AIM Innovation Showcase Application

# Sponsor

**Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation.** If selected, the sponsoring DOT will be asked to present the innovation at the Innovation Showcase during the AASHTO Spring Meeting.

1. Sponsoring DOT (State): Tennessee Department of Transportation (TDOT)

2. Name and Title: M. Jason Mellons

 Organization: State of Tennessee (Department of Transportation)

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City: Nashville

State: Tennessee

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# Innovation Description (30 points)

The term “innovation” may include processes, products, techniques, procedures, and practices.

3. Name of the innovation:

Surface Resistivity and Sequential Air Meter (SAM) Specification Implementation

4. Please describe the innovation.

The implementation of the specification will provide a less permeable concrete mixture on bridge decks which will protect the reinforcing steel in turn providing a longer life cycle of the structure.

5. What is the existing baseline practice that the innovation intends to replace/improve?

There is no baseline of surface resistivity currently. The SAM has been used for data collection only per specifications. This internal research project has shown the implemented values can be measured and are achievable.

6. What problems associated with the baseline practice does the innovation propose to solve?

The cost of equipment has deterred the concrete contractor and their producers from using a concrete mixture that would provide the physical characteristics that could lengthen the life cycle of the structures.

7. Briefly describe the history of its development.

The development of Tennessee’s program has come from the research that has been done across the country by academia such as Oklahoma State University, Oregon State University, University of North Carolina, Purdue University, Washington State University, etc. Tennessee took these research findings and used local academia such as Tennessee Technological University (TTU) and University of Tennessee – Knoxville (UTK) to ensure that the characteristics of local materials would yield the results supported by national standards.

8. What resources—such as technical specifications, training materials, and user guides—have you developed to assist with the deployment effort? If appropriate, please attach or provide weblinks to reports, videos, photographs, diagrams, or other images illustrating the appearance or functionality of the innovation below (if electronic, please provide a separate file). Please list your attachments or weblinks here.

TDOT has proposed specification and process changes to be implemented in the spring of 2025. TDOT is implementing the use of fly ash supplementary cementitious materials (SCM) at a rate of twenty-five percent (25%) in concrete bridge deck concrete (Class D/DS concrete). Also, TDOT will use surface resistivity (SR) in TDOT’s Acceptance and Verification Programs. SAM method will also be used in the concrete mixture design approval as well as TDOT’s Verification Program for Class L, Class PEM, and Class X concretes. TDOT will be presenting the above requirements as well as training and training materials at the TDOT Annual Concrete and Aggregate Meetings in December of 2024.

# State of Development (10 points)

Innovations must be successfully deployed in at least one State DOT. The AIM selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

9. How ready is this innovation for implementation in an operational environment? Please select from the following options. Please describe.

[ ]  Innovation is fully functional and yet to be piloted.

[ ]  Innovation has been piloted successfully in an operational environment.

[ ]  Innovation has been deployed multiple times in an operational environment.

[x]  Innovation is ready for full-scale implementation.

TDOT’s supplemental specifications and process changes are to be implemented in the spring of 2025. These process changes are to be incorporated on concrete mixture design approvals as stated above. Also, these supplemental specifications will be written into contracts awarded in the spring of 2025.

10. What additional development is necessary to enable implementation of the innovation for routine use?

The partnership with TDOT’s contractors and concrete producers will continue to develop through the implementation of these specifications and processes.

11. Do you have knowledge of other organizations using, currently developing, or showing interest in this innovation? [x]  Yes [ ]  No

If so, please list organization names and contacts.

|  |  |  |  |
| --- | --- | --- | --- |
| **Organization** | **Name** | **Phone** | **Email** |
| Minnesota DOT | Maria Masten | 651-334-4015 | Maria.Masten@state.mn.us |
| Missouri DOT | Brett Trautman | 573-751-1036 | Brett.Trautman@modot.mo.gov |
| Ohio DOT | Dan Miller | 614-398-7748 | Daniel.Miller@dot.ohio.gov |

# Potential Payoff (30 points)

Payoff is defined as the combination of broad applicability and significant benefit or advantage over baseline practice.

12. Identify the top three benefits your DOT has realized from using this innovation. Describe the type and scale of benefits of using this innovation over baseline practice. Provide additional information, if available, using quantitative metrics, to describe the benefits.

|  |  |
| --- | --- |
| **Benefit Types** | **Please describe:** |
| Improved Quality | Reducing the permeability of concrete mixtures used on bridge decks protect the reinforcing steel. |
| Improved Operation Performance | The acceptance and verification programs will allow freshly poured concrete project long term durability milestones. |
| Organizational Efficiency | Reduction of maintenance of concrete bridge decks to include life cycle bridge deck replacement cost will improve efficiency.  |

Provide any additional details below:

Research will be accepted and posted after December 31st, 2024.

# Deployability (30 points)

The AIM selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

13. What challenges and/or lessons learned should other organizations be aware of before adopting this innovation?

The challenge in the internal support to ensure that all specifications are achievable is key. This ensures that local materials will comply with the state specifications.

14. Please provide details of cost, effort, and length of time expended to deploy the innovation in your organization.

**Cost**: $175,000.00

**Level of Effort**: Intermediate, due to providing a consistent program statewide (4 regional geographic locations).

**Time**: 18-24 months

15. To what extent might implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

This implementation will affect internal and external customers, to include but not limited to, state and local governments, consultants, contractors, producers, suppliers, etc. TDOT will provide knowledge and training to ensure the understanding of all partners moving forward.