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DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

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moving FORWARD

WINTER 2023

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

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 by **March 3, 2023**. The LTAP Advisory Committee – a group made up of your peers – will judge the entry on cost savings, benefits to the community or agency, ingenuity, importance and impact, time savings, and ease of transference to other agencies. 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 download entry forms for the 2023 Build a Better Mousetrap, go to **gis.penndot.gov/ltap** and select "View more" under News. Complete the entry form and return it by March 3 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 (717) 763-0930, ext. 156.

ALSO IN THIS ISSUE

Stormwater Facility Construction and Maintenance is Different

By Susan Giannantonio, P.E., CPESC, NTM Engineering, Inc.

In the early 1980s, municipalities across the state began adopting stormwater management ordinances in response to Pennsylvania's Stormwater Management Act of 1978. Known as Act 167, the law aims to address accelerated rate of stormwater runoff due to human development activities. The adopted ordinances generally required the construction of a stormwater detention basin or similar feature to slowly release stormwater runoff, thereby mimicking the pre-development peak rate of flow from the land.

But changing the land around us changes stormwater runoff in more ways than just the peak rate. It also impacts the runoff volume and water quality of the flows. This eventually led to additional stormwater control regulations. The result is the use of a multitude of engineered facilities and devices designed to manage the peak, quantity, and quality of stormwater runoff. Known as stormwater control measures (SCMs), these features treat stormwater runoff before it enters waterbodies and groundwater.

Sediment and debris in SCMs waters as shown here causes damage to infiltration and filtration surfaces.

Lack of vegetation management can lead to issues such as a clogged outlet structure which can lead to flooding and safety hazards.

Construction and upkeep of the early detention basins was accomplished using similar techniques to those used by contractors and maintenance personnel on land development sites: heavy equipment for building, followed by occasional large tractor mowing.

As stormwater science has evolved, so have the types, designs, and construction and maintenance needs of SCMs. SCMs require different techniques and protocols than standard site construction and lifecycle maintenance activities. Failure to use correct SCM-specific techniques can damage or destroy SCM function and result in costly repair and remediation efforts.

Yet, training for persons responsible for construction and maintenance of SCMs is scarce. The industry is seeing more and more failed SCMs due in part to inadequate training and skill set. There is a need to provide foremen and crews with the knowledge and skill set to apply proper SCM construction and maintenance techniques.

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Stormwater Facility Construction *continued from page 2*

Some key knowledge tidbits:

- Equipment should ***never enter any SCM when the ground is not completely dry***. This includes the "plain old" dry detention basins! Tires and tracks leave ruts in soft soil, causing pockets of poor drainage and compacted soils.
- Understand and protect ***filtration and infiltration surfaces***:
  - What SCMs can have them?
  - Where are they in those SCMs?
- SCMs that are designed to reduce runoff volume or improve water quality typically contain a media (soil, sand, or engineered mix) through which filtration or infiltration occurs. This media is intentionally not compacted to allow water to soak through it. It can be easily damaged by compaction or sediment. These areas must be protected from heavy equipment and compaction. And proper erosion and sediment controls are required for all contributing drainage areas to protect from sediment.
- ***Low Ground Pressure (LGP) techniques*** must be used on filtration and infiltration surfaces to prevent compaction. To be considered LGP, equipment must meet several criteria including maximum weight per axle, maximum tire pressure, and appropriate tire tread. A common misconception is that track equipment has less of an effect on compaction than tires; in fact, tracks often cause more damage.
- Many SCMs contain ***intentional plantings that should not be mowed*** like shrubs, small trees, and perennials. Identify intentional shrubs and similar "no-mow" vegetation. Only mow areas vegetated with mowable plants such as grass seed mixes.
- Mowing clippings must be removed or directed into areas to ***prevent clogging*** the SCM filtration or infiltration surface and outlet structures.

The key to knowing the practices applicable to each type of SCM is understanding the SCM's intended stormwater functions (i.e., peak rate control, volume reduction, water quality). This indicates where a filtration or infiltration surface may be located, what types of vegetation are expected, and which areas of the SCM most impact its function. To learn the nuances of SCMs, construction and maintenance forces should take training that explain these and other concepts for successful field applications. LTAP will begin offering two half-day courses on SCMs in the summer of 2023. One course focuses on SCM types, inventory methods, and activity tracking; the other course delves into field operation techniques appropriate for SCMs.

After mowing high areas, removal of cut debris is critical to prevent clogging of SCM outlet structures.

Low Ground Pressure (LGP) techniques must be used on filtration and infiltration surfaces. Be aware that track equipment is not synonymous with LGP. Always check equipment specifications.

New LTAP Stormwater Courses Available in the Summer of 2023

Municipal Stormwater Facilities Program

This course will introduce participants to the stormwater processes, explain the need for SCMs, highlight the key laws regulating SCMs, define the common types of SCMs, explore inspection procedures, and outline general maintenance activities. Attendees will learn to about different aspects of a municipal SCM program including inventory methods, inspections approaches, and maintenance needs as required by municipal codes, MS4/NPDES permits, and Chapter 102 NPDES permits. Example check lists and resources will illustrate topics presented.

Stormwater Control Measures Operation and Maintenance

This course prepares attendees to perform routine and corrective maintenance on common types of SCMs. Participants will learn the keys of a successful SCM Operations Program, common SCM types and components, what infiltration/filtration surfaces are, common SCM vegetation considerations, and the difference between routine verses corrective maintenance. Attendees will be prepared to schedule and complete routine maintenance activities; be familiar with techniques and equipment appropriate for various SCMs types and understand specialized maintenance techniques to address frequently encountered SCM problems.

Transportation News Briefs

LATEST INFORMATION FROM PENNDOT & OTHERS

What's New with New Products

PennDOT continues to research products to determine their benefit to both the Commonwealth and local municipalities. In municipalities it is required to use approved products with the use of liquid fuels funds that are received from the state.

The PennDOT Lab has hundreds of products under study and when fully vetted they are published in the Pub 408 and Pub 35 (Bulletin 15). In the Bulletin 15 products are broken down by category of use. In the Pub 35 you can search by using your search (Control F3) and enter the name of the product or its potential use.

The Bureau of Planning and Research has done research on products that are mainly for use on local roads. The Pub 447 is kept updated with these specific items.

Recent additions to the Pub 447 have been #9M aggregate for smoother chip seals, and the use of old railroad flat-bottom cars for rural stream crossing to mention a few.

The links for the above publications are:

- https://www.dot.state.pa.us/public/PubsForms/Publications/Pub_408/PUB%20408.pdf
- https://www.dot.state.pa.us/public/PubsForms/Publications/Pub%20447.pdf
- https://www.dot.state.pa.us/public/pdf/bocm_mtd_lab/publications/pub_35/current_edition/bulletin15.pdf

The Bureau of Planning and Research is always looking for ideas on products or processes that may not yet have come to our attention. Currently we are checking adding fibers to a microsurfacing mix and the application of an asphalt rejuvenator to the surface of a newer paved roadway to help extend the life of the roadway before other pavement preservation is required.

Please contact Tom Welker with any questions.

Tom Welker
Municipal Services Specialist PA Department of Transportation
Bureau of Planning & Research Municipal Research and Outreach Section
Research Division
400 North Street, 6th Floor | Harrisburg, PA. 17120
Phone: 717.783.3721

The workers are adjusting the spray nozzles on a special small distributor used to apply the asphalt rejuvenator material.

EV Grants are Coming. Are you ready?

Since 2019, the number of electric vehicles in Pennsylvania has nearly tripled. And all those vehicles need a place to charge. The federal Bipartisan Infrastructure Law (BIL) has prioritized this need and will provide states with $7.5 billion to help make electric vehicle (EV) charging more accessible to all Americans for local and long-distance trips. This $7.5 billion comprises the $5 billion National Electric Vehicle Infrastructure (NEVI) Formula Program and the $2.5 billion Discretionary Grant Program for Charging and Fueling Infrastructure.

PennDOT will receive and distribute $171.5 million in formula funds for EV charging infrastructure over the next five years. The NEVI funding available for the first federal fiscal year is $25.4 million. NEVI grants will require the grantee to provide a minimum 20% match.

"The NEVI program will help Pennsylvania build out its EV charging infrastructure," said PennDOT Secretary Yassmin Gramian. "As this is a new program for Pennsylvania and the nation at large, we want to give our partners and businesses as much opportunity as possible to prepare for application submission to support our efforts of transparency and equity."

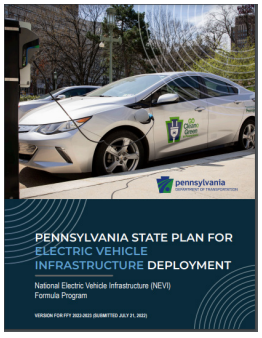
The NEVI grant funding supports the Commonwealth and federal goal of expanding EV charging along the previously designated Alternative Fuel Corridors (AFCs) and interstate lookalikes. Pennsylvania has over 1,800 miles of AFCs. Per the guidance from U.S. DOT, NEVI formula funds must first be used to "build out" designated AFCs (no more than 50 miles between stations and less than 1 mile from an exit) and meet U.S. DOT minimum standards and requirements.

The NEVI Grant pre-announcement resources include information about applicant eligibility, eligible projects, and eligible and ineligible costs. In addition, PennDOT has created an interactive map identifying existing AFC-qualifying stations and has grouped interchanges based on priority through a gap analysis. An outline of the potential scoring criteria is also included listed in order of priority. Interested businesses and organizations are encouraged to review the "How to Get Ready" section on PennDOT's website for recommendations on how to prepare for the upcoming grant opening.

NEVI stakeholder sessions are being held around the state. These sessions will include a presentation portion, followed by an opportunity to network, and expand professional connections and partnerships. Interested parties can register for a session of interest on PennDOT's "Learn About NEVI" webpage.

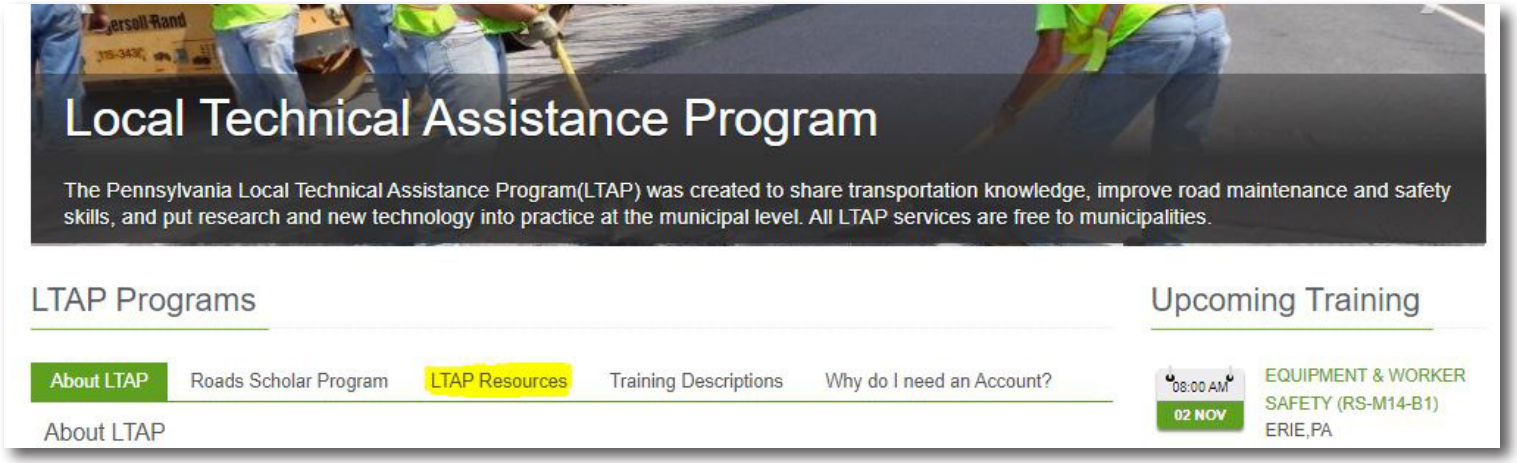
To enhance traveler information for the growing number of EV drivers, the state's traveler information system – 511PA.com – now also includes EV charging station locations as an option on its traffic map. Using data from the U.S. Department of Energy, the map shows locations across the state by connector type, including CCS, J1772, CHAdeMO, Tesla, and NEMA.

For more information on NEVI funds in Pennsylvania and to review PennDOT's pre-announcement resources, visit the PennDOT website (https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/NEVI.aspx).

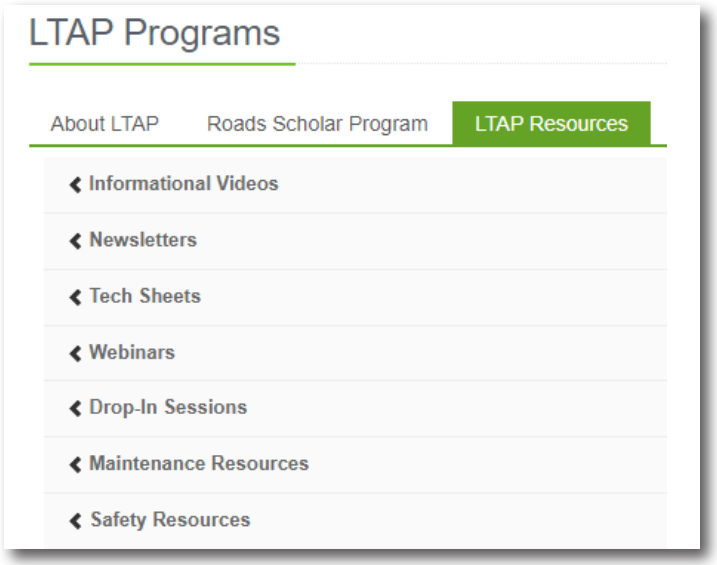


LTAP Website Resource Section

Have you been on the website looking for an article you remember reading on asphalt management, a tech sheet you saw a year ago on winter maintenance, a course on speeds that a peer recommended, or a drop-in you missed on traffic calming? The LTAP website has a new "LTAP Resources" tab on the website. It is being populated with links to the resources on the website by maintenance and safety topics. Now you can go to "curves" and see links to the resources on curves on the website in one place.



Go to the LTAP website at gis.penndot.gov/LTAP, select "LTAP Resources" and select Maintenance Resources or Safety Resources for a list of topics.



Under the topics are links to the resources available. These are the resources on Asset Management.

Drones: Help PennDOT Learn More about Current Applications and Needs for Local Roads

In order to learn more about current uses and anticipated needs for drone/Unmanned Aerial Systems (UAS) technology in municipal roadway maintenance and safety, please complete this brief survey: https://www.surveymonkey.com/r/MunicipalUAS.

Celebrating 10 Years of Innovation through Collaboration

Innovations Championed by State Transportation Innovation Council Translate into Better Services for Pennsylvania

A safety road countermeasure that dramatically cut fatal and injury crashes.

A more efficient and cost-effective way for local governments to replace bridges that expanded to include all of PennDOT.

A better approach to cutting intersection crashes and improving traffic flow at expressway interchanges.

Expanding knowledge about how to better address winter storms, saving time and money for local governments.

These are among the top success stories stemming from the 10-year history of the State Transportation Innovation Council (STIC) (https://www.penndot.pa.gov/about-us/StateTransportationInnovationCouncil/Pages/10th-Anniversary.aspx).

The key leaders at PennDOT and partner agencies who were responsible for these innovations recently were interviewed by Steve Chizmar, director of PennDOT's Bureau of Innovations, for a series of podcasts (https://www.penndot.pa.gov/about-us/StateTransportationInnovationCouncil/Pages/10th-Anniversary.aspx) celebrating the STIC's milestone.

"Innovation is extremely important," said Joe Szczur, P.E., the long-time district executive in PennDOT's Uniontown-based District 12. He now is director of the University of Pittsburgh's Center for Sustainable Transportation Infrastructure and also serves as a member of the STIC.

"If you are not innovating, you are falling behind," he added during the podcast interview.

Taxpayers are investing in a better transportation system, and the STIC helps provide "peace of mind that your tax dollars are being put to practice and being used very efficiently," he said.

Before the institution of the STIC, he added, it was questionable whether good ideas had a process to move forward. With STIC, there is a "forum that again encourages employees and gives them the confidence that they can bring up an idea." Giving it the formal presence the STIC does is the way advancements are being made, and our folks deserve the best, and that is what it's getting with the STIC," he said. "It's been great to be part of."

Szczur was joined on the podcast by his former District 12 colleague, Rachel Duda, P.E., assistant district executive for design. Both were instrumental in the adoption of the Diverging Diamond Interchanges (DDI) and roundabouts innovations, both part of the Federal Highway Administration's (FHWA) Every Day Counts Round 2 (EDC-2) Intersection and Interchange Geometrics innovation. The DDI installed along Interstate 70 in District 12 was the state's first. Two additional DDIs have been completed in PennDOT District 8 at the Shrewsbury interchange of Interstate 83 in York County (https://www.penndot.gov/RegionalOffices/district-8/ConstructionsProjectsAndRoadwork/Pages/I-83-Exit-4-Improvements.aspx), and the U.S. Route 222/U.S. Route 322 interchange in Lancaster County (https://www.penndot.gov/RegionalOffices/district-8/ConstructionsProjectsAndRoadwork/Pages/Route-322-222-Interchange-Improvement.aspx).

Duda, who also was leader of the STIC's Technical Advisory Group (TAG) for Design for the past three years, referenced the safety impact of the DDI innovation.

"Total crashes were down 46% the first year, and left-turn crashes were down 72%," she said. "And really what DDI does and what roundabouts do, they eliminate a lot of the conflict points. Eliminating conflict points makes it harder (for drivers) to make a bad decision."

This is a Diverging Diamond Interchange at the Interstate 70/U.S. Route 19 interchange in Washington County.

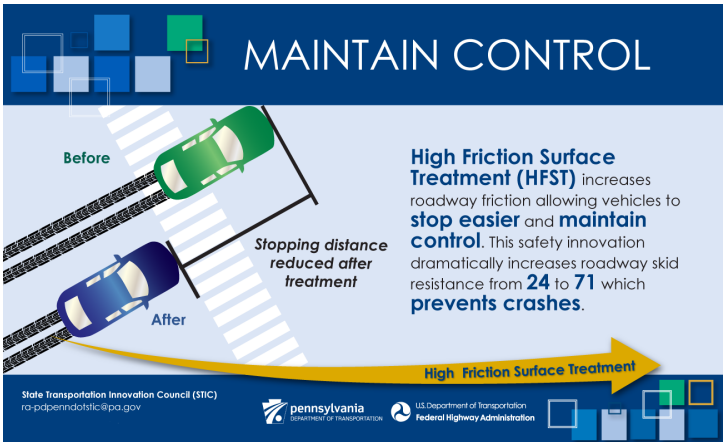
Among the DDI features are moving the crossroad traffic to the opposite side of the roadway at the on and off ramps to the interchange, which eliminates left turns across oncoming traffic. A roundabout flows traffic into a circular motion that eliminates the usual intersection cross traffic.

Duda said she had a great experience as the Design TAG Leader.

"Any time you bring an innovation to your TAG, you are sharing an idea that someone believes can save time, money or even lives," she said. "In reality, that is the main goal of PennDOT and the STIC."

Saving lives was the big impetus for the High Friction Surface Treatment (HFST) innovation. Joining the podcast were two PennDOT leaders who played a critical role in its advancement: Jason Hershock, manager of PennDOT's Safety Engineering and Risk Management Unit, and Neil Hood, safety engineer for PennDOT's District 9, based in Hollidaysburg.

"Lane departures in Pennsylvania are responsible for 50 to 54% of all fatal



HFST increases roadway friction allowing vehicles to stop easier.

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Celebrating 10 Years *continued from page 6*

crashes in the commonwealth, a pretty big number," Hershock said. Two-lane roads with curves make up about 10 to 15% of the state's roadway network, but account for over 50% of highway fatalities, he added.

Working through the STIC, PennDOT's District 5 in Allentown did a pilot with the first application of HFST on Route 611 in Northampton County. The process involved adding a layer of epoxy materials, such as bauxite and aggregates, on the top of the existing road surface, to increase friction. That helps prevent skidding, especially on wet pavements.

That stretch of Route 611 had 21 wet-road crashes in just one direction between 1997 and 2005, said Hershock, who worked in the district and played a key role in the deployment. Between 2007 and 2015, all crashes were eliminated because of HFST, he added. Similar results have been seen statewide.

"We found the HFST worked great and reduced not just certain crashes … it reduced all crash types. It was like the silver bullet of safety countermeasures," he said.

Hood said his district also applied HFST to intersections in addition to curves.

"We are seeing a benefit here as well," he noted. "We've had good success so far. We want to continue that."

Hershock noted how FHWA, the construction industry and all elements of PennDOT collaborated to make HFST work across the state.

"All of us had to work hard to develop good construction standards, quality specialized materials, and be willing to work with contractors and material suppliers to ensure a quality product," he said. "And it's made a big difference. We haven't had any major failures …"

The long-term failure of a small, locally-owned bridge in Huston Township, Clearfield County, opened the door to using Geosynthetic Reinforced Soil–Integrated Bridge Systems (GRS-IBS) in Pennsylvania.

GRS-IBS is a low-cost alternative for short-span structures that local work forces or district maintenance forces can construct using readily available materials and without expensive construction equipment. Using this technique, these bridges can be completed in weeks instead of months, with costs 25 to 60% less than conventional methods.

"It's one of the most satisfying achievements in my career at PennDOT," said Randy Albert, P.E., municipal services supervisor in PennDOT's District 2 based in Clearfield. He and Kristin Langer, P.E., assistant chief bridge engineer, joined the podcast to talk about the innovation, which was part of FHWA's EDC-1.

"Part of my job at PennDOT in helping local governments is finding solutions to local road and bridge problems," Albert said.

When trying to help the township deal with the long-term closure of one of its bridges, Albert remembered a FHWA presentation he had seen about GRS-IBS and proposed it to the township.

"There wasn't any influx of funding or big grants to get it started," Albert said. "There wasn't a big study group or research group in Pennsylvania implementing a pilot program or anything like that."

Albert pointed out to the township that the concept was experimental, and they couldn't use state funds.

"We discussed the things that FHWA promoted: ease of construction, the economy in building it, the quick turnaround time in getting the bridge open. And since they wanted the bridge opened as quickly as possible, they decided to move forward."

The project was so successful it generated widespread media coverage and garnered an innovation award from the Pennsylvania State Association of Township Supervisors (PSATS).

Langer then entered the picture and was instrumental in developing specifications, explaining the concept and its benefits to her PennDOT colleagues, and spreading the concept statewide.

"Specifically, they recognized the cost savings, the ease of construction, the speed of construction and everybody mentioned the elimination of the bump at the end of the bridge if constructed properly," Albert said. "That's really how it got started. It just started out to be a solution to a problem and took on a life of its own."

Langer said it was a challenge to get PennDOT district bridge engineers to buy into the concept.

"We overcame it basically the way we do most anything, by taking baby steps," she said.

Working with FHWA, Langer worked to get specifications into PennDOT publications and manuals, and staged showcases for engineers and contractors to explain the concept. In 2017 and 2018, FHWA STIC Incentive Program (https://www.penndot.pa.gov/about-us/StateTransportationInnovationCouncil/Pages/FHWA-STIC-Incentive-Funding.aspx) funding was awarded to underwrite extensive research that helped update the specifications for GRS-IBS bridges. Today, each PennDOT district has at least one GRS-IBS bridge, Langer said.

Looking ahead, GRS-IBS may be used for overpasses and to help deal with increased flooding impacts on bridges.

A GRS-IBS installation in Tioga County.

"We are starting to see and to be able to tout the benefits and tout the resiliency of those structures and carry that forward into the future to increase our resiliency on our bridges, especially in flooding situations," Langer said.

Aside from helping municipalities with bridges, a STIC innovation also provided salt and winter management training and support.

Sam Gregory, technical expert for the Local Technical Assistance Program (LTAP), and Karen Atkinson, program manager for PSATS, joined the podcast to talk about those efforts.

Atkinson noted that FHWA STIC Incentive Program funding, awarded in 2015, was the catalyst that helped accelerate development of the Salt and Snow Management Course.

"We always had a vision of developing this course, but with budgets, it's just

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Upcoming LTAP Training

Classes are being held in person and virtually. Check the website, **gis.penndot.gov/ltap**, for the latest listing. If you would like to receive email alerts about upcoming training, send a request to ltap@pa.gov. Here is a sampling of upcoming scheduled classes. ***All classes are free!***

Archived Training: Catch up online!

Recorded sessions and handouts from previously held drop-ins and webinars are available on the LTAP website, **gis.penndot.gov/ltap**. Sessions cover a variety of topics from asset management to truck restrictions. Check out the full list online and take advantage of this free training from the comfort of your home or office.

NEW! Course Handouts Are Now Online

Did you misplace a workbook or handout from a course? Do you wish you had the handouts in an electronic format? All the handouts from LTAP courses are now online and available for download. Go to **gis.penndot.gov/ltap** and under the Course Descriptions tab, click on the course and then scroll to the bottom of the course information to see a list of course handouts.

New Courses Available in the Summer of 2023

- Traffic Signals Basics
- Municipal Stormwater Facilities Program
- Stormwater Control Measures O&M
- Winter Maintenance Planning

Check the website for new courses or reach out to your Planning Partner or LTAP to schedule a class at your facility.

Congratulations to the following Roads Scholars!

The following scholars were certified between September 1 and October 31, 2022

Roads Scholar I:
- John P. Stine, Mount Joy Borough, Lancaster County

Roads Scholar II:
- Paul W. Twale, Elizabeth Township, Allegheny County

Roads Scholar Administrative:
- Scott A. Small, Conewago Township, Adams County
- Austin Erhard, Hempfield Township, Adams County

Roads Scholar Police:
- Michael Coughlin, Abington Township. Montgomery County

Roads Scholars, Share the News! LTAP has a press release you can modify and use to announce your accomplishment to your local media. To obtain a copy of the release, go to **gis.penndot.gov/ltap** and look for the release under "Roads Scholar Program."

Celebrating 10 Years *continued from page 7*

one-by-one … and it wasn't really high on the list," she said. "There were some other items we needed to take care of first. So, by having this funding, we were able to get this course out a lot sooner and help municipalities."

Gregory said one goal was to present national and PennDOT best practices to municipal staff.

"We provided the knowledge to the locals to increase their level of service while at the same time saving them materials, which related to obviously saving money," he said.

By helping with calibration of spreaders and other efficiency steps, the courses had an impact, Gregory said, adding, "They noticed the savings in materials, and it saved them a lot of time, and they could get onto some of their other roads quicker. ... and they brought it to the point where they could upgrade a couple of their trucks to do pre-wetting, and when I would go back a year later, they would be upgrading their entire fleet."

Gregory noted that the coursework has to stay current.

"Winter maintenance operations is one of the public works activities that is constantly evolving," he said. "So obviously, any new technology that has come about after the original course, we've had to make sure it was updated to include all those changes."

The STIC's focus on innovation and collaboration to reach success is important, Atkinson said.

"STIC is definitely making a difference, and my goal from LTAP is to reach out to municipalities and work with locals so a lot of my involvement is having my ears open and trying to determine what ideas can be applied on the local level and making sure through LTAP we are also promoting the STIC innovations. For me, it's been a great outlet to learn about things."

To listen to the full interviews, visit PennDOT's YouTube channel at https://www.youtube.com/pennsylvaniadot and click on the "Let's Talk STIC" playlist - an audio series in celebration of the STIC's 10th Anniversary.

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DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

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All LTAP services are free to municipalities.