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):** Colorado Department of Transportation

2. **Name and Title:** Lawrence "Allen" Kirk

   Organization: Colorado Department of Transportation

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   State: CO

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Innovation Description (30 points)

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

3. **Name of the innovation:**

Transformer Base Electrical Safety Plates

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4. Please describe the innovation.

In the event of a downed traffic signal or street luminary pole the transformer base is intended to break and allow the pole and equipment to fall to lower the impact to a vehicle. This often leaves exposed electrical wires at the electrical entry into the base. The improvement is utilized for such an emergency response where a new transformer base is installed and then the safety plate is installed to protect the energized wires while keeping snow/ice and debris from entering the base until a replacement pole can be installed.

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

The practice before this was to place a traffic pole over the electrical wiring.

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

The traffic cone is subject to be moved due to winds and snow removal equipment and leave electrical wires exposed to people, pets, and wildlife. The cones are not listed or tested to provide such protection and are insufficient.

7. Briefly describe the history of its development.

As a licensed electrician it is understood that energized wires over 50 volts are provided with at least two layers of protection. Having insulation cover the conductor installed in an electrical raceway is an example of such double protection. There are times when electrical connectors are left partial exposed after a vehicle incident where there is not any protection available.

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.

The National Electric Code (NFPA 70) was my primary standard to understand that there was not enough protection available. In Article 90 – Introduction, 90.2 (A) states, “Practical Safeguarding – The purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity. (con’t)” This application is more specifically referred to in Article 225 – Outside Branch Circuits and Feeders, 225.20 “Protection Against Physical Damage - Conductors installed on buildings, structures, or poles shall be protected against physical damage as provided for services in 230.50” This standard is the bases for creating a means of compliance.

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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.

☒ Innovation is ready for full-scale implementation.

Duplicate copies of the plates in two sizes are available to the traffic technicians. A training presentation with documentation has been provided as well.

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

No other development is necessary

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

If so, please list organization names and contacts.

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. 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 Safety	The safety plates ensure that electrical wiring and fittings are not accessible to people, pets, wildlife, or conductive paths outside of the protective base.
Organizational Efficiency	This allows us to provide sufficient protection at the time of an emergency until a replacement pole can be installed.
Improved Operation Performance	By reinstalling a base and plate at the time of an emergency we are able to prevent snow buildup and other obstructions that would slow down the ability to reinstall a new pole.

Provide any additional details below:

Click or tap here to enter text.

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?

Having the ability to provide a custom computer aided drawing that accounts for varying bolt patterns is important. Other than that the only other challenge, in our situation, was to find a metal fabrication vendor with the equipment capable of providing water jet metal cutting.

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

Cost: The average cost of each plate is about $62. There is about 15 minutes of labor costs to install.

Level of Effort: Low effort is needed.

Time: It takes about 15 minutes to install.

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.

In our situation I was able to design the plate where others might need that outsourced. Using a metal fabrication was the only other service we required.

How to Borrow This Idea

Date Published: **06/10/24**

Use this document as a guide for replicating this idea! If you need further clarification, feel free to reach out to the innovator.

Materials and Parts Used:

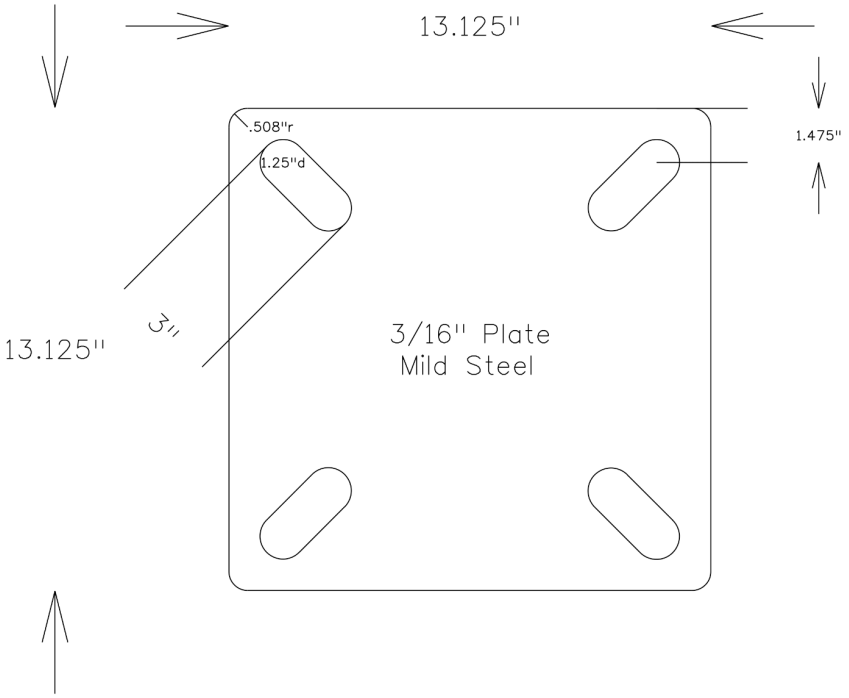
- **3/16'' Plate of Mild Steel**
- **Steel cutting tool**
- **TB-1 or TB-2 Mounting Base**
- **Nuts and Bolts**

Instructions:

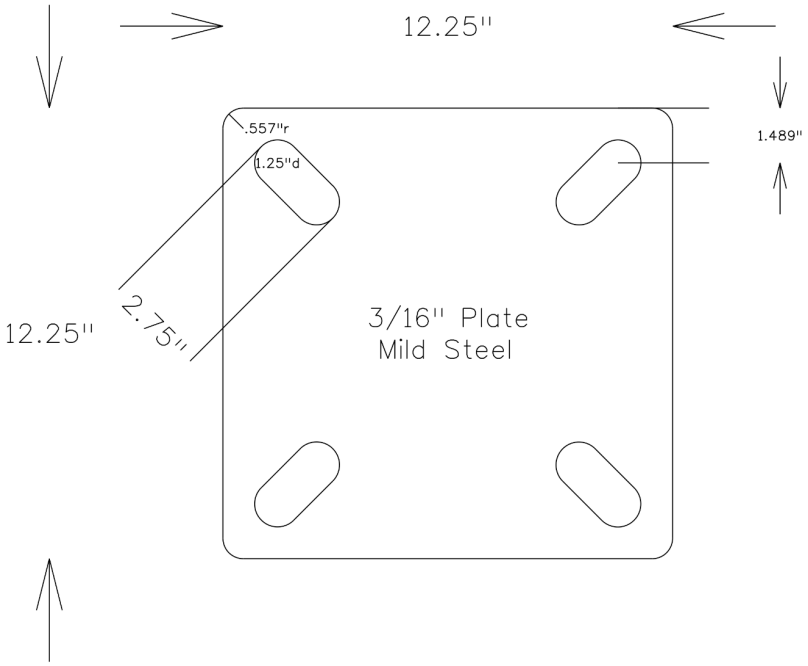
Energized conductors in luminaire poles can be incredibly dangerous to CDOT employees and passerby. The safety plates go atop of a base to protect passerby and prevent water damage to the wires.

1. Take your steel plate and cut a rounded square with a waterjet cutter:
    a. For a TB-1 Safety Plate, cut a 13.125'' square of metal.
    b. For a TB-2 Safety Plate, cut a 12.25'' square of metal.
2. On the square plate, cut four angled holes with a waterjet cutter, according to the schematic (see below):
    a. For a TB-1 Safety Plate, cut 3''- long holes.
    b. For a TB-2 Safety Plate, cut 2.75''- long holes.
3. Add nuts and bolts to the steel plate
4. When faced with an electrified luminaire base, place a TB-1 or TB-2 Mounting Base over it. Next, top it with your new safety plate.

TB-1 Safety Plate



TB-2 Safety Plate



Innovator Contact Information

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Questions? We can help!
Lean Everyday Ideas and Storeroom Contact Information, The Office of Process Improvement