

# AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

## 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 promote the innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative.

1. Sponsoring DOT (State): California DOT

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## Innovation Description (10 points)

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

3. Name of the innovation:

**Weigh-In-Motion (WIM) Stations using Precast Concrete Pavement**

4. Please describe the innovation.

Weigh-in-Motion (WIM) stations are used in highway networks to obtain data on the combination and axle load of trucks. The conventional method of WIM system construction is a

field installation of the equipment, after placing cast-in-place concrete. Due to the limitations of the field installation, it is difficult to maintain the accuracy of the installation, therefore, impacting the WIM performance. Besides, a cast-in-place conventional concrete needs minimum 10-day curing, which could not be practical from a traffic management point of view. On the other hand, a cast-in-place Rapid Strength Concrete (RSC) could be placed within a night shift and opened to traffic the next day, but the performance of this type of concrete is under question. A WIM system that is installed in precast concrete panels in a plant, transported and quickly installed in the field would address all the shortcomings of the conventional method of WIM station installation. WIM station with the precast concrete pavement is under construction on Highway 101 and 880 for the first time in the state.

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

The existing baseline practice is cast-in-place concrete construction.

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

The precast method of constructing a WIM station would significantly expedite the construction process by reducing the duration of the required lane closure from over 10 days to one shift, hence, improving the construction zone safety and reducing travelling public delays.

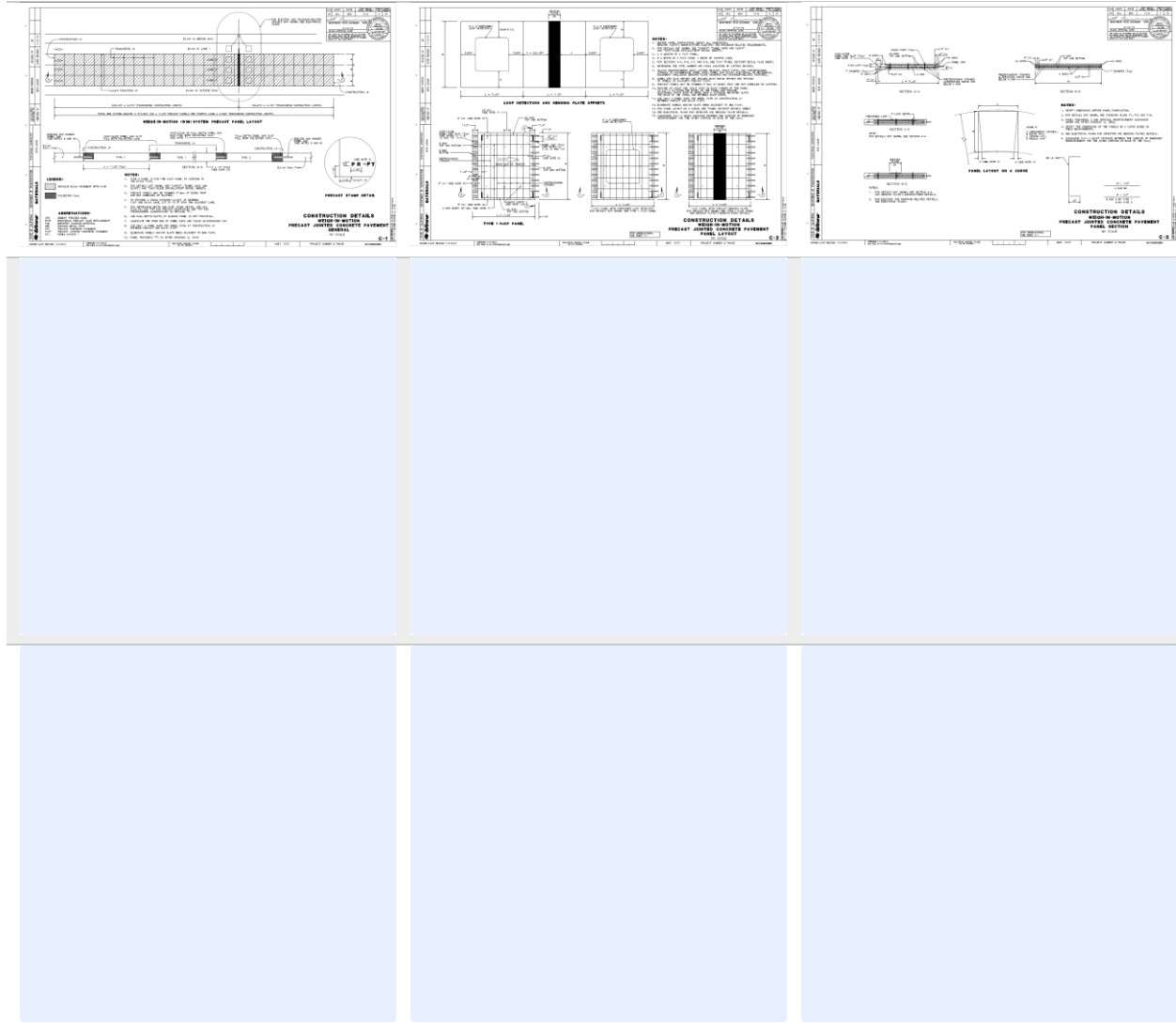
7. Briefly describe the history of its development.

No history of this application is available in California and this is the first time implementation of this method.

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 (if electronic, please provide a separate file). Please list your attachments or weblinks here.

Non-standard specifications and plans.

Attach photographs, diagrams, or other images here. If images are of larger resolution size, please provide as separate files.



## State of Development (40 points)

Innovations must be successfully deployed in at least one State DOT. The AII 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.

- ☐ Prototype is fully functional and yet to be piloted
- ☒ Prototype has been piloted successfully in an operational environment
- ☐ Technology has been deployed multiple times in an operational environment
- ☐ Technology is ready for full-scale implementation

The technology has been designed and constructed as a pilot for monitoring and evaluation. If successful, it would be fully implemented in the district.

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

The only potential development would be revision of specifications and plans, and preparation of a Quality Assurance document.

11. Are other organizations using, currently developing, or have they shown interest in this innovation or of similar technology?? ☐ Yes ☐ No

If so, please list organization names and contacts. Please identify the source of this information.

Organization	Name	Phone	Email
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## Potential Payoff (30 points)

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

12. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

The specification for any cast-in-place concrete pavement (including a WIM station) requires a minimum of 10-day curing time. This results in closing a traffic lane for over 10 days to construct and have the concrete ready for opening to traffic. For high traffic Bay Area road network, this means very long delays for DOT customers, the travelling public.

13. Identify the top three benefit types 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 Safety	The innovation would reduce the need for long lane closures. This would reduce the construction crew exposure to live traffic, hence reducing work-zone-related crashes. Shorter lane closure would also improve travelling public safety by eliminating potential confusions in a construction zone.
Cost Savings	The user delay cost in the Bay Area is very high, due to the concentration of many high-tech companies. Any roadway delays not only create a lot of complains, it also would be a huge use cost. On the other hand, while precast concrete WIM has a higher construction cost compared to a cast-in-place alternative, the reduction in total construction time would be an overall cost saving for the contractor.
Improved Quality	Precast concrete WIM is built in a plant under stringent quality control. The quality of concrete panels and the precision of the WIM equipment installation considerably improve compared to the cast-in-place installation.

Provide any additional description, if necessary:

As was explained before, the precast concrete WIM system improves the customer service for travelling public significantly.

**14 How broadly might this innovation be deployed for other applications. in the transportation industry (including other disciplines of a DOT, other transportation modes, and private industry)?**

This method could be used statewide for both the repair and new construction of a WIM system on any state highway. This method is also very effective when the placement of a cast-in-place concrete is limited to certain time of the year due to a harsh climate.

## Market Readiness (20 points)

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

15. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

Check boxes that apply	Dimensions	Please describe:
<input checked="" type="checkbox"/>	Gaining executive leadership support	Similar to any other innovations, the executive leadership needs to be convinced and supportive of the change and implementation of the new idea.
<input type="checkbox"/>	Communicating benefits	<a href="#">Click or tap here to enter text.</a>
<input checked="" type="checkbox"/>	Overcoming funding constraints	While precast concrete WIM system has a higher initial construction cost, the Life Cycle Cost Analysis would justify the selection of this system over the conventional cast-in-place installation.
<input type="checkbox"/>	Acquiring in-house capabilities	<a href="#">Click or tap here to enter text.</a>
<input type="checkbox"/>	Addressing legal issues (if applicable) (e.g., liability and intellectual property)	<a href="#">Click or tap here to enter text.</a>
<input type="checkbox"/>	Resolving conflicts with existing national/state regulations and standards	<a href="#">Click or tap here to enter text.</a>
<input type="checkbox"/>	Other challenges	<a href="#">Click or tap here to enter text.</a>

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

**Cost:** Precast concrete pavement technology has been widely used in California. The cost of implementing the idea of precast concrete WIM system was limited to revising the existing precast concrete pavement specifications and plans.

**Level of Effort:** It took the design engineer less than two months to make the necessary revisions to the existing precast specification and plans and coordinate with the WIM system vendors to prepare the final details.

**Time:** About two months.

17. 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.

Not applicable.