non-federal-aid eligible maintenance activities.

Base target-setting on longer term trend data

- Targets cannot be set in isolation of solid baseline and reliable, quality, multi-year trend data.
- The expansion of the NHS in MAP-21 has provided challenges as baseline and multi-year data may not be available for the full NHS system.
- Long term viewpoints and multi-year efforts should be considered in target-setting; one data point should not be used to evaluate a program.

Coordinate target-setting through a continuing, cooperative, and comprehensive process

- The development of state, MPO and transit provider targets should be coordinated through a 3C (continuing, cooperative and comprehensive) planning process. This process should result in MPO targets that are attainable given the level of investment a DOT plans to make in a metropolitan planning area (MPA) over a particular time-horizon. Whenever possible, DOTs and MPOs should use consistent (i.e. equivalent) targets to assess the condition and performance of state highways within an MPA.
- Only hold state DOTs and MPOs accountable for what they manage and control. Those who set targets should be those who manage and fund the system and are held responsible for compliance.
- Agencies should not be penalized for not meeting targets due to circumstances beyond their control.

Tell the story: performance is more than just a number

- Analysis and reporting on achieving targets should be both qualitative and quantitative:
- Target-setting should reflect a good faith effort and provide qualitative and quantitative reasoning, as appropriate, to support the results of failing to meet specific targets. For example, states and MPO should be given the opportunity to explain how available resources and other factors such as population dynamics and environmental factors influenced the failure to meet specific targets.
- State DOTs are under increasing pressure and scrutiny from the public regarding investments of public funds and the quality of services provided. While defining measures, setting targets, and aligning strategies to achieve the targets can all positively affect the performance of the state DOTs, these actions will do little to increase the credibility of DOTs unless there is a

reliable, transparent, and understandable method of reporting the progress in achieving the performance targets.

Avoid unachievable targets or the "one size target fits all approach"

- Funding constraints should be factored into the process for determining what values to use for targets. DOTs and local partners work within resource constraints, and cannot be expected to perform to a uniform level (target value) on all measures.
- Targets should reflect realistic expectation about what can be achieved through transportation investments.

Allow for appropriate timelines for target achievement

- Allow for appropriate timelines for achieving targets as a measurable change or progress toward targets may take many years to be noticeable. These may vary by performance area and measure.
- In addition, time horizon (short vs. long-term) for targets should be allowed to vary depending on the measure and at the discretion of each state. For example, safety measures could use the 5 year projection of the 5-year moving average to set targets; annual reports would demonstrate progress using these projections.
- At each DOT's discretion, targets should be regularly reevaluated and adjusted to reflect evolving risks (e.g. new revenue expectations, changing strategic priorities, etc.)
- At each DOT'S discretion, targets should be reviewed and revised periodically to confirm the selected target is still suitable for achieving the required results.

Guard against unintended consequences

- Consider how targets set for one measure could have unintended consequences for the performance of another measure due to resources shifting to other priorities.
- Targets could drive a "worst first" prioritization approach, risking neglect of long-term system needs. A sustainable, efficient transportation system must place a high priority on system maintenance, preservation, and maximizing asset life while minimizing overall life cycle costs.
- Worst first prioritization can lead to unintended consequences in the system. For example, International Roughness Index (IRI) targets could lead to smooth pavements with deteriorating structural conditions. The IRI target could also prompt states to address the wrong problems, and inadvertently shorten pavement life, instead of lengthening it.

Complement flexibility in target-setting with transparency and accountability

- Setting targets should be accompanied by a rationale for selecting the specific target value.
- When states and MPOs do not meet performance targets, they should describe what they have done to improve performance, how those actions impacted the performance, and why they have not met the target.

Allow flexibility for DOTs and MPOs to use a risk based target-setting approach

- Risk-based targets do not reflect optimal outcomes within a particular investment area; rather, risk-based targets represent strategic objectives within a plan to manage agency risks.
- Risk-based targets are meaningful in that they can be realistically achieved under existing revenue expectations. Unlike aspirational targets, risk-based targets can be managed.
- Risk-based targets are derived from risk assessments and revenue expectations at a point in time; Targets should be continuously reevaluated as risks and revenue expectations evolve.

1.2.3. Determining "Significant Progress"

The following guidelines are offered for approaches to rulemaking with respect to determination of "significant progress" for the HSIP and NHPP program areas.

- **Good Faith Effort:** In determining "significant progress achieved", FHWA should consider the demonstration of a state's or MPO's "Good Faith Effort" towards meeting targets. This information should be documented and provided by states and MPOs to a reasonable level of detail.
- **Programmatic Approach:** The "significant progress" determination should be made based on a programmatic approach rather than based on separate evaluations for individual target areas. This approach would support states and MPOs in making balanced and sound investment decisions rather than trying to meet one target at the expense of another.
- **Defining Significant Progress and Progress Agreements:** Consistent with current practice, states and their local FHWA Division offices should continue to work together and be empowered to consensually develop and determine what constitutes significant program – at the program or performance measure level. Progress determination could be based on mutually agreed on templates and criteria. Periodic meetings during the performance period can be held to review, discuss and adjust progress determinations as needed.
  Progress determination teams could work together to cooperatively understand and document specific circumstances that may impact a state's ability to achieve progress towards the established performance targets. These teams would consider unforeseen circumstances that may require adjusting and or resetting performance targets while considering progress.
- **Negative Trends**: Even though the value of a performance measure is not moving towards its target, this doesn't necessarily mean that "Significant Progress" is not being made. For example, if pavement is deteriorating at a slower rate than before implementing MAP-21; or if congestion is increasing at a slower rate than population growth, progress is still being made. These are examples of how a negative or deteriorating trend direction could still meet the "significant progress' definition.
- **Self-evaluation**: States and MPOs should be allowed to self-evaluate in determining whether 'significant progress" has been made. This assessment should be based on quantitative and, if

needed, qualitative data. In addition, determination of "significant progress" should be supported by narrative information if specific performance targets are not achieved. In this case, states and MPOs should provide narrative information and data to document the circumstances and assessment determination.

- **Significant Progress prior to MAP-21**: States that have already made significant progress in recent years (prior to MAP-21) should not be penalized if they do not continue to make significant progress at the rate of other states that are starting with a poor/fair level of performance. In other words, states that have already made significant progress over past (pre MAP-21) years, based on trend data, should be given credit for these improvements. In these circumstances, the failure to meet targets, especially if aggressive targets are pursued (i.e Target Zero), should not be considered a lack of progress.
- **Significant Progress Time Frame Constraints**: States and MPOs generally have 4 to 6 year STIP/TIPs. These are viewed as commitments to constituents. Even if resources are available and policy priorities can be shifted, "significant progress" may not be realized until the 4th or 6th year of a program since it may take time to redirect funds to a different priority.
- **Allow for Target Range Considerations:** When setting targets, states and MPOs may consider setting a target range (opposed to a single number). When making "significant progress" determinations during self–assessment (or FHWA assessment), states and MPOs can consider the full range of the performances measure target area.

2. **Bridge Condition** — Performance Area Recommendations

2.1. Measures

- **Percent of Deck Area on Structurally Deficient Bridges**—NHS bridge deck area on structurally deficient bridges as a percentage of total NHS bridge deck area.
- **NHS Bridges in Good, Fair and Poor Condition based on Deck Area**—Percentage of National Highway System bridges in good, fair and poor condition, weighted by deck area.

2.2. Targets

- AASHTO supports state flexibility in the setting of targets as long as the Percent of Deck Area on Structurally Deficient Bridges does not exceed 10%; as provided in MAP-21. National performance measurement targets should not be adopted. USDOT and professional organizations should provide guidance to states that need assistance to adopt various recommended national performance measures, and leading states should be able to continue their performance management path. Every state should be allowed to set their individual targets. Individual states should determine whether to set separate targets for bridges on urban vs. rural roads.
- For the second measure, given that the recommended performance measure includes three values to be reported (percent good, fair and poor), the Task Force to be convened will consider selection of single measure for target-setting (e.g. percent good or percent poor) or use of multiple measures (e.g. targets for both percent good and percent poor) – balancing the desire to support an asset management approach yet minimize complexity.
- Progress towards meeting state-established targets should be assessed based on analysis of state NBI data for the target year.

2.3. Methodology

Both measures are to be calculated with data from the NBI[1].

For the second measure, AASHTO has obtained input from its members on establishment of a Good-Fair-Poor categorization. However, at this time there is not sufficient consensus on how such a measure would be derived to present a detailed recommendation here. Therefore, AASHTO plans to convene a task force to agree on the details of how this measure would be calculated over the next few months. This Task Force will address topics such as:

[1] See FHWA *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*

- Specific NBI data elements and ranges to be used for categorizing structures as good, fair or poor
- Methods for combining individual NBI items ratings
- Derivation of the measure for states currently collecting only element-level data and using the NBI Translator to derive deck, superstructure and substructure ratings
- Methodology for deck area calculations for culverts

2.4. MAP-21 Performance Measurement Requirements

- Secretary to Establish State Performance Measures to Assess Bridge Condition on the NHS [§1203; 23 USC 150(c)(3)] The Secretary will establish performance measures and standards for States to assess NHS bridge condition.
- States to Set Performance Targets [§1203; 23 USC 150(d)] States have 12 months from final rulemaking to set targets reflecting the established measures, with the option of setting different targets for rural and urbanized areas.
- States to Submit Biennial Performance Reports [§1203; 23 USC 150(e)] States have four years from the enactment of MAP–21 to submit a first biennial performance report addressing progress in achieving performance targets.
- Minimum NHS Bridge Condition Level Established with Consequences for Failure to Meet Level [§1106; 23 USC 119(f)] Minimum condition levels are set at 10% NHS bridge deck area on SD bridges with consequences for flexibility in use of funds if these standards are not met.
- States Must Report Actions to Achieve Targets if Substantial Progress Hasn't Been Made in Two Reporting Periods. [§1106; 23 USC 119(f)]

3. Appendix

MAP-21 National-Level Performance Measure Factsheet
Bridge

AASHTO
SCOPM Communications Workshop

Why It's Important

- Bridges in sound condition are critical to the safety and mobility of the travelling public.
- Structural deficiency is a common, basic measure of bridge condition. A bridge is rated structurally deficient when it has deficiencies that require maintenance, rehabilitation or replacement to address.
- When tracked over time, network measures of bridge condition can provide a basic high-level perspective on whether an agency is holding, gaining, or losing ground with regard to bridge deterioration.

Measure: Structurally Deficient Bridges (specified in MAP-21)

What FHWA May Measure

Percent of NHS Deck Area on Structurally Deficient Bridges

Simply Put: The percent of your state's bridges on the National Highway System that are rated structurally deficient.
Technically Speaking: NHS bridge deck area on structurally deficient bridges as a percentage of total NHS bridge deck area – based on National Bridge Inventory (NBI) data.

Language of the Measure

This measure can be expressed in plain language as an overall percentage of structurally deficient bridges:

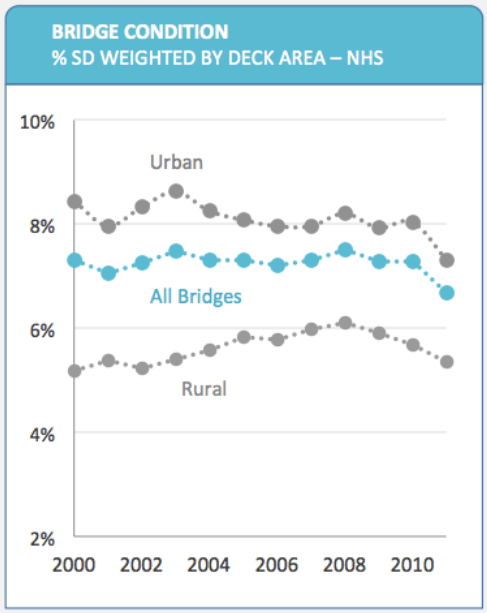
- "The percentage of our state's bridges on the National Highway System that are structurally deficient is 7.5%"

Structural deficiency is a potentially alarming and confusing term to non-technical audiences, as it may suggest a bridge is unsafe for travel, when in fact it may simply have a deteriorated deck. As a result, more detailed language may be appropriate, such as:

- "Weighted by deck area, 92.5% of our state's NHS bridges have a deck, superstructure, and substructure rated in fair or better condition."

It is worth noting that the percentages expressed by this measure are weighted by deck area. This may make communicating the measure a bit more complex, but it's an important detail. Weighting by deck area helps account for the fact that larger bridges cost more to repair than smaller bridges.

Visualizing it



National Reporting Issues

- **Accuracy.** NBI ratings are based on visual inspection methods, which are subjective and therefore variable across and within states. Ratings for a bridge may fluctuate from inspection to inspection without an actual change in condition. Furthermore, NBI ratings are intended to describe the overall or "average" condition of three major bridge components: deck, superstructure and substructure. But "average" is a relative term and can be challenging to apply consistently.
- **Asset Management.** Structural Deficiency doesn't distinguish a bridge that has a deteriorated deck from one with more fundamental problems with its superstructure and/or substructure, which require substantially more resources to correct. Because of such limitations, there is some concern that over-reliance on this measure could steer a state DOT to implement a worst-first approach for maintaining bridge condition.
- **Minimum Condition Level.** MAP-21 also requires a minimum condition level be set such that the percent of deck area on structurally deficient bridges does not exceed 10%.

Measure: Bridges in Good / Fair / Poor Condition

What FHWA May Measure

Percent of NHS Deck Area on Bridges in Good, Fair, and Poor Condition

Simply Put: Percentage of National Highway System bridges in good, fair, and poor condition, weighted by deck area.
Technically Speaking: Specific NBI data elements and ranges to be used for categorizing structures as good, fair or poor have not been proposed. Although data is presently available, many technical issues remain to be resolved. Furthermore, MAP-21 requires that states begin reporting element-level inspection data for NHS bridges in 2015. Use of element-level data will create opportunities for the development of enhanced performance measures. As a result, any measure established in the interim should be designed to flexibly accommodate a shift to these new data.

Unlike the measures of bridge condition based on structural deficiency, a measure of bridge structural health requires further development and is not suitable for implementation or technical definition at this time. This measure is introduced to address the limitations of the structural deficiency-based measures for supporting investment decision making.

Bridge Performance Communication Issues

Communicating Condition

- While the measures discussed provide a basic network-level perspective on bridge condition, it is worth remembering that the performance characteristics of each individual bridge on the network are a function of age, maintenance and rehabilitation actions applied, environment (e.g. exposure to road salt, weather), design, materials, traffic loadings and other factors.

Apples to Apples

- Comparative information on bridge condition is useful for putting one state's situation in perspective relative to peers. However, before using such information to draw conclusions about the effectiveness of a state's bridge program, it is important to consider the level of resources available for bridge improvements, as well as the age of the bridge network. For example, a growing state which has added considerable highway capacity will tend to have better network bridge conditions than a state with an older bridge network.