



moving FORWARD

WINTER 2018

A quarterly review of news and information about Pennsylvania local roads.

Roundabouts Reduce Crashes, Save Lives on Pennsylvania Roads

Crashes, injuries, and fatalities have decreased since roundabouts have been installed at 11 intersections around the state, according to PennDOT data.

“Our data shows that modern-day roundabouts reduce crash severity and injuries while improving traffic flow,” Secretary of Transportation Leslie Richards says. “This underscores why

roundabouts are becoming more commonplace in Pennsylvania and beyond.”

In addition to the 11 studied roundabouts, another 32 have been installed on state routes in Pennsylvania with 26 more in design.

Roundabouts are part of the Federal Highway Administration’s Every Day Counts Round 2 Intersection and Interchange Geometrics innovation, and

the Pennsylvania State Transportation Innovation Council (STIC) supports the deployment and promotion of roundabouts across Pennsylvania.

Using police-submitted crash reports spanning the years 2000 through 2017, PennDOT looked at 11 roundabouts that replaced stop- or signal-controlled intersections on state routes. Based on at least three years of data available before and after the installation of the roundabout, fatalities have been reduced by 100 percent (from two to zero) and the total number of crashes has dropped 47 percent (from 101 to 54). Furthermore, serious

injuries at these roundabouts were reduced by 100 percent (from seven to zero), minor injuries by 95 percent (from 19 to one), and possible or unknown severity injuries by 92 percent (from 49 to four). In addition, crashes causing only property damage decreased by 2 percent (from 49 to 48).

The roundabouts studied by PennDOT can be found at the following intersections:

- Route 3070 (Ewing and Resurrection roads) with Business Loop 376 eastbound on- and off-ramps in Moon Township, Allegheny County, installed in 2011;
- Routes 68 (Adams Street), 1034 (Brighton Avenue), and 18 (Rhode Island Avenue) in Rochester Borough, Beaver County, installed in 2011;
- Route 2043, Trevoise Road, and Somerton Road, Bucks County, installed in 2012;
- Route 82, Doe Run Road, and Unionville Road, Chester County, installed in 2005;
- Routes 34 (Spring Road) and 1007 (Sunnyside Drive) and Mountain Road at Sterretts Gap, Middlesex Township, and Carroll Township, Cumberland and Perry counties, installed in 2014;
- Route 39 (Linglestown Road) and Route 3019 (Mountain Road) in Linglestown, Lower Paxton Township, Dauphin County, installed in 2011;
- Routes 1023/46, Newton Street Road, and St. Davids Road, Delaware County, installed in 2008;
- Routes 19/97 and High Street, Erie County, installed in 2014;



Roundabouts have been proven to reduce crashes, injuries, and fatalities.

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SUCCESS STORY

Chambersburg Updates Aging Streets Using Full-Depth Reclamation

by Jason A. Snyder, P.E.

Many municipal officials in urbanized areas may not be aware of the benefits of full-depth reclamation for reconstructing their streets. A few years ago, Brian Fogel, the Borough of Chambersburg's engineering supervisor, was one of those officials.

He credits Manager Jeff Stonehill for suggesting that the borough investigate whether the road reclamation technique would help in redeveloping the borough's aging street infrastructure while saving money at the same time. That was nine years ago, and since then, the Franklin County borough has made full-depth reclamation a main tool in reconstructing its infrastructure, including entire blocks and neighborhoods.

With 58 miles of streets to manage and repair, the borough has found that full-depth reclamation stretches its funding dollars and ensures more projects are completed annually. Chambersburg's road reconstruction cost currently averages approximately \$300,000 per block, a 20 percent savings over conventional removal and replacement methods.

Starts with Utilities and Curbing

The borough's Engineering Department recommends street reconstruction projects, produces specifications, and monitors and manages construction activities. On an annual basis, the borough sets forth a list of reclamation projects to be completed. However, planning actually begins about two years earlier when the borough assesses and makes improvements to utilities and curbing.

Chambersburg owns and operates most of the utilities within its borders, including electric, natural gas, water, sanitary sewer, and storm sewer. With the borough in control of this infrastructure, Fogel can easily coordinate inspection, repair, and reconstruction of all underground utilities well in advance of a street project.

Prior to a reclamation project, the borough also upgrades drainage on all street projects.



Planning for a full-depth reclamation project begins about two years earlier when the borough makes improvements to utilities and curbing on the targeted road.

“We really pay close attention to drainage,” he says. “If you don't, you'll regret it.”

In addition to utility improvements, the borough's Engineering Department evaluates and determines which curb and sidewalk repairs must be completed before any roadwork begins. The Engineering staff will mark all curbs and sidewalks to be replaced, take photos to document their location, and notify the residents. To ensure a consistent curb line for drainage and paving, the borough replaces curbing under an annual contract, with the cost of new curbing billed to individual residents. Sidewalk repairs are left to residents to either self-construct or contract to the borough's specifications.

Bidding and Design

Once utility and curbing improvements are completed, Fogel will develop plans and construction documents the winter before construction is slated. He likes to bid projects early. The borough will develop the plans, specifications, and bidding documents in house, but that is only part of the equation. Fogel will also use a combination of PennDOT MS-944 forms, PennDOT Publication 447, the borough's general terms and conditions, and both project-specific and standard drawings to develop an inclusive package for contractors to bid on. Also included are the specialized pavement and full-depth reclamation mix designs needed to construct a cost-effective, long-lasting pavement section.

To develop the mix designs or “recipes” for the planned full-depth reclamation projects, the borough works with a local technical representative to cost effectively obtain soil samples and conduct analysis on them. To analyze the soils and properly design the full-depth reclamation, the contractor obtains bulk samples of soil at the depth of the reclamation since core borings rarely include the necessary soil and do not produce enough material for sampling.

In 2017-18, 13 planned projects were assessed for structural adequacy and appropriateness for a range of repairs, including mill/overlay, cold-in-place recycling, and full-depth reclamation. Based on numerous roadway characteristics, including soil type, moisture content, traffic volume, pavement thickness, and others, 11 projects were determined to be candidates for full-depth reclamation, one for either full-depth reclamation or cold-in-place recycling, and one for mill and overlay.

The Best Candidates

The majority of the borough's older streets are not heavily constructed but are thin asphalt pavements over soil. This type of construction lends itself to chemically stabilized full-depth reclamation with the addition of Portland cement. Newer streets, on the other hand, are more heavily constructed with aggregate base and significant asphalt pavement structures; these roads tend to be more appropriate for cold-in-place recycling or mill/overlay projects.

The borough will typically reconstruct its streets using 8 to 10 inches of chemically (Portland cement) stabilized full-depth

reclamation with 3 inches of hot mix overlay, providing 11 to 13 inches of overall pavement structure. In an attempt to save money in one of its first projects, Fogel noted the borough had tried to use a 2-inch overlay over the full-depth reclamation (FDR).

“We just weren’t happy with the ride quality,” he says. “Now, I like to scratch the FDR prior to paving to ensure a smooth ride.”

Fogel noted that the extra inches aren’t an issue with curbing since most of the roads lack crown. The roads are final graded with a 2 to 3 percent cross slope with 6 inches of curb reveal (after the scratch and overlay). By planning ahead, the borough can address grade changes by adding or removing material.

So far, the biggest challenge to any project is the weather, Fogel says. Typically, the reclaimer adds water during the reclamation process to hydrate the cement and aid in compaction, but during the previous wet summer, the moisture content of the soil was two to three times normal. Because many of the roads were so wet, the borough had to wait for them to dry out, pushing construction until later in the year. The only other way to address the excess moisture would have been to add more chemicals (either lime or cement), and both were an added expense.

Road projects can bring inconvenience to the residents and traveling public, all of which can create significant public pressure for the borough. But thanks to full-depth reclamation, the impact of road reconstruction has been reduced, and the borough can now reconstruct approximately five blocks of road in the same time it would typically take to complete one block using conventional methods. 🚧



Pulverization is the most basic and economical method of full-depth reclamation. Under this process, all the in-situ pavement layers are pulverized and blended with a predetermined amount of the underlying base material.



Full-depth reclamation creates a uniform load-carrying capacity, a level surface, and a cross-slope on which to place a new bituminous surface.

What is full-depth reclamation?

Full-depth reclamation is an in-place recycling process that reuses existing asphalt materials or gravel roads to produce a stabilized base course with improved structural characteristics. To this base, a final surface course or surface treatment is applied.

Full-depth reclamation has been proven to conserve energy and materials, eliminate reflective cracking, reduce or eliminate a loss of curb reveal, and restore proper crown and cross-slope. It is environmentally desirable and helps to reduce future maintenance costs. In addition, most FDR techniques reduce the inconvenience to the traveling public and local taxpayers when compared to other road rebuilding processes.

A good road requires a suitable foundation, which in turn requires material stability. A material is stable if it has little or no volume changes and, either wet or dry, can resist deformation under repeated or sustained loads. Full-depth reclamation will create a uniform load-carrying capacity, a level surface, and a cross-slope on which to place a new bituminous surface.

LTAP tech sheet #159 (Winter 2013) has more information about full-depth reclamation. You can access the tech sheet on LTAP’s website, www.ltap.state.pa.us.

More on cold in-place recycling

This technique involves the on-grade construction and material processing of a cold recycled base course in which bituminous material is combined with recycled asphalt pavement (RAP), reclaimed aggregate material (RAM), or virgin aggregates and emulsified asphalt.

A train of equipment is usually required: A self-propelled milling machine, a mobile sizing and pugmill plant where the emulsion is added, a paver, and a compaction roller for placing the reclaimed material.

After the material cures, it is paved with regular warm-mix asphalt.

Publication 221 Updated with Consistent Guidance for Posting and Bonding Locally Owned Roads

Municipalities will be able to more consistently manage heavy hauling on their roads, thanks to newly updated guidance from PennDOT on posting and bonding weight-sensitive roads. Publication 221, Posting and Bonding Procedures for Municipal Highways, is now consistently aligned with Publication 23, Chapter 15, Weight Restrictions on Highways (Posted Highways), to help ensure that the posting and bonding of state and local roads is consistent, effective, and defensible.

Throughout 2016 and 2017, PennDOT conducted extensive outreach, surveys, and information exchange sessions about the posting and bonding of local roads with industries, municipalities, and the agency's Municipal Services representatives and posted and bonded

coordinators. From this feedback, PennDOT restructured its guidance to simplify terminology, update training information and materials, provide step-by-step procedures with checklists, and improve the use of graphics to clarify content.

The updated Publication 221 will be released by year's end, and municipalities will receive email notification with a link to the document on the PennDOT website.

For more information, please contact Halley Cole, Chief, PennDOT Pavement Asset Management, at halcole@pa.gov or (717) 783-6146 or the PennDOT Municipal Services coordinator in your area. You can also visit www.papostedroads.pa.gov to learn about PennDOT's Posted and Bonded Roadway Program. 📄

PennDOT Approves the Use of Fog Seals to Enhance Seal Coat Treatments

by Marcy Lucas, PennDOT Research Project Manager

Municipalities may use liquid fuels funds (LFFs) to apply a combination of a seal coat with a fog seal on local road projects now that PennDOT approved design procedures and specifications for this treatment in October 2018.

Although municipalities have been using fog seals and bituminous seal coats (also known as chip seals) to improve the surface and extend the life of their roads for years, PennDOT only recently granted approval for fog seals or for the use of both treatments together. The design procedures and specifications for seal coats had previously been approved.

A fog seal is a thin application of an asphalt emulsion to an existing pavement surface with or without a fine aggregate cover, while a bituminous seal coat is a thin application of an asphalt emulsion covered with a single layer of course aggregate.

PennDOT began evaluating combining these two treatments

during the 2011 construction season. At locations on roadways in four districts, the fog seal covered the exposed top and side aggregate surfaces of the seal coat. Observations showed the treatment reduced the initial aggregate loss and prevented water intrusion into the bottom layer. After the third-year field view, PennDOT determined the experimental areas had outperformed the control areas where only one of the treatments was used.

The development and approval of this specification was conducted with input from the Pennsylvania Association of Asphalt Material Applicators (PAAMA). During the development of the specification, the 2011 sites continued to be monitored for performance, and after seven years, the experimental areas still performed better than the control areas.

Specifications for the use of fog seals on seal coats can be found in Publication 408/2016, Change No. 5, under Section 472, Bituminous Fog Seal for Bituminous Seal Coats. 📄

Roundabout Study *continued from page 1*

- Routes 29/73, Gravel Pike, and Big Road, Montgomery County, installed in 2009;
- Routes 16 (Main Street), 3072 (Hanover Street), and 3059 (Roths Church Road) in Spring Grove, York County, installed in 2007; and
- Routes 74 (Delta Road), 851 (Bryansville Road), and 2015 (Broad Street) in Delta, York County, installed in 2008.

Although roundabouts are frequently installed to address safety issues at intersections, they may also be used to improve traffic flow,

calm traffic, or facilitate pedestrian mobility.

While safer and typically more efficient than traditional signalized intersections, a roundabout may not always be the best option because of topography, the impact on property, capacity issues, or proximity to other intersections.

To educate Pennsylvanians about roundabouts, PennDOT has created a video that shows how to use both single and multi-lane roundabouts whether in a vehicle, on a bicycle, or on foot. The video can be accessed by visiting the roundabout page on www.penndot.gov or the department's YouTube channel, www.youtube.com/user/PennsylvaniaDOT. 📄

STIC Spotlight

New Strategic Plan Aims to Deploy More Transportation Innovations

The Pennsylvania State Transportation Innovation Council (STIC) recently unveiled a strategic plan that strives to “rightsize” the council’s structure and provide more opportunities for PennDOT employees and local governments as well as other partners and stakeholders to participate and get involved. The STIC Moving Forward plan establishes a process-driven management structure to ensure innovations are developed more consistently and deployed more rapidly throughout Pennsylvania.

This effort involves combining 10 existing technical advisory groups (TAGs) into four groups: 1) Design, 2) Construction and Materials, 3) Maintenance, and 4) Safety and Traffic Operations. With the help of a leader and assistant leader to manage the flow and development of innovations, each TAG is comprised of representatives from PennDOT, industry, academia, state and federal agencies, local governments, trade organizations, and metropolitan and regional planning organizations. Additionally, each TAG has a standing member from the Federal Highway Administration (FHWA).

The STIC Moving Forward plan also outlines an enhanced process that will serve as a roadmap for getting well-researched, proven, and documented innovations developed and deployed in a consistent and timely manner. To support this effort and increase awareness and involvement, STIC is developing a comprehensive marketing strategy and communication plan. Local government outreach is integral to this marketing effort.

Calling all local governments: Get involved with STIC!

STIC brings together a diverse team of transportation stakeholders to forge a culture of innovation and pursue and rapidly implement specific initiatives that will help to deliver a modern, high-quality transportation system to the citizens of Pennsylvania. STIC both supports the deployment of the Federal Highway Administration’s Every Day Counts initiatives and identifies new strategies and innovations that will enhance safety, efficiency, and sustainability across the state.

The following organizations represent local governments on STIC:

- Rural Planning Organizations (RPOs) and Metropolitan Planning Organizations (MPOs)
- Pennsylvania State Association of Township Supervisors (PSATS)
- Pennsylvania State Association of Boroughs (PSAB)

If you want to get involved or share your locally grown innovations for possible statewide deployment, please email STIC at penndotstic@pa.gov.

In a survey conducted by STIC, approximately 500 municipal respondents indicated that they would benefit the most from innovations that addressed stormwater management (around 60 percent), paving products (around 54 percent), and winter maintenance (around 47 percent).

Earlier this year, STIC conducted a survey of municipal leaders involved with transportation planning across Pennsylvania to get a better understanding of their interest in various transportation-related innovations and the challenges they face implementing them.

Of the nearly 500 responses, approximately 60 percent indicated that their municipalities would benefit from stormwater management innovations, followed by around 54 and 47 percent, respectively, who responded that innovations in paving products and winter maintenance would be helpful. The innovation categories that showed the most varied interest by municipality size were traffic signals and intersections and safety improvements. Municipalities also noted that funding, followed by equipment and staffing constraints, were primary challenges to deploying innovations.

STIC plans to move forward with innovations that will address local governments’ top areas of concerns. For more information on the survey results, email STIC at penndotstic@pa.gov.



State Transportation Innovation Council (STIC)

(717) 772-4664 RA-pdPennDOTSTIC@pa.gov

www.penndot.gov/about-us/PennDOT2020

Monroe Township Employee Earns LTAP's First Roads Scholar II Designation



Greg Hertzler of Monroe Township, Cumberland County, recently became the first person in the state to earn a Roads Scholar II, LTAP's newest certification designation.

Congratulations to Greg Hertzler of Monroe Township, Cumberland County, for being named LTAP's first Roads Scholar II. Hertzler, a public works employee and MS4 certified inspector who will become the township's roadmaster in January, has been taking courses toward his Roads Scholar II designation for the past year and a half.

Roads Scholar II is an expansion of LTAP's professional certification program, which trains road employees and municipal officials in the latest road-related technologies and innovations. A person seeking a Roads Scholar I certification must complete 10 approved LTAP courses within a three-year period and pass an in-class quiz, while Roads Scholar II candidates are required to pass eight LTAP-approved courses and accompanying quiz.

After completing his Roads Scholar I training in August 2017, Hertzler said it made sense to further his education and obtain a Road Scholar II certification, too.

"I try to attend as much training as my schedule allows," he says. "The LTAP classes have helped in our day-to-day operations."

Hertzler and his fellow road crew members find they can apply what they learn at the classes out in the field.

"Training is very important because there are always new and improved ways to do our jobs," he says. "The classes teach us up-to-date information that reflects changing rules and technologies and that helps to make our jobs better while often saving the township money in the process."

No wonder his township supervisors are supportive of the road crew becoming more educated.

Now that he is both a Roads Scholar I and II, Hertzler recommends that other public works and municipal officials take the training to become recognized, too.

"The certification is good to have, and you can learn a lot," he says. "It also shows the supervisors that you are getting something out of the classes you go to." 🚧

You, Too, Can Become a Roads Scholar II

To complete the Roads Scholar II program, participants must complete eight approved workshops within a three-year period and pass an in-class quiz consisting of 12 questions at the end of each workshop. Successful completion of an approved CPR training also earns one workshop credit.

Roads Scholar II Classes:

- Conducting Sign Retroreflectivity Inspections
- Bridge Inspection and Maintenance
- Salt and Snow Management
- Stop Signs and Intersection Traffic Control
- Curves on Local Roads: Issues and Safety Tools
- Speed Management and Speed Limits
- Road Safety Audit
- Project Oversight – Monitoring Quality by Asking the Right Questions

Go online to www.ltap.state.pa.us and register today to complete the Roads Scholar II designation. Successful candidates will earn a certificate, a Roads Scholar II hat, the admiration of their employer and peers, and the self-satisfaction that they are expanding their knowledge on a wide variety of road issues.

Did you miss one of the LTAP webinars this year?

The recorded webinars are now on the LTAP website at www.dot7.state.pa.us/LTAP/default.aspx under the Bulletin Board. The following webinars can be viewed there:

- ADA Transition Plans
- Curves on Local Roads: Issues and Safety Tools
- Speed Limits on Local Roads
- Stop Signs and Intersection Traffic Control

Upcoming 2019 Classes

To Register:
PHONE: 1-800-FOR-LTAP (367-5827)
WEBSITE: www.ltap.state.pa.us

This represents some of our scheduled courses. Look for updates on the website.

Engineering & Traffic Studies

March 14 – Montgomery County
April 9 – Cumberland County

Equipment & Worker Safety

March 6 – Cumberland County
April 17 – Lehigh County

Intersections

April 3 – Chester County
April 10 – Lehigh County

Pavement Markings: Applications and Maintenance

February 21 – Chester County
March 7 – Lehigh County
April 4 – Mercer County

Road Safety Audit ****New Course****

March 20 – York County
March 21 – Chester County

Safe Driver

February 19 – Cumberland County
March 12 – Lehigh County

Speed Limits and Speed Management ****New Course****

February 6 – Montgomery County
March 13 – York County
March 19 – Cumberland County

Stop Signs and Intersection Traffic Control

February 13 – Cumberland County
February 14 – Cambria County

Traffic Calming

May 9 – Montgomery County

Traffic Signs Basics

February 14 – Venango County

Work Zone (Temporary) Traffic Control

February 6 – Montgomery County
February 12 – Lehigh County
April 2 – York County

LTAP SUCCESS STORIES

Upper Leacock Township, Lancaster County

Curve Signing Study

LTAP assisted Upper Leacock Township with curve speed studies on East Eby Road. The road has a sharp turn that is difficult to negotiate, and an historic cemetery along the curve attracts tourists and buses. The previous curve signs had been placed without a study.

Need help with a transportation-related problem?
Schedule a **FREE Tech Assist** with LTAP today!

The study determined that the advisory speed for the curve should be 20 miles per hour. Following guidance in the Manual on Uniform Traffic-Control Devices (MUTCD), a large arrow sign was also placed on the outside of the curve. 🚩



A new turn sign (W1-1) and large arrow sign (W1-6) were installed to alert motorists to the curve.



The township decided to purchase its own ball bank indicator to conduct future studies on its own.



A historic cemetery is located on the inside of the curve.

Show Off Your Road Crew's Innovative Gadgets and Ideas by Entering PennDOT's Build a Better Mousetrap Contest

New this year: four categories, four potential winners!

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 2019 Build a Better Mousetrap Competition.

PennDOT is looking for projects that municipal employees or road crews designed and built. It can be anything from the development of tools and equipment modifications to processes that increase safety, reduce costs, or improve efficiency or the quality of transportation.

New this year, the contest will have four categories for submitting entries, with a potential winner in each. From among these winning entries, an overall winner of the contest will be chosen. The categories are:

- 1) Inspection and data collection (automated/remote means, testing, time, etc.)
- 2) Asset management techniques (GIS, mapping, decision support systems, etc.)
- 3) Maintenance tools and methods (lifters, reachers, modifications, assembly, etc.)
- 4) Transportation facilities improvements (storage, access, operations, services, etc.)

If you have a project that qualifies under one of these categories, submit your entry by March 8, 2019. PennDOT will choose winners in March and announce them at the annual conference of the winners' respective municipal association. Entries will be judged by a committee of municipal road employees on cost savings/benefits to the community, ingenuity, transferability to others, and effectiveness.

The winning entries will be submitted into the national competition for prizes and, of course, bragging rights. Winners of the national competition will be announced at the annual LTAP/TTAP national conference this summer. All entries at the national level will be posted on the LTAP/TTAP website and compiled into an electronic booklet.

Entry forms for the 2019 Build a Better Mousetrap Competition may be downloaded at www.ltap.state.pa.us; click on "News Items." Complete the entry form and return it by March 8 to PennDOT-LTAP, c/o PSATS, 4855 Woodland Drive, Enola, PA 17025 or email it to katkinson@psats.org. For more information, call Karen Atkinson at PSATS at (717) 763-0930, ext. 156. 📧

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If you do not want to receive a copy of this newsletter, please send an email to ltap@pa.gov. The newsletter is available electronically on the LTAP website under "Publications" on the right-hand side of the page.



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Previous Years' Winners



2018 Winner: Sign puller, Elizabethtown Borough, Lancaster County



2018 Runner-up: Storm sewer grate hoist, Bath Borough, Northampton County



2018 Runner-up: Grate solution, Milton Borough, Northumberland County



2017 Winner: Salt shed entrance curtain, Whitehall Township, Lehigh County



2017 Runner-up: The "LAW" lift, Horsham Township, Montgomery County



2017 Runner-up: The "Bounty" picker upper, South Manheim Township, Schuylkill County