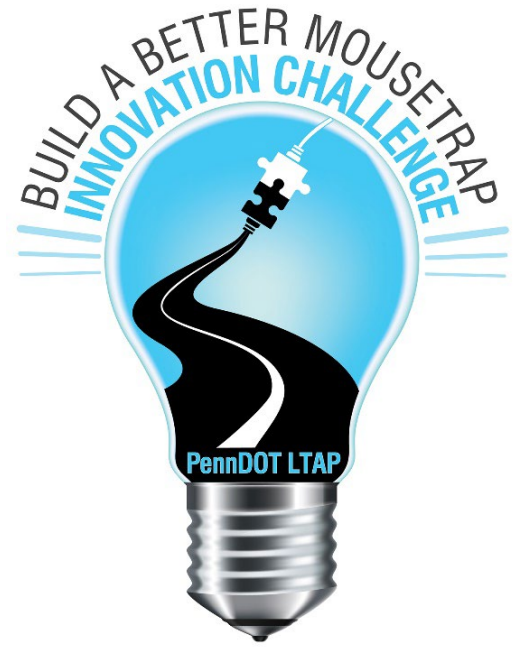


Build a Better Mousetrap Innovation Challenge

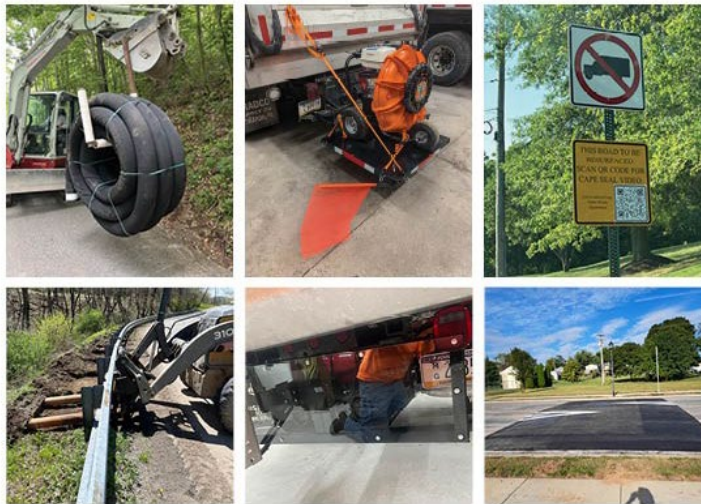
Recognizing Innovative Inventions
and Improvements



**Pennsylvania
Department of Transportation**
Local Technical Assistance Program



Pennsylvania Past Entries 2019-2026



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If you have questions Karen Atkinson can help.
Email: ltap@psats.org Call: 717-763-0930 ext. 156

2026 Build a Better Mousetrap: Pennsylvania Recognitions

[Video of 2026 Winners](#)

DIY Speed Tables: Save Yourself Money and Time

South Londonderry Township, Lebanon County

Contact Person: Richie Deibert

richie@southlondonderry.org

[Video Link](#)

What was the challenge? Residents of the Carriage Park Development petitioned South Londonderry Township to address excessive speeding along Woodlawn Avenue. This was mainly due to traffic diverting from Schoolhouse Road to Woodlawn Avenue to bypass a troublesome intersection at Schoolhouse Road and SR-322. Vehicle speeds consistently exceeded the posted limit, creating safety concerns for pedestrians, bicyclists, and neighborhood families. The township conducted a traffic study and found the 85th percentile speeds to be more than 11 mph over the posted speed limit of 25 mph.

How did you develop and implement your solution? The township followed PennDOT's *Traffic Calming Handbook* (Publication 383) and Design Manual, Part 2 (Pub 13) to develop a compliant approach. After receiving a formal request from residents, the township adopted a Traffic Calming Policy and worked closely with a resident-led community group to design and prioritize improvements. The township identified raised speed tables as the most effective and economical option.

To reduce costs, the township's Highway Department constructed forms for the tables in-house. Crews designed a custom form for the flat top of the tables and hand-formed the asphalt ramps. Each table location was selected based on traffic data — focusing on areas with the highest speeding and near existing streetlights for visibility.

What labor, equipment, plans, or material did it take to make the solution work? The project was completed entirely by township staff using township-owned equipment and a four-man crew within four days. The process included milling two inches into the existing roadway, installing new asphalt at a five-inch depth compacted to four inches, and leaving the form in place overnight to achieve clean, defined edges. The traffic table form was constructed using two-inch x six-inch boards, spanning 32 feet to cover the roadway width while leaving a two-foot gap along each curb line to maintain stormwater runoff. The table platform was built to a 10-foot width in accordance with PennDOT specifications, with the boards securely fastened together and lagged to the roadway to maintain uniform shape and elevation.



The township filled the speed table form with asphalt.



The township added the sides and markings on the speed table. Photos: South Londonderry, Lebanon County

A backhoe, skid loader, and hand tools were used to place and lute standard 9.5-mm warm-mix asphalt for both the table surface and ramps. Approximately 19 tons of asphalt were used for each speed table. Retroreflective pavement markings were applied using a propane torch to ensure durable adhesion and improved nighttime visibility. One reusable form was utilized to construct both speed tables, demonstrating efficiency and cost savings in the field process.

What was the cost of implementation? The total cost of the project was approximately \$5,000 for two speed tables, achieved through significant savings by utilizing in-house labor and township resources instead of contracted services and equipment.

What was the positive impact/result/outcome of your efforts? Pre- and post-installation traffic studies showed a reduction of over 5 mph in both the average and 85th percentile speeds — from approximately 36 mph down to 30 mph. We also reduced trips by 150 trips per day. The new traffic tables have improved pedestrian safety, reduced through traffic speeds, and strengthened community satisfaction. Residents have expressed appreciation for the township's responsiveness and cost-effective approach.

Guide Rail Debris Remover

Washington Township, Indiana County

Contact Person: Jesse Shotts

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[Video Link](#)

What was the challenge? Over the course of time, materials and debris builds along the shoulders of the road, and this is usually addressed with equipment to reestablish slope and grade to allow water to run off from the road surface. The challenge is getting this build-up from under guiderails. Guiderails that have additional rails with very little clearance to the road are even more challenging. These tight areas normally get neglected for long periods of time and result in overgrown vegetation.

How did you develop and implement your solution? After measuring the distance between the guiderail posts we realized we could use our backhoe with the fork attachment if we had something to slip over the forks and would be able to push the debris far enough away from the guiderails and at an adequate slope to allow water runoff.

What labor, equipment, plans, or material did it take to make the solution work? One rainy morning we scouted our scrap and discovered two seven-inch pipes that we cut to 65 inches so that they would slide over our six-inch-wide forks and cut an eight-inch "I" beam to fit between the guiderail posts with a little clearance to spare. We welded the pipe to the beam at a perpendicular angle. The last thing we needed was a way to keep this contraption from sliding off the forks when backing out, so we welded a large bolt between the top and bottom of the beam to run a chain from the beam the fork attachment.

What was the cost of implementation? Less than \$100. It was a half day labor for one employee. The material was scrap from the stockpile.



The guide rail before cleaning.



The guide rail being cleaned.



The guide rail after being cleaned.

Photos: Washington Township,
Indiana County

What was the positive impact/result/outcome of your efforts? Our expectation was to break in our little invention but to everyone's surprise it worked like a charm. In just one day we cleaned 1,000 feet of guiderail with another half of a day of light shovel work to get the little bits directly in front of the posts. We were glad this turned out so well and it saved us many days of facing this challenge with hand tools. Not only was this a back saver, it cut right through the small tree roots and poison ivy. We named it "Push it".

Salt Spreader Deflector

Everett Borough, Bedford County

Contact Person: Borough

everettborogarge@gmail.com

[Video Link](#)

What was the challenge? Trying to figure out how to keep the salt off the back of the truck so it wouldn't rust the bumper and hinge points and still be able to use the back-up camera.

How did you develop and implement your solution? We used an old metal bed frame and welded it to fit where I wanted to put it.

What labor, equipment, plans, or material did it take to make the solution work? A metal bed frame, clear plastic, metal welder, grinder, and paint.

What was the cost of implementation? With donation of the bed frame, the cost came to \$15. It took two-and-a-half hours to build the deflector.

What was the positive impact/result/outcome of your efforts? The back of the truck will not rust, and we can still use the back-up camera.



The salt deflector (a metal frame with clear plastic) mounted behind the salt spreader and in front of the back-up camera. Photo: Everett

2025 Build a Better Mousetrap: Pennsylvania Recognitions

Leveraging Technology to Communicate with Residents – QR Codes

Lower Salford Township, Montgomery County

Contact Person: Doug Jones

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What was the challenge? About five years ago, Lower Salford Township began using the Cape Seal surface treatment process as part of our road improvement program. This is a two-step process where a chip seal is first applied to a roadway followed by a slurry seal as the finished product. We get all the benefits of the chip seal with the aesthetics of the slurry seal, which is important in more suburban settings.

We send letters to all residents on the affected streets in advance of work to inform them of the work and to minimize phone calls. The challenge was to adequately explain the process in a concise manner without sending a multi-page letter that no one would take the time to read.

A two-step process that includes a seven-to 10-day gap lends itself to question of if and when the work will be completed. The "gap" period is typically when the phone calls would start coming in and would require staff time to answer the questions.

How did you develop and implement your solution? We were able to locate a professionally made YouTube video of the Cape Seal process, which included narration of the various steps and the overall benefits of the process. Using a free website, we created a QR Code linking the video.

The QR Code was then included in all letters sent to residents, who can simply scan the QR Code with their phone and watch the video that explains the entire process. We also had signs made that included the QR Code. About a week prior to the start of work, we installed these signs at strategic locations so that anyone driving, jogging, or walking their dog can simply scan the code and watch the video.

What labor, equipment, plans, or material did it take to make the solution work? Implementing the solution took approximately three hours of staff time to research Cape Seal videos, find the free QR Code creator website, create the code, and include it in the letters and on the signs. Other materials included aluminum sign materials.



The township created a road sign with a QR code that directs users to a cape seal video. The goal was to reduce phone calls from residents. Photo: Lower Salford Township, Montgomery County

What was the cost of implementation? The cost of implementation was less than \$500, which included staff time, and the purchase of 12 signs.

What was the positive impact/result/outcome of your efforts? Leveraging this technology reduced the number of phone calls from residents that "just wanted to know" if the chip seal (first step) was the final product, when the contractor would be back, and just the general what's happening on my street.

It also allows the township to better communicate with our residents by showing them what will be happening on their street and how the use of the Cape Seal process benefits the community.

Brine Blender

McSherrystown Borough, Adams County

Contact Person: David Williams
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What was the challenge? Blending salt brine without paying for an expensive system.

How did you develop and implement your solution? Observed expensive system and duplicated the processes used items lying around, donated, or could be purchased and low cost.

What labor, equipment, plans, or material did it take to make the solution work? It took one person approximately eight hours to assemble the entire system. R H Sheppard, a local business donated some IBC totes, PVC pipe, and fittings were left over from prior jobs or purchased for local stores. The 2-inch pump was equipment the borough already owned.

What was the cost of implementation? For less than \$500, labor included, the entire system was implemented.

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

We are now able to mix and store salt brine to use during winter operations. Using the brine mixture will reduce the amount of salt applied to our roadways, saving hundreds of dollars per event and while keeping the roads safer.



The photos are showing the brine maker the borough build and the totes that store the brine. Photo: McSherrystown Borough, Adams County

Truck Hitch Mounted Blower

North Centre Township, Columbia County

Contact Person: Steve Hess

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What was the challenge? Trying to blow grass off road safely after berm mowing operations.

How did you develop and implement your solution? We identified the dangers of using a gas-powered backpack blower in the roadway. While wearing hearing protection and focusing on the task at hand, the operators focus was taken away from oncoming traffic increasing the likelihood of an accident. Our solution was to keep the operator inside the vehicle.

What labor, equipment, plans, or material did it take to make the solution work? A modified walk behind blower, a couple hours of planning, some old square signposts for the frame, an old one lane bridge sign for the platform, welder, a day to build and paint, and some ratchet straps.

What was the cost of implementation? \$2,474.99 for the new blower, \$50.00 for paint, straps, and miscellaneous hardware.

What was the positive impact/result/outcome of your efforts? Safety was our main concern we had one worker struck by a vehicle and many more close calls while using a backpack blower. This gives us a way to stay inside the truck and still get the grass off the road for the safety of the motoring public.



The blower mounted on the back of a truck. Photo: North Centre Township, Columbia County

2024 Build a Better Mousetrap: Pennsylvania Recognitions

Saw Mounted on Loader “Fire Chicken”

North Codorus Township, York County
Contact: Travis J. Shearer, Roadmaster
nctroads@comcast.net



The blade used on the “fire chicken” spins at about 400-500 rpm. Photo: North Codorus Township, York County

What was the challenge? The township was tasked with daylighting (removing the tree canopy) within the right-of-way of township roads. This process keeps the roads dryer to extend the pavement life and reduces potential icy spots in the winter. To do this task, a bucket truck was used to elevate an employee off the ground. This puts the employee in a dangerous situation with the risk of falling and injury due to using a hand-held saw in an elevated position and the potential for falling debris hitting the person. The operation was slow as a person was raised in the bucket into a position so they could cut the limb, the limb had to be secured and then lowered after being cut. The entire process was time-consuming and potentially hazardous.

How did you develop and implement your solution? The township’s road department staff discussed the issue and determined that a ground-based equipment-mounted solution would be the safest and most efficient approach. This would reduce or eliminate the potential of falling, injuries from the saw, and being hit by falling debris. It could also increase the speed at which the task could be completed. Their invention was named the “fire chicken”.

What labor, equipment, plans, or material did it take to make the solution work? The design was thought out using a few sketches, ingenuity, scrap and surplus materials, and a trip to the government surplus to purchase saw blades. The steel which became the arms of the “fire chicken” was salvaged from the township yard. The hydraulic pump was from an old salt spreader, and the saw blades are government surplus. With the purchase of some hydraulic lines and fittings the road crew fabricated the ground-based limb cutter.

It was designed to fit on a loader. The arm is angled so the operator can see where they are going and keep clear of any falling debris. The blade spins at about 400-500 rpm unlike a conventional saw which spins at approximately 3,000 rpm. The initial design had a full blade guard, like a string trimmer. This guard severely obstructed the operator’s view of the blade, so the design was modified into a cage-type guard which contains the blade in the event of a connection point failure.

What was the cost of implementation? Altogether, the cost was about \$200 for new parts in addition to the salvage materials. A total of about 40 hours went into the design, gathering of materials, and fabrication.

What was the positive impact/result/outcome of your efforts? To complete the daylighting task the person running the saw is now inside a cab and not in a bucket holding a saw. This environment reduces the risks of accidents and injuries. The “fire chicken” also increased the crew’s efficiency so they can daylight

more road miles in the same amount of time. The task efficiency and increased pavement life stretch the township's road dollars. The community benefits by having dryer, safer roads that last longer.

The Un-Reeler - Coiled Pipe Un-Reeler & Back Saver

Lewis Township, Lycoming County

Contact: Charles E. O'Brien, Jr., 1ST Class Mechanic
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What was the challenge? The township staff faced challenges overcoming friction when uncoiling underdrain piping for installation on tar-and-chipped roads. The underdrain is installed to improve subsurface drainage, protect the roadway, and extend the pavement life.

Back injuries are a problem for employers across the county; the township is no different. Due to limited staff and an aging workforce (50s through 70s), a tool that would make the task of unrolling large coils of perforated piping easier and reduce the risk of back injury was needed.

How did you develop and implement your solution? The township developed and implemented the solution by harnessing our mechanical aptitude. Both typical sizes of coils were measured so the tool could be used with both six- and eight-inch underdrain pipe. After the initial plan, staff checked the shop for scrap materials and developed a sketch and went to work building the Un-Reeler.

What labor, equipment, plans, or material did it take to make the solution work? The design was simple and utilized welded two-by-two inch steel tubing as the frame, adding three-inch diameter Schedule 40 PVC pipe over the top to reduce friction, the main stem has a piece of 1/8-inch plate steel (four-inch diameter) added as a cap to keep the coil from slipping off.

The Un-Reeler fits over any excavation bucket and allows for easy transport and installation of both 100-foot-long reels of six-inch diameter underdrain and 60 feet long reels of eight-inch diameter underdrain.

All the equipment was available in the township's shop, including a portable band saw, welder, PVC saw, and power drill. All the materials were scrap, readily available in the shop. Ten feet of two-by-two inch square steel tubing, seven feet of three-inch schedule 40 PVC pipe, one piece of 1/8-inch plate steel, one 1/2-inch bolt and nut was used.

What was the cost of implementation? The township has no material cost invested in the project as everything was salvaged material from the shop. A total of two hours was invested into the fabrication.

What was the positive impact/result/outcome of your efforts? This invention reduces installation time by increasing the efficiency of uncoiling the spools in a minute and reduces the potential of back injuries. Due to the task being easier, staff can do more work in a day to lay the pipe.



The Un-Reeler assists with the transport and installation of both 100 feet long reels of 6 inch diameter underdrain and 60 feet long reels of 8 inch diameter underdrain. Photo: Lewis Township, Lycoming County

Storm Basin Frame Lifter

Peters Township, Washington County

Contact: Jared A. Scott

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What was the challenge? The challenge facing the road department was safely lifting the frames to make repairs to the storm water basins. Staff used clamps to lift and remove the frames and on occasion the clamps would slide, and the frame would become unbalanced. The result was to set it back down and completely adjust the clamps and lifting points. The township needed something that was safer and more consistent to do the job more efficiently.

How did you develop and implement your solution?

The township welding shop needed a major overhaul and was looking for things to fabricate to use existing material. Staff knew the materials would be on hand so the only cost associated with the frame lifter would be labor. The fabricators designed the lifter to be adjustable and so it can be used to lift a lot of things other than the basin frames. The lifter can be used with any equipment, including the crane on the utility trucks to make projects easier.

What labor, equipment, plans, or material did it take to make the solution work? The labor hours involved in the fabricating of the project totaled approximately 16 hours. It was completed in one-and-a-half days and painted during the afternoon of the second day. Materials used include square tubing, square bar, angle, 3/4-inch bolts and nuts, and black and red paint.

What was the cost of implementation? There was zero costs of materials to fabricate the frame lifter as all the materials used were on hand. The labor costs were approximately \$480.

What was the positive impact/result/outcome of your efforts? The main benefit of the frame lifter is safety and convenience. The tool makes the overall project of reconstructing storm basins a lot easier and safer for our crews. Something that seemed so simple was an ongoing issue and this “tool” has benefited our department in a great way.



Peters Township designed a tool to safely and conveniently lift storm basins for maintenance.

Photo: Peters Township, Washington County

2023 Build a Better Mousetrap: Pennsylvania Recognitions

Inlet Replacement Tools

London Grove Township, Chester County

Contact: Shane Kinsey, Director of Public Works
skinsey@londongrove.org

What was the challenge? With our infrastructure starting to age, we were seeing a significant number of inlet top and riser failures in 20- to 30-year-old developments. In many of these cases the inlet box and associated stormwater piping was in excellent condition. In one development alone we identified the need to replace inlet tops and/or risers on over 90 inlets. We wanted to limit any curb and roadway repairs beyond what was necessary, while attempting to save money as well. We quickly realized that we needed a solution to lift the inlet tops from the inside as opposed to the traditional lifting methods from the outside of the inlet top. We attempted to find a commercially available safe solution but could not locate anything.



London Grove Township came up with a lift to ease repairs associated with inlet tops and risers in decades-old developments in the township. Photo: London Grove Township, Chester County

How did you develop and implement your solution? Our public works crew brainstormed to develop a lifting mechanism that could lift the inlet from the inside of the inlet top in a safe manner. We wanted a solution that would allow the inlet to be rotated during installation and would keep the inlet level. While the focus of our immediate needs was lifting “S” tops utilized with rolled curbs, we also wanted to make the lifting device compatible with “M” and “C” type tops which have a different center of gravity. A “paper napkin” sketch of the design was created, and the crew worked to create the lift. We later identified the need for a simple way to keep debris from falling into the inlet boxes as we worked on replacing risers and/or tops. An additional pan was developed to sit inside the inlet, and the pan was set up to allow it to be lifted out with debris by a backhoe or excavator and dumped into a dump truck.

What labor, equipment, plans, or materials did it take to make the solution work? The project went quickly, and more time was spent brainstorming the design than constructing the lift. Most of the materials for the project were metal leftovers from other projects. The only material purchased specifically for the project was a section of round stock for the lifting pins. In the construction process we utilized both MIG and Stick Welders and a Plasma Cutter along with basic hand tools.

What was the cost of implementation? Most of the materials for this project were leftover materials from other projects. The only “new” materials utilized were four bolts, washers, and nuts from our bolt bins and a piece of round stock for the lifting pins. The total cost of the project was under \$200.

What was the positive impact/results/outcome of your efforts? Being able to lift the inlets from the inside has allowed the township to replace most inlet tops without the need to remove adjacent rolled curb. We have also been able to decrease the size of associated asphalt repairs. This resulted in significant cost savings in both material and labor. We feel that the lift has resulted in a safer solution for inlet top installation and has led to less disruptions to vehicle and pedestrian traffic.

Truck Tamper Transporter

Delaware Township, Pike County

Contact: Rich Baio, Roadmaster

roadmaster@delawaretownship.pa.gov

What was the challenge? Our biggest concern is safety as some of our roads are narrow and very busy. This makes it difficult when we need to bring the tamper around from behind the truck. Lifting the tamper from the back of a truck and/or trailer and then dragging it around the truck is not the easiest task and it is time consuming.

How did you develop and implement your solution? We decided that there was another way. An old plow frame would be ideal for holding the tamper directly behind the truck with the asphalt making it a safer zone as no one needs to leave the area between the two trucks.

What labor, equipment, plans, or materials did it take to make the solution work? Labor took about two days. We used an old Western Ultra-mount 1, some scrap metal, a welder, and torch. We purchased one trailer jack for the front to store the tamper. We also welded eye hooks to the tamper frame to tie it down securely.

What was the cost of implementation? The cost was about \$100 to create, and it was well worth every penny.

What was the positive impact/results/outcome of your efforts? This innovation creates a safer working environment for the road crew, less time wasted dragging a tamper from the back of the truck, and we don't have to lift the tamper as high to place in the back of the truck. This also saves us time now as we just pull the truck up and lock it in and go. When we are done, we just pull it in and leave the tamper on the holder, place the trailer stand, release plow, and drive the truck away



Delaware Township's innovation saves time and energy when the road crew is patching potholes. Photo: Delaware Township, Pike County

Tar Kettle Turned Hydroseeder Project

Warwick Township, Lancaster County

Contact: Brian Harris, Township Manager/Municipal

Authority Administrator

BHarris@warwicktownship.org

What was the challenge? Warwick Township maintains over 89 miles of roadway, over 80 acres of parkland, and over five miles of trails. The township annually schedules road improvement projects and park maintenance projects to ensure the safety of its residents and visitors to our parks. Following these improvements, restoration work is scheduled for any disturbed areas. Historically, the Public Works Department would seed and straw these areas by hand, which took several crew members an inordinate amount of time away from other



Warwick Township crafted a hydroseeder which made restoration and seeding after projects much easier. Photo: Warwick Township, Lancaster County

projects and was also labor intensive. The township needed a solution for a more efficient process for restoration and seeding post township paving projects as well as reseeding associated with recreational projects involving earth disturbance.

How did you develop and implement your solution? Warwick Township had considered purchasing a commercial hydroseeder. However, after comparing prices and realizing these pieces of equipment are costly, the township then considered whether it could retrofit existing equipment that could be used to construct a hydroseeder. The township had a 1995 Crafcro EZ Pour 100 Crack Sealing machine, which was well past its prime, and discussed converting it to a commercial hydroseeder. This would be much more efficient and reliable for restoration work than hand spreading seed and covering it with hay. It was decided that the Public Works employees were skilled enough with engines and welding so that they decided to tackle the project.

What labor, equipment, plans, or materials did it take to make the solution work? It was determined that the 1995 Crafcro had a structurally sound frame and a strong 17HP Isuzu diesel engine. The Public Works crew disassembled the unit and stripped it down. The engine was thoroughly cleaned and refurbished with great results. It was decided that a 300-gallon water tank would provide the best option to cover large areas efficiently. After that decision, a commercial pump was added that accommodated the tank size. The necessary hoses and fittings were added to the unit for it to be operational. The frame and associated parts were taken to be sand blasted, and the equipment was brought back to the township garage for painting and finishing work. It took roughly 70 hours to convert the sealer to a hydroseeder.

What was the cost of implementation? The cost of materials was roughly \$1,500, which consisted of a commercial pump, necessary hoses, clamps, fittings, and steel. The township custom fabricated the frame and most of the labor hours were spent welding and fabricating the frame. This work was done with welding equipment that the township already owned. The engine cleaning and restoration work was done in house by the township. Additional hours were spent painting the unit with equipment already in the township garage. The installation of the water tank and pump and the necessary valves and fittings were all done by the township crew.

What was the positive impact/results/outcome of your efforts? This piece of equipment is much more efficient than hand seeding and spreading hay. At times the seed could dry out, and the hay would blow around. Now the township can simply drive along an area and spray the seed. Warwick Township recycled a nearly 30-year-old piece of equipment to efficiently reseed and restore disturbed areas. Township staff no longer need to purchase straw bales and seeds and cover by hand. This drastically reduces staff time to half of the hours previously associated with restoration projects and improves seeding efficiency. This also saved thousands of dollars in expense to purchase a commercial hydroseeder.

2022 Build a Better Mousetrap: Pennsylvania Recognitions

Sidewinder – 2022 National Winner

South Manheim Township, Schuylkill County

Contact: Corby Lewis, Roadmaster

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What was the challenge? Like many small, rural communities, we face budget constraints. Therefore, we can not 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 like 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 the backhoe so everything can be controlled right from the driver's seat.



South Manheim Township came up with a way to preserve materials, save time, and create a more consistent fill along berms with the sidewinder. The township used existing materials and a donated ATV plow to create a product that saves money, time, and materials. Photo: South Manheim Township, Schuylkill

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

Contact: Ross Miller, Roadmaster

NMTRoadmaster@comcast.net

What was the challenge? We do a lot of catch basin repairs, pouring 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 haul fuel to the jobsite. We weren't satisfied with these options.

How did you develop and implement your solution? All 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.



North Manheim Township's innovation solves several problems and eliminates the need for additional equipment and fuel back and forth to job sites. The mixer saves the township time and money and gives township workers flexibility at the site. Photo: North Manheim Township, Schuylkill County

Decorative Light Rebuild

Tarentum Borough, Allegheny County

Contact: Mark Anuszek, Borough Foreman
streets@tarentumboro.com

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 out 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 out 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.



Tarentum's invention enables the borough to save considerable money by refurbishing streetlights in house. Crews disassembled an existing light to learn how better to repair the units. Photo: Tarentum Borough, Allegheny County

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 modify our decorative lights in the park.

2021 Build a Better Mousetrap: Pennsylvania Recognitions

Snow Fence Winder

Penn Township, Lancaster County

Contact: Daryle J. Lefever, Roadmaster
publicworks@penntwplanco.org

Problem Statement: Putting up and taking down snow fence can be very labor intensive. The township has an aging workforce and to be on our knees rolling up the snow fence, can be a task. Rolling up snow fence in higher grass and corn stalks or fodder is a problem. The public works crew felt there is a need to keep putting up snow fence in problem areas and high traffic roads.

Discussion of Solution: The public works crew felt there was a need to come up with some way to roll snow fence up tighter and not be bent over or on our knees to do it. We came up with a way we can roll snow fence up tighter and utilize the hydraulics on our small dump truck. There was a lot of thought put into creating this tool. One of the hurdles was, once the roll was rolled up, how do we remove it from the winder and keep moving, without wasting time. The winder bar is lifted out of a cradle, and the snow fence roll is slid off the shaft. Two men then throw the roll onto the truck. There was some trial and error on all aspects of the snow fence winder.

Labor, Equipment, & Materials Used: Two innovative minds, on the public works crew, came up with the idea to use the framework of an old stone pan from the back of a dump truck, add hydraulics and valving to it to make a snow fence winder. There was some work involved in removing the floor of the stone pan and welding a platform for the valve and controls to sit on. Most of the material used, other than the valving, hydraulic hoses, a couple of universal joints, and controls for the operation of the winder, was scrap we had laying around the shop and not being used. This unit was built in the shop over the 2019/2020 Winter season.

Cost: Our total cost, other than labor, was \$520.

Savings & Benefits: Putting up snow fence has cut down on the blowing and drifting of the snow in problem and high traffic areas, so the traveling public can travel safer. It has enabled us to be more efficient in rolling the snow fence rolls tighter for storage. It has benefited from getting up and down from rolling snow fence on the ground. Possibly a benefit in workmen's compensation claims.



Penn Township came up with a way to use the hydraulics on its small dump truck to create a winder that rolls up the fencing on a metal rod. The new equipment has increased the efficiency of rolling the snow fence into tighter rolls for storage. Photo: Penn Township, Lancaster County

Snow Fence Installation Equipment

Jefferson Township, Butler County

Contact: William L. Foertsch

jefbutldustydrds@consolidated.net

Problem Statement: Snow fence installation can be very time consuming and labor intensive. Complete manual installation can cause back and shoulder injuries. It is a challenge to install all snow fence in a timely matter before inclement weather sets in.

Discussion of Solution: To modify a used 3-point hitch post pounder (donated from another township that was going to be scrapped) to install posts and to fabricate other attachments to carry all snow fence materials (snow fence, posts, wooden slats, tires, etc.) so they can be laid out at the time of pounding in the fence posts. All equipment to be mounted on a tractor (commonly used by townships) with the side deck mower removed.

Labor, Equipment, & Materials Used: Approximately 65 hours of labor to complete.

Used post pounder – (donated)

Tractor with 3-point hitch – (already on TWP inventory used for mowing along the roads).

Used pallet forks, various pieces of scrap steel, left over particle board (all on inventory).

2 new hydraulic hoses - \$120

New steel - \$80

Miscellaneous hardware - \$30

Welders, torches, and other various tools on hand.

Cost: \$230

Savings & Benefits: The road crew can safely and efficiently install temporary snow fences in about one-third of the time as in past years. Three personnel can install approximately 2,500 feet in seven hours. Using machines to do the work will also save on possible back and shoulder injuries. Using snow fence will keep frequent drifting areas to a minimum and keep the roads clear and safe throughout the township. Using snow fence also saves on extra man hours (usually over time), wear and tear on trucks, plows, salt and antiskid. By using the post pounder, the posts can be driven deep enough so that no additional anchor posts or guy wires will be needed to keep the fence from blowing over.



Jefferson Township's innovation helps with snow fencing installation. The crew modified a donated post pounder that attaches to a tractor's three-point hitch to install the snow fence posts and then fabricated other attachments to carry the fencing, posts, wooden slats, and other materials. The tool enables all the elements to be laid out as the posts are driven into the ground. Photo: Jefferson Township, Butler County

Hammer Holder

Borough of Brentwood, Allegheny County

Contact: Robert Mackewich, Superintendent of Public Works

rmackewich@brentwoodboro.com

Problem Statement: Storing the hammer in an upright position so the seals do not get damaged, since the equipment is not used everyday.

Discussion of Solution: We either buy or fabricate a holder.

Labor, Equipment, & Materials Used: One man, six hours, plasma cutler, welder, old ramp from trailer, pipe covers, and spray paint.

Cost: \$150 in labor all other materials were on hand through other jobs.

Savings & Benefits: New holders were approximately \$1,200 and we were saving by being able to store them indoors and out of the way until we needed to use the hammer again. There will be no downtime for repairs due to the fact it is stored in an upright position.



Brentwood's invention enables the borough to store its excavator hammer in an upright position to keep the hammer's seals from getting damaged. Photo: Borough of Brentwood, Allegheny County

2020 Build a Better Mousetrap: Pennsylvania Recognitions

Black Top and Shoulder Stone Paver –2020 National Winner

Lower Heidelberg Township, Berks County

Contact: Matt Clay, Road Foreman

mclay@lowerhbtwp.org

Problem Statement: When repairing spot repairs or filling in shoulders we must hand shovel and rake the material, which can cause an uneven road surface. Shoveling and raking could also cause back injuries.

Discussion of Solution: With the paver it allows the township to set an even height which eliminates wavy road surfaces and creates safer driving conditions. With the new operation, minimal hand work is required which reduces the risk of injury and work fatigue.

Labor, Equipment, & Materials Used:

38 hours of labor, Skid steer, 3 point drag box, quick attach weld on plate, 5 trailer jack.

Flat Steel: 1 in.- 4 in. x 21 in., 3/8 in.- 6 in. x 21 in., 3/8 in.- 6 in. x 17 in., 1-1/2 in. x 17 in., 1/4 in.- 13 in. x 22 in.

Pins: (2) 1 1/2 in. x 5/8 in.

Bolts and Washers: (16) 3/4 in. x 1 1/2 in., (16) 3/8 in. x 1 in.

Cost: \$1,950

Savings & Benefits: Thousands of dollars for years to come in labor costs and workman's compensation claims for back injuries. It also makes for a smoother riding road surface. For example, previously it would take 35 minutes to unload a truck of black top and rake it by hand. Now it takes only 6-8 minutes to unload the truck.



The Lower Heidelberg Township public works department created the Black Top and Shoulder Stone Paver. "When doing spot repairs or filling in shoulders, we would have to hand shovel and rake the material, which can cause an uneven road surface," Matt Clay, the township's road foreman, says. Photo: Lower Heidelberg Township, Berks County

Sign Post Driver

Upper Mount Bethel Township, Northampton County

Contact: Lindsey Manzi

townshipsecretary@umbt.org

Problem Statement: The current signpost driver swells and cracks the posts during installation into the rocky terrain of the township. The driver also twists, damaging the footer, causing wasted posts. The driver only extends into the post 2 inches in depth.

Discussion of Solution: The signpost driver extends into the post 9 inches in depth. The design includes a round hole for a round bar or a square hole for a flat bar to be inserted for stability and safety. The driver was field tested, and the results were successful. The driver is used weekly, and it has reduced costs and improved efficiency when installing signposts.

Labor, Equipment, & Materials Used: Labor included cutting, welding, and painting. Materials: 1/4 x 2 inch steel tube with a solid piece of square tube installed and welded inside for a total length of 12 inches.

Cost: \$90 – Materials were cut off from scraps of other shop repairs and projects.

Savings & Benefits: Signposts are no longer being wasted, so the township is saving money.



The new driver extends 9 inches into a signpost, and the design allows either a round or flat bar to be inserted. Photo: Upper Mount Bethel Township, Northampton County

Spreader Storage Rack

London Grove Township, Chester County

Contact: Shane Kinsey

Skinsey@Londongrove.org

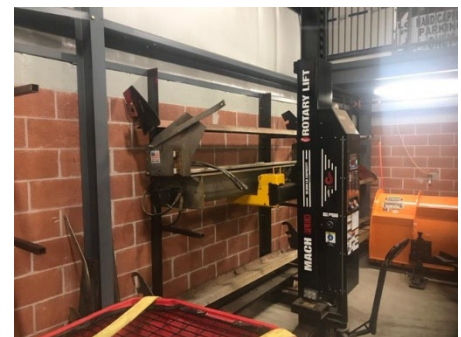
Problem Statement: There was a need for an efficient method to install and store salt spreaders allowing for quick removal and installation.

Discussion of Solution: The solution was to utilize the empty wall space by installing a rack which allowed the use of a portable hydraulic vehicle lift to remove, transport, and install spreaders. All these functions can be done easily with a single person.

Labor, Equipment, & Materials Used: Eight hours of labor to build. Materials: Steel, scrap steel, welder, and fasteners.

Cost: \$200

Savings & Benefits: Allows staff to quickly install and remove spreaders so equipment can be used for other tasks between storms.



The storage rack allows the road department to efficiently store, install, and remove salt spreaders. Photo: London Grove Township, Chester County

2019 Build a Better Mousetrap: Pennsylvania Recognitions

Polish Paver

City of Williamsport, Lycoming County

Contact: James O'Brien, Street Department Foreman
Streets@cityofwilliamsport.org

Problem Statement: Completing the most potholes possible with the least amount of manpower and equipment.

Discussion of Solution: Something that would allow more blacktop to be put down with less work.

Labor, Equipment, & Materials Used: Steel, welder, pins, bolts, and 24 hours of labor.

Cost: \$600

Savings & Benefits: We are repaving roads without a paver. It is now a two-employee operation. 10 tons can be laid down in 10 minutes.



The City of Williamsport was looking for a solution that would repair roads without a paver. The polish paver allowed them to do repairs without a paver with only two employees . Photo: City of Williamsport, Lycoming County

Spreader Rack – 2019 National Winner

East Brandywine Township, Chester County

Contact: Matthew VanLew, Township Road Master
roadmaster@ebrandywine.org

Problem Statement: The spreaders for the trucks were always on the floor taking up space and if we needed to move them, we had to hook them up to a chain with the backhoe. Also used a backhoe to mount on the trucks with two guys.

Discussion of Solution: The road department devised a storage rack which is portable for the spreaders. It holds four spreaders that can be moved throughout the building and outside to a lift for truck mounting.

Labor, Equipment, & Materials Used: The rack was built using scrap lumber, the only material purchased was the wheels which swivel. Approximately 10-man hours were used to build the rack.

Cost: \$50 for wheels and bolts.

Savings & Benefits: This saves time for the department utilizing one person and no equipment to install and remove salt spreaders from trucks.



The East Brandywine Township road crew designed a portable storage rack for spreaders using scrap lumber and inexpensive wheels. A hoist lifts the spreaders for mounting on trucks. Photo: East Brandywine Township, Chester County

Inlet Grate Puller

City of Easton, Northampton County

Contact: Charles Wilson
cwillson@easton-pa.gov

Problem Statement: Removal of storm sewer inlet covers for inspecting and cleaning.

Discussion of Solution: Staff designed and fabricated a user-friendly tool.

Labor, Equipment, & Materials Used: Stop signpost, chain with hook, car jack and four hours of labor.

Cost: Personnel hours = \$150.

Savings & Benefits: Eliminated the need to have a backhoe to remove difficult inlet grates.



The City of Easton engineered a device that easily removes storm sewer inlet covers for inspection and cleaning.
Photo: City of Easton, Northampton County

Past National Winners

2022 Sidewinder

South Manheim Township, Schuylkill County

Contact: Corby Lewis, Roadmaster
southmanheimroads@gmail.com

2019 Spreader Rack

East Brandywine Township, Chester County

Contact: Matthew VanLew, Township Road Master
roadmaster@ebrandywine.org

2016 High Pressure Undercarriage Sprayer

Swatara Township, Dauphin County

Contact: Todd Webb
twebb@swataratwp.com



Sample 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 the first **Friday in March**, to ltap@psats.org,
fax it to 717-763-9732, or mail it to:



Pennsylvania
Department of Transportation
Local Technical Assistance Program

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

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