

Michigan LTAP



Great Ideas Challenge

Identifying, sharing, and rewarding innovative ideas from local road agencies

www.MichiganLTAP.org/GreatIdeas

 Center for
Technology & Training

Attention!

Note: This document describes equipment and practices developed by employees of local road agencies for use within their agencies. The equipment and practices described herein have not necessarily been tested and/or approved to meet engineering design or safety standards. Agencies considering adopting the practices described in this document should first verify the practice is appropriate and safe for their agency's use. The Center for Technology & Training (CTT) is not responsible for damage to equipment or facilities, or for bodily injury as a result of reproducing and/or using the equipment or practices described herein.

What is the Great Ideas Challenge?

Working through Michigan's Local Technical Assistance Program (LTAP), members of the Center for Technology & Training staff visit dozens of local road agency facilities every year. Every time we stop at a county road commission or a city department of public works, we are impressed with what goes on behind the scenes. The men and women who manage and maintain local agency roads, facilities, and equipment are intelligent, ambitious, passionate, innovative, and productive. No matter the obstacle, they figure out how to get stuff done — and do it well.

The *Great Ideas Challenge* is meant to help identify, share, and reward the great work that gets done at local road agencies in Michigan. The Challenge is open to all employees of road agencies who serve counties, townships, cities, and villages in Michigan. All entries are considered for the statewide competition, and the entry that wins first place in Michigan is automatically entered in the Federal Highway Administration's LTAP Build a Better Mousetrap national competition.

Next year, the 2018 *Great Ideas Challenge* submissions will open in October 2017 and will have a May deadline for submitting a great idea.

Special Thanks to the Judges

Judges for the *Great Ideas Challenge* took time out of their busy schedules to evaluate, discuss, and score each entry based on five criteria: Cost, Ingenuity, Effectiveness, Ease of Adoption, and Return on Investment. Judges include:

Christopher Gilbertson — Associate Director, Center for Technology & Training
Andrew Manty — Research Engineer, Center for Technology & Training
Lance Malburg — Engineer, Dickinson County Road Commission

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Emulsion Tail

Ingham County Road Department

Contact Information

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Problem Statement

Spray patching the larger cracks in the asphalt roads before applying a seal coat is an important preventive maintenance procedure. This is required to get a total seal over the existing asphalt pavement. Spray patching requires a crew of up to six employees working for up to four days in order to complete a one-mile section of road. Many road agencies do not have the manpower to dedicate a crew to complete necessary spray patching.

A more efficient system would allow agencies to fill cracks and imperfections on a project without needing to dedicate a crew to crack filling before the seal coat team arrived.



Summary of Solution

The Emulsion Tail tool is a device pulled behind the distributor to spread extra emulsion into cracks and imperfections that would otherwise have to be crack sealed before the emulsion application. The emulsion is discharged onto the surface of the road, and then the mat of the Tail spreads the extra emulsion liquid into the cracks on the road.

The standard emulsion application is 0.40–0.45 gallons per square yard. By applying 0.50 gallons per square yard, there is extra emulsion on the road, which keeps the drag system full of emulsion. This procedure fills cracks with emulsion and causes them to “disappear”. The Emulsion Tail is designed for local and primary roads that have aged four years or more. It is not intended for newer pavement with no cracks that would be better served by a chip seal.



Emulsion Tail (cont.)

Material & Expenses, Labor, Equipment

The Emulsion Tail is constructed from five sections of Telespar, ridged rubber matting, $\frac{1}{4}$ " steel chain, $\frac{3}{16}$ " cable, a 12-volt tarp motor, and miscellaneous nuts and bolts. Materials cost approximately \$650.

The Emulsion Tail requires six to eight hours to assemble, amounting to approximately \$200 in labor. Fabrication of the Emulsion Tail requires a shop mechanic with welding skills.

Benefits

This process eliminates the need to have a crew spray patching in advance of the seal-coat process. Using this tool can save 150 hours of labor for each mile of road, amounting to tens of thousands of dollars in labor over a single season.



Wing Plow Light Box

Kent County Road Commission

Contact Information

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Problem Statement

Like many agencies throughout the state, the Kent County Road Commission has been using wing plows, deployed on the right-hand side of the truck, to clear the right lane of traffic and shoulder simultaneously. Although it is possible to use the wing plow to help clear two lanes of traffic (rather than one traffic lane and a shoulder) at the same time, safety concerns compelled KCRC to prohibit the practice.

“Although motorists are constantly warned not to pass plow trucks on the right, some do,” said Jerry Byrne, KCRC’s deputy managing director of operations. “Motorists have swiped our wings while trying to pass our trucks on the shoulder. Given that the wing can be hard to see, we wanted to develop a better design for wing warning lights before putting the wing into a traffic lane.”

Summary of Solution

The Wing Plow Light Box places the amber and green lights at approximately 42-inches high, aligning them with a driver’s natural line of sight. Together with an additional amber light (which is mounted to the side of the light box and sits at the top-center part of the wing) the lights replicate “tail lights” and alert motorists that something is occupying that lane of traffic.



Wing Plow Light Box (cont.)

Material & Expenses, Labor, Equipment

The Light Box requires a steel frame made from ¼"-thick 4" flat stock, that can be bent or welded into an open rectangle. This forms the steel frame that houses the stainless steel light box (purchased from Truck and Trailer). The lights are wired to allow lights to strobe and flash. Assembly and installation of the Light Box takes approximately five hours. Constructing the Wing Plow Light Box requires welding skills.



Benefits

In the first winter that the Light Boxes were used, no right-lane wing plow was struck by a passing vehicle. The design is durable enough to withstand the regular impacts that wing plows receive. Because of their invention of the Wing Plow Light Box, the KCRC is one of two road commissions in Michigan that has received MDOT permission to operate a plow truck and its wing plow in two travel lanes.



Drag ‘N’ Plow

City of East Jordan

Contact Information

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Problem Statement

When snowblowing sidewalks in winter with a vehicle-mounted snowblower, a single pass may be enough to clear away most of the snow. However, there is almost always a noticeable amount of snow left behind, which can become a slipping hazard when it is packed down by foot traffic. Making a second trip with the blower is an option, but the second pass would double the cost associated with clearing the sidewalks while providing no guarantee that the snow blower will be able to clear away the lowest snow that it has already missed.



Summary of Solution

The Drag ‘N’ Plow tool is a plow attached to the rear of a Trackless Tractor—or similar vehicle—and follows behind the vehicle as it snowblows, cleaning the sidewalks bare of any residual snow missed by the blower.

Drag 'N' Plow (cont.)

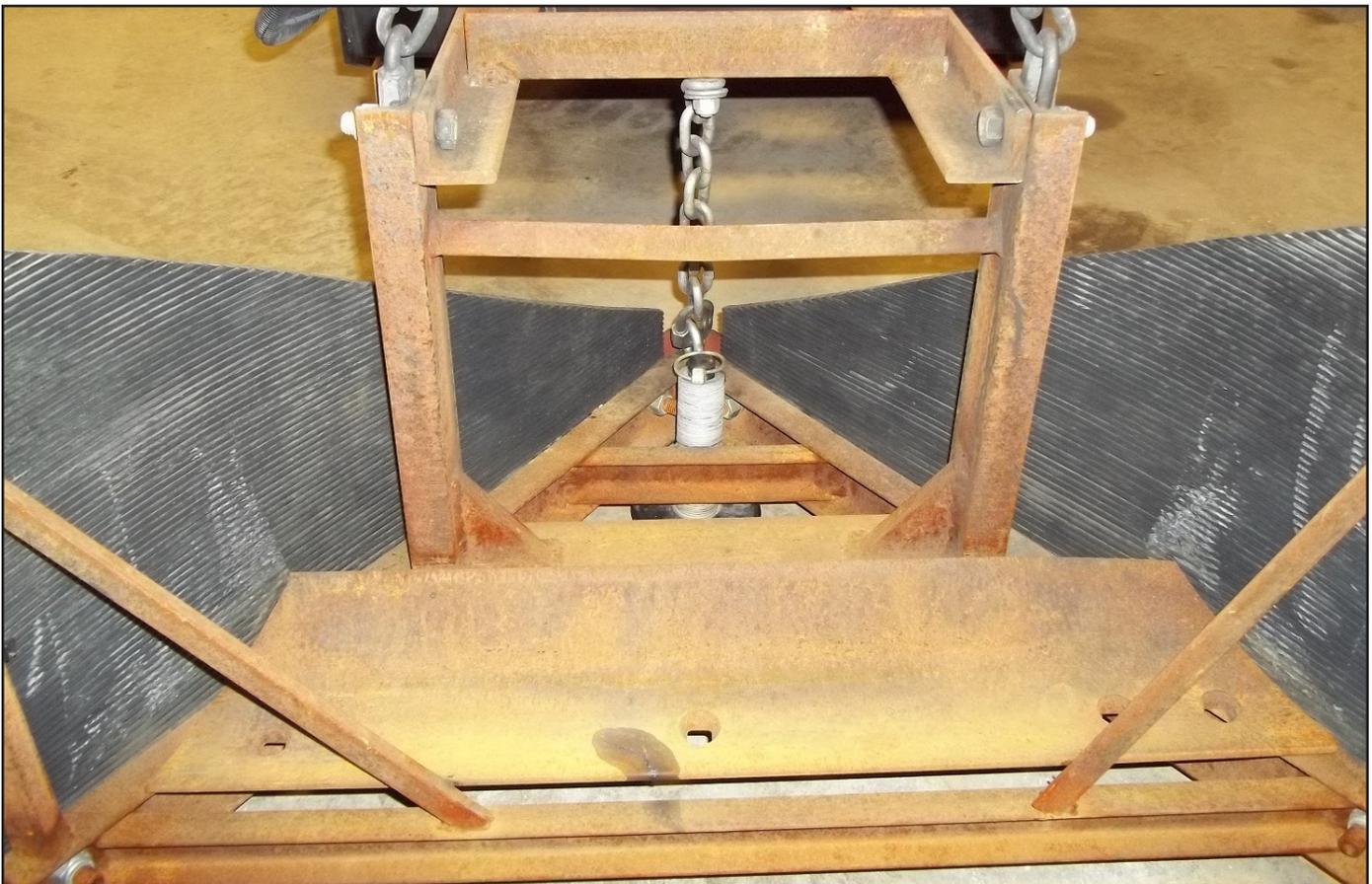
Material & Expenses, Labor, Equipment

The plow frame is constructed primarily of a 24" x 36" mud flap, 2" and 3" C-channel steel, 1" and 2" L-channel steel, 1" square steel tubing, 3" x 1" steel bar stock, 3/8" chain, and a 6' x 6" grader blade. The rest of the Drag 'N' Plow consists of a Boss round plow shoe and Boss Plow Smart hydraulic cylinder. The labor requires general shop knowledge to cut steel to length, layout, assemble, and weld and bolt together. The materials and labor all-together cost approximately \$400. Equipment needed to construct the Drag 'N' Plow include tooling, a welder, a metal band saw, and a torch set.



Benefits

With the Drag 'N' Plow, snowblowing vehicles can completely clear sidewalks on a single pass, making sidewalks safer for pedestrians, as well as saving time and money.





The Center for Technology & Training is located on the campus of Michigan Technological University. The CTT's mission is to develop technology and software, coordinate training, and conduct research to support the agencies that manage public infrastructure. For more information, visit www.ctt.mtu.edu.