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): Colorado

2. Name and Title: Chuck Kline, Safety Specialist 4, Region 2 and Brian Manguso, Equipment Mechanic 3, Region 2

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# Innovation Description (10 points)

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

3. Name of the innovation:

Plow Blade Installer Cart

4. Please describe the innovation.

The rim/bottom edges of snow plows have blades that need to be periodically removed/replaced. There are numerous injuries installing or removing plow blades to the vehicle. In 2021, 29 injuries were reported for this reason alone. We have designed a cart to help install or remove plow blades safely reducing the risk of injury. There is no bodily contact with the blades. Instead, a cart is used to hook on to holes in the blade, lift it up and wheel it to the snowplow. The blades are then deposited unto the plow hooks by tilting the cart. This also improves efficiency and saves time as a single person can do this quickly in under a minute. It can also be removed in the same manner with the same cart. The cart is multi-purpose and can be used for transporting other items as well.

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

Existing method involves doing it by hand without safeguards. It normally takes two people to lift and replace the blades. This reduces it to a one-person job.

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

It aims to make the installation and removal of plow blades safe. It also reduces the time it takes to replace/install blades and thereby, improves efficiency. It also reduces the amount of people needed from two to one.

7. Briefly describe the history of its development.

Workman’s Compensation injuries over the past years have been piling up due to the injuries caused by removing/installing plow blades. This is why we started to come up with this idea to reduce lost time and money due to the injuries, and enhance safety for our workers.

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.

[Installation directions](https://drive.google.com/file/d/1mBDD0ZEGzC_oJ5mh8Peayf2kX-8rP58-/view?usp=sharing) Blade Cart Plans

Video Attached here : <https://drive.google.com/file/d/1OkKoXezIbIy26Z6vp2drwm6lGm9zi94K/view?usp=sharing>

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

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# 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 Plow Blades Cart is currently being used in our facility. 1 has been built and being successfully used by operators.

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

Need more time for assembly or a manufacturer to build it for large scale deployment. At present we would need 1 for every patrol, or 300 per region in CDOT.

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.

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| **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?

It improves internal customer experience for coworkers by providing a safer alternative of changing plow blades. The time used to change blades is also reduced. This impacts overall cost by reducing cost of damages and allowing more time for the vehicle to be out faster for doing snow removal rather than in the workshop getting blades changed. It also reduces manpower for people needed to change the blades. It can be used in adverse conditions in rugged and snowy conditions making it more versatile.

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.

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| **Benefit Types** | **Please describe:** |
| Improved Safety | Numerous blade removal injuries are drastically reduced by this method since there is no bodily contact with the blades. |
| Organizational Efficiency | This method reduces the time it takes to change the blades. More vehicles can be processed in a shorter amount of time. Less manpower is needed to lift and change the blades. |
| Cost Savings | Lots of Cost savings due to reduced Worker’s Comp filings of injuries related to snow plow blade handling. |

Provide any additional description, if necessary:

Customer Service is also a big advantage since vehicles are ready faster to go for snow removal. The cart isn’t just for plow blades. It can also be used for motor graders, tow plows and skid plates on a mower deck.

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 can easily be implemented in any transportation industry, public or private that uses snow plows regularly for its business needs. The cart isn’t just for plow blades, it can also be used for motor graders, tow plows and skid plates on a mower deck. It can also be used to transport blades for storage.

# Market Readiness (20 points)

## The AII 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?

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| **Check boxes that apply** | **Dimensions** | **Please describe:** |
|  | Gaining executive leadership support | Click or tap here to enter text. |
|  | Communicating benefits | This can be done through a quick demo. Once the carts are ready it will be easy to see how quickly they can be fabricated and utilized. |
|  | Overcoming funding constraints | The parts are fairly inexpensive. The final cost would depend on the organization’s budget allocations. |
|  | Acquiring in-house capabilities | The parts used in this are fairly accessible . Built from scratch it uses items like wheels and metal. However, a fabrication shop would need to be used to manufacture multiple units of production. |
|  | Addressing legal issues (if applicable) (e.g., liability and intellectual property) | Depends on their own specific processes. We did not face any and we are happy to share this idea with others. |
|  | Resolving conflicts with existing national/state regulations and standards | Other business units might need to cross check with safety standards for their specific snow blade removal process. |
|  | Other challenges | Click or tap here to enter text. |

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

**Cost**: Under $200 for parts

**Level of Effort**: Moderate – to implement this the person assembling it must be skilled to read the schematics and be careful in designing the angles correctly because that plays a crucial role in making the machine efficient.

Time: 1 day - if following the plans correctly

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.

Fabrication shop / welding assistance to do large scale production. Community Colleges and High School welding programs can be enlisted to be mutually beneficial for their students’ skill building and for getting this produced. This would greatly benefit the state, counties, cities and other private industries.