pennsylvania
DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

# moving FORWARD

WINTER 2019

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

## GRS Technology Helps Municipalities Replace Failing Bridges Quickly and Affordably

by Jason A. Snyder, PE, F.ASCE, Maintenance Engineer, LTAP

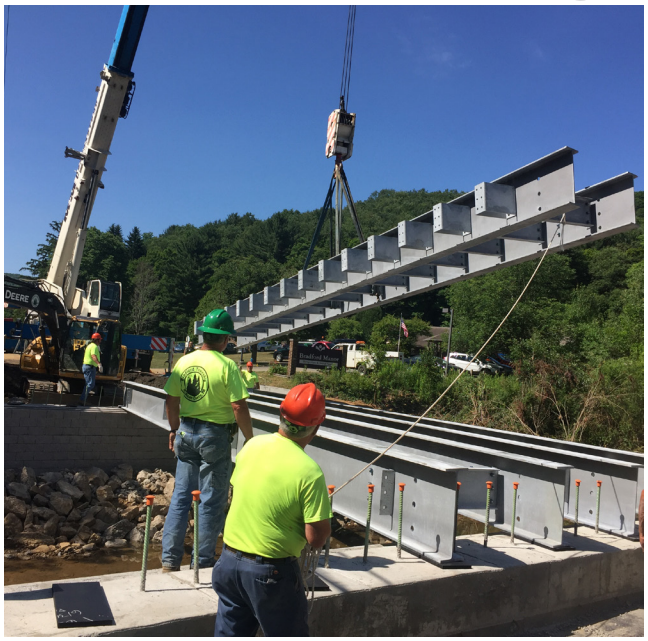

PHOTO OF LANGMAID LANE BRIDGE IN BRADFORD TWP., MCKEAN CO.

Municipalities across the state appreciate how they can use their own staff to quickly and cost effectively replace structurally deficient bridges with GRS technology.

Municipalities in Pennsylvania must maintain tens of thousands of miles of road, culverts, and bridges with limited financial resources and staff. Many have turned to alternate construction practices, funding, and labor sources to help with their infrastructure needs.

Geosynthetic reinforced soil (GRS) technology is an innovative, cost-effective alternative for replacing structurally deficient bridges. It uses walls built of layers of compacted stone and fabric sheets of geotextile reinforcement to take the place of traditional concrete bridge abutments. GRS bridges can be constructed in a short time period using part-time labor with limited construction knowledge or skills. Requiring less manpower, equipment, and materials, the process can reduce the cost of small-bridge construction by 25 to 60 percent.

Since PennDOT has adopted GRS technology, Liquid Fuels money and other state funds can now be used to build GRS bridges, rather than being solely funded by the municipality. PennDOT will also work with municipal forces to provide technical assistance and guidance during design review and/or construction, if requested.

> GRS bridges are proving to be a popular, cost-effective way for municipalities to replace failing structures.

More than 30 GRS bridges have been constructed across Pennsylvania, and more are in the works. Let's look at how a few municipalities in Pennsylvania have turned to GRS as a cost-effective way to replace their aging or deficient bridges.

### North Hopewell Twp., York Co.

The Huson Road bridge was North Hopewell's first GRS bridge project — and the state's second — in 2012. The township used its own road crew and general fund monies to replace the single-lane bridge, which spans 21 feet over an unnamed tributary of the Muddy Creek, for around $135,000. Construction took four weeks.

Since that time, the township has found GRS bridges to be a cost-effective solution for replacing failing structures over 20 feet in length. The bridges are easy to construct in a short timeframe using township staff with some help from college interns and prison labor. Over the years, the township has successfully partnered with York County's

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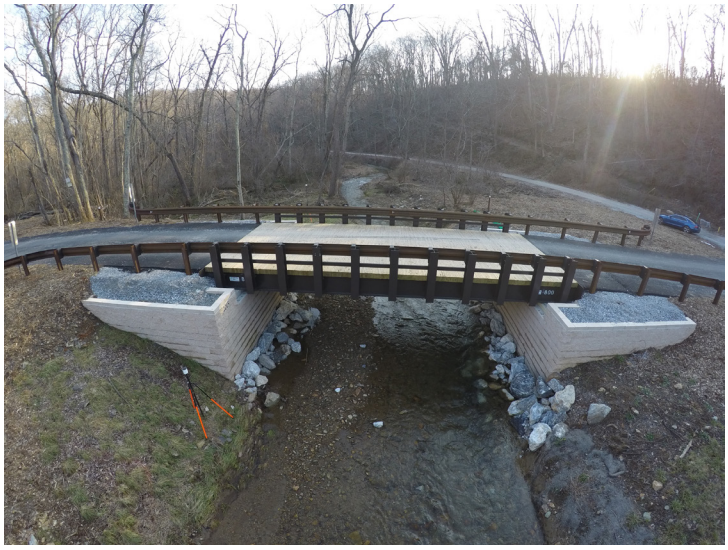
**ALSO IN THIS ISSUE**

**GRS Technology** *continued from page 1*

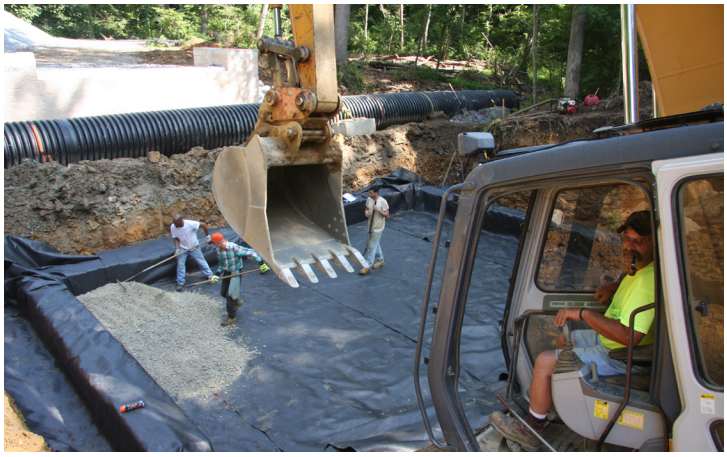
commissioners and conservation district to secure funding assistance and construct a few GRS bridges, including the Cherry Street bridge, which provides access to a popular county park, after it was destroyed in 2015 by a high-water event.

With help from its county partners, the township built a 28-foot-long replacement in just under six weeks at a cost of $185,000. The project included enlarging the bridge opening to "bank full width" to accommodate nearly twice the flood volume and reduce the potential for future damage to the structure. When two large flood events hit the township in September 2018, the bridge survived with no damage or scour while three adjacent large bridges and culverts were heavily damaged or destroyed.



Cherry Street bridge in North Hopewell Township.

In 2016, North Hopewell also constructed the Blymire Hollow bridge, a single-lane, 25-foot span, with GRS technology. For this project, the township upgraded the superstructure to a galvanized and bolted structure to reduce future maintenance costs and used a tan substructure and painted facia beam for a more aesthetic appearance. This project was completed within six weeks at a cost of $205,000 by two full-time and two part-time employees and two inmates on loan from the county.



Blymire Hollow bridge under construction in North Hopewell Township.

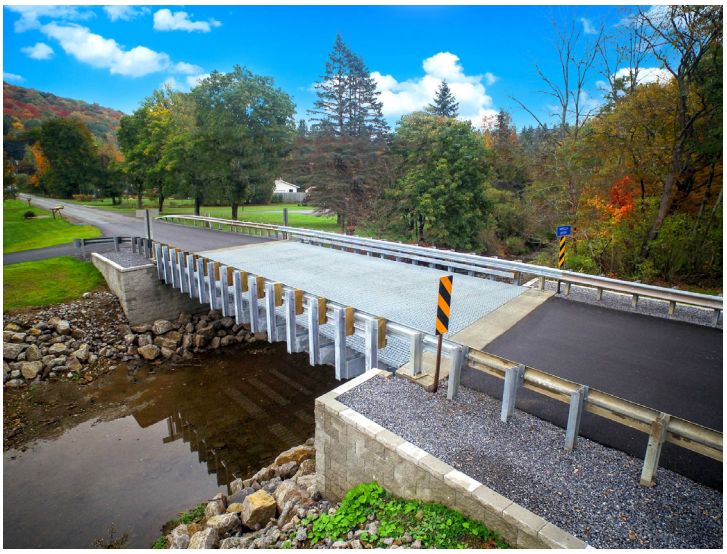
## Bradford Twp., McKean Co.

Several years ago, weight restrictions on the failing Langmaid Lane bridge in Bradford Township prevented emergency vehicles from quickly accessing a nearby elder care facility. With an estimated price tag of more than $1 million to construct a conventional bridge replacement, the township began to explore GRS as an affordable alternative.

In 2016, Bradford Township's five-member road department constructed a two-lane, 52-foot-span GRS structure for $562,000, nearly half what a conventional bridge would have cost. The township reduced construction time using a prefabricated superstructure, and the project was completed in just over six weeks. Financial assistance came from the county's Act 13 funding and PennDOT's retro-reimbursement bridge program, in which the township received 80% reimbursement for building the bridge to agency standards.

On the heels of this success came the replacement of the Sleepy Hollow bridge immediately upstream. This structure, which was in extremely poor condition, restricted the flow of Marilla Brook and served as the only access to approximately 13 homes.

Construction on this GRS bridge began in 2018. The new structure was widened from one lane to two and moved 100 feet south to align with the intersection across the street. The township worked with the community to provide a more aesthetically appealing bridge more in line with the previous structure's covered-bridge appearance. The replacement bridge was built with galvanized and weathering steel and a nail-laminated wood deck to provide a more rustic appearance.

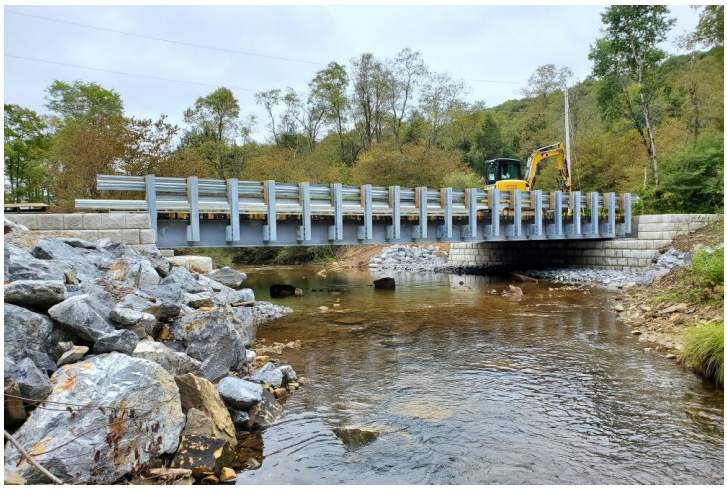


Langmaid Lane bridge in Bradford Township.

## Jones Twp., Elk Co.

When Bradford Township was constructing its GRS bridge, nearby Jones Township loaned several employees to help on the project, partly to be neighborly and partly to receive "on-the-job training," which would come in handy when Jones Township built its Twin Lakes bridge over Wilson Run.

The old bridge was in extremely poor condition, and the township obtained a Pennsylvania Multimodal Grant to fund its replacement. With help from Bradford Township, Jones constructed the Twin Lakes bridge in about eight weeks. The new bridge eliminated the load posting and the center pier, which allowed for better stream hydraulics, and used a prefabricated completely galvanized superstructure.



Twin Lakes bridge in Jones Township.

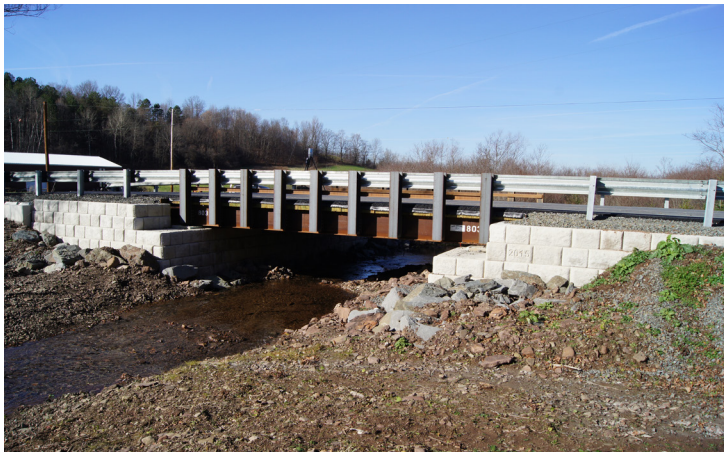
## Sullivan Twp., Tioga Co.

After experiencing traffic growth due to the oil and gas industry, Sullivan Township quickly realized that certain roads and bridges had to be upgraded to accommodate larger, heavier vehicles.

The first bridge to receive GRS technology was Ensminger Road bridge, which dated back to the 1920s and whose width and weight limits were restricting oil and gas exploration. Using its own workforce with help from two college interns, the township replaced the bridge for $275,000 in about four weeks. The new bridge is designed to accommodate the heaviest drilling traffic up to 80 tons.

Following this success, Sullivan Township set its sights on the Bungy Road bridge, whose odd geometry had long been a thorn in the township's side. Large farm machinery and traffic from a nearby heavy truck repair facility were granted limited access to the structurally deficient bridge. Adding to the complexity of the site, the state owned and maintained the narrow structure, which was not scheduled for replacement.

Through "turnback" negotiations, the township was able to accept ownership and funding for the structure. After demolition of the old bridge in 2018, the township crew with the assistance of some supplemental labor and a contract excavator constructed a new GRS bridge, which opened to traffic in January 2019. The latest rendition is wider and accommodates larger and heavier vehicles while also allowing for additional hydraulic capacity of an unnamed tributary to Elk Run.



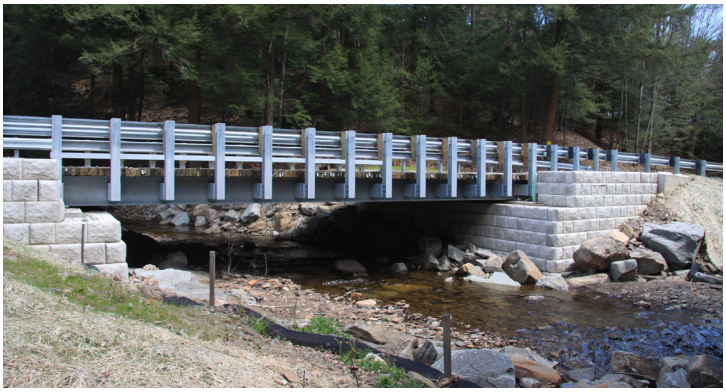
Ensminger Road bridge in Sullivan Township.

Since PennDOT has adopted GRS technology, Liquid Fuels money and other state funds can now be used to build GRS bridges.

## Liberty Twp., Tioga Co.

Elsewhere in Tioga County, the county's conservation district worked with the Liberty Township supervisors to replace two bridges on Salt Springs Road. Both were built with railroad tank cars installed after the previous bridges were destroyed during Hurricane Agnes in July 1972. Not only were the tank cars in poor condition, severely rusted and beginning to distort, but they were causing substantial obstruction to the stream's aquatic life.

After receiving bids exceeding $1.1 million to replace the bridges, the board of supervisors sought a cost-effective solution that would allow the new bridges to be installed without a significant labor commitment from the township's two employees, who were committed to other projects. The 12-week GRS project was completed by a seven-member labor force that included four college students with no construction experience and funded with general fund dollars, dirt and gravel/low-volume monies, and National Fish and Wildlife Foundation fund grants. The project also successfully reconnected Salt Springs Run, allowing trout to migrate back up the stream.



Salt Springs Road bridge in Liberty Township.

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GRS bridges are proving to be a popular, cost-effective way for municipalities to replace failing structures and for good reason. They can be built in varying heights and lengths (currently up to 70-foot spans) using a variety of superstructure materials from wood to concrete to steel. The technology also easily lends itself to municipalities employing their own forces and resources in the bridge construction, which helps to save municipalities money.

PennDOT recently received funding from the Federal Highway Administration to expand the use of GRS technology for longer spans and higher stream velocities. Once approved, this expansion will translate into more locations where municipalities could use GRS technology to create safer, sturdier, and more affordable bridges.

To learn more about GRS bridges, contact LTAP or your PennDOT district office or search "GRS-IBS bridges" on the internet.

PennDOT Connects
Planning with our communities

# How the PennDOT Secretary Is Shifting the Infrastructure Conversation in Pennsylvania and Across the Country

***Secretary Leslie Richards is trying to re-engineer the engineering process by making community engagement a top priority.***

by Daniel C. Vock, *GOVERNING* magazine

**EDITOR'S NOTE:** This is an edited, shortened version of an interview with Richards that ran in the August "Infrastructure" newsletter of GOVERNING. To read the full interview, go to governing.com/topics/transportation-infrastructure/gov-Pennsylvania-transportation-director-interview.html.

In just four-and-a-half years as the secretary of the Pennsylvania Department of Transportation, Leslie Richards has seen a lot of changes in the transportation industry.

When she started her job, she was the only woman in a high-ranking position at PennDOT and one of only four women who led a state DOT nationwide. Now she has numerous female colleagues within her agency and across the country.

Richards also had to convince her colleagues and her employees to think differently about solving transportation problems. For years, PennDOT, like many state transportation departments, was dominated by engineers, and those engineers focused on how to move vehicles on highways. Richards, who has a master's degree in regional planning, encouraged her agency's workers to talk with local leaders before ever sketching out a new road configuration or bridge design. That's the underlying idea behind her program, called PennDOT Connects, which the agency now uses in its planning processes. Richards has also promoted a more diverse workforce to generate more creative solutions to transportation problems.

Nationally, Richards has pushed the transportation industry to better accommodate pedestrians and cyclists, and it has responded positively. She now chairs the newly formed Active Transportation Council of the American Association of State Highway and Transportation Officials (AASHTO), which sets national standards for how roads are designed, how they're built, and what they're made of. Richards, among others, pushed for changes in the group's structure that will give pedestrian and cyclist experts equal footing with highway experts in drafting those national design and safety standards.

**Q: PennDOT used to be an agency driven by engineers, but you're a planner and you've advocated a different approach to building projects. Do you see the same shift happening at other DOTs?**

It's slow, but I do see a shift. I see more and more departments of transportation understanding that what they do impacts people's quality of life and taking that responsibility seriously. Where before it may have just been an afterthought or an added benefit, I think now it's part of all of our responsibilities.

Through PennDOT Connects, we're having early conversations with our communities. We're understanding what our asset means to them. We want them to see it as an investment. Every dollar we spend on a PennDOT transportation project is an investment in their community, and we want that to tie into their vision of the future.

Because we're having those conversations early on, it's allowing us to impact the design process. It's allowing us to incorporate different elements. For instance, we're able to help counties build trails alongside our asset, because now we know about it. We can build a retaining wall where we were planning just to build a safety wall, and, by building the retaining wall, the county then can come in and build the multiuse trail parallel to this bridge that we're building years ahead of schedule.

We're able to have conversations with communities and see how people walk around. We think we know how students get to school because there are crosswalks and sidewalks, but students cut through parking lots, they cut through backyards, and they pop up in areas that you're not always planning for them to be in. That's really important for us to know, so that we can make sure those areas are well-lit and as safe as possible.

Through PennDOT Connects, we're having early conversations with our communities.

**Q: Does the change in approach help PennDOT with its relationships with counties and municipalities?**

Absolutely. While I knew that PennDOT Connects would be beneficial in many ways, I did not fully understand how our relationships with our local communities and our local stakeholders would be strengthened.

We're seeing a lot of improvement in how we're received by our communities. Even when we've had our assets damaged by flooding, [local communities] would be defensive or antagonistic. Now they know how hard we work to maintain these assets. They know who to call to coordinate safety. They know how to call the maintenance crews to see what's being done. The flow of information is better than ever.

We're seeing a lot of improvement in our utility coordination, too. Because we're having these conversations earlier and having everybody around the table earlier, we're seeing what improvements they have planned for their water system or their electric system, where their pipes are being dug out, and what their public works departments are planning. We can see how we can work alongside them when we get the construction phase and how we can shorten those timeframes and projects.

# Transportation News Briefs

LATEST INFORMATION FROM PENNDOT & OTHERS

## Winter Maintenance Videos Can Help Train Staff

The Iowa Department of Transportation has released an updated operator training video series on YouTube. The new series is broken into 13 videos covering about an hour and a half of topics, such as plowing technique, preseason prep, mounting plows, and deicing chemicals.

Take advantage of a rainy day to view the free videos with your winter maintenance team. The videos can be accessed at www.youtube.com/playlist?list=PLurY2WfsVWKn9ismDC4Uz3IbRivAnf0Ld.

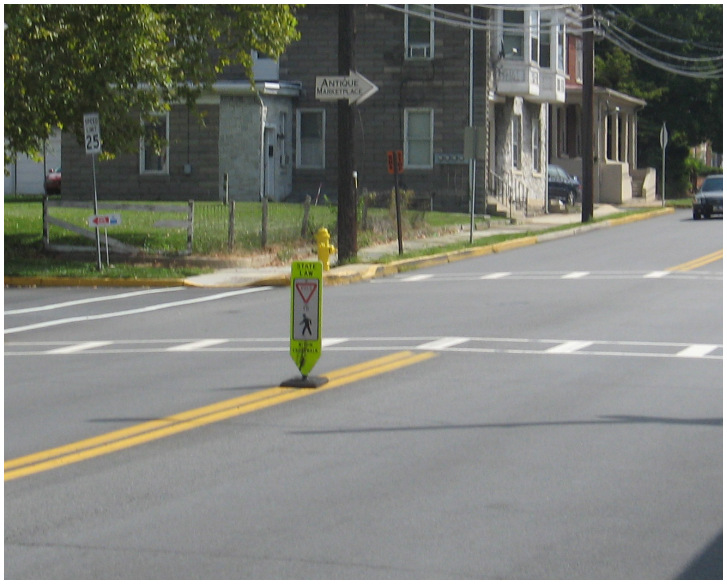
## Pedestrian Warning Signs Used on Low-Speed Roads

In-street pedestrian crossing signs (R1-6) alert motorists to pedestrian crossings in marked crosswalks at intersections without any signals. Their use is governed in PennDOT Publication 236, *Handbook of Approved Signs*.

The sign should be placed on the centerline, lane line, or median island within 50 feet of a crosswalk to remind motorists to obey state law and yield to pedestrians in those crosswalks. These devices should not be used on roads where the speed limit is greater than 35 mph or the clear width of the road is less than 20 feet. They should also not be used in locations where the sign would adversely affect the turning radius of motor vehicles.

PennDOT uses Publication 236 and Appendix B of Publication 638, *District Highway Safety Guidance Manual*, to prioritize requests for these signs based on locations where the crossing distance may be longer, a review of historical crash data, and current placement of signage in the area.

Municipalities are responsible for local enforcement of the signs to ensure motorists yield to pedestrians. Contact LTAP for more information about the use of these signs.




This warning sign along Third Street in Lemoyne Borough, Cumberland County, alerts motorists to a pedestrian crossing.

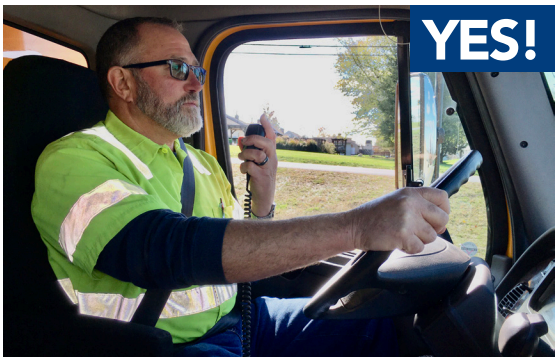
## Remember, No Texting While Driving!

Municipalities should remind their drivers and operators that they may not use a mobile phone to send, read, or write a text or email while operating a commercial motor vehicle, under Section 1621 of the Vehicle Code.

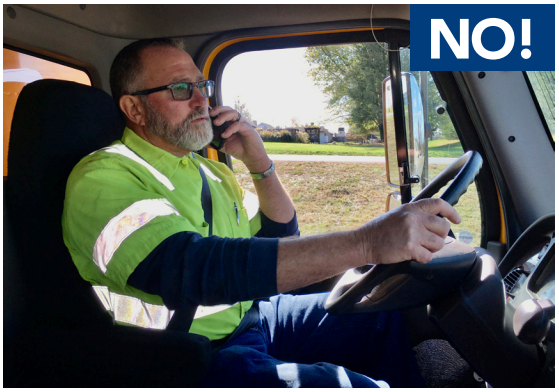
Texting does *not* include the following:

- Inputting, selecting, or reading information on a global positioning system or navigation system.
- Pressing a single button to initiate or terminate a voice communication using a mobile telephone.
- Using a device capable of performing multiple functions, including but not limited to fleet management systems, dispatching devices, citizens' band radios, and music players, if the purpose is not prohibited by the code.

Mobile phone use by operators of commercial vehicles is governed by Section 1622 of the Vehicle Code. While drivers are permitted to use two-way or citizens' band radios while operating a commercial vehicle, they may not hold a mobile phone to talk. A driver may talk on a mobile phone only if it is in the hands-free mode and it takes just one touch to answer or hang up. Furthermore, a driver cannot reach for a mobile phone if it requires removing the seatbelt or no longer being in a seated driving position.




A commercial vehicle operator can use a two-way or CB radio to talk while driving.




A driver cannot hold a mobile phone to talk while operating a commercial motor vehicle.

*Continued on page 6*

# Become trained as a Roads Scholar… and be a valuable part of your municipality's team

Through the Roads Scholar Program, municipal employees and officials are trained by LTAP's professional team in the latest road-related technologies and innovations and receive recognition as a certified Roads Scholar.

The Roads Scholar Program consists of two designations—Roads Scholar I and Roads Scholar II—and provides a professional certification to municipal employees and officials who attend a certain number of LTAP courses within a three-year period (10 courses for Roads Scholar I and 8 for Roads Scholar II). During these courses, participants are educated on up-to-date maintenance and safety topics so that they become even more valuable members of their municipal team.

Courses eligible for Roads Scholar credit are conducted at convenient locations throughout the commonwealth. To learn more, go to gis.penndot.gov/ltap and click on "Roads Scholar Program."

**Congratulations to the following Roads Scholar I recipients**
*(Certified between August 1 and October 31, 2019)*

- Chad Yohe, East Pennsboro Twp., Cumberland Co.
- Zach Patton, Scottdale Boro., Westmoreland Co.

**Congratulations to the following Roads Scholar II recipients**
*(Certified between August 1 and October 31, 2019)*

- Eric M. George, Penn Forest Twp., Carbon Co.
- Shane P. Kinsey, London Grove Twp., Chester Co.
- Mike Tome, London Grove Twp., Chester Co.
- William McIntosh, Luzerne Boro., Luzerne Co.
- Steve Herman, Lewisburg Boro., Union Co.

**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."

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**Transportation News Briefs** *continued from page 5*

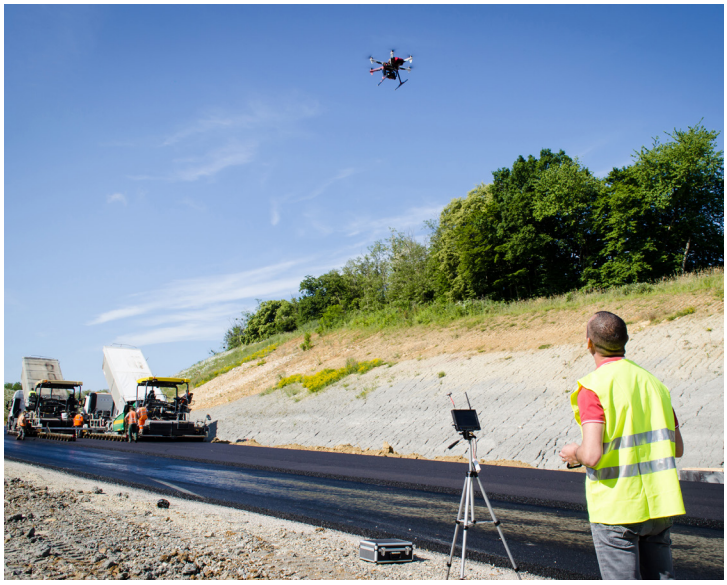
## Drones Prove Popular for Improving Transportation Systems

Unmanned aerial systems, or drones, have become a useful and popular tool for improving transportation systems across the nation, including in Pennsylvania. The multi-use aircraft, which is controlled by licensed operators on the ground, enhances safety and productivity at lower costs and provides quality data that allows for better-informed decision making.

These eyes-in-the-sky increase accuracy, speed up data collection, and provide access to hard-to-reach locations. Drones allow high-quality survey and data mapping to be collected automatically and remotely, replacing boots on the ground and keeping workers out of harm's way. For example, inspecting a bridge traditionally requires setting up temporary work zones, detouring traffic, and using special access equipment or even climbing. Using a drone instead speeds up data collection while reducing risk to work crews and motorists.

Uses of drones in transportation include surveying emergencies, assessing and responding to traffic incidents, and inspecting bridges and road construction. The ability to routinely and consistently map terrain and monitor conditions allows problem areas to be addressed before an emergency occurs, both saving lives and reducing asset maintenance costs.

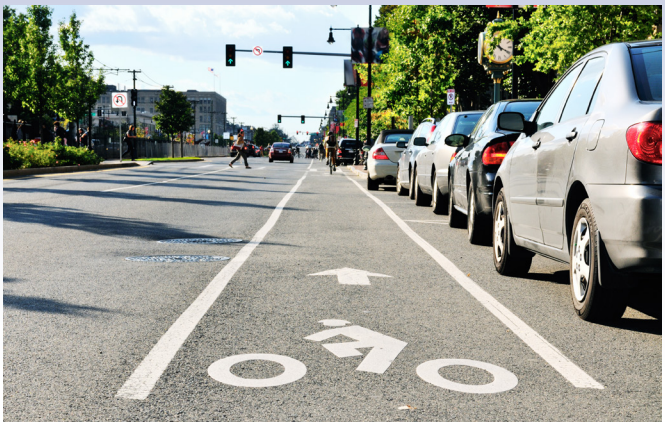
More information about drones can be found on the Federal Highway Administration's website, www.fhwa.dot.gov/uas.



Drones collect important data for improving transportation systems.

## Did you know…?

**Municipalities may use Liquid Fuels funds to install bike lanes and markings on their roads.**



# Show Off Your Road Crew's Innovative Gadgets and Ideas

## Build a Better Mousetrap contest: 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 2020 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.

The contest has 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:

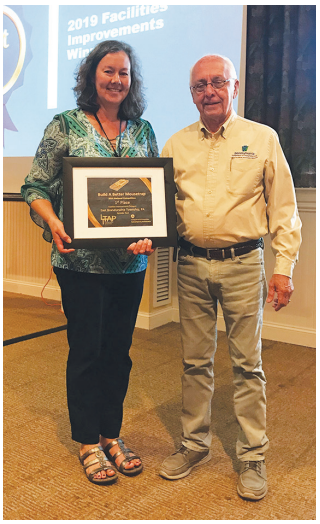
1) Inspection and data collection (automated/remote means, testing, time, etc.)
2) Asset management techniques (GIS, mapping, decision support systems, etc.)
3) Maintenance tools and methods (lifters, reachers, modifications, assembly, etc.)
4) Transportation facilities improvements (storage, access,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

If you have a project that qualifies under one of these categories, submit your entry by March 6, 2020. 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 for each category will be submitted into the national competition. 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 2020 Build a Better Mousetrap Competition may be downloaded at gis.penndot.gov/ltap; click on "Bulletin Board." Complete the entry form and return it by March 6 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.

## If your township submitted an entry in a prior year of the contest but didn't win, consider entering it again in 2020.



### Township Receives First Place at National Level

East Brandywine Township in Chester County, the 2019 winner of PennDOT's Build a Better Mousetrap Contest, took highest honors in the "transportation facilities improvements" category at the national level of the competition. The township road department's creation, a portable storage rack for salt spreaders, was awarded the top prize in August at the annual LTAP/TTAP national conference in Stowe, Vt., where Karen Atkinson of PSATS (left) and Lou Ferretti of PennDOT accepted the award.

## Need ideas for what to enter?

Check out these innovative winning entries from the past two years:

**2019 Winner:** Spreader rack, East Brandywine Township, Chester County

**2019 Runner-up:** Inlet grate puller, City of Easton, Northampton County

**2019 Runner-up:** Polish paver, City of Williamsport, Lycoming County

**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

# UPCOMING 2020 TRAINING

**The 2020 LTAP classes are being scheduled; please check the LTAP website, gis.penndot.gov/ltap, for classes in your area.**

## Check Out These New Courses for 2020

The Local Technical Assistance Program (LTAP) is offering three new courses in 2020. Check the website for a class in your area or contact LTAP if you are interested in scheduling one in your municipality.

### Active Transportation

More municipalities are encouraging active transportation, such as walking and cycling, to enhance their community and foster healthy lifestyles. This course reviews the latest research and guidelines for nonmotorized transportation and examines the basic design standards for facilities, such as bicycle paths, sidewalks, trails, and greenways. It also explores how to develop an active transportation plan and highlights successful examples of local plans, practices, and policies in Pennsylvania.

### Pedestrians and Crosswalks

This course explores safety data, mobility characteristics, and behaviors for pedestrians and examines federal and state guidelines for sidewalks, crosswalks, and other pedestrian features. During workshop activities, participants are encouraged to improve pedestrian safety, support walking activities in communities, determine when and how to mark crosswalks, improve the visibility of pedestrian facilities, and make physical road improvements to enhance safety.

### Introduction to Traffic Studies

This course provides information on basic engineering and traffic studies that must be conducted before erecting signs on municipal roads. Content includes reviewing applicable laws, ordinances, regulations, and required study procedures for establishing, revising, and removing traffic restrictions, as presented in PennDOT Publication 212, *Official Traffic Control Devices*. Participants also complete exercises in which they perform common engineering and traffic studies using real data.

# Upcoming 2020 Webinars

Each of the following LTAP webinars will be repeated on two consecutive days. Registration is free and will open 30 days prior to the webinar; email notifications will be sent. Register at gis.penndot.gov/ltap (under "Webinars"). If you have not been receiving email notifications about webinar registrations, email ltap@psats.org and provide your name, municipality, county, and email address to be added to the list.

- **Principles of Paving** Spring (April 23 or 24), Noon
- **Roadside Safety Features** Summer (July 9 or 10), Noon
- **ABC's of Asset Management** Fall (date TBD), Noon
- **Emergency Preparedness** Winter (date TBD), Noon

## Missed one of LTAP webinars? Catch up online!

Previously recorded webinars are available on the LTAP website, gis.penndot.gov/ltap (under "Webinars"). The following titles can be viewed there:

- ADA Transition Plans
- Curves on Local Roads: Issues and Safety Tools
- Crosswalks
- GRS Bridges
- Municipal Bidding
- PennDOT Pennsylvania Crash Information Tool
- Speed Limits on Local Roads
- Stop Signs and Intersection Traffic Control
- Truck Restrictions

# Mark Your 2020 Calendars!

## Road Maintenance and Safety Symposium

***May 3-5***

**Hershey Lodge**

***Hosted by LTAP and PSATS***

## Roadway Management Conference

***October 26-28***

**Charlottesville, Va.**

***Hosted by the LTAP and T2 Centers of the Mid-Atlantic region – PA, MD, VA, WV, and DE***

**WATCH FOR MORE INFORMATION TO COME OUT IN 2020.**

pennsylvania
DEPARTMENT OF TRANSPORTATION
LOCAL TECHNICAL ASSISTANCE PROGRAM

**LTAP Contact Information:**
400 North Street, 6th Floor, Harrisburg, PA 17120 • 1-800-FOR-LTAP (367-5827)
Fax: (717) 783-9152 Email: ltap@pa.gov Web: gis.penndot.gov/ltap