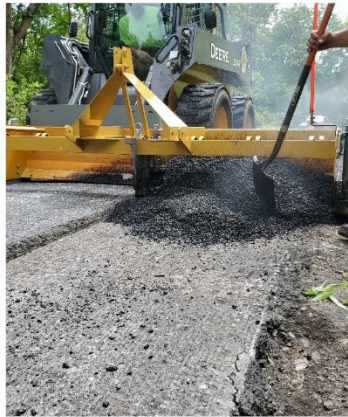


2023

Build a Better Mousetrap

Recognizing Innovative Inventions and Improvements

PennDOT Local Technical Assistance Program



pennsylvania

DEPARTMENT OF TRANSPORTATION

LOCAL TECHNICAL ASSISTANCE PROGRAM



Show Off Your Road Crew's Innovative Gadgets and Ideas by Entering the 2023 Build a Better Mousetrap Recognition Program

Has one of your employees recently built an innovative gadget or come up with a better way to do a job? If so, now is the time to show it off by entering the **2023 Build a Better Mousetrap Recognition Program**.

Municipalities must use limited budgets and resources to serve the needs of residents and innovation can be the mission-critical factor that helps bridge that gap. Local road practitioners continually implement incremental changes in their processes, tools, and services to reflect changes in technologies and best practices. In their roles as innovators, municipal staff leverage their considerable creativity, technical expertise, and diverse talent pool to suggest changes that are useful, valuable, and impactful to their local system. The Build a Better Mousetrap Recognition Program showcases the most clever and creative practices and tools from across the state. By sharing these innovations with one another, local road departments can adopt these new tools and practices, and deliver more efficient, cost-effective services to their communities.

LTAP is looking for projects that municipal employees or road crews designed and built. It can be anything from the development of tools and equipment to modifications to processes that increase safety, reduce costs, or improve efficiency or the quality of transportation. Technological innovations and unique use of new tools such as drones, apps, computers, smart phones, tablets, etc., are welcome.

If you have an innovation to share with other municipalities, submit your entry form by **March 3, 2023**. The LTAP Advisory Committee – a group made up of your peers – will judge the entry on recognized importance/impact, originality, applicability to others, cost effectiveness, time savings, agency or community benefit, and the overall quality of the application. The winners will be chosen in March and recognized at the annual conference of the winners' respective municipal associations.

The top-three entries will be submitted to the national Build a Better Mousetrap recognition program. Winners of the national program will be announced at the annual LTAP national conference this summer.

To enter the recognition program, complete the entry form that follows and
return it by Friday, March 3, 2023

If you have questions, feel free to email them
to ltap@psats.org, or call Karen Atkinson at 717-763-0930 ext. 156.



U.S. Department of Transportation
Federal Highway Administration



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2022 Build a Better Mousetrap: Pennsylvania Recognitions

Sidewinder

South Manheim Township, Schuylkill County, PA

What was the challenge? Like many small, rural communities, we face budget constraints. Therefore, we cannot purchase or rent additional equipment for every job. Along many of our roadways, the berm is not very wide, and our challenge was to be able to fill areas of the berms without losing expensive materials. We also needed to be mobile enough to cover a large area in a short amount of time. Dumping our material directly on the roadway and working it in slowly with our backhoe caused a waste of material, as some material was not going into the correct areas. The result was inconsistent and required continuous sweeping to keep roadways safe. We owned a berming machine with a moon paver which works well; however, you are limited to using one truck over and over which results in a lot of down time while the truck gets loaded, then returns to the site. We needed something more efficient that allowed us to use multiple trucks and provide consistent flow of materials to avoid waste and increase productivity.



How did you develop and implement your solution? The township needed something similar to a widener, which can be expensive. Working together, we developed something along the lines of a widener using implements we already owned, including a berming machine, which usually would mount on the back of a truck, and some scrap metal from the shop. Although we knew there would be some cost involved, we estimated we would save thousands in labor in just a short time. The machine would need to mount to our backhoe (JD 410j tmc) and it needed to be able to push the trucks like a paver. This would allow us to use multiple trucks (we often work with neighboring municipalities, sharing trucks and equipment) and eliminate unnecessary loss of material due to the truck coming out of the berming machine and making a mess on the roadway. We constructed a frame with quick-attach mounting for our backhoe and put a dock bumper to eliminate potential damage from pushing the trucks. Next, we created a frame for the berming machine, and skis to run on the roadway to ensure it stays on grade.

What labor, equipment, plans, or materials did it take to make the solution work? It took roughly 60 manhours to construct the sidewinder, using basic metal-working tools (welder, grinder, etc.). A good portion of the metal was scrap from our shop. Also, one of our employees donated an old ATV plow he intended to scrap. We reinforced it so it could handle the material load. We had to purchase metal and a dock bumper. The quick-attach plates were cut by a plasma cutter instead of buying blanks from the dealer, which can cost \$1,500. Plasma-cutting material was roughly \$250 for the pair through a local metal sales group. As we were building it, we also discovered we could make other attachments to accomplish other tasks with the same unit. We designed an attachment for doing curbing with blacktop, and an attachment for making a uniform 2-inch-wide pass for berms. We also ran the hydraulics off of the backhoe so everything can be controlled right from the driver's seat.

What was the cost of implementation? The cost of materials was just under \$500. This included the cost of blanks for the quick-attach for the backhoe. We used a mig welder and simple angle grinders to fabricate the sidewinder, all of which we already owned.

What was the positive impact/results/outcome of your efforts? This invention has been very beneficial to the township. It saves time because we can keep it running continuously. We have a three-man crew, and this allows one person to operate the sidewinder while the other two employees are hauling materials. The sidewinder also saves our township on costs of materials. We don't lose as much material over the banks because we can control the flow and placement of the materials. Above all we can make our township roadways safer for our residents by having wider shoulders.

Hydraulic Powered Concrete Mixer North Manheim Township, Schuylkill County, PA

What was the challenge? We do a lot of catch basin repairs, pouring of headwalls, and other concrete work. Our off-the-shelf options were to mix by hand with a wheelbarrow, which can be labor intensive and slow; use an electric mixer, which requires hauling a generator and fuel to jobsite; or use a gas-powered mixer, which requires another engine to maintain and hauling fuel to jobsite. We weren't satisfied with these options.



How did you develop and implement your solution? All of our trucks are built with central hydraulics, so we decided to convert an electric mixer to hydraulic. We removed the electric motor, fabricated a mount to install a hydraulic spinner motor, added a safety shut-off valve, and had long hydraulic lines made to hook to the spreader or spinner hydraulic hook-ups at the back of the trucks. We purchased a suitably sized pulley from Tractor Supply and the correct length belt from a local hardware store to complete it. Since those hook-ups already have adjustable flow for controlling salt usage, we were able to adjust the speed of rotation on the mixer. Now we don't have to haul any extra fuel or a generator to the job site. We don't have to worry about getting a small engine to start, and we don't have to break our backs mixing by hand.

What labor, equipment, plans, or materials did it take to make the solution work? A used electric mixer, hydraulic spinner motor, V belt pulley, V belt hydraulic lines and fittings, hydraulic safety valve, random sheet metal laying around to build the mount and about 8 hours of labor.

What was the cost of implementation? Our costs included: a used mixer, \$100; pulley, \$20; belt, \$15; and hydraulic lines and fittings, \$90. The hydraulic spinner motor and hydraulic safety valve were already in stock and not planned to be in used in the near future. Labor was approximately \$200. The total cost for us was \$425.

What was the positive impact/results/outcome of your efforts? Not running a gas engine or generator saved us fuel costs and resulted in reduced emissions/pollution. Time was saved from not having to perform maintenance on the engine/generator or having difficulty getting them started. Not having to hand mix saved on labor. The main benefit for the crew is simply convenience. Just hook the lines to the truck and you're done.

Decorative Light Rebuild

Tarentum Borough, Allegheny County, PA

What was the challenge? Multiple decorative LED streetlights were fading or completely burning out at the same time. The lights are about 10 years old and out of warranty and the cost to retrofit one light was estimated at \$870, plus shipping. We have 45 of these lights in the borough, and in October 2021 we had to figure a way to repair or replace 38 of them. No money was allocated for this large purchase in the 2021 budget.

How did you develop and implement your solution?

We took the top light assembly from one of the units, disassembled it and evaluated its design. The LED lights were built into a 22-inch aluminum-finned shaft. The top of the LED lights included a plastic shield designed to deflect the light downward. At the top and bottom of the shaft were three threaded holes for screws. Our group came up with an idea to somehow fit this light with a new 360 LED screw in the light by using a ceramic socket. We spoke with the local electrical vendor who had seen our lights before and recommended the correct lumens. Our group purchased the material and came back to the table for design. We had to figure a way to put it all together so that all the disassembled parts got reconnected. We started with an inch-and-a-half piece of threaded PVC to hold the decorative top onto the assembly. We removed all LED lights and shields from the aluminum shaft. We then cut 3 inches off the top and bottom of the shaft. This allowed us to use the threaded spots to attach our ceramic socket. We wired the socket through the center of the 3-inch aluminum shaft and reattached to the bottom of assembly. We then removed the driver for the decorative light pole and wired a new assembly to the pole.



What labor, equipment, plans, or materials did it take to make the solution work? We used our lineman and bucket truck to take down the light assembly and wire it back up to the pole. We had two laborers disassemble and strip old LED lights apart. Two others cut the aluminum shafts using our bandsaw. They then assembled the new sockets onto the aluminum base and wired them to the base for our linemen to finish.

What was the cost of implementation? Material costs: Ceramic socket, \$8.85; Keystone 360 LED, \$67; miscellaneous wire/nuts, \$20. Total cost: \$95.85 per light. With 38 lights, the project came to \$3,642.30. New retrofitted lights would have cost over \$33,000.

What was the positive impact/results/outcome of your efforts? The savings came to \$29,417 for the borough. The results were fresh and brighter lighting throughout the borough. Our citizens and businesses immediately noticed the difference. Every one of the workers that participated in the project felt rewarded by the positive feedback of the community and borough officials. We still have eight more to complete, and in the future we will be modifying our decorative lights in the park.

2023 Build a Better Mousetrap Entry Form

Agency Name: _____

Contact Person: _____

Contact Phone #: _____

Contact Email: _____

Contact Address: _____

County: _____

Entry Title: _____

What was the challenge?

How did you develop and implement your solution?

What labor, equipment, plans, or materials did it take to make the solution work?

What was the cost of implementation?

What was the positive impact/results/outcome of your efforts?

Email photographs to ltap@psats.org and include the municipality and the entry title. You may enter more than one innovation. Use separate forms for each innovation.

Return your completed form by **Friday, March 3, 2023**, to ltap@psats.org, fax it to 717-763-9732, or mail it to:



PennDOT LTAP
c/o PSATS
Attention: Karen Atkinson
4855 Woodland Drive
Enola, PA 17025

Questions? Call Karen 717-763-0930, ext.156 or email katkinson@psats.org.